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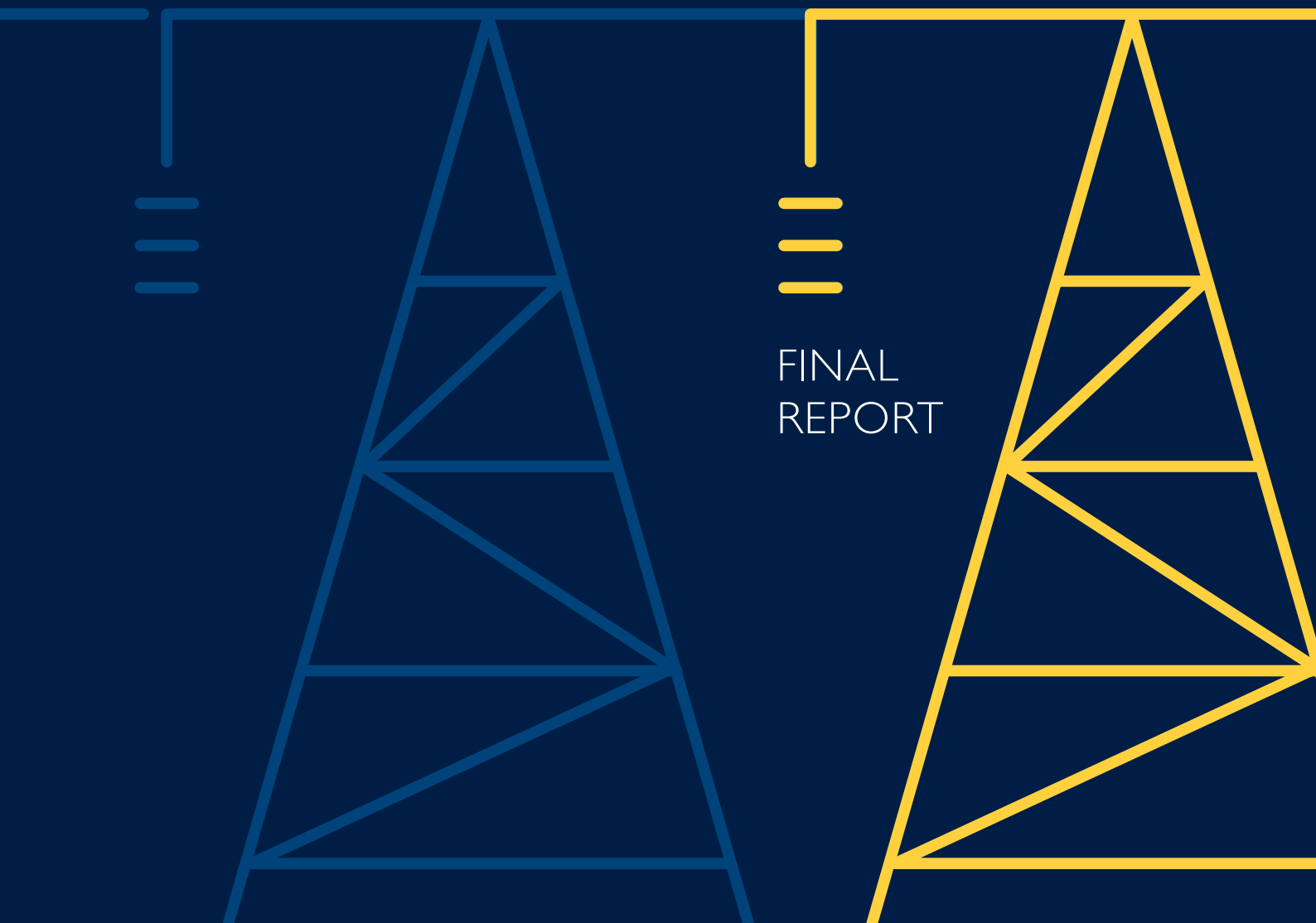
POWER AFRICA
A U.S. GOVERNMENT-LED PARTNERSHIP

POWER AFRICA TRANSACTIONS AND REFORMS PROGRAM



FINAL REPORT

POWER AFRICA
TRANSACTIONS AND REFORMS PROGRAM

FINAL REPORT
DECEMBER 2019

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CONTRACT NUMBER: AID-623-C-14-00003
MAY 23, 2014 TO NOVEMBER 23, 2019

Photo by Ryan Kilpatrick

CONTENTS

1. EXECUTIVE SUMMARY

Launched in 2013, Power Africa is a U.S. Government-led partnership, coordinated by the United States Agency for International Development (USAID), that brings together the collective resources of over 170 public and private sector partners to double access to electricity in sub-Saharan Africa. Power Africa's goal is to add more than 30,000 megawatts (MW) of new electricity generation capacity and connect 60 million new homes and businesses to power by 2030.

In 2014, USAID selected Tetra Tech to lead the Power Africa Transactions and Reforms Program (PATRP), a five-year contract to provide technical assistance, capacity-building, and transaction advisory services across the continent.

This final report details PATRP's activities during contract implementation (May 2014 to November 2019), which included transaction advisory support for power generation projects, assistance to off-grid electrification efforts, energy sector policy and regulatory support to African governments, and a range of other work streams designed to achieve Power Africa's goals.

OUR GOALS

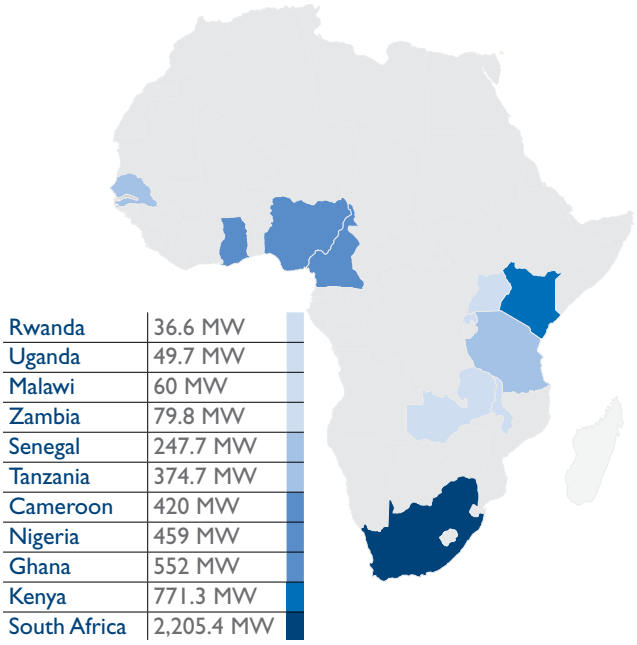
PATRP's key targets mirrored Power Africa's overarching goals, and centered on:

- **Adding power generation capacity** by bringing late-stage transactions to financial close, as well as building a pipeline of power generation projects at all stages of development;
- **Increasing electricity connections for homes and businesses** through support to transmission, distribution, and off-grid companies; and
- **Improving the enabling environment** in partner countries to facilitate private sector engagement.

ADDING POWER GENERATION CAPACITY

To help Power Africa reach its 30,000 MW goal, PATRP engaged experienced transaction advisors to identify and advance promising power generation projects across the continent. PATRP's life-of-project targets were to achieve 6,421 MW of financially closed generation capacity, in addition to an ambitious pipeline of 32,120 MW of projects (i.e. pending financial close). Over the course of the contract, **PATRP facilitated the financial close of 5,263 MW of power generation projects, of which 1,487 MW have been commissioned and are providing critical electricity supply across the continent**.

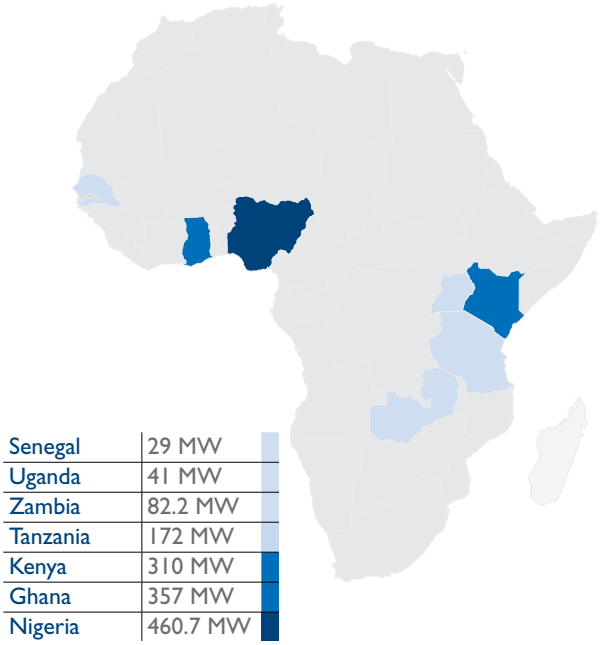
EXHIBIT 1
PATRP FINANCIALLY CLOSED TRANSACTIONS BY COUNTRY



Rwanda	36.6 MW
Uganda	49.7 MW
Malawi	60 MW
Zambia	79.8 MW
Senegal	247.7 MW
Tanzania	374.7 MW
Cameroon	420 MW
Nigeria	459 MW
Ghana	552 MW
Kenya	771.3 MW
South Africa	2,205.4 MW

0-200 MW · 201-400 MW · 401-600 MW · 601-800 MW · 800+ MW

EXHIBIT 2
PATRP COMMISSIONED TRANSACTIONS BY COUNTRY



Senegal	29 MW
Uganda	41 MW
Zambia	82.2 MW
Tanzania	172 MW
Kenya	310 MW
Ghana	357 MW
Nigeria	460.7 MW

0-200 MW · 201-400 MW · 401-600 MW

PATRP also secured a pipeline of more than 250 active Power Africa transactions at various stages, representing nearly 33,000 MW of potential generation capacity. These transactions are monitored by the web-based Power Africa Tracking Tool (PATT), developed by PATRP, which allows Power Africa and its stakeholders to track transactions as they progress toward financial close and commercial operation.

The PATRP pipeline increased significantly year by year, from under 10,000 MW at inception, to nearly 33,000 MW at the end of the contract.

EXHIBIT 3
PATRP ADDITIONS TO THE PROJECT PIPELINE BY YEAR (MW)

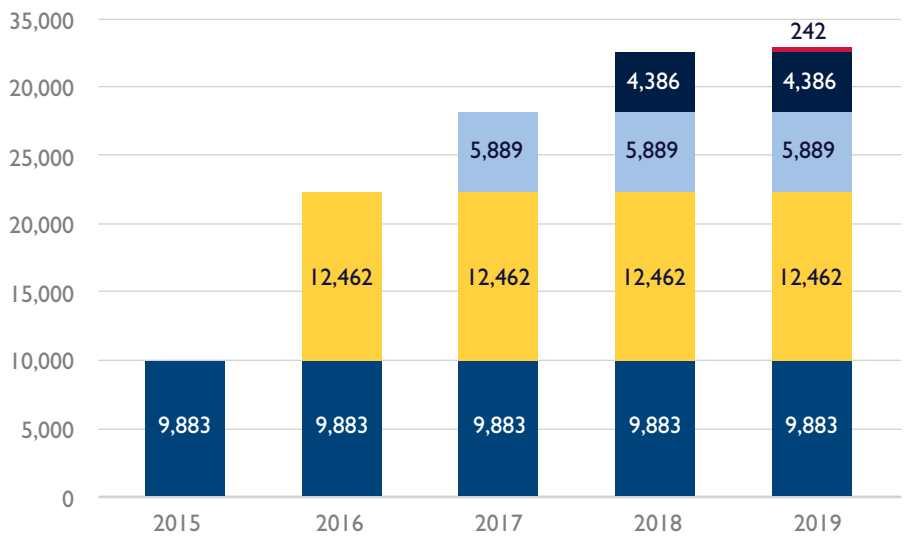
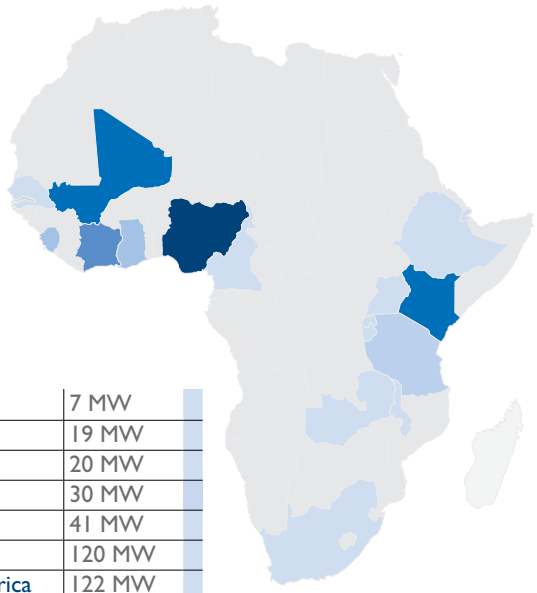


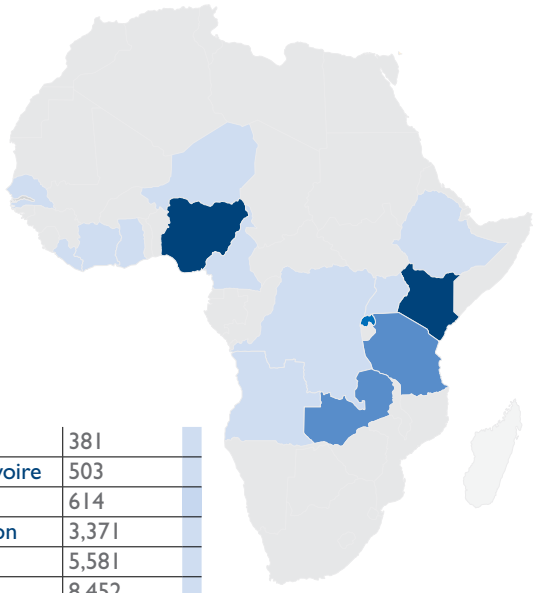
EXHIBIT 4
PATRP LATE-STAGE TRANSACTIONS (PENDING FINANCIAL CLOSE) BY COUNTRY



Uganda	7 MW
Burundi	19 MW
Ethiopia	20 MW
Djibouti	30 MW
Malawi	41 MW
Senegal	120 MW
South Africa	122 MW
Rwanda	145 MW
Tanzania	147 MW
Zambia	180 MW
Ghana	222 MW
Sierra Leone	224 MW
Côte d'Ivoire	390 MW
Kenya	491 MW
Mali	500 MW
Nigeria	1,715 MW

0-200 MW
201-400 MW
401-600 MW
601-800 MW
800+ MW

EXHIBIT 5
PATRP CONNECTIONS BY COUNTRY



Angola	381
Côte d'Ivoire	503
Niger	614
Cameroon	3,371
Liberia	5,581
Ghana	8,452
DRC	11,443
Ethiopia	14,682
Senegal	24,845
Tanzania	55,451
Zambia	85,964
Uganda	97,361
Rwanda	116,337
Kenya	559,826
Nigeria	694,596

0-50,000
50,001-100,000
100,001-200,000
200,000+

INCREASING ELECTRICITY CONNECTIONS FOR HOMES AND BUSINESSES

For the millions of people in sub-Saharan Africa who lack access to reliable electricity, new power generation projects are only part of the solution. Power Africa also aimed to increase access to electricity by adding 60 million new connections to homes and businesses. PATRP's share of this goal was 907,000 new connections, through a combination of support to electricity distribution companies and support to off-grid electricity companies. In the end, **PATRP added more than 1.7 million new on-and off-grid electricity connections across the continent**, significantly surpassing contract targets.

Exhibit 5 highlights the locations of PATRP's on-grid and off-grid connections results.

IMPROVING THE ENABLING ENVIRONMENT

To create the conditions for private sector engagement and investment in sub-Saharan Africa's energy sector, Power Africa promoted policy and regulatory reforms in partner countries, strengthened key institutions, and trained future energy sector leaders. PATRP provided an array of support to further these efforts, including policy development, technical training, and dedicated institutional capacity building via embedded expert advisors. **PATRP exceeded all enabling environment targets by drafting 150 policies, implementing 59 policies, and training 6,417 people, of which 1,288 were women**.

Exhibit 6 highlights PATRP's achievements in key areas.

EXHIBIT 6

PATRP RESULTS ON KEY PROJECT GOALS

INDICATOR	TOTAL TARGETS	CUMULATIVE ACTUAL	% ACTUAL VS TARGET
Generation Capacity Pending Financial Closure[1]	32,120 MW	32,862 MW	102%
Generation Capacity Reached Financial Closure	6,421 MW	5,263 MW	82%
Generation Capacity Commissioned	990 MW	1,487 MW	150%
New Grid and Off-grid Actual Direct Connections	907,525	1,729,848	190%
Training and Capacity Building (Persons Trained)	1,542	6,417 (5,085 M) (1,289 F)	416%
Policies Drafted	55	150	272%
Policies Implemented	25	59	236%
Power Lines Reached Financial Close	606 KM	2,153 KM	355%

5,263 MW
Reached Financial Closed
Target: 6,421 MW
Average Size: 88.9 MW

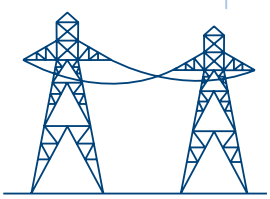
1,729,848
On-Grid & Off-Grid Direct Connections
Target: 907,525

1,487 MW
Generation Capacity Commissioned
Target: 990 MW

32,862 MW
Added to Pipeline Project
Target: 32,120 MW

6,417
People Trained (5,069 men; 1,288 women)

150
Policies Drafted



2,153 Km
of Power Lines Reached Financial Close

59
Policies Implemented

1 The Cumulative Actual figure represents the total potential generation capacity of the projects at the time they were onboarded as PATRP-supported transactions. MW values may have changed during the course of project development.

2. INTRODUCTION

Launched in 2013, Power Africa is a U.S. Government-led partnership, coordinated by the United States Agency for International Development (USAID), that aims to increase access to electricity for homes and businesses in sub-Saharan Africa, where two-thirds of people live without power.

The initiative's early goals were to add 10,000 MW and 20 million connections in a first set of Power Africa focus countries: Ethiopia, Ghana, Kenya, Liberia, Nigeria, and Tanzania.

In 2014, Power Africa's goals were tripled to 30,000 MW and 60 million connections, and over time the geographic scope of on-the-ground Power Africa support expanded to nearly 40 countries across sub-Saharan Africa.

To achieve these ambitious goals, Power Africa draws on the combined expertise and resources of 12 U.S. Government (USG) agencies, and more than 170 public and private sector partners. Together with African governments, Power Africa is stimulating investment in sub-Saharan Africa's energy sector, bringing critical power projects online, and providing access to electricity for millions.

In 2014, USAID selected Tetra Tech to lead the Power Africa Transactions and Reforms Program (PATRP) under a five-year contract to provide technical assistance, capacity-building, and transaction advisory services from a base office in Pretoria, South Africa. The PATRP team was led by Tetra Tech, ES, Inc., as the prime contractor, with Nexant, Inc., and BDO Risk Advisory Services as principal subcontractors. Other services were provided by Aurecon, McKinsey, and several U.S.-based and other small businesses.

In addition to transaction advisory assistance, PATRP also supported power sector reforms and utility commercialization activities, and provided institutional support to the Power Africa Coordinator's Office. These activities are represented in the four overarching objectives set forth in PATRP's contract:

OBJECTIVE 1: Institutional Support to the Power Africa Coordinator's Office

OBJECTIVE 2: Late-Stage Transaction Support

OBJECTIVE 3: Small-Scale Projects and Rural Electrification/Mini-Grids Support

OBJECTIVE 4: Regulatory and Institutional Strengthening and Policy Reform

- **4A.** Electricity Transmission & Distribution (T&D)/ Regional Trade, and Institutional Strengthening of Power Pools
- **4B.** Policy and Regulatory Reform
- **4C.** Natural Gas
- **4D.** Mobilizing Finance and Building Institutional Capacity

OBJECTIVE 1

INSTITUTIONAL SUPPORT TO THE POWER AFRICA COORDINATOR'S OFFICE

Support to the Coordinator's Office was primarily provided from the PATRP office in Pretoria, South Africa, and backstopped by project staff at the Tetra Tech home office in Arlington, Virginia. The Pretoria team led program implementation and directed field activities, as implemented by in-country Transaction Advisors and Beyond the Grid (BTG) Advisors across the continent. Other activities conducted in Pretoria consisted of monitoring and evaluation (M&E), project and periodic reporting, communications, environmental compliance, gender integration, quality control, and technical support for field teams, including deployment of short-term consultants and other resources to provide specialized expertise to support specific transactions.

OBJECTIVE 2

LATE-STAGE TRANSACTION SUPPORT

Activities under Objective 2 were led by PATRP's Senior Transaction Advisor, based in Pretoria, and driven by a team of expert Transaction Advisors in Power Africa countries across the continent. PATRP's Transaction Advisors focused on bringing late-stage power generation, transmission, and distribution projects to financial closure, and developed a pipeline of power generation projects at all stages. Depending on the needs of the project or the host country, transaction advisory support included technical, financial, legal/regulatory and policy interventions, or a combination of all.

OBJECTIVE 3

SMALL-SCALE PROJECTS AND RURAL ELECTRIFICATION/MINI-GRIDS SUPPORT

PATRP's activities under Objective 3 were in service to Power Africa's Beyond the Grid sub-initiative, which focuses on the provision of energy solutions for rural and peri-urban communities that are not – and may never be – connected to a national grid. Beyond theGrid works with private investors and other organizations to increase generation and improve access, helping to meet Power Africa's goal of 60 million new home and business connections by 2030.

OBJECTIVE 4

REGULATORY AND INSTITUTIONAL STRENGTHENING AND POLICY REFORM

Among Power Africa's many contributions is the enhancement of enabling environments for the development of new energy projects, whether through regulatory reform, capacity building, or first-of-kind transactions that pave the way for later deals. PATRP supported these efforts in a variety of ways, including commercialization programs at electricity utilities, promotion of cost-reflective tariffs, facilitating development of new transmission infrastructure, policy and legal reviews, advancement of natural gas projects, assistance to competitive procurement programs, and more. PATRP also provided capacity-building and training programs to improve the effectiveness of energy sector institutions.

In 2016, Power Africa's scope and reach expanded significantly, and PATRP quickly adapted to the modified contract, supplemented scope of work, and new levels of staffing required to support the program and achieve our goals. The expansion required PATRP to ramp-up its footprint and increase the number of long-term staff resident in Africa from 30 to nearly 100 in less than six months, with a further 50 active short-term technical advisors and support staff. The same year, passage of the *Electrify Africa Act* and the release of the *Power Africa Roadmap* – and its organization around the three strategic pillars of Generation, Connections, and Unlocking Energy Sector Potential – further defined and shaped PATRP's work.

PILLAR 1:
GETTING TO 30,000 MW

Pillar 1 activities are aligned with Objective 2, and are centered on in-country transaction advisory services that help bring late-stage projects to financial close.

PILLAR 2:
GETTING TO 60 MILLION CONNECTIONS

Pillar 2 activities are aligned with Objective 3, and support Power Africa's Beyond the Grid sub-initiative that aims to connect rural and peri-urban areas where national grids do not reach.

PILLAR 3:
UNLOCKING ENERGY SECTOR POTENTIAL

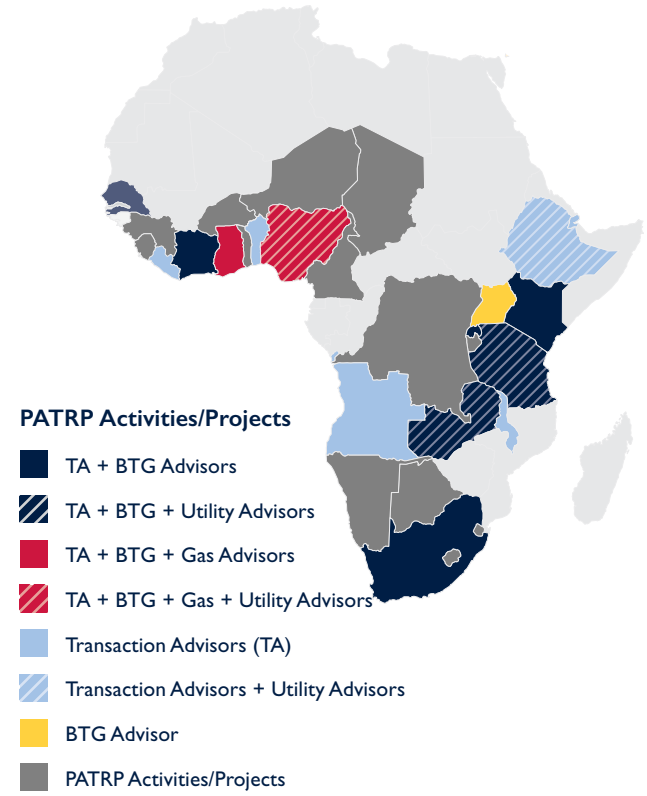
Pillar 3 activities are aligned with Objective 4, and focus on the policy, regulatory, and enabling environment enhancements needed to advance power projects across the continent.

PATRP was a complex program with a challenging mix of issues to be addressed across the energy sectors of several sub-Saharan countries. Its complexity required the creation of an extensive resource infrastructure spread across the continent. PATRP's main office in Pretoria was conveniently located near the Power Africa Coordinator's Office at USAID Southern Africa. This office was home to PATRP's leadership team, including the Chief of Party (COP), Assistant COP, two Deputy COPs, the Senior Transaction Advisor, Small-Scale Renewable Energy Advisor, and Policy and Institutional Advisor. PATRP's M&E team, Environmental Advisor, Gender Advisor, Communications Specialist, budget team, and administrative staff were also based here. The majority of staff in the Pretoria office were South Africans or nationals from other African countries.

In addition, PATRP staff operated as field-based transaction advisors and technical specialists in countries across sub-Saharan Africa, and reported to program leadership using a matrix approach. This approach empowered the lead transaction advisors to make localized decisions relative to needs and opportunities on the ground.

Exhibit 2 illustrates the locations of PATRP Transaction Advisors, as well as the geographic scope and reach of their engagements, at the height of PATRP operations.

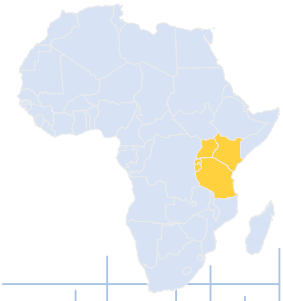
EXHIBIT 7
LOCATIONS OF PATRP TRANSACTION ADVISORS



STRUCTURE OF THIS REPORT

The remainder of this final report outlines PATRP's results in each focus region or country (Section 3), organized by each of the three Power Africa strategic pillars, as well as results achieved in support of the Power Africa Coordinator's Office (Section 4). A detailed overview of PATRP results by region or country is provided in Appendix A. Sections 5 and 6 summarize the challenges encountered by the project, as well as lessons learned and recommendations for future Power Africa support in each country.

3. RESULTS



EAST AFRICA

RESULTS SUMMARY

49.7 MW
Reached Financial Close

42 MW
Commissioned

96,361
On-Grid & Off-Grid Direct Connections

207
People Trained

PATRP's activities in the East Africa Region were focused on facilitating regional electricity trade, to include constructing the underlying power transmission infrastructure, as well as advancing regional off-grid (BTG) electrification efforts. In addition, PATRP supported select electricity generation transactions in Uganda and Burundi.

PATRP's transmission work centered on support to the Nile Equatorial Lakes Subsidiary Action Program (NELSAP) via an embedded advisor, and to the East Africa Power Pool (EAPP) through short-term technical assistance. Both NELSAP and EAPP lacked the capacity to execute complex, cross-border transmission programs, and most countries in the region viewed interconnection as a threat to their own generation programs. While progress was made during PATRP's engagement, the bigger picture of regional trade and integration is not yet well understood, and there is not yet an enabling environment in place to ensure that the interconnectors can work across borders as a coherent market.

Regional BTG activities were delivered by two BTG Advisors based in Nairobi, Kenya, and a resident BTG Advisor in Kampala, Uganda. BTG support included direct assistance to governments and private sector companies, as well as advocacy to improve the enabling environment for off-grid electrification services in the region.

Power Africa's support in Burundi was initiated in 2017 in response to the Government of Burundi's efforts to increase generation capacity through public-private

partnerships (PPPs). Assistance focused on connecting independent power producers (IPPs) with potential financing partners.

Most of the generation projects PATRP supported in Burundi were stalled due to a lack of understanding of the contractual documents, such as the Concession Agreement (CA) and Power Purchase Agreement (PPA). In response, PATRP worked to improve stakeholder understanding of the complexities of IPPs/PPPs with the goal of facilitating energy transactions.

PATRP's activities in other East African countries, including Djibouti, Ethiopia, Kenya, Rwanda, and Tanzania, were conducted under different work streams, and are outlined in subsequent sections of this report.

A solar mini-grid on Uganda's Bugala Island in Lake Victoria provides power for businesses and the community's very first health center.

ACTIVITIES

PILLAR 1: GETTING TO 30,000 MW

Burundi – Mubuga Solar (7.5 MW). In October 2018, the Government of Burundi signed a PPA for the Mubuga 7.5 MW solar energy project, the first renewable energy IPP in the country. The advancement of the project is encouraging for the energy sector and the business climate of the country. PATRP assisted the developer with preparing EU-compliant tender documents for the EPC RFP, connected the developer to various financing sources, and engaged with the Minister of Energy and Mines as well as other high-level stakeholders in the Burundian energy sector. The project was also supported by the U.S. Embassy in Burundi, as well as OPIC. At the end of PATRP engagement, the project was nearing financial close.

Uganda – Achwa 2 Hydropower Plant (42 MW). In FY 2017, AfDB approved a $20 million senior loan to the Achwa 2 hydropower project in Northern Uganda. The project involves the construction and operation of a 42 MW run-of-river hydropower plant located on the banks of the Achwa River in the districts of Pader, Kitgum, and Gulu. The project also involves construction of nearly 20 kilometers of access and service roads, as well as interconnection facilities to the grid substation. The total project cost is estimated at $110 million. PATRP's embedded advisor at AfDB, as part of the financing team, performed due diligence on the project for financing, negotiating the terms of the credit agreements and the security packages, and further Conditions Precedent to effectively execute financing documentation for financial close. Power Africa also assisted through a USAID contribution to one of the sponsors, AREF. The project achieved financial close in May 2017 and commercial operations began at the end of 2018.

The Achwa 2 Hydropower Project site in Uganda. Photo by ATB Riva Calzoni.

Uganda – Hydropower Project Assessment. As part of PATRP's support to power project development in Uganda, PATRP deployed a hydropower expert to assess the Nyamabuye Hydropower Project (7 MW) and the Nyabuhuka-Mujunju Hydropower Project (3.2 MW). The goals of this short-term technical assistance were to review project development studies, meet with hydropower project developers to assess their capabilities and qualifications to implement projects, and meet with national and regional government agencies involved in hydropower development to understand policies and programs in place and how they impact project development.

Reviewing gauge data for the Kaku River in Uganda. Read twice daily, these river gauges provide the hydrology data critical to a bankable hydropower project.

PILLAR 2:
GETTING TO 60 MILLION CONNECTIONS

Support to Private Sector Companies. PATRP actively engaged 19 off-grid companies in Uganda and identified specific business or project needs that could be supported by the BTG team. For solar home system (SHS) companies, PATRP advisors supported distribution and sales agent models, marketing strategies, logistics, and after-sales service. PATRP support to micro-grid companies involved clarifying and navigating regulatory processes and approvals. PATRP also assisted SHS and mini-grid companies in structuring and sourcing finance, including suggesting and advising on grant applications, and investor matchmaking.

During FY 2018, Fenix, a PATRP-supported Power Africa partner, sold their 200,000th solar home system in Uganda.

Celebrating the 200,000th solar home system sold by Fenix in Uganda. Photo by Fenix.

Another PATRP-supported company, Winch Energy, completed construction and commenced operation of their first installation in Uganda. This initial "Community Hub" will provide a number of services, including phone charging, printing and wireless internet access and help to stimulate economic activity in the community before wider electricity access is established. PATRP worked with Winch Energy through the required regulatory approvals for this project.

Support to the Mini-Grid Sector. PATRP support to the mini-grid sector in Uganda involved determination of cost-reflective tariffs, including assistance to mini-grid developers in license negotiations with the national regulator, ERA, to support cost-reflective tariffs and set the precedent for future tariff approvals. PATRP met with major stakeholders, including REA and GIZ, to outline a path forward for mini- and micro-grid projects, and provided value engineering for the design of mini-grids and associated cost-reflective tariffs.

Bukasa Island Mini-Grid. In FY 2017, PATRP provided advice and assistance to Absolute Energy to help redesign and deploy the company's second solar mini-grid project on Bukasa Island. PATRP-recommended changes included a lower renewable energy fraction to optimize the levelized cost of energy, redefined demand profile based on data from a previous site, and division of the project into more phases allowing for generation capacity to grow more closely with demand and better financial performance in the initial years of project. The project received license exemption in July 2017, and construction commenced shortly thereafter. In late 2018, the mini-grid was commissioned, and now powers an icemaking facility on the island, which is expected to boost economic development.

> Absolute Energy strongly believes that further success in Uganda will continue to act as a catalyst to accelerate development in the region...PATRP's efforts in supporting this vision have been both laudable and significant towards attaining these results.
>
> Riccardo Ridolfi, Co-founder, Absolute Energy Africa

Support to Renewvia Energy. PATRP provided U.S.-based Renewvia Energy with a mini-grid market overview, including available subsidies, regulatory requirements, major players and their geographical focuses. PATRP also provided direct advice on their

license exemption application and on their application for certain grant funding opportunities and mini-grid tender for 15 sites.

Regulatory Support. PATRP provided input on the draft Uganda Off-Grid Strategy. The Off-Grid Strategy is likely to guide the Government of Uganda and donor activities for the next 12 years. In addition, PATRP supported the development of an informal linkage between the Uganda Solar Energy Association and the African Mini-grid Developer Association (AMDA). The mini-grid representative on the Uganda Solar Energy Association board will act as the informal representative for AMDA going forward, with AMDA providing input and research to the board member so as to better represent the nascent Ugandan mini-grid sector. PATRP worked with the Uganda Solar Energy Association to encourage eligible members to apply for AMDA membership, facilitate the formation of a mini-grid working group within the association, and assisted in exploring how to expand the working group to include mini-grid developers whose primary generation is not solar-based.

GIZ Pro Mini-Grid Northern Uganda Tender. A call for Expressions of Interest (EOI) for up to 25 village mini-grids in Northern Uganda was published in FY 2018, supported by GIZ, EU, the Uganda Rural Electrification Agency (REA) and the electricity regulator (ERA). PATRP assisted 18 companies in preparing bids for the 25 mini-grid sites available in GIZ's Pro Mini-Grid Northern Uganda tender. The tender was seen as a pilot for a reverse-auction mechanism and saw multiple sites bundled together, along with regulatory pre-approvals and a grant subsidy. This approach is seen as de-risking and lowering the barrier for entry for international mini-grid developers to enter the Ugandan market. PATRP also assisted international developers with market and regulatory knowledge, in addition to matchmaking between developers, suppliers, EPCs and operators.

Mandulis Energy. PATRP supported the preparation of the Earth Energy SEFA grant application, and participated in the first stage evaluation of candidates for project Procurement Specialist. This process led to a shortlist of three candidates that were interviewed by the Mandulis team. PATRP also provided comments on seven draft TORs, including work to be conducted on a biomass study, a power evacuation study, an off-grid strategy, and a Front-End Engineering Design (FEED) study. Input was gathered from the PATRP biomass and transmission and distribution specialists to generate comments on the biomass and evacuation studies. The off-grid study focused on assessing customer and load characteristics in the target villages, as well as identifying existing distributed generation to be integrated into the mini-grids. PATRP also shared an open grant opportunity directed at off-grid power projects in Uganda, Zambia, and Ethiopia.

Smart Communities Coalition. PATRP conducted due diligence site visits to two refugee settlements in Uganda in support of the Smart Communities Coalition (SCC) a public-private venture that employs technology and strategic partnerships to empower refugees with the ability to provide for themselves and their families, and can help generate greater value to host communities. By cataloguing needs and demand, and piloting solutions, SCC can enable transformational change in the delivery of services to the forcibly displaced and assist implementers with the management of settlements, increasing efficiencies and stretching funding for greater impact. PATRP subsequently supported several refugee energy access pilots in Uganda, which included a weeklong site visit in collaboration with the Smart Communities Coalition partner Mercy Corps to the West Nile region and the refugee settlements in that area, including Bidi Bidi, the largest individual refugee settlement globally and one of the pilot settlements chosen by SCC. PATRP also supported the completion of a market assessment in the Rwamwanja refugee settlement area focused on spurring energy access and connectivity in line with SCC commitments.

Azuri Technologies Irrigation Pilot. Power Africa Partner Azuri Technologies was in the first phase of a solar irrigation pilot in partnership with Kwapa Farmers Association in Eastern Uganda. This first phase would act as a pre-pilot, with systems installed on four smallholder vegetable farms. The next phase of the pilot would distribute an additional 50 systems and lead to commercial rollout. PATRP assisted Azuri in identifying local agriculture and pumping/irrigation partners, in addition to providing input on current market status and trends.

PILLAR 3:
UNLOCKING ENERGY SECTOR POTENTIAL

STRENGTHENING REGIONAL TRANSMISSION NETWORKS & ADVANCING CROSS-BORDER TRADE

PATRP provided direct support to several transmission transactions in East Africa, as well as to organizations or initiatives furthering transmission projects in the region. This support was principally delivered through PATRP's assistance to two main regional bodies: The East Africa Power Pool (EAPP) and the Nile Equatorial Lakes Subsidiary Action Program (NELSAP).

PATRP's support to the EAPP focused on the Ethiopia-Kenya-Tanzania (EKT) Power Transaction, the EAPP Short-term Bilateral Trading Platform, and the EAPP Interconnection Code Compliance and Operational Readiness program. PATRP also seconded an embedded technical advisor to NELSAP to accelerate implementation of 1,500 MW of key interconnector corridors and transmission projects that support regional power trade within the Great Lakes Region. The goal of PATRP's assistance to NELSAP was to support the organization's core function of asset creation towards regional integration and trade.

Ethiopia-Kenya-Tanzania (EKT) Transaction. The EKT transaction is a proposed 20-year, 200 MW long-term power sale from Ethiopia Electric Power (EEP) to Tanzania Electric Supply Company (TANESCO), with wheeling service to be provided by the Kenyan Electricity Transmission Company Limited (KETRACO) under a long-term Transmission Service Agreement (TSA) with TANESCO. The TSA is important not only for Ethiopia, Kenya and Tanzania, but also more generally as a precedent for other EAPP members who may have opportunities for long-distance energy trading involving transit through another country's network. As such a groundbreaking development, progress on the power sale transaction and related agreements has high visibility with the EAPP Steering Committee, Council of Ministers, EAPP Independent Regulatory Board (IRB), and international donors.

PATRP supported the EAPP for several years by helping to manage the scopes of work for the EKT Transaction Working Group (TWG) and its technical consultants provided by Power Africa. Specifically, PATRP developed the general principles (i.e. the basic terms and conditions) that apply to long-term firm transmission service, led the working group meetings, advised on the calculation of transmission wheeling charges for transit through Kenya, maintained project plans for the development of the TSA, and helped reach agreement on wheeling charges.

At the end of PATRP engagement, all of the technical modeling studies were completed, most of the inputs to the wheeling charges model were agreed between the parties to the transaction, and all of the necessary agreements were in draft form. However, one significant

open issue regarding the technical rating assumptions for transmission facilities in Kenya remained: the DC facilities interconnecting Ethiopia and Kenya, which have a major impact on the calculation of wheeling charges. Also, some of the remaining process steps to reach agreement on the KETRACO-TANESCO Transmission Service Agreement and the KETRACO-KPLC Accession Agreement are yet to be completed, and the standard form Control Area Interconnection Agreement, developed by Power Africa and intended for use on a bilateral basis between EEP, TANESCO and KETRACO, has not yet been executed by any of the parties. We anticipate that these areas will be a focus for Power Africa's East Africa Energy Program (EAEP).

EAPP Short-term Bilateral Trading Platform. In 2017, the EAPP Steering Committee authorized EAPP to develop protocols for short-term bilateral trading (up to two years). EAPP, supported by PATRP advisors, formed the Bilateral Trading Working Group, consisting of representatives of EAPP member utilities. PATRP supported the team and assisted in developing a template standard form bilateral trading agreement as well as a report on options for EAPP transmission access and pricing policy for short-term bilateral trading.

The objectives established for the bilateral trading platform include:

- To facilitate short-term trading of energy, capacity and reserves, as well as transmission wheeling service for cross-country transit, under a common set of definitions and rules;
- To make it easier to enter into bilateral trades between EAPP members, and between EAPP members and non-EAPP members with whom they are interconnected; and
- To complement, and coexist with, a future centralized day-ahead market platform, when operational.

PATRP completed the following two main deliverables for the technical assistance, obtained buy-in from EAPP and the Bilateral Trading Working Group, and distributed the final form documents to the EAPP Secretariat for its further action:

- **Final Draft EAPP Bilateral Trading Agreement** – This is a standard form Agreement that EAPP trading entities will use for short-term transactions with other signatories, according to a common set of terms and conditions approved by EAPP and applicable to all transactions executed under the Agreement.
- **Report on Options and Recommendations for EAPP Transmission Access and Pricing Policy for Short-Term Bilateral Trading** – This report provides guidelines on pricing and access for short-term cross-country wheel-through service that ideally will be implemented uniformly by all member countries.

EAPP Interconnection Code Compliance and Operational Readiness. In 2017-18, PATRP provided support to EAPP and its member countries to help prepare them for safe, reliable, secure and efficient interconnected power system operations. Initially, PATRP prepared a set of 11 draft EAPP Operating Guidelines based on international best practices in key areas. These guidelines were distributed to utilities to assist with gap analysis and mitigation planning. To increase utilities' understanding of the Code's technical requirements, and improve their capacity to undertake the compliance self-assessments, PATRP delivered a three-day workshop on the EAPP Interconnection Code Compliance Program, and conducted field work to identify gaps for cross-border transmission system security and reliability. Based on the gap identification, PATRP made recommendations on upgrading interconnection facilities, implementing standardized procedures and equipment specs, operational planning, inter-utility communications and coordination and contingency mitigation, and delivered a series of training workshops in various EAPP countries.

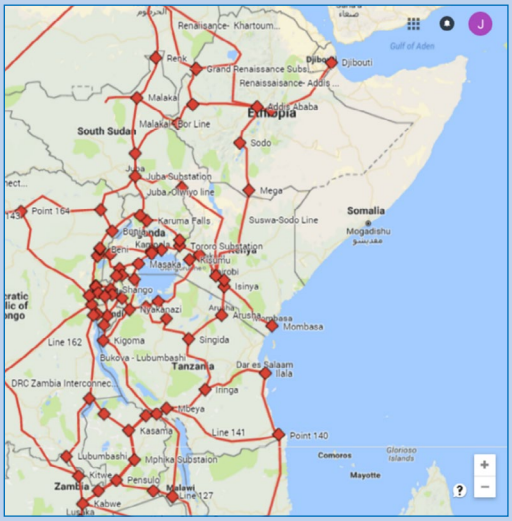
PATRP provided all of the member countries with the tools and tutorials that they would need to implement the EAPP Compliance Program within their country's utilities. Once these tools and tutorials were released to all member countries, PATRP provided additional support to Ethiopia, Kenya, Tanzania, Uganda and Rwanda (EKTUR) utilities since they were the furthest along in interconnecting bulk transmission system tie-lines between their countries. PATRP conducted on-site meetings and workshops at each of the EKTUR Transmission System Operators, generators and distribution utilities to kick off the IC Program, including hands-on sessions with assigned compliance representatives on how to conduct an effective, accurate self-assessment of their current compliance with the IC Standards and to develop Mitigation Plans on any IC standards that they were non-compliant in order to close the gaps.

PATRP held its last workshops on operational readiness and mitigation planning in Rwanda and Uganda in June 2018. At that point, technical assistance for operational readiness was to transition from Power Africa to World Bank-funded advisors working with the EAPP Secretariat in Addis Ababa. The World Bank subsequently retained its own advisory team and the project is underway.

Prior to the end of engagement in November 2019, PATRP provided further technical assistance to Rwanda's electric utility, EUCL, in relation to construction of a new 220kV line that will connect Rwanda's transmission network with Uganda. Rwanda was selected for support due their advancement in closing the non-compliance gaps as outlined above, as well as the impending plan for interconnection with Uganda. PATRP developed Terms of Reference (TOR) documents for the procurement of capital equipment, including equipment specifications, benefits analysis, and estimated capital costs. The TOR documents will be presented to multiple donor agencies that have expressed interest in providing financial support to Rwanda to advance energy trading with the East African region.

Regional Interconnector Pipeline Database. The goal of Power Africa assistance to NELSAP was to support the organization's core function of asset creation towards regional integration and trade. In this respect, PATRP supported NELSAP with the development of an interconnector pipeline database tool listing the interconnectors in East Africa. These interconnectors will ultimately make a significant contribution towards regional trade, either by interconnecting countries, or by facilitating regional power flow within member countries. The database defined the data and characteristics of the interconnections, and covered geographical, technical, commercial and project management related data. The database is an Excel sheet that is used to package project-related information into organized slides according to a popular arrangement used for NELSAP-supported projects. These are still effectively used to formulate project presentations, mainly required at funding workshops and conferences, where development partners are informed about the funding requirements in the transmission environment.

A further characteristic of this model is that it is linked to Google Maps, where the interconnections are superimposed on the Google Map, and associated data from the database is displayed, simply by clicking on the related line icon. This is a valuable tool for management and stakeholders to access and filter data related to transmission lines through universally accessible data.



Regional Interconnection Projects as of March 2016

North-South Corridor. This corridor stretches from Ethiopia to Zambia, and runs through Kenya and Tanzania. While the Ethiopia-Kenya-Tanzania (EKT) portion is supported under other Power Africa initiatives (described above), PATRP assisted NELSAP with finalization of the Feasibility Study on the Tanzania-Zambia portion. Various setbacks were experienced on this part of the feasibility study, which has been ongoing for a number of years. The latest challenge is currently the diverging country positions on sizing and routing of the lines connecting the two countries between Mbeya, Tanzania, to Kabwe, Zambia. The consultants on the project also presented a number of challenges as they proposed unrealistic and overly ambitious scenarios that were neither supported by NELSAP nor the two affected countries.

PATRP attended to these challenges by reviewing the terms of reference, and through constructive dialogue, aligned the consultants to deliver what was expected. Through the attendance of several workshops and interactions with the two countries, PATRP set the scene for the consultants to deliver according to their contracts and proposed mutually acceptable development scenarios with which both countries and the financiers of the study, KfW, would be comfortable.

Northern Corridor. The development of the Northern Corridor was targeted to see completion of transmission lines and commencement of trade between Kenya, Uganda, Rwanda, Burundi and the DRC as early as December 2018. However, the underlying projects have been plagued by delays. The main challenge in developing this program has been the poor contract performance in attempting to achieve commercial effectiveness of these lines, combined with the lack of technical and commercial readiness of the interconnectors.

NELSAP was tasked to procure a Project Turnaround Specialist to analyze the whole Interconnection Project and advise on ways to bring it back on track and realize its regional objective. PATRP filled this role and during the ensuing investigations focused on the eight transmission project segments in Uganda and Kenya under construction, through three EPC contracts. Some of the challenges unearthed during the investigation included contractors that had gone bankrupt, contracts that had been terminated before completion, delays in loan disbursement (and subsequent deadline extensions), and cancellation of undisbursed donor funding for portions of the project.

In pursuit of a rapid solution to the turnaround process, due consideration was given to the landscape in which these projects currently reside, and how the funding, contractual, technical, legal and political issues should be addressed to meet the various challenges. PATRP's recommended turnaround interventions included engagement at the political level, as this approach is likely to benefit the turnaround process and facilitate an amicable settlement in closing out the contracts.

In mid-September 2018, PATRP and NELSAP hosted an Escalation Event in Uganda. The event was a ministerial-level meeting with the goal of reaching a consensus among the key stakeholders on a regional strategy to turnaround the stalled Northern Corridor interconnector projects. Ministerial representatives from Kenya, Uganda, Rwanda, DRC, and Burundi attended as well as development partners such as the EU, AfDB and KfW. As part of its final activities with NELSAP, PATRP offered a series of recommendations to move the projects forward, and shared these recommendations with NELSAP and USAID.

Burundi – Workshop on Public-Private Partnerships. In March 2018, PATRP conducted a workshop on Public-Private Partnerships within the Burundian Energy Sector (serving as an introductory course covering PPPs, Risks and Risk Mitigation, PPAs and Project Finance). Subsequent workshops were held to finalize project documentation (see below), so that they may be used as the official templates for future IPPs. PATRP also supported IPP developers directly, who were promoting a total of 50 MW of both hydro and solar projects.

PATRP translated neighboring countries' pre-existing project documents for run-of-river hydropower transactions below 20 MW into French and presented them to public and private sector stakeholders. In May 2018, PATRP conducted a two-day working session to finalize these templates. Feedback from the session was integrated into the documents, and PATRP engaged a Burundian law firm to ensure compliance with local law so that they may be used as official templates for hydropower transactions.

PATRP's Andre Larocque, West Africa Regional Transaction Advisor, leads a session at the Public-Private Partnerships training in Bujumbura, Burundi.

DJIBOUTI

RESULTS SUMMARY

295 MW
Added to Project Pipeline

68
People Trained

7
Policies Drafted

PATRP commenced engagement in Djibouti in 2015, with close cooperation between the PATRP Transaction Advisor (TA) and the Government of the Republic of Djibouti (GORD), notably the Ministry of Energy (MERN) and the state-owned utility Électricité de Djibouti (EDD).

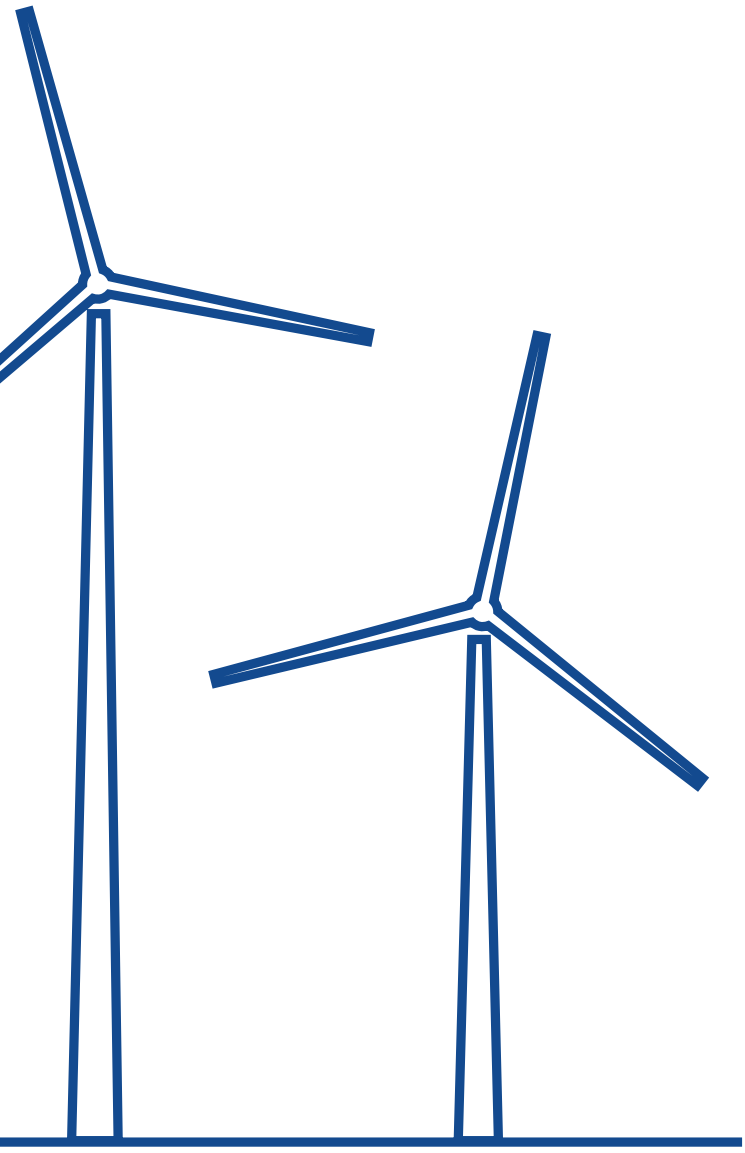
The PATRP TA was embedded at MERN from 2015 to 2017, during which time transaction and project finance support was provided to 14 generation transactions, representing 1,300 MW in potential new capacity, and $985 million of investment. In parallel, PATRP led efforts to advance market-based reforms in the energy sector, including promulgation of the PPP Law, drafting IPP implementing regulations and action plan, and promotion of a new Integrated Resources Plan (IRP).

PATRP's scope in respect to GORD, MERN, and EDD was to advise government parties on their participation in the design, negotiation and implementation of energy infrastructure, including independent power producer (IPP) projects from the time that the IPP and Energy Efficiency laws were promulgated in Djibouti (July 1, 2015). GORD had little experience in dealing with private projects, as most large infrastructure projects in Djibouti are the result of government-to-government relations between China and Djibouti. These projects have relied largely on China EXIM finance, leaving GORD, MERN and EDD without an understanding of the structure of project finance, and the rationale behind the agreements and specific terms that underpin project finance transactions, and importantly aspects relating to the allocation of risk among project developers, equity providers, debt providers, off-takers and government counterparties.

PATRP provided commercial, financial and legal perspectives to foster confidence between government parties and private sector developers and investors to move projects forward.

However, in 2016, two Ministers of Energy were replaced in rapid succession, and critical energy transactions were shifted from MERN's responsibility to an economic commission at the Presidency. In parallel, MERN experienced substantial personnel turnover, which had a negative impact on PATRP's engagement with the MERN secretariat and MERN technical staff.

At the same time, the Chairman of the Djibouti Ports and Free Zones Authority (DPFZA) requested Power Africa support, and PATRP's focus shifted from MERN to the DPFZA, as well as to private sector developers, as the entities best placed to advance energy projects in the context of Djibouti's political environment.



ACTIVITIES

PILLAR 1: GETTING TO 30,000 MW

During the first 18 months of Power Africa intervention in Djibouti, PATRP provided transaction and project finance support to the Ministry of Energy for 14 energy transactions, none of which had reached financial close at the time of writing. Substantial efforts were made to support project developers in their engagement with the relevant institutions in Djibouti.

The pivot to provide support to the DPFZA (outlined above) proved successful to the extent that DPFZA has played important roles in all of the utility scale IPP projects that are currently ongoing in Djibouti, including the Grand Bara Solar PV Project and the North Ghoubet Wind Power Project. That said, progress on achieving financial close on the pipeline of IPPs has been slow.

Grand Bara Solar PV Power Project (30 MW scalable). PATRP worked with the Ministry of Energy to advance this project. The Ministry engaged the IFC to determine a possible role for the IFC's Scaling Solar Program for this project. The project was ultimately downsized from 50 MW to 30 MW, and all of the project agreements with the Government of the Republic of Djibouti (including the PPA with EDD) were signed. At the close of PATRP engagement, the developer was in the process of finalizing the financial consortium for this phase of the project. PATRP's achievements on this project include:

- Implementation Agreement negotiated and signed
- PPA agreement negotiated and signed
- Land lease completed, negotiated and signed
- Introduced potential debt funders

North Ghoubet Wind Power Project (60 MW). PATRP supported the investor consortium during the due diligence phase of the project, and provided liaison activities between the Ministries of Energy and Environment in an attempt to clarify the processes required for a no-objection letter in accordance with

Green Climate Fund investment procedures. PATRP also supported the African Development Bank's African Legal Support Facility and MIGA, so that the latter agency better understood the investment climate in Djibouti, in the context of the legal and regulatory framework for IPPs. At the end of PATRP's engagement, an EPC contractor was selected, and the investor consortium sponsored a grid study to examine the best way to integrate wind power into Djibouti's transmission network.

EDD – GE Gas-to-Power Project (120 MW scalable). Power Africa partner General Electric (GE) entered into discussions with EDD regarding the development of a gas-to-power solution for the Djibouti ports and other demands. The development of this project concept follows PATRP efforts dating back to 2015, working in conjunction with the U.S. Ambassador and the DPFZA. In October 2018, a delegation from GE visited Djibouti to meet with the President of Djibouti, the CEO of EDD, and the Chairman of the DPFZA, as well as the Minister of Energy and the President of the Chamber of Commerce. At the end of PATRP engagement, GE was finalizing two concepts: one for a combined-cycle power plant, and the other one for the back-up of the North Ghoubet wind power plant, alongside corresponding financial solutions that could be offered.

GridX LLC Solar PV Captive Power Projects (15 MW). PATRP engaged with GridX LLC, a U.S. developer interested in organizing and developing small-scale production of renewable energy in Djibouti-ville for commercial or other entities that are currently running diesel generators. PATRP provided support to GridX through a commercial analysis of the legal and regulatory framework, and considerations for structuring its transactions in the form of a lease vs. off-taker format. Moreover, the Transaction Advisor provided support to GridX in its engagement with potential commercial clients, as well as facilitating dialogue between GridX and the DPFZA, as well as the U.S. Department of Defense Camp Lemmonier facility (CLDJ). GridX now has seven transactions in its pipeline with commercial, industrial and military clients.

PILLAR 3: UNLOCKING ENERGY SECTOR POTENTIAL

PATRP deployed a technical team to provide institutional support to MERN, to assist the ministry in its transition to energy planning and procurement activities following the promulgation of the IPP law (July 2015) legalizing independent power production, and thus shifting key energy sector roles from the former electricity monopoly EDD, to MERN. These activities included:

Regulatory Support to MERN in Designing and Drafting the Implementing Regulations for the IPP Law. One of PATRP's most notable achievements was promulgation of the PPP law in 2017. PATRP support included engagement with IFC's PPP team, and collaboration with IFC's Scaling Solar team to identify opportunities.

PATRP developed a draft IPP Action Plan in conjunction with MERN to establish a roadmap for energy projects after analyzing an appropriate energy mix for Djibouti, as well as appropriate technologies and scale for projects. Consistent with the recommendations of the IPP Action Plan, PATRP began work on template tender documents for potential IPP procurements.

In FY 2018, PATRP engaged with the Director of Energy to advocate for the release of new IPP regulations that had been set for promulgation in the 2018 calendar year. These IPP regulations would make it easier for developers to build and supply power in Djibouti as independents, thereby paving the way for accelerated power sector growth.

Integrated Resources Plan. PATRP collaborated with technical staff in the Energy Directorate to examine the factors of energy generation, transmission and distribution as part of preliminary planning for the development of an Integrated Resources Plan (IRP). PATRP provided simultaneous capacity building to give MERN ownership of the preliminary IRP to address the shift of energy planning responsibilities from EDD to MERN following the promulgation of the IPP law.

Renewable Energy Pilot Project. Institutional support was provided to the engineers at the Energy Efficiency Agency of Djibouti (ADME), responsible for the implementation of small-scale renewable energy production. PATRP provided technical support to ADME as they worked through a design concept for pilot projects to demonstrate opportunities for small-scale solar energy production, including residential solar energy production now possible with the Energy Efficiency law. However, many of PATRP's planned activities were paused due to changes within host government structures. In response, PATRP shifted focus to support for transaction-specific activities, with the intention to re-engage on enabling environment work as conditions improve.

IPP Procurement Support. PATRP worked with MERN to define and create commercial processes for transparency and efficiency of IPP procurement. PATRP advised on the structure for draft implementation agreements, power purchase agreements, and transmission connection agreements, and highlighted commercial, financial and legal issues that should be resolved in documentation. In addition, PATRP supported AfDB's African Legal Support Facility to design a scope of work to complete this activity.

Coordination with other Donors and Implementing Partners. PATRP worked with other development and implementing partners, as well as Power Africa partners, on a multitude of projects, mostly by providing advice to international development partners regarding specific projects and assignments as well as the general business climate and energy landscape of Djibouti.

- PATRP supported USAID's DCA, which explored possibilities for DCA support to the ongoing development of captive power solutions by GridX LLC in Djibouti. This support also involved introducing GridX to representatives of local banks in Djibouti that would be interested in working with the DCA.
- PATRP facilitated an engagement between GridX LLC and USTDA.
- PATRP supported the DOD's CLDJ, where PATRP provided energy planning support to DOD's CLDJ operation, and attended meetings at the U.S. Embassy to discuss diversification of the energy mix, along with relevant considerations for the development of renewable energy production. Subsequent meetings between CLDJ and captive power solution provider GridX LLC were organized. This introduction has now advanced to the stage of white paper development for internal DOD consideration.
- Similar support was provided to DOD's Chabelley Airfield operation, including the production of an options paper by the PATRP technical team for Djibouti. The activities comprised a site visit along with a presentation of the relevant considerations and the legal and regulatory framework relating to the development of renewable energy production in the context of Djibouti.

PATRP also provided support on an as-needed basis to the AfDB, and AfDB's African Legal Support Facility (ALSF), the World Bank, the IFC, and MIGA. To this end, the PATRP Transaction Advisor worked with the development partners to contribute to their in-country efforts, including:

- Support to the IFC PPP team during its engagement in Djibouti with the PPP law, which was promulgated in 2017, and also collaborated with World Bank consultants tasked with aligning the draft IPP implementing regulations with the implementing regulations for the PPP law.
- Support to the AfDB's ALSF as they engaged with MERN and GORD entities relevant to transaction activities, with a focus on providing support for IPP legal documentation while navigating the new IPP and PPP legal environments.
- Support to MIGA so that the agency may better understand the investment climate in Djibouti, in the context of the legal and regulatory framework for IPPs, and to better understand the issues relating to GORD's seizure of the DP World operations in Djibouti in 2018.
- Support for GORD membership to the East Africa Power Pool (EAPP), where PATRP collaborated with the EAPP Secretariat and GORD entities to draft the entry documentation required for membership.

ETHIOPIA

RESULTS SUMMARY

14,682
On-Grid & Off-Grid Direct Connections

4,771 MW
Added to Project Pipeline

402
People Trained

PATRP initiated support in Ethiopia in 2014 to assist the Government of Ethiopia, the electricity utilities, and the National Bank of Ethiopia (NBE) with preparing, structuring, negotiating, and tendering power sector transactions.

To this end, PATRP worked to ensure that the Government of Ethiopia is cognizant that the successful implementation of independent power producer (IPP) developments will pave the way for improving the national energy mix by incorporating geothermal, solar and wind power in a sustainable way, thereby increasing reliability and affordability. Moreover, it will also accelerate achievement of electrification goals, and boost the prospects of power exports for the country.

PATRP maintained a transaction advisory presence in Ethiopia since its inception in 2014. In early 2016, the Lead Transaction Advisor was joined by a Power Project Finance Advisor and a Power Project Legal Advisor. From 2016-2018, PATRP advised the Ethiopian Electric Power Company (EEP), Ethiopian Energy Authority (EEA), Ministry of Water, Irrigation and Energy (MOWIE), Ministry of Finance and Economic Cooperation (MOFEC) and NBE. In FY 2017, PATRP's activities extended to providing dedicated support to the Ethiopian Electric Utility (EEU) to reduce commercial losses and connect more customers to the grid. This work stream was performed by a Team Leader, two Commercial Loss Reduction Specialists, and four local staff.

PATRP also supported the development of a modern and efficient electricity grid in Ethiopia through the Grid Management Support Program (GMSP). The objective of the GMSP was to assist in preparing the grid for renewables integration, as well as new generation and transmission projects, to keep pace with expected significant increases in demand and potential electricity export to other countries.

However, a few key issues remain that hinder the establishment of necessary conditions to secure bankable IPP projects, namely:

- Lack of clear guidelines and process on how to initiate a standalone, directly negotiated IPP project for developers and investors to follow;
- Lack of institutional capacity that can initiate, structure and execute IPP transactions without outside help in key disciplines; and
- Undue delays (from the client side) in carrying out the RFP process per the RFP timeline increased the level of perceived risk on developers and investors alike.

The Corbetti Caldera is approximately 240 kilometers south of Addis Ababa in Ethiopia's Rift Valley, where there is substantial geothermal activity. Photo by Robert Sauers USAID.

ACTIVITIES

PILLAR 1: GETTING TO 30,000 MW

PATRP's transaction advisory support was principally focused on assisting the Ethiopian Electric Power company (EEP) with its management of proposed independent power producers (IPPs), both through direct negotiations and a competitive procurement process. Priority transactions included Corbetti (500 MW) and Tulu Moye (500 MW) geothermal IPPs, and the Metehara Solar (100 MW) IPP, the first-ever IPP procured through competitive procurement in Ethiopia.

Corbetti Geothermal (570 MW). The Corbetti power project is a landmark project for Ethiopia, as it is the country's first privately financed, large-scale power project to harness geothermal resources to be developed under an IPP model, and to sign a Power Purchase Agreement (PPA) with Ethiopia's state-owned utility (EEP). The Corbetti project will require a total investment of $2 billion, and will be developed in four phases.

PATRP, in collaboration with the Ministry of Finance and EEP, assembled international legal, technical and project finance advisory team to support the Government of Ethiopia and EEP with negotiations for Corbetti and an additional geothermal project, Tulu Moye (see below). PATRP also worked with AfDB's African Legal Support Facility (ALSF) team to secure funding to retain external legal counsel. This combined transaction team supported the structuring and negotiation of the PPA and Implementation Agreement (IA). At the time of PATRP's close out in Ethiopia, it was anticipated that Parliament would need to ratify the IA to enable financial close of the first phase of development (20 MW) to commence construction.

Corbetti PPA signing – July 2015. Photo by Neb Girma.

Azeb Asnake, former CEO of Ethiopian Electric Power, and Luka Buljan, MD of Berkeley Energy sign the implementation agreement (IA) for Corbetti – December 2017. Photo by InfraCo Africa.

Tulu Moye Geothermal (570 MW). The Tulu Moye geothermal power project is located approximately 100 km south east of Addis Ababa in the Oromia region of Ethiopia, and is part of the historic agreement alongside Corbetti (see above). Similar to the Corbetti project, the Tulu Moye project will also be developed in four phases under a 25-year PPA. The project is led by U.S., French, and Icelandic investors. In parallel with the Corbetti project, PATRP assisted with the negotiation, structuring and execution of the PPA and the IA, and commercial aspects of the project development. Assuming the IA is ratified by Parliament, financial close for the first 50 MW is expected in 2020.

Metehara Solar PV (100 MW). EEP identified solar power generation as one of the resources that will complement its massive hydro portfolio to diversify its generation fleet. To that end, EEP management approached PATRP for assistance to competitively tender the first utility-scale solar project in Ethiopia: Metehara. PATRP assembled a team of international experts, including external legal counsel, a technical advisor, and a tariff expert, to draft the project documents and enable EEP to tender the project under a competitive bid process.

Furthermore, PATRP delivered two workshops to EEP staff on the key elements of project finance, and best practices on conducting financial evaluation of bids. At the end of FY 2017, after completion of both technical and financial evaluation of offers, EEP selected a preferred bidder – a significant milestone for this transaction.

In parallel, PATRP engaged a consulting firm to conduct an environmental and social impact assessment (ESIA) for the project. PATRP later learned that after many months of negotiations between EEP and the zone administration to obtain the land use rights, the zone administration opted to provide EEP with an alternate site, which was adjacent to the initial site. EEP noted that local residents and administration preferred to reserve the original site for agricultural purposes. EEP subsequently requested that PATRP provide the necessary assistance with the remaining works, including:

- review of the pre-feasibility study (technical study review due to change of location);
- geotechnical investigation review (the new site is adjacent to the original site and some additional geotechnical investigations may be required); and
- update the ESIA study.

PATRP deployed its consultants to conduct a new pre-feasibility study to assess the viability of the alternate site and to flag any major project risks. The ESIA was finalized and the project is scheduled to financially close in 2020 and is expected to be online to sell power to EEP under a 20-year term PPA by late 2020.

Mekele, Humera, Welenchiti, and Weranfo Solar IPP Projects (400 MW combined). As a continuation of the support to Metehara (see above), PATRP supported the competitive procurement of the Mekele, Humera, Welenchiti, and Weranfo solar IPP projects, with a combined generation capacity of 400 MW. As part of a fatal flaw analysis, PATRP advisors traveled to the respective sites to assess their suitability

for solar development, and found that the Humera site is suitable for large-scale development, but identified a geopolitical risk due to its proximity to the Ethiopia-Eritrea border. The report also found the original site at Mekele unsuitable and looked at the acceptability of two alternative sites. At the end of PATRP's engagement in Ethiopia, the PPP Directorate, under the Ministry of Finance and Economic Cooperation, shortlisted these IPP solar projects to advance to the development stage, and EEP acquired the land from the regional land administration. PATRP had initially earmarked funds to conduct pre-feasibility studies and ESIAs to prepare the projects for tendering approval by the PPP board; however, given time constraints these activities were transferred to EAEP.

Awash II and III, Koka, Tis Abay I and II, and Tekeze Hydro Projects. In 2018 MoWIE requested PATRP assistance with rehabilitation studies for the Tekeze, Awash II and Awash III, and Koka hydropower projects. PATRP deployed a hydropower expert in late March 2018 to determine what, if any, actions can be taken to increase generation output at each plant and provide a more focused terms of reference for maximizing the energy out of the plants. PATRP submitted the final rehabilitation study and condition inventory report to the MoWIE Minister, EEP, and USAID for the hydropower plants inspected, which contained several recommendations aimed at improving operational efficiencies, and generation output. The Minister was briefed by PATRP on the report findings, to include proposed interventions, which identified opportunities for efficiency improvements and increased generation output. It is anticipated that this activity will be advanced by EAEP.

PILLAR 2:
GETTING TO 60 MILLION CONNECTIONS

ON-GRID

PATRP's support to the Ethiopian Electric Utility (EEU) resulted in more than 13,000 new on-grid connections for homes and businesses in Addis Ababa. See Pillar 3 for details on this work stream.

BEYOND THE GRID

Support to Private Sector Companies. PATRP supported several off-grid electricity companies in Ethiopia on a range of business-related issues:

- PATRP supported the U.S. company Biolite in their endeavor to enter the Ethiopian market, which included identifying a local partner, a savings and loan circle used across Ethiopia (generally by women) to help finance different activities or purchases. PATRP also shared several prospective leads and introduced Biolite to companies across Ethiopia, Uganda, Tanzania and Kenya.
- PATRP supported HelloSolar, part of the HelloCash and BelCash mobile money family funded through the Shell Foundation, World Bank, and USAID. Support included coaching company executives, supporting implementation, updating their investor slide deck, introducing the company to lenders, and refining their distribution model.
- PATRP supported Fenix International with market entry into Ethiopia.
- PATRP supported Precise Consulting with their remittance model, and via connections to industry experts and introductions to the greater solar energy provider community.
- PATRP supported M-Birr, a mobile money company located in Ethiopia, with its quest to develop partnerships with energy companies. M-Birr initially selected six government micro-finance institutions (MFIs) to test their model, and PATRP connected M-Birr to several larger solar companies as potential partners. Most importantly, shared best practices and lessons learned from other MFI models from Kenya and globally with M-Birr.

Support to Global Off-Grid Industry Organizations. PATRP supported IFC Lighting Africa Ethiopia by connecting them with manufacturing and PAYGO companies outside of Ethiopia for the IFC Off-Grid Matchmaking and Networking event held in May 2018. PATRP worked with IFC to share information about PAYGO at the conference and the IFC designated two speaking spots to PATRP at the conference to present on the ecosystem that is required to implement PAYGO and PAYGO technology, as well as which companies offer the technology. PATRP also shared its initial research on Ethiopia with AECF, supporting them in their research and development of their ecosystem in Ethiopia to support their REACT program window.

Rooftop Solar Assessment. In 2016, PATRP conducted field studies to determine the preliminary levelized cost of electricity (LCOE) of rooftop solar. Ethiopia's rooftop solar program targets affordable housing and low-income communities in peri-urban areas of Addis Ababa, targeting 70,000 buildings with an expected population of 250,000 people. PATRP developed an analysis comparing the rooftop solar program and utility scale projects of the same magnitude. Using PVSyst software, PATRP ran the LCOE under four scenarios – one run was conducted for the rooftop system, while three additional runs were conducted to analyze the LCOE of larger utility-scale projects.

While the analysis showed that utility-scale projects have lower LCOE compared to the rooftop solar program, which was expected, other factors such as land and resettlement issues, as well as impact from capacity-building efforts with local private developers, play a significant role in supporting the rooftop solar program efforts. However, the team also identified that the Government of Ethiopia would require significant training and capacity-building efforts to implement the rooftop solar program, including resources outside the scope of the PATRP support.

PILLAR 3: UNLOCKING ENERGY SECTOR POTENTIAL

Commercialization Assistance to EEU. In 2017, PATRP deployed a utility reform team focused on improving the commercial performance of the Ethiopian Electric Utility (EEU) in its South Addis Ababa Region (SAAR). This program was typically referred to as 'Meter to Cash', or 'M2C'. From an electricity usage and collections perspective, the major commercial revenue generating territory within Ethiopia is Addis Ababa. Based on the documentation provided by EEU, four out of fifteen EEU service territory regions are in Addis Ababa and surrounding suburbia. These regions contribute almost 55 percent of the total billing revenues for EEU.

Of their approximately 2.5 million customers, EEU estimated that 1.75 million were billed monthly, 250,000 were pre-paid, 300,000 were inactive, and 200,000 were unbilled. There were also challenges relating to inaccuracy of estimated billing, electricity theft (due to meter tampering or corrupt meter readers), lack of processes for energy accounting, and lack of bill collection enforcement.

When PATRP's M2C team first engaged, customers did not receive electricity bills, but were rather required to visit a service center to learn the amount owed and remit payment.

PATRP's M2C program embedded a team of technical experts within EEU Retail Business Department to help streamline operations, develop and implement efficient processes, and build staff capacity. The M2C team focused primarily on improving EEU'se cash collection activities by concentrating on and improving several activities within the utility's commercial cycle, which broadly consists of meter reading, billing, cash collection, and disconnection for non-payment.

Other PATRP activities included detection and reduction of non-technical losses through replacement of faulty meters, and identification of distribution transformers in feeders where an energy balance pilot project was implemented. PATRP conducted an exercise to identify all of the distribution transformers (DTs) that would require meter installation in a chosen pilot area for energy balance and loss identification. This study was presented to the EEU and PATRP worked with utility leaders to identify required material and labor to execute the meter upgrade project.

Single-phase meters being tested on a partially functioning meter test bench in EEU.

Distribution transformer to be metered for energy balance purposes.

To achieve the improved results, PATRP:

- Identified the main/key customers within SAAR and commenced a process of supplying bills to these customers and implementing a cash collection follow-up process, including disconnection;
- Advised on better collection processes for the customers;
- Improved the method of historical debt collection within SAAR; and
- Established procedures for collection of debts from large municipal customers, and advised on similar processes for residential customers.

These activities helped EEU increase its billing and cash collection activities, with more than $5.3 million in additional revenue collected, compared to a target of approximately $950,000.

Grid Management Support Program (GMSP). PATRP supported the development of a modern and efficient electricity grid in Ethiopia through the Grid Management Support Program (GMSP), the aim of which was to prepare the grid for renewables integration, as well as new generation and transmission projects, to keep pace with expected significant increases in demand and potential electricity export. Outcomes also included new distribution and transmission grid codes, and system analyses on renewable penetration, as described below.

PATRP conducted a System Integration Study (SIS) that determined the optimal intermittent (solar and wind) mix to complement the baseload generation (hydro and geothermal). A PATRP-led System Operations Gap Analysis (SOGA) identified operational requirements for integrating new generation (conventional and renewables) to deliver quality and reliable electrical services. The new transmission Grid Code specifies the rules and responsibilities for all stakeholders involved in grid operations (and complies with the PATRP-developed EAPP Interconnection Code for cross-border energy trading). The Final draft for SOGA and SIS were delivered to the Government of Ethiopia in 2018.

PATRP's GMSP engagement helped the Government of Ethiopia address the demand forecast for the interconnected systems for 2018-2030, validated the 2018-2030 generation and transmission expansion plan,

provided a detailed operational analysis with renewable integration assessment, and addressed key concerns of project developers and lenders.

Energy Sector Regulations. PATRP assisted with the development of new laws and regulations to facilitate IPP investments, and advocated for strong and transparent regulatory frameworks. Prior to 2015, geothermal resource development activities were regulated under the mining law. While negotiating the Corbetti and Tulu Moye transactions, the Government of Ethiopia carved out the regulation of geothermal from the mining law, and drafted a new geothermal law to manage all geothermal projects under a single regulatory framework. To that end MOWIE requested assistance from Power Africa to help develop the first geothermal law in Ethiopia. PATRP advocated, participated in stakeholders' meetings and provided input on the geothermal regulation, which was drafted and finalized by the IFC.

PATRP also assisted in the amendment of the energy law which was enacted into law on June 8, 2018. In addition, the team advocated for the energy operations regulation (currently awaiting Council of Minister's ratification) to accommodate and accelerate IPP development.

Furthermore, PATRP advocated for the enactment of the PPP proclamation, which was passed into law on February 22, 2018. PATRP provided input during the drafting of the PPP proclamation on issues that would likely raise concerns about, or may impair implementation of, privately financed public-private partnership projects and participated in stakeholder meetings.

Institutional Gender Assessment of the Ethiopian Electric Utility. PATRP's Gender Advisor visited EEU in April 2017 to map existing policies and programs that facilitate and increase women's participation in the utility, particularly with respect to leadership positions. Based on the mapping, gaps and challenges were identified to inform a gender action plan for implementation by EEU, with financial and technical support from the World Bank.

As part of this activity, PATRP identified synergies between Power Africa and World Bank activities in relation to support to Ethiopia's power sector and gender equality. Opportunities for collaboration were identified in the context of an existing memorandum of understanding between the World Bank and Power Africa. Accordingly, the findings from the mapping and needs assessment informed activities relating to gender mainstreaming in the World Bank's Ethiopia Electrification Project Document.

A gender expert was recruited by the World Bank to be embedded in the EEU to work alongside the Acting Director of Women and Children's Affairs.

Tariff Review. As part of its support for legal and regulatory reforms, PATRP advocated for the passage of cost-reflective retail tariff structures. PATRP advised MOWIE, and coordinated capacity building for EEA, EEP and EEU, to assist in the electricity tariff adjustment exercise that was authorized by the Energy Ministry, which resulted in a decision to adjust the retail electricity tariff to an average of $0.06/kWh from its current rate of $0.018/kWh over the course of four years, starting December 8, 2018.

Capacity Building and Training. The lack of knowledge on how to implement good utility practice, combined with lack of prudent planning and operations expertise and experience, is the most significant obstacle to getting sufficient electricity production to meet the growing internal and export demand expected of utilities the size of EEP and EEU. PATRP diligently worked with the private sector, development partners, and other stakeholders to address these barriers by providing capacity-building and institutional-strengthening activities to help the utilities deliver reliable and efficient electricity service. Moreover, PATRP was a source of reliable energy sector information for private sector investors interested in actively investing in the energy sector in Ethiopia due to our close advisory role to MoWIE and its Minister, including other Government of Ethiopia ministries and agencies involved in energy sector development.

STRENGTHENING GENDER EQUALITY AND INCREASING WOMEN'S PARTICIPATION IN THE ETHIOPIAN POWER SECTOR

Could on-site childcare facilities boost performance at a national power utility by creating a better workplace for women? Meazagenet Tsegaye at the Ethiopian Electric Utility (EEU) strongly believes so. As the Acting Head of the Women and Children's Affairs Department, Ms. Tsegaye's mission is to advance gender equality within the electricity distribution company. She and EEU teamed up with Power Africa and the World Bank to explore ways to effectively integrate gender considerations into daily business operations, including provision of on-site child care.

The EEU has 12,083 employees, of which only 2,502 are women. Only 13 percent of female employees hold senior management positions (3 of 23). However, if the utility expects to meet its goal of serving 7 million customers by 2025, more than double its current base, EEU will need to recruit and retain the nation's best talent, both male and female.

The utility has identified several priority initiatives that can help attract and keep female employees. In fact, EEU recently adopted a Gender Mainstreaming Policy and Procedure, which is informed by broader national commitments on gender equality. To support the EEU in the implementation of their policy, PATRP undertook a mapping exercise to identify any remaining gaps and challenges. A resulting Action Plan highlighted below translates EEU's policy into actionable interventions designated to specific department heads within the company.

The EEU believes that a better work environment for women can help build a better power company for Ethiopia. This belief is bolstered by evidence that gender diversity plays a key role in organizational performance, efficiency, and success. With support from Power Africa and the World Bank, the EEU has an actionable plan to find and keep great female employees, integrate gender into business strategy, and contribute to the creation of a more empowered nation.

Adapted from the Power Africa blog, prepared by PATRP's Gender Advisor (https://medium.com/power-africa/strengthening-gender-equality-and-increasing-womens-participation-in-the-ethiopian-power-sector-fdc4f4049e55)

KENYA

RESULTS SUMMARY

771 MW	559,826	310 MW	3,126 MW	408
Reached Financial Close	On-Grid & Off-Grid Direct Connections	Commissioned	Added to Project Pipeline	People Trained

The Kenyan power sector has evolved from a single, privately owned and vertically integrated utility in 1922, to the current unbundled structure comprising a mix of public and private ownership. Kenya Power (formerly KPLC) is the sole off-taker. Approximately 74 percent of the population has access to electricity, either connected to the grid or to public sector mini-grids.

PATRP's technical assistance covered three main areas: (i) transaction advisory support to private developers on generation projects; (ii) ad hoc assistance to Government through the Ministry of Energy (MoE) and state-owned entities (SOEs), which include Kenya Power, Kenya Electricity Transmission Company (KETRACO), and the Energy Regulatory Commission (ERC); and, (iii) enabling environment activities, including a National Strategic Environment Assessment to identify and address any biodiversity risk from wind power development in Kenya.

PATRP was engaged in Kenya from July 2014 to February 2019, with a multi-disciplinary team comprising of a Lead Transaction Advisor, Senior Technical Advisor, Regional Geothermal Advisor, a Transaction Advisor Legal, and a Community Engagement Advisor. PATRP also had a Senior Transaction Advisor embedded within KenGen from May 2016 to November 2017. For off-grid power projects, PATRP maintained a resident Beyond the Grid (BTG) Advisor for Kenya, as well as a BTG Market Development Advisor and Off-Grid Business Specialist. Additional short-term technical assistance was provided to support this advisory team over the course of the PATRP mandate, as further detailed in this report. In parallel, in 2016 PATRP deployed a Senior Advisor to the Cabinet Secretary position within the Ministry of Energy. Additional support was provided via short-term technical assistance.

ACTIVITIES

Lake Turkana Wind Power Project. Photo by LTWPP.

PILLAR 1: GETTING TO 30,000 MW

Lake Turkana Wind Power Project (310 MW). The Lake Turkana Wind Power Project (LTWPP) is the largest grid-connected wind farm in sub-Saharan Africa, and was among the first projects to reach financial close under PATRP in December 2014. However, the project required significant support to reach commercial operations and safely dispatch power into the national grid. PATRP's assistance to the Grid Management Support Program (GMSP, see Pillar 3 below) was critical, as the GMSP was a Condition Precedent to the financing of the project. In addition, PATRP helped KETRACO and Kenya Power develop and implement solutions to key issues affecting the smooth operation of the grid once LTWPP was ready to go online. Specific deliverables included:

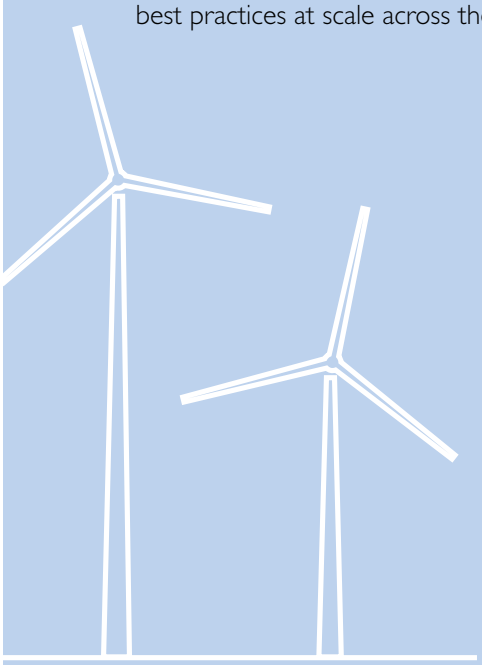
- Kenyan Power System Stability Study (including definition of new system limits with LTWPP in operation, new criteria of how to operate the system, suggestions to enhance existing system capabilities, review/update of applicable grid code requirements, etc.);
- System Emergency Procedures (including creation of System Defense Plan and System Restoration Plan); and,
- Real-time Data Exchange with Lake Turkana WPP (including review of current PPA requirements in the terms of real-time data exchange and improvements suggestions and definition of operational procedures for conducting audits of submitted real-time data from LTWPP).

In March 2019, an independent engineer issued the Plant Commercial Operation Test (PCOT) Certificate, meaning LTWPP was online and operational. The commissioning of the power plant represented a significant milestone in both the advancement of renewables in Kenya, as well as for PATRP.

KIPETO WIND POWER PROJECT

PATRP assisted both the Government of Kenya and the developer of the 100 MW Kipeto Wind Project, which reached financial close in December 2018. PATRP supported efforts to secure a bankable Power Purchase Agreement (PPA) and Government Letter of Support (GLOS), and performed a project-specific Biodiversity Action Plan, which was a condition precedent to reaching financial close.

Two critically endangered vulture species, the Rüppell's Vulture and the White-backed Vulture, appear regularly within Kipeto's Project area and qualify the area as Critical Habitat. To align with IFC's Performance Standard 6, the project was required to apply a mitigation hierarchy to avoid, minimize, restore, and where necessary offset the biodiversity impacts. PATRP performed a project-specific Biodiversity Action Plan that was critical to advancing the project to financial close. A second PATRP-supported study, the National Strategic Environmental Assessment for Windpower and Biodiversity in Kenya, is expected to catalyze best practices at scale across the wind industry in Kenya and across East Africa (see Pillar 3).



> Kudos to PATRP for executing this assignment with speed, which has contributed significantly to the progress of the Kipeto transaction.
>
> Eng. William Madara,
> Program Management Specialist – Energy
> USAID Kenya and East Africa

Rumuruti Solar (40 MW). The PPA for the 40 MW Rumuruti Solar project was signed in 2018 and the sponsors commenced the process of applying for a GLOS. PATRP engaged with debt providers on behalf of the project sponsors, and provided support on key points to the project before and during PPA negotiations with Kenya Power. PATRP also approached the AfDB to provide financing for the 132kV Nanyuki-Rumuruti transmission line needed to evacuate power, which was approved in December 2018. The completion of the transmission line is a Condition Precedent to the project reaching financial close.

Front-runner Solar Transactions (160 MW). Following two years of continued support by PATRP, several front-runner solar IPP transactions received Government Letters of Support in FY 2018, including Radiant Solar (40 MW), Eldosol Solar (40 MW), Malindi Solar (40 MW), and Alten Solar (40 MW). Generally speaking, these letters allowed the projects to progress toward financial close. Indeed, Malindi Solar reached financial close in June 2019, Radiant and Eldosol in September 2019, and Alten is expected soon.

Malindi Solar PV (40 MW). PATRP assisted with negotiations and lobbying for the issuance of a bankable PPA and GLOS, and supported the due-diligence efforts of the debt financing provider, CDC. The project received approvals from the Energy Regulatory Commission regarding Change of Control (from Malindi Solar Group to Globeleq) and for the Deed of Variation. The National Lands Commission also approved the Change of User on the land. Financial close was achieved in June 2019.

Ngong Wind Farm (25 MW). PATRP conducted a performance analysis and resource assessment for the Ngong Wind Farm, which had been underperforming. The assessment was also designed to assess the potential for a proposed expansion. Following completion of site inspection/assessment of the Ngong Wind Farm and training of KenGen staff by PATRP, the wind farm performance analysis and wind resource assessment report were delivered to KenGen. KenGen indicated that they were grateful for PATRP's intervention and the interim findings of the assessment, which identified issues with location of the turbines, as well as some operational concerns. In February 2019, KenGen announced that the expansion will proceed and new turbines will be constructed to increase power output by 10 MW.

3-D Simulation of the Ngong Wind Farm provided by PATRP.

Lamu Gas-to-Power Project (50 MW). In August 2018, the Lamu Gas-to-Power Project commenced drilling of the first exploratory well and surpassed 2,000 meters. It is targeting a depth of 4,300 meters to allow the developer to accurately determine resource availability. The project sponsor received feasibility study funding from USTDA and technical assistance from PATRP. PATRP helped the sponsors raise financing by facilitating introductions to potential equity partners and lenders.

KenGen Geothermal Support. Power Africa and KenGen established a strategic partnership in 2016 to help improve KenGen's operational efficiency and advance Kenya's energy goals. In support, PATRP deployed a Senior Geothermal Utility Advisor, based in Nairobi, to focus on completing KenGen's immediate pipeline of geothermal projects, namely competitive tenders for three new Olkaria projects totaling 350 MW, as well as the rehabilitation of Olkaria I.

In addition, PATRP worked with KenGen on planning and developing a new binary electric generating project to be located near existing Olkaria generating plants to maximize the existing well production. PATRP's assistance was rendered through its regional geothermal advisor based in Kenya. At the end of PATRP engagement, funding for the project had not been secured.

Specific PATRP activities included:

- Supporting development of additional MW generation through Special Purpose Vehicles (SPVs), by completing exploratory discussions with investors, and synthesizing investor insights for KenGen's consideration.
- Continuing to build CAPEX optimization capabilities at KenGen by delivering models and tools to the KenGen team, and designing a Contract Management Office, a project Control Tower, and the overall Portfolio Management architecture (including demonstrations for KenGen leadership).
- Finalizing the RFP for binary plants using hot brine from existing well separators. The original concept involved one project sized at 2,000 tons per hour of 190°C fluid (project size estimated at 20-30 MW), but later evolved to two projects with an approximate size of 400 tons (4-7 MW) each. The reason for change is the multiple locations of the supply fluid, making it very difficult to structure as one large project. The project has been considered under several commercial structures including public financing, contractor BOO and finally an arrangement of whereby KenGen engages an EPC contractor only, with KenGen owning and operating. To date, funding for the project has not been secured by KenGen.

KenGen Olkaria V Geothermal (158 MW). On April 28, 2017, President Uhuru Kenyatta presided over the groundbreaking ceremony for the construction of the Olkaria V Geothermal power plant, which PATRP attended. The $550 million project is financed through a $400 million JICA loan, and the balance from KenGen reserves and proceeds from the recently held rights issue. PATRP's embedded advisor in KenGen provided technical support in development of the bid documents and review of the bids submitted for construction of the power plant.

Olkaria VI PPP (140 MW). On KenGen's request, PATRP reviewed the feasibility study for this proposed public-private partnership (PPP) project, and submitted a report on the optimal scenario for KenGen to participate in and unlock maximum value from the project, as well as recover costs associated with risk for resource exploration and steam drilling.

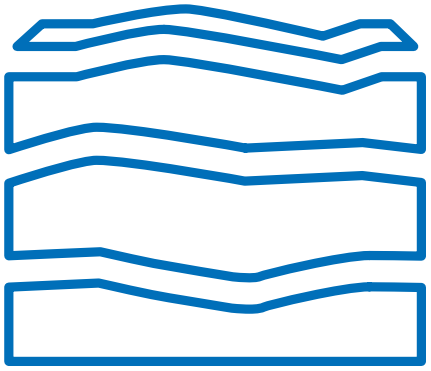
Olkaria I Additional Unit 6 70 MW Tender. PATRP provided support to KenGen on this project by conducting capital expenditure (CAPEX) optimization prior to the public tender. In September 2018, the Government of Kenya granted approval for the Japanese International Cooperation Agency (JICA)-funded portion and the contracting parties signed the contract. Financing for the steamfield development is pending, but KenGen will undertake retroactive financing to ensure no delays on this portion. President Kenyatta presided over the groundbreaking ceremony for the project on December 4, 2018. Commencement dates were agreed upon and all parties are working to finalize a few pending contracting issues between the European Investment Bank, JICA, and the National Treasury. The Commercial Operations Date (COD) is anticipated for late 2020 or early 2021.

Olkaria Eco-Industrial Park. During the groundbreaking ceremony for Olkaria I Unit 6, President Kenyatta announced that KenGen set aside land in Nakuru County for development of an industrial park

Olkaria V Project Site.

that would consume geothermal power at the source and provide job opportunities for youth. In FY 2019, PATRP submitted a strategy paper for USAID review regarding development of an Eco-Industrial Park in, Kenya, that would capture and utilize geothermal energy. The concept is strongly supported by KenGen and the Geothermal Development Company (GDC). Further consultations with ERC and the Ministry of Energy relating to the development of an optimal tariff and other policy issues are continuing via EAEP.

Menengai Geothermal Project (3 X 35 MW). Three IPPs intend to generate the first 105 MW from Menengai and each will install a 35 MW power plant. PATRP assisted with due diligence efforts for the AfDB, who are the lenders on one of the transactions, and lobbied for the off-taker, Kenya Power, to expedite payments to another of the IPPs to ensure smooth financing of the three Menengai projects. Kenya's Geothermal Development Corporation (GDC) and the IPPs signed a Project Implementation and Steam Supply Agreement (PISSA), which stipulates that the IPPs will finance, design, construct, install, operate, and maintain the plants on a Build-Own-Operate (BOO) basis. The IPPs also signed a PPA with Kenya Power, the power off-taker.



PILLAR 2:
GETTING TO 60 MILLION CONNECTIONS

Support to Private Sector Off-Grid Companies. PATRP's BTG advisors were actively engaged with more than 50 solar home, micro-grid, and small-scale renewable energy companies in Kenya including PowerGen, Greenlight Planet, BBOXX and Tesla. PATRP support varied depending on the need of off-grid companies, and included grant application support, advisory support to private companies navigating local laws, regulations and licensing, and introductions to potential investment partners as well as preparing companies in their pitches to investors. As an example, PATRP supported the micro-grid company Renewvia to raise funding for its development of 15 mini-grid sites in Kenya. The 15 sites will result in 3,900 connections, 21,450 people impacted and 0.5 MW installed. PATRP also helped companies to source local currency funding and assisted with the organization of events to promote off-grid products.

> In my experience there is no one more knowledgeable and insightful about the sector than [PATRP BTG Advisor, Carolina Barreto] is.
>
> Anne Amanda Bangasser,
> Director
> Treehouse Investments, LLC

PATRP BTG Transaction Advisor Carolina Barreto (middle) at a mini-grid installation in Kenya, with Mt. Kilimanjaro behind.

$55 MILLION STANBIC-M-KOPA DEAL

The $55 million Stanbic-M-KOPA deal reached financial close in September 2017. Co-lenders included Stanbic ($9 million), CDC ($20 million), FMO ($13 million) and Norfund ($13 million). The deal will serve both Kenya and Uganda, is denominated in local currency, and will be backed by customer receivables, paid over mobile money payment plans. It is the largest commercial debt facility to date in the pay-as-you-go (PAYGO) off-grid energy sector. PATRP provided support to Stanbic with overall sector due diligence in November 2016 and March 2017.

Financing Support. PATRP supported more than 30 financial institutions in Kenya, including Results-Based Finance funds, Working Capital Facilities, Mobile Money Platforms, and crowdfunding partners, among others. Support included market intelligence to banks on various off-grid sectors, helping banks strategically understand how they could support off-grid products with local currency financing products.

PATRP participated in the mini-grid tariff modelling study and in the development and review of the mini-grid regulations by GIZ. PATRP support to the micro-grid sector continued through participation in the final stakeholder workshop for new, GIZ-led, micro-grid regulations, and presented to the ERC its micro-grid PPA model. As a result of PATRP inputs, the mini-grid regulation included private sector-friendly clauses such as (i)compensation calculations in the event of grid encroachment; (ii) cost-reflective tariffs; (iii) grid-connected mini-grids accepted; and (iv) a light-handed distribution licensing track.

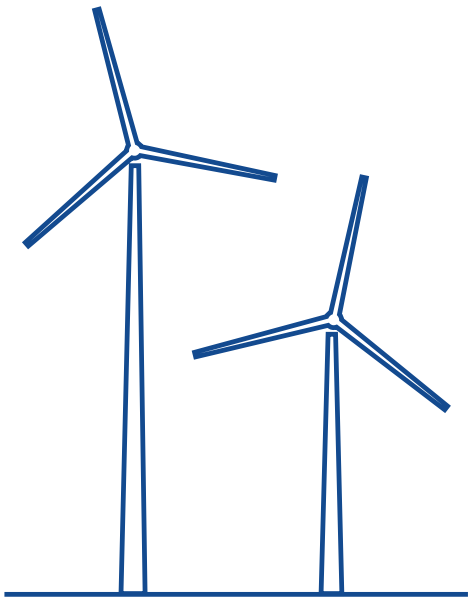
Kenya Off-Grid Solar Access Project (KOSAP). PATRP supported the design of the $150 million, World Bank-funded KOSAP program, which was officially launched in September 2017 and is intended to enable marginalized communities in Kenya to access modern energy services through off-grid solar. The project will use a combination of investments to provide modern energy services, to households, businesses and community facilities. PATRP was instrumental in garnering the views and feedback from private sector participants in the SHS and mini-grid sectors, to ensure that the program was fit for purpose. PATRP continued to advise and support the private sector in preparation of their proposals for the SHS component of the program with partnerships from organizations based in the 14 targeted counties.

Smart Communities Coalition (SCC). As also reported under the East Africa activities, PATRP supported the Smart Communities Coalition (SCC), which is a public-private venture led by Power Africa and Mastercard that employs technology and strategic partnerships to empower refugees with the ability to provide for themselves and their families, and can help generate greater value to host communities. In Kenya, PATRP participated in a two-day SCC design workshop in furtherance of discussions on diesel and kerosene displacement in humanitarian settings through the deployment of mini-grids and SHS. PATRP also shared the initial draft of the working group's roadmap and has supported the development of a high-level pilot project concept note for Kenya.

Smart Communities Coalition.

Removing Barriers. PATRP supported GOGLA in its efforts to reverse or secure exemptions from the East African Community's import tax codes that will affect the off-grid sector, including taxing LED light bulbs. In parallel, PATRP supported the private sector with up-to-date information on the licensing, importation, and tax exemption requirements and processes to ensure consistency among the sector. For example, PATRP convened a workshop late in 2017 that brought together more than 70 solar PV companies and Government of Kenya agencies (Energy Regulatory Commission, MOE, Kenya Revenue Authority, and Kenya Trade Network) to increase awareness of the sector on the current systems, train them on how to use the online importation system launched in July 2017, and identify challenges facing the private sector for further engagement by PATRP and other industry associations and to be addressed by the Government of Kenya.

As a result of this engagement with the Kenya Revenue Authority (KRA) and private sector companies, PATRP proposed the creation of an SHS working group within the Kenya Renewable Energy Association (KEREA) that serves as a channel of communication with KRA for the private sector to report transparency issues they experience with their shipments.



PILLAR 3: UNLOCKING ENERGY SECTOR POTENTIAL

Grid Management Support Program (GMSP) and Grid Code Development. To prepare for renewable energy integration in Kenya, PATRP helped develop new grid codes and identified related technical needs. Strengthening its network will allow Kenya to keep pace with increased demand, and plan for potential electricity export to other countries. PATRP assisted the regulator (ERC) with the review and update of the Grid Code into two codes for electricity transmission and distribution in 2013-2018. This work included a regulatory impact assessment, assistance to the various grid participants (Kenya Power, KenGen and IPPs) in conducting an assessment of their compliance to the grid code, and support to ERC in the gazettement process of the code.

Operational Readiness Support to KETRACO/ KPLC to Onboard the Lake Turkana Wind Power Project. The 310 MW Lake Turkana Wind Power Project (LTWPP) in Kenya is delivering power into the grid thanks to PATRP support for a system stability study and a plan for real-time data exchange between the wind farm and the national grid control center. PATRP helped develop and implement solutions to key issues affecting the smooth operation of the grid once LTWPP was fully online. Specific deliverables included conducting a Kenyan Power System Stability Study that defined system limits with LTWPP in operation, new criteria of how to operate the system, suggestions to enhance existing system capabilities, and an update of applicable grid code requirements. PATRP also supported the implementation of a Real-time Data Exchange system between LTWPP and the national grid control center.

Kenya National Electrification Strategy (KNES). PATRP contributed to the development of the Kenya National Electrification Strategy, which was launched in December 2018. The KNES aims to ensure that the Government of Kenya's goals of universal access to electricity by 2022 will be achieved. Some of the key challenges to achieving this goal included high connection charges; high costs of supplying electricity

to rural and peri-urban households; lack of appropriate incentives to attract private investors; inappropriate technical standards and nature of settlements; weak implementing capacity and difficulties and delays in obtaining wayleaves consents, rights of way and demands for high compensation.

One of the most contentious issues during the program design process was the Government of Kenya's inclination to provide consumer-facing subsidies, which would distort the SHS sector in Kenya. As a result of PATRP consultation, the private sector presented alternative solutions that can support low-income communities and would not distort the market, such as voucher systems, results-based finance grants, and local currency finance, among others. PATRP submitted the private sector input to the KNES committee and its consultant, NRECA. In addition, GOGLA and KEREA, the two main SHS industry associations, issued letters endorsing PATRP's recommendations.

Financing Transmission Targets. PATRP assisted the Government of Kenya and KETRACO with initiatives required to finance Kenya's estimated $14-18 billion gap to achieve generation, transmission and distribution, and off-grid electrification. PATRP presented options to KETRACO that included blended finance structures with development finance institutions and local and international commercial lenders, as well as promotion of a Build-Own-Transfer (BOT) option on transmission lines to attract private capital and skills. KETRACO subsequently gazetted five BOT pilot lines, and at the end of PATRP engagement KETRACO was mobilizing concessional funding for a Transaction Advisor (legal, financial, and technical) to design the feasibility studies of the pilot lines and advise on implementation.

Revised Energy and Petroleum Policy. PATRP assisted the Ministry of Energy with comments on the Concept Paper on transitioning from Feed-in Tariffs (FiT) to Renewable Energy Auctions, which preceded a feasibility study on the same funded by Agence Française de Développement. PATRP later advised the Task Force established by the Ministry on IPP PPAs and transitioning from FiT to auctions.

Tariff Reduction Plan. PATRP developed a Tariff Reduction Plan that broke down the different components of the tariff (generation, transmission, distribution, pass through costs, etc.) and devised specific strategies to realize efficiencies and/or mitigate costs – resulting in a quantifiable, time-bound action plan. The plan was successfully presented to the Presidency for approval.

Kenya Power 5-Year Strategic Plan. PATRP worked with Kenya Power (formerly KPLC) to develop a new 5-Year Corporate Strategic Plan. Kenya's markets, technology, institutions, and regulatory characteristics are under continuous change, rendering parts of the existing strategic plan obsolete before completion of the 5-year horizon in 2020-21. Among other tasks, PATRP engaged to deliver 5-year projections for key performance indicators related to the human, material, and financial resources necessary to achieve the goals of the plan. PATRP also undertook an assessment of possible consumer energy tariff reduction and distribution operational efficiency by baselining Kenya Power's losses, reviewing ongoing loss-reduction initiatives, and developing detailed action plans to reduce technical, commercial, and collections losses. This workstream was transitioned to the East Africa Energy Program in 2019.

KenGen Community Engagement Strategy. Building on a Power Africa-sponsored New Zealand Exchange program led by USEA in 2017, as well as the launch of the *Power Africa Guide to Community Engagement for Power Projects in Kenya* (see next page), PATRP's Community Engagement Advisor provided technical assistance to KenGen to examine the challenges and opportunities for more effective community engagement with a focus on KenGen's growth strategy. KenGen has experienced challenges from communities due to lack of complete buy-in and project acceptance. For this reason, KenGen sought and received technical support to develop this strategy from Power Africa. Working closely with a multi-disciplinary team of KenGen staff, PATRP's Community Engagement Advisor helped develop a comprehensive Community Engagement Strategy that features a values-based approach to community engagement. Upon approval by the Executive Committee, the core team responsible for developing the strategy, with the support of the PATRP Community Engagement Advisor, held sensitization and feedback sessions with KenGen staff throughout the country. Discussions with community representatives were also held separately at Turkwel, Sondu, Seven Forks and Kipevu operation areas. The KenGen Community Engagement Strategy was officially released in August 2019.

GUIDE TO COMMUNITY ENGAGEMENT FOR POWER PROJECTS IN KENYA

Recognizing that land acquisition and community engagement can be challenging in Kenya, PATRP developed a *Guide to Community Engagement for Power Projects in Kenya* that aims to assist power generation and transmission project developers to plan and conduct more effective, robust, and transparent community engagement. The Guide was launched in Nairobi in January 2018 at an event featuring U.S. Ambassador Robert F. Godec, Principal Secretary of the Government of Kenya's State Department of Petroleum, Andrew Kamau, and other stakeholders. The Guide is designed to be an actionable tool for developers of electricity generation and transmission infrastructure and outlines best practices for the kind of inclusive and effective engagement needed to create positive outcomes for companies and communities alike. PATRP worked with USAID Kenya to organize the launch and generate media coverage of the event. PATRP-led webinars were conducted to introduce the guide to transaction advisors, appropriate staff within the U.S. Government and private sector power developers in Kenya.

Launch of the *Guide to Community Engagement for Power Projects* in Kenya in Nairobi.

L-R: Sandra Agola, Business Development Associate at Power Africa Partner Globeleq; Eunice Pulei, a member of the indigenous Masaii community in Olkaria; Andrew Kamau, Principal Secretary of the Government of Kenya's State Department of Petroleum, Ministry of Energy & Petroleum; U.S. Ambassador to Kenya, Robert F. Godec; Dr. Ken Nyaundi, an advocate of the High Court and Executive Director of the Institute for Research and Policy Alternatives; Zainab Chemughe, a youth representative and peer mentor in the PEPFAR/USAID-funded DREAMS Initiative implemented by Power Africa Partner Global Communities; Kimberly Tilock, Kenya Country Director for Power Africa Partner Global Communities. (Photo: Ryan Kilpatrick for Power Africa)

Solar PV PPA Capacity Building Support Trip (Kenya Power). In April 2016, PATRP hosted delegates from Kenya Power in South Africa as part of a study tour to build capacity to negotiate and implement PPAs for utility-scale solar PV projects. PATRP consequently arranged a trip to visit two Solar PV IPPs in Kimberley. In addition, meetings were arranged with the national electricity utility of South Africa (Eskom) and law firm Herbert Smith Freehills in Johannesburg. The overall purpose of this initiative was to provide legal and commercial capacity building support to Kenya Power on the terms of solar PV PPAs through a tour of operating solar PV plants in South Africa and holding meetings with key parties involved in solar PV projects. The delegation was later assisted by the PATRP team based in Nairobi. These activities were instrumental in helping to advance Kenya's own front-runner IPP projects.

Scatec Solar PV Farm, Kimberley.

Training at the Kenya Power Institute for Energy Studies and Research. PATRP provided support to the Kenya Power Institute of Energy Studies and Research (IESR) in the development of a new Renewable Energy Curriculum, including the following courses developed by PATRP: (i) Strategies for Developing Renewable Energy Projects – Mini-Hydro; (ii) Strategies for Developing Renewable Energy Projects – Solar PV; (iii) Strategies for Developing Renewable Energy Projects – Wind Power. This support was provided through utilization of a mix of local and international experts, and included a train-the-trainer component. PATRP discussed next steps for collaboration with IESR, and recommended that the Institute continue its progression on rebranding and rebuilding itself as a Center of Excellence. In addition, there are other courses that should be developed to enable the Institute to continue growing in its role as the hub for renewable technologies and advances in energy management.

IESR Solar PV Training Site Visit in Nairobi.

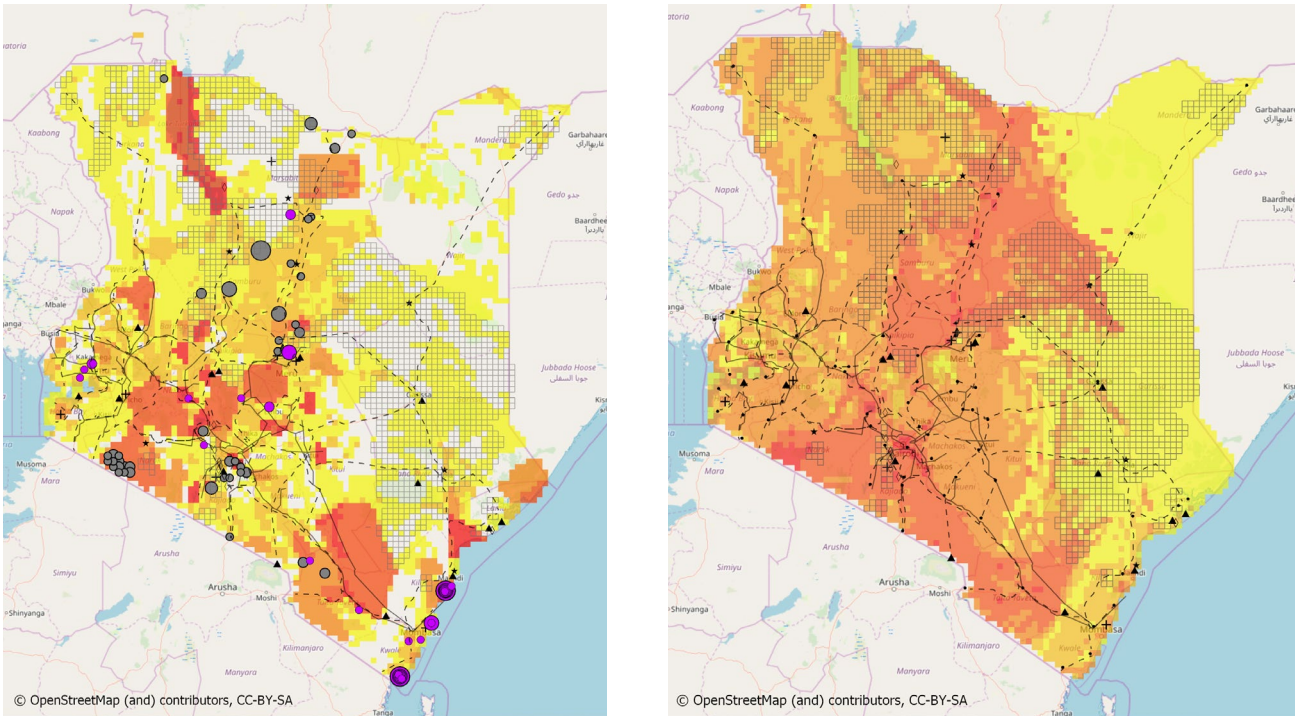
IESR Wind Power Site Visit to the Strathmore Wind Farm near Nairobi.

Project Finance Master Class. In June 2018, PATRP, in collaboration with Covington & Burling, Fieldstone Africa, and Kaplan & Stratton, convened a Project Finance Master Class workshop in Nairobi. The training covered PPA critical provisions, a review of project documents that are part of the PPA and some of the key provisions thereof, and the structure of the Direct Agreement and the Accounts Agreement. A two-hour open question and answer period was held on the final day. Participants included 86 public and private sector actors from across Africa.

Financial Modeling Training. As part of PATRP's continued engagement with Kenyan utilities and capacity building for developing new generation projects, PATRP conducted a Financial Modeling Training course for Power Purchase Agreements in December 2018 to 16 participants, mostly from KPLC, KenGen, and KETRACO.

Kenya National Strategic Environment Assessment. PATRP completed a National Strategic Environment Assessment (SEA) to identify mitigation and management measures to address cumulative biodiversity risk from wind power development in Kenya. The Ministry of Energy agreed to host the study, which was conducted in line with the National Environment Management Authority (NEMA) guidance and with the close involvement of relevant government agencies in both the energy and environment sectors, as well as research institutions and civil society. The SEA identifies sensitive species and sites ('Valued Ecological Components' or VECs) and enables sensitivity mapping of VECs against existing and potential wind power resources. Additionally, the SEA identifies mitigation and management measures to address cumulative biodiversity risk from wind power development, and aligns with international good practice guidance. It is hoped that the assessment will be integrated into future wind power planning in Kenya.

Tariff Benchmark Assessment. PATRP conducted a study to determine potential electricity tariffs based on a request from the Ministry of Energy as it sought to migrate from its feed-in tariff program to competitive procurement for new generation. This benchmarking study compared prices realized via REFiTs, directly negotiated prices and levelized costs of energy (LCOE), mainly in emerging markets and Africa. Benchmarked data was adjusted for the market and investment conditions in Kenya. A four-step approach of (i) international price benchmarking (mainly in emerging markets), (ii) correlating renewable energy prices with country indices, (iii) considering additional factors influencing renewable energy bid prices and (iv) determining price caps, was utilized. Findings were presented at a workshop in Nairobi in early 2016, and informed further engagement on competitive procurement processes in bsequent years, which aligns with the planned transition from feed-in tariffs to an auction process.



Analysis of avian species sensitivity in relation to areas of high-potential wind development.
(Source – *Strategic Environmental Assessment for Windpower and Biodiversity in Kenya*).

RWANDA

RESULTS SUMMARY

36 MW
Reached Financial Close

166,337
On-Grid & Off-Grid Direct Connections

220 MW
Added to Project Pipeline

PATRP's engagement in the Rwanda energy sector covered two main areas, namely (i) transaction advisory support to several generation projects, to include advancing enabling environment policies to facilitate these projects; and (ii) promoting energy access through off-grid solutions. Accordingly, PATRP maintained a resident Transaction Advisor to advance large-scale projects and a BTG Advisor in Rwanda to advance off-grid electrification projects.

PATRP's assistance to the Government of Rwanda (GoR) and power utility focused on reviewing project documents (such as power purchase agreements – PPAs) and providing related training to Government agencies. Engagement with the private sector centered on assisting a number of independent power project (IPP) developers with advancing projects to financial close through facilitating access to finance, reviewing project documents, and deploying hydropower expertise to provide input on project designs and construction plans.

ACTIVITIES

PILLAR 1: GETTING TO 30,000 MW

So Energy Thermal Project (30 MW). So Energy's 30 MW thermal project reached commercial operations in September 2017. The project addressed capacity shortfalls during peak demand hours. Although the project uses non-renewable technology, it is a short-term solution to address the 2017-2020 demand gap and is in line with Rwanda's goal of phasing out non-renewable energy sources. PATRP assisted with moving the project forward by providing the initial draft of the PPA and providing ongoing negotiation support to unblock key deal issues.

Rwaza Hydropower Project (2.6 MW). In September 2018, Rwaza, a 2.6 MW hydropower project, reached commercial operations. The project received significant PATRP support with assistance in finalizing the Concession Agreement, connecting to potential refinancing partners (including OPIC), and technical recommendations from a hydropower expert. Early on in the project, Rwaza received a USTDA grant for a feasibility study. From the early stages until the project came online, PATRP closely followed the project and advocated for its progress to the utility.

Five Small Hydropower Plants. PATRP facilitated five small hydropower plants (Keya, Nkora, Nyamotsi I, Nyamotsi II, Cyimbiri, and Agatobwe) reaching financial close, representing nearly 3.5 MW in potential new generation capacity.

Bihongore Hydropower Project (5.37 MW). PATRP encouraged the developers to apply for a USTDA grant for feasibility studies and their project is now under consideration for assistance. Additionally, the PATRP TA reviewed the PPA and provided negotiation advice. The TA also connected the developer with OPIC with the idea of including the project in the developer's portfolio. The project is expected to sign a PPA in early 2019, with financial close expected in late 2019.

Nyundo Hydropower Project (4.5 MW). Power Africa partner Amahoro Energy is developing the 4.5 MW Nyundo hydropower project. Amahoro signed a PPA in 2015 and faced some obstacles reaching financial close and meeting PPA deadlines. Fortunately, PATRP closely monitored the project in an effort to ensure its success. PATRP support included assistance with finalizing the Concession Agreement, connecting with and following up with proposed local and international lenders, and technical advice on proposed construction plans. Further, PATRP secured a withdrawal of a default letter issued by REG under their PPA. The developers had been sent a default letter claiming they were in violation of their PPA agreement on the basis that they had not yet commenced construction, which was incorrect. The PATRP TA sought to clarify the situation with the utility, which prompted the withdrawal of the default notice.

KivuWatt Methane-to-Power Project (26 MW, Phase I; 75 MW Phase II). The KivuWatt project, developed by Power Africa partner Contour Global, was Rwanda's first methane-to-power project. KivuWatt's 26 MW Phase I was commissioned in 2016. KivuWatt Phase II is an additional 75 MW methane-to-power project. The project has been delayed due to ongoing legal issues related to KivuWatt between Contour Global and the GoR. PATRP provided a draft of the amended PPA, and continued to track the project before handover to EAEP.

Kivu 56 Methane-to-Power Project (56 MW). Power Africa partner Symbion Power is developing a 56 MW methane-to-power project in Lake Kivu, Rwanda. The project is one of the largest energy projects in Rwanda being developed by an IPP. The developer is paying particular attention to the social and environmental impact of the project, especially the livelihoods of the fishermen where the project is to be developed. PATRP connected the developer to local tourism and environmental experts in an effort to mitigate the risks of the effects of the project.

The KivuWatt gas project is owned and operated by Power Africa partner Contour Global, which signed 25-year gas concession and power purchase agreements with the Rwandan government to extract up to 100 MW of electricity from Lake Kivu's methane gas. Photo by Rachel Couch for Power Africa.

PILLAR 2:
GETTING TO 60 MILLION CONNECTIONS

Support for Private Solar and Mini-Grid Companies and Developers. PATRP supported more than 15 companies in Rwanda by providing market intelligence and links to investors. Of these companies, three received more detailed support. In FY 2018, PATRP collected market intelligence and other information requested by several solar home system companies for the development of a comprehensive market assessment report to augment the companies' due diligence processes with potential investors. PATRP also supported an innovative company that is entering Rwanda to provide both electricity and clean water through a central solar-powered container that charges batteries and filters water. PATRP introduced the company to key players in the government and potential investors and is providing market information. PATRP also provided information on potential avenues of financing for a number of mini-grids under development that are in need of funds beyond those available from donors.

Rural Electrification Strategy (RES). PATRP supported the Government of Rwanda with the design and implementation of the Rural Electrification Strategy. The Rwanda Energy Group (REG) – the public utility – developed a high-level plan to become an intermediary in the off-grid market, which would see REG partnering with BTG companies and assisting with distribution, sales, and maintenance of solar home systems. PATRP other donors and the private sector association will work with the utility on the design of this plan to minimize any possible market distortions and ensure that the sector benefits from the intervention.

Mini-Grid Policy Framework. The mini-grid sector in Rwanda faced major challenges, including a lack of policy and regulatory certainty, as well as low affordability and consumption levels in rural areas. Rwanda's Rural Electrification Strategy and its draft National Electrification Plan (NEP) both highlight mini-grids as necessary for achieving universal access by 2024. The draft NEP shows as much as nine percent of the country as suitable for mini-grids, which translates to over 2,000 mini-grids, but the framework and the financing to enable this growth is not in place. PATRP worked with the mini-grid developers on a financial model to demonstrate to the government what level of subsidies will be required for different tariff scenarios as well as the impacts of a number of proposed interventions, including ownership of the distribution network or customer relationship by the utility. At the end of PATRP engagement, this work stream was transitioned to the Power Africa Off-grid Project (PAOP).

BTG Development Credit Authority (DCA) Loan Guarantees and Financing. PATRP assisted two Rwandan banks that signed DCA agreements under the available BTG facility. PATRP assisted the banks by providing technical assistance under the USAID Climate Economic Analysis for Development, Investment and Resilience program (CEADIR) program. PATRP and CEADIR helped build a project pipeline for the bank to ensure that the guarantee is utilized. The availability of lower-cost capital through the new Renewable Energy Fund was of interest to the banking sector broadly, as well. PATRP worked with the Development Bank of Rwanda to educate and catalyze interest in drawing from this on-lending debt facility. A number of companies expressed interest and are in discussions with the bank. PATRP and CEADIR also provided support to accelerate uptake in the Renewable Energy Fund (REF), a $50 million off-grid debt facility managed by the Development Bank of Rwanda (BRD). PATRP organized a meeting with the CEOs of the local commercial banks, the Ministry of Infrastructure, BRD, and a few key donors to help the banks understand the facility. During the meeting, the CEOs learned about opportunities in the off-grid sector as well as the government's desire for local banks to support off-grid companies in reaching Rwanda's electrification targets.

Analysis of PPP Law. PATRP advised the Government of Rwanda on issues related to the impacts of a public-private partnership (PPP) law. The PPP law would potentially affect future development of mini-grid projects in Rwanda. The law was passed without exceptions or consideration of small projects, which the onerous PPP processes would make completely unviable. PATRP, in conjunction with development partners, worked with the electricity utility and the Ministry of Infrastructure to establish legal mechanisms for excluding mini-grids developed by the private sector as well as those subsidized by government.

GIZ/EnDev Rwanda Grant. USAID signed a $1.75 million grant agreement with GIZ in April 2018 to support its EnDev Rwanda program over three years, joining other EnDev donors from the Netherlands, Norway, Sweden, Switzerland, and the UK. The funds will support a new off-grid solar information system and verification program, as well as a first-of-its-kind results-based financing pilot. The design of these programs was supported by PATRP. These programs will address two major challenges in Rwanda's off-grid market: (i) a lack of quality data to track progress towards targets and ensure good quality systems and services to households, and (ii) the inability of many Rwandan households to pay for off-grid solar at current market rates.

PILLAR 3: UNLOCKING ENERGY SECTOR POTENTIAL

Rwanda and Regional Trade Support. In July 2018, PATRP worked closely with the USAID Mission in the Democratic Republic of Congo (DRC) to draft a scope of work for a study to be conducted exploring the possibility of the DRC importing power from Rwanda. In November 2018, a team of consultants came to Rwanda and met with the key players of the energy sector to better understand and outline the possibilities of the trade.

Electricity Access Rollout Program. The Electricity Access Rollout Program (EARP) was created in 2009 to increase electricity access in Rwanda. Since then, the on-grid access rate has increased from 10 percent to 35 percent. However, EARP faced challenges with inventory management, which contributed to commercial losses as well as delayed connections. To assist, PATRP deployed a consultant to Rwanda to work with utility Inventory and Logistics staff on this activity, and subsequently generated a report, which identified gaps and made recommendations on next steps. At the conclusion of PATRP engagement, this work was transitioned to EAEP.

System Operational Planning and Dispatch Support. The Energy Utility Corporation Limited (EUCL) is responsible for day-to-day operations of power generation, transmission, distribution in Rwanda. EUCL is also in charge of operations planning of the existing power system. In 2017, PATRP delivered a gap assessment of EUCL's Operational Planning and Dispatch Procedures to align with utility best practices. PATRP's findings were later shared with the utility for their action.

Lake Kivu Monitoring Support Program. Lake Kivu is one of the largest East African Rift Lakes, and contains enormous amounts of dissolved gases: ~250 km^3 of carbon dioxide, ~55 to 60 km^3 of methane and hydrogen sulfide. Methane gas, with a low solubility in water and high partial pressure, is the trigger element for any potential gas eruption that may occur when the concentration of gases reaches saturation point. As an upside, this gas has economic potential. The dissolved methane can become a valuable energy source for the bordering countries Rwanda and Democratic

Republic of Congo. In 2008, the Government of Rwanda started extraction of methane from Lake Kivu via a pilot plant. Monitoring of the impact of extraction on the lake started with the operationalization of Lake Kivu Monitoring Program (LKMP), a unit that was established by the Ministry of infrastructure to serve as the inspection and monitoring authority of Rwanda. Proof of concept of the pilot plant gave confidence to investors to start with other investment companies. Industrial extraction of methane gas from Lake Kivu started production in December 2016 with a 24 MW (10m^3/sec flows) plant. The next phases will upgrade the production to 100 MW.

To effectively implement its inspection role, LKMP needed to increase its engineering expertise. Inspections are crucial to ensure that operators and their outfit meet the required standards and do not cause environmental disasters or cause poor economic exploration for Rwanda. To this end, in 2016 LKMP sought PATRP support with facilitating assessment/inspection for IPPs and better policies/processes for inspecting gas extraction designs and operations. PATRP subsequently deployed experts to Rwanda, but implementation of the full scope of support was ultimately curtailed by Rwandan counterparts who wanted the technical assistance to be sourced through them contractually, and not through PATRP.

The KivuWatt Power Plant in Rwanda. Lake Kivu is one of Africa's Great Lakes, and straddles the border between Rwanda and the Democratic Republic of Congo. Lake Kivu is a fresh water, volcanic lake, and contains significant amounts of methane gas. Methane can be used as a fuel to generate electricity. Photo by Rachel Couch for Power Africa.

TANZANIA

RESULTS SUMMARY

375 MW
Reached Financial Close

55,451
On-Grid & Off-Grid Direct Connections

172 MW
Commissioned

2,325 MW
Added to Project Pipeline

As one of the original Power Africa focus counties, PATRP supported the expansion of electricity services in Tanzania through transaction advisory assistance to priority power projects across the country, including large-scale energy infrastructure that will boost the national grid, as well as for off-grid electricity systems in more remote areas.

Power Africa also supported the Government of Tanzania with its plans to upgrade its electricity network by "unbundling" the transmission functions of TANESCO. Separating electricity transmission from generation and distribution is key to creating transparency and providing open access to the electricity grid, including independent power producers, and is critical for establishing cross-border electricity trade with neighboring countries.

The PATRP team in Tanzania included an embedded transaction advisor at the national utility, TANESCO; an embedded advisor at Tanzania's Rural Energy Agency (REA); a dedicated Beyond the Grid advisor; and other short-term expert advisors.

ACTIVITIES

PILLAR 1: GETTING TO 30,000 MW

Kinyerezi I Expansion (186 MW) & Kinyerezi II (240 MW, reduced to 167.82 at COD). PATRP's embedded transaction advisor at TANESCO helped secure the financial close of the Kinyerezi I Expansion (186 MW) transaction and the Kinyerezi II (240 MW) transaction, which are natural gas-fired power plants that will supply new electricity to the Tanzanian grid.

For both deals, PATRP provided detailed technical reviews of the project feasibility studies and prepared Recommendation Memos for the TANESCO Board of Directors, two steps that led to approval of the transactions. PATRP also engaged with the private sector to provide debt financing (although subsequently the Government of Tanzania provided sole equity financing).

With the National Association of Regulatory Utility Commissioners (NARUC), PATRP also helped the Energy and Water Utilities Regulatory Authority (EWURA) establish an interim gas tariff, setting the rates that the Tanzania Petroleum Development Company (TPDC) can charge for processing and transporting natural gas through the pipeline. Natural gas is now being pumped to Dar es Salaam, powering Kinyerezi's gas turbines, which are manufactured by Power Africa

partner General Electric. The Kinyerezi II plant was subsequently commissioned in the first quarter of 2018 at a lower than design operating capacity due to gas constraints to the Kinyerezi complex.

Inspecting the Kinyerezi I Power Plant in Dar es Salaam. Photo by U.S. Embassy Tanzania.

Tulila Hydro (5 MW, scalable to 7.5 MW). PATRP aided the financial closure of the $24 million Tulila hydropower project, which is now producing cleaner and more efficient electricity for an isolated mini-grid, displacing the existing diesel generators. To achieve financial close, PATRP facilitated discussions on comprehensive insurance coverage between Swiss export risk insurance (SERV), the lender, Credit Suisse, and the project sponsors. Furthermore, the PATRP TA facilitated the issuance of comfort letters from the Ministry of Energy and Minerals and TANESCO by drafting the initial support letters that enabled the project to clear one of the two main hurdles to closing financing. Since there was no mechanism that explicitly deals with the commercial risk associated with TANESCO, the support letters provided additional comfort to the lenders and project insurer, SERV. The final hurdle that remained was related to the regulatory framework, and the Standardized PPA term was amended from a 15-year term to 20 years. The amendment was not only beneficial to the Tulila project but all other projects in the pipeline.

PATRP support also included assistance to local investors with project finance concerns. Access to late-phase pre-implementation funding is often an overlooked issue for small-scale developers. Commercial banks are hesitant to loan without sufficient collateral and/or other required conditions.

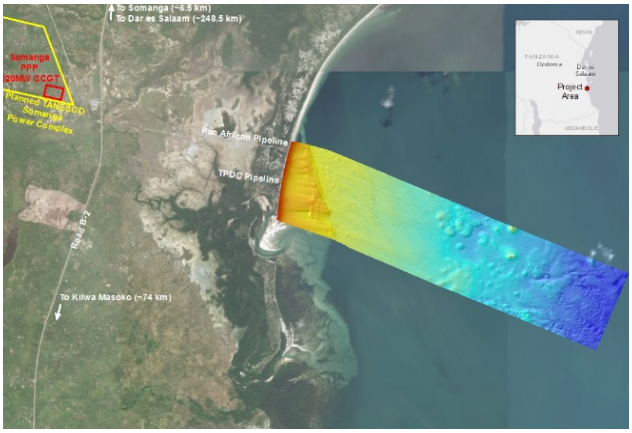
The Tulila hydrpower project in Tanzania is run by the Benedictine Sisters of St Agnes. Photo by Benedictine Sisters of St Agnes.

The project was commissioned in 2016 after TANESCO upgraded equipment to fully utilize the plant's initial 5 MW from Phase 1. Phase 2 (the additional 2.5 MW) is contingent upon the construction of a 220 kV line by TANESCO, which is funded by the Swedish government. PATRP engaged significantly and regularly with REA and TANESCO to ensure the transmission line required for evacuation of power from Tulila Hydro's first two turbines would be built in time for scheduled commissioning.

Somanga Site Studies. Developing large-scale power projects can take years from concept to completion. In Somanga, Tanzania's national electric utility (TANESCO) approved development of a new gas-fired power plant that would add 320 megawatts (MW) to the national grid. However, the project was stalled for two years as the developers had difficulty completing the technical studies needed prior to building the plant. At TANESCO's request, PATRP mobilized a team of engineers and scientific experts from around the world and completed the critical site studies in less than four months, including:

- A geotechnical survey and topographic study of the proposed project site to confirm suitability for engineering design and construction of the power plant
- A bathymetric survey of the undersea area through which to construct an associated offshore water intake pipeline

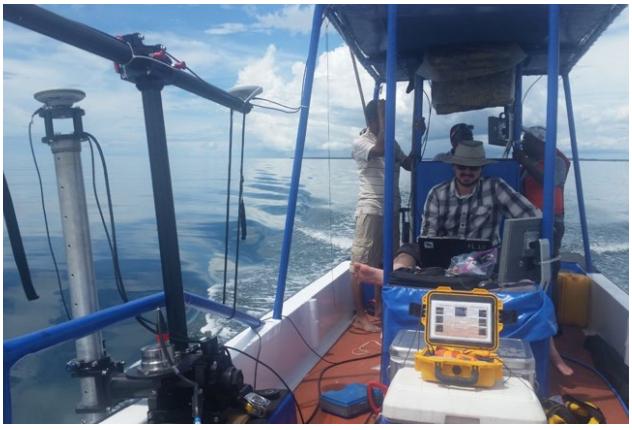
Completion of the studies allowed a public-private partnership procurement to move forward with World Bank support. TANESCO used the site studies to attract investors for the development of the project.



PATRP conducted the technical studies needed to jumpstart construction of the 320 MW Somanga power plant.

Once online, the Somanga power plant will inject 320 MW into Tanzania's electricity network, which constitutes nearly 20 percent of Tanzania's current generation capacity.

At the end of PATRP's engagement with TANESCO, the Somanga transaction stalled due to a change in the Host Government's unclear position towards IPPs.



Conducting bathymetric and water quality testing near the proposed Somanga site in Tanzania. Photo by PATRP.

Technical Assistance to REA. PATRP's Rural Energy Agency (REA) Transaction Advisor provided technical assistance to REA related to several transactions and programs initiated by Power Africa partners:

- Early in FY 2016, PATRP identified two new hydropower plant projects for potential inclusion as Power Africa transactions: **Lupali (317 kW) and Ijangala (360 kW)**. PATRP recommended changes to the indicative term sheets issued by the lender on behalf of the project promoters, and later assisted the promoters in drafting a letter of response to the lender. On Lupali, PATRP assisted the project sponsors to prepare its grant application for RBF financing, which was successful. Lupali had previously received approximately 50 percent of the total investment through grant funding.
- PATRP helped move the **407 kW Isigula Small Hydro Project** toward bankability by resubmitting all project documentation, including technical and feasibility studies, environmental impact assessment, and socio-economic analysis of beneficiaries.
- PATRP helped the **NextGen Kigoma 5 MW Solar Plant** reach financial close and move to the construction phase with a loan from a local bank. This project will increase power availability in a region that struggles with multiple power outages. PATRP's embedded transaction advisor at the REA had been advising the developer, who after the commencement of construction, received a letter from TANESCO advising that a lower tariff would be paid for the electricity output from the plant. PATRP worked with Power Africa and other stakeholders in an attempt to broker a resolution; however, the way forward remains unclear undermining investor confidence in the Tanzanian power sector.
- PATRP reviewed and commented on the memorandum for the **10 MW Nakatuta small hydro project**, which required investment for expenditures associated with construction, management during construction and financing. Following the publication of the new Standardized PPA (SPPA), PATRP engaged with the project sponsors to discuss the approach needed to secure a new SPPA. The project developers have compiled all required documentation, and submitted their application to TANESCO. Meanwhile, the project sponsors requested assistance to finance the 106 km 33 kV double circuit transmission line from the proposed Nakatuta project site to the Songea TANESCO substation has also been granted. A Rural Energy Agency (REA) contractor was mobilized to commence the construction of the transmission line together with the electrification of some of the villages along the line. The electricity generated will be sold to TANESCO via a PPA (20 years) at a standardized tariff, which will be scalable on an annual basis.
- Parties to the **10 MW Kiwira small hydro project** executed the U.S. dollar-based standardized PPA after the regulator, EWURA, approved amendments.

Conducting geotechnical tests at the proposed Somanga site in Tanzania. Photo by PATRP.

Through collaborative efforts of PATRP, Kiwira project sponsors and other partners, this became the first PPA signed under Tanzania's new small power producers (SPP) framework – known as the second generation SPP Framework – established in April 2015. While the project was initially approved for financing, a decision was later made by the lender's parent company to reverse the decision, citing a change of strategy on cross-border transactions on small power projects. Nevertheless, the project is moving forward towards financial close with cooperation from a local bank. PATRP introduced the developer and existing financiers to two additional potential lenders. PATRP participated in conference calls with the various parties and subsequently, the developer and new equity investors signed a term sheet that effectively re-structures the equity investment holding in the project. The new shareholder agreement will now be presented to the lead debt facility provider, so that the financing documentation can be finalized with the new structure in place.

Sida/DFID Off-Grid Renewable Energy Project Technical Assistance Program (11.054 MW). Between 2014 and 2018, PATRP provided transaction advisory services to the government of Tanzania through an embedded Resident Transaction Advisor (TA) based at the Rural Energy Agency (REA). The PATRP TA developed country-wide strategies, enabling policy, regulatory frameworks and other instruments used to foster private sector project development in the energy sector. For example, the PATRP advisor was instrumental in advancing the Green Mini- and Micro-Grid Program, funded by the Swedish International Development Agency (Sida) and United Kingdom Department of International Development (DFID), which has the potential of adding 30,000 household connections and may benefit more than 170,000 people in Tanzania. Sixteen of the 18 projects reached financial close with PATRP support in FY 2018, including Volta Africa/ Autarsys (pictured), as well as five small hydro projects had received conditional approval.

Matthias Ross and Edson Uhale signing the Mini-Grid Results Based Financing Program (RBF) Grant agreement on behalf of JV Volta Africa/Autarsys. This JV is an RBF Grant Program recipient intends to install a solar hybrid mini-grid in Chamwino District.

Tanzania Rural Electrification Expansion Program (TREEP). PATRP provided advisory support to REA's World Bank-sponsored Tanzania Rural Electrification Expansion Program (TREEP). Specifically, PATRP worked with smaller commercial banks, including Azania and Access Bank, to participate in the TREEP funding program. PATRP also helped Tanzania Investment Bank (TIB) source financial institutions and SHS companies to partner under the $10 million TREEP. PATRP advised TIB on how to work with small commercial banks, and also shared a pipeline of solar developers to contact for their small-scale power producers program. PATRP also supported several SHS companies, including Greenlight Planet, Mobisol, BBOXX, Simusolar, Solaris, Azuri and d.light, with access to low-interest working capital in local currency.

PATRP later assisted the World Bank with restructuring TREEP based on a comprehensive market assessment of SHS companies and financial institutions. The restructured TREEP will award approximately $42 million through 2022 for the provision of term finance and/or working capital to small-scale renewable energy projects. The TREEP off-grid component of the program is projected to bring electricity connections to 310,000 Tanzanians (approximately 60,000 households).

PILLAR 2:
GETTING TO 60 MILLION CONNECTIONS

Support to Solar Companies. PATRP provided direct support to local and international renewable energy and off-grid companies in Tanzania. PATRP assistance included assessment of company operations and recommendations to improve internal processes (e.g., business models, accounting, and logistics). PATRP also provided helped companies improve distribution networks, as well as marketing and retail strategies. Additional support was given to companies that need advanced support in sales strategies, financial analysis, support on developing new market channels and distribution networks, as well as future planning and testing of productive-use equipment. PATRP also worked directly with pay-as-you-go (PAYGO) technology companies to help improve their PAYGO platforms.

PATRP regularly helped companies cultivate partnership opportunities with consumer finance banks, farming associations, and financial institutions. Most micro-finance institutions are interested in exploring financing initiatives to help boost their expansion into the solar space in Tanzania. PATRP assisted more than 30 renewable energy companies (local and international) ranging from solar home system (SHS) providers, solar product distributors and suppliers, solar EPCs, mini-grid developers, and productive use application providers.

An example of PATRP support is the work with Jaza Energy. Jaza was raising debt and expanding their hubs across Pemba Island, as well as moving onto the Tanzanian mainland. PATRP introduced Jaza to the Southern Farmers' Cooperative to discuss options for collaboration, and worked with their sales team to develop products/services that will help them to grow their customer base in each hub. PATRP also supported Jaza Energy to raise equity and scale-up connections in their hubs on Pemba Island.

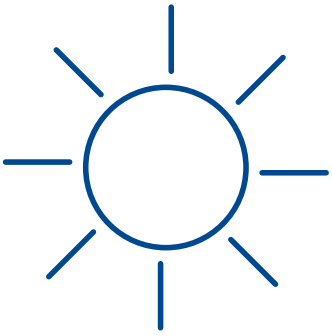
Access to Finance. PATRP helped off-grid and renewable energy companies access finance by connecting companies to potential investors, advising on pitch decks, and reviewing grant applications. PATRP also connected companies to several debt investors and platforms like KIVA, Lendahand, SunFunder and Acumen. In turn, PATRP supported foreign investors looking to work in Tanzania by introducing them to local companies, providing market intelligence, and connecting investors to other sector players.

PATRP facilitated the efforts of local financing institutions that sought to invest in renewable energy by sharing pipeline, sector intelligence, and general due diligence. PATRP also advised Tanzania Investment Bank (TIB) on how to work with small commercial banks, and also shared a pipeline of solar developers to contact for their small-scale power producers program.

In addition, PATRP worked with the IFC to address access to finance challenges for solar enterprises in Tanzania. The IFC has been looking into collateral challenges for solar companies.

Some key examples of PATRP financing assistance include support to the World Bank to structure their $10 million renewable energy fund, support to the Bank of Africa with pipeline generation and market intelligence for their $12 million AFD/SUNREF facility, and support to local banks to partner with SHS companies to provide end-user financing.

Policy and Regulatory. PATRP worked with the World Bank Lighting Tanzania program during development of the commercial market for quality-verified solar lanterns and SHS. PATRP support included introducing companies to the program and advocating sales of verified products. PATRP also supported the Tanzania Renewable Association (TAREA) and the Africa Mini-grid Developers Association (AMDA) to address mini-grid policy changes, and advocated to the Ministry of Fisheries to lift the ban on fishing lights, which led to new fishing lights regulations in Tanzania.



PILLAR 3:
UNLOCKING ENERGY SECTOR POTENTIAL

ENHANCING TANZANIA'S ELECTRICITY NETWORK

The continued development of Tanzania's energy sector is critical to the country's ability to grow economically, attract foreign direct investment, and spark industrialization. In 2014, the Government of Tanzania approved plans to upgrade its electricity network by "unbundling" the generation, transmission, and distribution functions of the national electric utility, TANESCO.

PATRP developed TANESCO's first verified power system single-line diagram (network map). Photo by PATRP.

In 2015, PATRP began working with TANESCO to establish and develop an independent transmission system operator, or TSO. Separating electricity transmission from generation and distribution is key to creating transparency and providing open access to the electricity grid, including independent power producers, and is critical for establishing power pool transactions with neighboring countries.

Creating a new TSO meant developing a new business, from organizational design and human resources, to budgeting and financial planning. PATRP advised TANESCO on the business structure, revenue requirements, transmission tariff margin, and five-year financial model. These elements laid the groundwork for PATRP to help design the TSO Business Plan and Transition Roadmap, which points the way toward a fully operational TSO by 2021.

PATRP, in conjunction with TANESCO's Transmission Unit, also completed the Transmission Asset Registry task, which included single-line diagrams of all TANESCO transmission substations and transmission lines. This involved verifying length, type of wire, number of supports, type of isolators, and cross-section of every transmission line within Tanzania, as well as those connecting TANESCO substations with neighboring countries. This effort enabled PATRP to produce the first ever single-line technical drawing of the TANESCO system, which is key for operational purposes, relay protection, planning activities, as well as for development of the TSO Metering Requirements. TANESCO is now able to develop and modify their national electricity planning models, and coordinate with other East African utilities on cross-border electricity trade.

In parallel, and in furtherance of promoting greater sustainability PATRP conducted a PSS/E LF Advanced Training and Model Development Workshop, where PATRP and TANESCO modelers developed the TANESCO PSS/E LF 2017 operational model and verified the Load Flow model.

PATRP's collaboration with TANESCO helped ensure that electricity from proposed and future power projects in Tanzania can be effectively delivered to the people, businesses, and services that need access wherever they live, work, and play.

> On behalf of TANESCO, I would like to express our sincere thanks to USAID and organizers who facilitated the training and made it successful. During this training, we were able to identify new transmission and generation projects, and agree on a methodology to determine the load forecast and power balance of Tanzania by 2021.

Eng. Evalder S. Munisi
Manager Stretegic Planning
TANESCO

WEST AFRICA

RESULTS SUMMARY

420 MW
Reached Financial Close

15,931
On-Grid & Off-Grid Direct Connections

8,198 MW
Added to Project Pipeline

The energy mix in West Africa remains oriented towards fossil fuel-fired generation. The recent development of viable solar PV and wind projects have diversified the mix somewhat, but in terms of total generation, energy provided by intermittent renewable resources remains nascent.

PATRP was engaged in West Africa from February 2015 through November 2019 with direct assistance provided to 14 countries. PATRP also conducted separate work streams in specific countries in the West Africa region, including Ghana, Liberia, Nigeria, and Senegal, which are reported in subsequent sections.

PATRP's technical assistance in West Africa covered three main areas:

- Transaction advisory support to private developers on generation projects;
- Ad hoc assistance to multiple stakeholders of the electricity sector, including governments via ministries of energy and state-owned entities, international organizations such as Organisation de mise en valeur du Fleuve Gambie (OMVG) and Organisation de mise en valeur du Fleuve Sénégal (OMVS), the West Africa Power Pool (WAPP), and several public and private sector Power Africa partners; and
- Enabling environment activities, such as workshops, trainings, power purchase agreement (PPA) negotiations, etc.

One of the most important steps toward economic integration in the field of energy was the creation of the Western African Power Pool (WAPP) in 2006. The WAPP promotes the integration of the national power systems of the fourteen inland countries into a unified regional electricity market with the ultimate goal of providing, in the medium and long term, regular and reliable energy at competitive prices.

PATRP's multi-disciplinary team in West Africa included two Regional Transaction Advisors (a lead advisor based in Dakar, Senegal, and a natural gas specialist based in Abidjan, Côte d'Ivoire), an embedded Transaction Advisor at the African Development Bank (AfDB) headquarters in Abidjan, a Senior Energy Advisor based in Dakar (June 2016 to May 2018), and an administrative assistant in Dakar. PATRP also maintained a Regional

BTG Advisor, based in Dakar, who covered projects in Burkina Faso, Senegal, Mali, Guinea, DRC, Benin, and Niger, and later engaged a second BTG Advisor based in Côte d'Ivoire.

The Azito 288 MW gas-fired generation facility in Côte d'Ivoire uses natural gas supplied from the country's offshore gas fields. Photo by Globeleq.

ACTIVITIES

PILLAR 1: GETTING TO 30,000 MW

Burkina Faso – Windiga Solar (26 MW). PATRP worked with the developer, Windiga, on a tariff structure that could be acceptable to the Government of Burkina Faso. The Government previously did not accept the tariff proposed by the developer, citing its perceived high cost. In 2019, PATRP proposed a solution to reduce the cost of this tariff while still maintaining the return on equity sought by Windiga. This solution aims to increase the size of the plant to a level that would ensure the amortization of significant development costs over an increased number of MW, with the plant still being able to be easily integrated into the grid network (based on existing integration studies).

PATRP also received a mandate from Windiga to engage with the International Finance Corporation (IFC) on their behalf with respect to the opening of off-shore accounts. The IFC is a major lender and equity provider to the project. PATRP discussed the possibility of opening a limited number of off-shore accounts that would be favorable to the developer for loan disbursement and debt repayment. The IFC has agreed to the number of off-shore accounts allowed by BCEAO (Central Bank).

CAMEROON – NACHTIGAL AMONT HYDROELECTRIC PROJECT (420 MW)

The Nachtigal hydropower project intends to increase Cameroon's existing installed generation capacity by 30 percent and help lower the cost of electricity. PATRP's embedded transaction advisor at the AfDB worked with the AfDB financing team to advance the project to financial close. Power Africa partner IFC, as global arranger, coordinated the due diligence process of the pool of lenders, and negotiated financing terms with the sponsors and the Government of Cameroon. The AfDB subsequently approved a loan of €150 million ($186.8 million) to the project, and the PATRP advisor at AfDB led the project team during the negotiations for financing. The World Bank also approved a series of financing packages/instruments for the project, to include a senior loan, liquidity PRG to guarantee PPA payments, and PRG to guarantee government obligations. Financial close was reached on December 24, 2018.

Chad – Djermaya Solar (28 MW). PATRP's embedded advisor at the AfDB led a team that explored financing participation from the bank for this project, which will be the first IPP to be developed in Chad. The Sustainable Energy Fund for Africa (SEFA) provided a $580,000 grant to fund late-stage development and transaction-related activities (independent consultants, including engineers, insurance, and independent legal counsel). The AfDB, along with other co-financiers, will extend a senior loan to the project, and will put in place a partial risk guarantee (PRG) to cover payments under the PPA with the Utility, SNE.

In 2019, PATRP's Transaction Advisor led the AfDB team (together with Proparco as co-financier) in undertaking a due diligence of the project, supported by the lender's legal counsel and the lender's technical advisor. PATRP provided inputs in determining bankability of key project documents (PPA, PCAO and Framework Agreement) in preparation of the anticipated negotiations with authorities in April/May 2019.

PATRP also coordinated the hiring of the insurance advisor and the model and development cost advisor to complete the due diligence. PATRP's embedded TA helped prepare the Project Appraisal Report (PAR) to be presented to the Credit Committee, and prepared the presentation for and attended meetings with Authorities in Chad to clear some of the key bankability issues on project documents, namely around the Framework Agreement, fiscal issues, the PCOA enforceability, the PPA exchange rate and the regularization of the status of SNE (the off-taker). The TA also attended an E&S workshop among lenders' and sponsors' E&S officers and their respective advisors in order to agree on compensation criteria under the Resettlement Action Plan (RAP). Further, the PATRP TA participated and led (with Proparco) initial negotiations on the financing term sheet of the senior loans and participated in negotiations with the Partial Risk Guarantee (PRG) team on the term sheet of the several contractual arrangements required.

The project secured AfDB board approval in September 2019, and should reach financial close by April 2020.

Côte d'Ivoire – Azito IV CCGT (255 MW). PATRP participated in the lender's due diligence in February 2019 through its embedded transaction advisor at the AfDB, with the anticipated AfDB board approval for financing expected after PATRP ends. Financial close is expected to follow by the end of 2019. In FY 2019, PATRP also supported DFIs, including the AfDB and Proparco, by providing an assessment of possible natural gas supply scenarios and options for the Azito IV and Ciprel V power Financial close is expected in early 2020.

Côte d'Ivoire – Ciprel V CCGT (422 MW). PATRP, as part of the AfDB team, participated in project due diligence, which identified that the financing and the timely implementation of the 400 kV transmission system component was not part of the original scope of the IPP. This situation was remedied, and construction

of such infrastructure is expected to start in early 2020. The Board of the AfDB approved a senior loan of up to €100 million in May 2019, as part of the pool of lenders led by the IFC, to finance the project. All lenders obtained their respective approvals in 2019, and financing documents were being negotiated as at the end of PATRP engagement. The generation capacity of the project was increased to 422 MW from the original 390 MW, and financial close is anticipated in early 2020.

Côte d'Ivoire – Tiassalé Hydropower Project (33 MW). PATRP worked with a hydro consultant and financial advisors to explore ways to reduce the capital cost of this hydropower project in Côte d'Ivoire. PATRP also worked with the project sponsor to identify suitable co-developers for the project. Three companies were shortlisted and were given access to project information. Equity was secured to finance the end of the feasibility study, the EPC tender, the detailed design, and the PPA negotiation. Financial close is expected in late 2020.

Democratic Republic of Congo – Sombwe Hydropower Project (133 MW). This captive hydropower project in the DRC was supported by PATRP through assistance to the developer with preparation of project agreements, the PPA, obtaining development funding, and securing additional equity investment. PATRP worked with the developer to identify potential off-takers in Lubumbashi, including mining companies interested in purchasing power from the project. PATRP also assisted the developer with the preparation letters of intent and related solicitation processes, as well as the draft project agreements. PATRP reviewed letters of intent from potential off-takers and recommended that the developer undertake further due diligence before starting PPA negotiations. PATRP also assessed a new proposal to add a 50 MW solar PV plant to the project, and provided input into a USTDA grant request. In addition, PATRP supported potential off-takers and advocated for the inclusion of a capacity payment to improve the project's business case and reduce the impact of the seasonality of the generation.

PILLAR 2:
GETTING TO 60 MILLION CONNECTIONS

Beyond the Grid. Initially, PATRP's West Africa BTG Advisor met with off-grid companies to understand their expansion plans, including priority countries and timelines. Most companies have international presence and are active in the East African markets; they looked at West Africa as the next region to expand their operations. During these meetings PATRP discussed several options for expansion and market entry with the off-grid companies, including partnerships and joint ventures with local distributors. PATRP identified Senegal and Côte d'Ivoire as two of the main markets in Francophone West Africa where off-grid companies sought to expand their operations.

In addition to off-grid companies, PATRP also met with mobile network operators (MNOs) interested in relying on renewable sources for tower operations. These MNOs were actively looking at some off-grid companies to supply their energy needs. PATRP discussed potential partnerships between the MNOs and off-grid companies that would be interested in providing this service.

Support to Private Sector Companies. PATRP engaged ten companies, including five investment funds, in six countries in West Africa (excluding Senegal, reported separately), and identified specific business or project needs that can be supported by the PATRP BTG team. Specific activities included:

- **Benin**. PATRP was actively involved with four local SHS companies, and assisted with assessments of their projects, with a view to linking them to investors. Furthermore, PATRP provided market intelligence and introduced the companies to investors and other stakeholders. PATRP also connected project developers to MCC and provided insights to NIRAS, a Danish consultancy and facility manager for off-grid.
- **Burkina Faso**. PATRP introduced an off-grid company to two potential investors and linked all parties with three international mini-grid companies. PATRP organized meetings with local companies with a view to facilitate consortia and local company participation.

- **Côte d'Ivoire**. PATRP supported a company pilot project by sharing data and linking it to a mobile money operator.
- **Democratic Republic of Congo**. PATRP supported two companies to ramp-up as full PAYGO SHS distributors, introducing them to potential investors that could provide full funding support that the company requires to scale. PATRP also introduced one company to ElectriFI.
- **Guinea.** PATRP reviewed the Investment Prospectus prepared by a World Bank Consultant to guide investment in Guinea's Power Sector, targeting universal access to electricity by 2030. PATRP noted that the assumptions made by the consultant significantly undervalued the contribution of off-grid solutions to the rural electrification strategy in Guinea. PATRP BTG advisors provided detailed recommendations that were formally submitted by Power Africa to the committee overseeing the work. The PATRP BTG team provided technical assistance to an Orange-sponsored micro-grid pilot, including support on specific technical choices of design (AC vs. DC, metering, etc.). Orange also received support from BTG in securing soft funds to deploy the pilot.
- **Guinea-Bissau**. PATRP presented options for an off-grid company to explore new emerging battery technologies with strong focus on U.S. technologies to support their 1 MW micro-grid.
- **Mali**. PATRP supported three SHS companies with market entry into Mali by acting as liaison between the government and the companies, raising awareness about World Bank support mechanisms executed by the AMADER. PATRP also linked the companies to the main telecom company, Orange, to explore mobile payment options. Some companies also requested support in identifying a logistics company to deal with imports. A final activity consisted of raising awareness about an AECF grant call. PATRP also supported two Malian companies by providing advice on investor pitch documents and highlighting grant opportunities. In addition, PATRP supported Commercial and Industrial (C&I) solar projects and companies, and helped one company position itself as a C&I leader in Mali by pursuing deals with leading industries.
- **Niger.** PATRP identified two large companies trying to enter the country and advised two other companies on ways to launch their products. PATRP also supported the Government of Niger with the launch of an ambitious mini-grid intervention (see below).
- **Sierra Leone**. PATRP helped an off-grid company with a successful application for a USTDA grant to support business development, and helped an international off-grid company connect with investors to support expansion into the Sierra Leone market.
- **Togo**. PATRP began exploratory work with companies that are working with government programs aimed at stimulating supply of solar kits.

Support to the Off-grid Financial Sector. PATRP supported several financial sector institutions, including Gaia, SunFunder, PEC, Africa Investment Corporation, TRINE, Chroma Impact Fund, Africa Frontier Capital, Shell Foundation and ElectriFi. PATRP helped Gaia and PEC with strategic insights into investment opportunities, notably in Cameroon, and provided support in finding additional investors to join the coalition of investors in the targeted companies. For the Gaia Impact Fund, PATRP reviewed their investment thesis on mini-grids and provided market insights.

PATRP worked with the Shell Foundation in Senegal, looking at the Government of Senegal's position on concessions and provided recommendations on potential ways to deploy a vision of an integrated approach to electrification for the "Energy Company of the Future" concept that the Shell Foundation is pitching. PATRP also pitched the work of the Shell Foundation to the EU office in Côte d'Ivoire, who are now exploring ways to align their agendas in country on an integrated approach that combines grid and off-grid (both SHS and mini-grids).

In Côte d'Ivoire, the CDC fund approached PATRP to provide a proper understanding of the size of the market opportunity as part of its decision on whether to invest in a company. After the first meeting with the fund managers, PATRP engaged with the company conducting due diligence and provided them with market insights and key reports to inform its recommendation. PATRP also helped the SIMA Fund prepare its visit to Senegal, where it engaged with two companies and conducted due diligence.

Gender Integration. PATRP initiated a program of technical support to PEG Africa to integrate gender into its business operations in West Africa. Interventions to strengthen gender mainstreaming in PEG were identified by PATRP's Gender Advisor. The interventions were deemed to be such a priority for the company that PEG recruited a full-time Gender Project Officer to implement the proposed activities with the ongoing support from PATRP. The activities outlined in the agreed scope of work include an organizational gender assessment to inform steps to strengthen gender equality in the workplace, as well as the development of a gender-sensitive data collection tool in relation to consumer metrics. Based on the new data collected, business practices will be modified where, and if, necessary to better respond to the energy needs of men and women in the communities PEG serves. (See the Ghana section for more details.)

Support to the Niger Rural Electrification Agency (ANPER). ANPER developed three micro-grids, and is constructing a few others with financing from the EXIM Bank of India. ANPER is looking at a framework to recruit a system operator for these sites and PATRP provided comments and suggestions on their draft framework. The PATRP BTG team also provided support to ANPER to kick-start ANPER's 1,000 villages electrification project. This included the review of the 68 telecoms towers sites data and the list of villages to be considered by the USTDA feasibility study, including the socio-economic data and the validation of the selection criteria for rural communities to be served by off-grid solutions. PATRP has also been engaged with the Government of Niger, and assisted them by providing scenarios for an ambitious mini-grid intervention that the Government intends to roll out.

Electricity Access in Côte d'Ivoire. The Programme Electricité Pour Tous (PEPT) program seeks to connect low-income households to the grid by requiring a very small up-front fee (1,000 FCFA) and financing the remaining connection cost over up to 10 years through an additional fee per kWh consumed. The goal of the program was to connect one million households to the grid throughout the next five years (from 1.4 million households to 2.4 million households). In FY 2017, PATRP identified how to allocate the initial $3.5 million Power Africa has dedicated to advance its on-grid electrification goals; and prepared the terms of reference of a willingness to pay study, which would allow improved modelling of electricity demand/willingness to pay for future PEPT households and to better forecast PEPT revolving fund needs.

Côte d'Ivoire Off-grid Policy and Regulatory Support. In Q3 2018, PATRP deployed a new BTG Advisor to support the Ministry of Energy with development of policy and regulatory documents for off-grid systems, with a focus on regulated systems such as micro- and mini-grids. As part of this work, PATRP assisted national energy sector policy analysis, supported implementation of rural electrification programs, and reviewed feasibility studies for rural electrification projects. PATRP's BTG Advisor met with Ministry officials to outline PATRP's complete scope of work, to include development of a Draft Framework for mini-grid regulation and licensing, assistance with design of financing/operating models for off-grid mini-grids, and provision of an off-grid mini-grid tariff simulation tool with ANARE. The Ministry of Energy organized a high-level workshop to review the deliverables, which included an Off-Grid Electrification Strategy and a draft Regulation for Mini-grids in Côte d'Ivoire. In Q1 2019, PATRP finalized the off-grid regulations, the Off-grid Action Plan, as well as the Inter-Ministerial Decree waiving import duty and tax on solar equipment. All documents were submitted to the Ministry of Energy through the Deputy Director of Cabinet, and were approved in December 2019.

Coordination with Development Partners. PATRP worked closely with all development partners' members of the Energy Group, led by the European Union and the African Development Bank, to prepare the participation of the Ministry of Energy of Côte d'Ivoire for the three-day Africa Investment Forum that was held in Johannesburg, South Africa. The assistance included a review and improvement of the PowerPoint Presentation on the Côte d'Ivoire Action Plan for attracting private investment in the energy sector, and advice to the official delegation during the Forum in Johannesburg. After the mission, PATRP prepared a report with recommendations on the way forward for raising private sector interest in investing in the off-grid sector in Côte d'Ivoire.

Elsewhere in the region, PATRP provided insights on quick wins for the implementation of DFID's ACE program in West Africa. Notably, PATRP encouraged the program to focus on improving the lobbying capacity of renewable energy associations.

Sierra Leone Off-grid Market Assessment. To effectively guide Sierra Leone's off-grid energy strategy and associated policies, the Ministry of Energy requested Power Africa support to undertake an assessment of the current off-grid energy sector market. Such an assessment will provide Government of Sierra Leone (GoSL) with a better view of their off-grid market, the opportunities for scale-up, and the financial, policy and regulatory barriers that prevent further market growth and hinder associated energy access gains.

While other consultants and donor agencies have undertaken assessments of Sierra Leone's off-grid solar and appliance market and mini-grid programs and policies, in almost all cases the findings were not sufficiently socialized with relevant GoSL actors. PATRP reviewed the findings and analysis of these collective market assessments and identified gaps to be re-examined or updated. PATRP then conducted a two-week data gathering and consultation mission to Sierra Leone to interview key stakeholders in the energy sector. PATRP presented results from the gap analysis, along with a well-informed assessment of the off-grid market based on discussions with private sector companies and GoSL agencies such as the Standards Bureau. Recommendations on next steps and improved processes were presented to the Ministry of Energy.

Togo – Connection Program for Universal Access. Togo's public utility company, Compagnie Energie Electrique du Togo (CEET), is responsible for grid connection (and mini-grids), and aims to develop an on-grid rural electrification program to connect between 400,000 to one million households to the grid. PATRP supported CEET with preparation of a project proposal, which was presented to the Government of Togo in Q3 FY 2019. PATRP supported CEET in identifying the main risks to their rollout strategy and suggested that CEET focus on key parameters that will impact success, such as upfront fees, realistic household consumption, assessment of type of customer, physical connection timelines, reimbursement options and payment options.

PILLAR 3: UNLOCKING ENERGY SECTOR POTENTIAL

Burkina Faso – Capacity Building. At the request of the Government of Burkina Faso, PATRP provided a five-day training program in February 2019 on the basics of independent power projects (IPPs). PATRP's assistance was aimed at advancing the 167 MW of power projects that have stalled since 2014. The training was initiated with an opening ceremony attended by the Minister of Energy, the Minister of Economy, Finance & Development, and the U.S. Ambassador to Burkina Faso. The main topics included quantified risk analysis, optimal risk allocation and the development of a clear terms of reference, project finance, understanding of PPP projects, and negotiation of a power purchase agreement covering the following topics: Introduction to public-private partnerships; Project financing; Guarantees and financial closure mechanisms; PPA negotiations; Settlement of disputes, energy purchase agreements being long-term contracts; Introduction to risk analysis; and Project documentation.

A follow-up session was conducted in March to cover the following additional topics: Risk analysis; Development of a risk model; PPA negotiations; The tariff structure – how to understand the pricing methods proposed by the IPPs; Analysis of financial models; Financial closure; Lender's requirements for collateral; and provision of a synchronous reserve.

Participants gather following the opening ceremony of the IPP training in February. Featured in the front row are Emmanuel Moteng, Senior Energy specialist, USAID; M. Bachir Ismaël Oudraogo, Ministry of Energy; M. Lassané KABORE, Ministry of Economy, Finance, and Development; and U.S. Ambassador to Burkina Faso, Andrew Young.

Burkina Faso – MCC Compact Assistance. PATRP assisted MCC with assessment of the regulatory, institutional, and commercial framework for the implementation of IPP projects. PATRP also conducted an assessment of the national electricity company, Sonabel, and is assisting with the design of the terms of reference for a roadmap similar to what has been achieved in Senegal.

Assistance to the OMVG. PATRP assisted the OMVG in managing the progress of the regional 1,677 km transmission line project currently underway and expected to be fully completed by 2021. As detailed below, once completed, the OMVG interconnection line will enable electricity trade between the Gambia, Guinea, Guinea-Bissau, and Senegal. PATRP assistance aligned with the broader project management support provided to the West African Power Pool (WAPP).

PATRP worked on a suite of draft agreements related to cross-border power trade on the OMVG transmission line between Senegal, Gambia, and Guinea Bissau. Once executed, these agreements will ultimately result in the following outcomes:

- OMVG will have a long-term electricity transmission service agreement with the four countries (with an estimated value of $1.2 billion)
- Guinea will have three contracts for the sale of electricity with its neighbors (with an estimated value of $2.8 billion)
- OMVG will have a contract for the sale of electricity with the four countries in connection with a regional hydropower project.

PATRP worked with the underlying four countries and nine financial institutions on the agreements, which had to be negotiated in three languages (English, French, and Portuguese). The challenge was compounded by the fact that the original draft agreements, which were developed by two international consulting firms, were abandoned due to major changes in the structure of the transaction. Therefore, PATRP was required to rework new template agreements in less than three weeks.

Three of the four countries, in addition to OMVG, had never previously signed regional power trade agreements. Further, the four governments have very different needs in terms of power requirements and PATRP had to discuss individually with each of them in order to better understand their requirements and promote a compromise in terms of supply agreements, particularly with Guinea, the seller of power. Following a three-day conference involving all stakeholders, the countries endorsed the overall deal structure proposed by the PATRP team.

However, the workshop did not address cost or tariff issues as this data (which is vital for the conclusion of the agreements) was not available at the time of the workshop. The final communiqué highlighted PATRP's contribution and requested further PATRP support until the conclusion of the process. PATRP continued refining the contracts based on final comments received after the workshop for presentation to OMVG project lenders in June 2019. PATRP also translated relevant documents from the original French into English and Portuguese.

Subsequent discussions were held after financial proposals from EDG (Guinea Electricity), acting as the producer, were received. A conference subsequently organized between the parties and chaired by OMVG did not result in any resolution on the tariff. PATRP also began developing a financial model to provide an independent assessment of a realistic electricity wheeling tariff based on the various options proposed by the OMVG. The lack of information and the difficulty in obtaining the full support of OMVG has prevented conclusion of this activity prior to the end of PATRP engagement.

West African Power Pool (WAPP) Regional Electricity Market. PATRP participated in the first of WAPP's bi-annual Donors' Conference meetings in Cotonou in April 2018. During the conference, PATRP met with WAPP, the ECOWAS Regional Electricity Regulatory Authority (ERERA), West African utility executives, and bilateral and multilateral financial institutions to support operationalization of the new regional power market, where they developed a scope of work for PATRP assistance to WAPP:

- Develop the interconnection between Guinea and Senegal as a pilot transaction. This project will build on the Senegal Generation and Transmission Master Plan developed by PATRP in FY 2017. The plan includes hydropower imports from Guinea as a part of its strategy to lower electricity cost and increase reliability of the system.

- Develop a risk matrix. PATRP developed a risk matrix to determine the risks and possible constraints related to these projects, and to determine the means to mitigate the risks. This analysis could also help to better understand the nature of the risks and validate the allocation of these risks between the stakeholders to optimize the costs of the projects.

In December 2018, PATRP conducted a series of meetings with ERERA in Ghana to determine risks to the timely development of generation projects to increase power generation capacity and access in the region; identify challenges to the development and implementation of a regulatory, legal, and institutional framework to ensure an adequate landscape for transactions; gauge potential interest of ERERA to implement a project monitoring tool developed by PATRP, including the validation of deadlines impacted by the risks inherent in the development of documentation, and the negotiation of the acceptance of the environmental control conditions of the Regional Regulatory Authority in the member states; and assess interest of ERERA and member states in assistance/tools offered by Power Africa.

To accelerate the power market integration and enhance the coordination among national and regional institutions and Development Partners, Power Africa proposed in 2019 that a Regional Market Delivery Unit (RMDU) be established. The RMDU will be responsible to identify and propose, and where appropriate implement, concrete actions to accelerate the regional electricity market integration and achieve Phase 2 market launch by 2020/2022. In March, Power Africa received a formal letter from OMVG expressing interest to collaborate on engagement of representatives of the countries involved in finalizing the PPAs and transmission agreements associated with the Kaleta, Souapiti, and Sambangalou power projects. As a result, PATRP collected information associated with the transaction, engaged the regional and national actors, analyzed draft contracts, and developed recommendations for improvement.

West African Power Pool (WAPP) Backup Information and Coordination Center. PATRP supported WAPP in developing a feasibility study for a Backup Information and Coordination Center (BICC). A BICC facility provides the information and communication infrastructure needed for real-time supervision of the operation of the interconnected system, as well as management of the regional electricity market (see above). The study, which was presented to WAPP and stakeholders in Benin in October 2019, evaluated two activities: (i) the main system (including the hardware and the software of the BICC); and (ii) the building that will house the BICC.

Regional Gas Assessment. Availability of natural gas has been identified as one of the key requirements for a well-functioning regional power market by 2020. To that end, PATRP developed a West Africa regional gas assessment to be shared with the Tony Blair Africa Governance Initiative to inform their regional power trade analysis. PATRP provided gas scenarios (volume and prices) to support the West Africa regional power trade analysis across 20 countries. The assessment noted that 11,000 MW out of 26,000 MW to be developed in the region by 2030 would be gas. The West Africa gas availability assessment report was finalized in March 2019, and complements the *Power Africa Gas Roadmap* published in 2018.

The report covered the full gas value chain, from the exploration phase to gas consumption, including gas and LNG infrastructure requirements. To conduct this study, PATRP engaged with and interviewed many key gas stakeholders from the ECOWAS region, including national oil and gas companies, hydrocarbon ministries, LNG and SSLNG developers, gas companies, and others. PATRP also presented the Gas Assessment to the Government of Côte d'Ivoire.

Côte d'Ivoire Gas Roadmap. After participating in the AfDB Africa Energy Market Place conference and facilitating the "Gas in Côte d'Ivoire" roundtable discussions, PATRP prepared a Natural Gas Strategy orientation paper for Côte d'Ivoire, which was presented to the AfDB and the Government of Côte d'Ivoire (GOCI). The GOCI requested Power Africa support to further the strategy. Topics such as potential gas demand, optimal infrastructure make-up, security of supply, and LNG contracts were the main topics covered by the support. This engagement will likely be transitioned to the new West Africa Energy Program (WAEP).

GHANA

RESULTS SUMMARY

552 MW	8,452	357 MW	2,476 MW	438
Reached Financial Close	On-Grid & Off-Grid Direct Connections	Commissioned	Added to Project Pipeline	People Trained

Ghana boasts one of the highest electrification rates in sub-Saharan Africa, at 85 percent. As of September 2019, Ghana had installed, grid-connected generation of approximately 5 gigawatts (GW), although only 4.4 GW is considered "dependable capacity" due to technical limitations (i.e., maintenance) and fuel supply limitations (i.e., transportation related and financial). The system is comprised of approximately one-third hydro and two-thirds thermal resources, with solar PV contributing less than one percent.

PATRP deployed four resident Transaction Advisors (TAs) in Ghana, including a Lead TA who also served as a Gas Advisor, a Transaction Advisor, and a local assistant to the Transaction Advisors. Both the Lead TA and Transaction Advisor were embedded within the Ministry of Energy (MOEn) to provide technical assistance to the MOEn, government-owned or administered institutions and agencies, and private sector developers and investors active in the energy sector. PATRP also maintained two resident BTG Advisors in Ghana.

Ghana's power transmission grid is relatively well-developed, covering most of the country and inter-connected with neighboring countries in the East, West and North. The transmission losses at approximately four percent compare well with its peers. However, Ghana's distribution utilities suffer from significant losses of approximately 25 percent, which includes technical and commercial losses and unmetered street-lighting use. Most of Ghana's energy sector issues arise from the inability of the distribution entities to collect and pay for the power supplied, which creates difficulties for the power and fuel suppliers.

Ghana has a relatively robust and transparent investment, legal and regulatory framework, and has generally upheld the rule of law and the sanctity of contractual agreements. However, government decision making, such as which energy projects are given priority to proceed, are frequently influenced by political considerations and lobbying by vested interests.

ACTIVITIES

PILLAR 1: GETTING TO 30,000 MW

Kpone Independent Power Plant (350 MW). The Kpone Independent Power Plant (KIPP) is among Ghana's most fuel-efficient thermal power stations and critical to meeting the country's growing demand for electricity. Developed by Cenpower Generation Company Limited, KIPP accounts for approximately ten percent of Ghana's total installed capacity and employs at least 70 people full-time during operation. PATRP helped the power project reach financial close in December 2014 by providing independent transaction advisory support to MOEn, the Electricity Company of Ghana (ECG), and project sponsors, and by facilitating agreement on commercial terms and conditions in the power purchase agreement and Government Support and Consent Agreement, which was required to obtain financing from international lenders under the traditional IPP model. KIPP began commercial operations in June 2019.

The 350 MW Kpone Independent Power Plant is among the largest independent power producers in Ghana. Photo by Cenpower.

Early/Bridge Power (400 MW). The 400 MW Early Power Limited (EPL) project was developed as a fast-track Independent Power Project (IPP) by a group of international private investors in the Tema power enclave in eastern Ghana. PATRP assisted the Government of Ghana and the developers of this transaction through direct review and comment on project agreements, as well as enabling environment and capacity-building activities. PATRP met regularly with the Electricity Company of Ghana (ECG), the off-taker, to review transaction status and feedback from regular ongoing negotiations and provided additional analysis to prepare ECG for continued discussions with the project sponsors.

For example, PATRP reviewed proposed changes to transaction documents, including a 20-year PPA, tariff structure, and detailed financial model. PATRP worked with the Ministry of Finance and their external consultant/legal counsel, the Ministry of Energy and the Attorney General to finalize a modified Government Consent and Support Agreement (GCSA) for use by IPPs. PATRP worked with relevant ministries to facilitate completion of a modified GCSA that provided equal or better protection to equity investors and debt holders than the original version of the GCSA. Eventually, the Government of Ghana and project sponsors agreed on a PCOA based on the one PATRP helped negotiate in Nigeria.

PATRP also assisted Early Power in securing a $100 million Development Credit Authority (DCA) portable loan guarantee (for Phase 1 of the project). PATRP supported this process by conducting due diligence of the project for DCA. PATRP further supported USAID Ghana to respond to due diligence enquiries by OPIC in its review of the project's request for a $45 million political risk insurance policy. Vendor financing reached close in December 2018, and sponsors issued notice to proceed to the EPC contractor for Stage 1 (202 MW), for which COD was expected at the end of 2019.

Renewable Energy Transaction Analysis. PATRP provided independent transaction advice to the Ministry of Energy, as well as developers of renewable energy projects. PATRP specifically helped developers revise and offer proposals acceptable to the Ministry of Energy and/or the state utility (ECG) and navigate the changing decision-making process. The MOEn requested that the Ministry of Finance provide a government support agreement (the Put/Call Option Agreement, or PCOA along with L/C liquidity support) for several projects including Siginik (50 MW solar), Windiga Tilli (20 MW solar), Whitecap (25 MW solar), and Ayitepa (150 MW wind).

PILLAR 2:
GETTING TO 60 MILLION CONNECTIONS

Support to Off-Grid Companies. PATRP supported several of the leading off-grid energy companies in Ghana, mainly suppliers of solar home systems (SHS) and lanterns. PATRP helped companies identify potential financial partners, new distribution partners for their SHS products, micro-financing options for small loans to purchase SHS, and helped companies better understand the import duties and taxes in Ghana. Examples of support include:

- **Villageboom**: Support focused on enabling the company to access local finance, and for local partners, in particular SunHut, to increase sales of Villageboom lanterns. The local distribution partnerships will enable the company to distribute more products through these new partners. Under the distribution partnership engagement with Villageboom, five women's groups operating as part of the Village Savings and Loans Account (VSLA) were selected to start the distribution of solar lanterns in northern Ghana, which is now being further scaled up to other women's groups.

A PEG sales agent (in orange) demonstrates an off-grid energy product to members of a Village Savings and Loan Association (VSLA) as part of the company's efforts to both increase the number of female sales agents and female customers in remote northern Ghana. Photo by Laura Allan for PEG Africa.

- **Offgrid Electric (OGE)/ZEGHA Technical Assistance**: PATRP supported ZEGHA in several areas, including identifying new partnerships, training their sales agents and helping them access finance. This support has led to the sale of over 800 SHS+TVs since their inception in Ghana, and their sales target was set as 50,000 systems by 2019 if they are able to raise sufficient funds. PATRP supported ZEGHA by providing input on new value-added services that ZEGHA plans to offer customers to encourage them to continue to pay for the products purchased and to serve as new unique selling propositions to boost sales. PATRP also supported the company to develop a Sales Internship Program in partnership with the National Youth Authority.
- **SunHut**: PATRP organized two-day sales training for 13 Direct Sales Representatives of SunHut Enterprise as part of the Sales Capacity Building Program. The training was intended to build the capacities of the sales representatives to become better at sales targeting, sales proposition, handling customer feedback and rejection.

Mobile Payments. PATRP engaged with mobile network operators (MNOs) and their Third-Party Aggregators to understand the possibility of the operators accepting scratch cards (airtime) in addition to mobile money as an alternative and more efficient mobile payment method for their customers. This work also focused on investigating the potential of using a customer's mobile transaction history as a form of credit check. PATRP, in collaboration with PEG Ghana, engaged in recruiting more mobile money agents in locations where PEG PAYGO SHS are sold. It was anticipated that this would serve as an interim solution until an "airtime to solar" solution becomes possible. Subsequently, PATRP, in partnership with Swifta, achieved some progress on the "airtime to solar" initiative. Swifta is leveraging their existing relationships to present a proposal to MTN. he active PAYGO companies in Ghana also requested for support to enable them to use customer telephone data characteristics to determine the creditworthiness of these individuals.

Collaboration with the Rural Development Fund (RDF). PATRP initiated a potential collaboration between Power Africa and the Ghana Rural Development Fund (RDF) that would help renewable energy companies in Ghana access local currency finance at reasonable rates to help them reach more rural customers. This collaboration would help Power Africa and RDF achieve their shared development objectives of providing clean and easy access to renewable energy products, in particular in rural areas of Ghana that do not have access to reliable and affordable grid electricity. The provision of finance in local currency at low interest rates from RDF would help create a level playing field for local renewable companies and the opportunity to access working capital and consumer financing.

USTDA Feasibility Study for Micro-Grids. USTDA engaged with the Ministry of Energy to apply for a feasibility study to identify the investment potential in micro-grids in the Afram Plains South District. PATRP prepared a draft Terms of Reference, which was approved and submitted to the Renewable Energy Directorate at the Ministry of Energy, prior to formal submission to USTDA. A grant application for $852,950 was submitted to USTDA, and was approved.

Renewable Energy Regulatory Support. In collaboration with the Association of Ghana Solar Industries (AGSI), PATRP organized an industry meeting to bring together private sector players and regulators to kick-start a collective conversation about regulatory issues, opportunities and challenges facing the sector, as well as proposed steps to rectify them. Fifty-one participants from the entire renewable energy value chain attended, and they were able to present their issues directly to the Ghana Revenue Authority (GRA) and Ministry of Energy (MoE), who promised to reassess their Harmonized System Codes. PATRP continued to follow-up with the Association to advocate and press on these government departments to deliver on their promises. Based on existing public policy, the Economic Commission of West African States (ECOWAS) governments are able to offer concessionary tax rates until 2020 on 197 selected goods.

Black Star Energy mini-grid Ghana.

GENDER INTEGRATION

PATRP initiated a program of technical support to Ghana-based PEG Africa, a solar home systems provider, to integrate gender into its business operations. Interventions to strengthen gender mainstreaming in PEG were identified by PATRP's Gender Advisor, and were deemed to be such a priority for the company that PEG recruited a full-time Gender Project Officer (GPO) to implement the proposed activities with ongoing support from PATRP.

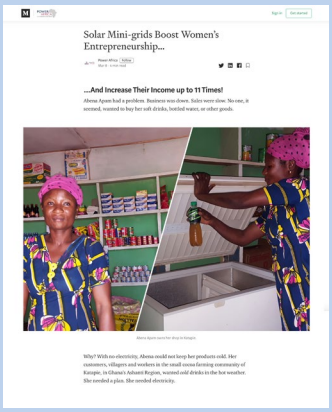
PATRP worked with PEG to develop a Gender Action Plan informed by findings from a baseline assessment done by the GPO. Input for the plan was also solicited from senior management during a gender sensitization meeting facilitated by PATRP's Gender Advisor.

Implementation of the gender-inclusive measures identified in the Gender Action Plan yielded positive results for PEG. Namely, PEG increased the number of women in leadership positions at their headquarters by 14 percent, resulting in reports from senior managers that there was increased collaboration within the management team and more meaningful engagement in management meetings. Greater efficiency with respect to problem solving and a shorter turnaround time to implement decisions were also highlighted. Female employees referred to the positive impact the presence of female role models as leaders in the company had on their own engagement in the company.

An identified gender pay gap that was a result of the gender imbalance in leadership positions was reduced by 24 percent following the increase of women in leadership positions. There was also 60 a percent increase in revenue during the period of implementation of the Gender Action Plan. The suggestion is not that the gender inclusive measures led to this increase in profits alone, but that the increase in profits is in line with a wealth of literature and existing evidence that gender diversity in leadership can positively impact corporate performance.

These changes also qualified PEG Africa for a $12.5 million local-currency investment from Canada Investment Fund for Africa LP (CDC) under the 2X Challenge for Gender Equality.

PATRP also supported the Ghanaian off-grid company Black Star Energy (BSE) with development of a survey to measure the impact of energy services on men and women in communities that have beenelectrified thanks to BSE mini-grids. BSE had a specific interest and focus on measuring the impact of electricity access on female entrepreneurs. PATRP support included researching, compiling, and sharing existing metrics, which were then tailored to the specific context in which BSE works. PATRP reviewed the draft survey and provided input to ensure data collection would sufficiently capture impact on men and women.


Solar Mini-grids Boost Women's Entrepreneurship...

...And Increase Their Income up to 11 Times!

The survey findings indicated that female entrepreneurs who gained access to electricity boosted earnings by 11 times over a two-year period. A summary of findings was published as a blog on Power Africa's Medium site.

PILLAR 3: UNLOCKING ENERGY SECTOR POTENTIAL

Energy Sector Financial Restructuring. PATRP was instrumental in assisting the Government of Ghana improve the financial balance of the power sector, ensuring that cash flows allow all public and private financial commitments to be met and re-establish a sound investment climate. Specifically, PATRP helped the Ministry of Energy implement financial management tools, such as the Cash Waterfall Mechanism and a Power Sector Cash Flow Model to remove working capital bottlenecks in the sector, which heavily impact fuel suppliers and public generators.

- **Cash Waterfall Mechanism**. The Cash Waterfall Mechanism (CWM) is an escrow mechanism concept being pursued by the Government of Ghana whereby all revenues from sector state-owned entities (SOEs) would be sequestered into an independently administered escrow account where disbursements to SOEs and other sector entities are made according to each entity's proportionate share of sector expenses as determined according to an agreed formula. The CWM is intended to minimize cash flow bottlenecks in the sector that were disproportionally affecting the gas suppliers and transporters.

  PATRP developed a concept paper on the mechanics of implementing a Cash Waterfall Mechanism, highlighting key pitfalls to avoid, and assisting with the development of the Cabinet Memorandum used to obtain Parliamentary approval for the implementation of the mechanism. PATRP also assisted the Energy Sector Finance Committee to prepare the model to be used by the Trustee of the Cash Waterfall Mechanism to calculate the revenue allocation to each participant and update the Legacy Debt Matrix to track the net accrued payables for the power sector. PATRP later assisted the Investment Appraisal, Financial Analysis & Monitoring Unit (IAFAMU) to develop the Terms of Reference to engage an Escrow Bank, Payee Bank and Lending Bank.

  Implementation of the CWM was ultimately suspended pending the outcome of the ECG concession.

- **Power Sector Cash Flow Model.** PATRP created an annual Power Sector Cash Flow Model in 2017 that tracked the monthly cash inflows and outflows of all power sector SOEs (ECG, NedCo, GridCo, VRA, BPA and GNGC) as one integrated entity in an effort to demonstrate the extent of the financial shortfall in the sector to key decision makers, and to and quantify the key factors contributing to the shortfall. The exercise was repeated for the 2018 calendar year, which was used as a basis for assumptions in the forecasting model (see below). The model demonstrated that the power sector has a revenue/expense deficit of approximately $1 billion annually.

  PATRP also analyzed publicly available data published by the Energy Commission to cross-check the data provided by the SOEs against data reported to the EC for reasonableness. After presenting the results of the analysis, MOEn requested that more analysis be done on the potential financial impact of various policy and administrative options. PATRP sponsored a financial analysis workshop in July 2018 to present findings of the modelling work to the sector agencies, and as a means to verify and obtain inputs to update the model.

- **Power Sector Forecasting Model.** Using the results and insights gained from the Power Sector Cash Flow models, PATRP created a Power Sector Forecasting Model that calculates the expected revenue/expense gap within the power sector for the next five years. The model was used to identify key drivers of the sector shortfall and quantify the potential impacts of various policy and reform activities, in an effort to prioritize effort on the most impactful reforms.

  PATRP conducted several workshops with sector entities to disseminate the results of the analysis, seek further input to refine the priority policy reforms and improve the capacity of representatives of the SOEs to utilize the model.

  The model became the basis for all power sector financial analysis included in and supporting the Energy Sector Recovery Program.

Energy Sector Recovery Program. PATRP helped the Ministry of Energy prepare an Energy Sector Recovery Program (ESRP), the adoption of which is a Prior Action to funding of a $500 million budget support loan from the World Bank. PATRP assisted the Ministry's

Technical Committee with financial analysis to prioritize potential reform actions, and, in coordination with the World Bank, Ministry obtain Cabinet approval for the ESRP. The ESRP is intended to be a roadmap to restore the energy sector to financial balance within five years and was based on PATRP's energy sector cash flow modelling work (see above). The Ministry of Energy subsequently adopted the "Least-Cost Fuel Procurement Policy" and the "Policy on Competitive Procurement of Energy Supply and Services", which were developed with PATRP support.

Gas Master Plan and Natural Gas Pricing Policy. PATRP was instrumental in securing government approval of the Gas Master Plan (GMP) by first reviewing a draft developed by consultants engaged by the World Bank, organizing a stakeholder workshop to achieve consensus, and drafting a Cabinet Memorandum, which was approved in June 2016. An Action Plan for Implementation of Gas Master Plan was also developed and provided. The GMP is a 25-year strategy for Ghana (2016-2040) that lays out priorities for natural gas infrastructure development in an effort to boost sustainable economic growth and security of the national energy supply.

Gas to Power Unit. In 2018, Ghana's Minister of Energy established a Gas to Power Unit within the ministry, and requested that PATRP oversee project management activities. PATRP coordinated with stakeholders and participated in meetings to plan the Ghana gas system shutdown to:

- undertake Turret Remediation Works on the Jubilee Floating Production, Storage, and Offloading Unit (FPSO);
- conduct annual maintenance of the Atuabo Gas Processing Facility; and
- complete the interconnection of the Offshore Cape Three Points (OCTP) gas supply pipeline to supply up to 180 million standard cubic feet of natural gas per day (MMscfd) of Sankofa gas in Ghana's gas transmission system, which will double the supply of domestic natural gas to the power sector.

PATRP also assisted the Government of Ghana to assess options for the expansion of the Atuabo gas processing plant and the development and financing of an onshore gas pipeline from Takoradi to Tema.

Jubilee Gas Supply Project. In April 2014, PATRP provided Technical Assistance to the Energy Commission (EC) and the Petroleum Commission (PC) of Ghana to enable start-up of the delayed Jubilee Gas Supply Project. The Government of Ghana obtained a $3 billion loan from an international development bank, and a portion of the loan proceeds were used to finance the Jubilee Gas Project, which had three components:

- a 57 km offshore gas gathering pipeline from the production platform (FPSO) to shore;
- an onshore gas processing plant at Atuabo, with capacity to process 150 MMscfd of raw gas; and
- an onshore 110 km transmission pipeline to transport processed gas to power plants in the Takoradi power enclave.

The Ghana National Gas Company (GNGC), the designated developer and owner of the project, entered into an Engineering Procurement Construction & Commissioning (EPCC) Contract in November 2011.

The project was scheduled to achieve completion by December 2012, but was facing delays and concerns regarding safety and integrity. In early 2014, the Government of Ghana requested USAID technical assistance to support completion of the project. PATRP support enabled the project to start producing nearly 100 MMscfd, which provided fuel to 500 MW of thermal generation plants, replacing imported light crude oil and saving nearly $1 million dollars in fuel imports daily.

After inspecting the project site, PATRP advised that an independent technical/safety audit was required to assess the quality of work done by the previous contractor. PATRP developed the TOR for a technical/safety audit and assisted the EC in engaging a reputed engineering firm to conduct a safety audit, which identified several critical issues, including 40 high-risk conditions, and prescribed mitigation measures to address them, prior to introducing first gas in the plant. PATRP supervised implementation of those safety measures by the GNGC/Sinopec team, and supported the EC/PC in the issuance of commissioning and operating permits. As a result of PATRP support, the project reached commissioning stage in November 2014, and the first gas was delivered to the Volta River Authority, which reported production of 'first electricity' from Ghana's domestic gas in December 2014.

> The support provided by [PATRP] provided the necessary confidence to Energy Commission's regulatory team to discharge their responsibilities in Ghana's new natural gas sector. It helped to eliminate delays due to regulatory uncertainty, and ensured that all required permits were issued in a timely manner.
>
> The Energy Commission, Ghana

Reverse Flow of Gas in the West African Gas Pipeline (WAGP). The West African Gas Pipeline (WAGP) was built to transport part of Nigeria's large gas reserves west to Benin, Togo, and Ghana. However, due to a lack of available gas in Nigeria, the WAGP is currently operating at just 20 percent of its capacity. As more indigenous gas is becoming available in Western Ghana, there is a need to reverse flow to supply power plants in Eastern Ghana. PATRP supported the WAGP Integration Project to enable reverse flow of up to 120 MMscfd of gas from Takoradi to Tema, to meet the fuel requirement of power plants in the Tema power enclave, which will address a major localized deficit that limits roughly 65 percent of the enclave's capacity, and forces the use of expensive liquid fuels. PATRP also supported negotiations of the Construction Management Agreement between the West African Gas Pipeline Company (WAPCo) and the Italian firm Eni. PATRP provided project management assistance to MOEn to monitor and expedite the expansion works on the Ghana Gas Company (GNGC) Takoradi Regulating & Metering Station and the West African Gas Pipeline Company (WAPCo) Takoradi Regulating Station, which were completed and interconnected in mid-2019, allowing the commencement of commercial gas transportation from Takoradi to Tema and increasing indigenous gas offtake by the power sector. The third stage of the project is currently under construction, with completion expected by December 2019, which will enable full flow of up to 120 MMscfd to realize fuel cost savings of approximately $250 million per year.

Relocation of 450 MW Karpowership from Tema to Takoradi. This project aimed to fully offtake 180 MMscfd of OCTP Sankofa gas, which reached commercial operations in August 2018 but was constrained due to infrastructure bottlenecks. When complete, the project will eliminate imported fuel consumption to save nearly $100 million per year in fuel costs, while saving valuable foreign exchange on the import of heavy fuel oil. PATRP developed a concept paper for relocation of the 450 MW Karpowership from Tema to Takoradi, to utilize up to 90 MMscfd of OCTP Sankofa gas, and later a Cabinet Memorandum for its approval. PATRP also assisted the MOEn and contracting parties with contract negotiations, and supervised project implementation to ensure timely completion of the project. Karpowership successfully relocated to Takoradi in August 2019 and interconnected with the power grid in September. Conversion to gas is expected by December 2019.

Suppressed Demand and Forecast Study. PATRP developed a comprehensive study on Ghana's Electricity Demand Forecast and Suppressed Demand Estimation. The study aimed to provide a realistic forecast of the electricity demand in Ghana for the next 15 years, which informed subsequent studies such as the Gas Market Review and Generation Capacity Expansion (GCE) planning (see below). PATRP also delivered a one-day workshop on the study results in May 2016. At the end of PATRP engagement, a questionnaire for consumers was developed and circulated.

Generation Capacity Expansion Planning. PATRP developed a Generation Capacity Expansion (GCE) model in 2016 to evaluate the impact of projects under construction and proposed IPPs on Ghana's power supply/demand balance, and, in particular, the impact on national and regional gas demand from gas-to-power projects. The model used power demand and peak load (excluding hydropower and renewable energy output) to arrive at a thermal generation requirement. A PATRP analysis using the GCE model showed that capacity additions already under construction will progressively narrow the power supply deficit that caused the load-shedding of 2014-2015, and enable Ghana to achieve a power surplus in 2018.

LIBERIA

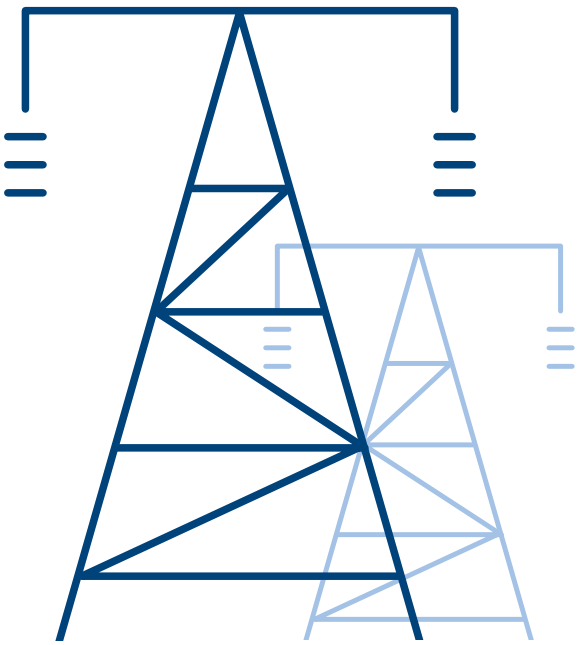
RESULTS SUMMARY

6,022
On-Grid & Off-Grid Direct Connections

121 MW
Added to Project Pipeline

82
People Trained

Less than five percent of Liberia's population is served by the national electricity grid, down from 20 percent before the civil war, with the remainder being dependent on firewood, candles, batteries and kerosene lamps for their daily energy needs.

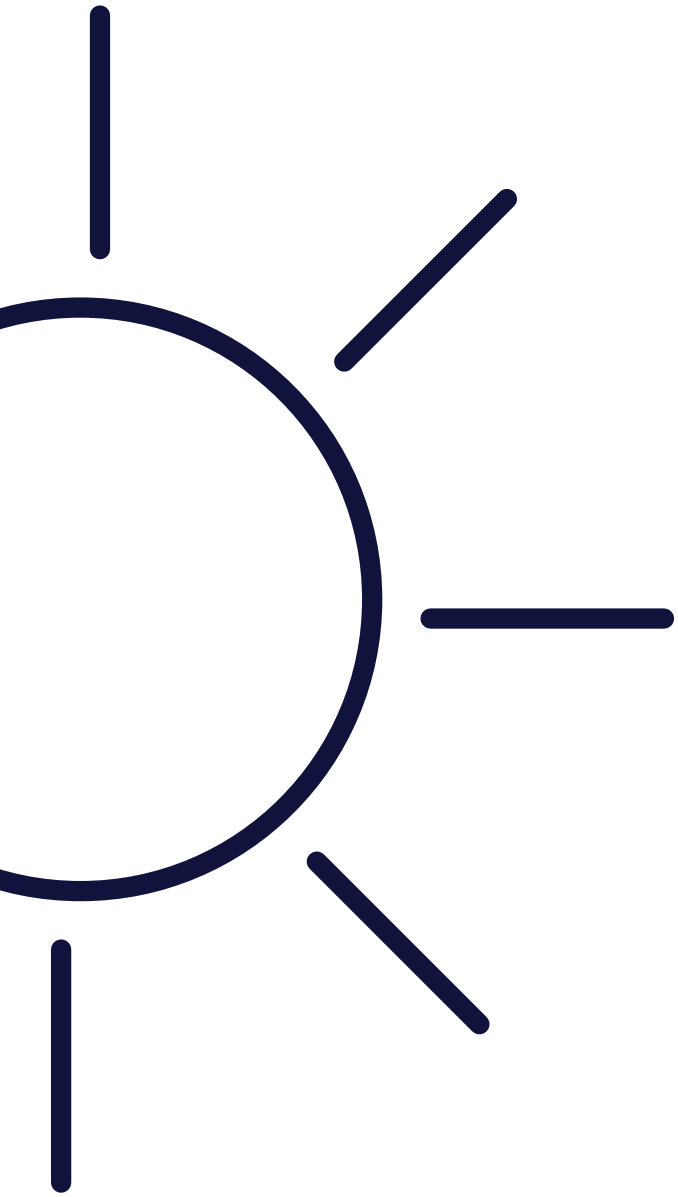


PATRP supported Power Africa in Liberia though frequent short-term technical assistance (STTA), focusing on the turnaround of LEC to make it self-sustainable, and the procurement of a new management contractor the utility. PATRP also supported specific large- and small-scale transactions.

The national utility, the Liberia Electricity Corporation (LEC), operates 38 MW of Heavy Fuel Oil (HFO), but the country has limited oil reserves, resulting in reliance on imported oil. Hydro resources hold around 1,000 MW of power generation potential, although harnessing this potential will require development of reservoirs, which require significant lead time and capital investment.

The electricity tariff in Liberia is one of the highest in the world due factors such as the costs of diesel-based generation, system losses at LEC, and a lack of local solutions to address the slow pace of electrical infrastructure development. The tariff can be reduced when the generation mix shifts from diesel to more cost-effective sources, such as hydro and solar.

Among Liberia's most significant energy needs is a more efficient national utility. Building capacity within LEC will lead to faster implementation of projects. Increased clarity on institutional set-up and regulatory framework is essential to attract private participation in the energy sector. A national electricity master plan is also critical to show a defined direction of electricity infrastructure growth. The government must also strengthen the enabling environment by fully implementing the Electricity Act and framing enabling regulations.



ACTIVITIES

PILLAR 1: GETTING TO 30,000 MW

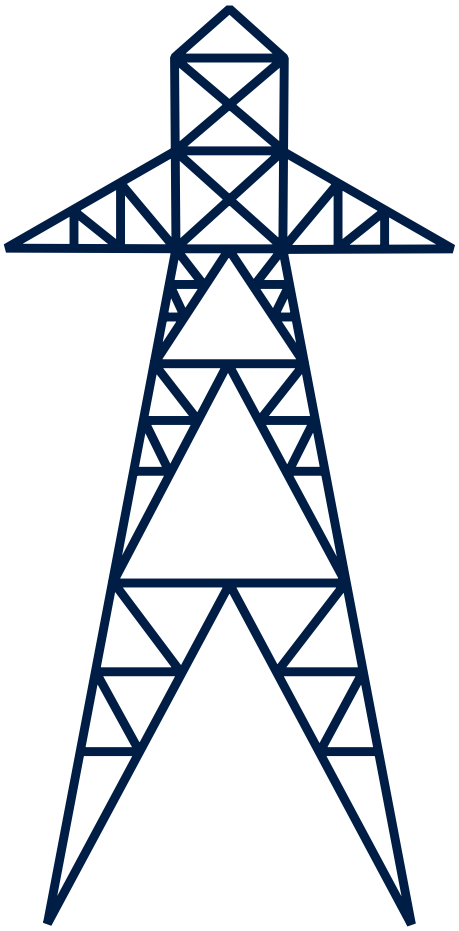
Solar Resource Assessment. Liberia possesses one of the highest solar irradiations in the world, and the Government of Liberia was interested in utilizing solar resources to expand access to electricity. In February 2018, PATRP conducted a solar resource assessment to understand solar potential based on future energy demand, provide policy and regulatory recommendations, and develop technical standards and grid code requirements for grid-connected solar projects.

Specialists visited Liberia and conducted consultations with a multitude of Government departments and development partners. This would allow for identification of potential sites for utility-scale and mini-grid solar projects. PATRP's advisory team completed the work and finalized project concepts and business models for shortlisted off-grid solar projects. PATRP submitted the final draft of the solar assessment and the report was circulated among all energy stakeholders.

The study determined that a potential of 900 MW of solar capacity could be installed by 2050 to meet part of the electricity demand at that time, given that sufficient grid flexibility and capacity is developed. The study identified potential locations for the solar plants and PATRP also agreed to provide general transaction support to stakeholders in Liberia to support proposed deals for utility-scale solar projects.

Du River Biomass Project (17.5 MW). PATRP provided transaction advisory assistance to this proposed biomass project near the city of Kakata, including support for a grant proposal to USTDA, preparation of a draft investment prospectus, review of and input on the project designs and EPC, monitoring the project's progress toward obtaining a generation license. PATRP also delivered technical assistance to finalize the feasibility studies for the project and submitted a pre-feasibility report to USAID for review and comments.

Pursuing New Generation Capacity. In 2018, at the request of the Government, PATRP identified 110 MW of heavy fuel oil (HFO) assets owned by mining company Arcelor Mittal (AM) as a potential generation resource for Liberia Electricity Corporation (LEC) for providing increased electricity access to the Liberian people. While AM intended to privately sell 78 MW outside of Liberia, 26 MW was under consideration for LEC. PATRP supported this request with a technical and financial feasibility study, which resulted in moving all the units to the Buchanan Port Facilities, and the preparation of a detailed demand estimates for Buchanan City in Grand Bassa County. PATRP shared previous demand studies with GoL and LEC and discussed possible electrification options, including grid extension and acquisition of new generation plants.



PILLAR 2:
GETTING TO 60 MILLION CONNECTIONS

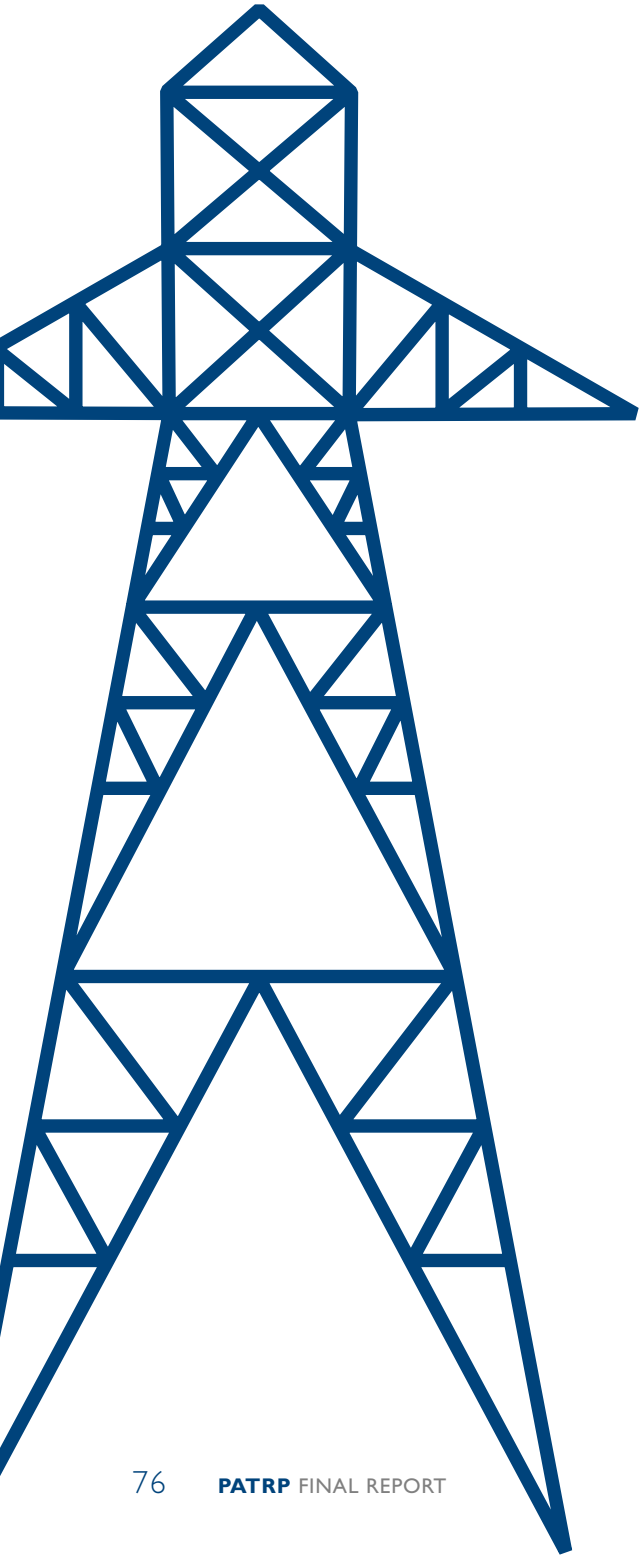
Off-Grid Market Assessment. PATRP conducted a market assessment of the off-grid energy sector in Liberia to assess the overall off-grid energy sector, including the barriers to market entry. Meetings were held with 18 government stakeholders, donors, and private sector companies, leading to several recommendations on potential BTG support in Liberia. The report concluded that, in the short term, the primary focus of any future support should be on pico-solar PV systems for homes and small businesses, particularly high-quality certified solar lanterns and small home systems (SHS), through pay-as-you-go (PAYGO) mobile payments. A secondary focus should be on supporting local active solar PV mini-grid independent power producers (IPPs) to build their business and technical capacity and solar PV hybridization of their predominantly diesel-powered systems.

Support to Off-Grid Companies. Following the completion of off-grid energy concept notes for the future USAID-funded Solar Energy Development for Liberia, PATRP supported the following companies: EcoPower, LEN, and VAAFD, by providing further improvements of their business models and investment slides, and introduced them to investors, including Kiva, Acumen and SunFunder.

Off-Grid Solar Activity Design Plan. In 2018, Liberia's Rural and Renewable Energy Agency (RREA) requested USAID support to conduct a study on the policy and business environment for off-grid solar lighting business in Liberia. PATRP supported the development of a Terms of Reference (TOR) for the study, to be implemented under the Power Africa Senior Advisory Group mechanism, in addition to supporting the delivery of the work. A stakeholder consultation meeting was held in October 2018 to share key findings resulting from this study, and to initiate discussions on the action plan recommendations. Access to finance was identified as a key constraint in the solar business environment. Barriers identified include: (i) high import taxes and duties on solar products; (ii) limited capacity in marketing and management of solar businesses; (iii) no competition

in pricing structures; and (iv) limited awareness of solar potential. Recommendations on policy, program and coordination were integrated into an action plan of the final report.

New On-Grid Connections. The Management Services Contractor (MSC) for the Liberia Electricity Corporation (LEC), who was procured with PATRP support, is expected to add nearly 200,000 new customer connections over the life of their 5-year contract. See below for details.



PILLAR 3: UNLOCKING ENERGY SECTOR POTENTIAL

Loss Reduction Study at LEC. This PATRP program at LEC aimed to characterize the sources of transmission and distribution energy losses, identify how they may result from technical and non-technical sources, and develop a plan for reducing them to a level consistent with international utility practice using both technological and administrative measures.

The Liberia Energy Corporation (LEC) reported total losses of 35 percent in July 2015, up from approximately 25 percent prior to the Ebola crisis. A contributing factor is thought to be theft from pre-paid electricity meters. Of the 35,000 meters registered, only about 21,000 customers made purchases in July, and it is presumed that many of the 14,000 quiescent meters were bypassed to allow customers to consume "free" electricity.

PATRP was asked to characterize the sources of transmission and distribution energy losses, identify how they may result from technical and non-technical sources, and develop a plan for reducing them to a level consistent with international utility practice using both technological and administrative measures. Such a loss reduction plan would propose investments needed to achieve the goal, a timetable for execution, and indicators for monitoring both the progress of the plan's implementation and of the plan and its outcomes in terms of improved efficiency. PATRP deployed a team of experts to undertake this activity.

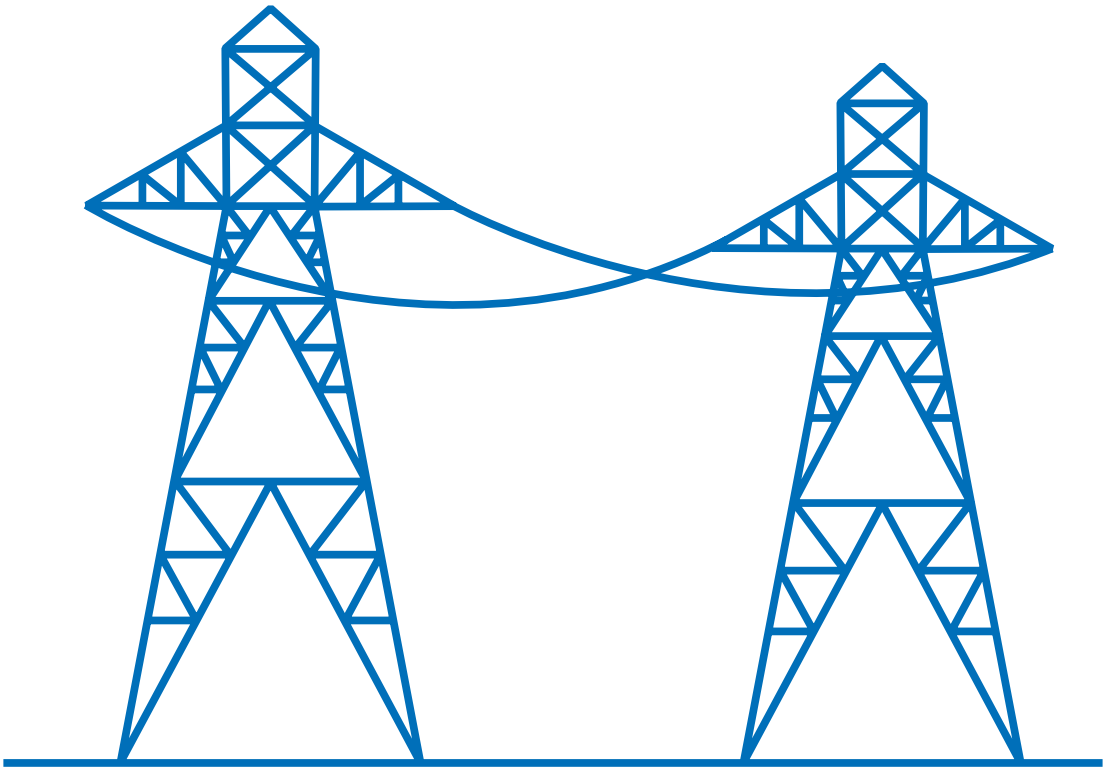
An inception report was submitted to USAID/Liberia following the initial kick-off meetings and data gathering. Follow-on activities were performed, including assessing revenue protection activities undertaken by LEC, making recommendations to improve performance, and reviewing LEC's billing cycle and metering systems. A final report outlining a loss-reduction program was delivered in Q3 FY 2016. In the report, PATRP identified interventions that LEC could initiate to reduce losses. These interventions relate to many functional areas of LEC, including commercial processes, network

management, and capacity building. An investment plan was also presented. The final recommendations were incorporated into the action plan prescribed for the new LEC management services contractor.

Liberia National Electricity Sector Master Plan (NESMP). In FY 2018, the World Bank approved a request from the Government of Liberia to support the development of a National Electricity Sector Master Plan. Through USAID, the Government of Liberia requested support from PATRP to prepare the terms of reference (TOR) for developing an electricity sector master plan for Liberia to share with the World Bank, who will fund this study. The study intends to update the Liberia National Electricity Policy, collate all sector studies, and develop an electrification and electricity sector plan for the country. PATRP provided technical assistance support to Government of Liberia and the World Bank during the execution and review of the study. The procurement of consulting services for the master plan is currently underway.

Ganta-Gbarnga Grid Extension Project (GGGEP). USAID Liberia is funding the construction of the Ganta-Gbarnga grid extension corridor in Nimba County. The grid extension consists of a 77 km, three-phase 33 kV line; a 25 km, single-phase distribution line and associated transformers; and a 10 km, low-voltage line with around 500 service connections to end consumers. Power to the corridor will come from the Danane-Ganta Cross Border 33kV system from Côte d'Ivoire. The construction of the corridor extension and connections to end customers is expected to be completed by May 2020. In 2019 PATRP conducted field visits to the grid extension areas and inspected electrical infrastructure at Phebe Hospital, Cuttington University (CU), Central Agricultural Research Institute (CARI), Bong County Technical College (BCTC), and B C Dunbar Hospital. Due to the high cost of running and maintaining diesel generators, these institutions use electricity for just a few hours each day to provide essential services. With a connection to the grid, hours of operation will increase, and these institutions will be able to function at optimal levels. This in turn will lead to better service delivery and improved social benefits, including improved health of rural communities, increased agricultural productivity, better education and job creation.

As at the end of engagement, PATRP had prepared a preliminary recommendations report, as well as the detailed technical specifications for equipment required for interconnection, along with the scope of work for executing the connection.



MANAGEMENT SERVICES CONTRACT FOR LIBERIA ELECTRICITY CORPORATION (LEC)

PATRP supported the procurement process for a new management services contractor (MSC) for LEC. The new MSC will be expected to not only operate and maintain LEC's generation, transmission and distribution systems, but to improve performance, increase efficiency, and build capacity within LEC. The overarching goal is to support the Government of Liberia in achieving targeted levels of electrification and network expansion. As part of its performance requirements, the new management contractor will be expected to add 200,000 new customer connections over five years.

PATRP conducted due diligence activities in support of the tendering process, and submitted findings to USAID/Liberia. PATRP further assisted LEC develop the RFQ and RFP documentation.

PATRP hosted a webinar in early October 2016 for interested bidders and approximately forty-five firms requested the RFQ documents and registered for the webinar, and more than twenty organizations participated. Four organizations submitted the RFQ applications and were pre-qualified. PATRP subsequently hosted a pre-bid conference on March 2017, and bids were received from three groups in June 2017. A Technical Evaluation Panel (TEP), consisting of two members each from LEC and Millennium Challenge Account (MCA) Liberia, and one member from PATRP, reviewed and scored technical proposals.

Following review of technical and financial proposals, Ireland-based ESB International (ESBI) was selected as the new Management Services Contractor. PATRP assisted with negotiations between LEC and ESBI, which resulted in a fully executed contract in November 2017.

The duration of the contract is three years, funded by MCC through the Millennium Challenge Account-Liberia and, if exercised, two optional years to be funded by the Government of Liberia (GOL). As part of its performance requirements, ESBI will be expected to add 200,000 new customer connections over the next five years. In its endeavor to ensure a smooth transition of operations from the Interim Management Team at LEC to the new MSC, PATRP deployed a utility sector specialist in December 2017 to coordinate the transition arrangements. His responsibilities included handover documentation and support to the interim management team. The transition coordinator also organized stakeholder meetings for the MSC management and supported collation of documents needed to meet the requirements of the contract. Full transfer of authority to the new management team was completed in early January 2018, thus ending PATRP support.

NIGERIA

RESULTS SUMMARY

459 MW	694,596	460.7 MW	5,927 MW	4,195
Reached Financial Close	On-Grid & Off-Grid Direct Connections	Commissioned	Added to Project Pipeline	People Trained

PATRP maintained a multidisciplinary team in Nigeria, covering the full spectrum of activities within the energy sector.

The large-scale project team included a Lead Transaction Advisor, Gas Sector Advisor, Transaction Advisor, Legal/Policy Advisor, and an embedded commercial advisor at the Niger Delta Power Holding Company (NDPHC). Power Africa BTG support started in early 2016, with an advisor for financing as well as an advisor for mobile money payments. Power Africa also deployed eleven field-based utility specialists to Nigeria in 2016 to provide assistance to Abuja Electricity Distribution Company (AEDC), Benin Electricity Distribution Company (BEDC), Eko Electricity Distribution Company (EKEDC) and Ibadan Electricity Distribution Company (IBEDC).

Other team members included a transmission Advisor seconded to the Transmission Company of Nigeria (TCN), as well as a financial advisor tasked with financial modeling and tariff studies. Various technical experts were also deployed for short-term assignments.

ACTIVITIES

PILLAR 1: GETTING TO 30,000 MW

Azura-Edo Gas Power Project (450 MW). PATRP's engagement on this transaction was extensive. Initially, through support to NBET, PATRP assisted with the PPA negotiations and with the development of the Put/Call Option Agreement (PCOA), which was adopted in lieu of a government guarantee to provide assurance to the lenders and investors that their investments can be recovered in the event of an early termination of the PPA. In addition, PATRP worked with the U.S. Government to facilitate President Buhari's decision to waive compliance with a Presidential circular for the project. Certain provisions of the circular were blocking the final acceptance of the financial securitization by the lenders. These efforts finally reached conclusion in FY 2016, as PATRP helped with the final steps needed for the transaction to reach financial close. Specifically, PATRP transaction advisors reviewed a draft second amendment to the PPA sent to NBET by Azura's legal counsel. The amendment was limited to resetting the deadlines, which were affected by the delay in closing and were subsequently approved by the parties and the Nigerian Electricity Regulatory Commission (NERC). Ultimately, all conditions precedent were met and the transaction reached financial close in December 2015, and entered into commercial operation in April 2018.

Qua Iboe Power Project (QIPP, 540 MW). PATRP provided critical assistance that enabled NBET, Mobil Producing Nigeria (MPN) and the Nigerian National Petroleum Corporation (NNPC) to negotiate key commercial project agreements – including the PPA, PCOA, Ancillary Services Agreement, and Grid Connection Agreement – to advance the $1.2 billion Qua Iboe Power Project (QIPP). As a result, a 20-year Gas Supply Agreement and a Put/Call Option Agreement (PCOA) for QIPP were also signed, paving the way to deliver 540 MW of natural gas-fueled power to Nigeria's national grid. PATRP's technical assistance to NBET and the transaction parties was instrumental in advancing the project, particularly in terms of supporting the negotiation of the PPA and PCOA terms, deploying legal and technical solutions to removing key project development bottlenecks, and undertaking a project financial audit, which is a lender requirement for financial close.

Front-Runner Solar IPP Projects (1.2 GW). PATRP supported NBET to advance 14 front-runner solar IPP projects. The proposed solar projects are located in economically disadvantaged areas with the highest need for electrical power generation, such as the north of the country and some areas in the center and south. These solar projects would ensure an efficient allocation of available generation resources to the areas with highest need of new generation capacity.
To advance these projects, PATRP produced a tariff study outlining pricing benchmarks for solar generation in Nigeria, designed to aid deliberations within the Ministry of Power and NBET. In parallel, PATRP worked with NBET to finalize the standard form solar PPA, incorporating detailed comments from several donor agencies and developers.

To secure approval for signing the PPAs with the front-runner solar projects, PATRP prepared a briefing paper for NBET's meeting with the Ministry of Power and the Vice President's Office with recommendations on a suggested policy for competitive procurement and a way forward on the pending directly negotiated solar PV projects. In turn, PATRP was able to brief and advise the Vice President on the merits of solar power project development in Nigeria, and the Vice President ultimately approved PATRP's recommendations and NBET proceeded with finalizing the PPAs, which were signed in July at a ceremony in Abuja.

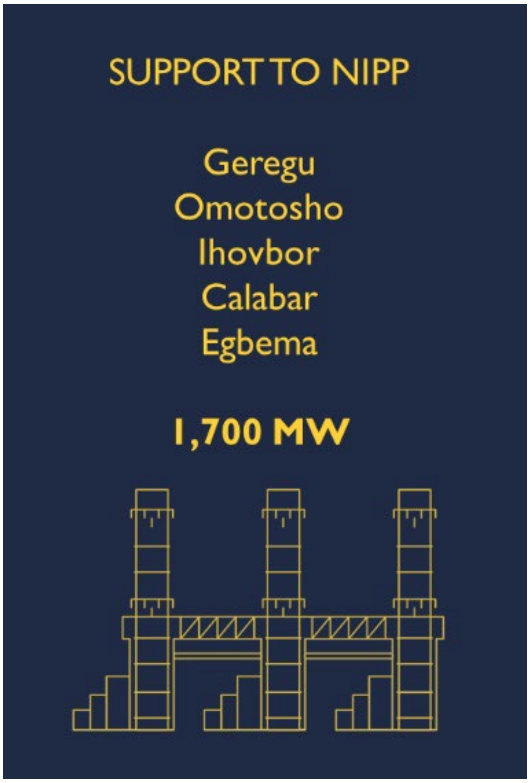
Following this milestone success, PATRP began support to NBET on negotiations for the PCOA, which must be submitted to the Federal Ministry of Finance and Federal Ministry of Justice for approval. This is a critical step toward achieving financial close. To support this effort, and at the request of NBET, PATRP helped organize a high-level, two-day training on the PPA and PCOA. This was the first workshop of its kind organized for the senior leadership of key stakeholders in the power sector of the country, such as the Ministry of Finance; Ministry of Justice; Ministry of Power, Works and Housing; the Bureau for Public Procurement; the Nigerian Electricity Regulatory Commission; and NBET. The training was organized in coordination with NBET's legal counsel and helped broker discussion and dialogue on outstanding provisions in the PCOA.

Before the transition to the new implementing program, NPSP, PATRP was helping both NBET and private developers navigate the current impasse on front-runner solar projects that signed PPAs with NBET in mid-2016. The principal challenge stems from the terms of the PCOA, which were not considered to be bankable. However, in October 2017, NBET issued a revised solar PCOA. PATRP assisted NBET to structure and negotiate the first standardized solar PCOA, which formed the basis for the revised versions issued to the solar developers. PATRP also assisted several project sponsors and Power Africa Partners in structuring the projects to attract project financing and complete the conditions precedent to their PPAs; although real progress remains a challenge.

> I wish to put on record our profound thanks and appreciation to Power Africa for the unflinching support to the evolution and development of Nigeria's fledgling electricity market. I also want to place on record the great work that your transaction advisor has done singularly in support of NBET's Solar PCOA negotiations.
>
> Waziri Bintube,
> CFO
> Nigerian Bulk Electricity trading Plc (NBET)

Nigeria Integrated Power Project (NIPP, 1,700 MW). Through two embedded advisors (legal and commercial) and additional short-term technical assistance, PATRP supported the Niger-Delta Power Holding Company's (NDPHC) efforts to finalize the privatization and sale process for five key Nigeria Integrated Power Project (NIPP) Plants, including Geregu, Omotosho, Ihovbor, Calabar, and Egbema. The NDPHC estimates that the privatization of the plants will yield up to an additional 1,700 MW.

To overcome challenges with payment for these assets, PATRP presented a deferred payment option to stakeholders, which would lead to the accelerated completion of the privatization of the assets. PATRP also provided legal and commercial support to NDPHC with respect to its gas supply payment obligations, and proposed several solutions such as reducing the gas "Take or Pay" obligation or modifying the take or pay reconciliation period.



Shiroro Hydropower Plant Technical Due Diligence. PATRP conducted a site visit and technical assessment of the Shiroro Hydropower Plant, a 600 MW development located in Niger State, approximately 180 km north of Abuja. The plant was commissioned in 1990, and is a key station of the Nigerian national grid. In 2014, a 30-year Concession was granted to North South Power (NS Power) to operate the plant, and NS Power subsequently sought financing from InfraCredit, a specialty company established by the Nigerian Sovereign Investment Authority and others to provide guarantees for infrastructure financing instruments. InfraCredit requested Power Africa assistance to analyze the potential for the project to operate safely and efficiently throughout the NS Power Concession Period to 2043. In response, PATRP commissioned a hydropower expert to evaluate the condition of the Shiroro hydropower plant. The resulting evaluation contributed to InfraCredit's decision to support Nigeria's first green corporate bond for NS Power.

Proton Energy Gas-to-Power (500 MW). Proton Energy is a Power Africa partner developing a 500 MW gas-to-power plant in Sapele, in Nigeria's Delta State. PATRP assisted Proton with negotiating a Gas Supply and Purchase Agreement, EPC Contract Negotiation, and the development of a Gas Compendium. Proton Energy pledged that the power plant will create at least 1,000 local jobs, starting from the construction stages.

Groundbreaking Ceremony at Proton Delta Sunrise in Sapele. Photo by Proton Energy LTD.

PILLAR 2:
GETTING TO 60 MILLION CONNECTIONS

BEYOND THE GRID

Support to Off-grid Companies. PATRP actively engaged more than 20 off-grid companies in Nigeria, providing targeted business and technical support on distribution and sales agent models, marketing strategies, logistics, after-sales service, and mobile payments. PATRP also helped off-grid companies' structure and source finance, advised on grant applications, and offered investor matchmaking.

Distribution and Retail Strategies. PATRP supported several companies with development of strategic partnerships with microfinance banks (MFBs) throughout Nigeria who serve as distributors of solar products. Our assistance helped to create linkages with distributors and social groups within rural and peri-urban communities, for the sales and distribution of solar systems through these channels. Sales commenced in late 2017 through more than 40 branches.

Access to Finance. PATRP supported several companies to secure new working and receivables financing from investors, including Acumen, Lendahand, Oikocredit, ElectriFI, FINCA Ventures, Open Capital Advisors, Trine and Bettervest, as well as from USTDA and USADF. PATRP support included facilitating meetings, reviewing investment decks and providing market intelligence and due diligence for the companies and the investors. Our support resulted in more than $2 million in investments.

Microfinance and Consumer Loans. PATRP supported partnerships with 10 microfinance banks – including LAPO Microfinance Bank, Grooming People, and Mutual Benefits Microfinance Bank, three of the largest Microfinance companies – to develop new distribution channels for off-grid companies. LAPO, for example, provided loans to three companies to help facilitate sales of more than 8,000 new solar home systems.

Off-Grid Mobile Finance Pilots. PATRP supported several companies with their mobile payment strategies in collaboration with a range of mobile money operators (MMOs) and mobile network operators (MNOs). This support resulted in the companies' ability to reach more customers in off-grid areas, and thus increased connections. PATRP also worked with Interswitch's Quickteller Paypoint network (11,000 agents nationwide) on a pilot scheme focused on giving selected off-grid companies access to their agents nationwide, which would make collections and customer reach much easier for the companies.

PATRP also coordinated with the Gates Foundation on Nigeria's regulatory change regarding the participation of MNOs in the mobile money space, which would allow MNOs to apply for super-agent licenses to acquire and manage agents that can provide financial services on behalf of licensed financial service providers.

ON-GRID

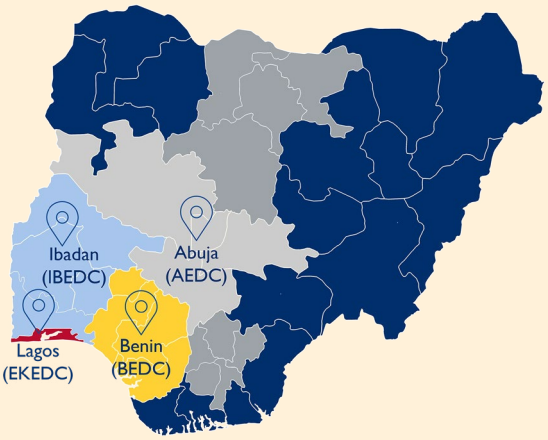
Support to Distribution Utilities. PATRP support to four distribution companies (DISCOs) in Nigeria produced more than 570,000 new on-grid connections. These connections derived, in large part, from regularizing customers who had previously not been paying for electricity consumption, as well as those who had not previously been metered. For a full description of PATRP support to the four DISCOs, see Pillar 3.

An AEDC technician inspecting power distribution lines in Abuja, Nigeria. Photo by Ryan Kilpatrick for Power Africa.

PILLAR 3:
UNLOCKING ENERGY SECTOR POTENTIAL

COMMERCIAL LOSS REDUCTION AT FOUR DISTRIBUTION COMPANIES

PATRP deployed 11 field-based utility specialists with skills in utility management and commercialization to Nigeria with the task of providing dedicated assistance to four distribution companies (DISCOs): Abuja Electricity Distribution Company (AEDC), Benin Electricity Distribution Company (BEDC), Eko Electricity Distribution Company (EKEDC), and Ibadan Electricity Distribution Company (IBEDC).



The purpose of PATRP's assistance was to reduce non-technical losses in the distribution system and enhance revenue through more efficient business management. At each DISCO, PATRP was assigned a specific geography or pilot area, which was often the worse performance districts, with a goal to demonstrate 'proof of concept' in terms of the team's approach to loss reduction and improved revenue collection.

The methodology taken at each DISCO followed a common track. First, a diagnostic was conducted to identify key shortfalls or deficiencies. Subsequently, a transformation plan was developed that outlined specific changes needed to move the utility towards sustainability. One of the key changes PATRP instituted at the DISCOs was introduction of a 30-day commercial cycle based on international best practices, starting with preparing reading sheets to measure energy consumption, improving data entry, coordinating bill delivery, and implementing customer disconnection and reconnection activities.

PATRP's work with the DISCOs involved implementing more than 800 activities and tasks related to corporate organizational issues, technical and commercial operations, stakeholder engagement, operational efficiency, and customer service. In parallel, PATRP engaged with the utilities and local law enforcement and justice systems to improve the process of identifying and prosecuting electricity theft cases, and built capacity on the subject within the legal profession. More than 1,650 electricity theft cases were sent to relevant courts, resulting in 20 convictions. By introducing and conducting comprehensive turnaround management programs, Power Africa helped the four DISCOs significantly reduce losses and increase revenue by more than $160 million.[2]

2 For detailed information on loss reduction, see Appendix A.

To achieve the results, PATRP engaged in the following activities across all DISCOs:

- Delivered training and capacity-building programs with field staff, including metering, illegal connections detection, and improvement of field practices.
- Inspected the quality of meter installations, ensuring the meters are accessible for DISCO employees and are duly sealed to prevent/detect illegal connections.
- Strengthened revenue protection teams by restructuring them to report directly to regional commercial managers, instead of area managers, to more efficiently use resources and target activities in areas where it was needed most.

PATRP substantially exceeded all targets, and the return on Power Africa's investment was high. Based on feedback provided by DISCO leadership, the improvements implemented by PATRP are fundamentally sustainable and will help each company continue its journey to self-reliance.

Handing over keys to a bucket truck donated to AEDC by Power Africa under the commodity support initiative.

Workshop for judges and magistrates on electricity theft prosecution.

Using the new Zera Meter test equipment in the field to detect energy theft.

Nigeria Gas Flares Commercialization Program. PATRP provided legal, financial, and technical support to the Nigeria Gas Flare Commercialization Program (NGFCP), an innovative initiative to capture petroleum processing byproducts for productive use. PATRP coordinated the advisory team that supported Nigeria's Ministry of Petroleum Resources as it implemented NGFCP.

One of PATRP's accomplishments was the development of the Flare Gas *(Prevention of Waste and Pollution) Regulations 2018*. The regulations, which the Nigerian government signed into effect, provide a legal framework to support the country's policy objectives around Greenhouse Gas (GHG) emissions reduction.

PATRP also designed and launched a competitive auction program for bidders to propose productive uses for flare gas. Selected bidders will establish a Nigerian special purpose company to develop, finance, construct, and operate their respective projects. According to early estimates and financial analysis by PATRP the flare gas auctions may mobilize debt and equity in excess of $3 billion to fund capital expenditures for the monetization projects. This presents a significant opportunity for both domestic and international investors and lenders, including OPIC, U.S. EXIM, and more than 30 interested firms from the United States. Power Africa involvement in the NGFCP is also helping to promote the export of U.S. goods and services to the Nigerian market.

However, there was a three-month delay in publishing the advertisement for the Request for Qualifications in the local Nigerian press, which finally happened in October 2018. This was an important milestone as it signaled the Federal Government of Nigeria's endorsement and adoption of the NGFCP's first auction. In early December 2018, other publications followed in the Economist and *Arab Oil and Gas*. At the end of PATRP engagement, there were over 400 registered potential bidders. At the end of PATRP engagement, this activity transitioned to Power Africa's Nigeria Power Sector Support Program (NPSP).

Assistance to the Transmission Company of Nigeria (TCN). Power Africa recognizes the importance of expanding the transmission network and improving the transmission system reliability and the role it plays in increasing energy access. In Nigeria, PATRP helped the Transmission Company of Nigeria (TCN) overcome barriers to complete a critical transmission line project: the 2nd Benin-Onitsha 330kV line crossing Edo, Delta and Anambra States. The project had been stalled for many months due to funding issues and unpaid invoices. PATRP assistance included developing TCN's action plan, convening an interdepartmental team, negotiating a handshake arrangement with the contractor to re-mobilize to the project site, and advising TCN management on how to reprogram funds in an existing AfDB loan facility to provide stopgap funding. The transmission line was successfully completed and energized in February 2016, and adds 211 MW of system wheeling capacity.

The NGFCP team at the IFC-sponsored engagement with financial institutions in Lagos. Photo by NGFCP.

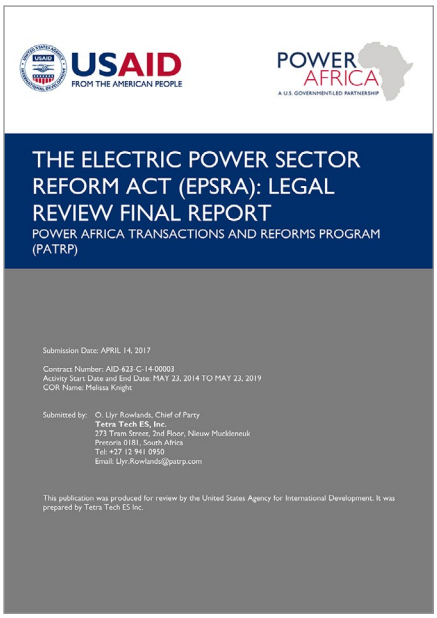
Another major milestone in early 2016 was NERC's decision to adopt the PATRP-prepared forecast of transmission revenue requirements (TRR) as the basis for the transmission use-of-system charge ordered by NERC effective February 2016. PATRP advisors developed the TRR based on detailed modeling of the company's budgets and accounts. The PATRP-prepared rate filing helped convince the regulator to more than double the transmission tariff compared to the prior level. TCN management cited the successful rate filing as one of the company's most important achievements of 2015-16. This tariff increase represents a vital step in making TCN a more financially viable company that can self-fund its capital program and reduce reliance on government borrowing for transmission investments.

To promote increased private investment in transmission systems, PATRP assisted with preparations for the competitive procurement of an initial set of contractor-financed transmission projects, amounting to $200 million. PATRP assistance included working with TCN staff to select the projects, developing a proposed

framework for the transactions, modifying the World Bank template bidding documents for procurement of works, and developing the bidder eligibility criteria and bid scoring system. The prospect of private investment in the Nigerian transmission sector is considered an "early stage" transaction and there remain major barriers to be overcome.

In 2018, PATRP focused on capacity building within the TCN, and delivered two, multi-day workshops to the TCN on transmission cost regulation and utility economics, as well as a workshop on financial modeling and transmission tariff setting. PATRP also delivered a Manual of Utility Engineering Economics and a template spreadsheet to TCN to be used for economic/financial assessments of project alternatives. The methodology is applicable to a wide range of projects such as generation, interconnection projects, and facility replacement projects.

Legal and Regulatory Reviews. PATRP undertook several efforts to improve the enabling environment for energy sector investment in Nigeria via legal and regulatory reviews and reports. For example, PATRP conducted a review of the Nigeria power sector, which identified challenges ranging from gas supply issues, non-cost-reflectiveness of tariffs, foreign exchange, policy inconsistency, insufficient transmission infrastructure, weak corporate governance, and mounting debts and illiquidity across the power sector. PATRP completed a review of the legal structure governing the Nigerian Electricity Supply Industry (NESI) with an emphasis on the Electric Power Sector Reform Act 2005 (EPSRA) and made recommendations for changes to be



considered by the legislative and executive branches of the Federal Government of Nigeria. Similarly, PATRP provided feedback on the Power Sector Recovery Program (PSRP), covering a broad range of issues and recommendations, including implementation, timing, proceeds from the sale of NIPP GENCOs, tariffs, allocation and administration of funds, power generation procurement, distribution companies, and off-grid interventions.

Effects of the CBN Circular on the Power Sector. In 2016, PATRP produced a report on the current and potential future effects of a Central Bank of Nigeria (CBN) Circular on the operating entities of the power sector and other participants close to the sector, including banks and investors. The Circular

Participants at the PATRP-hosted Workshop on Transmission Cost Regulation & Utility Economics in Abuja.

directed banks to extend foreign currency loans only to customers with foreign currency-generating businesses, and to avoid redenominating loans originally granted in Naira to foreign currency loans where the customer does not have foreign exchange receivables.[3] This restriction included the issuing of any instrument that would typically require the lender to back the underlying transaction with a foreign currency position – for example, Letters of Credit.

As operating entities in the Nigerian electricity sector have substantial foreign capital needs, the CBN Circular would significantly curtail investment in the power sector. This would, PATRP research found, have potentially far-reaching and damaging consequences for the Nigerian economy as a whole. Using the Power Africa Tracking Tool (PATT) database of transactions for Nigeria and the NBET pipeline of transactions, PATRP's report concluded that an investment of approximately $9.3 billion was required to finance 35 power projects that were projected to come online in Nigeria by 2018. However, if the projects were prevented from sourcing the required funding due to foreign exchange restrictions imposed by the CBN, or specifically as a result of the Circular, 8.1 GW of power potential would be lost, resulting in an estimated $97 billion loss in annual GDP.

The PATRP report outlined a series of recommendations, including rescinding the CBN circular or creating a carve-out for the power sector to remove the barrier to investment.

Tariff Benchmarking. The Federal Government of Nigeria (FGN) established a goal of diversifying its energy mix, with a move away from thermal energy sources, and in 2016-7 planned to introduce, for the first time, grid-connected solar PV power. In support of this goal, PATRP conducted a tariff study with the aim of determining a range of tariff prices that the FGN might achieve in utility-scale grid-connected solar PV competitive bidding tenders or auctions, and specifically, whether it could expect to achieve the low prices realized in auctions in other large, emerging economies. The study showed that lower prices could be achieved for large-scale solar PV projects via auctions or competitive tenders, and that the Nigerian REFiT was not an appropriate benchmark for assessing reasonable prices for large grid-scale PV projects. Ultimately, the report's findings informed the agreed tariffs for the country's front-runner solar PV projects (see Pillar 1).

Grid Connection Study for Solar PV Project (100 MW). PATRP assisted several project sponsors and Power Africa partners in structuring the projects to attract project financing and complete the conditions. As part of the ongoing support to these transactions, PATRP helped secure a $301,600 U.S. Trade and Development Agency (USTDA) grant to finance a solar grid connection study. The grant was awarded to Dangote Industries Limited, supporting their efforts to develop a 100 MW solar photovoltaic power plant with Black Rhino Group, a Power Africa Partner, in Kano State. The feasibility study will assess the viability of Nigeria's transmission grid to offtake from a solar PV power plant with generation of up to 100 MW. PATRP supported this project by drafting the technical terms of reference, commenting on the grant proposal, and liaising with USTDA to support their due diligence activities.

Power Sector Recovery Plan (PSRP). Following PATRP review of the Nigeria Power Sector Recovery Plan (PSRP) in FY 2017, the Power Sector Recovery Plan Implementation Monitoring Team (PSRP IMT) and NERC met to present the PSRP to the Donor Group, which consists of USAID, DFID, African Development Bank, World Bank, European Union, GIZ, AFD, and JICA. Both parties discussed the critical need for the FGN to more effectively coordinate with the Donor Group to achieve greater synergy. In line with the decision to actualize that goal and achieve the PSRP objectives, the FGN developed a list of areas where Ministries, Departments, and Agencies require critical support on communications and operational tasks in line with the PSRP.

3 "Granting of Foreign Currency Loans to non-Dollar Generating Businesses," August 4, 2015.

SENEGAL

RESULTS SUMMARY

247.7 MW	24,845	29 MW	965 MW	155
Reached Financial Close	On-Grid & Off-Grid Direct Connections	Commissioned	Added to Project Pipeline	People Trained

Approximately two-thirds of Senegal's electricity is generated via diesel or heavy fuel oil (HFO) power plants, and just over half (56 percent) of Senegal's 15 million people have access to electricity. After a revision of the law governing the energy sector in 2011, the Government of Senegal embarked on tendering processes to sign a larger number of transactions with the private sector. However, the government underestimated the regulatory aspects necessary for success, and the first two transactions provided little incentive for the private sector to pursue new deals.

The electricity sector in Senegal continues to face three major challenges:

- Mobilizing significant investments to ensure the development, renewal and maintenance of facilities;
- Improving the quality of electricity service in a context of strong growth in demand; and
- Significantly increasing the electrification rate, particularly in peri-urban and rural areas, where coverage is only approximately 30 percent.

The national electricity company (Senelec) had a monopoly on generation, transmission, and distribution until 1998, when the government paved the way for partial privatization. Thus far, two private power producers signed PPAs and are still in operation.

PATRP's assistance in Senegal focused on aspects that were lacking in the management of the country's energy infrastructure development:

- Direct assistance to the government (including embedding a technical advisor within the Ministry of Energy);
- Development of increased planning capacity; and
- Assistance in the management of electricity projects in coordination with the private sector.

PATRP's Lead Regional Transaction Advisor, based in Dakar, directed the Senegal work streams, alongside a dedicated energy advisor for Senegal who led development of a Generation and Transmission Expansion Master Plan. PATRP also maintained a Regional BTG Advisor and Local BTG Advisor for off-grid and rural electrification projects.

ACTIVITIES

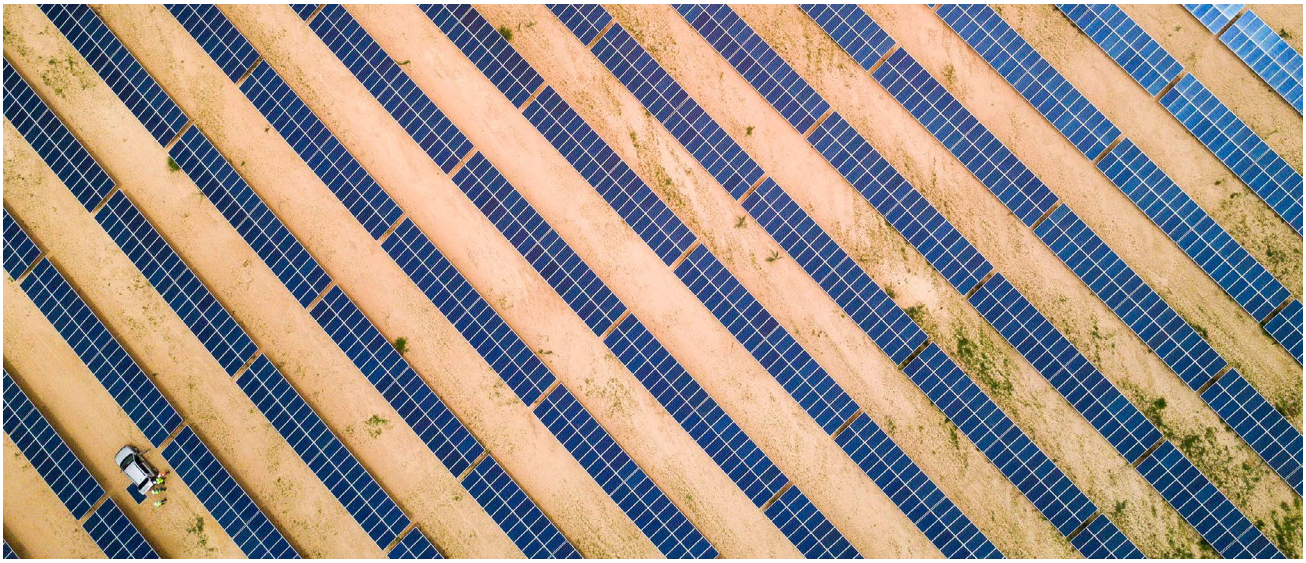
PILLAR 1: GETTING TO 30,000 MW

Taiba N'Diaye Wind Power Project (158.7 MW). PATRP supported the Taiba N'Diaye transaction, the first utility-scale wind project in Senegal, with assistance on financing, insurance, negotiation, and land rights issues. The project achieved financial close after a prolonged period of uncertainty regarding the use of offshore accounts. Despite early indications that the project would be approved to use offshore accounts, there was no development from the government related to the authorization to open offshore accounts for this or other energy projects, as the Central Bank of West African States continued to impose special conditions that limited the scope of the use of such accounts. As a result of such restrictions, loan documents had to be significantly modified.

PATRP also supported this project by working with OPIC and DCA on loan guarantees. OPIC committed $250 million in debt financing and $70 million in re-insurance for development of the wind farm. The developer issued the short-term guarantee required by OPIC with their own funds. The initial phase of the project was commissioned in December 2019 and is already pumping 55 megawatts (MW) of renewable energy into the national grid.

Scaling Solar Senegal. Senegal was the second country to join the Scaling Solar program. IFC signed a mandate with the government of Senegal on February 9, 2016, to attract private investors to finance the development of a series of grid-connected photovoltaic power plants ranging from 50 to 200 MW of capacity. PATRP provided assistance during a critical stage of the negotiation and helped unlock the entire project, marking a significant turn in project development and leading to a first-phase award with an average price of less than $0.04/kWh. Two PATRP-assisted Scaling Solar projects reached financial close in July 2019 and will add 60 MW to Senegal's national grid. By embedding a technical advisor within MPE for one year, PATRP enhanced the ministry's efficiency and helped advance many initiatives related to the development of better and more complete procurement methodologies.

Senergy I Solar PV (29 MW). PATRP advanced the Senergy I transaction to financial close in Q2 FY 2016 through a range of support to project stakeholders. Support included evaluation of and advice to the local project partner on the project financial models and the PPA to ensure bankability. In the process, PATRP detected some critical flaws (specifically the overestimation of future earnings) and suggested several modifications. Following further discussions with the local project partner, PATRP discovered that the project was 29 MW, not 20 MW as referenced in the PPA. PATRP recommended that the PPA be adjusted accordingly to allow the project to advance to financial closure. The project achieved commercial operation in June 2017.



Aerial view of the Senergy I Solar PV plant. Photo by Xaume Olleros for Power Africa.

PILLAR 2:
GETTING TO 60 MILLION CONNECTIONS

Support to Private Sector Off-Grid Goods and Service Providers. PATRP actively engaged 10 companies in Senegal and identified specific business or project needs that were then supported by the BTG team. PATRP supported companies with business plans for solar home systems (SHS), introduced companies to potential investment partners, and provided insights and recommendations to companies on entry plans into the Senegalese market. Companies supported included Bonergie, Solar Village, SparkMeter, Oolu Solar, Baobab+ and Nadji.Bi.

PATRP also supported PEG Africa with information, contacts, personnel, service provider for the establishment of operations in Senegal. PATRP advised on strategy and thinking about opportunities in Senegal, potential agent networks to link with, distribution partners and routes to market.

PATRP supported the drafting of a letter of interest for the building and operation of mini-grids related to Local Rural Electrification Initiatives (ERILs). Following positive formal response from the Senegalese Agency of Rural Electrification (ASER), PATRP helped the French energy consortium, ENGIE, liaise with local experts who could point them to key villages and help them prepare a detailed response as per ASER's expectations. PATRP support has been critical since ASER has very tight timelines for submittal of proposals.

Support to Government and DFIs. PATRP worked with the sovereign fund of Senegal (FONSIS) and the Agency for Guarantees (FONGIP) to develop an off-grid strategy that will unlock lending and support to off-grid companies (both SHS and mini-grid).

PATRP also met with GIZ on SHS deployment in Senegal, and helped EnDev rethink their SHS strategy considering the metering requirements introduced under Senegal's new policy of harmonization. On the mini-grid side, PATRP provided technical support on GIZ pilot projects focused on meters, decreasing the temperature in the managing rooms, and drafting the TOR for the calls for tenders for the audit of local operators. PATRP also engaged with GIZ in Senegal to allow the implementation of pilot projects for productive-use appliance programs. PATRP support is particularly focused on helping PAYGO distributors' structure proper applications with the right set-up and focus, notably in pumping and cold chain.

In a related work stream, PATRP worked with a local company to share its technicians trained in SMA solar technology to troubleshoot inverters in several mini-grids of the Promotion of Renewable Energy, Energy Efficiency and Access to Energy Services (PERACOD) program in Senegal. This way, PATRP illustrated that the private sector can provide the solutions without need for a grant or a government program.

Support to Power Africa Partners. PATRP provided contacts, scoped stakeholder and government interest, identified relevant solution providers, and overall helped conceptualize upcoming USTDA-sponsored project aimed at doing a feasibility study of solar pumping in replacement of diesel in Senegal.

PATRP also followed up with different agencies of the Senegalese Government, MCC, and private sector companies regarding a potential USTDA mini-grid project. Outcomes included a formal request of support for the adoption of the Odyssey platform of mini-grid management; an invitation to NREL to apply the Quality Assurance Framework in Senegal; and a request from the Government of Senegal for PATRP advice on selected aspects of the Mini-grid Framework.

Support to Investment Funds. PATRP recommended several SHS and pumping companies to Locafrique, a Senegalese financial institution specializing in leasing. The significance of this support is that should such deals be successful they will be the first instances of debt financing by local financial institutions to an SHS PAYGO company in Senegal.

National Rural Electrification Program. In support to the Ministère du Pétrole et des Énergies (MPE, formerly MEDER), the Senegalese Agency of Rural Electrification (ASER), and Senelec, PATRP developed an action plan to ensure the successful implementation of their electrification program, minimize program risks, leverage partner interventions, and maximize connections. The aim was to electrify over 1,400 rural villages between 2017-2019.

A solar home system allows children in rural Senegal to study at night. Photo by Xaume Olleros for Power Africa.

PATRP gathered and analyzed data from MPE, ASER, Senelec, and the various operators in rural areas to estimate the 2016 rural electrification rates and develop projections for 2017-2019. PATRP also supported MPE to harmonize and streamline monitoring of rural electrification programs across agencies and operators.

PATRP also supported the MPE planning unit to deliver notes to the Minister on the implementation of the recommendations in the action plan, including actions to improve rural electrification metrics, methodology, and data quality used by the Ministry to strengthen rural electrification program management at each entity level.

Power Africa Site Visits. PATRP helped organize a series of meetings between staff from the Power Africa Coordinator's Office and off-grid companies in Senegal, including Oolu Solar, Microcred, and Baobab+. PATRP also arranged for site visits to some of the companies' client sites in rural villages outside of Dakar, and hired a photojournalist to document the journey.

The visits also included stops at some larger-scale power projects, including the Senergy PV Solar Farm, and the Cap des Biches HFO plant. Power Africa shared maps and photos from these visits on its Medium channel.

PILLAR 3:
UNLOCKING ENERGY SECTOR POTENTIAL

Competitive IPP Procurement. Early in 2017, PATRP met with the Regulatory Electricity Commission (CRSE) to pursue the mandate related to the IPP procurement process. PATRP was asked to evaluate the PPAs executed to date and make recommendations to improve the framework and procurement processes for new generation. This evaluation included the legislative and regulatory framework set up to promote independent generation, and the role of the various actors in the planning, selection and negotiation process leading to the signing of the PPAs.

The goal of the regulatory and institutional assessment was to identify an approach to simplify the PPA process and, more generally, to improve relations between private producers and the Government of Senegal. PATRP presented results of the assessment a working group consisting of the Ministère du Pétrole et des Énergies (MPE), Senelec, and CRSE staff, and incorporated their feedback in the final assessment report.

From this work, PATRP also developed a tool to evaluate the risk and the cost of projects made through IPPs or EPC, and delivered the tool to CRSE in November 2017.

In FY 2018, PATRP delivered a draft risk decision model for review and comment, and provided training to CRSE and Senelec staff on the use of the risk decision tool and on best practices of PPA negotiation. PATRP also worked with the CRSE on IPP procurement and best practices for PPA negotiation. CRSE submitted a report on the IPP procurement process to the Government of Senegal for comment. However, the process did not progress further.

The Senergy 1 Solar PV plant. Photo by Xaume Olleros for Power Africa.

SENEGAL GAS ROADMAP

Following a scoping mission to Dakar in 2017, as well as extensive primary and secondary research, PATRP issued a report on the economic viability of gas infrastructure options for Senegal, including gas and proposed solutions to implement gas for electricity generation in the country. The Gas Roadmap for Senegal comprised three focus areas:

- Pre-feasibility of high-potential gas sites, LNG import solutions, and gas import landing points;
- Identification and quantification of gas markets and the opportunity to convert them; and
- Development of gas supply scenarios and simulation of their impact on the distribution prices of natural gas and electricity.

Through PATRP, Power Africa completed a key U.S. Government commitment to support the Government of Senegal's strategic plan to significantly decrease the price of electricity. The Gas Roadmap was presented to the Senegalese Minister of Energy in September during a Reverse Trade Mission in Houston. PATRP also developed a 2-page summary for the U.S. Embassy in Senegal and the Minister of Petroleum, and presented the Gas Roadmap to the U.S. Ambassador, U.S. Deputy Chief of Mission, and USAID Mission Director in Senegal.

PATRP presented the final report and summary of findings related to development of gas infrastructure in Senegal to the Senegalese government. The study was highly anticipated by industry stakeholders, and particularly by the Ministry of Petroleum and Energy. The results of the study will permit the Government of Senegal to take the necessary steps to allow for the deployment of gas infrastructure to feed existing electricity plants (once converted) and new power plants to ensure a constant supply of electricity in Senegal. Further studies will be necessary to allow a final decision on the implementation of the best solution.

PATRP also engaged with USAID, MCC and the World Bank on the organization of an information workshop to formally present PATRP's findings to GoS, as well as what actions that will be required by GoS to ensure the implementation of the gas study within a three-year period.

> Thank you for producting such a great product under tight circumstance. I just wanted to let you know that I think that you have done a great job.
>
> Cheryl Voisard, Power Africa team Lead, USAID Senegal

Millennium Challenge Corporation (MCC) Roadmap. PATRP provided comments on a revised MCC Roadmap and investment program related to the Senegal Proposed Compact. The total program of $750 million was presented to more than 150 Senegalese organizations and DFIs. Four aspects were presented as areas of investment:

- Diversification of generation sources and demand management: $181 million
- Improvement of electrification in urban and sub-urban areas: $132 million
- Modernization and strengthening of the grid network: $400 million
- Improvement of the regulatory and institutional framework and capacity building: $35 million

PATRP also met with MCC and the French Development Agency (AFD) to help improve coordination between the two agencies in their efforts to support the energy sector in Senegal. PATRP provided a set of discussion points for MCC consideration related to their decision. The MCC's final plan included a reduction of support for the connection of the industrial and mining sectors, which could have a significant impact on the average cost of electricity in Senegal.

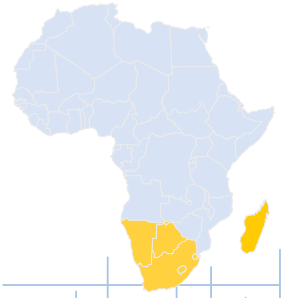
Renewables Integration Studies for Senelec. PATRP analyzed potential actions to be taken by Senelec in response to three renewable energy integration studies performed by the World Bank, AFD, and MCC, respectively. Each study relied on different data and produced different conclusions regarding a battery storage solution to counter instability of the network. MCC and the World Bank finalized a joint conclusion, which was presented to Senelec. PATRP also expects that a tender for 60-90 MWh of battery storage will be released in the future by the Government, with support from the World Bank and the MCC.

GENERATION AND TRANSMISSION MASTER PLAN

PATRP supported Senelec and the Ministère du Pétrole et des Énergies (MPE) to identify power demand and supply strategies and electricity sector investments in the short, medium, and long terms. PATRP delivered the final and validated report with updated demand projections, as well as a generation expansion plan for 2017-2035. Master Plan conclusions conveyed that:

- the goal to deploy 20 percent intermittent renewable energy is achievable if implemented cautiously (to ensure network stability);
- the target to operate gas power plants starting in 2025 with indigenous gas is essential;
- the integration of large coal power plants should be re-evaluated to include power plants that can better maintain the stability of the network;
- Senelec should maintain their partnerships with neighboring countries (particularly Guinea) and regional entities (OMVS and OMVG) to develop hydropower resources and solidify its technology mix through the 225 KV network; and
- PPAs with IPPs should integrate technical characteristics to protect the stability of the network.

As part of this support, PATRP maintained constant coordination with donors, such as the World Bank, KfW, AFD, and EU to discuss potential areas of collaboration.



SOUTHERN AFRICA

RESULTS SUMMARY

2,205 MW
Reached Financial Close

2,637 MW
Added to Project Pipeline

62
People Trained

PATRP's Southern Africa activities included support for projects in Botswana, Eswatini, Lesotho, Madagascar, Mauritius, South Africa, and Namibia. The activities were managed by a Lead Regional Transaction Advisor, with support from one other Regional Transaction Advisor. PATRP handed over most activities in Southern Africa to SAEP in FY 2018.

ACTIVITIES

PILLAR 1: GETTING TO 30,000 MW

Lesotho – Letseng Wind Farm (38 MW). PATRP revitalized this project, under development since 2009, by assisting the developer to restructure the development imperative and enter into NDAs with eight potential development partners. PATRP support resulted in identifying a new strategic equity partner (SEP) that will be better placed to drive the transaction forward to financial close. Bearded vultures in the area are considered a risk to the project, and a monitoring program of bearded vultures in the area (a condition of the ESIA) has been undertaken. PATRP has also advised the Lesotho Electricity Company (LEC) on other developer issues; however, progress on the project has since stalled.

Lesotho – NEO1 Solar PV (20 MW). PATRP advised Lesotho Electricity Company (LEC) on its PPA negotiations with NEO1 (formerly the OnePower consortium) for this groundbreaking, large-scale solar project. PATRP assisted LEC in evaluating the revised tariff proposal and extension request, and drafted response letters to the consortium. With PATRP assistance, the project sponsors, led by Scatec Solar and Norfund, concluded the power purchase agreement (PPA) and tariff negotiations, and the PPA was initialed on June 12, 2018. This is the first IPP in Lesotho and LEC has very limited experience in the IPP or PPP initiatives.

SOUTH AFRICA – RENEWABLE ENERGY INDEPENDENT POWER PRODUCER PROCUREMENT PROGRAM

One of PATRP's most significant accomplishments was stepping up to assist the highly political South Africa Renewable Energy Independent Power Producer Procurement Program (REIPPPP) to reach financial close. This was a significant intervention, as the lauded program had been stalled since 2015, after three successful rounds. The projects represent generation capacity of over 2,300 MW, a total value of $5 billion in investment and will create 61,000 jobs in South Africa.

PATRP identified and cultivated this opportunity and presented it to the Power Africa Coordinator's Office, and quickly assembled a team of experts to ensure the South Africa IPP Office was provided with the requisite legal and financial support. Power Africa support to the IPP Office was facilitated by PATRP's Senior Transaction Advisor, who has strong working relationships with its leadership.

Independent Power Producer Procurement Programme Office

Tetra Tech
Complex World, Clear Solutions
1320 North Courthouse Road
Suite 600
ARLINGTON
VA 22201
www.tetratech.com

Attention: Erik Wandrag |

Dear Erik

SUPPORT PROVIDED TO THE FINANCIAL CLOSE PROCESS OF THE BW 3.5 AND 4 PROJECTS IN THE RENEWABLE ENERGY INDEPENDENT POWER PRODUCER (REIPP) PROGRAMME

As you are aware the 27 projects from BW 3.5 and 4 of the REIPP Programme reached Commercial Close on 4 April 2018 after facing two challenging years that have seen the postponement of the signing of the Project Agreements on more than one occasion. All of these had an impact on the REIPP Programme, but also on the IPP Office including the IPP Office's ability to prepare and finalise the financial models and Project Agreements for the Commercial Close of these projects.

To this extend we sincerely appreciate the assistance provided by Tetra Tech through the Power Africa initiative. We appreciate your swift response to our requests in coordinating and providing the IPP Office with the necessary support in the Commercial Close of these 27 projects. Without your support we certainly would have struggled to meet the challenging timelines.

Yours faithfully

Elmarie Oosthuizen
Programme Manager: REIPP Programme

Date: 29 May 2018

To date, 26 of the 27 REIPPPP projects have reached financial close, with a total generation capacity of more than 2,000 MW.

Supporting the South Africa IPP office was a significant win for Power Africa. Relative to the resources invested in this work stream, securing 2,300+ MW of new generation capacity represents tremendous value.

Power Africa Coordinator Andrew Herscowitz, U.S. Embassy Chargé d'Affaires Jessye Lapenn, former South Africa Minister of Energy Jeff Radebe, and former South Africa IPP Office Director Karén Breytenbach at the signing ceremony for the REIPPPP projects.

Andrew Herscowitz
@aherscowitz
Following

Thank you @TetraTechIntDev @ErikWandrag and team for helping advance these @PowerAfricaUS supported projects!!!!

Andrew Herscowitz @aherscowitz
Count how many @PowerAfricaUS partners just signed power deals in South Africa today! 27 deals 2700 megawatts!!! @BioThermEnergy @denhamcapital @SolarReserve @StandardBankZA @Nedbank #NewEnergyRealism @opicgov ...

9:46 AM - 4 Apr 2018

South Africa – Wonderkop Heat Recovery. This project is a first of its kind in terms of recovering heat from a ferrochrome smelter. Heat recovery has been done successfully at several cement kilns, glass manufacturers, iron smelters, and geothermal resources. The project was under development for several years, and the original developers negotiated a power purchase agreement with Glencore, conducted the original project scoping, and brought Black Economic Empowerment (BEE) partners to the consortium. PATRP's Transaction Advisor was intimately involved in assisting the original consortium to onboard a major IPP and a German utility. This provided (i) development capital, (ii) critical shareholder mass, and (iii) corporate discipline to the consortium. The Transaction Advisor assisted the consortium with negotiating their joint development agreement, Glencore with obtaining board approval for the PPA, and several iterations of technical, legal and commercial aspects of the project development. Support to this transaction was transitioned to Power Africa's Southern Africa Energy Program (SAEP).

South Africa – Soldustria Rooftop Solar PV. Soldustria has a portfolio of approximately 100 commercial, industrial, and residential clients, and have built 1.2 MW of projects to prove their rooftop solar concept. However, Soldustria needed a strategic equity partner (SEP) and lender finance to roll out its portfolio. PATRP's Transaction Advisor assisted Soldustria with its commercial structure and preparing an information memorandum to be issued to the prospective SEPs. In addition, the Transaction Advisor introduced two potential SEPs to the bidding process, and assisted Soldustria in evaluating the proposals. The Transaction Advisor's advice was to select a SEP with a deep understanding of the solar and IPP industries. However, Soldustria opted for a financial partner who could provide an income tax break, as this appeared advantageous. However, at the end of PATRP engagement, lenders were still testing the market, and the first package of approximately 3 MW of rooftop solar products was to be rolled out on an all-equity basis.

PILLAR 2:
GETTING TO 60 MILLION CONNECTIONS

South Africa – Electrifying Informal Settlements in Johannesburg. PATRP supported the City of Johannesburg in South Africa with development of sustainable and affordable energy access solutions to their more than 180 informal settlements. These settlements are predominately served by dangerous illegal electricity connections or are completely without access. Many settlements are due to be relocated or redeveloped, meaning that electrification solutions must include temporary or re-deployable equipment, while also considering affordability and commercial sustainability. PATRP worked with city officials from various departments to develop an open tender to attract private companies to provide energy services in the settlements. The primary challenges in this effort are to specify appropriate technology solutions and design a sustainable subsidy mechanism that addresses South Africa's obligation to ensure Free Basic Energy. PATRP conducted site visits to four informal settlements and drafted an official city policy document outlining the objectives and overarching guidelines for the policy. PATRP also developed a cost-benefit analysis and budget estimates; stakeholder consultation approach; and a review of existing city studies/data pertaining to demographics within the settlements. The City Infrastructure Planning and Coordination group, which leads the off-grid initiative, convened a workshop for key City departments, including Housing and City Power. During the workshop, PATRP presented the current draft policy framework for the off-grid electrification of informal settlements. PATRP engagement concluded before the tenders were issued.

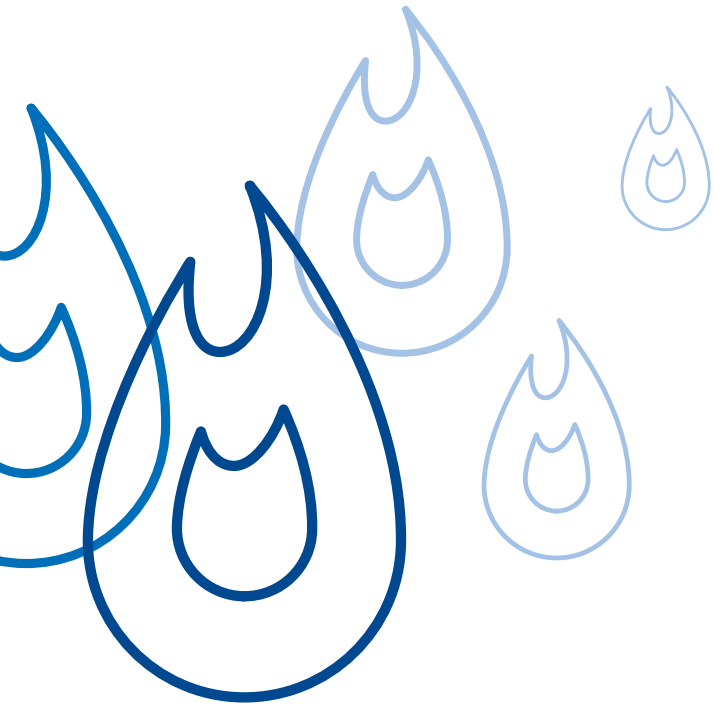
ANGOLA

RESULTS SUMMARY

381
On-Grid & Off-Grid Direct Connections

857 MW
Added to Project Pipeline

In the conventional sense, there has been very limited private sector engagement in the Angolan power sector. Installed generation capacity in Angola is approximately 4,145 MW, of which 287 MW, or roughly seven percent, represented projects with private investment/participation from national and international investors.



A stated goal of the Government of Angola, under its long-term energy sector strategy, is increasing the country's electrification rate from 37 percent to 60 percent and increasing the installed generation capacity to 9.9 GW by 2025. As of June 2018, installed capacity was 4.1 GW. Although large hydro will continue to be Angola's predominant power source, the GoA seeks to exploit other renewable resources (and natural gas) to meet increasing energy demand, which is estimated at an average annual growth rate of 12.5 percent between 2017 and 2025.

PATRP deployed a Transaction Advisor (TA) to Angola at the beginning of FY 2017 to support (i) the identification and facilitation of power generation projects to build a Power Africa project pipeline; (ii) the implementation of the Ministry of Energy and Water's (MINEA's) priorities defined in the Vision 2025 Strategy related to the exploitation of renewable resources (namely solar PV, small hydro, wind, and biomass) and the expansion of energy services to rural areas; and (iii) the development of the enabling environment and policies that enhance the implementation of both grid-connected and off-grid energy projects in Angola.

At the start of this assignment, there were no private sector projects that could be immediately supported by PATRP. Thus, Angola offered few near-term contributions to Power Africa's key metrics, namely new megawatts and new connections. The initial focus was on identifying a pipeline of viable power projects and developing relationships with counterparts.

ACTIVITIES

PILLAR 1: GETTING TO 30,000 MW

MINEA Energy Pipeline. PATRP worked with Angola's Ministry of Energy and Water (MINEA), development partners, and private sector developers to advance power generation projects in Angola toward financial close. PATRP's support included development of a pipeline of 28 priority renewable energy projects, collectively totaling 1,285 MW. PATRP finalized a review of these projects and identified issues preventing progression to financial close, including incorrect classifications of project status and delays in action by MINEA.

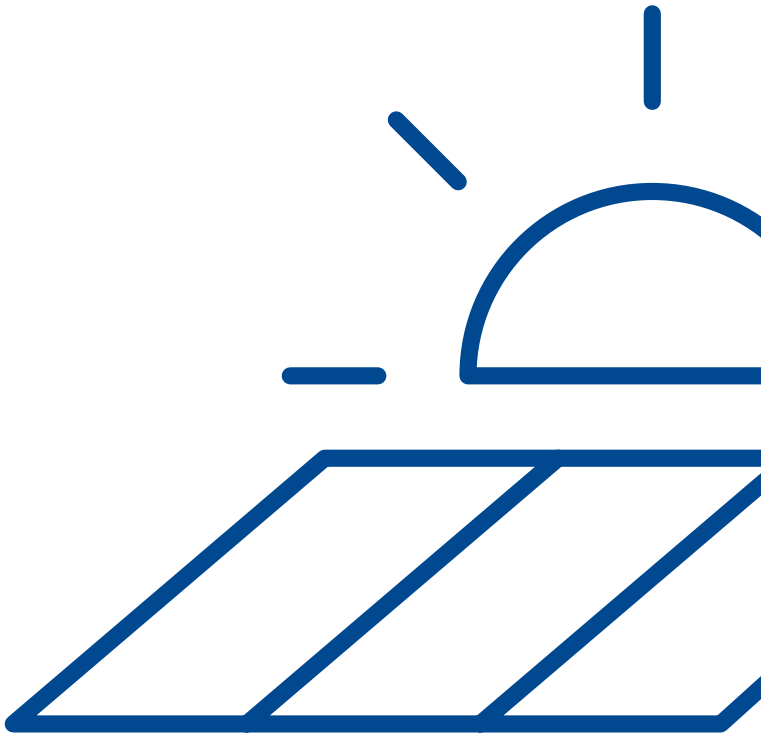
Additionally, the Minister confirmed that it is the Government of Angola's (GoA) intention to procure renewable projects principally through competitive bids under the procurement law enacted in 2016. To this end, PATRP consulted with the African Development Bank (AfDB) regarding support to establish an IPP Implementation Unit (IU) within MINEA. The PATRP-developed pipeline was also helpful in accelerating the approval of a $1 million AfDB/SEFA funding proposal for a Renewable Energy (RE) IPP Implementation Unit, which required identification of potential pilot projects and the potential timing of private project implementations.

Soyo II Power Project (550 MW). PATRP worked to advance the 550 MW Soyo II project, which was moving slowly due to gas supply and regulatory issues. The necessary transmission infrastructure was completed in conjunction with construction of the Soyo I project, but it is unclear when the pipeline for gas delivery will be completed. PATRP coordinated with a Power Africa partner and the Government of Angola on a timeline for Soyo II, as there is uncertainty on the timing of policy decisions and future agreements with the Government for additional gas exploration needed to support this project.

PILLAR 2: GETTING TO 60 MILLION CONNECTIONS

Market Assessment for Off-Grid Opportunities. PATRP conducted a market assessment for off-grid opportunities, ultimately identifying near-term opportunities for SHS, which provided an opportunity to engage PATRP's BTG resources in Angola in support of a pilot program by a private sector company.

SHS Pilot Program. PATRP assessed the Angolan market to identify and support private-sector engagement that would have a near-term impact in the area of rural electrification. Ultimately, the TA, supported by other PATRP resources, worked with local companies for the introduction of solar home systems (or solar kits) into rural communities, resulting in a pilot program in the province of Kwanza Sul in 2018.



PILLAR 3:
UNLOCKING ENERGY SECTOR POTENTIAL

Legal and Regulatory Framework Assessment. PATRP conducted legal and regulatory assessment to identify gaps and inconsistencies in existing sector and private investment legislation. The aim of the assessment was to examine possible enhancements that, if implemented, would make the sector more attractive to the private sector and more conducive to the near-term development of the country's renewable energy resources. The assessment was completed with recommendations presented to the sector regulator (IRSEA), principally related to enhancements to the General Electricity Law (GEL) to address issues related to grid access, sector planning, issuance of production licenses, and project tariffs. At the close of PATRP's engagement in Angola, new regulations were being drafted with support from the Government of Norway. As alterations to the GEL may not be viable in the near term, IRSEA, the Government of Norway, and PATRP identified areas where the recommendations could possibly be addressed within subordinate legislation.

Scaling Solar. The TA worked extensively with MINEA to facilitate a preliminary evaluation of the Scaling Solar Program and an understanding of the government obligations and potential benefits for Angola given current institutional and market constraints. The TA also worked with MINEA and the IFC to organize a Scaling Solar Workshop in Luanda in May 2018, and a subsequent high-level follow-up meeting in October 2018, to facilitate discussions around government obligations under Scaling Solar, aiming to fully address inquiries and obtain buy-in among key stakeholders outside of MINEA, namely the sector regulator, the transmission company, Ministry of Finance, and Ministry of Economy. As of the end of this assignment, the proposal continued to advance. The GoA stated that, in principle, it has an interest in implementing the Scaling Solar Program.

Standardized Power Purchase Agreement (PPA). PATRP worked with the U.S. Department of Commerce's Commercial Law Development Program (CLDP) on a model PPA for MINEA after the African Legal Support Facility was unable to provide the necessary support. PATRP revised some of the main clauses of the document and explored other legal support options for Angola, including from the European Union under a Technical Support Facility available to Angola. Legal support to MINEA was critical to advancing a Standardized PPA and other key project agreements as current in-house legal capacity is limited. Subsequently, a legal consultant was engaged under the EU/SE4All Technical Assistance Facility to work with PATRP and GoA to finalize the template document. PATRP worked with the legal consultant and the GoA on developing the model document focused principally on language regarding grid connection and tariffs.

MALAWI

RESULTS SUMMARY

60 MW
Reached Financial Close

226 MW
Added to Project Pipeline

Malawi has one of the lowest electrification rates in sub-Saharan Africa; its 365 MW installed capacity, mostly from hydroelectric power plants on the Shire River, provides electricity to less than 10 percent of the population. Reliance on hydropower makes Malawi particularly vulnerable to drought-induced power crises. Currently low river levels and associated siltation mean that only about 60 percent of hydropower capacity is available.

The U.S. Government has been actively invested in Malawi's power sector for many years. Power Africa support includes USAID-funded activities that complement the $350 million Millennium Challenge Corporation (MCC) Malawi Compact. Investment has focused particularly on major transmission investments with some generation enhancements, but with an expectation that much of the future generation required will be procured through foreign direct investment via independent power projects (IPPs). MCC deliberately invested in Malawi's power sector market reform with the intention of providing an environment that supports private sector engagement. This reform program included the development of a draft IPP Framework.

However, Malawi's state-run electricity company, ESCOM, lacked the experience and trained personnel to enter into deals with IPPs. Consequently, MCC and USAID agreed that a Power Africa Transaction Advisor should be engaged specifically to advise ESCOM on IPP procurement and contracting. In May 2016, PATRP deployed a Transaction Advisor to work directly with ESCOM to support the implementation of a framework to facilitate private sector investment by incorporating generation through IPPs within the national energy strategy. The advisor also took responsibility for nurturing private sector interest in Malawi's power sector by supporting ESCOM through the negotiations of power purchase agreements (PPAs), providing technical support for future procurements, and building critical capacity within ESCOM itself.

ACTIVITIES

PILLAR 1: GETTING TO 30,000 MW

Salima Solar (60 MW). The 60 MW Salima plant, in central Malawi, will be the first solicited renewable energy project connected to Malawi's electricity grid. Support for the competitively procured Salima solar transaction shifted from PATRP to SAEP as part of the planned transition in May 2018. While PATRP had anticipated bringing this project to financial close, the remainder of the work will be completed by SAEP. Prior to the transition, PATRP had assisted development activities, including a grid capacity study, which the IPPs and ESCOM used to determine the MW capacity.

Representatives from JCM, ESCOM, and PATRP at the PPA signing in Blantyre.

Mbongozi Hydro (41 MW). The PPA and the transmission connection agreement with ESCOM were signed in Q3 FY 2018. PATRP supported ESCOM during negotiations with the developer, HE Power, and helped both parties with their preparation and meetings with the regulator. PATRP also developed a Project Teaser and put the developer in touch with numerous financiers. The Mbongozi project is an exciting development for Malawi as it will provide diversity of electricity supply, and includes storage and hydrology regulation, which will help make any additional hydro power development downriver viable.

PILLAR 3: UNLOCKING ENERGY SECTOR POTENTIAL

IPP Planning Procurement and Implementation. PATRP drafted a standardized PPA for new unsolicited solar and dispatchable power projects and built internal capacity at ESCOM to empower the utility to handle PPA negotiations with confidence . Following a competitive procurement launched in December 2016, ESCOM and JCM Matswani Solar signed PPA terms for two solar PV sites, Salima (60 MW) and Golomoti (20 MW). Thereafter, and at the end of FY 2018, the Government of Malawi also approved the Implementation Agreements required to progress both projects, which should allow for financial close in FY 2019. They represent the first competitively solicited renewable energy projects connected to Malawi's electricity grid. PATRP helped ESCOM manage the PPA process, and drafted tender and project documents, responded to bidder clarifications, provided an assistance team for evaluation, and served as an advisor in meetings with the IPP. PATRP also assisted development activities, such as a grid capacity study, which the IPPs and ESCOM used to determine the MW capacity of each solar PV project. PATRP also assisted ESCOM with the connection agreement (which is expected to be standardized and used for all solar PV IPPs). PATRP provided advice to ESCOM on other required government support.

ZAMBIA

RESULTS SUMMARY

86 MW
Reached Financial Close

85,964
On-Grid & Off-Grid Direct Connections

82 MW
Commissioned

539 MW
Added to Project Pipeline

53
People Trained

At the outset of PATRP's engagement in Zambia in 2017, the country was viewed as having inadequate electricity supply and network, but a progressive government willing to embrace economic reforms. As such, Zambia benefitted from support of the donor community, ready to assist with liberalizing and rationalizing the energy sector.

As Zambia is endowed with 40 percent of Southern Africa's water resources, there is tremendous potential for additional hydro-based domestic power generation. Zambia also has ample solar potential, pockets of wind, plus biomass, biogas and likely geothermal resources. Zambia, given its central location in the Southern African Power Pool (SAPP), where it borders eight of the 11 other countries in the region, is in a position to lead renewable energy expansion in the region and bridge SAPP with the Eastern Africa Power Pool (EAPP) and beyond.

Zambia's potential is attractive to a large number of power developers. However, the lack of an enabling environment with clear rules and predictable investment climate has kept investment to a minimum.

In FY 2017, PATRP assigned a Transaction Advisor to Zambia to provide policy and regulatory reform assistance to the Ministry of Finance (MoF). In addition, PATRP deployed an Advisor to work with the Zambia Electricity Supply Corporation (ZESCO) to improve the development and implementation of PPAs with IPPs. In addition, transaction advisory support was provided by the Regional Transaction Advisors for Southern Africa, who focused primarily on working with and providing assistance to IPPs who faced difficulty accessing international financing. PATRP's BTG team in Pretoria also supported opportunities to advance off-grid projects.

ACTIVITIES

PILLAR 1: GETTING TO 30,000 MW

Scaling Solar Zambia (88 MW). Zambia is the first country in sub-Saharan Africa to participate in the World Bank/IFC Scaling Solar program, an initiative to unlock private-sector investment for solar power in emerging markets. PATRP supported the Zambia Electricity Supply Corporation (ZESCO) with power purchase agreement (PPA) negotiations for two Scaling Solar transactions: Enel's 34 MW Ngonye solar PV project and the 54 MW Bangweulu solar PV project, developed by a joint venture between Neoen of France and the U.S. company First Solar. PATRP's support to ZESCO included modernizing its systems to bring renewables onto the national grid, and support for a competitive procurement process that resulted in one of the lowest solar tariffs in Africa, at just $0.06/kWh and $0.078/kWh, respectively. PATRP also provided general project advice to the Ministries of Energy and Finance. Both projects reached financial close in 2018, and were commissioned in 2019.

Upepo Energy Partners Wind Project (100 MW). With PATRP support, Power Africa Partner Upepo Energy cleared a major hurdle on its proposed 100 MW wind project in Zambia when it secured the required "no objection" letter from the Ministry of Energy. This permits Upepo to commence work on the detailed feasibility analysis on private land adjacent to ZESCO's Lusaka West substation, Upepo management indicated that the site is one of the best they have ever seen.

President of the Republic of Zambia Edgar Lungu prepares to power on the Bangweulu Solar Plant during the project's inauguration in Lusaka on March 11, 2019. Photo by Neoen.

PILLAR 2:
GETTING TO 60 MILLION CONNECTIONS

Sida Beyond the Grid Fund for Zambia (BGFZ). PATRP supported the €20 million Sida Beyond the Grid Fund for Zambia (BGFZ) through assistance with development and evaluation of the first round of the grant program and into the implementation phase. All four companies that were awarded grants under this initial round commenced operations in Zambia. PATRP was involved in the initial design of the fund and assisted in reviewing and rank-ordering proposals submitted. In 2018, the BGFZ helped connect 75,000 homes and businesses and created nearly 1,500 new jobs in Zambia.

Standard Microgrid. PATRP supported Standard Microgrid (SM) through advisory on their financing efforts and sourcing information on Zambia's off-grid policy environment. For example, PATRP assisted Standard Microgrid with a USTDA grant that resulted in funding for micro-grids in up to 150 rural communities. As the award process progressed, PATRP provided input into the development of their draft TOR, budget, and bid evaluation criteria. Finally, PATRP provided insight on how a typical USTDA contracting arrangement would be structured, and suggested contract provisions that would allow Standard Microgrid sufficient oversight of the contractor's community engagement approach. PATRP also provided advice and final review on applications to two Power Africa Toolbox facilities: ElectriFi and DIV. Both facilities would go to Standard Microgrid's micro-utility projects in Zambia. For ElectriFi, PATRP offered suggestions on how best to structure the facility's concessional debt given their current equity and grant funding. For DIV, PATRP advised Standard Microgrid on the types of funding that DIV supports, and helped them to frame their application around DIV objectives. Standard Microgrid successfully secured grant funding from both ElectriFi and DIV.

> The Tetra Tech team has provided invaluable input in assisting Standard Microgrid achieving its goal of becoming the first scaled miro-grid utility in Africa. Support in the form of making connections to potential funders, reviewing grant proposals, linking us with technical assistance, helping us think better about women in power, and helping us understand investor requirements at the outset have had a significant impact on our business and was instrumental in securing the funding for our 150 micro-grid projects in Zambia, which will provide modern, renewable power to over 125,000 people.
>
> Matt Wainwright
> CFO
> Standard Microgrid

PILLAR 3: UNLOCKING ENERGY SECTOR POTENTIAL

ZESCO Restructuring. PATRP supported the restructuring of ZESCO's operations, with a goal of developing it into an independent system and market operator. PATRP worked closely with a technical committee consisting of the Ministry of Energy, ZESCO, the Industrial Development Corporation (ZESCO's holding company), the Energy Regulation Board, and the Ministry of Finance. The committee identified a roadmap of reforms for Zambia's electricity sector over the short, medium, and long terms. PATRP also worked with ZESCO to develop a financial and economic appraisal framework for power projects (generation, transmission, and distribution), and assisted ZESCO in refining project management policies and procedures for all project phases to ensure its process aligns with requirements for private sector financing.

Integrating Renewable Energy. PATRP worked with ZESCO to build an understanding of the Zambian power system and the potential issues for the dispatch of renewable generation. Specifically, PATRP obtained detailed solar resource data from the meteorological station and developed a model to enable the forecasting of generation levels in dispatch terms. Additionally, PATRP completed a series of grid studies outlining the maximum/optimal intermittent renewable energy the grid can accommodate in the short term and long term. PATRP also delivered standardized PPA templates for renewable and non-renewable technologies, as well as a comprehensive checklist for reviewing renewable and non-renewable PPAs.

Enabling Environment and Policy Reform Planning. PATRP worked closely with Ministry of Finance stakeholders to formulate a series of sector reforms aimed at mobilizing the private sector and introducing efficiency measures into the existing sector institutions in Zambia. Specifically, PATRP assisted with development of a Cabinet Memorandum to be submitted jointly by the Ministries of Finance and Energy regarding proposed reforms. The recommended reforms may include groundwork for the creation of an Independent System and Market Operator (ISMO), as well as the redrafting of regulations that govern the electricity sector. These proposed reforms are intended to attract additional private sector investment and development, and to streamline existing operations within the electricity generation, transmission, and distribution systems.

Support to Ministry of Energy and Ministry of Finance. PATRP worked closely with a Technical Committee comprising the Ministry of Energy, ZESCO and its holding company the Industrial Development Corporation (IDC), the Energy Regulation Board (ERB) and the Ministry of Finance to develop a roadmap of Zambian energy sector reforms. The roadmap covers a ten-year span.

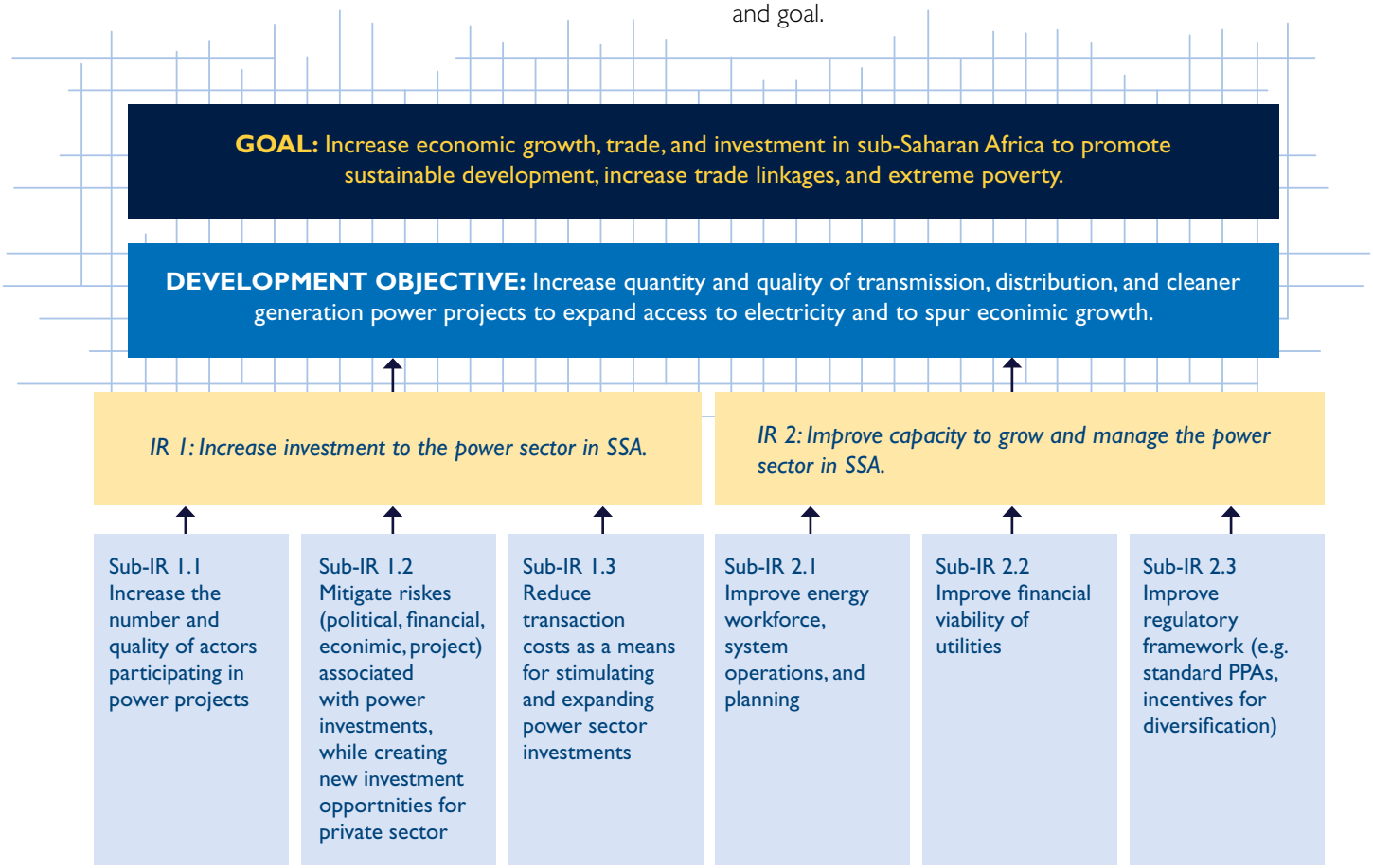
Multi-Year Tariff Framework. PATRP supported the development of a new Multi-Year Tariff Framework (MYTF) aimed at addressing the needs of the evolving and expanding electricity supply industry in Zambia. The MYTF was requested by ERB because the existing framework did not provide price stability or predictability for the utility or consumers. PATRP advisors reviewed legislation and other regulatory tools to ensure the draft MYTF synchronized with existing and/or proposed legislation.

4. SUPPORT TO THE COORDINATOR'S OFFICE

MONITORING AND EVALUATION (M&E)

PATRP prepared a Performance Management Plan (PMP) to meet the requirements of Section C.6, Monitoring and Evaluation, of the contract. The PMP was originally submitted to USAID in July 2014, but was significantly revised in June 2015 and July 2016, and in each instance approved by USAID.

Monitoring and evaluation activities were based on the larger Power Africa Initiative Results Framework, which is graphically represented in Figure 6-1 and described in detail in the Power Africa Monitoring and Evaluation Plan. The Results Framework (RF) is a planning, communications and strategic management tool that conveys the development hypothesis implicit in the Development Objective (DO), illustrating the cause-and-effect linkages between outputs, Intermediate Results (IR), and the DO to be achieved with the assistance provided. In the results framework for the DO, there is a set of related IRs and sub-IRs. In addition, sets of performance indicators are derived from the RF. The logic is that if the IRs are achieved, these results will contribute to accomplishing the higher-level DO and goal.



In addition to M&E activities performed to track PATRP progress and results, PATRP's M&E specialists often provided direct support to M&E counterparts at USAID, particularly to assist with milestone reporting requests, providing surge support, and covering for USAID staff on extended leave.

In line with USAID's Collaborating, Learning, and Adapting (CLA) approach to improving development effectiveness, PATRP coordinated with the Coordinator's Office to host a CLA event for Power Africa implementing partners. The event, held in August 2019, was geared toward ensuring a consistent approach across all Power Africa contract mechanisms in the following key areas:

- Environmental & Social Assessment (E&S) – particularly the assessment of risks associated with the transaction advisory mandate;
- Data input and management of the Power Africa Tracking Tool (PATT);
- Vetting and assessment of transactions – particularly the deployment of the Qualified Transaction Assistance Tool (QTAT) and associated protocols;
- Monitoring & Evaluation (M&E) – to facilitate a common understanding of the value of M&E at Power Africa;
- Communications; and
- Gender.

The forum also afforded opportunities to discuss and share lessons learned by PATRP in the implementation of Power Africa assistance for the benefit of other implementing partners.

Power Africa Deputy Coordinator Richard Nelson opened the Power Africa CLA event coordinated by PATRP.

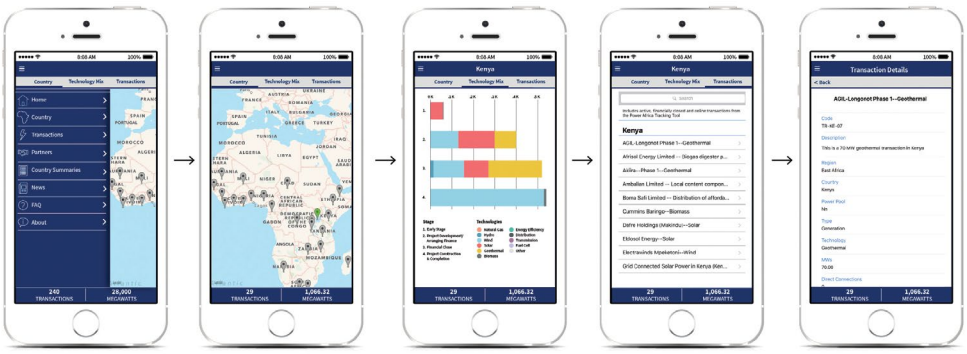
POWER AFRICA TRACKING TOOL

To help Power Africa and its partners monitor energy transactions on the continent, PATRP developed the Power Africa Tracking Tool (PATT). PATT is a database and mobile app that provides real-time intelligence on power projects at every stage of development, from concept to close.

PATT began as a simple database of approximately 80 Power Africa transactions developed, updated, and managed by PATRP to track current and potential opportunities. As the number of qualified Power Africa transactions, as well as PATRP's geographic footprint, grew, PATT evolved into a more robust and comprehensive product that incorporates data from U.S. Government agencies and Power Africa development partners, and that is now used by multiple Power Africa partners and implementing partners. PATT now houses more than 1,000 qualified Power Africa transactions, 440 of which are available on the public app. PATT app was launched alongside the *Power Africa Roadmap* at the Powering Africa Summit in Washington, DC, in January 2016.

PATT is a significant achievement for Power Africa as it provides public access to centralized transaction data, some of which was previously unavailable. Having this information at hand enables Power Africa's private sector partners and other players in the African energy sector engage in a more transparent market. PATT is also informing financing opportunities and driving deal flow in a range of energy technologies.

At the close of PATRP engagement, there were more than 200 registered internal PATT users, approximately 80 of which were active users of the Android and iOS mobile apps. In terms of the public iOS app, of more than ten thousand views, the vast majority came from users in the United States, South Africa, the United Kingdom, Kenya, and Nigeria.[4]



The PATT mobile app for iOS.

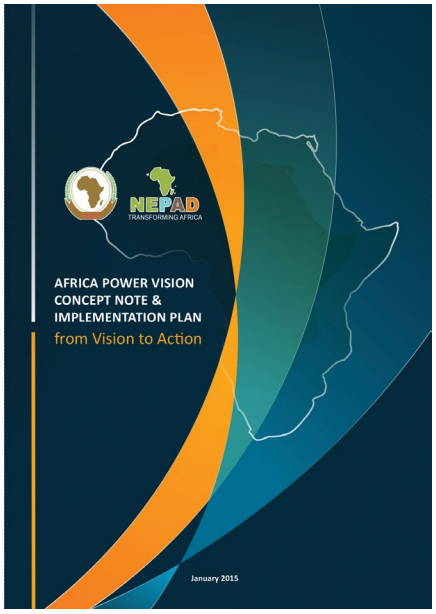
4 Usage estimated from extrapolated data provided by Apple of app users who opted in to sharing usage data.

SUPPORT TO POWER AFRICA PARTNERS

African Development Bank (AfDB). At the end of FY 2016, PATRP deployed a Transaction Advisor to Abidjan, Côte d'Ivoire, to be embedded within the African Development Bank (AfDB), a Power Africa partner. The advisor served as a key link between AfDB and Power Africa, focused on attracting incremental capital investment into clean, renewable energy investments. This advisor assisted in bringing the broad range of technical and financial services to bear on qualifying power sector transactions that are financed or co-financed by the Bank.

In addition to the activities and results outlined throughout this report, the PATRP AfDB advisor supported the structuring of AfDB's Facility for Energy Inclusion (FEI) for debt and mezzanine lending for off-grid projects and small IPPs. FEI focuses on providing senior and mezzanine debt financing to small-scale projects (on-grid, mini-grid, and off-grid) with total costs less than $30 million, and to distributed energy companies and other entities focused on off-grid energy solutions. PATRP's advisor at AfDB continued support on a pipeline of potential projects to be financed by FEI, including several Power Africa BTG projects.

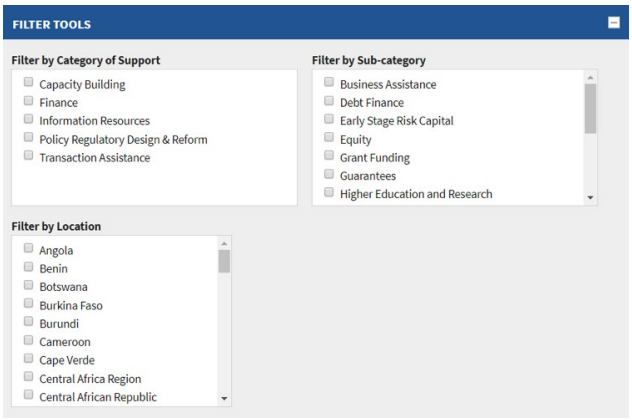
New Partnership for Africa's Development (NEPAD). On September 11, 2014, Power Africa signed a memorandum of understanding with the African Union's New Partnership for Africa's Development (NEPAD) to collaborate and accelerate the development of energy projects throughout the continent. In furtherance of this partnership, PATRP was tasked with supporting the development and finalization of NEPAD's list of Africa Power Vision (APV) priority energy projects. PATRP developed a strategy and methodology to prioritize APV projects, and presented recommendations on how to operationalize this strategy. After completing the report, PATRP delivered it to the NEPAD Africa Union offices in Addis Ababa on January 26, 2015. The APV was later endorsed by the Heads of State and Governments Orientation Committee meeting.



As a follow-on activity, PATRP seconded a transaction advisor to NEPAD, tasked with accelerating the development and implementation of APV energy projects. Over the course of this engagement, PATRP's embedded advisor supported advancements of the Ghana 1000 gas-to-power project (a NEPAD priority under APV) by advocating for the ratification of the project's Put-Call Option Agreement (PCOA) by Ghana's Parliament, as well as for the important Kenya-Tanzania-Zambia (KTZ) Interconnector, including coordination with the Zambian Office for the Promotion of Private Power Investment (OPPPI). The PATRP TA also provided technical and strategic advice to NEPAD on the Sambangalou Dam Project and the NEPAD Renewable Energy Initiative, an energy marketplace for governments to showcase their renewable energy (RE) projects.

> OPPPI would like to thank NEPAD and power Africa for the support that you have rendered to the ZTK Power Project.
>
> Clement Chiwele
> Chief Engineer
> Zambian Office of Promoting Private Power Investment (OPPPI)

Power Africa Partners Toolbox. PATRP supported the development, refinement, and maintenance of the Power Africa Partners Toolbox, which details the financial, legal, transaction advisory, and other resources available for power project development in sub-Saharan Africa. Initially created as a PDF, PATRP worked with the Development Partnerships Specialist and Coordinator's Office staff in FY 2017 to initiate creation of a searchable, database-driven version of the Toolbox to be hosted on the Power Africa website. The online version launched in FY 2018, and is fully searchable by category of support, country, and other criteria.



Power Africa Partnerships Team. PATRP bolstered Power Africa's partnership efforts by providing an embedded Development Partnerships Specialist within the Coordinator's Office, responsible for managing relationships with major donors and technical partners. PATRP also supported the team by conducting due diligence on prospective Power Africa partners. Over the life of the program, PATRP prepared 160 due diligence memos.

GENDER INTEGRATION

Power Africa supports projects, programs, and policies that strive to reduce gender inequalities and promote increased participation of women in the African energy sector. In turn, PATRP endeavored to integrate gender into all operations, including work planning, scopes of work, and recruitment.

PATRP's gender integration work was aligned with the increasing attention paid to gender as an energy issue, and on the growing body of evidence for the benefits of gender diversity in decision-making across all sectors. PATRP's Pretoria-based Gender Advisor was responsible for implementing PATRP's Gender Integration Strategy, described below.

GENDER INTEGRATION STRATEGY

PATRP's Gender Integration Strategy, developed and approved in FY 2015, set out clear goals, approaches, and implementation plans to incorporate gender-related considerations into all activities. This strategy was implemented by PATRP's Gender Advisor, and included the following activities:

- Review and provide timely input into all key PATRP documents;
- Include highlights and achievements with respect to advancing gender equality and women's empowerment in information provided by PATRP for Power Africa annual reports, quarterly newsletters, and website;
- Share information on best practices and lessons learned relating to gender and small-scale renewable energy from Power Africa activities;
- Identify potential and unforeseen negative impacts from Power Africa-supported activities through gender integration into the PATRP Environmental and Social Review Methodology (PESRM) Checklist and propose interventions to mitigate the impacts; and
- Build the capacity of transaction advisors to integrate gender into their transaction-based activities and in their engagement with key ministries through training, information sharing, and resource development.

GENDER INTEGRATION ACTIVITIES

In addition to the activities detailed within their respective sections in this report, PATRP's Gender Advisor delivered the following gender integration activities:

Women in African Power Network (WiAP). PATRP supported the Power Africa Coordinator's Office to establish and manage the Women in African Power (WIAP) network. WIAP convenes and connects established and emerging female leaders working in the African energy sector, and provides a platform for networking, information exchange, professional mentorship, and exposure to new business opportunities. PATRP assisted in convening the inaugural meeting, which was held in Cape Town in June 2015 on the sidelines of the Africa World Economic Forum, and

conducted significant outreach to build the database and LinkedIn Group. PATRP continued to support WiAP throughout the project in the following ways:

- collaborated with the implementing contractor, the International Union for the Conservation of Nature (IUCN), to share relevant information on a regular basis with network members and to identify and introduce new members to the network;
- supported the Power Africa Gender Advisor and the IUCN to promote WiAP at the Women in Energy Conference in Johannesburg in February 2017, including hosting a cocktail networking event; and
- prepared and co-delivered a presentation with Power Africa Chief of Staff on gender integration in Power Africa for a "Women in Power" breakfast event in Johannesburg, South Africa, hosted by Standard Bank and Power Africa in November 2017.

Internal Capacity Building. PATRP's Gender Advisor conducted a webinar on gender integration for 22 participating PATRP Transaction Advisors and presented on gender integration in the off-grid sector to BTG Advisors during a workshop in Pretoria, South Africa.

> Thewebinar really helped me understand how we need to think about gender equality in all of our work activities, in everything we're doing.
>
> PATRP Transaction Advisor

Communications and Thought Leadership. PATRP contributed to three gender-related blogs during the project: PATRP prepared a research brief on the link between gender-based violence and electricity access. The brief informed a thought leadership piece prepared by the Power Africa Gender Advisor and published on the Power Africa Medium page during the International 16 Days of No Violence Against Women Campaign, PATRP also collaborated with two off-grid companies in Ghana, PEG Africa and Black Star Energy, to document success stories highlighting gender inclusion in the sector that were also published on Power Africa's Medium page in a blog post that celebrated International Women's Day.

Young African Leadership Initiative (YALI). PATRP's Gender Advisor facilitated trainings for the Young Women in African Power Leadership Course as part of the YALI Southern Africa program. PATRP also supported content development on gender and energy and delivered training to the 2016 YALI Energy Institute at the University of California-Davis.

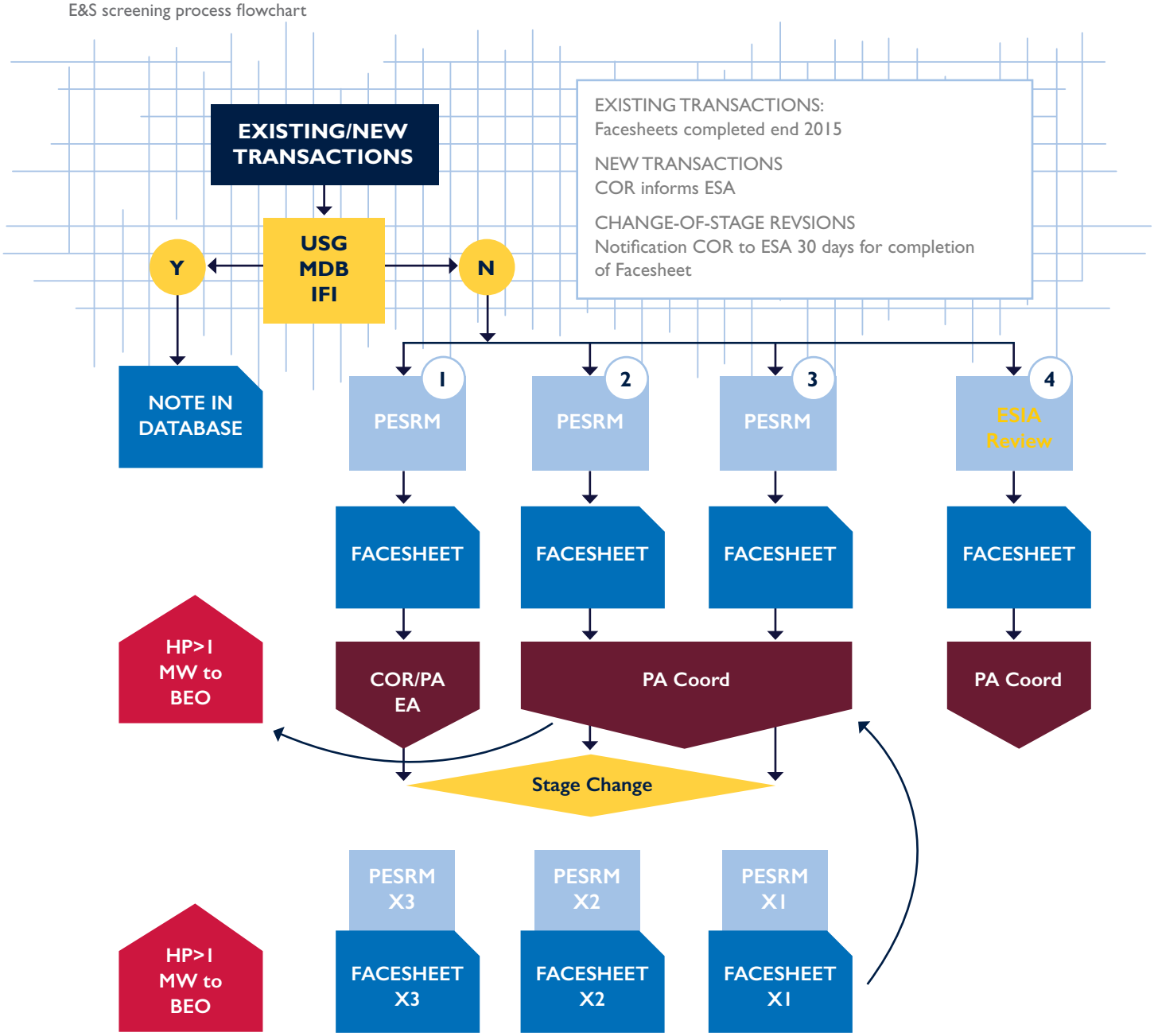
Participants at the Young Women in African Power Leadership Course as part of the YALI Southern Africa program.

ENVIRONMENTAL AND SOCIAL DUE DILIGENCE

In March 2015, USAID approved the PATRP Initial Environmental Examination (IEE) in accordance with U.S. Federal Regulation (USAID 22 CFR 216). Although PATRP was a technical assistance program, the IEE recommended a Negative Determination with Conditions for PATRP as a whole because of the common and potentially significant impacts of energy sector development activities when implemented.

Mitigating actions specified under these conditions applied only to PATRP Objectives 2 (Late-Stage Transaction Support) and 3 (Small-Scale Projects and Rural Electrification/Mini-Grids Support). Objectives 1 (Institutional Support to Power Africa Coordinator's Office) and 4 (Regulatory and Institutional Strengthening and Policy Program) have no additional conditions attached, other than to observe the general commitment to integrating environmental and social safeguards into activities. For Objectives 2 and 3, before PATRP provided transaction advisory services, or for transactions that do not involve environmental and social (E&S) appraisal by other USG agencies, an environmental and social screening process is conducted. The E&S screening process followed the flowchart below which complies with IEE's Section 4.5.

E&S screening process flowchart



THE TRANSACTION SCREENING PROCESS

For all transactions listed in the Power Africa Tracking Tool (PATT), PATRP conducted and documented E&S impact screening in one of two ways:

- By completing a more detailed E&S review checklist called the PATRP Environmental and Social Review Methodology (PESRM) Checklist (see Appendix B). In addition, and to allow for a more rigorous screening, if it is a hydropower transaction, PATRP performed a PESRM Supplementary Checklist, or
- By confirming that another USG agency, multilateral development bank (MDB) or international financial institution (IFI) is conducting E&S impact screening or assessment of the transaction using its respective processes.

The PESRM screening process comprised a desktop due diligence mechanism for identifying environmental and social impacts and constraints at a site-specific level. It considered such aspects as:

- Developer and/or key partners involved in the transaction, their track record and policies in place relating to labor practices and sustainability;
- Nature of the project, including technical details of the components and extent of the infrastructure;
- Governance framework, including country frameworks and policies on environmental and social issues;
- Land tenure status and resettlement issues;
- Environmental considerations, including biodiversity impacts and project emissions; and
- Social/cultural/political/economic considerations, and country risk – including issues such as government stability and conflict situations.

PATRP re-screened transactions and their previously completed PESRM checklists when transactions moved from one stage to another in the project cycle, or changed significantly in scale, scope, technology, or location. A key decision point in the process was whether another USG agency, MDB, or IFI is involved in the transaction, and whether it was following its own E&S review, assessment, and due diligence approach. If this was the case, a note was inserted into the transactions (PATT) database, and no further was required until that transaction moved to a later stage or significant scope and scale changes occurred. Otherwise, PATRP conducted a more detailed review of E&S aspects of the transaction, in line with the PESRM Checklist and completed a face sheet to be cleared by the Power Africa Coordinator or his/her designee. The completed checklists and face sheets for these projects were shared with the Power Africa Coordinator's Office and the Regional Bureau Environmental Officer.

FULFILMENT OF IEE CONDITIONS

The table below details the actions taken by PATRP in fulfillment of the IEE conditions.

IEE CONDITION	REQUIREMENT	COMMENTS
1	Establish a process for Establish a process for tracking and screening existing, new, and reclassified transactions Support substations construction in Sodo-Suswa	A process for tracking transactions for E&S screening was developed in conjunction with the PATT system. Existing and new Power Africa Transactions captured in the PATT were screened to determine 1) whether PATRP was actively providing support 2) level of involvement of other USG Agencies, International Finance Institutions and Multilateral Development Banks and 3) if further screening merited based on project activities. Over six-hundred transactions were subjected to this initial high-level screening procedure. The initial screening criteria were used to determine which transactions then needed to be subjected to the PATRP Environmental and Social Review Methodology (PESRM) Checklist for more in-depth analysis. The E&S section of the PATT was updated per individual PATRP transaction to indicate the screening status and whether further in-depth PESRM screening was to be undertaken, had been completed, or was due for rescreening.
2	Power Africa review of E&S checklist to determine whether continued support appropriate (for rescreening or new transactions)	E&S risks have to some extent been a determining factor in whether continued support by Power Africa is merited. More than 200 PATRP and Power Africa Partner transactions were subjected to the PESRM at various development stages over the life of the project. Over this time, the majority of transactions presented no significant E&S concerns and remained eligible for USG support. There were seven transactions that were placed on-hold or PATRP support was terminated due to severe E&S deficiencies or concerns highlighted in the PESRM. In some of these cases the development partner was prompted by PATRP to address the identified deficiencies by providing additional or better information so that rescreening of the project E&S risks could be undertaken.
3	Review of ESIAs for stage 3 and 4 transactions (Power Africa will not provide support to any Stage 4 transaction without a completed ESIA party to that transaction)	PATRP obtained and reviewed in excess of 80 ESIAs over the life of project and subjected them to the PESRM Checklist. This process has allowed for a more comprehensive E&S risk assessment of individual transactions in their later project stages. However, most of the cases where PATRP support was put on-hold was down to deficient ESIAs not conforming to good standards. Support to individual transactions has seldom been withdrawn on account of the potential significance of E&S impacts, provided that suitable measures are in place to mitigate those impacts through robust ESIAs and Environmental Management Plans.
4	Resources: Power Africa to make available links to E&S soundness policies and procedures of USG agencies as well as IFC, Equator Principles and carbon principles. If USG agency policies are not available, Power Africa is to list regulations governing E&S impacts of agencies and provide links to their public statements.	PATRP sourced the environmental and social safeguard policies, standards and guidelines of various USG Agencies, Multilateral Development Banks and International Funding Institutions and made these accessible to Transaction Advisors over the life of project. These were also included within PATRP's E&S Awareness Training to the Transaction Advisors and any revision or development thereof taken into account.
5	Staffing: Power Africa through PATRP to make available an E&S advisor to complete PESRM checklists, provide E&S social soundness on activities and serve as a resource to relevant staff as needed.	PATRP employed an E&S specialist on a full-time basis to undertake the following: • Screening of PATRP transactions • Review of ESIAs and other relevant E&S documentation • Complete PESRM Checklists and identify E&S risks to Power Africa • Communicate significant E&S findings to TAs • Prepare training materials and facilitate training of TAs and other Power Africa staff • Undertake quarterly reporting • Provide E&S support to the COR

IEE CONDITION	REQUIREMENT	COMMENTS
6	PATRP, with support from Power Africa, to provide training to PATRP staff including transaction advisors, relationship managers, other USAID staff and implementing partner staff. Training will empower staff to address, promote and help overcome barriers to E&S soundness in PATRP transactions.	E&S awareness training material was prepared by PATRP's E&S specialist and training facilitated periodically over the life of the project and specifically when onboarding of new TAs. The training focused on 1) PATRP's IEE and its conditions 2) PATRP's role in ensuring sustainability of power transactions and mainstreaming environmental issues and 3) Environmental and Social Impact Assessment with a focus on power generation. The training also highlighted other USG Agency and IFI / MDB E&S safeguard policies and standards and drew on lessons learned in Power Africa
7	Advising: Power Africa / other relevant staff to provide recommendations to private sector partners on adhering to international E&S best practice.	PATRP generally required adherence to international E&S best practices with its partners before supporting transactions. If this could not be determined initially by the TA dealing with the transaction, it was the intention of the PESRM screening process to identify such risks. PATRP's E&S specialist also provided ad-hoc support to Power Africa partners over the life of the project by providing input into the robustness of E&S documentation, preparing and facilitating bespoke training for utility partners (Ethiopian Electric Power) and; providing technical and administrative support to PATRP's E&S initiatives.
8	Reporting: Report to Power Africa leadership any significant environmental and social issues with respect to a transaction or party they are engaged with	The PESRM Checklist served as the primary mechanism for identifying and reporting to Power Africa leadership any significant E&S issues for specific transactions. All PESRM Checklists were reviewed by the Coordinator Office and in this way any recommendations or determinations made by PATRP vetted. In the event that significant risks were identified, concurrence from the Coordinators Office was received before deciding on how to proceed with PATRP support.
9	Screen hydropower transactions in PESRM supplement.	For hydropower transactions associated with elevated E&S risk, PATRP completed a detailed supplementary hydropower checklist as an added precaution. This could usually only be completed for projects in their later stages on review of the ESIA documentation.

COMMUNICATIONS

PATRP provided direct support to the Power Africa Coordinator's Office and its dedicated communications team, initially through a Nairobi-based Communications Manager, and later via Pretoria-based Communications Specialists, as well as through staff in Tetra Tech's home office, who assisted with Washington, DC-area events and other logistics.

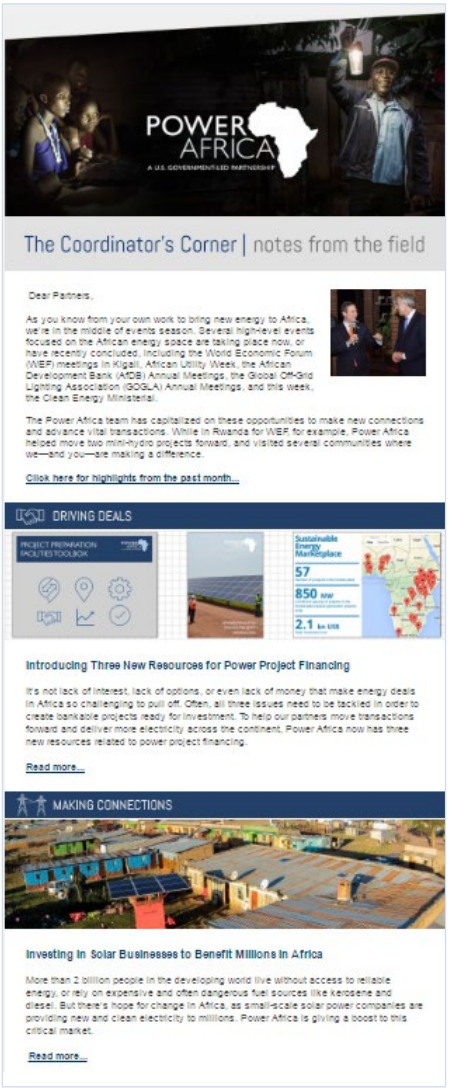
Over the life of the program, PATRP contributed to a range of communications projects and other deliverables, including:

- Reviewed, edited, and provided creative direction on the ***Power Africa Guide to Community Engagement for Power Projects in Kenya***
- Wrote **speeches, blogs, and talking points** for U.S. Ambassadors, USAID Mission Directors, and Power Africa principals
- Created **graphics for Power Africa social media channels**
- Created a refreshed design for the **Beyond the Grid PowerPoint presentation**, to be used by Power Africa and other USG staff
- Developed a brand manual and style guide for the Smart Communities Coalition
- Updated and/or created **new country fact sheets** for all Power Africa countries, ensuring consistency of content and accuracy of information
- Edited **reports, blogs, presentations**, and other deliverables for clarity and to alignment with Power Africa messaging
- Designed and managed production of various **Power Africa banners, signs, books, flags**, and other collateral

Specific and high-profile deliverables are described below.

Power Africa Website and Monthly Newsletter. PATRP's Communications Specialist, reporting directly to Power Africa's Communications Director (DOC), provided regular support and content for the Power Africa website and email newsletter, which transitioned from a quarterly update to a monthly update in FY 2016. As part of this transition, the PATRP Communications Specialist led the redesign of the email newsletter template, and worked with the DOC to develop an editorial calendar for interagency use.

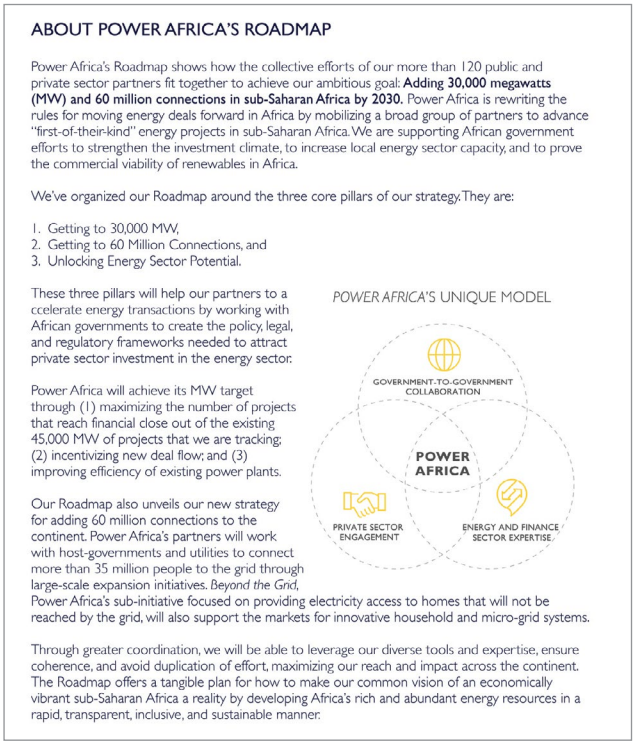
For each edition, the PATRP Communications Specialist drafted topical stories, provided news clips, and performed quality control tasks. On an ongoing basis, the PATRP Communications Specialist maintained the growing list of newsletter subscribers, and managed event invitations.



Screenshot of Power Africa monthly email newsletter.

Power Africa Roadmap Release. PATRP's Communications Specialist provided talking points, promotional content, and graphic design for materials related to the launch of the Power Africa Roadmap, and provided on-site support during the launch events in Washington, DC.

Photos from the *Power Africa Roadmap* release events at the 2016 Powering Africa Summit. Photos by Ryan Kilpatrick for Power Africa.



ABOUT POWER AFRICA'S ROADMAP

Power Africa's Roadmap shows how the collective efforts of our more than 120 public and private sector partners fit together to achieve our ambitious goal: **Adding 30,000 megawatts (MW) and 60 million connections in sub-Saharan Africa by 2030.** Power Africa is rewriting the rules for moving energy deals forward in Africa by mobilizing a broad group of partners to advance "first-of-their-kind" energy projects in sub-Saharan Africa. We are supporting African government efforts to strengthen the investment climate, to increase local energy sector capacity, and to prove the commercial viability of renewables in Africa.

We've organized our Roadmap around the three core pillars of our strategy. They are:

1. Getting to 30,000 MW,
2. Getting to 60 Million Connections, and
3. Unlocking Energy Sector Potential.

These three pillars will help our partners to accelerate energy transactions by working with African governments to create the policy, legal, and regulatory frameworks needed to attract private sector investment in the energy sector.

POWER AFRICA'S UNIQUE MODEL

Power Africa will achieve its MW target through (1) maximizing the number of projects that reach financial close out of the existing 45,000 MW of projects that we are tracking; (2) incentivizing new deal flow; and (3) improving efficiency of existing power plants.

Our Roadmap also unveils our new strategy for adding 60 million connections to the continent. Power Africa's partners will work with host-governments and utilities to connect more than 35 million people to the grid through large-scale expansion initiatives. *Beyond the Grid*, Power Africa's sub-initiative focused on providing electricity access to homes that will not be reached by the grid, will also support the markets for innovative household and micro-grid systems.

Through greater coordination, we will be able to leverage our diverse tools and expertise, ensure coherence, and avoid duplication of effort, maximizing our reach and impact across the continent. The Roadmap offers a tangible plan for how to make our common vision of an economically vibrant sub-Saharan Africa a reality by developing Africa's rich and abundant energy resources in a rapid, transparent, inclusive, and sustainable manner.

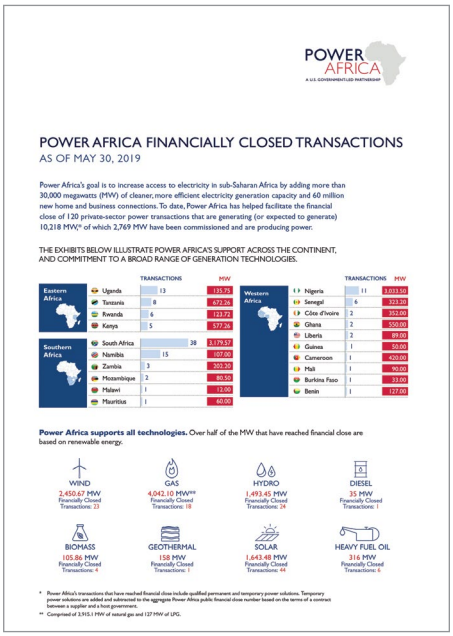
Roadmap 1-pager produced for the launch event.

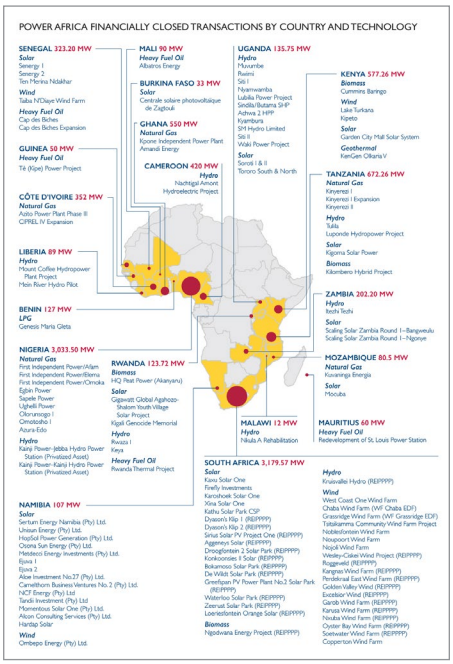
Power Africa 2018 Annual Report Video. PATRP provided creative and content input on the print version of the Power Africa 2018 Annual Report, and managed the design and production process. PATRP's Communications Specialist also contributed to the initial storyboard of the related Power Africa Annual Report Video, and provided creative, technical, and other feedback on all drafts of the final product.

Nigeria DISCO Video. At the request of the Coordinator's Office, PATRP developed an outline and strategy to produce a video that highlights Power Africa's achievements at four Nigerian electricity distribution companies (DISCOs) and promotes Power Africa's focus on distribution and transmission as part of Power Africa 2.0. PATRP contracted a Lagos-based videographer, and deployed staff from Pretoria to Lagos and Abuja to capture footage and photographs of the team in action, and interviews with key partners from the DISCOs. The video was first screened at African Utility Week in May 2019, and released publicly in July 2019.

Conversation between AEDC staff and a customer during the Nigeria DISCO video. Photo by Ryan Kilpatrick for Power Africa.

Transaction Fact Sheets. PATRP supported the Coordinator's Office with development, design, and production of the first in a series of fact sheets showcasing Power Africa's financially closed transactions around the continent. The overview piece, shown below, summarizes all transactions and affirms Power Africa's commitment to using all generation technologies. PATRP also delivered individual fact sheets for each country, and contributed to the development of dedicated pages on the Power Africa website.





Power Africa Transactions Fact Sheet.

Event Support. PATRP's Communications Specialists often supported the Coordinator's Office with planning, logistics, and on-site assistance at major industry events and conferences, such as the Powering Africa Summit, African Utility Week, and the Africa Energy Forum (AEF). For example, in 2019 PATRP supported Power Africa with preparation for AEF in Lisbon. Specific PATRP support included development of a PowerPoint for the Coordinator's keynote speech (see below), shipment of materials to the conference venue, and on-site support in Lisbon to document Power Africa activities and manage the Power Africa booth.

Figure 4 1: PowerPoint Developed for the Coordinator Keynote at AEF.

STRATEGY DOCUMENTS

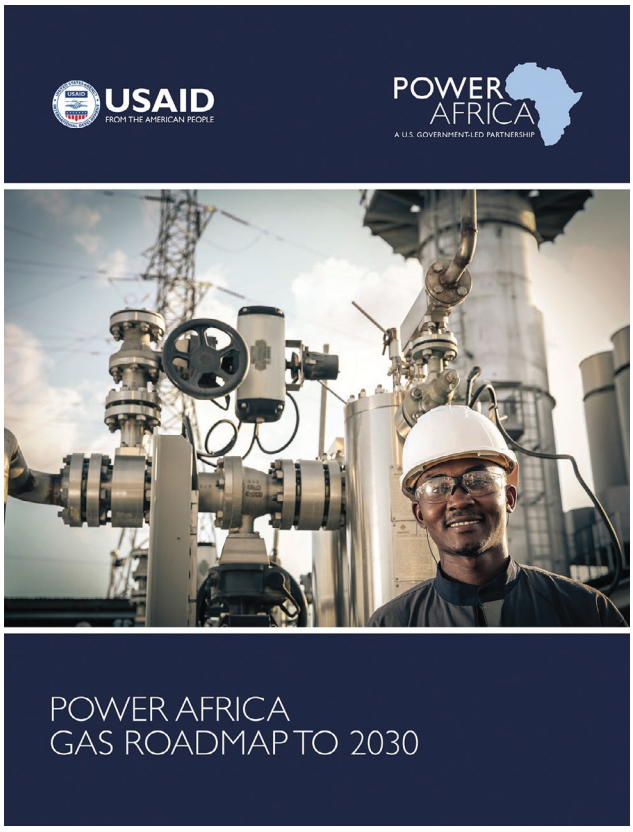
Transaction Advisor Handbook. To instill a consistent approach among all field-based Transaction Advisors, PATRP developed a handbook to articulate the policies, procedures, and best practices that all Power Africa transaction advisors should follow in their work. The handbook includes (i) a common scope of work for transaction advisors; (ii) policies and procedures for transaction advisors, including independence of advice, U.S. Government policies, public comments and statements, travel, meetings, gifts and entertainment, confidentiality agreements, weekly reporting, and annual performance metrics; and (iii) potential U.S. Government interventions to help unblock obstacles to private investment in the power sector, including direct interventions to assist specific power projects, capacity building for host governments, techniques to mitigate project risk, credit enhancement techniques, and a discussion of how power projects typically attract finance.

Qualified Transactions Assistance Tool (QTAT). To be eligible for Power Africa assistance, a transaction must, in the first instance, be a "qualified" transaction. In addition, it must satisfy the requirements set forth in the Qualified Transactions Assistance Tool, a detailed checklist developed by PATRP to identify high-priority, transformative, replicable transactions with broad-ranging local and regional impacts. A good candidate for assistance is a transaction that is at a stage where it has made enough achievements to inspire confidence (or soon can) that it will reach financial close and, ultimately, result in incremental megawatt generation, increased financial assistance, additional connections, and/or increased efficiency/reliability.

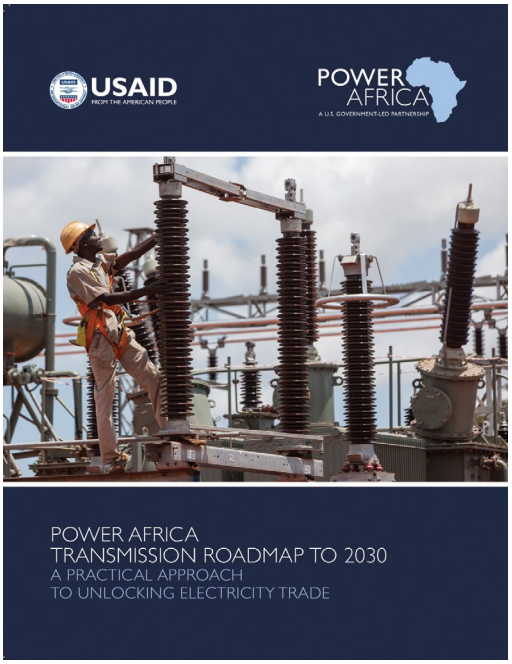
Power Africa Gas Roadmap. Building on the Power Africa Roadmap, PATRP worked with USAID and Power Africa interagency partners to develop the *Power Africa Gas Roadmap to 2030*, which was launched on June 27, 2019, by Secretary of Energy Rick Perry and Secretary of State Mike Pompeo, in conjunction with the World Gas Conference in Washington, DC. In addition, PATRP provided significant support to the Southern Africa Energy Program (SAEP) regarding content synchronization, design, and production of their Southern Africa Gas Roadmap.

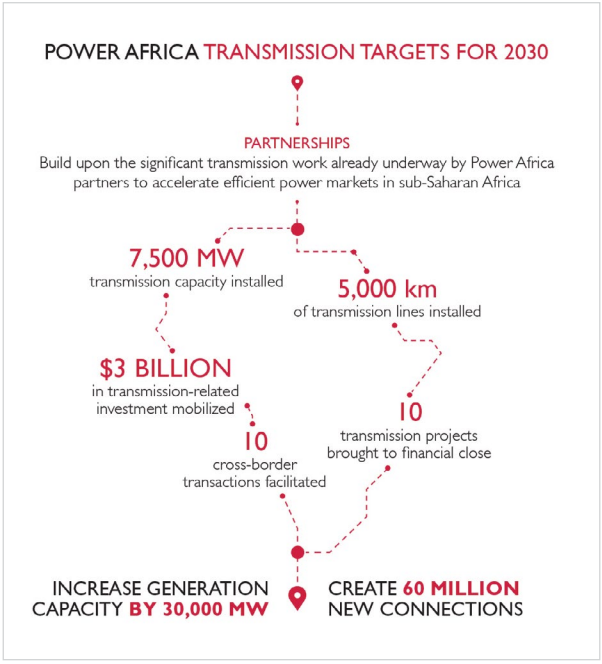
The *Power Africa Gas Roadmap* outlines the interventions necessary for Power Africa to unlock between up to 16,000 MW of new, gas-fired power generation in sub-Saharan Africa by 2030. Centered around gas supply, gas demand, and the infrastructure linking the two, the Gas Roadmap focuses on nine, strategically selected countries, and details the regulatory and policy support, finance assistance, transaction advisory services, and capacity-building programs needed in each country.

The strategy document also highlights the benefits of investing in Africa's natural gas infrastructure, as well as opportunities for U.S. companies to play a role in the growth and development of Africa's energy sector, which can translate to significant new business and the ability to create more employment opportunities in the U.S. and in Africa.



Power Africa Transmission Roadmap. PATRP supported the Coordinator's Office with review, editing, design, and production of the *Power Africa Transmission Roadmap to 2030*, the latest volume in Power Africa's Roadmap series. The Transmission Roadmap is designed to promote regional electricity transmission and cross-border electricity trade. While the content of the document was developed by another consultant, PATRP was requested to ensure quality development of the final products, including hard copies of the book and an accompanying one-page fact sheet, just a few weeks before the planned launch at the Africa Investment Forum. The launch of the Transmission Roadmap reinforces the emphasis on transmission and distribution infrastructure under Power Africa 2.0.





The cover of the Transmission Roadmap (left) and a supporting graphic from the one-pager (right).

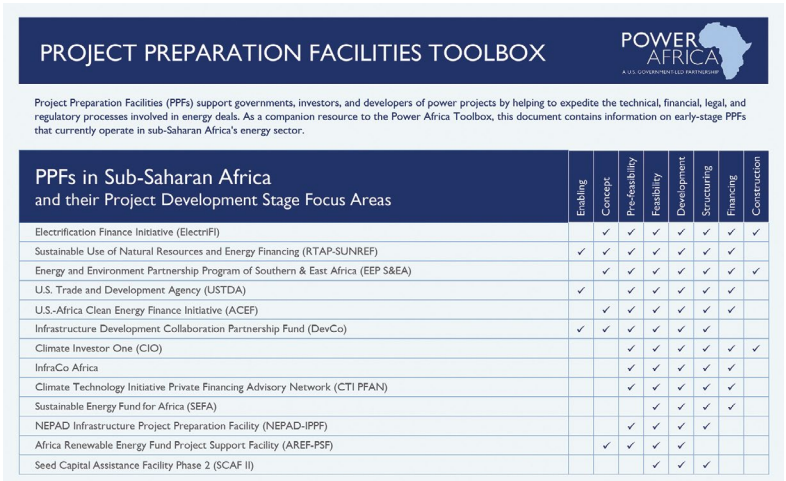
Power Africa Hydropower Roadmap. PATRP developed a draft *Power Africa Hydropower Roadmap to 2030*, and met frequently with Power Africa and interagency staff to advance the strategy. As with the Gas Roadmap, the Hydropower Roadmap also advances the Power Africa Roadmap by outlining the interventions Power Africa will undertake to further integrate hydropower projects into the technology mix in sub-Saharan Africa. The Hydropower Roadmap focuses on the seven most promising countries for hydropower development in the next five years. PATRP estimated that the seven focus countries hold at least 4,800 MW of hydropower projects that could be realized by 2030. As of the end of PATRP engagement, the Hydropower Roadmap had not been published.

Project Preparation Facilities Report and Toolbox. In FY 2015, the Power Africa Coordinator's Office asked PATRP to research and report on the project preparation facilities (PPFs) that are relevant to early-stage project development in the energy sector. PPFs enable governments, investors, and developers accelerate the technical, financial, legal, and policy processes that can often delay power projects. PATRP completed the research and submitted a comprehensive report in FY 2016 on PPFs working in the African energy sector. The report presents a set of recommendations on how and where Power Africa could best focus any future support to PPFs.

From the report, PATRP developed a PPF Toolbox that evaluates thirteen PPFs and their objectives, geography, funding sources, eligibility criteria, application processes, and other relevant details. This new addition augments the Power Africa Toolbox, and was used by the entire Power Africa team for insight into the power project funding landscape.

Megawatt Assessments. To aid Power Africa in its short-, medium-, and long-term planning in individual countries, PATRP prepared a series of reports on energy supply and demand scenarios, with suggestions for Power Africa assistance to achieve additional MW. These assessments included reviews of potential demand growth based on population projections and macroeconomic conditions, as well as the infrastructure and financial constraints limiting the expansion of electricity access.

Assessments were completed and submitted for Benin, Burkina Faso, Cameroon, Côte d'Ivoire, Ethiopia, Ghana, Guinea, Kenya, Liberia, Mali, Niger, Nigeria, and Senegal.

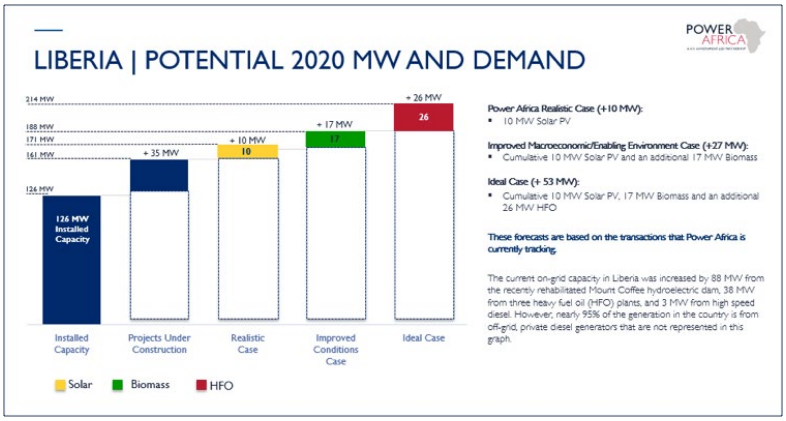


PROJECT PREPARATION FACILITIES TOOLBOX

POWER AFRICA

Project Preparation Facilities (PPFs) support governments, investors, and developers of power projects by helping to expedite the technical, financial, legal, and regulatory processes involved in energy deals. As a companion resource to the Power Africa Toolbox, this document contains information on early-stage PPFs that currently operate in sub-Saharan Africa's energy sector.

PPFs in Sub-Saharan Africa and their Project Development Stage Focus Areas	Enabling	Concept	Pre-feasibility	Feasibility	Development	Structuring	Financing	Construction
Electrification Finance Initiative (ElectriFI)		✓	✓	✓	✓	✓	✓	✓
Sustainable Use of Natural Resources and Energy Financing (RTAP-SUNREF)	✓	✓	✓	✓	✓	✓	✓	
Energy and Environment Partnership Program of Southern & East Africa (EEP S&EA)		✓	✓	✓	✓	✓	✓	✓
U.S. Trade and Development Agency (USTDA)	✓		✓	✓	✓	✓	✓	
U.S.-Africa Clean Energy Finance Initiative (ACEF)		✓	✓	✓	✓	✓	✓	
Infrastructure Development Collaboration Partnership Fund (DevCo)	✓	✓	✓	✓	✓	✓		
Climate Investor One (CIO)			✓	✓	✓	✓	✓	✓
InfraCo Africa			✓	✓	✓	✓	✓	
Climate Technology Initiative Private Financing Advisory Network (CTI PFAN)			✓	✓	✓	✓	✓	
Sustainable Energy Fund for Africa (SEFA)				✓	✓	✓	✓	
NEPAD Infrastructure Project Preparation Facility (NEPAD-IPPF)			✓	✓	✓	✓		
Africa Renewable Energy Fund Project Support Facility (AREF-PSF)		✓	✓	✓	✓			
Seed Capital Assistance Facility Phase 2 (SCAF II)				✓	✓	✓		



5. CHALLENGES & LESSONS LEARNED

This section outlines the challenges faced by PATRP over the life of the program, in conjunction with lessons learned during contract implementation.

CHALLENGES

RELOCATION FROM KENYA TO SOUTH AFRICA

The PATRP contract was finalized between USAID and Tetra Tech on May 23, 2014. By June 2014, it became apparent that the increasing terrorist activity in nearby Somalia jeopardized the original plan to establish the Power Africa and PATRP offices in nearby Nairobi, Kenya. Thus, the locus of USAID's Power Africa Coordinator and staff, including the PATRP project office, were reassigned to Pretoria, South Africa.

The relocation of PATRP's office from Nairobi to Pretoria gave rise to several challenges: relocating the main staff and offices, revisiting subcontract arrangements, and identifying new local personnel. The program's start-up was delayed as almost all key personnel changed as part of the relocation, including the COP and DCOP. To compensate, Tetra Tech and Nexant deployed their respective home office managers to Pretoria to fill the void. USAID approved the COP and DCOP candidates presented to USAID in January 2015, and they were deployed quickly. There were also challenges in filling certain transaction advisory positions, such as in Kenya and Tanzania. In the latter case, deployment of a Transaction Advisor finally occurred in September 2015.

This unforeseen development delayed project mobilization by several weeks, and had an early ripple effect on program achievements. However, over the course of the ensuing five years, the project was able to gain the necessary momentum to achieve significant results.

COMPLEX STRUCTURE

PATRP's complexity required the creation of an extensive resource infrastructure, with offices and staff spread across 10 or more countries. Following the expanded scope of work agreed in April 2016, PATRP deployed additional advisors and enlarged its country/regional footprint. PATRP's original geographic focus comprised only seven countries (Kenya, Ethiopia, Nigeria, Djibouti, Tanzania, Liberia, and Ghana) and 3 regions (Southern Africa, East & West Africa). The expansion added a further 7 countries (Senegal, Côte d'Ivoire, Rwanda, Uganda, Zambia, Malawi, and Angola), and witnessed the doubling of full-time staff on the continent – from just over 30 staff to an eventual roster of nearly 100 permanent staff, plus many more short-term technical experts.

BURDENSOME ADMINISTRATION

In the first year of the program, there were more than 48 work orders to track. As all expenditures and invoices were required to be itemized by work order, the preparation of PATRP's invoices became complex and required significant time and effort. This process sometimes resulted in delays and oversights.

In FY 2016, PATRP transitioned from the Work Order System to Country Implementation Plans, which promoted a holistic programmatic approach to PATRP's objectives in each country. Initially, this shift gave rise to additional administrative burdens, particularly with respect to the re-allocation of billing codes to ongoing activities and the resulting challenges during invoicing. However, these challenges diminished with time and the transition proved to be more efficient.

ADDITIONS TO THE WORK PLAN

PATRP was challenged in the requirements to deploy or divert resources, often under time constraints.

PATRP provided more support than originally planned to the Coordinator's Office, including the addition of geothermal as a principal work stream; the addition of Transaction Advisors to the East Africa Region, West Africa Region, Southern Africa Region, and Djibouti as new work areas; support to NEPAD Africa Power Vision; the addition of resident technical advisors, as well as country transaction advisors in Nigeria (TCN), Tanzania (Rural Electrification Agency) and Ghana (gas); and follow-on requirements for legacy work streams from AIP in Nigeria, Ghana, and possibly other countries, to be transitioned and funded. These additions were made to help Power Africa achieve the new Presidential objectives, but also increased the burn rate significantly.

2016 PROGRAM EXPANSION

The PATRP contract was modified in April 2016 to include seven new countries: Senegal, Côte d'Ivoire, Rwanda, Uganda, Zambia, Malawi, and Angola. The rapid expansion invariably presented challenges in terms of recruiting new staff, deployment logistics, securing work permits and visas, and processing the corporate registration of Tetra Tech in four separate jurisdictions simultaneously.

MONITORING AND EVALUATION

The size and scope of PATRP, including work streams in more than 25 countries, created inherent monitoring and evaluation challenges. Beyond this general programmatic complexity, there were specific challenges faced by PATRP, most of which were external:

- **Off-Grid Connections**. PATRP relied on reporting from the private sector companies it assisted via the Beyond the Grid sub-initiative. Some companies are still in early stages of existence, and do not yet have robust or regular reporting mechanisms. Therefore, PATRP often received late connections data. In a few cases, corrections were made to previously reported numbers, which shows not only the issue at hand, but also PATRP's due diligence and commitment to accuracy.
- **Revenue Improvement and Loss Reduction at DISCOs**. PATRP relied on the four electricity distribution companies in Nigeria, as well as EEU in Ethiopia, for official figures on revenue collection and energy loss reduction. This reliance led to delays in reporting to USAID.
- **Generation Capacity Reached Financial Close/ Commissioned**. The supporting documentation required to prove financial close is often not easily available. PATRP Transaction Advisors were required to aggressively follow up with developers and project stakeholders to obtain documentation, which in some cases resulted in a lag between actual financial close or commissioning and PATRP's ability to confidently report such to USAID. Similarly, lenders to a transaction may disagree on whether the project has satisfied all requirements of financial close.

DIFFICULTY AT THE DISCOS

PATRP faced significant challenges to successful implementation of transmission- and distribution-related work streams in FY 2018. Foremost was the regular obstruction on the part of the Nigeria DISCOs to implement PATRP recommendations. The PATRP team assisting the DISCOs has deep experience in the type of turnaround activities required in Nigeria, yet the management and boards of directors at the DISCOs often chose not to heed PATRP advice, to include disciplining non-performing or dishonest staff. These obstacles ultimately lowered the loss reduction trajectory.

LESSONS LEARNED

ALIGNMENT WITH THE *POWER AFRICA ROADMAP*

Since Power Africa's transaction focus represents a shift from traditional enabling environment work, there was a tendency to deviate from, and focus on activities that do not have a direct link to the Roadmap indicators (i.e. MW and new connections). Accordingly, whenever activities were conceived, it was essential to ensure clear alignment with Roadmap objectives, which must be understood by all parties, to include bilateral and regional USAID Missions. To this end, regular communication between all the parties (i.e. between PATRP and USAID, and within USAID) is critical.

Following on from the above point, Power Africa is not a program in which capacity building alone can be considered a "success", unless such capacity building has a direct impact on improving the power sector, advancing sustainability, or making the sector more

attractive for investment to achieve additional MW and increased electricity access. Although there are undoubtedly important technical assistance activities needed across Africa, PATRP was required to orient its activities – and continually test such activities – in reference to their contribution to the program's overarching generation MW and connections targets. To put it simply, results matter.

RESIDENT IN-COUNTRY ADVISORS ARE ESSENTIAL TO MAINTAINING REAL MOMENTUM ON DEAL FLOW

Power Africa requires Transaction Advisors to operate effectively in a multi-stakeholder environment, maintain an urgency to advance transactions, and creatively respond to challenges or barriers that threaten a sound transaction from advancing. As the Power Africa Roadmap characterizes the initiative's goals, it is almost akin to a business or trade association type of approach, where advocacy skills, the ability to work effectively in a large team, and positive stakeholder environment are critical. With this complexity, it was critical that Power Africa advisors (and by extension PATRP) were predominantly Africa-based specialists, dedicated to the goals of the Power Africa program.

TRANSACTION ADVISORS MUST PLAY DIFFERENT ROLES

Initially, PATRP envisioned its TAs would play an investment banker type of role, offering objective advice to get deals across the finish line. In certain cases, however, USAID and PATRP concluded that TAs could be more effective if embedded within government ministries or utilities as a means of leveling the playing field with developers. This approach was also designed to builds capacity within governments while, at the same time, advancing the goals of the program. In this event, the roles and responsibilities of the embedded advisor needed to be clearly defined, and the protocol for engaging the private sector agreed ahead of time, to avoid any misunderstandings.

TRANSACTION ADVISORS' ABILITY TO ADVANCE A PROJECT WITHIN A DEFINED TIMESPAN HAS ITS LIMITS

If there are barriers that cannot be removed with TA assistance, it is imperative that the issue be elevated within Power Africa so that other channels of dialogue can be pursued at a policy or strategic level. To this end, it is important to remember that PATRP's TAs were only able to advance projects to a certain point, beyond which other transaction parties, such as developers, sponsors, lenders and governments and utilities were required to fulfil their respective roles and responsibilities. In this context, an understanding of the role that PATRP was able to play (and the limitations), together with the complexities of progressing power generation projects in Africa, are instrumental in managing client expectations on outcomes and results. PATRP sees this as a collaborative process, and strives to work in concert with USAID and Power Africa partner agencies to solve such issues efficiently.

THE IMPORTANCE OF FLEXIBILITY IN DELIVERY

The results-oriented nature of this work required flexibility in implementation: if an activity became less important or relevant to the overarching Power Africa objectives, then it was reconsidered and possibly terminated. In this respect, PATRP advised USAID if, and when, it believed that activities were not efficiently leading to Power Africa's overall objectives, and proposed a course correction, as needed. This aligned well with the USAID process life cycle approach, which advocates for collaborative, learning and adaptive (CLA) management.

COUNTRY-LEVEL HOLISTIC APPROACH IS CRITICAL

One of the lessons learned from the initial PATRP approach, which focused on the use of multiple work orders by country, was that such an approach risked creating activity "silos" within a country, where activities under individual work orders were not always well integrated with other activities to create a seamless country-level program. This less-than-optimal effect was most readily observed in Nigeria, with each work order activity operating somewhat independently of the other activities in the program.

Accordingly, activities were later planned based on country implementation plans that were holistic in their approach to promoting new generation, connections, and the overall investment climate.

GREATER FLEXIBILTY REQUIRED TO ADDRESS RECRUITMENT CHALLENGES

The particular demands of PATRP called for a skill set that falls outside the typical pool of USAID consultants. PATRP was required to resource professionals who were conversant in transaction advisory assistance – to include legal, financial, and technical work. Experts were largely drawn from banks, law firms, commercial developers, or investment advisory houses – all of whom operate on pay scales that are outside of the norm seen in government advisory work. Accordingly, there were challenges recruiting qualified candidates willing to accept compensation below relevant USAID salary ceilings (for either U.S. nationals or cooperating country nationals (CCNs)). The requirement for payment in local currency for CCNs also proved to be a challenge, particularly when PATRP was in competition with private sector entities, such as developers and banks, for local expertise. To the extent possible, greater flexibility in hiring CCNs, in terms of salary levels, and currency of payment, should be considered.

INTERNAL COMMUNICATIONS PLAY AN IMPORTANT ROLE IN DELIVERY OF RESULTS

The roles of TAs were very similar in all countries, with several core activities that comprised most of the work (e.g., transaction advice leading to MW or connections) and a few country-specific activities (e.g., direct support to government policies) that complemented the core activities. Similarly, Transaction Advisors also encountered similar issues and challenges when implementing the activities, which provided a valuable context for technical and non-technical discussions between team members, where issues and challenges being addressed in one country can benefit from similar past experiences from other countries. PATRP's Beyond the Grid (BTG) team was particularly active in promoting interaction and communication between country and regional Transaction Advisors, with regular meetings to discuss the state of play in each country and technical topics of interest that would benefit the team's performance and delivery of services. Further, the BTG also benefited from having a dedicated USAID BTG lead, who engaged on a day-to-day basis with team members.

An AEDC linesman climbs an electricity distribution tower to check for faults. Photo by Ryan Kilpatrick for Power Africa.

6. RECOMMENDATIONS FOR FUTURE POWER AFRICA SUPPORT

PATT CONTENTS MUST BE CONSTANTLY VERIFIED AND REVIEWED FOR ACCURATE REPORTING

The initial data capturing for PATT was done under time pressure and without the opportunity to verify all key data being provided. Much of the data were taken from spreadsheets that had been used to track transaction progress. Thus, the accuracy of the data contained in PATT was not always reliable. This issue was addressed and a data quality assessment was completed on PATRP-supported transactions. There was a continual need to maintain the accuracy of the data and ensure they were current, so that reports generated were credible and reliable.

The creation of PATRP Portfolio Managers that consistently verified PATT data with Transaction Advisors and Relationship Managers helped keep data as accurate as possible. This process required proactive management, and included an M&E specialist working with Portfolio Managers in coordination with the Transaction Advisors in the field.

Post-PATRP, there will be multiple implementing partners feeding transaction data into PATT, a function that can be accommodated within PATT's infrastructure. However, it will be critical that the same level of data gathering is performed post-PATRP, which may require some continued centralized entity (within USAID or contracted) to oversee data entry/quality in PATT.

CHOOSE YOUR COUNTERPARTS CAREFULLY

Careful consideration must be given to which beneficiaries are supported and how to support entities that may have lost considerable credibility with Development Partners, may be unresponsive, and/or are unwilling to listen or act on recommendations or assistance.

RELATIONSHIPS MATTER

In the African energy sector, as in any market, personal relationships often open doors to opportunities to make a great impact. For example, PATRP's ability to engage and effectively work with the South African IPP office stemmed from a solid pre-existing relationship – hence there was trust and confidence that PATRP could deliver.

REGION- AND COUNTRY-SPECIFIC RECOMMENDATIONS (AS OF NOVEMBER 2019)

EAST AFRICA

PATRP's support to EAPP on the EKT transaction was pivotal in achieving progress on a relatively complicated, ground-breaking, three-country transaction. Since this transaction is likely to set a precedent for many years to come, its success is a high priority for EAPP and the donor community. The EAPP Secretariat is keen for Power Africa to continue to support completion of this transaction for the sake of efficiency and continuity, recognizing the pivotal role of Power Africa's past work.

At NELSAP, The Northern Corridor interconnector project is best moved forward by agreeing settlement of any outstanding claims, with this being the most cost-effective method of resolving any outstanding legal risks/liabilities and permitting each country to close out these historical issues. Further assistance to NELSAP should be targeted and well delineated with specific outcomes, which is best deployed through short term technical assistance.

Finally, and notwithstanding the capacity building and technical assistance delivered by PATRP, the entities concerned continue to lack the capability to execute complex cross border transmission programs, and/or develop regional power pools. Moreover, most countries

in the region view interconnection as a threat to their own generation programs. The bigger picture of regional trade and integration is not yet well understood, and there is not yet an enabling environment (trading platforms, bilateral agreements, PPAs, wheeling agreements, operational and technical requirements, and regulatory frameworks for cross-border trading) in place to ensure that the interconnectors can actually work across borders on a regional scale. In summary, significant work remains to advance the activities and goals PATRP initiated.

DJIBOUTI

Power Africa and USAID Djibouti have a deep understanding of the technical, economic, and political dynamics of the energy sector in Djibouti, and this institutional knowledge has proven useful not only for purposes of advancing the objectives of the Power Africa initiative, but also for developers, investors as well as development (and development finance) institutions, including many Power Africa Partners, that are engaged in Djibouti. To this end, there are several continuing advisory scopes to fulfill as none of the projects have reached financial close or commercial operation.

The most efficient route forward, given Djibouti's current political environment, involves a two-pronged approach:

- Continuation of targeted transaction advisory for the energy transactions that do move forward, including but not limited to the following projects: (a) North Ghoubet Wind Power Project (60 MW); (b) EDD – GE Gas-to-Power Project (120 MW); (c) GridX Captive Power Solutions (15 MW); (d) Grand Bara Solar PV Project (30 MW); and, (e) ADME's Government Facilities Renewable Energy Project (50 MW).
- Expand assistance to ADME, a reliable Power Africa partner in Djibouti's complex political environment.
- Further collaboration on the project design and implementation for the Government Facilities Renewable Energy Project.
- Cooperation with ADME to identify private sector technical partners for the Government Facilities Renewable Energy Project.
- Support to ADME for the creation of one or more consortium(s) of public and private funders for ADME's Government Facilities Renewable Energy Project.
- Engagement with ADME on the development of a detailed cost assessment for the production of energy from various sources available to Djibouti with a view to initiate within GORD an evidence-based dialogue of energy production prices.

ETHIOPIA

Since Ethiopia has a single-buyer market (EEP and EEU), the lack of creditworthiness of the utilities presents hurdles to private sector investment. The underperformance of the state-owned utilities must be addressed by the Government of Ethiopia (GoE) and may include activities such as introducing external integrated near- and long-term planning and operations teams. Moreover, executives with solid utility management experience need to be engaged to lead and restructure some of the utilities' core business units. If the GoE wishes to pursue a path of IPP development, it needs to create and improve the procurement processes for prospective project developers and provide information on future power projects. Further, if there is real expectation that new IPPs will be developed, additional work on tariff reform is needed to add liquidity into the sector, not to mention liberalizing the conditions for foreign direct investment, particularly as they relate to repatriation of funds, and currency restrictions. Lastly, there will be a need to create a more transparent and firmer pathway for new IPPs under a competitive procurement process, which will require further support to EEP and the new PPP Unit created.

In terms of utility reform, EEU should expand the actions that were undertaken by the PATRP M2C team across other regions (beyond SAAR), including expediting the start of Enterprise Resource Planning (ERP) usage, the installation of meters at all incoming and outgoing substation feeders, and the mapping of all customers by distribution feeders and transformers. EEU will also need to improve and expedite its meter calibration process, and the meter test bench should be replaced.

KENYA

PATRP's accomplishments in Kenya were achieved in the face of ongoing challenges in the power sector. For example, the existing public-private partnership (PPP) framework remains overly bureaucratic, and developers are finding it difficult to comply. There is also a fairly complex governance structure within the sector, which creates multiple points of failure. The lack of standardized PPAs and Government Letter of Support, combined with long procedures and inconsistency on approval for PPAs, have caused unnecessary holdups. Acquisition of wayleaves for transmission lines and high costs of associated compensation have impeded several projects, an issue Power Africa attempted to address via the *Guide to Community Engagement* (and related support to KenGen). There has also been a delay in the enactment of the Energy Bill 2017, which would operationalize the Grid Code and Mini-Grid Regulations, among others.

Power Africa should continue to build on what has been accomplished with our Kenyan counterparts, particularly with respect to relationships established with KenGen and Kenya Power. Assisting with the implementation of the Energy Bill 2017 (once enacted), encouraging the establishment of an IPP Office that could see a significant shift in procurement of new generation projects, working with KETRACO and Kenya Power to improve the reliability and capacity of their respective grids and supporting grid code implementation should be at the top of the list.

RWANDA

Looking ahead in Rwanda, with the 80 MW Hakan peat project due to come online in 2020, short-term demand will be met, and there will be an increased focus on exporting any surplus power, with limited opportunities for new generation. A major roadblock for power trade between Rwanda and its neighbors is obtaining up-to-date information. Power Africa, with a presence in all of Rwanda's neighboring countries, can serve to supply accurate information to permit the Government of Rwanda to make informed decisions, and facilitate bilateral trade arrangements.

TANZANIA

While PATRP recorded some successes through its engagements with TANESCO and REA, several critical challenges remain. The current Government of Tanzania, as well as energy sector legislation, favors an Engineering, Procurement and Contracting plus Finance (EPC+F) approach over an Independent Power Producer (IPP) approach. This EPC+F approach is not acceptable to most project developers, meaning a number of IPP projects may not be able to progress. Developers that are willing to proceed on an EPC+F basis will need to enter into a whole new suite of project agreements. The matter is further compounded by TANESCO's financial position and the government's inability to provide a government guarantee to backstop TANESCO's obligations. Further, Grid-connected mini-grids and other small power projects, consider the TANESCO commercial risk to be quite high. Project developers/ lenders are concerned about TANESCO/off-taker late payments and have requested government guarantees to be assured with loans issued. Unfortunately, this is not possible in Tanzania due to the Government Loans, Guarantee and Grants Act, which stipulates the issuance of grants to only companies whereby the government of Tanzania owns majority of the shares (over 50 percent), and not to individuals or private entities.

Power Africa's continued engagement should be premised on a clear commitment to private sector engagement in the energy value chain, and continue to promote competitive procurement and enabling environment reforms as part of its Power Africa 2.0 focus.

WEST AFRICA

Looking forward, it will be important for Power Africa to continue assisting the governments of West Africa in their drive to attract IPPs. Power Africa is in a unique position in that it is the only donor program that actively works with the private sector. In addition to the continuation of advisory support to the pipeline of projects pending financial close or commercial operations, several other activities should commence or continue, as outlined below:

- Support regional bodies such as OMVG, OMVS and WAPP in the development of the regional market;
- Continue to educate governments about the implementation of ancillary services to facilitate integration of renewable energy projects; and
- Continue to provide "on the job" training related to the private sector engagement and contractual issues.

GHANA

Ghana has contracted more generation capacity than what is actually required in the short to medium term (depending on actual demand growth), mostly with relatively expensive, "fast-track/emergency" power projects. Per the Integrated Power Sector Master Plan (IPSMP), no new thermal generating capacity is required until 2027 and renewable energy expansion is only required until the overcapacity situation diminishes to the extent tariffs can reduce the system marginal generating cost. Further, the financial challenges in the sector have led the Ministry of Finance to declare a moratorium on executing any new contracts until the situation stabilizes.

Depending on demand growth assumptions, it is likely that the majority of new capacity allowed to proceed in the next few years will largely be drawn from a pipeline of renewable energy projects with already executed PPAs, but only to the extent that Ghana decided to push forward with its stated renewable energy target of 10 percent of new generation capacity by 2030.

The primary obstacle to private sector participation and investment is the creditworthiness of the main electricity off-taker, the Electricity Company of Ghana (ECG) and the general financial health of the power sector. PATRP analysis demonstrates that the sector is not collecting enough revenue to cover its operating expenses, to the tune of $1 billion annually, which means that some power generators, including IPPs, are not getting paid in full or on time. Looking forward, Ghana will benefit from Power Africa's technical assistance in the following areas:

Policy Reforms to Reduce Power Sector Financial Imbalance

- Continuing support efforts to address the financial shortfall in the sector and the development and implementation of the Energy Sector Recovery Program;
- Continuing to develop the financial management tools and transfer or ownership to the MOEn staff; and,
- Improving the financial reporting structure.

Renewable Energy Project Development

- Assisting priority renewable energy projects that clearly have the support of government for issuance of a PCOA;
- Providing transaction advisory services to developers and other sector entities to identify and remove obstacles to financial close, such as providing market assessments, conducting preparatory studies and accessing concessionary financing; and
- Advising on the Renewable Energy Master Plan.

Liquefied Natural Gas

- Natural gas is the principal fuel for thermal power generation.
- LNG has emerged as the cheapest option for importing natural gas.
- Assistance can be provided to run a competitive tender to procure competitively priced LNG at favorable terms on Henry Hub linked prices.

Competitive Procurement for 2023-2025

- Utilizing the Power Africa manual for competitive power procurement;
- Developing a competitive framework and templates to run the private tender process; and
- Advising on the transition from directly negotiated transactions to competitive bidding of new power generation capacity, to facilitate transparency in an effort to reduce the overall delivered cost of electricity.

Takoradi-Tema Onshore Pipeline Project

- Assisting with financing (CAPEX could range around $500 million) before issuance of RFPs for appointment of EPCC contractors; and
- Assisting with scoping, financing and construction of this project within a competitive tender framework to reduce gas transportation costs.

LIBERIA

The energy sector is a priority area for the Government of Liberia. The donor community has committed sizable resources for creating a sustainable sector and increasing electricity access to all citizens. However, progress has been slower than anticipated and Liberia continues to experience low electrification, high tariffs and a fragile energy sector.

Moving forward, Power Africa support should focus on:

- **Off-grid sector** – The off-grid sector is key to increasing electricity access rapidly, especially in rural areas. The capacity of actors involved in the sector is quite low. Power Africa should focus on capacity building of local firms and create an environment where they can have easier access to products and finance.
- **National utility** – Power Africa supported procurement of the new management services contractor for LEC. However, the management contractor has not yet performed to expectations, in part due to political interference. In the absence of substantial Power Africa support, especially at the management and capacity-building level, a vacuum may arise that may undo all the gains made thus far.
- **Institutional and policy framework** – The electricity regulator is up and running, however, there is lack of sectoral understanding and knowledge in the regulatory body that needs immediate attention. With U.S. Government support to the regulator ending in 2020, Power Africa should develop support programs for the regulatory commission. Key regulations for managing the sector are still to be developed. The Ministry of Land Mines and Energy (MLME) was split to create Ministry of Mines and Energy (MME) for greater focus on the energy sector. However, such increased focus is not yet evident in the sector. Similarly, the autonomy of the national utility board is not guaranteed, which hampers efficient functioning. Hence, there are several areas in the institutional and policy domain for Power Africa to provide support and help move the sector towards sustainability.

NIGERIA

PATRP's achievements in Nigeria came in the face of ongoing challenges in the Nigerian power sector. For example, critical Federal Government of Nigeria (FGN) agencies have not committed to fulfil their obligations around purchasing from IPPs, and NBET and the Ministry of Finance refuse to close on the 14 solar deals at the current PPA tariff.

Further engagement is needed with FGN with respect to pricing of IPP tariffs, as FGN must commit to fulfil its obligations to IPPs despite a historical tendency to not commit. Additionally, the available capacity in Nigeria now exceeds the amount TCN and DISCOs can deliver, meaning major new generation growth is in sight, but constrained by downstream capacity limits.

Development of the off-grid sector in Nigeria is progressing and shows promise. Off-grid energy companies need increased access to financing and more local currency funding through local commercial and microfinance banks with appropriate terms. The lending model of microfinance institutions (MFIs) has proven to increase collateral for systems in rural communities resulting in increased payment for SHS. Additionally, extending DCA guarantees to microfinance banks could help increase off-grid energy loans as MFIs are more active in the space than commercial banks who haven't extensively used their guarantees. Currently, there is no mobile money service with nationwide coverage in Nigeria.

Power Africa can continue to build on what PATRP accomplished. The FGN will need continued assistance and engagement in understanding the requirements for private developers to participate in private IPP projects, as well as the requirements for private capital to be deployed. In the off-grid sector, availability of reliable data of Nigeria's population density will help increase sales of SHS products across all rural areas. The work done by PATRP with distribution companies in a few regions of Nigeria has returned remarkable results and has potential to be replicated in other DISCOs across the country, but continued engagement with the same

intensity is needed in order entrench the changes that were introduced by the PATRP team.

SENEGAL

PATRP's engagement in Senegal confirmed that the public-private partnership (PPP) framework is overly bureaucratic and hindering development of PPP projects. There are also complex governance structures within the energy sector that have historically created multiple points of failure.

Moving forward, Power Africa should continue to support the implementation phase of the MCC compact in Senegal, and continue to manage and support the implementation of Senegal's gas-to-power strategy. In addition, Power Africa can assist the eventual review of the regulatory landscape initiated by the Government of Senegal.

SOUTHERN AFRICA

There are several continuing advisory scopes to fulfil as certain projects in South Africa and the broader region have not reached financial close or commercial operations. Advice is thus ongoing. To this end, support to the projects were transitioned over to the Southern Africa Energy Program (SAEP).

ANGOLA

To date, there has been limited private sector engagement in the Angolan power sector. At the start of PATRP engagement, there were no private sector projects that could be immediately supported. Private sector-led power projects have not advanced in Angola, in large part due to the lack of government support for off-taker risks, as well as other risks that cannot be prudently borne by developers or financiers. Angola is an exceedingly challenging market for private sector project development and financing. In the off-grid sector, the regulatory framework and lack of mobile money posed challenges for significant opportunities.

In this context, the market potential for Angola (in terms of Power Africa's goals) is viewed as long-term. In general terms, the Government of Angola (GoA) could benefit from continued technical assistance in the following areas:

- Addressing gaps in the enabling environment, as a complementary activity to the current interventions of other donors (e.g., Norway);
- Well-targeted capacity building activities for select staff across the sector entities;
- Advisory support on cross-border projects proposed for Namibia, Zambia, and DRC;
- Addressing issues related to transmission and distribution planning – the implementation of new installed generation capacity, principally through mega-hydro projects, is considerably outpacing progress in these areas; and
- Further development of off-grid opportunities, such as PAYGO SHS, supporting the government's recent focus on rural electrification, and establishment of a rural electrification agency and fund.

It is recommended that potential future support not only be informed by the priorities defined under the Energy Sector Action Plan for 2018-2022, but also by detailed, advance consultations with government to clearly understand the priorities to which the government is currently committed to actively engage. Such planning will be required for effective engagement under existing associated work plans (or general frameworks) across the relevant sector entities.

Additionally, there may be opportunities for continued collaboration with the AfDB as it seeks to establish the IPP Implementation Unit – particularly as it relates to training and other areas of short-term, discreet support. Similar opportunities might exist should the GoA ultimately decide to pursue the implementation of IFC's Scaling Solar program, which would require government support for private sector projects.

Development partners continue to provide support to the GoA with the aim of increasing its engagement with the private sector. However, in the context of Power Africa's goals, the most desirable outcome of this support will ultimately depend upon key decisions that need to be taken by GoA and its commitment to engage, demonstrated firstly by improvements in general interactions and follow-up with its existing and prospective partners.

MALAWI

The main barriers to increased generation capacity in Malawi, particularly through IPP contracting, are ESCOM resources and processes. In addition, the related stakeholder, government, and regulatory processes are all new to Malawi so what is already a protracted bureaucratic procedure can take much longer. ESCOM's resources are stretched due to the significant reform and related work they are required to undertake. There are also major learning curves for what is effectively a new executive team at ESCOM. ESCOM has also been slow to finalize an IPP procurement plan which would provide direction on type and capacity of IPPs they should be pursuing and how to do this.

Power Africa can continue to counsel ESCOM to implement executive stability now, provide hands-on capacity building, and provide guidance on the various processes required to procure and contract IPPs. ESCOM should also continue to be encouraged to finalize an IPP plan.

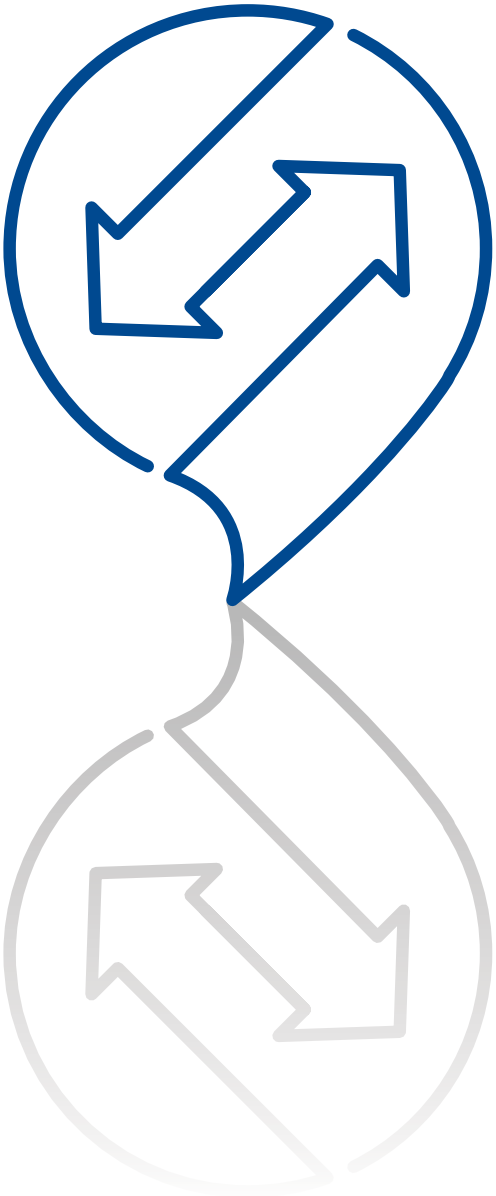
ZAMBIA

Among the key results of PATRP's work in Zambia is the conception and formulation of an End Vision for the energy sector, articulated in the form of Energy Sector Reforms, agreed in principle by the Cabinet on July 16, 2018. This is a first for Zambia, despite multiple attempts and discussions over the last two decades.

What lies ahead is the implementation of reforms, a process that will have its challenges. Zambia needs capital to upgrade and extend the grid, increase and diversify the installed generation capacity and electrify all its communities. To do this, ZESCO efficiency is a necessary condition. However, even if ZESCO were to become efficient overnight, the needed funds would not become available. Such funding can only come from private investors and creditors, who will not be mobilized unless they see clear sector rationalization and restructuring in the implementation.

It is in this context that the Cabinet's agreement in principle to unbundle ZESCO and enhance the enabling environment for private sector mobilization should be viewed. Private investors' and commercial creditors' fund flows into emerging markets, according to World Bank statistics, are at a ratio of 96:04, compared to flows from bilateral and multilateral donors combined. These funds are not coming to Zambia in adequate amounts, but to wherever the rules have clarity. Accordingly, the clarity with which the Cabinet reforms will be implemented will determine their lasting success.

Based on the proposed reforms, an Implementation Delivery Unit will be constituted, staffed by senior-level civil servants and electricity sector experts, to carry out the day-to-day activities of commencing, coordinating, and executing the reforms. Power Africa can coordinate with this office to help advance the reform objectives, in line with the focus of Power Africa 2.0.



APPENDIX A: PATRP RESULTS

The results-level indicators in the tables below refer to indicators of life of program results that can be reasonably attributable to PATRP's efforts and for which PATRP can be held accountable. Generally, attribution exists when the causal linkages between program activities and the measured results are clear and significant. For PATRP, a result is attributable when the program can plausibly claim that without PATRP intervention, the result would not have occurred as it did. These indicators measure performance against the DO and IRs in the Results Framework (see Monitoring & Evaluation Section above) and serve as the basis for performance reporting to USAID. Summary-level, country- and regional-level results are detailed in the subsequent tables.

GENERATION CAPACITY PENDING FINANCIAL CLOSURE[5]

INDICATOR	TOTAL TARGETS (MAY 2014 – NOV 2019)	CUMULATIVE ACTUAL (MAY 2014 – NOV 2019)	% ACTUAL VS TARGET (MAY 2014 – NOV 2019)
Generation Capacity Pending Financial Closure; Unit MW	32,120.0	32,861.97	102%

GENERATION CAPACITY REACHED FINANCIAL CLOSURE

INDICATOR	TOTAL TARGETS (MAY 2014 – NOV 2019)	CUMULATIVE ACTUAL (MAY 2014 – NOV 2019)	% ACTUAL VS TARGET (MAY 2014 – NOV 2019)
Generation Capacity Reached Financial Closure; Unit MW	6,421.2	5,262.842	82%

GENERATION CAPACITY COMMISSIONED

INDICATOR	TOTAL TARGETS (MAY 2014 – NOV 2019)	CUMULATIVE ACTUAL (MAY 2014 – NOV 2019)	% ACTUAL VS TARGET (MAY 2014 – NOV 2019)
Generation Capacity Commissioned; Unit MW	990	1,486.798	150%

NUMBER OF NEW GRID AND OFF-GRID ANTICIPATED DIRECT CONNECTIONS

INDICATOR	TOTAL TARGETS (MAY 2014 – NOV 2019)	CUMULATIVE ACTUAL (MAY 2014 – NOV 2019)	% ACTUAL VS TARGET (MAY 2014 – NOV 2019)
Number of new grid and off-grid anticipated direct connections; Unit: #	1,936,971	2,384,733	123%

5 The Cumulative Actual figure represents the total potential generation capacity of the projects at the time they were onboarded as PATRP-supported transactions. MW values may have changed during the course of project development.

NUMBER OF NEW GRID AND OFF-GRID ACTUAL DIRECT CONNECTIONS

INDICATOR	TOTAL TARGETS (MAY 2014 – NOV 2019)	CUMULATIVE ACTUAL (MAY 2014 – NOV 2019)	% ACTUAL VS TARGET (MAY 2014 – NOV 2019)
Number of new grid and off-grid actual direct connections; Unit #	907,525	1,729,848	190%

TRAINING AND CAPACITY BUILDING ACTIVITIES

INDICATOR	TOTAL TARGETS (MAY 2014 – NOV 2019)	CUMULATIVE ACTUAL (MAY 2014 – NOV 2019)	% ACTUAL VS TARGET (MAY 2014 – NOV 2019)
Training and Capacity Building Activities; Unit: Number of persons trained	1,542	6,417	416%

POLICY ACTIONS

INDICATOR	TOTAL TARGETS (MAY 2014 – NOV 2019)	CUMULATIVE ACTUAL (MAY 2014 – NOV 2019)	% ACTUAL VS TARGET (MAY 2014 – NOV 2019)
Policy; Unit: # (Actions)	55	150	272%

POLICY IMPLEMENTATION

INDICATOR	TOTAL TARGETS (MAY 2014 – NOV 2019)	CUMULATIVE ACTUAL (MAY 2014 – NOV 2019)	% ACTUAL VS TARGET (MAY 2014 – NOV 2019)
Policy; Unit: # (Implemented)	25	59	236%

KILOMETERS OF POWER LINES REACHED FINANCIAL CLOSE[4]

INDICATOR	TOTAL TARGETS (MAY 2014 – NOV 2019)	CUMULATIVE ACTUAL (MAY 2014 – NOV 2019)	% ACTUAL VS TARGET (MAY 2014 – NOV 2019)
Kilometers of Power Lines Reached Financial Close; Unit: KM	606	2,152.90	355%

SUBSTATION CAPACITY ADDED

INDICATOR	TOTAL TARGETS (MAY 2014 – NOV 2019)	CUMULATIVE ACTUAL (MAY 2014 – NOV 2019)	% ACTUAL VS TARGET (MAY 2014 – NOV 2019)
Substation Capacity Added; Unit: MVA	450	327	73%

INCREASED GAS SUPPLY AND AVAILABILITY TO POWER PLANTS

INDICATOR	TOTAL TARGETS (MAY 2014 – NOV 2019)	CUMULATIVE ACTUAL (MAY 2014 – NOV 2019)	% ACTUAL VS TARGET (MAY 2014 – NOV 2019)
Increased gas supply and availability to power plants; Unit: MMscfd	990	90	9%

4 PATRP did not originally have targets for this indicator, which was added at the request of USAID Nigeria. This indicator focuses on evacuation of megawatts in the pipeline that will otherwise be stranded without this assistance. In addition, it assists in minimizing the number of scheduled and non-scheduled outages that lead to system failure.

EAST AFRICA RESULTS SUMMARY

INDICATOR	TOTAL TARGETS (MAY 2014 – NOV 2019)	CUMULATIVE ACTUAL (MAY 2014 – NOV 2019)
New grid and off-grid anticipated direct connections; Unit #	77,733	130,974
New grid and off-grid actual direct connections; Unit #	38,624	96,361
Generation Capacity Pending Financial Closure; Unit MW	280	175.4
Generation Capacity Reached Financial Closure; Unit MW	64.5	49.7
Generation Capacity Commissioned; Unit MW	No Target	42
Training and Capacity Building Activities; Unit Persons Trained	70	207
Policy; Unit # (Actions)	1	2
Policy; Unit # (Implemented)	No Target	1

DJIBOUTI RESULTS SUMMARY

INDICATOR	TOTAL TARGETS (MAY 2014 – NOV 2019)	CUMULATIVE ACTUAL (MAY 2014 – NOV 2019)
Generation Capacity Pending Financial Closure; Unit MW	467	295
Training and Capacity Building Activities; Unit Persons Trained	No Target	68
Policy; Unit # (Actions)	No Target	7
Policy; Unit # (Implemented)	No Target	0

ETHIOPIA RESULTS SUMMARY

INDICATOR	TOTAL TARGETS (MAY 2014 – NOV 2019)	CUMULATIVE ACTUAL (MAY 2014 – NOV 2019)
Generation Capacity Pending Financial Closure; Unit MW	5,436.0	4,771.73
Generation Capacity Reached Financial Closure; Unit MW	120	0
New grid and off-grid anticipated direct connections; Unit #	20,000	57,073
New grid and off-grid actual direct connections; Unit #	120,000	14,682
Training and Capacity Building Activities; Unit Persons Trained	125	402
Additional revenue generated at SAAR due to improved operations; Unit Birr	27,000,000	158,353,510
Policy; Unit # (Actions)	14	8
Policy; Unit # (Implemented)	5	2

KENYA RESULTS SUMMARY

INDICATOR	TOTAL TARGETS (MAY 2014 – NOV 2019)	CUMULATIVE ACTUAL (MAY 2014 – NOV 2019)
New grid and off-grid anticipated direct connections; Unit #	142,500	367,723
New grid and off-grid actual direct connections; Unit #	130,000	559,826
Generation Capacity Pending Financial Closure; Unit MW	1,505	3,126.27
Generation Capacity Reached Financial Closure; Unit MW	440	771.3
Generation Capacity Commissioned; Unit MW	310.0	310.225
Utilization of Risk Mitigation Measures; Unit #	4	4
Training and Capacity Building Activities; Unit Persons Trained	486	408
Policy; Unit # (Actions)	4	7
Policy; Unit # (implemented)	2	0
Kilometers of Power Lines that have reached Financial Close; Unit km	No Target	438

RWANDA RESULTS SUMMARY

INDICATOR	TOTAL TARGETS (MAY 2014 – NOV 2019)	CUMULATIVE ACTUAL (MAY 2014 – NOV 2019)
New grid and off-grid anticipated direct connections; Unit #	155,000	135,000
New grid and off-grid actual direct connections; Unit #	76,965	166,337
Generation Capacity Pending Financial Closure; Unit MW	305	219.836
Generation Capacity Reached Financial Closure; Unit MW	86.7	36.575
Generation Capacity Commissioned; Unit MW	No Target	33
Training and Capacity Building Activities; Unit Persons Trained	0	15
Policy; Unit # (Actions)	0	1
Policy; Unit # (implemented)	1	1

TANZANIA RESULTS SUMMARY

INDICATOR	TOTAL TARGETS (MAY 2014 – NOV 2019)	CUMULATIVE ACTUAL (MAY 2014 – NOV 2019)
New grid and off-grid anticipated direct connections; Unit #	18,300	184,615
New grid and off-grid actual direct connections; Unit #	14,829	55,451
Generation Capacity Pending Financial Closure; Unit MW	3,790	2,325.795
Generation Capacity Reached Financial Closure; Unit MW	354	374.874
Generation Capacity Commissioned; Unit MW	186	172.82
Utilization of Risk Mitigation Measures; Unit #	1	1
Training and Capacity Building Activities; Unit Persons Trained	No Target	313
Policy; Unit # (Actions)	No Target	1
Policy; Unit # (implemented)	No Target	1

WEST AFRICA RESULTS SUMMARY

INDICATOR	TOTAL TARGETS (MAY 2014 – NOV 2019)	CUMULATIVE ACTUAL (MAY 2014 – NOV 2019)
New grid and off-grid anticipated direct connections; Unit #	80,000	107,700
New grid and off-grid actual direct connections; Unit #	15,292	15,931
Generation Capacity Pending Financial Closure; Unit MW	5,467	8,198.145
Generation Capacity Reached Financial Closure; Unit MW	606	420
Utilization of Risk Mitigation Measures; Unit #	4	5
Training and Capacity Building Activities; Unit Persons Trained	20	19
Policy; Unit # (Actions)	No Target	6
Policy; Unit # (implemented)	No Target	0

GHANA RESULTS SUMMARY

INDICATOR	TOTAL TARGETS (MAY 2014 – NOV 2019)	CUMULATIVE ACTUAL (MAY 2014 – NOV 2019)
New grid and off-grid anticipated direct connections; Unit #	20,000	144,407
New grid and off-grid actual direct connections; Unit #	12,093	8,452
Generation Capacity Pending Financial Closure; Unit MW	400	2,475.99
Generation Capacity Reached Financial Closure; Unit MW	194.0	552.045
Generation Capacity Commissioned; Unit MW	494.0	356.852
Utilization of Risk Mitigation Measures; Unit #	0	3
Training and Capacity Building Activities; Unit Persons Trained	259	438
Policy; Unit # (Actions)	11	30
Policy; Unit # (implemented)	5	1
Increased gas supply and availability to power plants; Unit: MMscfd	390	90

LIBERIA RESULTS SUMMARY

INDICATOR	TOTAL TARGETS (MAY 2014 – NOV 2019)	CUMULATIVE ACTUAL (MAY 2014 – NOV 2019)
New grid and off-grid anticipated direct connections; Unit #	201,550	203,150
New grid and off-grid actual direct connections; Unit #	50,600	6,022
Generation Capacity Pending Financial Closure; Unit MW	131	121.5315
Policy; Unit # (Actions)	1	2
Policy; Unit # (Implemented)	1	0
Training and Capacity Building Activities; Unit Persons Trained	70	82

NIGERIA RESULTS SUMMARY

INDICATOR	TOTAL TARGETS (MAY 2014 – NOV 2019)	CUMULATIVE ACTUAL (MAY 2014 – NOV 2019)
New grid and off-grid anticipated direct connections; Unit #	723,628	419,778
New grid and off-grid actual direct connections; Unit #	359,070	694,596
Generation Capacity Pending Financial Closure; Unit MW	9,313	5,927.05
Generation Capacity Reached Financial Closure; Unit MW	3,200.0	459
Generation Capacity Commissioned; Unit MW		460.7
Training and Capacity Building Activities; Unit Persons Trained	668	4,195
Utilization of Risk Mitigation Measures; Unit #	No Target	3
Aggregate Losses-Abuja (average); Unit %	FY 2016: 43% FY 2017: 38% FY 2018: 34%	Baseline FY 2016: 41% FY 2017: 38.25% FY 2018: 30.3% FY 2019: 11.04% (1 Quarter)
Aggregate Losses-Eko Lagos (average); Unit %	FY 2016: 36% FY 2017: 33% FY 2018: 31%	Baseline FY 2016: 34% FY 2017: 34.25% FY 2018: 29.3% FY 2019: 18.00% (1 Quarter)
Aggregate Losses-Benin (average); Unit %	FY 2016: 56% FY 2017: 50% FY 2018: 44%	Benin Edo Baseline FY 2016: 55.7% FY 2017: 46.25% FY 2018: 44.3% Benin Delta Baseline 2017: 47.85% FY2018: 38.75%
Aggregate Losses-Ibadan (average); Unit %	No Target	Baseline FY 2017: 52.2% FY 2018: 41.07% FY 2019 29.7%
Policy; Unit # (Actions)	9	75
Policy; Unit # (Implemented)	9	53
Kilometers of Power Lines that have reached Financial Close; Unit km	15	0
Substation Capacity Added; Unit MVA	606	327
Additional revenue (collections) generated at DISCOs due to regularization of existing consumers; Unit Naira	8,237,000,000	58,428,967,876
Transactions that improve Gas availability; Unit MMscfd	450	0

SENEGAL RESULTS SUMMARY

INDICATOR	TOTAL TARGETS (MAY 2014 – NOV 2019)	CUMULATIVE ACTUAL (MAY 2014 – NOV 2019)
New grid and off-grid anticipated direct connections; Unit #	127,810	106,818
New grid and off-grid actual direct connections; Unit #	56,470	24,845
Generation Capacity Pending Financial Closure; Unit MW	400	965.241
Generation Capacity Reached Financial Closure; Unit MW	No Target	247.701
Generation Capacity Commissioned; Unit MW	No Target	29.001
Utilization of Risk Mitigation Measures; Unit #	No Target	4
Training and Capacity Building Activities; Unit Persons Trained	70	155
Kilometers of Power Lines that have reached Financial Close; Unit km	No Target	1,677
Policy; Unit # (Actions)	1	1

SOUTHERN AFRICA RESULTS SUMMARY

INDICATOR	TOTAL TARGETS (MAY 2014 – NOV 2019)	CUMULATIVE ACTUAL (MAY 2014 – NOV 2019)
New grid and off-grid projected direct connections, Unit #	No target	0
New grid and off-grid actual direct connections, Unit #	10,000	0
Generation Capacity Pending Financial Closure; Unit MW	1,100	2,637.41
Generation Capacity Reached Financial Closure; Unit MW	520	2,205.41
Utilization of Risk Mitigation Measures; Unit #	No Target	26
Training and Capacity Building Activities; Unit Persons Trained	No Target	62

ANGOLA RESULTS SUMMARY

INDICATOR	TOTAL TARGETS (MAY 2014 – NOV 2019)	CUMULATIVE ACTUAL (MAY 2014 – NOV 2019)
New grid and off-grid anticipated direct connections; Unit #	1,000	22,500
New grid and off-grid actual direct connections; Unit #	1,000	381
Generation Capacity Pending Financial Closure; Unit MW	800	857.4
Policy; Unit # (Actions)	3	1

MALAWI RESULTS SUMMARY

INDICATOR	TOTAL TARGETS (MAY 2014 – NOV 2019)	CUMULATIVE ACTUAL (MAY 2014 – NOV 2019)
Generation Capacity Pending Financial Closure; Unit MW	261	226
Generation Capacity Reached Financial Closure; Unit MW	40.0	60
Training and Capacity Building Activities; Unit Persons Trained	22	0
Policy; Unit # (Actions)	No Target	2

ZAMBIA RESULTS SUMMARY

INDICATOR	TOTAL TARGETS (MAY 2014 – NOV 2019)	CUMULATIVE ACTUAL (MAY 2014 – NOV 2019)
New grid and off-grid anticipated direct connections; Unit #	0	504,995
New grid and off-grid actual direct connections; Unit #	154,882	85,964
Generation Capacity Pending Financial Closure; Unit MW	365	539.077
Generation Capacity Reached Financial Closure; Unit MW	151	86.237
Generation Capacity Commissioned; Unit MW	No Target	82
Utilization of Risk Mitigation Measures; Unit #	No Target	2
Training and Capacity Building Activities; Unit Persons Trained	100	53
Policy; Unit # (Actions)	No Target	8

APPENDIX B: PATRP ACRONYMS

ACRONYM	MEANING
ADME	Djiboutian Energy Management Agency
AECF	Africa Enterprise Challenge Fund
AEDC	Abuja Electricity Distribution Company (Nigeria)
AFC	African Finance Corporation
AfDB	African Development Bank
AFD	French Development Agency
AG	Attorney General
AGSI	Association of Ghana Solar Industries
ALSF	African Legal Support Facility
ANARE	Autorité Nationale de Régulation de l'Electricité (Côte d'Ivoire)
ANER	National Agency for Renewable Energy (Senegal)
ANPER	Agency for the Promotion of Electrification in Rural Areas of Niger
APV	Africa Power Vision
ARE/RECP	Alliance for Rural Electrification (ARE) and the Africa-EU Renewable Energy Cooperation Programme (RECP)
AT&C	Accumulated Commercial and Technical (losses)
AUC	African Union Commission
B2B	Business-to-Business
BEDC	Benin Electricity Distribution Company (Nigeria)
BEE	Black Economic Empowerment Programme (South Africa)
BEO	USAID Bureau Environmental Office
BOAD	West African Development Bank
BOOT	Build-Own-Operate-Transfer
BOT	Build-Own-Transfer
BPC	Botswana Power Corporation
BTG	Beyond the Grid
C&I	Commercial and Industrial
CAPEX	Capital expenditure
CBN	Central Bank of Nigeria
CCGT	Combined Cycle Gas Turbines
CIE	La Compagnie Ivoirienne d'Electricité (Côte d'Ivoire)
CIO	Chief Information Officer

ACRONYM	MEANING
CLSG	Côte d'Ivoire-Liberia-Sierra Leone-Guinea (transmission line)
COMESA	Common Market for Eastern and Southern Africa
COP	Chief of Party
COPERES	Conseil Patronal des Energies Renouvelables du Sénégal
COR	Contracting Officer's Representative
CP	Conditions Precedent
CREE	Mali Commission de Régulation de l'Électricité et de l'Eau
CRM	Customer Relationship Management
CRSE	Commission de Régulation du Secteur de l'Électricité du Sénégal
CSP	Concentrated Solar Power
DCA	USAID's Development Credit Authority
DCOP	Deputy Chief of Party
DFI	Direct Foreign Investment/Investor
DFID	Department for International Development (UK)
DGE	Deemed Generated Energy
DISCO	Distribution Company
DIV	Development Innovation Ventures
DMD	Deputy Managing Director
DO	Development Objective
DOC	Director of Communications
DPFZA	Djibouti Ports & Free Zones Authority
DRC	Democratic Republic of Congo
E&S	Environmental and Social
EAC	East Africa Community
EAPP	Eastern Africa Power Pool
EAEP	East Africa Energy Program
EC	Energy Commission (Ghana)
ECG	Electricity Company of Ghana
ECOWAS	Economic Community of West African States
ECREEE	ECOWAS Centre for Renewable Energy and Energy Efficiency
EDCL	Energy Development Corporation Limited (Rwanda)
EDD	Electricité de Djibouti
EDG	Electricité de Guinée (Guinea)
EEP	Ethiopian Electric Power Corporation
EEU	Ethiopian Electric Utility
EIA	Environmental Impact Assessment
EIB	European Investment Bank

ACRONYM	MEANING
EKEDC	Eko Electricity Distribution Company (Nigeria)
EKT	Ethiopia-Kenya-Tanzania Transmission Interconnector
EKTZ	Ethiopia-Kenya-Tanzania-Zambia Transmission Interconnector
EKZ	Ethiopia-Kenya-Zambia Interconnector
ELPS	Escravos-Lagos Pipeline System (Nigeria)
EMMP	Environmental Monitoring and Mitigation Plan
EOI	Expression of Interest
EPC	Engineering, procurement and construction
EPL	Early Power Limited (Ghana)
EPSRA	Electricity Power Sector Reform Act (Nigeria)
ERA	Energie Rurale Africaine (Senegal)
ERB	Energy Regulation Board of Zambia
ERC	Energy Regulatory Commission (Kenya)
ERP	Enterprise Resource Planning
ESCOM	State power utility (Malawi)
ESIA	Environmental and Social Impact Assessment
EU	European Union
EUCL	Energy Utility Corporation Limited (Rwanda)
EWURA	Energy & Water Utilities Regulatory Authority (Tanzania)
EXIM	Export–Import Bank of the United States
FGN	Federal Government of Nigeria
FEI	Fund for Energy Inclusion
FiT	Feed-in Tariff
FSRU	Floating Storage Regasification Unit
FY	Fiscal Year
GCE	Generation Capacity Expansion
GCSA	Government Consent & Support Agreement
GDC	Geothermal Development Company (Kenya)
GDL	Global Development Lab
GENCO	Generation Company
GEDAP	Ghana Energy Development and Access Project
GETFiT	Global Energy Transfer Feed-in Tariffs Program
GHG	Greenhouse Gas
GIS	Geographic Information Systems
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GLOS	Government Letter of Support (Kenya)
GMP	Gas Master Plan (Ghana)

ACRONYM	MEANING
GMR	Gas Market Review (Ghana)
GMSP	Grid Management Support Program (Ethiopia & Kenya)
GoA	Government of Angola
GoB	Government of Belgium
GoCI	Government of Côte d'Ivoire
GoE	Government of Ethiopia
GoG	Government of Ghana
GOGLA	Global Off-Grid Lighting Association
GoK	Government of Kenya
GoL	Government of Liberia
GoN	Government of Nigeria
GoR	Government of Rwanda
GoRD	Government of the Republic of Djibouti
GoS	Government of Senegal
GoSL	Government of Sierra Leone
GoT	Government of Tanzania
GRMF	Geothermal Risk Mitigation Facility
GRZ	Government of the Republic of Zambia
GSA	Government Support Agreement
GTF	Global Tracking Framework
GTP	Growth and Transformation Plan (Ethiopia)
GUMP	Gas Utilisation Master Plan (South Africa)
GW	Gigawatt
HFO	Heavy Fuel Oil
HOMER	Hybrid Optimization of Multiple Energy Resources
HPP	Hydropower plant
IA	Implementation agreement
IDC	Industrial Development Corporation
IEA	International Energy Association
IEE	Initial Environmental Examination
IFC	International Finance Corporation
IFI	International financial institution
IMF	International Monetary Fund
IPP	Independent power producer
IRB	EAPP Independent Regulatory Board
IRENA	International Renewable Energy Agency
IRP	Integrated Resource Plan

ACRONYM	MEANING
IRRP	Integrated Resource and Resilience Planning
JDA	Joint Development Agreement
JICA	Japan International Cooperation Agency
JUFG	Joint Utilities Finance Group (Ghana)
KenGen	Kenya Electricity Generating Company
KEREA	Kenya Renewable Energy Association
KETRACO	Kenya Electricity Transmission Company Limited
KfW	German Development Bank
km	Kilometer
KNES	Kenya National Electrification Strategy
KOSAP	Kenya Off-grid Solar Access Project
KP (formerly KPLC)	Kenya Power
KTZ	Kenya-Tanzania-Zambia Transmission Interconnector
kV	Kilovolt
kWh	Kilowatt hour
kWp	Kilowatt-peak
LCO	Light Crude Oil
LCOE	Levelized costs of energy
LEC	Lesotho Electricity Company
LFO	Light Fuel Oil
LNG	Liquefied Natural Gas
LOP	Life of Program
LVN	Low-Voltage Network
M2C	Meter to Cash
M&E	Monitoring and Evaluation
MCA	Millennium Challenge Account
MCC	Millennium Challenge Corporation
MD	Managing Director
MD	Maximum Demand
MDB	Multilateral development bank
MEDER	Ministry of Energy and the Development of Renewable Energy Sources (Senegal) [name changed to MPE, see below]
MEM	Ministry of Energy and Minerals (Tanzania)
MEMD	Ministry of Energy and Mineral Development (Uganda)
MERN	Ministère de l'Energie Chargé des Ressources Naturelles (Djibouti)
MHPP	Micro-Hydro Power Project
MINEA	Ministry of Energy and Water (Angola)

ACRONYM	MEANING
MININFRA	Ministry of Infrastructure (Rwanda)
MLM&E	Ministry of Lands, Mines and Energy (Liberia)
MMEWR	Ministry of Minerals and Water Resources (South Africa)
MMO	Mobile Money Operator
MMscfd	Million standard cubic feet of gas per day
MNO	Mobile Network Operator
MNREM	Ministry of Natural Resources, Energy and Mining (Malawi)
MOE	Ministry of Energy (Zambia)
MOEn	Ministry of Energy (Ghana)
MOEP	Ministry of Energy and Petroleum (Kenya)
MOF	Ministry of Finance (Ghana)
MOFEC	Ministry of Finance and Economic Cooperation (Ethiopia)
MOFP	Ministry of Finance and Planning (Tanzania)
MOU	Memorandum of Understanding
MoWIE	Ministry of Water, Irrigation & Energy (Ethiopia)
MPE	Ministère du Pétrole et des Énergies (formerly MEDER)
MPN	Mobil Producing Nigeria
MSC	Management Services Contract
MVA	Megavolt Amperes
MW	Megawatt
MWp	Megawatt-peak
MYTF	Multi-Year Tariff Framework
MYTO	Multi-Year Tariff Order
NBET	Nigeria Bulk Electricity Trading, Plc.
NBI	Nile Basin Initiative
NDA	Non-disclosure Agreement
NDPHC	Niger Delta Power Holding Company Limited
NEDCO	Northern Electricity Distribution Company (Ghana)
NELSAP	Nile Equatorial Lakes Subsidiary Action Program
NEPAD	New Partnership for Africa's Development
NERC	Nigerian Electricity Regulatory Commission
NERSA	National Energy Regulator of South Africa
NES	National Electrification Strategy (Ethiopia)
NGFCP	Nigeria Gas Flares Commercialisation Programme
NIPP	National Integrated Power Project (Nigeria)
NLNG	Nigeria LNG Limited
NMD	Non-Maximum Demand

ACRONYM	MEANING
NNPC	Nigerian National Petroleum Corporation
Norfund	Norwegian Investment Fund for Developing Countries
NPSP	Nigeria Power Sector Program
NRECA	National Rural Electric Cooperative Association
NREL	National Renewable Energy Laboratory (USA)
O&M	Operations and Maintenance
ODDEG	Office Djiboutien de Développement de l'Energie Géothermique
ODPP	Office of the Director of Public Procurement
OFID	OPEC Fund for International Development
OMVG	Organisation pour la Mise en Valeur du fleuve Gambie
OMVS	Organisation pour la Mise en Valeur du fleuve Sénégal
OPEC	Organization of the Petroleum Exporting Countries
OPEX	Operating Expenses
OPIC	Overseas Private Investment Corporation
OPPPI	Office for Promoting Private Power Investment (Zambia)
PA	Power Africa
PAD	Project Appraisal Document
PAIS	Power Africa Information System
PAOP	Power Africa Off-grid Project
PASER	Plan d'Action Sénégalais d'Électrification Rurale
PATRP	Power Africa Transactions and Reforms Program
PATT	Power Africa Tracking Tool
PAUESA	Power Africa Uganda Electricity Supply Accelerator
PAYGO	Pay-as-you-go
PCOA	Put/Call Option Agreement
PEPT	Programme Electricité Pour Tous (Côte d'Ivoire)
PESRM	PATRP Environmental and Social Review Methodology
PIDG	Private Infrastructure Development Group
PIP	Performance Improvement Plan
PISSA	Project Implementation and Steam Supply Agreement (Kenya)
PIU	Project Implementation Unit
PMP	Performance Management Plan
PNER	Programme National d'Électrification Rurale (Sénégal)
POC	Point of Contact
PPA	Power purchase agreement
PPF	Project preparation facility
PPM	Pre-Paid Meter

ACRONYM	MEANING
PPP	Public-Private Partnership
PRG	Partial Risk Guarantee
PS	Principal Secretary
PSP	Private sector partner
PSS/E	Power System Simulator for Engineering
PURC	Public Utilities Regulatory Commission (Ghana)
PV	Photovoltaic
QAF	Quality Assurance Framework
QIPP	Qua Iboe Power Project
QTAT	Qualified Transactions Assistance Tool
RAED	Renewable and Alternative Energy Directorate (Ghana)
RBF	Results Based Financing
RE	Renewable Energy
REA	Rural Energy Agency (Tanzania)
REACT	Renewable Energy and Adaptation to Climate Change Technologies Window
REEEP	Renewable Energy and Energy Efficiency Partnership
REFiT	Renewable Energy Feed-in Tariff
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme (South Africa)
REPARLE	Renewable Energy to Power Agriculture and Rural Livelihood Advancement (Uganda)
RES	Rural Electrification Strategy (Rwanda)
RF	Results Framework
RFEOIWC	Request for Expression of Interest with Evaluation Criteria
RFP	Request for Proposal
RFQ	Request for Qualifications
RNT	Rede Nacional de Transporte de Electricidade (Angola)
RSD	Regulatory Services Department (Djibouti)
SAEP	Southern Africa Energy Program
SDFS	Suppressed Demand and Forecast Study
SE4All	Sustainable Energy for All (United Nations)
SEC	Swaziland Electricity Company
SENELEC	Société National d'Éléctricité du Sénégal
SEP	Strategic Equity Partner
SERA	Swaziland Electricity Regulatory Authority
SHS	Solar Home System
SIDA	Swedish International Development Cooperation Agency
SIS	System Integration Study
SOGA	System Operation Gap Analysis

ACRONYM	MEANING
SOW	Scope of Work
SNEL	Société Nationale d'Éléctricité (DRC)
SNP	Solar Nigeria Project
SPP	Small Power Producer
SPPA	Standardized Power Purchase Agreement
SPV	Special Purpose Vehicle
SREP	Scaling up Renewable Energy Program
SSA	Sub-Saharan Africa
SSRE	Small-scale renewable energy
STTA	Short-Term Technical Assistance
SUNREF	Sustainable Use of Natural Resources and Energy Finance (AfDB)
T&D	Transmission & distribution
TA	Transaction Advisor
TANESCO	Tanzania Electric Supply Company Limited
TBI	Tony Blair Institute (formerly AGI)
TCN	Transmission Company of Nigeria
TEDAP	Tanzania Energy Development and Access Project
ToP	Take-or-Pay
TOR	Terms of Reference
TPDC	Tanzania Petroleum Development Corporation
TREEP	Tanzania Rural Electrification Expansion Project
TRR	Transmission Revenue Requirements
TSA	Transmission Service Agreement
TSO	Transmission System Operator
TSP	Transmission Services Provider
TWG	Transmission Working Group
UN	United Nations
UNHCR	United Nations High Commissioner for Refugees
UNOPS	United Nations Office for Project Services
USADF	United States African Development Fund
USAID	United States Agency for International Development
USD	United States dollars
USEA	United States Energy Association
USG	United States Government
USTDA	United States Trade and Development Agency
VAT	Value Added Tax
VfM	Value for Money

ACRONYM	MEANING
VP	Vice President
VRA	Volta River Authority (Ghana)
WAEP	West Africa Energy Program
WAGP	West African Gas Pipeline
WAPCo	West African Gas Pipeline Company
WAPP	West African Power Pool
WB	World Bank
WENRECo	West Nile Rural Electrification Company
WIAP	Women in African Power
WO	Work Order
Wp	Watt-peak
WTE	Waste to Energy
YALI	Young African Leadership Initiative (USA)
ZESCO	Zambia Electricity Supply Corporation