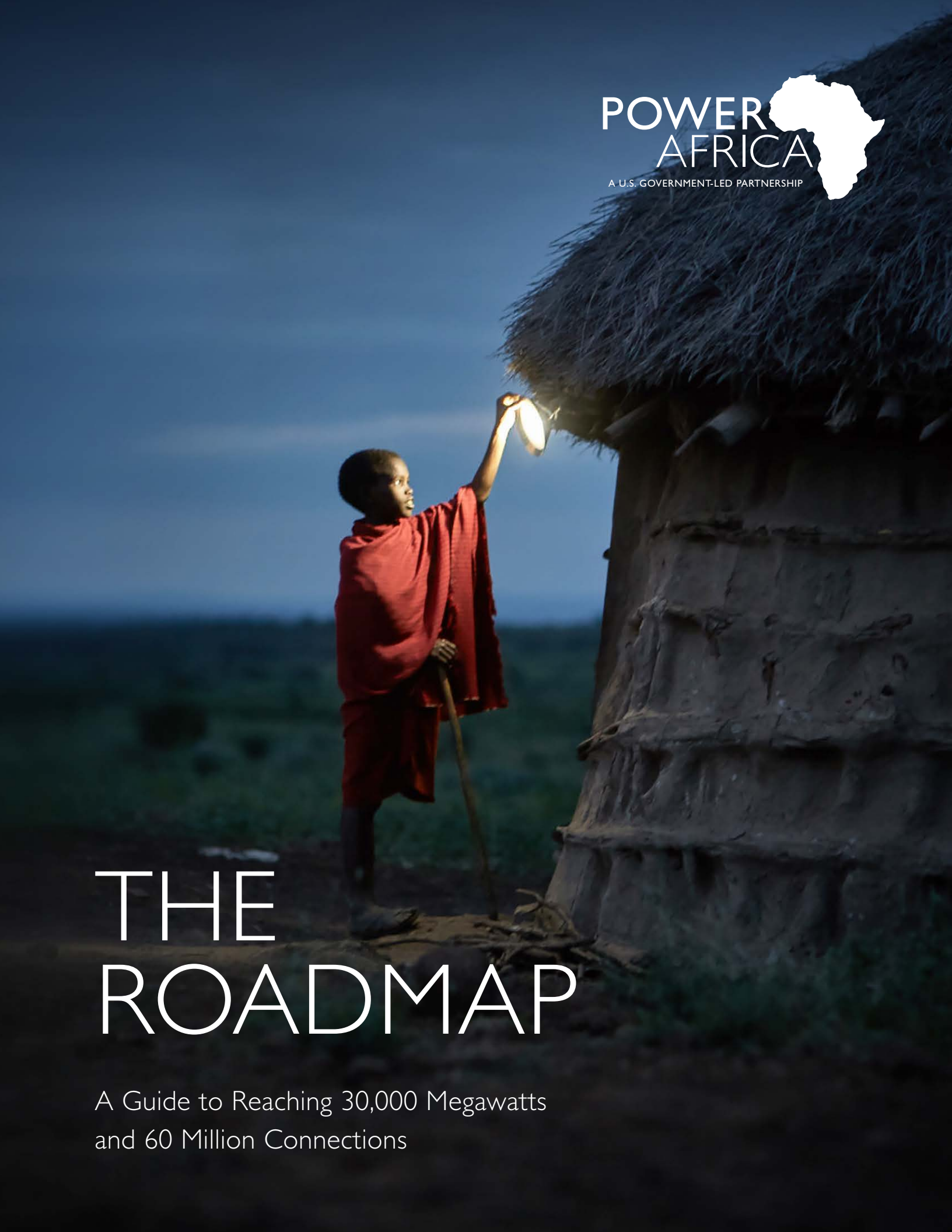

THE ROADMAP

A Guide to Reaching 30,000 Megawatts and 60 Million Connections

ACKNOWLEDGMENT

Many individuals and organizations contributed to the development of this Roadmap. This strategy brought together the ideas, input, and vision from a wide range of *Power Africa*'s many partners, including those serving at U.S. Government agencies and posts across sub-Saharan Africa, civil society, academia, think tanks, the private sector, multilateral development banks, and like-minded governments.

In particular, we would like to extend a special thanks to the following people outside of the U.S. Government, who provided detailed input for the Roadmap as part of a peer review process: ***Tony Blair*** and ***Pierrick Judeaux***, Africa Governance Initiative; ***Solomon Asamoah***, ***Sheila Khama***, ***Monojeet Pal***, and ***Alex Rugamba***, African Development Bank; ***Philippe Niyongabo***, African Union Commission; ***Moe Shaik***, Development Bank of South Africa, ***Aubrey Hruby***; Atlantic Council; ***Ben Leo*** and ***Todd Moss***, Center for Global Development; ***Georgios Pantoulis***, ***Roberto Ridolfi***, and ***Felice Zaccheo***, European Commission; ***Koen Peters***, Global Off-Grid Lighting Association; ***Dan Haglund***, International Centre for Trade and Sustainable Development; ***Fatih Birol***, International Energy Agency; ***Femi Akinrebiyo***, ***Eva Bakonyi***, ***Jacqueline Strasser Higgins***, and ***Gregor Pfeifer***, International Finance Corporation; ***Jan Martin Witte***, KfW Development Bank; ***Robert Stoner***, Massachusetts Institute of Technology Energy Initiative; ***Hans Olav Ibrekk***, Ministry of Foreign Affairs, Norway; ***Mosad Elmissiry***, The New Partnership for African Development; ***Tutu Agyare***, Nubuke Investments; ***Bengt Johansson*** and ***Anders Arvidson***, Swedish International Development Cooperation Agency; ***Daniel Schroth,*** Sustainable Development for All Initiative; ***Anita Marangoly George***, ***Rahul Kitchlu***, ***Lucio Monari***, ***Jamal Saghir***, and ***Meike van Ginneken***, World Bank Group; ***Steven Hunt*** and ***Sally Gear***, the United Kingdom's Department for International Development.

Finally, a special acknowledgement to the staff in *Power Africa*'s Coordinator's Office at USAID and all of the staff across U.S. government agencies and departments involved in developing this Roadmap.

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A LETTER FROM THE PRESIDENT OF THE UNITED STATES **BARACK OBAMA**, AFRICAN DEVELOPMENT BANK GROUP PRESIDENT **AKINWUMI ADESINA**, AND WORLD BANK GROUP PRESIDENT **JIM KIM**

In 2013, the United States laid out an ambitious goal for *Power Africa*: to double access to electricity in sub-Saharan Africa. To meet this goal, the United States and its partners recognized the public and private sectors would need to work together to rethink and rewrite the rules for moving energy deals forward in Africa. *Power Africa* is working in partnership with African governments to make this happen.

Thanks to *Power Africa*, new power projects have already brought thousands of additional megawatts of cleaner electricity to sub-Saharan Africa. Our public and private sector partners are harnessing the continent's abundant energy resources — including solar, wind, hydropower, geothermal, and natural gas. In conjunction with *Power Africa*, African governments and their partners are connecting homes and businesses, farms and schools, clinics, and communities to electricity grids or providing off-grid electricity and modern cooking solutions.

But our success is measured in more than just megawatts and connections. Today, *Power Africa* comprises a diverse coalition of public and private sector partners who are committed to investing in Africa's future and working tirelessly to deliver on their commitments and ensure their efforts have an impact on millions of lives. The U.S. Government, the African Development Bank, the World Bank Group and the Governments of Sweden, the European Union, Norway, and the United Kingdom have committed to leverage substantial financial resources and technical expertise to expand *Power Africa*'s work across the continent.

Building on *Power Africa*'s vision and leadership, a number of new initiatives have emerged that seek to address Africa's energy challenges and further accelerate progress towards our shared goal of expanding energy access. We know that there is no silver bullet or quick fix to solving Africa's energy challenges, but we are committed to working together with African leaders to unlock Africa's vast energy potential – proving that our partnership-driven model is working.

The partnerships we have developed are fundamentally changing the way energy deals are done in Africa. By strengthening the investment climate across sub-Saharan Africa and increasing the capacity of African governments and utilities to develop and manage their domestic energy sectors, we are helping catalyze the investments of private companies across the continent. Our approach builds on the priorities laid out in the *Africa Power Vision*, developed by the African Union's New Partnership for Africa's Development and endorsed by African governments in 2014.

In 2015, the world adopted the new Sustainable Development Goals (SDGs), which include a commitment to ensure access to affordable, reliable, sustainable, and modern energy for all. *Power Africa*'s partnership with the joint World Bank and United Nations *Sustainable Energy for All* (SE4All) initiative supports this goal. The African Development Bank recently developed a *New Deal* on *Energy for Africa* and a Transformative Partnership on Energy for Africa, to accelerate universal access to energy in Africa, complementing our joint efforts to meet the energy needs of millions of people. Our combined efforts to scale up access to cleaner electricity will also help mitigate climate change and enhance resilience to climate shocks, both of which are important for the implementation of the historic Agreement to Combat Climate Change, reached in Paris at COP-21 in December 2015.

Power Africa lays out a clear path for African governments to create the kind of legal, policy, and regulatory environment that will encourage accelerated and sustainable investment and growth in Africa's energy sector for generations to come. With new and increasing commitments to finance electricity in Africa and stronger political will to drive universal access to energy, our collective efforts will help power the continent.

This Roadmap illustrates how the *Power Africa* model is working and can be expanded so our aspirational goals can ultimately be achieved, ensuring that no one is left behind. It reaffirms our shared commitment to double access to electricity across sub-Saharan Africa, with renewed confidence in our ability to deliver on our promise. As we move forward, we will continue to work hand-in-hand with our partners in Africa, to bring affordable, reliable, and sustainable power to the millions of people who currently lack access to electricity.

BARACK OBAMA
President of the United States

AKINWUMI ADESINA
African Development Bank Group

JIM KIM
World Bank Group

ABOUT THE ROADMAP

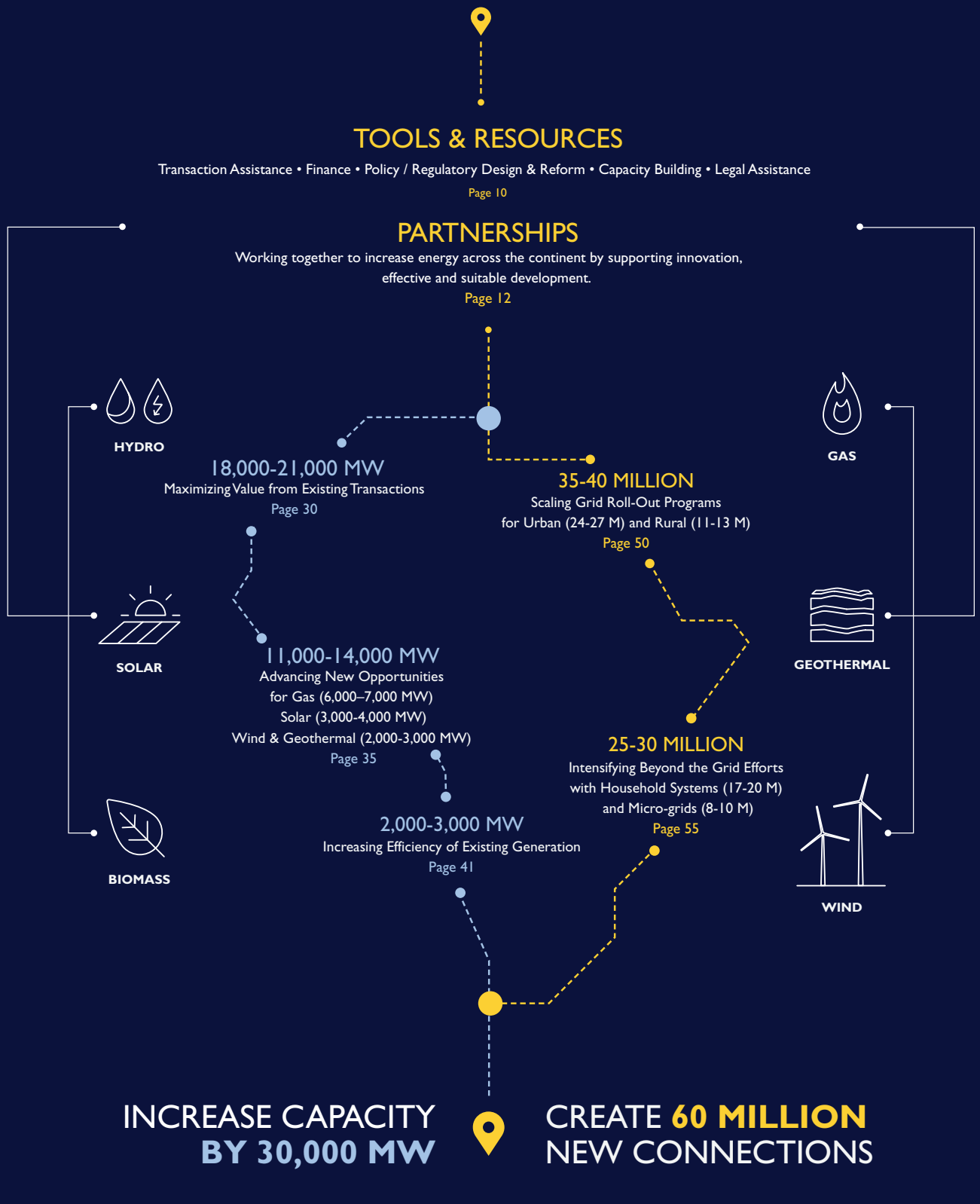
This Roadmap shows how the collective efforts of *Power Africa*'s more than 120 public and private sector partners fit together to achieve our ambitious goal of adding 30,000 megawatts (MW) and 60 million connections in sub-Saharan Africa by 2030. The Roadmap outlines *Power Africa*'s three strategic pillars: Generation, Connections, and 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.

This Roadmap does not provide a comprehensive breakdown of all *Power Africa* activities in every country, of every potential transaction, or of every partners' activities. Rather, it highlights work that *Power Africa*'s partners are engaged in all over sub-Saharan Africa to illustrate the broader, strategic, and collective effort that is required to implement and sustain our stated goals and objectives.

It provides energy practitioners, academics, politicians, development partners, and other interested parties with insight on how electricity access in sub-Saharan Africa can be doubled if all stakeholders work together to advance that common goal. 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.

John Njoroge has been selling d.lights since September 2014 at his small hardware shop at the market. He sells approx. 20 per month — mostly to women. He has a payment plan available so customers can make deposits until they've saved enough to purchase their d.light. At home he uses his S20 Family Lantern d.light to feed his chickens and goats in the morning. He also makes tea for his wife and himself. Though their house is connected to the grid, it is unreliable. They are able to use the d.light at night when the main power is out. Some of his clients have used the lights to sell vegetables in the market at night which has significantly increased their savings and income because they don't have to buy batteries anymore and they can sell later at night. Photo: Morgana Wingard

THE ROAD AHEAD



Catherine Wambu uses her M-KOPA solar powered light to cook at night. Photo: Morgana Wingard

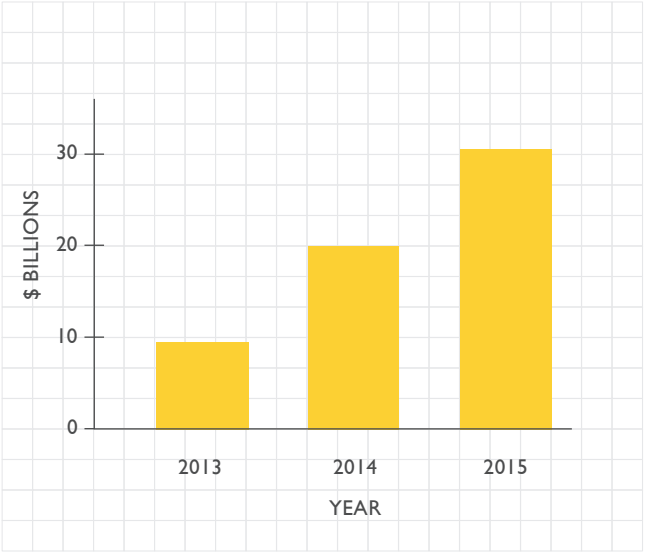
INTRODUCTION

In June 2013, President Barack Obama launched *Power Africa*, a partnership among the U.S. Government, African governments, bilateral and multilateral development partners, and the private sector to double access to electricity in sub-Saharan Africa.

Now in its third year, *Power Africa* has built the financial and human resource foundation, recruited the partners, and identified specific deal flow to facilitate a clear path to success. We are now partnering with more than 120 public and private sector entities to accelerate power transactions in sub-Saharan Africa.

The United States' initial $7 billion dollar commitment has leveraged nearly $43 billion in commitments from the public and private sectors, including more than $31 billion in commitments from our private sector partners. Our public sector partners, including the African Development Bank (AfDB), the World Bank Group (WBG), the Government of Sweden, and the European Union (EU) have collectively committed nearly $12 billion in support of sustainable energy activities across the region.

EXHIBIT 1
PRIVATE SECTOR PARTNER COMMITMENTS HAVE TRIPLED SINCE 2013
Total commitments, $ billion, as of Q4 2015



Most recently, *Power Africa* signed new partnerships with the Governments of Norway and the United Kingdom (UK). We have also forged strategic partnerships with the African Union's New Partnership for Africa's Development (NEPAD), the United Nations' Sustainable Energy for All initiative (SE4All), and the International Renewable Energy Agency (IRENA).

THE CHALLENGE: POWERING AFRICA

More than 600 million[1] people in sub-Saharan Africa live without access to electricity. Only approximately 32% of the population has access. Of sub-Saharan Africa's 49 countries, only eight (Botswana, Comoros, Equatorial Guinea, Gabon, Ghana, Mauritius, the Seychelles, and South Africa) have an access rate of over 60%. Millions of households rely on expensive, polluting, and often unsafe power sources (e.g., kerosene and diesel generation).

Today's low access rates hamper Africa's development. By increasing access, *Power Africa* will drive economic growth and reduce poverty across the continent, particularly in the lowest-income communities that are often located in rural areas that have a high population concentration of children, women, and the elderly.

Connecting households and communities to power enables individuals to push beyond basic living standards and allows businesses to employ vital technology. It gives clinics the ability to refrigerate life-saving medicine, and provides children with light to study after dark.

When *Power Africa* was launched, sub-Saharan Africa had approximately 90,000 MW[2] of installed capacity, around half of which is in South Africa alone. Our goal is to mobilize the required investment to grow this base by at least a third.

Power Africa has set two ambitious targets to expand access to power across sub-Saharan Africa by 2030:

- Increase installed power capacity by **30,000 MW;** and
- Create **60 million new connections** to double electricity access.

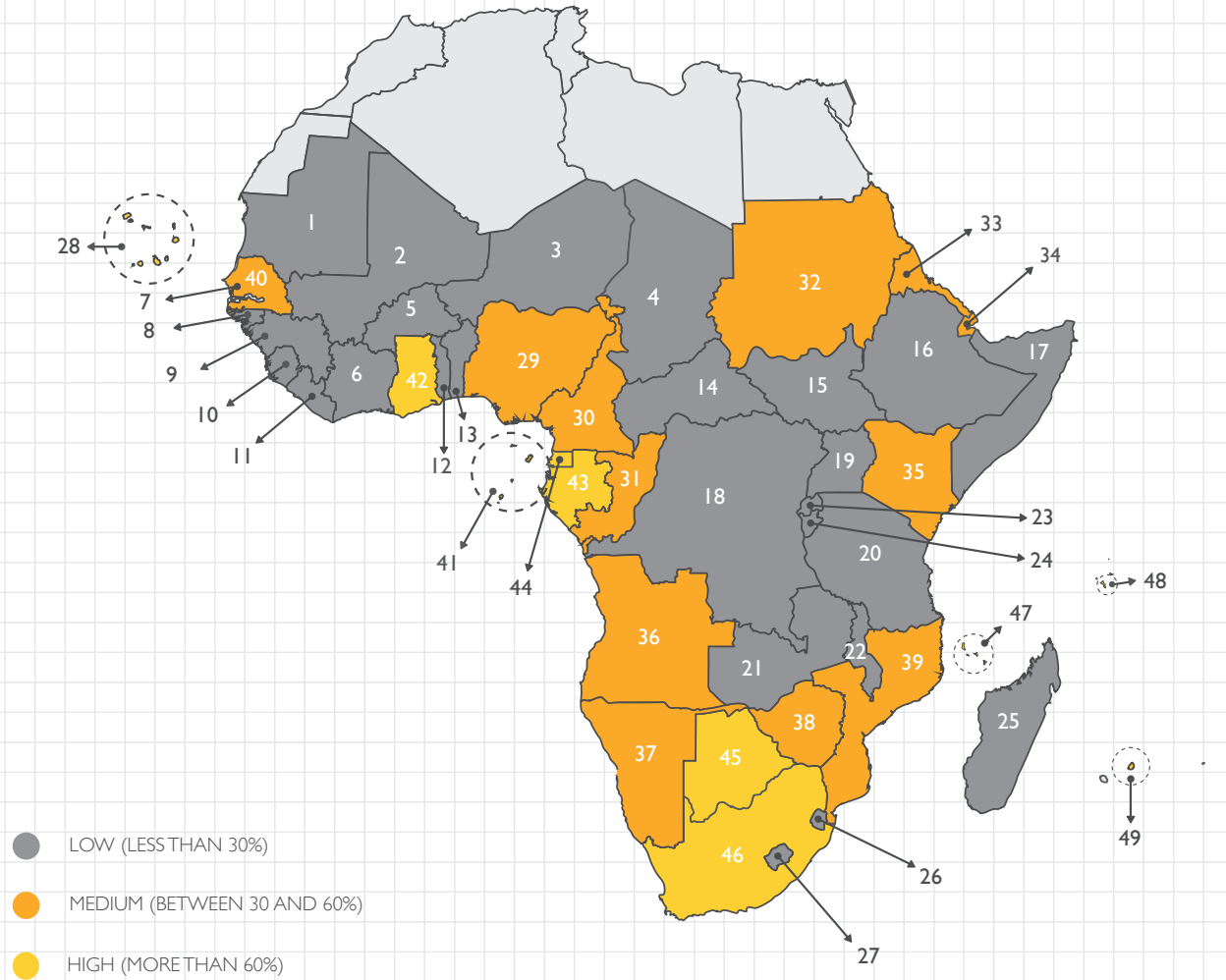
By achieving these targets, *Power Africa* will play a critical role in advancing the goal of ensuring universal access to affordable, reliable, and modern energy services and substantially increase the share of renewable energy by 2030, as articulated under Sustainable Development Goal 7 in the 2030 Agenda for Sustainable Development.

Many of the transactions that will make up these new 30,000 MW will utilize renewable technologies. In some countries, these transactions will be first-of-their-kind projects. By demonstrating that cleaner power transactions are financially viable, improving the performance of utilities, changing the regulatory mind-set on renewables, and harmonizing policies to drive investment and stability, we will help clear the path for many additional renewable generation deals that will not require our involvement.

Our support for cleaner generation projects, grid expansion efforts, and innovative off-grid power and lighting solutions will help bring electricity to hundreds of millions of Africans, thereby enabling households to invest more money in education, start or grow businesses, and save for the future.

[1] International Energy Agency (IEA), World Bank
[2] IEA (Africa Energy Outlook 2014)

EXHIBIT 2
ELECTRICITY ACCESS IN
SUB-SAHARAN AFRICA, 2013



1. Mauritania 21%
2. Mali 27 %
3. Niger 14 %
4. Chad 4%
5. Burkina 16%
6. Cote d'Ivoire 9%
7. Gambia 35%
8. Guinea Bissau 21%
9. Guinea 26%
10. Sierra Leone 5%
11. Liberia 2%
12. Togo 27%
13. Benin 28%
14. Central African Republic 3%
15. South Sudan 1%
16. Ethiopia 23%
17. Somalia 15%
18. Democratic Republic of Congo 9%
19. Uganda 15%
20. Tanzania 24%
21. Zambia 26%
22. Malawi 9%
23. Rwanda 17%
24. Burundi 10%
25. Madagascar 15%
26. Swaziland 27%
27. Lesotho 28%
28. Cabo Verde 97%
29. Nigeria 45%
30. Cameroon 54%
31. Republic of the Congo 42%
32. Sudan 35%
33. Eritrea 32%
34. Djibouti 50%
35. Kenya 40%
36. Angola 30%
37. Namibia 30%
38. Zimbabwe 40%
39. Mozambique 39%
40. Senegal 55%
41. Sao Tome and Principe 59%
42. Ghana 72%
43. Gabon 60%
44. Equitorial Guinea 66%
45. Botswana 66%
46. South Africa 85%
47. Comoros 69%
48. Seychelles 97%
49. Mauritius 100%

Source: International Energy Agency (IEA)

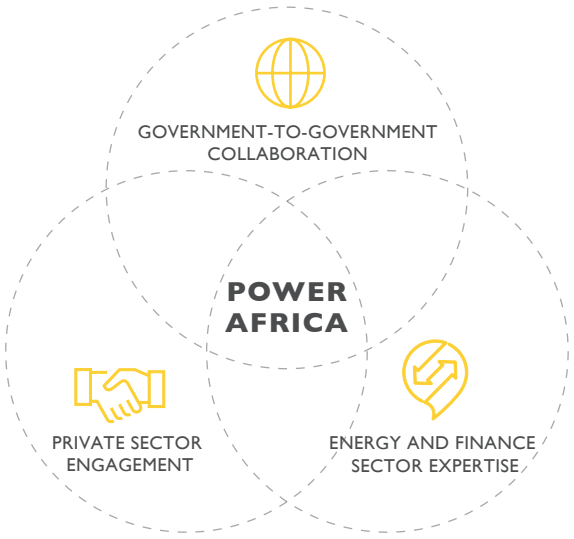
AN INNOVATIVE MODEL

Power Africa is grounded in an innovative model of development. We focus on supporting "first-of-their-kind" transactions (especially for renewable technologies) that create pathways for future transactions to move forward without our support. We also prioritize unlocking and accelerating transactions by removing barriers and building a more investment-friendly enabling environment.

Helping countries establish a track record of successfully developed projects is critical to attracting and sustaining future investment flows. Our model enables countries to create the hard infrastructure (power plants and grids) as well as the soft infrastructure (institutional capacity, policies, and regulatory frameworks) necessary for long-term, sustainable power sector growth.

Encouraging the private sector to play a leading role is among the most sustainable and practical ways to increase access. *Power Africa* does not seek to be involved in or fund every power transaction on the continent. McKinsey & Company estimates that it will cost $835 billion[3] to connect the entire continent's population to electricity by 2030 — far more than the public sector has available to spend. To meet this cost, it is essential that African governments attract private sector investment.

POWER AFRICA'S UNIQUE MODEL



Power Africa's model focuses on practical solutions. We are uniquely positioned to drive results, because our partnerships combine three important elements:

- **Deep knowledge** of the power sector;
- **A private sector-led engagement approach**; and
- **Experience working with governments and civil society** to improve policies and sector governance.

Power Africa's teams live and work in Africa, and regularly engage with public and private sector stakeholders to understand and alleviate the constraints holding back transactions. To help harmonize our field efforts, we established a Coordinator's Office, managed by the U.S. Agency for International Development (USAID), and located in Pretoria, South Africa and Washington, D.C. This team provides both administrative and technical assistance to our field organization and helps coordinate activities across our full roster of partners.

To help advance transactions across the continent, we have deployed more than 20 seasoned power sector experts to serve as Transaction Advisors for private sector partners and host governments, and the number of these advisors will continue to grow. These on-the-ground experts work to remove the barriers slowing down individual transactions, and help connect various stakeholders with the innovative solutions offered in our Toolbox.

[3] $490 billion of capital for new generation capacity and $345 billion for transmission and distribution; McKinsey & Company, Brighter Africa Report 2015

Similarly, *Power Africa*'s Regional and Country Teams in U.S. embassies and development partner missions in Africa work directly with local governments and institutions to share our partners' resources and help build local capacity. These teams help local governments implement the specific reforms necessary to advance transformative transactions. Further, our technical assistance and capacity building support ensures that governments will be able to oversee a sustainable power sector long after our teams are gone.

By eliminating the hurdles for one transaction, we create a pathway for future transactions, speeding up timelines and de-risking future power sector projects while upholding environmental and social standards throughout the due diligence process over the life-cycle of the project. We currently support transactions in over 20 sub-Saharan Africa countries through our Transaction Advisory network, and will expand our reach in the coming years.

> We value the support the United States has offered to us in terms of engaging the private sector, especially your initiative of the *Power Africa* program, which is taking shape. I think it's remarkable and a modern kind of approach. And in that sense, we are obliged to thank you very much for this program and to deepen this *Power Africa* initiative.
>
> Hailemariam Desalegn Boshe, Prime Minister of Ethiopia

POWER AFRICA'S VALUE PROPOSITION

On-the-ground support through Country Teams and Transaction Advisors

Transaction-focused with a database of projects that tracks progress and bottlenecks

Partnerships among a diverse network of public and private sector players

Toolbox from more than 120 partners to accelerate deal flow, leverage capital, and improve the enabling environment

POWER AFRICA PARTNERSHIPS

Partnership is at the heart of *Power Africa*'s strategy and our innovative development model. We have four types of partners:

- **African governments and institutions** that set national and regional power priorities and policies, provide power, finance projects, and create the enabling environment necessary for power sector transactions to move forward
- **The private sector,** which includes developers, project sponsors, financiers, equipment suppliers, and industry associations (see Appendix 2 for a list of our private sector partners)
- **Development partners,** including multilateral institutions and convening bodies, bilateral aid agencies, and government agencies that provide direct support for power sector transactions and assist our government partners to improve sector governance
- **Civil society organizations,** ranging from international non-governmental organizations to local African non-governmental organizations, and local community-based organizations

***Power Africa*'s Toolbox**[4] is at the center of our partnership model; it assembles the suite of catalytic support services offered by our development partners.

Our tools include transaction assistance, financing and risk mitigation, policy/regulatory design and reform, capacity building, legal assistance, and convening and coordination. We offer this support to our private sector and African government partners to help accelerate power sector transactions.

[4] For more information on the *Power Africa* Toolbox, visit: www.usaid.gov/powerafrica/toolbox

WORKING WITH AFRICAN GOVERNMENTS AND INSTITUTIONS

African governments and institutions work with *Power Africa*'s country-based teams to identify needs and access support from the *Power Africa* Toolbox. This support includes technical and legal assistance to help governments reform their regulatory frameworks, negotiate the terms of power agreements, and build local capacity. These interventions help advance critical power transactions and attract new investment in the sector.

For example, *Power Africa* provided assistance to help the Government of Ethiopia negotiate the country's first power purchasing agreement on the Corbetti project. We also provided Ethiopian Electric Power, the national power utility, with critical financial modeling and other technical assistance on geothermal development issues to support the project. We are now helping the government draft a new geothermal law to clarify its rules on resource exploration and development rights.

Such laws are a critical precondition to close power sector transactions, because they ensure adequate government oversight.

> *Power Africa* taps the strengths of America, bringing not just money but U.S. experience with the pricing and management reforms needed to crowd in private investment and innovation into the critical power sector. Across Africa, industry and household access to reliable power is absolutely fundamental to sustained growth and improved well-being. U.S. leadership on how to get it done can make a difference.
>
> Nancy Birdsall, President, Center for Global Development

WORKING WITH THE PRIVATE SECTOR

Our private sector partners range from project developers, to private equity and debt finance providers, to engineering, procurement, and construction firms, to associations. Each partner has undergone an extensive due diligence process to ensure that they will not only contribute to *Power Africa's* goals, but that they are also reputable and have policies and procedures that align with Power Africa's approach.

The *Power Africa* Coordinator's Office has a team of Relationship Managers that work with partners to advance deal flow, track progress against commitments, and connect partners with one another. Using the Toolbox, Relationship Managers also work with these partners to facilitate transactions and troubleshoot various issues as they arise.

WORKING WITH DEVELOPMENT PARTNERS

Our development partners all share a common goal of extending access to electricity to millions of people. Given the magnitude of the challenge, we pool our resources, leverage our shared expertise, and provide support to accelerate transactions that will increase the flow of electricity to households and businesses.

To maximize the value of our collective work, we coordinate our efforts through deep relationships and honest dialogue. Coordination does not mean simply splitting geographies and staying out of each other's way; it means collaborating on how and where we support private sector partners, governments, and utilities responsible for developing power projects.

> *Power Africa* has not only been transformational in specific individual cases, it is a new and better way of doing development. The most important innovation of *Power Africa* is that it is practical. It focuses on getting things done. It builds future capacity and infrastructure by helping specific deals and projects get over the line.
>
> Tony Blair, Africa Governance Initiative

The breadth of our development partners' support ranges across project sizes and types, technologies, regions, and sectors. For example, the World Bank Group and the AfDB often support large-scale, grid-level generation, transmission, and distribution projects. Others, like the Sustainable Energy Fund for Africa (SEFA), provide early-stage funding to small and medium-sized renewable projects. Some partners focus primarily on off-grid opportunities, such as the U.S. African Development Foundation (USADF) and its Off-Grid Energy Challenge. Other partners, such as the Government of Norway, focus their *Power Africa* efforts solely on renewable energy. The United Kingdom's Department for International Development (DFID) provides support across the full range of *Power Africa*'s work.

We also collaborate closely with large convening bodies such as SE4All and the African Union's NEPAD to coordinate development partner activities (e.g., through NEPAD's Africa Power Vision). The Africa Power Vision is a long-term plan for increasing access to reliable and affordable energy by driving critical energy projects under the Programme for Infrastructure Development in Africa.

Exhibit 3 on page 15 highlights how each of our development partners contributes to *Power Africa*.

OPIC President and CEO signs commitment to provide financing for a major wind power project in Kenya. Photo: Courtesy of OPIC

WORKING WITH CIVIL SOCIETY AND AFFECTED COMMUNITIES

Power Africa recognizes the valuable roles that civil society and affected communities play across the power sector value chain, ensuring that project developers consider the full spectrum of needs and concerns of those whose lives and communities will be most impacted. We strive to facilitate inclusive dialogue, and will continue to draw upon the expertise, capacities, and resources of our civil society partners to raise the bar for power and transmission projects. Furthermore, we understand the significant value that regular and open engagement with affected stakeholders adds to our collective efforts. These discussions help improve inclusiveness, information sharing, and transparency with governments, the private sector, and local communities. We have recently increased engagement with a range of NGOs, and welcome the opportunity to solidify and strengthen ongoing dialogue on a regional and country-specific basis.

OUR INNOVATIVE MODEL IN ACTION: LAKE TURKANA WIND POWER

Private sector partners utilize our transaction assistance and financial support to move power projects past roadblocks to financial close and beyond. In Kenya, the Lake Turkana Wind Power (LTWP) consortium utilized *Power Africa* technical assistance and financing instruments to reach financial close on a 310 MW wind farm transaction. *Power Africa* provided transaction advisory assistance to the Kenya Electricity Transmission Co. Ltd. in their negotiations with Kenya Power to finalize the wheeling agreement for a new transmission line that is being built to evacuate power from Lake Turkana. The pricing and risk allocation model used to establish this wheeling regime will also be helpful for future undertakings in Kenya.

In order for the new wind generation to be effectively integrated onto the grid, however, it was also critical that reforms be made to strengthen the grid operations and infrastructure of the national utility, Kenya Power. This was a condition precedent to financial close for one of the project's financiers. Through its Grid Management Support Program, *Power Africa* provided technical assistance to Kenya Power to help it address the challenges of integrating intermittent renewable energy into the national grid.

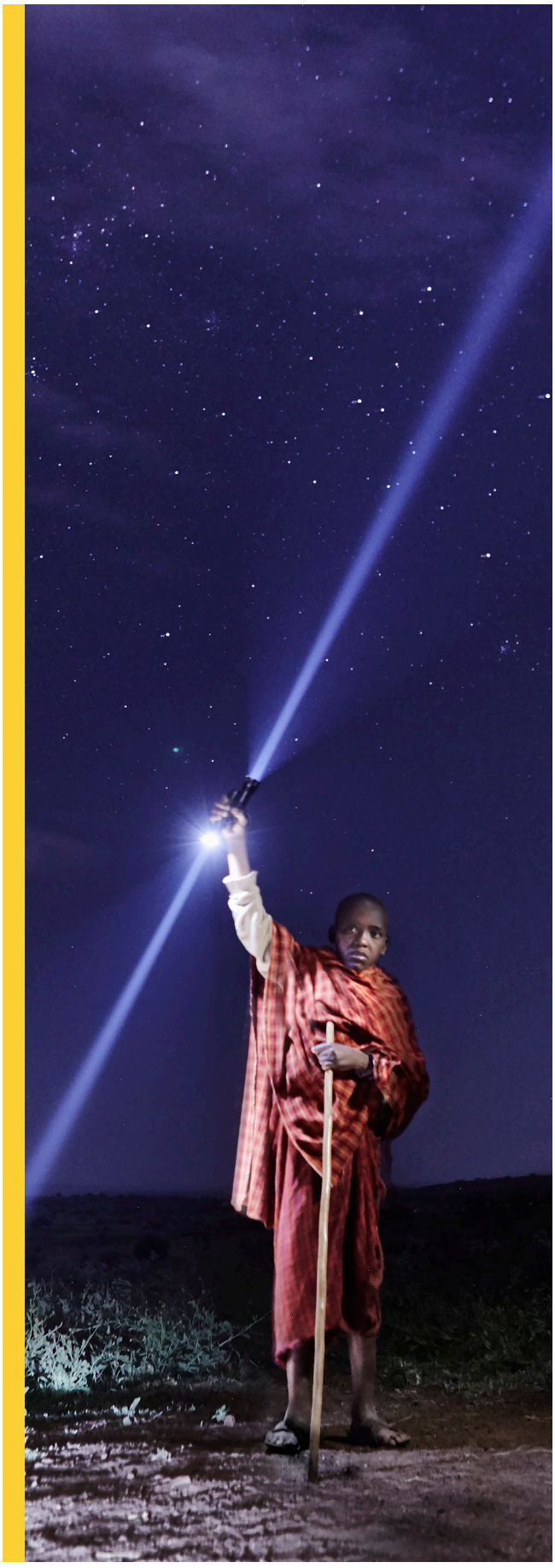
To ultimately reach financial close, the developers of LTWP utilized financing instruments from a number of *Power Africa* partners. The African Development Bank, the lead arranger for the project, provided a $115 million loan and $20 million partial risk guarantee. Norfund is invested indirectly through KLP Norfund Investments AS for a 12.5% stake in LTWP and furthermore has directly given a guarantee (of approximately $1.4 million). In addition, the Overseas Private Investment Corporation (OPIC) approved a $250 million investment guarantee ($128 million of which is already committed) and provided insurance for an additional $46 million.

EXHIBIT 3
PARTNER CONTRIBUTIONS
TO *POWER AFRICA*'S TOOLBOX

● AREA OF SUPPORT

TECHNICAL AND DEVELOPMENT PARTNERS	TRANSACTION SUPPORT	FINANCE	POLICY/ REGULATORY REFORM	CAPACITY BUILDING	LEGAL ASSISTANCE	CONVENING
African Development Bank/African Development Fund	●	●	●	●	●	●
World Bank Group	●	●	●	●	●	●
Swedish International Development Cooperation Agency	●	●	●	●		●
U.K. Department for International Development	●	●	●	●	●	●
European Union	●	●	●	●	●	●
Goverment of Norway	●	●	●	●		
Sustainable Energy for All			●	●		●
The New Partnership for Africa's Development			●	●		●
International Renewable Energy Agency	●	●	●	●		●

U.S. GOVERNMENT AGENCIES						
Overseas Private Investment Corporation	●	●	●		●	
United States Trade and Development Agency	●	●		●		●
Millennium Challenge Corporation	●	●	●	●		
United States Agency for International Development	●	●	●	●		●
U.S. Department of State			●	●		●
U.S. African Development Foundation	●	●		●		
U.S. Department of Commerce	●		●		●	●
U.S. Department of Energy			●	●		●
U.S. Department of the Treasury			●	●		
Export-Import Bank of the United States		●				



THE ROADMAP: THREE STRATEGIC PILLARS

Our Roadmap is built on three strategic pillars and is underpinned by our global partnership approach.

PILLAR 1: GETTING TO 30,000 MW

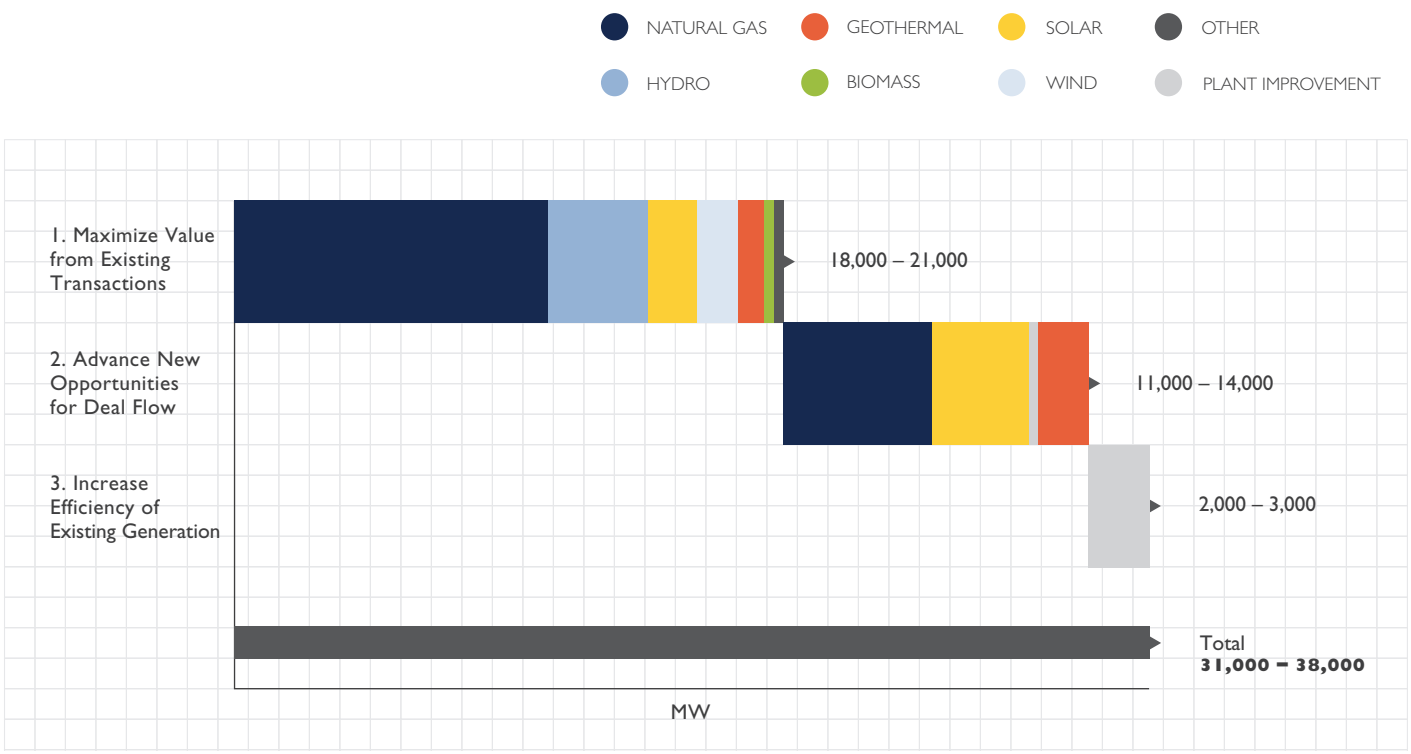
Power Africa's approach to increase generation starts and ends with energy deals. We prioritize support for transactions rooted in a country's national power strategy, particularly those using renewable technologies, such as solar, wind, biomass, and geothermal.

We also support economically feasible hydropower projects when they are developed in an environmentally and socially sustainable manner. Renewable energy opportunities are crucial for the diversification of African energy markets, increasing energy security, the expansion of off-grid access, and the mitigation of environmental damage.

In addition, we support non-renewable projects with lower carbon emissions, including natural gas. In limited circumstances, we support other non-renewables like fuel oil where there are no viable affordable alternatives and, whenever possible, help countries transition from fossil fuels to cleaner generation sources. We also support transmission projects that unlock generation capacity, as well as operational improvements that increase the available capacity at existing generation plants.

Photo: Mathieu Young/Off Grid Electric

EXHIBIT 4
ROADMAP TO 30,000 MW
MW
Power Africa aims to increase generation capacity by 30,000 MW across the continent.



Source: Team analysis based on data from IEA, World Bank, and *Power Africa* Tracking Tool

Not all proposed power generation deals are feasible and sustainable. Therefore, we focus our efforts on the most catalytic, bankable, and scalable transactions, as identified by our expert advisors and country teams across sub-Saharan Africa.

Currently, we are tracking approximately 45,000 MW of generation projects, which we recognize is a subset of all generation projects proposed or underway. Of the 45,000 MW we are tracking, we actively support approximately 29,000 MW — and are reviewing options to support the rest. Based on the realities of capital projects, our experience in sub-Saharan Africa, and the best available information we have today, we expect that between 18,000 – 21,000 MW of the 45,000 MW we are tracking will reach financial close and will likely be online by 2030.

Beyond these projects, we believe that an expansion of our toolbox will unlock opportunities for new transactions across the continent in line with each country's resource base. Additional opportunities will include identifying and accelerating deal flow for new natural gas projects, utility-scale solar projects, and geothermal and wind projects. In addition, we will improve the efficiency of existing generation plants and transmission and distribution systems. Combined with existing deal flow, these additional opportunities will ensure that we drive 31,000 – 38,000 MW to financial close and online by 2030 (see Exhibit 4 above).

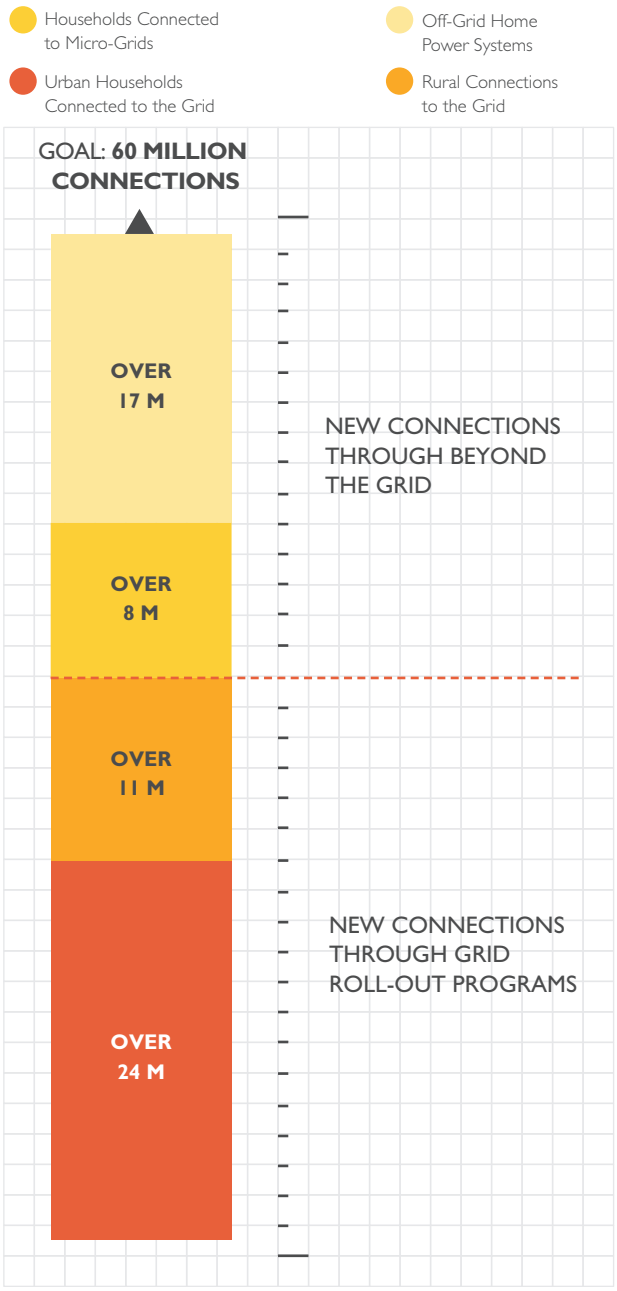
PILLAR 2: GETTING TO 60 MILLION CONNECTIONS

Creating new generation capacity is not an end unto itself. New MW are only important if they can be delivered to homes and businesses. We, therefore, will work through two main mechanisms to double the number of electricity connections in sub-Saharan Africa.

First, we plan to coordinate the expansion of electricity grids to connect to approximately 35 to 40 million homes and businesses by scaling up our support for large-scale urban and rural grid roll-out programs. African partner governments are responsible for managing and coordinating their grid development, while we work with our development partners to ensure that every step of the transmission and distribution value chain receives adequate technical and financial support. By taking a holistic approach, we can significantly increase a program's likelihood of success. We plan to refine this model in a few initial countries, and then apply our learning to additional countries.

Second, we realize that even by 2030, many households in sub-Saharan Africa will still be too far from urban areas and major transmission lines to connect directly into the grid. To reach these households, we launched *Beyond the Grid*, a *Power Africa* sub-initiative supporting off-grid and small-scale solutions, particularly rooftop solar and micro-grids. *Beyond the Grid* helps expand access to electricity to those who will not be grid-connected by 2030 for an additional 25 to 30 million connections.

EXHIBIT 5
ROADMAP TO 60 MILLION CONNECTIONS
Connections, million



Source: *Beyond the Grid* strategy and team analysis based on International Energy Agency, World Bank, and geospatial data

PILLAR 3: UNLOCKING ENERGY SECTOR POTENTIAL

Reaching 30,000 MW and 60 million connections requires the development of effective institutions within partner governments and regional organizations that can support and maintain sustainable power projects. Three critical enablers are necessary to ensure that transactions are effectively identified and completed.

First, governments need laws, regulations, and institutions in place that are capable of developing and managing the country's power sector. This includes developing appropriate legal and regulatory frameworks to attract sustainable investment, and ensure that regulators and oversight bodies have sufficient expertise, experience, and authority to manage the sector.

Power Africa is supporting governments with targeted policy interventions that move transactions forward (such as developing competitive procurements and frameworks for public-private partnerships). This also includes support to governments, regulators, and utilities to achieve cost-reflective tariffs and improve utility balance sheets in order to increase service reliability. These interventions will help attract responsible investors, facilitate effective government oversight, and ultimately enable governments to sustainably expand access.

Second, we will facilitate national and regional power sector integration through support of regional power pools and electricity trade. Regional efforts unlock new generation and connections opportunities, improve generation efficiencies, and help stabilize national grids.

A utility crew from Pike Electric, an American contractor, works to string power lines in rural Dodoma Region, Tanzania. The initiative is part of the Millennium Challenge Corporation's Energy Sector Project. Photo: Jake Lyell for the Millennium Challenge Corporation

We will ensure long-term sustainability of reforms and new power generation by investing in African institutions; supporting capability building in local governments and civil society organizations; promoting the establishment of private sector trade associations; and facilitating dialogue between the private sector, governments, civil society, and development partners.

MEASURING PROGRESS

Our monitoring and evaluation (M&E) framework measures progress and outcomes, identifies challenges, and shares lessons-learned to improve implementation. *Power Africa*'s full range of partners regularly contributes data and analysis. See Appendix 5 for a summary of *Power Africa*'s M&E indicators and our website for more details. In addition to projects supported directly by the U.S. Government, we also include most power sector projects that our development partners support, in consultation with these partners.

PROGRESS TOWARD GENERATION GOALS

To be considered a *Power Africa* project and to be counted toward our MW goal, a transaction must have substantive involvement from one of *Power Africa*'s U.S. Government agencies, development partners, or private sector partners. For partner transactions, the U.S. Government and the partner must agree to the transaction's classification as a *Power Africa* project. Transactions must meet a set of criteria related to improving the availability, access, or reliability of electric power; be technically and financially sound; align with local government priorities; and meet best practices for environmental and social safeguards, among others.

Many of the deals that we support have been in progress since before *Power Africa*'s launch, reflecting the reality of long project lead-times (see Exhibit 9). Typically, projects receive support from multiple public and private sector stakeholders at various points in their development, as well. As such, *Power Africa* is often not the lead developer or sponsor of these projects nor always engaged in every stage of the project; instead, we work with the various project stakeholders to identify and resolve barriers in order to accelerate progress.

We consider financial close to be the best milestone to measure progress towards our generation goals. Projects often face their greatest challenges before reaching financial close. To reach financial close, a project must finalize all agreements with host governments, secure finance from investors, and receive the first flow of money. We continue to monitor and support deals as they progress through construction and become operational with late-stage transaction assistance. Ultimately, our impact over time will be measured when projects come online.

Power Africa counts MW from new grid-connected and micro-grid generation projects, installed off-grid systems (including solar home systems) from companies, and additional MW generated above a historical baseline that result from power plant utilization improvements supported by *Power Africa*. This includes increased generation resulting from utility privatization transactions.

Transmission infrastructure is a critical enabler for new generation. Therefore, *Power Africa* also counts any additional generation capacity unlocked through the construction or improvement of transmission infrastructure. Several countries have stranded generation capacity — meaning their plants can generate power, but cannot transmit all of it as a result of challenges in transmission infrastructure. Consequently, these plants operate below capacity, despite sufficient end-user demand domestically or in neighboring countries. If *Power Africa* interventions can revive stranded or underutilized capacity, we count these MW toward our generation goal.

PROGRESS TOWARD CONNECTIONS GOALS

Power Africa tracks new connections in two ways: direct and inferred connections. Direct connections reflect the actual number of new households and

businesses that access electricity through on-grid connections, micro-grid connections, and off-grid solutions. Inferred access is calculated by estimating the average number of households that can be served by an additional MW of generation capacity.[5]

While *Power Africa* tracks inferred access to ensure that there is sufficient new generation capacity to support new direct connections, we only count direct connections from projects that we support to demonstrate progress toward our goal of doubling access.

SUPPORTING POLICY CHANGES & THE ENABLING ENVIRONMENT

Our impact goes beyond MW and connections. We also track the impact we have on improving the legal, policy, and regulatory environment to support cleaner, sustainable energy systems and private sector investment. Indicators correspond to our enabling environment principles; for example, we track improvements in a country's energy mix and utility losses. We also track electricity trade and transmission infrastructure expansion as key enablers for increasing generation and improving access. Our Country Teams and Transaction Advisors play an integral role in identifying critical issues, as well as progress toward specific enabling environment goals and objectives.

As part of our transaction approach, we ensure that best practices regarding environmental and social safeguards are being followed, and aim to incorporate measures that will reduce gender inequalities and promote female engagement across the entire power sector. In doing so, we ensure that policy change extends across a wide-range of dimensions — environmental, social, and power sector governance.

[5] The estimate is based on World Bank methodology and takes into account existing residential and per capita consumption, household size, capacity factors for various forms of generation, and other relevant metrics on a country-specific basis

POWER AFRICA INCORPORATES GENDER EQUITY INTO ALL ASPECTS OF THE POWER SECTOR

Power Africa aims to reduce gender inequalities and promote the effective engagement of both men and women in sub-Saharan Africa's power sector. To realize this vision, we support activities to advance the following goals:

- Increase women's participation in energy sector policy development and project planning processes
- Increase women's participation in the energy sector workforce
- Increase consideration of gender issues in the design of energy sector policies and projects
- Increase women's access to energy services

Power Africa will mobilize the collective expertise and resources of its public and private sector partners to increase women's participation in the power sector.

By creating opportunities for women's engagement and empowerment across all activities in the power sector value chain, *Power Africa* aims to create a more responsive and sustainable sector.

PILLAR 1: GETTING TO 30,000 MW

This section of the Roadmap lays out our plan to achieve over 30,000 MW of new generation capacity in sub-Saharan Africa.

Our approach focuses on transactions. We prioritize economically viable renewable energy transactions where possible, but also focus on non-renewable projects with lower carbon emissions, such as natural gas.

The 50 MW PV De Aar Solar Power facility in South Africa was commissioned in 2014 and is one of the first solar generating facilities in the country. Photo: De Aar Solar Power

PROGRESS TO DATE

Over the last three years, we have identified and are now tracking transactions with the potential to generate approximately 45,000 MW of new generation capacity in more than 20 sub-Saharan African countries (see Exhibits 6 and 7).

As part of our tracking process, we have developed a system called the *Power Africa* Tracking Tool (PATT). We use PATT to record project developments, to list specific *Power Africa* partner interventions, and to identify the roadblocks and specific hurdles that stand in the way of new projects coming online. We have released a public version of PATT, which can be viewed at www.usaid.gov/powerafrica, or on our mobile app *Power Africa* Tracking Tool.

We expect that this number will continue to rise as our presence in the field and our partnerships expand. We are actively providing or previously

provided support to approximately 29,000 MW of these transactions, including projects expected to generate more than 4,300 MW that have already reached financial close.

The remaining approximately 16,000 MW comprise transactions that *Power Africa* is evaluating for potential support in the near future.

Of the 45,000 MW of transactions that *Power Africa* is tracking, nearly 30,000 MW are in the conception, pre-feasibility, and feasibility stages, illustrating a steady flow of new projects (see Exhibit 6).

Given the heavy share of projects that are in early stages, we are investing substantial resources in early stage project development (e.g., through multiple project preparation facilities) to ensure that transactions reach financial close. As the bulk of our transactions progress to the later project stages over time, we will adjust our support model accordingly. The transactions we track focus almost exclusively on renewable energy sources and natural gas (see Exhibit 7). Over three-quarters of all projects we track (by number) involve renewable energy sources (see Appendix 3 for more detail on *Power Africa*'s tracked transactions). This is a significant departure from the coal- and fuel oil-dominated energy mix that currently powers much of sub-Saharan Africa. We aim to send a clear message that renewable energy projects are not just economically viable and sustainable, but can compete with traditional fuels in specific contexts.

EXHIBIT 6
TRACKED GENERATION PROJECTS BY STAGE
MW, Q4 2015 (estimates)

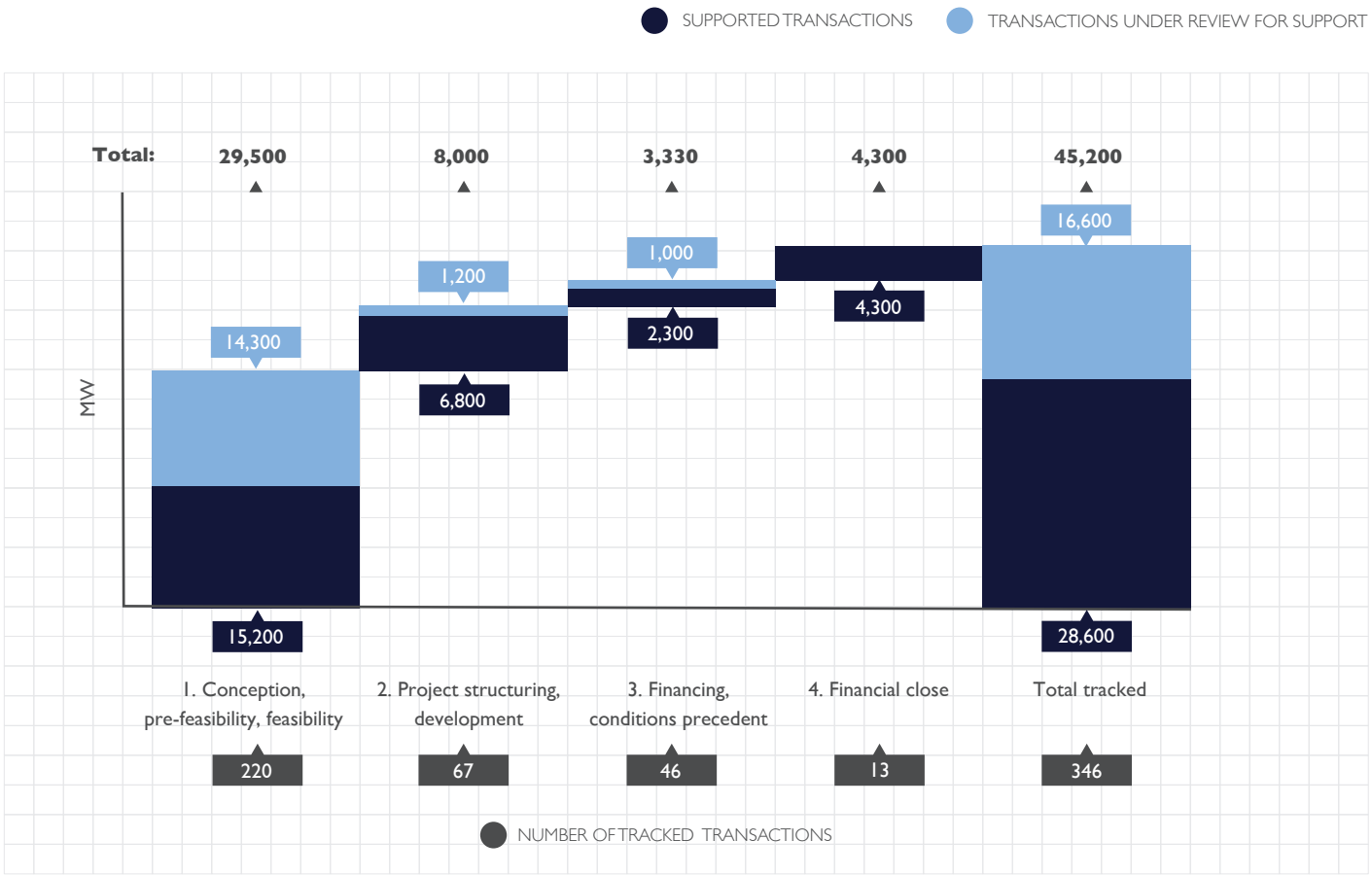
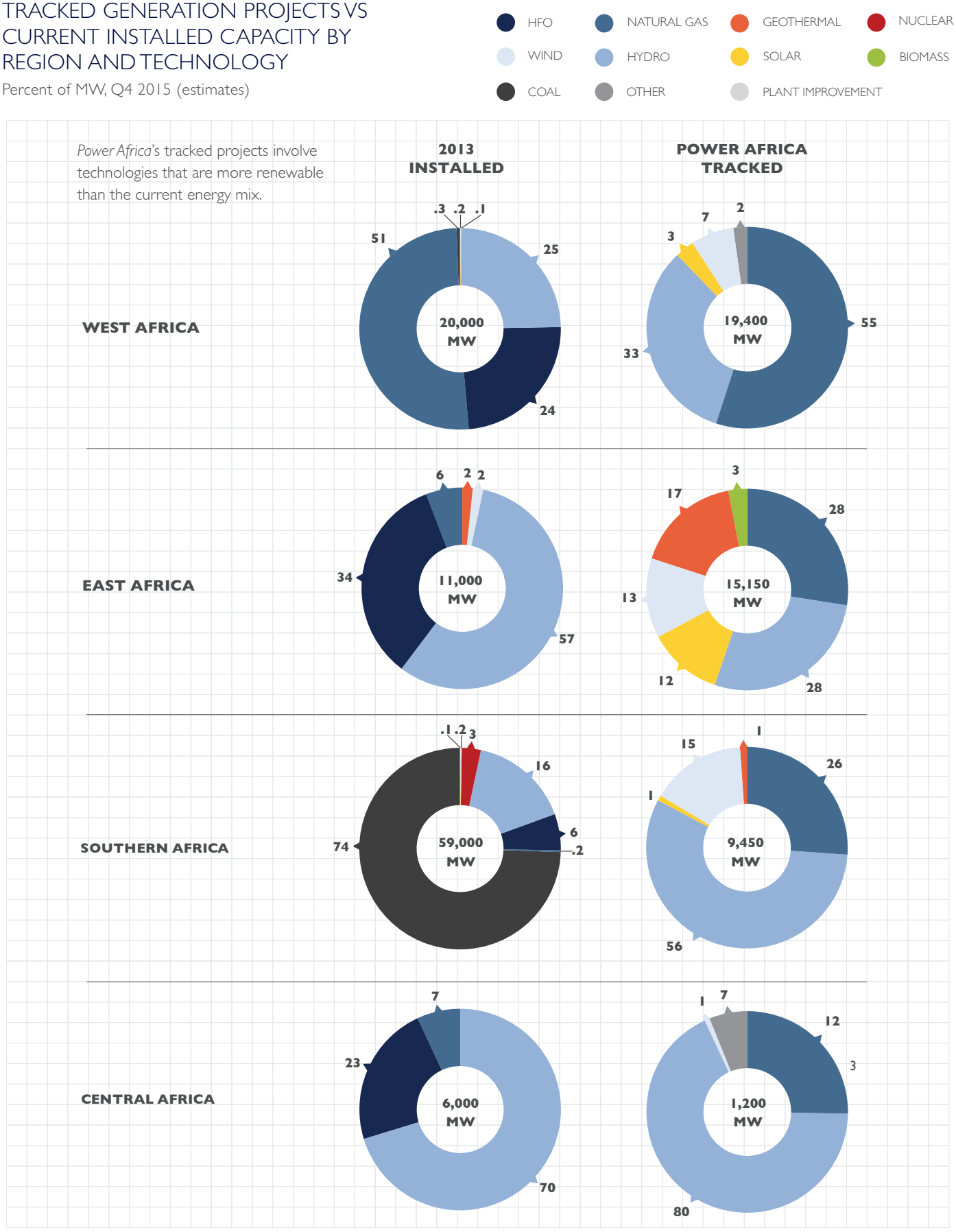


EXHIBIT 7

TRACKED GENERATION PROJECTS VS CURRENT INSTALLED CAPACITY BY REGION AND TECHNOLOGY

Percent of MW, Q4 2015 (estimates)



Source: 2013 installed capacity based on Enerdata 2013 database

MCC CEO Hyde and Ghana's Finance Minister Terkper Shake Hands After Signing the Ghana Compact. Photo: Courtesy of the U.S. Department of State

The renewable projects that we support are often the first-of-their-kind in a particular country, and help to pave the way for future transactions. Not only are we accelerating the transactions that we track; we are laying the groundwork for future transactions.

FINANCIALLY CLOSED PROJECTS

To date, 13 projects (expected to generate approximately 4,300 MW) have already reached financial close. These projects include solar, wind, hydro, biomass, natural gas, and dual-fire natural gas/liquid fuel projects. Nearly half of the projects involve renewable sources, although the majority of MW involve natural gas from privatized assets in Nigeria (see Exhibit 8).

Since our launch, *Power Africa* has contributed significant support to each of these projects to overcome hurdles in the development and/or financing stages. While many of these projects were in development before *Power Africa* launched, the relatively small proportion of total projects tracked that have reached financial close reflects the long lead times that projects experience across different stages of development. Lead times to financial close vary significantly across different countries, technologies, and project sizes. In most cases, the duration of a project can run well over five years.

Exhibit 9 outlines our base view of timeline ranges for the major technologies, with the low end of the range representing the global average and the high end of the range representing an indicative estimate for sub-Saharan Africa.

In practice, however, we assess lead times on a project-by-project basis. Given the length of these lead times to financial close and construction time, we expect that transactions that we support from conception or pre-feasibility will only reach financial close several years after our first engagement.

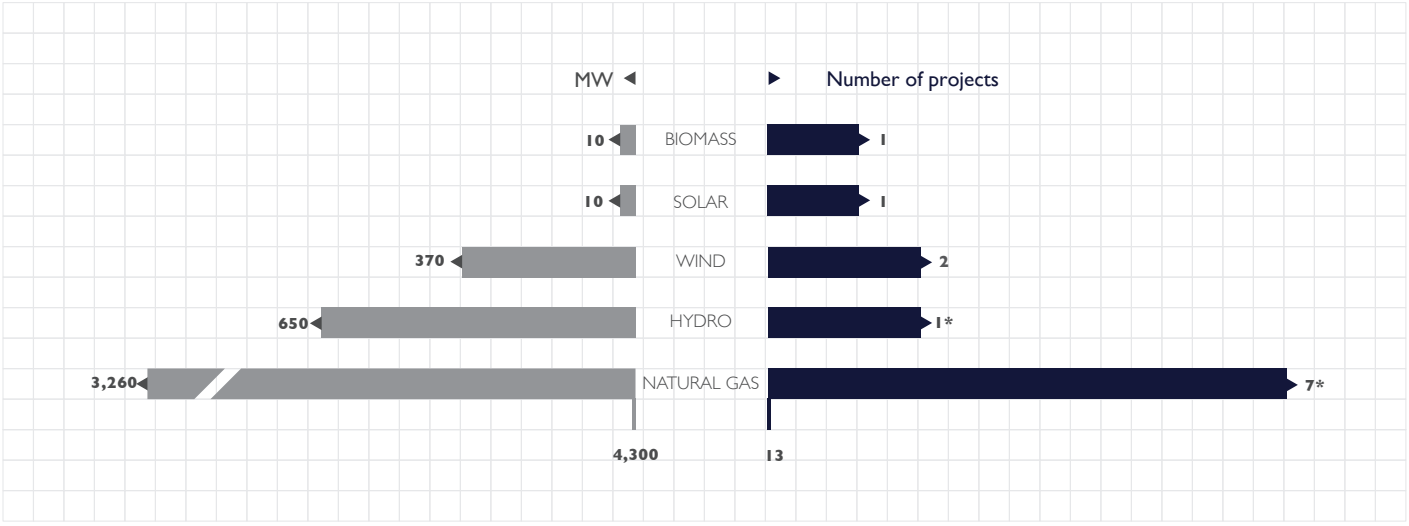
While certain elements of these lead times are difficult to influence, *Power Africa* is working to reduce lead times for transactions wherever possible.

Our Transaction Advisors and Relationship Managers actively seek out and eliminate the barriers holding transactions back. There are already examples of transactions in sub-Saharan Africa moving faster than the illustrative, estimated timelines in Exhibit 9, especially when stakeholders are aligned.

EXHIBIT 8

POWER AFRICA'S GENERATION PROJECTS AT FINANCIAL CLOSE BY TECHNOLOGY

MW (left), Number of projects (right), Q4 2015 (estimates)



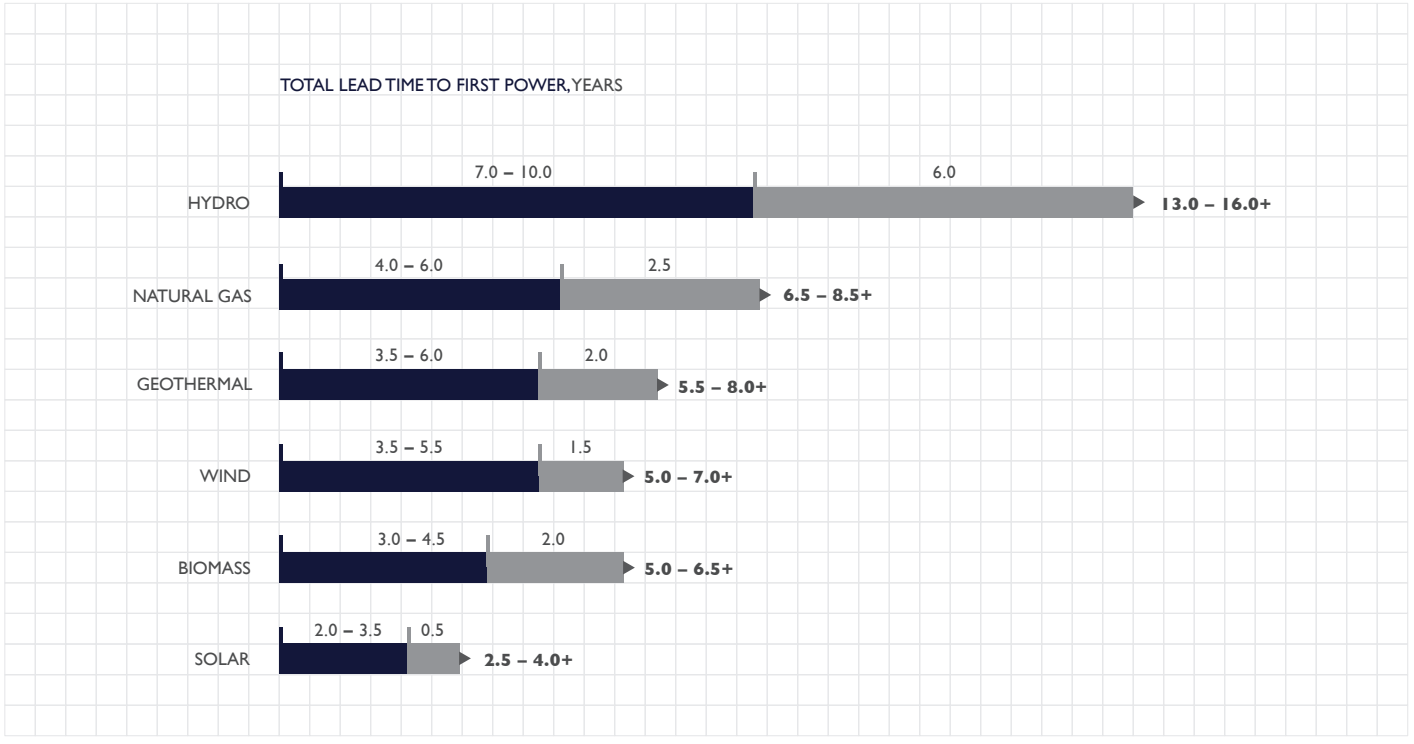
Source: *Power Africa* Tracking Tool

*In order to disaggregate by technology, *Power Africa* counts the added capacity resulting from the Nigerian privatizations as two transactions — one hydro and one natural gas.

EXHIBIT 9

ILLUSTRATIVE LEAD TIMES BY TECHNOLOGY

Years (estimates)



Source: Platts Utility Database Institute, U.S. Energy Information Administration, Comisión Nacional de Energía, European Union Commission, Renewable Energy Progress Report 2009

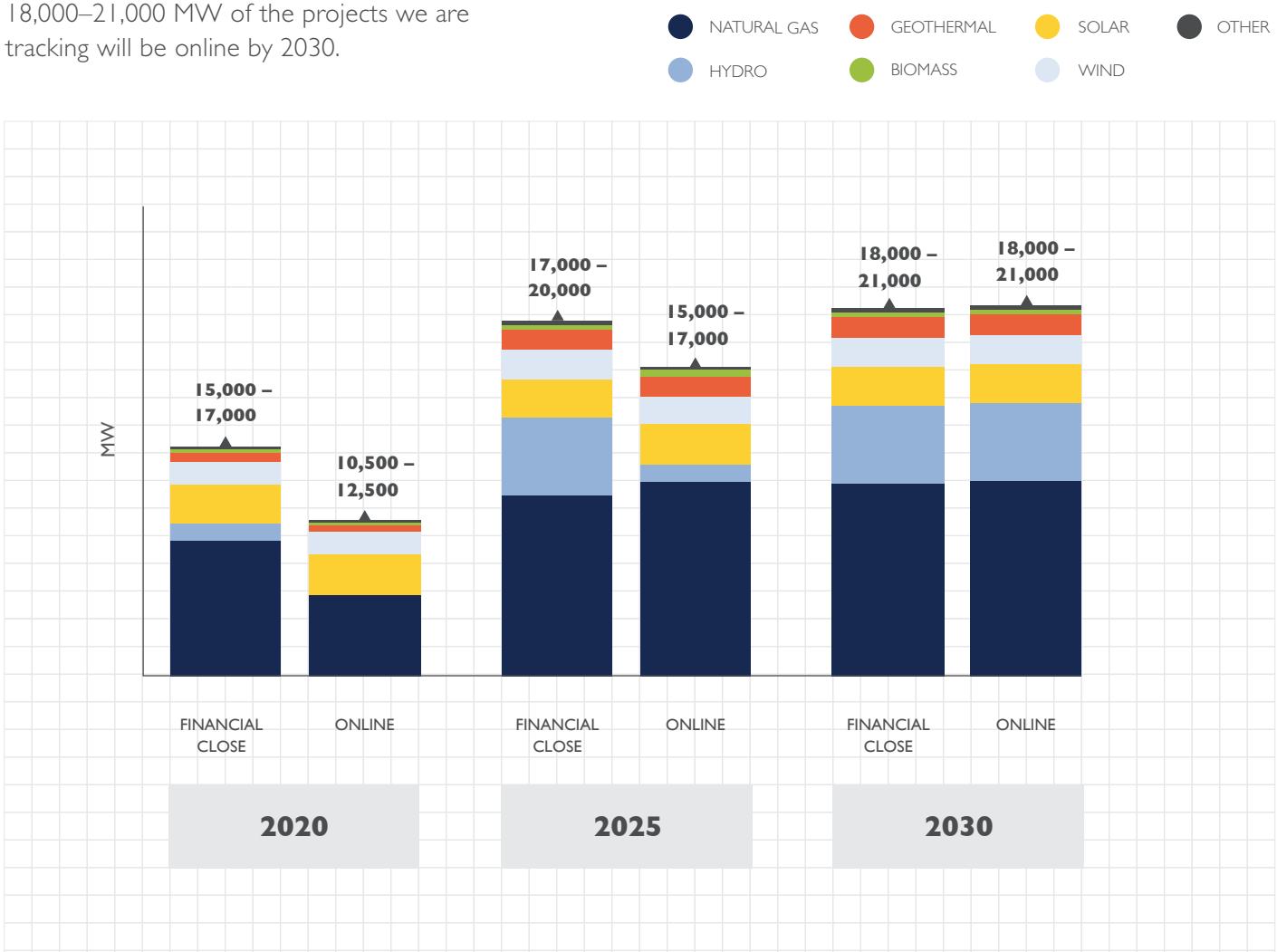
For example, project developer ContourGlobal worked closely with International Finance Corporation (IFC) and OPIC on an innovative financing model that addressed foreign currency challenges allowing the Government of Senegal and Senegal's national electricity utility to address the growing demand for electricity in Senegal. *Power Africa*'s support helped accelerate the signing and financing of the 53 MW Cap des Biches power purchase agreement in Senegal. While an agreement like this could typically take up to four years to sign, our network of partners helped us bring to the table the right players, reducing the timeline to one year. The U.S. Embassy in Dakar also assisted the lenders and ContourGlobal in working with the Government of Senegal to comply with legal, environmental, banking, and regulatory requirements, helping to smooth the way for the transaction. This support was critical to keeping all parties at the table, and to reassure the Government of Senegal when there were concerns or issues to clarify. Construction has already started and will be complete by the end of 2016.

EXHIBIT 10

MW PROJECTIONS FROM *POWER AFRICA* TRACKED PROJECTS

MW, Q4 2015 (estimates)

Power Africa estimates that approximately 18,000–21,000 MW of the projects we are tracking will be online by 2030.



Source: Success factors based on McKinsey Energy Insights, Platts Utility Database Institute, U.S. Energy Information Administration, Comisión Nacional de Energía, European Union Commission, Renewable Energy Progress Report 2009, McKinsey Europe, Middle East and Africa Electric Power and Natural Gas Practice

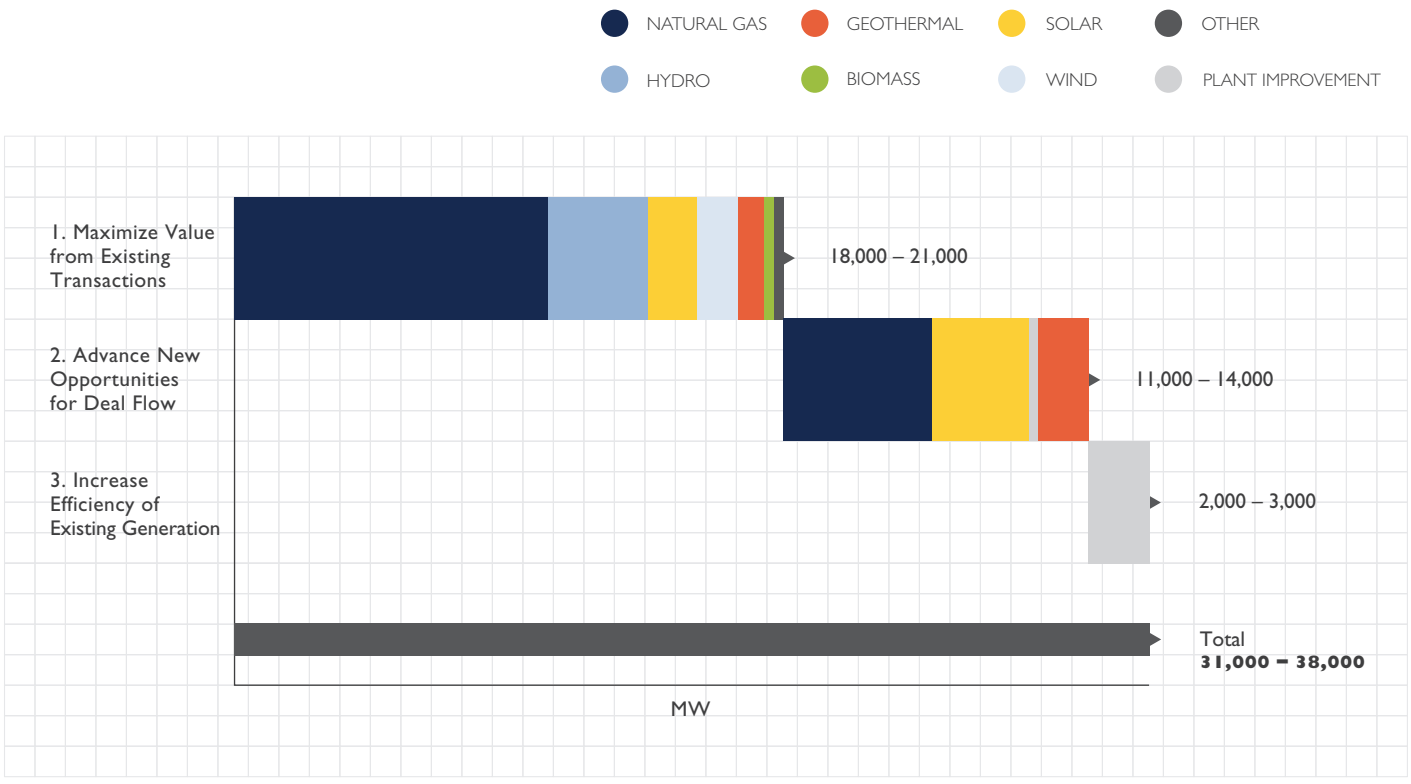
RISK ADJUSTING THE PROJECTS WE TRACK

While we are tracking 45,000 MW, experience shows that not all projects come online; many projects do not prove to be financially viable after initial feasibility, or face social, financial, or political barriers that prevent progress at a later stage. Further, we know that even when our Transaction Advisors support transactions, some will experience longer than expected lead times. Our best estimate is that 18,000 – 21,000 MW of the 45,000 MW we are currently tracking will reach financial close and will likely be online by 2030 (see Exhibit 10).

To arrive at this number, we first developed an average likelihood of success factor based on a review of data from 10,000 energy projects, as well as through interviews with experts. We then reviewed the projected financial close date for each transaction we are currently tracking and then applied the likelihood of success factor based on the current stage of the transaction and the type of technology.

It is worth noting that our forward-looking transaction success rates also account for our impact. We believe that *Power Africa*-supported transactions are more likely to succeed. Without our coordinated approach and broad set of tools, these power projects would be less likely to reach financial close and would be slower to come online. Further, as more projects we reach financial close and prove to be commercially viable, investors will perceive fewer risks, providing a powerful demonstration effect.

EXHIBIT 11
ROADMAP TO 30,000 MW
MW
Power Africa aims to increase generation capacity by 30,000 MW across the continent.



Source: Team analysis based on data from IEA, World Bank, and *Power Africa* Tracking Tool

GENERATION ROADMAP

To ensure that we reach our 30,000 MW goal, we will pursue three strategies.

First, we will focus on **ensuring that we realize the projected 18,000 – 21,000 MW** from projects we currently track. To reduce project failure rates and accelerate project timelines, we will expand our current support model by scaling up our transaction advisory services in critical countries, expanding access to early-stage project preparation facilities, and providing access to innovative finance mechanisms.

Second, we will **identify new deal flow in technologies that provide large-scale opportunities.** By increasing support to natural gas transactions and by supporting utility-scale solar expansion across the continent, we aim to add 9,000 – 11,000 additional MW. Furthermore, we will continue supporting specific geothermal and wind transactions in East and West Africa that are expected to yield an additional 2,000 – 3,000 MW. Given the expected lead times for these respective technologies, we expect these MW will reach financial close and are likely to be online by 2030.

Third, we will **continue to increase generation efficiency at underutilized power plants** by improving plant management and/or financing repairs or full refurbishments. Through this strategy, we expect to support an additional 2,000 – 3,000 MW.

Together, these strategies will enable *Power Africa* to achieve and even exceed its 30,000 MW generation goal by 2030, as shown in Exhibit 11.

1. MAXIMIZE VALUE FROM EXISTING TRANSACTIONS

Expected impact: 18,000 – 21,000 MW

Maximizing the likelihood of transaction success requires that we ramp up support across several fronts. We will increase the amount of early and late-stage transaction assistance. This assistance will ensure that the maximum number of financially and technically viable deals will reach financial close and go online.

EXPAND EARLY-STAGE TRANSACTION SUPPORT

Projects are extremely vulnerable in the earliest stages. We have identified that early-stage transaction support (or project preparation support) is integral for attracting the necessary financing from the investment community. We are, therefore, committing significant additional resources to help projects become "bankable."

Early-stage transaction support takes many forms; it includes grant funding, concessional loans, and technical assistance for innovative energy solutions. This support can be used for resource evaluations; feasibility, social, and environmental impact studies; or project appraisal and costing. Early-stage support also includes commercial support, such as trade missions, reverse trade missions, international buyer programs, and international partner searchers to link suppliers to projects.

A number of development partners and U.S. government agencies already extend early-stage support. The U.S. Trade and Development Agency (USTDA) has already provided critical project planning assistance for 36 *Power Africa* projects that support the development of over 720 MW of new power generation across the continent. These activities have the potential to help leverage an anticipated $6.4 billion in financing from public and private sources. USTDA supports all aspects of cleaner energy development and deployment, from new power generation to grid modernization, that

can increase efficiency and improve access. In addition, USTDA, along with OPIC and the U.S. Department of State, is part of the U.S.-Africa Clean Energy Finance initiative (ACEF) that provides early-stage support to renewable energy projects.

In Senegal, for example, the 152 MW Taiba N'Diaye wind park project has been approved for U.S.-ACEF project preparation assistance, and the project developers are now in financing discussions with OPIC. To complement this and other renewable projects coming online in Senegal, USAID and the U.S. Energy Association (USEA) will provide technical assistance on the integration of intermittent energy.

The African Development Bank's Sustainable Energy Fund for Africa is a multi-donor trust fund that provides cost-sharing grants, technical assistance, and equity investments to small- and medium-scale renewable energy and energy efficiency projects in their beginning stages. The European Union's Electrification Financing Initiative (ElectriFI) is a joint venture with multiple *Power Africa* partners and others that will provide early-stage grants that can be converted into long-term subordinated debt to help improve project bankability and increase access to late-stage finance.

EXPAND LATE-STAGE SUPPORT

Late-stage projects are those undergoing project structuring and development, or are soliciting financing. For transactions that require late-stage support, a team of field-based Transaction Advisors with experience in the energy and investment sectors help the private sector and governments prioritize, coordinate, and expedite the steps necessary for the implementation of power projects. Transaction Advisors work with teams of U.S. Government energy advisors on the ground to identify deal flow and the role, if any, that we might play in advancing those deals. USAID leads the deployment of these transaction advisors and works across sub-Saharan Africa.

As we scale, we will refine the use of these tools and will add country-specific, regional, and technology-specific Transaction Advisors and technical assistance as required by the level of deal flow.

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

We will also introduce Transaction Advisors into new countries where we actively support projects, but do not yet have full-time staff. When available, we hire local Transaction Advisors and local Fellows who will continue to develop the power sector moving forward.

PROVIDE FINANCE TO SUPPORT POWER PROJECTS FROM CONCEPTION TO FINANCIAL CLOSE

Financing is often the greatest barrier to project success. The financial and political risks associated with investment decisions in sub-Saharan Africa can be greater than in the developed world because of the region's smaller markets, less mature political structures, knowledge and capability gaps, and underdeveloped legal frameworks. Higher risks, or perceived risks, can deter investors, which means that projects can go underfunded or can only access capital with less favorable terms.

PARTIAL RISK GUARANTEES (PRGS) AND PARTIAL CREDIT GUARANTEES (PCGS) ARE POWERFUL RISK MITIGATION TOOLS THAT CAN HELP SUPPORT PRIVATE SECTOR INVESTMENT

PRGs cover private sector lenders against risk of payment default due to non-performance by governments. PCGs cover debt-related instruments for a portion of scheduled payments against all risks, thereby improving the terms of commercial debt. PCGs and PRGs are particularly powerful tools for larger-scale infrastructure projects.

For example, in 2013 the AfDB used a $20 million PRG to facilitate the financing of the Lake Turkana Wind Power Project transmission line in Kenya, the first ever PRG granted by the AfDB's African Development Fund (ADF). The PRG protects private lenders and investors against the risk of contractual failure by the Kenyan government and delays in construction of the transmission line. The PRG was a key condition for accessing long-term debt and subsequent financial close for the project. Beyond PRGs, we are supporting additional tools to reallocate the risk and reduce the cost of financing.

To help private sector developers overcome these hurdles, we directly provide and/or facilitate access to a range of financing and risk mitigation mechanisms, including equity investment for small-to-medium renewable energy projects, guarantees to mobilize commercial debt capital, mezzanine financing, senior and sub-senior loans, grants, blended finance, and export credit insurance to cover commercial and political risks. When projects demand further risk mitigation, we use other innovative tools to attract investors.

The transition from a power sector composed of mostly non-renewable energy to one that heavily features renewables must be carefully managed. These changes will have significant startup and establishment implications for individual projects, and unique finance and risk mitigation tools are essential for both public and private sector renewable power projects.

We plan to expand our financial and risk mitigation support, particularly by improving utility performance and solvency, and by scaling support for blended finance products. These products marry competitive finance from development finance institutions, export-credit authorities, and philanthropic entities with traditional private sector products. See the ElectriFI feature on page 34 for an example of using blended finance to move transactions forward.

Power Africa provides a variety of finance and risk mitigation tools. One of our most prominent financing partners is OPIC. It invests in late-stage transactions across the continent and has been influential in bringing transactions to financial close. OPIC has pledged $2.5 billion in total to *Power Africa*, and has already committed $1.6 billion to create almost 1,500 MW of on-grid and off-grid power across sub-Saharan Africa and supports generation, transmission, and distribution projects for traditional fuels and renewable resources.

As a share of OPIC's portfolio, sub-Saharan Africa has grown from 9% in 2002 to 28% in 2015, reflecting increased focus to deploy its wide array of tools in the region.

The Garden City solar project site in Nairobi, the largest solar carport in Africa and one of the largest commercial distributed generation sites in sub-Saharan Africa. Photo: CrossBoundary Energy

The official export credit agency of the United States, the Export-Import Bank (EXIM), has a congressional mandate to do more in sub-Saharan Africa and has pledged $5 billion to *Power Africa*. EXIM provides short-, medium-, and long-term debt as a source of stable and sustainable finance to power projects.

The UK's Public Infrastructure Development Group (PIDG) provides patient capital and blended finance for high-risk power sector projects, having mobilized $11 billion investment in the power sector since 2002. PIDG funding can work in conjunction with other *Power Africa* tools to help advance key transactions.

For example, PIDG contributed financing for the Cenpower Kpone Independent Power Project in Ghana, while USAID provided transaction and technical assistance for the Grid Company and the Electricity Company. Cenpower represented a key milestone for Ghana's power market, as it led to the first power purchase agreement in the country's power sector, the first generating license, and the first connection agreement with an independent power producer.

THE EU'S ELECTRIFI WILL USE BLENDED FINANCE TO ACCELERATE PRIVATE INVESTMENT IN RURAL ELECTRIFICATION

In the period 2014-2020, the funding earmarked by the EU for energy cooperation exceeds EUR 3.6 billion in grants expected to leverage between EUR 15-30 billion in loans and equity. The flagship energy initiative of the EU is the Electrification Financing Initiative (ElectriFI), a joint venture with its global development partners, including many *Power Africa* partners, that aims to encourage investments providing access to reliable, affordable, and sustainable electricity and energy services. USAID has committed up to $10 million to support this project preparation facility.

ElectriFI will be a platform for supporting investments, making green power projects bankable, and facilitating access to finance throughout project cycle. It will do this by providing blended finance to stimulate investment, inter alia, in the form of early-stage grants that can be converted into longterm subordinated debt. These actions will support private investors along the rural power supply chain with the ultimate goal of expanding power access.

Additional examples of financing tools include:

- **USAID's Development Credit Authority,** which offers loan and partial credit guarantees to increase the private sector's willingness to lend (where it has leveraged approximately $320 million of private debt finance under *Power Africa* to date)
- **MCC's innovative grants to utilities,** which allow utilities to set their own terms for success where MCC provides grants to the utilities when they reach these goals
- **The AfDB, IFC, and OPIC's** innovations of new currency risk mitigation tools
- **The Nigerian Government's put-call option agreement** signed for the Azura-Edo gas plant, in which it agrees to purchase a generation asset at a set price in the event of payment default
- **OPIC's political risk insurance,** which covers losses to tangible assets, investment value, and earnings that result from political perils

CONVENE AND COORDINATE ACROSS THE POWER SECTOR

The coordination of government, development partner, and private sector activities leads to better outcomes. Through workshops, memoranda of understanding, and the joint development of strategies, *Power Africa* helps ensure stakeholder alignment across a country's power sector. In Kenya, we convened a group of private, public, and development representatives to address the financing gaps identified in the country's power sector — this group now meets regularly to coordinate actions and share ideas on future interventions.

2. ADVANCE NEW OPPORTUNITIES FOR DEAL FLOW

IDENTIFY OPPORTUNITIES TO PURSUE

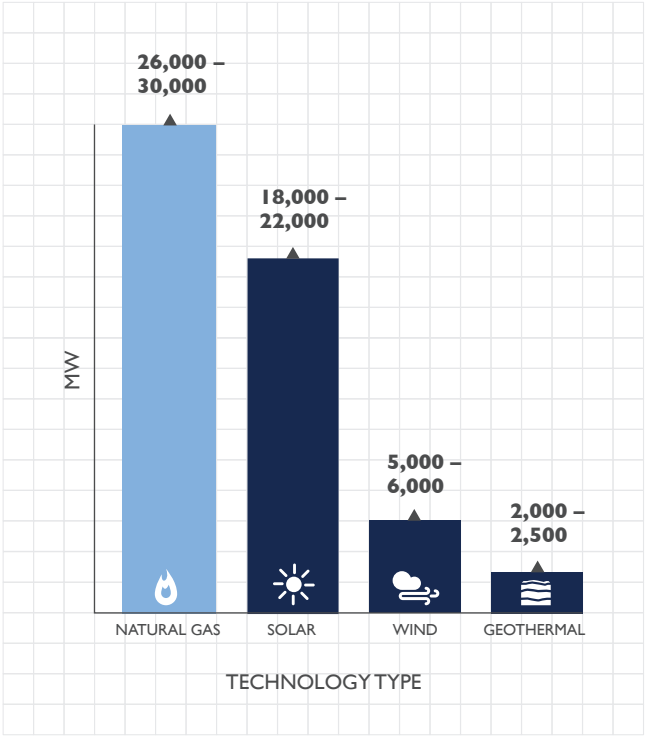
We expect that 18,000 – 21,000 MW of the transactions we are currently tracking will reach financial close, leaving us with a gap of 9,000 – 12,000 MW to reach our 30,000 MW goal. To determine how we should fill the gap, we projected electricity capacity additions across sub-Saharan Africa for all of the major technologies that we support, based on projected demand for each country and likely shifts in the supply mix based on resource potential.

Exhibit 12 compares the opportunities in four major technologies — natural gas, solar, wind, and geothermal. Across sub-Saharan Africa, we believe that the most significant opportunities across the greatest number of countries involve natural gas and solar. *Power Africa* will not support every project, particularly in countries that will have a proven record for success once a number of transactions reach financial close and come online. We will, however, focus on accelerating the most bankable and catalytic transactions in these two technologies. Specifically, we aim to drive an additional 6,000 – 7,000 MW of gas (largely in West Africa, but including East and Southern Africa), and 3,000 – 4,000 MW of solar (spread across all regions) to financial close by 2030, further catalyzing the market for those technologies.

We will continue our support for wind and geothermal in select East and West African countries, driving an additional 2,000 – 3,000 MW. New deal origination teams, additional *Power Africa* staff in the field, and collaboration with partners will help us identify new viable projects to support.

The environmental and social risks associated with new power projects over their life-cycle inherently increase in proportion to the size of the proposed plant. Therefore, while large hydro projects form a major component of potential future power generation in Africa, *Power Africa* has developed a strategy to achieve our goals

EXHIBIT 12
EXPECTED NEW MW IN SUB-SAHARAN AFRICA BY 2030
MW, Q4 2015 (estimates)



Source: Team analysis based on data from IEA, World Bank, and *Power Africa* Tracking Tool

> Nobody should live in the dark. Initiatives like *Power Africa* and ElectriFI have pulled a highly-driven group of partners together to ensure rapid change. Our teams on the ground work daily with African governments and companies from all over the world towards the same goals: more clean power, more quickly for more people."
>
> Roberto Ridolfi, Director for Sustainable Growth and Development, European Commission

without relying on the success and completion of these transactions. As we do with all potential projects, we will continue to consider hydro projects on a case-by-case basis, weighing the environmental and social concerns with the positive developmental impact of potential new power to be generated.

CAPTURE THE OPPORTUNITY IN LARGE-SCALE GAS

Expected impact: 6,000 – 7,000 MW

There are three important reasons for investing in natural gas:

- Large, indigenous natural gas reserves and a significant drop in global prices of natural gas mean that gas is a cost-competitive power source;
- Carbon emissions from natural gas plants are much lower than emissions from coal and oil-based fuels like kerosene, diesel, gasoline, and heating oil (see Exhibit 13); and
- Natural gas power complements intermittent renewable power, as natural gas plants can be ramped up and down on short notice.

Power Africa has already provided assistance to large natural gas transactions in West Africa, primarily in Ghana (to the 340 MW Cenpower Kpone plant — see AFC feature) and Nigeria (to the 450 MW Azura-Edo plant). We will seek opportunities to extend our reach in West Africa and will target new opportunities in East and Southern Africa.

In West Africa, we will expand our efforts to ensure a stable natural gas supply. Natural gas shortages are a major constraint to both existing generation plants (forcing them to operate at lower utilization rates) and new plants (as supply concerns limit project bankability). While shortages exist, the potential to increase supply is vast and several new natural gas fields are being developed across West Africa. *Power Africa* will help facilitate these developments through project finance, technical assistance on natural gas master planning, and support to link supply to domestic power markets.

In Ghana, for example, *Power Africa* provided technical expertise to design the conceptual framework for natural gas infrastructure development for the Jubilee gas field. In addition, *Power Africa* helped to develop and finalize the contractual framework for the supply of natural gas, proposed and drafted the natural gas industry institutional and regulatory framework, and put in place the necessary protocols for safe operations.

This support led to the new Jubilee infrastructure coming online in 2014. Looking ahead, *Power Africa* will support natural gas supply beyond Jubilee. For example, the World Bank has already committed $700 million in guarantees to accelerate Ghana's Sankofa natural gas project.

THE AFRICA FINANCE CORPORATION (AFC) IS INVESTING IN NATURAL GAS

The AFC is fast emerging as one of the continent's leading infrastructure banks. AFC has already exceeded its five-year Power Africa investment target of $250 million. Major projects include financing the 340 MW Cenpower combined cycle natural gas plant in Ghana, and a $200 million investment in a number of privatized Nigerian generation assets. Through these investments, AFC has been able to mobilize over $1 billion of third party investments into energy projects on the continent. Over the next five years, AFC expects to leverage additional investments of $1 billion into African energy projects and generate 1,700 – 2,000 MW that will provide electricity access to millions of users.

In East and Southern Africa, *Power Africa* will target new natural gas opportunities, building on our experience in West Africa. Major discoveries in these regions have spurred a wave of interest in natural gas development. In Tanzania and Mozambique alone, estimates of recoverable natural gas are above 100 trillion cubic feet, with further potential in Angola, South Africa, and Namibia.

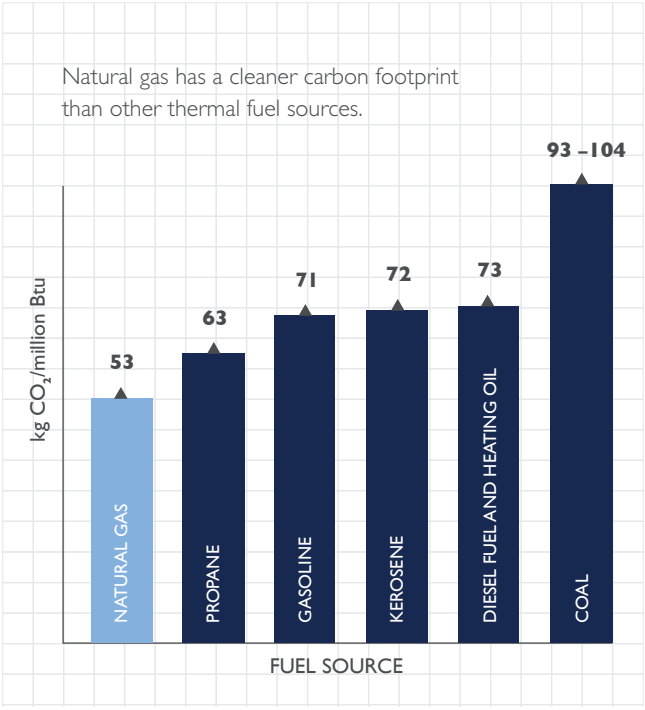
Currently, Tanzania and to a lesser degree Mozambique are the only countries that use natural gas for power. However, other countries have expressed their intent to develop domestic natural gas industries. In Mozambique, for example, the Natural Gas Master Plan (2014) and new Petroleum Law (2014) lays out the country's vision to use natural gas domestically. South Africa, also, is investigating natural gas-to-power, and recently announced plans to develop a 3,000 MW natural gas independent power producer framework.

Where appropriate, *Power Africa* is prioritizing large-scale natural gas transactions as a major contributor to the 30,000 MW target by developing country-specific interventions in discussion with governments, civil society, and private sector partners. Examples for potential support could include:

- Supporting indigenous natural gas supply development (including previously flared natural gas) and liquified natural gas imports, where these sources will be used for power generation
- Helping governments establish comprehensive natural gas master plans that define roles and responsibilities in the sector, establish the regulations required for natural gas independent power producers, efficiency/emissions targets, reducing and preventing gas flaring, and public-private partnerships
- Providing transaction advisory support across the project value chain, and help in accessing private sector finance (see feature on Standard Chartered and Black Rhino on page 38)

EXHIBIT 13
CARBON EMISSIONS OF NATURAL GAS VS OTHER FUEL SOURCES

kg CO_2/ Million British thermal units (Btu)



Source: U.S. Energy Information Administration

DRIVE UTILITY-SCALE SOLAR INDEPENDENT POWER PRODUCERS

Expected impact: 3,000 – 4,000 MW

Solar developers are proving that it is possible to build solar photovoltaic (PV) plants at scale. In the United States, First Solar recently completed two 550 MW plants (Topaz and Desert Sunlight, currently the world's largest solar PV plants), while SunPower is developing a 579 MW Solar Star Project. Developers in emerging markets are also stepping up. In India, the 345 MW Charanka Solar Park, a collection of 23 co-located plants, was completed in 2012. In Chile, the 100 MW Amanecer Solar CAP plant was completed in 2014.

In sub-Saharan Africa, utility-scale solar power represents a significant opportunity for countries to increase capacity while reducing the environmental

POWER AFRICA'S PRIVATE PARTNERS ARE PROVIDING ACCESS TO FINANCE FOR NATURAL GAS PROJECTS

Standard Chartered has partnered with *Power Africa* on two major natural gas projects. On the 450 MW Azura-Edo Power Project, Standard Chartered is the Lead Arranger and Structuring Bank. Its total invested capital in the power plant and natural gas supply will exceed $1 billion. For Ghana 1000 (a 750 MW natural gas plant that will be partly powered by domestic natural gas), Standard Chartered has been mandated as a Financial Advisor. This project could become the largest independent power producer in sub-Saharan Africa. Standard Chartered has more than doubled its overall commitment to *Power Africa* from $2 billion to $5 billion.

Black Rhino is an infrastructure development company focused on energy and infrastructure projects in select African countries. In 2014, Black Rhino and Dangote Industries announced a partnership to jointly invest up to $5 billion over the next five years in energy infrastructure projects across Africa, focusing on power generation, transmission, and pipelines. In partnership with *Power Africa*, Black Rhino intends to develop more than 3,000 MW of natural gas and solar generation capacity in Nigeria, Ethiopia, Djibouti, and other select countries.

costs of their power supply. Most countries in sub-Saharan Africa experience more than 320 days of bright sunshine annually and solar irradiation levels of almost 2,000 kilowatt hours (kWh) per square meter (twice the level of Germany, a global hub of solar PV generation). Parts of Southern Africa have solar irradiation levels as high as 2,500 kWh per square meter, some of the highest in the world (and on par with the Sahara desert in North Africa).

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

The South African experience has also proven that solar costs are likely to drop dramatically with scale and competitive procurements. Over the first four rounds of REIPPP's bidding, prices dropped by 76%, to ZAR 0.8/kWh (below $0.10/kWh) (see Exhibit 14). As solar technology continues to improve and developers learn through experience, solar will become increasingly competitive in African countries, especially for those that rely on high-cost oil or diesel as a major part of their power generation mix.

The development partner community has also realized the importance of utility-scale solar. OPIC recently committed to finance the 100 MW Redstone concentrated solar (CSP) plant, also developed by SolarReserve, that will become the largest in South Africa when completed. In Uganda, the Global Energy Transfer Feed-in-Tariff (GET FiT) program funded by the Governments of Norway, Germany, UK, and the EU, and implemented by the Government of Uganda and KfW, aims to support 170 MW of private sector, on-grid renewable energy projects amounting to 20% of the country's current generation capacity.

The World Bank Group, through the IFC, recently launched its *Scaling Solar* initiative to provide a "one-stop-shop" for governments seeking to mobilize investment in utility-scale PV plans. The

Nighttime market lit by solar power in Western Tanzania. Photo: Jake Lyell for the Millennium Challenge Corporation

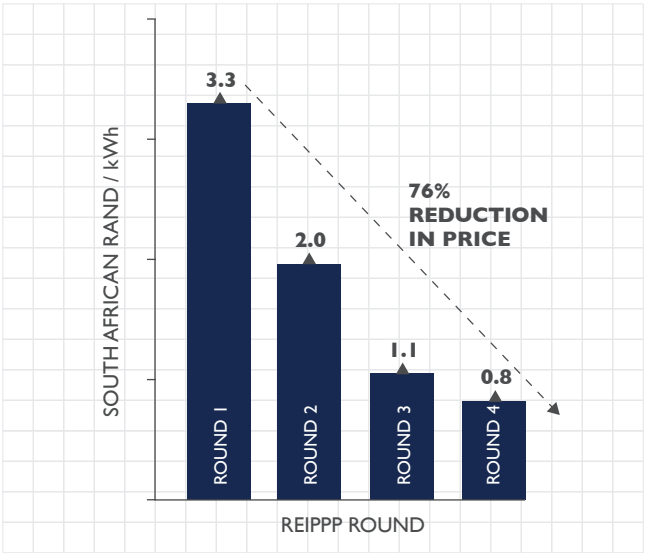
offering includes technical assistance on the correct size and location of plants, standardized tender documents and processes, finance and insurance for the tender process, risk management, and products. *Scaling Solar* aims to secure initial power production within two years of initiating an engagement. The initiative will encourage international developers and investors to increase their focus on the continent, allowing countries to enjoy the economies of scale experienced in solar hubs such as the United States.

Through *Scaling Solar,* IFC recently signed a memorandum of understanding with the Industrial Development Corporation of Zambia (IDC), outlining a joint mandate to competitively procure 600 MW of solar power. The projects will be developed through a tender process to incentivize competition between potential developers. There are already two 50 MW solar PV projects in the first round of the *Scaling Solar* program. *Power Africa* support includes transaction advisory and technical assistance. As *Scaling Solar* expands, *Power Africa* will continue to explore means to support the initiative on a country-by-country basis.

EXHIBIT 14

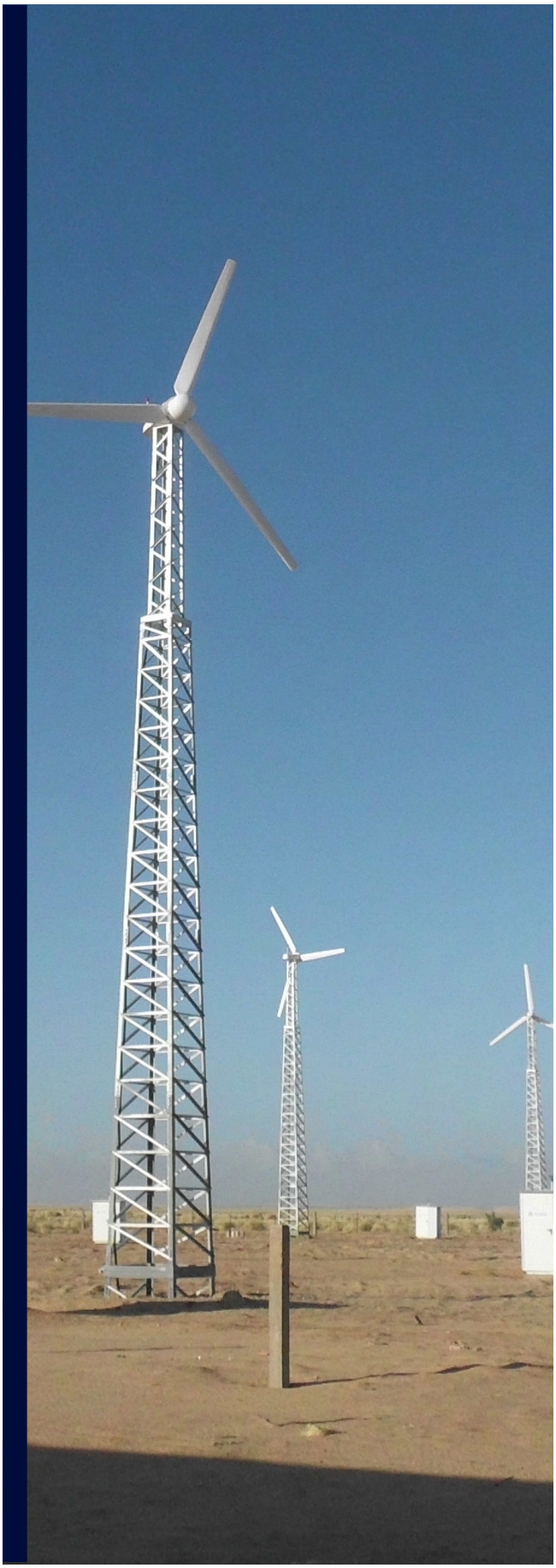
REDUCTION IN AVERAGE BID PRICES OVER REIPPP[1] ROUNDS

South African Rand / kWh



[1] South African Renewable Energy Independent Power Producer Program

Source: South African Department of Energy



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

- **Competitive procurements:** Support competitive independent power producer tender processes (such as auctions) that attract multiple private players and ensure that countries receive cost-competitive generation options.
- **Smart public and private incentives:** Establish the legal and regulatory frameworks that create a transparent playing field for private investors and developers, while ensuring sustainable, reliable, and cost-effective generation for governments.
- **Sustainable grid integration:** Ensure that intermittent solar generation can be integrated into the existing grid and, where necessary, support measures to strengthen the grid and increase the level of integration.
- **Regional power sharing:** Help countries to think and act regionally to unlock large (and cost-competitive) solar projects that would not be feasible for a single country.

ENSURE THAT OTHER TECHNOLOGIES RECEIVE TARGETED SUPPORT

Expected impact: 2,000 – 3,000 MW

In addition to the major opportunities across sub-Saharan Africa in natural gas and solar, we are well positioned to support new geothermal and wind transactions in countries where we are already working. These transactions tie closely to our existing support for wind and geothermal in Kenya and Ethiopia, and support for wind projects in select West Africa countries.

Mauritania hybrid wind power project. Photo: National Agency for Development of Renewable Energy

Power Africa is already supporting wind projects in East Africa and West Africa and we will continue to explore new transactions in these regions. We will also look to support opportunities in Southern Africa where we can help accelerate project lead times and lay the groundwork for success. Our support will continue to include transaction assistance, financing, improved power sector planning, transaction assistance, and technical support to help integrate intermittent energy into the grid.

Geothermal projects are complex and involve significant exploration risks. These transactions need substantial up-front capital, extensive feasibility studies, and broad technical expertise. In East Africa, we will leverage our multi-donor geothermal strategy to capture new opportunities. This strategy aims to facilitate technical and financial support to realize major geothermal projects and improve the enabling environment to better attract and retain private investment.

3. INCREASE EFFICIENCY OF EXISTING GENERATION

Expected Impact: 2,000 – 3,000 MW

Although sub-Saharan Africa's electricity access rate remains low, the region already has substantial generation capacity (approximately 90,000 MW).

Generation, transmission, and distribution losses are highly problematic, with losses exceeding 50% in some countries. Technical losses in generation reflect low levels of plant utilization, which can range from 10 – 30% across sub-Saharan Africa.[6] In transmission and distribution, technical losses reflect broken or poorly maintained power lines and transformers.[7] Finally, non-technical losses at the distribution level include commercial losses (where end users are not being billed for power) and collection losses (where end users are billed but revenue is not collected due to non-payment).[8]

[6] Compared to 5% or less in developed energy markets (McKinsey Electric Power & Natural Gas Practice Expert)
[7] Compared to 5-10% in developed energy markets (ibid)
[8] Compared to 5% or less in developed energy markets (ibid)

POWER AFRICA PRIVATE PARTNERS ARE DEVELOPING UTILITY-SCALE SOLAR

NEXTGEN IS INVESTING $600 MILLION TO SET UP 200 MW OF SOLAR PLANTS

NextGen Solar is a U.S.-based renewable energy company and a pioneer in building and operating large utility-scale solar plants. NextGen operates in Tanzania, Kenya, Uganda, and the Seychelles, and plans to expand to other remote diesel-dependent areas of sub-Saharan Africa. It is involved in several projects with *Power Africa*, including two in Tanzania (5 MW and 60 MW), and has a bold vision to invest $600 million to set up 200 MW of generation capacity and expand access to 3.7 million people. *Power Africa* has supported NextGen through a $10 million project finance commitment from OPIC and catalytic funding for project preparation and technical assistance from the U.S.-Africa Clean Energy Finance (ACEF) initiative and USTDA.

SUNEDISON HAS BEEN AWARDED 587 MW OF SOLAR PLANTS IN SOUTH AFRICA

SunEdison has extensive experience in the development and management of renewable energy projects within South Africa and has become one of the country's top independent power producers.

Building on its success in prior rounds, the company was awarded 50% of the solar photovoltaic (PV) allocation in the fourth round of the Renewable Energy Independent Power Producer Program. This adds to the existing operating projects of 130 MW that were developed by SunEdison and acquired by its listed yieldco for international markets, Terraform Global. SunEdison aims to expand its footprint to the rest of Africa, targeting countries with high solar potential and stable economic environments.

POWER AFRICA'S MULTI-DONOR GEOTHERMAL STRATEGY COORDINATES GEOTHERMAL SUPPORT

Olkaria geothermal complex and power station, the first geothermal power plant in Africa. Photo: Courtesy of IRENA

Geothermal is a source of renewable base load energy, and when developed properly can replace polluting base load sources at a lower cost. It has the potential to be a significant source of power throughout East Africa, notably in Kenya and Ethiopia with an estimated combined 12,000 MW of generation potential.

To ensure a coordinated approach to East Africa's geothermal development, *Power Africa* has brought together a wide range of its private sector and development partners and African governments and institutions, including the African Union Commission (AUC), to develop a multi-donor geothermal strategy to improve partner coordination and the targeting of private investment.

WHY ISN'T GEOTHERMAL A BIGGER PART OF THE ENERGY MIX?

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

SUCCESSFUL GEOTHERMAL DEVELOPMENT REQUIRES A COORDINATED MULTI-DONOR STRATEGY

Given the challenges of developing geothermal, it is critical that all stakeholders work together to build government capacity and create the right enabling environment for success. *Power Africa* is working with other donors and partners to overcome the up-front capital, planning, policy, and regulation barriers to geothermal investment. This includes the *Power Africa* multi-donor geothermal strategy which provides a detailed overview of geothermal development activities in six East African countries, including current development partner assistance, and proposals for future assistance that best leverage the expertise of different stakeholders. It also provides recommendations for assistance at a regional level to promote policies, capacity building, and information sharing.

The 500 MW Corbetti project in Ethiopia has already benefited from this strategy. *Power Africa*'s Transaction Advisors were influential in assisting Ethiopia with a power purchase agreement (the first ever in Ethiopia) for the Corbetti geothermal resource by providing negotiation support, financial modeling expertise, and technical assistance to Ethiopian Electric Power. The Corbetti project has also been selected for support by the African Union's East Africa Geothermal Risk Mitigation Facility (GRMF), which is part-funded by DFID and the EU, as well as Germany. *Power Africa* is now working with the Ethiopian Government to draft a new geothermal law governing resource exploration and development rights (a condition precedent to Corbetti's financial closure) to be submitted to parliament for approval in 2016. Further support on the Corbetti transaction included legal assistance from the AfDB's African Legal Support Facility facilitated by USAID.

By focusing on the efficiency of utilities, we can improve the financial position of the off-taker, reduce the costs to consumers, and free up generation capacity. Increasing plant utilization can be linked directly to additional MW (e.g., raising utilization at a 100 MW plant from 30% to 60% is equivalent to an additional 30 MW of generation). The total opportunity for generation efficiency improvements across the continent is equivalent to more than 5,000 MW of additional capacity, and we believe we could support 2,000 – 3,000 MW.

We will help to improve generation efficiency by ensuring operational excellence. We will work with utilities and existing power plants to help them adopt best practices, develop maintenance protocols, and establish correct fuel quality mixes. Technical assistance will also seek to improve the skills and capacity of operations, maintenance, and supervisory staff.

Two further opportunities for support to increased efficiencies exist: project finance for major repairs or refurbishment (such as new turbines to refurbish a natural gas plant) and privatization of generation facilities.

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

Privatization can occur at different levels: wholesale, where assets are sold into the private sector, and long-term concessions, where the government or national utility retains ownership but a private sector player invests in upgrading the utility and operates it.

In Nigeria, for example, *Power Africa* provided transaction advisory assistance to support the privatization of generation assets (see the Nigeria feature for further details).

Looking ahead, we will scale up financial support for plant refurbishment and expand our technical assistance on privatization efforts.

EXAMPLES OF *POWER AFRICA*'S GENERATION ASSISTANCE

The federal Government of Nigeria aspires to be among the world's 20 largest economies and has ambitious plans to increase generation capacity to support this growth. In the short-to-medium term, the Nigerian Government hopes to add approximately 3,000 MW of capacity, primarily through rehabilitating and improving the utilization of its existing plants, to bring total grid capacity to 7,000 MW. *Power Africa* is playing an active role in Nigeria's generation expansion through a broad range of supporting mechanisms, which we expect will add nearly 14,000 MW to the grid by 2030.

Setting up a new power sector delivery unit

Power Africa is scaling up its on-the-ground transaction support by deploying additional Transaction Advisors to help unlock stranded generation and support new renewable energy projects.

We are providing capacity building support to the government's new Advisory Power Team, a delivery unit that is tasked with increasing available capacity and strengthening the power sector.

NIGERIA

Supporting new feasibility studies and technical assistance programs

USTDA is funding a feasibility study for a proposed 275 MW gas-fired power plant in Lagos, a 50 MW solar PV project in Kaduna State, and a gas-fired power project in Ogun State that could generate up to 100 MW. It is also sponsoring or planning technical assistance projects with electricity distribution companies to develop frameworks for grid modernization.

Upgrading existing power transmission infrastructure

The World Bank's Nigeria Electricity and Natural Gas Improvement Project is increasing the availability of natural gas supply and improving the capacity and efficiency of transmission infrastructure, thereby unlocking the potential of generation plants. To support this, the Bank has invested over $100 million in gas and power transmission.

Offering technical assistance on power purchase agreements

USAID and DFID provide technical support to the Nigeria Bulk Electricity Trading Company (NBET). This support led to the successful negotiation of the power purchase agreement and the put call options agreement for the Azura natural gas project.

Financing independent power producers (IPPs)

Multiple *Power Africa* partners are supporting new natural gas IPPs in Nigeria. For example, OPIC has pledged $50 million in finance and $20 million in insurance, and PIDG has provided $30 million in subordinated loans, to the Azura-Edo natural gas project.

Accelerating the privatization of power assets

To accelerate the privatization process, *Power Africa* participated in the evaluation of technical bids and reviewed agreements signed by investors. The privatized generation companies are obligated to increase plant efficiency to approximately 6,000 MW in total. In 2014, Standard Chartered, with support from *Power Africa*, mobilized more than $1 billion for the privatized generation and distribution companies to reduce energy losses, improve operational efficiencies, and eventually expand generation and grid capacity.


CHEMISTS
PLUMBING FITTINGS
BUILDING MATERIALS
d.light

PILLAR 2: GETTING TO 60 MILLION CONNECTIONS

There are currently 600 million people (approximately 120 million households) without access to electricity in sub-Saharan Africa. *Power Africa*'s goal of adding 60 million new connections would double the number of connections in sub-Saharan Africa by 2030.

This section of the Roadmap lays out our plan to create new connections through grid extension and off-grid projects while working together with partner governments, utilities, and the private sector.

PROGRESS TO DATE

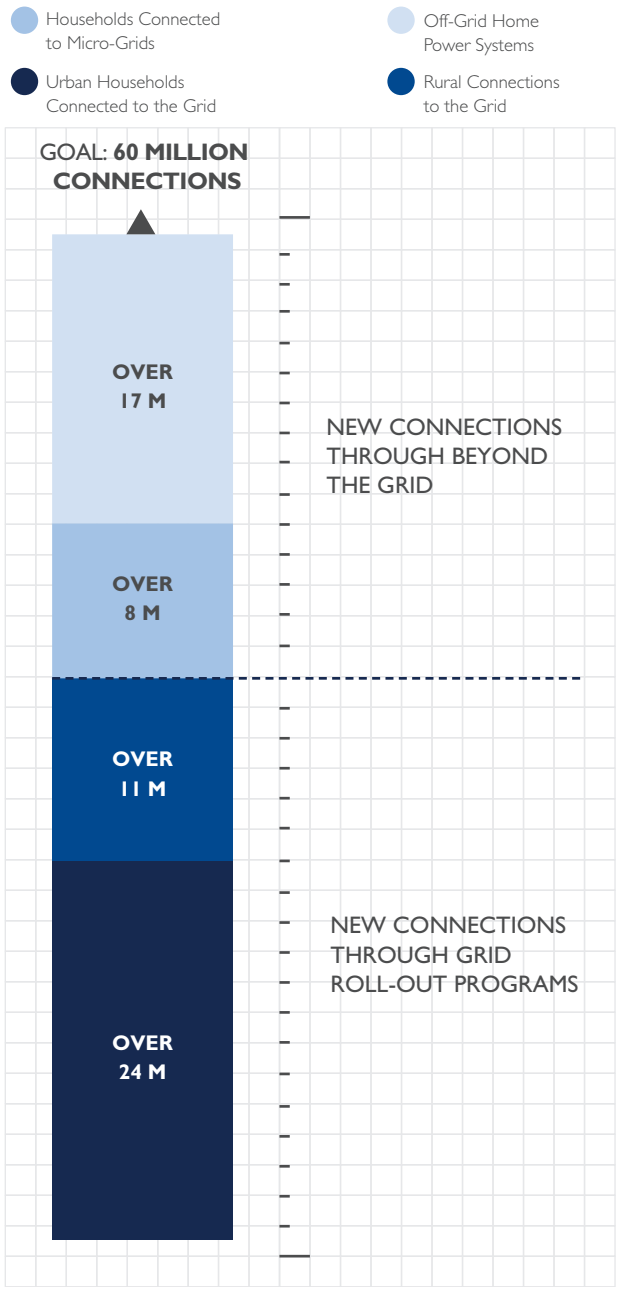
In its first year, *Power Africa* focused heavily on grid-scale generation transactions, recognizing their long lead-time and role in grid network expansion. With significant progress underway on our MW generation target, greater efforts will now be put into meeting our connections target.

Power Africa currently tracks both "inferred" access and direct connections (see methodology in "Measuring Progress" on page 20). Inferred access takes the number of MW in a generation project and estimates how many households could be served by that new capacity, taking into account the type of plant, the share of power that goes to residential customers, and typical household consumption. We track inferred access to ensure that there is sufficient power in the grid to build new connections.

John Njoroge sells solar power solutions to energy-poor Kenyans. Photo: Morgana Wingard

When measuring *Power Africa*'s impact and progress toward our connection goal, we only count direct or actual connections of households and businesses to the grid or off-grid. The strategies laid out in this Roadmap focus on direct new connections.

EXHIBIT 15
ROADMAP TO 60 MILLION CONNECTIONS
Connections, million



Source: *Beyond the Grid* strategy and team analysis based on International Energy Agency, World Bank, and geospatial data.

Power Africa has already supported projects that have the potential to lead to more than one million direct new household and business connections. Most of these connections are off-grid, and come from two sources: 50 grants from the *Power Africa* Off-Grid Energy Challenge awarded to organizations in nine countries (Ethiopia, Ghana, Kenya, Liberia, Nigeria, Rwanda, Tanzania, Uganda, and Zambia); and 16 projects were awarded funding through the U.S.-Africa Clean Energy Finance (ACEF) initiative.

CONNECTIONS ROADMAP

Reaching 60 million new connections requires a broad-based approach. To achieve our goal, we will pursue two strategies (see Exhibit 15):

- Support grid roll-out programs in both urban and rural areas (35 – 40 million connections)
- Intensify *Beyond the Grid* efforts (25 – 30 million connections) to facilitate additional off-grid connections.

Of the 35 – 40 million new grid connections expected to be added, 24 – 27 million are expected to be in urban areas and 11 – 13 million in rural areas (see Exhibit 15).

We will leverage the expertise and resources of development finance institutions and other funding partners to help bring in the large volume of capital needed to drive grid expansion projects, especially where utilities remain publicly owned.

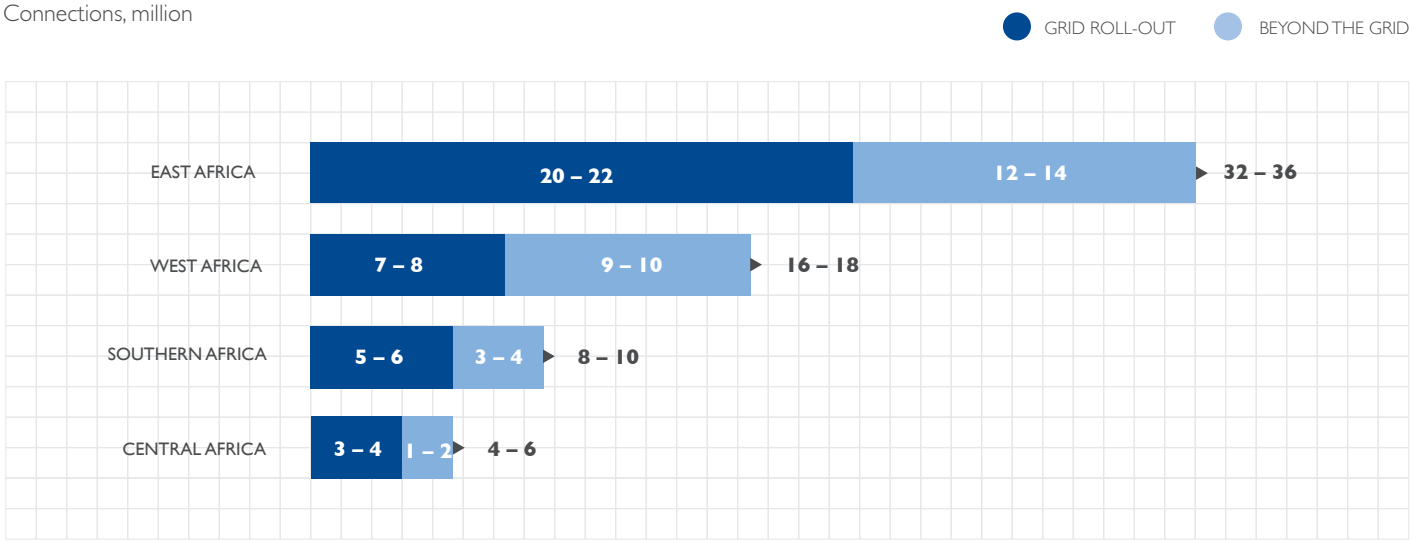
Where utilities are private companies, we will work with our partners to increase their performance and bring in new investment to help fund transmission and distribution expansion.

Private companies have brought great innovation to the off-grid space, and we will continue to make resources available to help scale up successful models and develop new ones.

President Barack Obama tours the pay-as-you-go solar home systems exhibit at the *Power Africa* Innovation Fair at the United Nations compound in Nairobi, Kenya, July 25, 2015. The President talks with June Muli, Head of Customer Care, M-Kopa. Photo: Pete Souza/ White House

EXHIBIT 16
REACHING 60 MILLION: A BREAKDOWN OF *POWER AFRICA*'S TARGETS FOR NEW CONNECTIONS (BY REGION)

Connections, million



Source: World Bank, International Energy Agency, AfDB transmission lines data, WorldPop database, geospatial analysis

1. SCALE GRID ROLL-OUT PROGRAMS

Expected impact: 35 – 40 Million Connections

The growth, scale, and density of sub-Saharan Africa's urban populations provide an opportunity to connect millions of people to the grid. We expect about 68% of our grid connection goal (24 – 37 million connections) to come from urban areas, and the remaining 32% (11 – 13 million connections) to come from rural "near grid" households[9] across all sub-Saharan regions (see Exhibit 17).

Large-scale grid roll-out programs are highly complex, and to be successful, governments and utilities need the capacity and financial resources to manage the full project delivery value chain. However, many governments and utilities in sub-Saharan Africa are still in the early stages of developing these capabilities, or have focused heavily on only a few links in the value chain.

Power Africa currently supports grid roll-out capacity building, primarily through planning, regulatory, and financing support, but we will expand our support to include other aspects of the value chain such as procurement and project management. We will start by supporting the entire grid roll-out value chain in a few countries, and, if successful, extend support to additional countries.

There are already a few examples of successful grid-roll out programs in sub-Saharan Africa. In just four years, Kenya has increased its access rate from 26% to 46%, delivering an additional 1.8 million connections, primarily through urban and peri-urban grid expansion initiatives.

[9] Rural near grid households are those residences that are close to but not yet connected to transmission and distribution infrastructure. For the purpose of the Roadmap we estimate these households are within 20 km of transmission lines, the range of a medium-voltage distribution line.

PROVIDE PLANNING SUPPORT

Planning is a core component of the project delivery value chain. It includes segmenting new customers to optimize roll-out strategies with a differentiated tariff rate structure; engaging existing and new customers; selecting (and standardizing) appropriate technologies; and planning how to strengthen transmission and distribution networks to align with grid roll-out needs.

Power Africa's multilateral development partners such as the World Bank Group and AfDB often take the lead in helping utilities and governments plan grid-roll out strategies, while our bilateral partners and U.S. government agencies also provide support where appropriate. For example, the World Bank supported the Government of Rwanda's 2009 Electricity Access Rollout Project, which successfully tripled the number of connections in four years. The World Bank helped segment customers and helped select technologies, and also provided a $70 million zero-interest credit facility.

USTDA offered support to the Electricity Company of Ghana and the Northern Distribution Company (NEDCo) in Ghana and is currently working with three distribution companies in Nigeria to develop grid expansion plans with identified technology inputs. The U.S. Department of Energy is also well suited to help countries standardize their technology choices and coordinate purchases to drive scale-based savings.

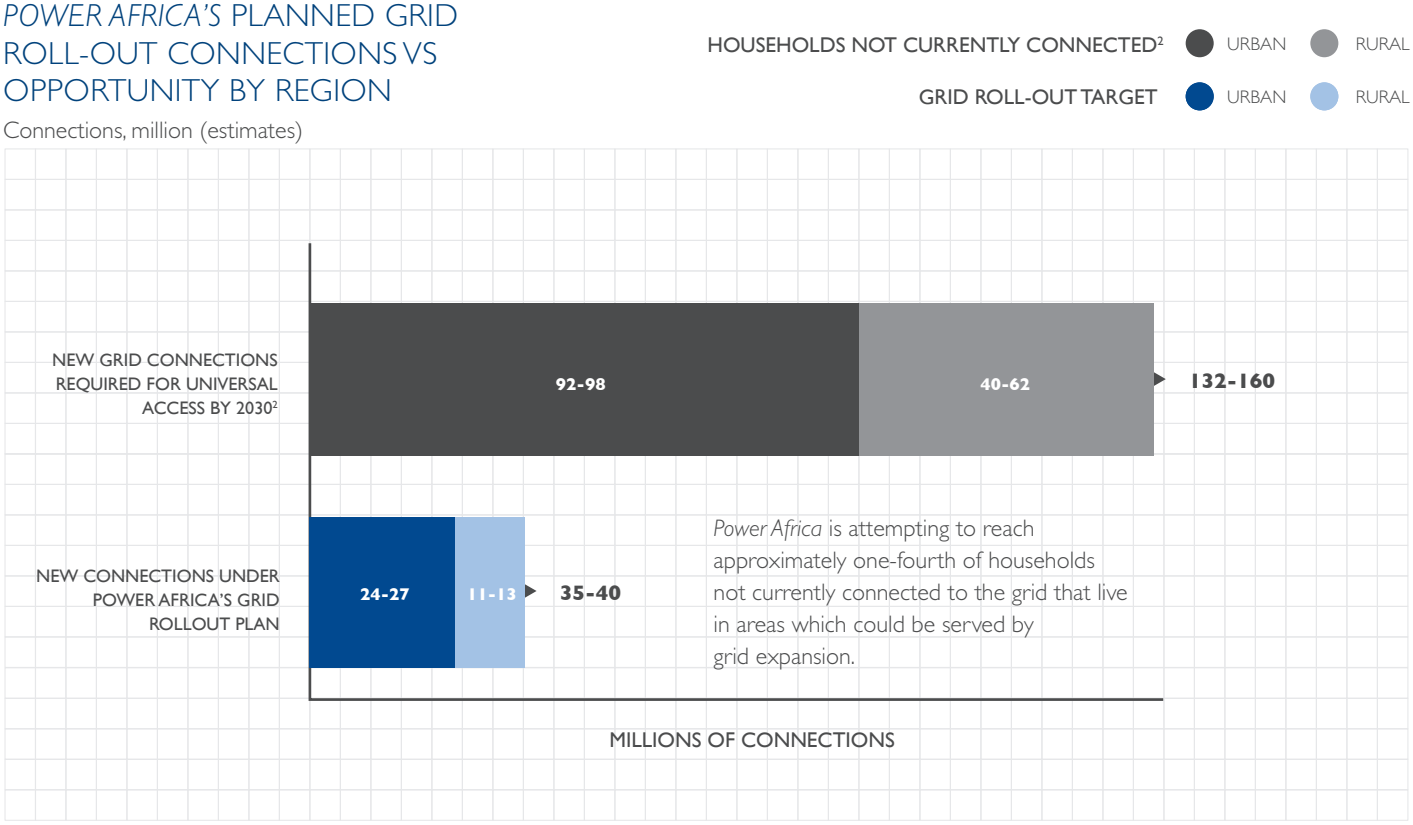
The World Bank and AfDB recently partnered with the Government of Kenya to fund a $150 million last mile connectivity project that will add an additional 1.5 million Kenyans to the national grid. These "last mile" projects are aimed to reach mostly low-income groups in rural or urban households located within a certain radius of a transformer, ultimately reducing the cost of accessing electricity for the customer.

In East Africa, *Power Africa* is providing technical support to facilitate distribution upgrades. In addition, *Power Africa*'s work with utilities and the Eastern Africa Power Pool will provide countries with up-to-date information on each national network — information that will help countries match generation with demand.

EXHIBIT 17

POWER AFRICA'S PLANNED GRID ROLL-OUT CONNECTIONS VS OPPORTUNITY BY REGION

Connections, million (estimates)



[1] In the 49 sub-Saharan countries, assumption of 5 people per household

[2] Current non-connected households that will likely be served by grid connections

Source: World Bank, International Energy Agency, AfDB transmission lines data, WorldPop database, geospatial analysis

PROVIDE REGULATORY SUPPORT

Power Africa partners are supporting regulatory reform and capacity building in many countries to help identify and resolve regulatory barriers to grid expansion. For example, DFID's Nigeria Infrastructure Advisory Facility provides policy and planning advice at the federal and state level, to remove infrastructure bottlenecks. In 2015, the Millennium Challenge Corporation (MCC) signed a compact for over $200 million with the Government of Liberia that includes support to stand up an independent electricity regulator as well as provide financing for the Mt. Coffee hydro refurbishment and expansion, and broader utility support. Our partners will work together to help establish consistent regulatory standards across sub-Saharan Africa, which will further simplify grid expansion efforts.

In East Africa, *Power Africa* is working with regulators to develop a Uniform System of Accounts that will require clear and consistent data from utilities, enabling regulators to more accurately conduct tariff reviews and allocate costs for generation, transmission, and distribution, which is essential for national projects and cross-border trade.

IMPLEMENT THE RIGHT FINANCING MODEL

Access to adequate, affordable finance is crucial to grid extension programs. Building the right financial model to drive grid roll-out programs is a critical component. This includes sizing the required investment and identifying the optimal split across end-users, the government, and the utility; selecting financial mechanisms for funding the government contribution; defining the correct payment and collection mechanisms; and developing cost-reflective, tiered tariff structures.

Power Africa partners are already helping governments and utilities identify and develop the right financing models for grid roll-out programs. For example, in Ghana, the AfDB provided a $30 million grant and a $44 million loan to reinforce and extend the country's electricity distribution network.

> We worked in the past four years to pass the required indicators, including control of corruption that made us eligible for a Compact with the Millennium Challenge Corporation (MCC)...This happened when the Liberian Vice President witnessed the signing by the Minister of Finance and Development Planning and the MCC for a $256.7 million grant on November 2nd (2015) in Washington, DC. Power is a major priority under the Compact. The promise of BIG LIGHTS tomorrow is now close at hand. The Compact is significant because it is a new partnership that would transcend the administrations of President Barack Obama and me.
>
> Ellen Johnson Sirleaf, President of Liberia

In October 2014, EXIM Bank's Board approved an additional $56 million direct loan for a small U.S. business to expand the grid in Ghana to over 2,000 villages. The AfDB is also funding a rural electricity access project with a $100 million sovereign guaranteed loan in Uganda that aims to build 2,000 km of distribution lines and provide connections for more than 50,000 rural households.

The World Bank provided the Ethiopia Second Electricity Access Rural Expansion project with an International Development Association (IDA) credit of $130 million to help expand electricity access to rural populations, connecting about 265 rural towns and 1.1 million inhabitants to the grid.

In Uganda, the World Bank is supporting Umeme, the main private power utility, to undertake a four-year, $440 million capital investment program to expand distribution and connect 25,000 households. We will continue to leverage our large multilateral and bilateral development partners to support financing activities for grid roll-out programs.

Power Africa partners are also helping identify innovative solutions to help end-users pay for the cost of their grid connections. For example, USAID's partial credit guarantees have been offered to Kenyan households in order to borrow money that will pay for connection and internal wiring fees and will enable tens of thousands of Kenyans to connect to the grid.

BUILD PROCUREMENT CAPABILITY

Large-scale power programs require effective execution of procurement processes. Utilities must identify and contract with the right execution partners, develop local suppliers, and adopt a fair and transparent sourcing process. Utilities also manage supply chain challenges such as sourcing partners and coordinating import, warehousing, and distribution logistics. Although *Power Africa* supports some procurement processes and sourcing capabilities, these are still significant points of failure for many grid roll-out programs. We will identify additional mechanisms to support this aspect of supply chain development

Olkaria Geothermal Plant in Kenya. Photo: USAID

and unlock grid connection potential. Current support for this includes a U.S. Department of Commerce Commercial Law Development Program (CLDP) *Understanding Power Purchase Agreement Handbook* and a model procurement document library.

DEVELOP UTILITY PROJECT MANAGEMENT SKILLS

Strong project management capabilities help to deliver power projects on time and on budget. Utilities must decide how much of their program to manage internally versus externally. If they are using external partners, they must ensure that contractors perform as promised.

Development institutions such as the AfDB and the Norwegian Agency for Development Cooperation build execution and monitoring capabilities in power utilities. For example, the Government of Norway is funding a project implementation unit (PIU) to manage and oversee implementation of the Mt. Coffee Hydropower Rehabilitation Project in Liberia.

Power Africa will continue to provide project management support to utilities working on grid roll-out programs, for example by creating specialized delivery units to improve project scheduling, master-planning, project monitoring, and contractor claim management capabilities.

ENCOURAGE EFFECTIVE DECISION-MAKING AND CROSS-SECTOR COORDINATION

Political will is central to successful grid roll-outs. Governments need to make difficult choices on how to fund programs and structure cost-reflective tariffs across different types of consumers. Having national plans backed by senior government officials can be a critical enabler.

Vocational Training and Education for Clean Energy (VOCTEC), under the leadership of Arizona State University, is a global program funded by USAID. VOCTEC aims to improve the sustainability of renewable energy infrastructure and investments in developing countries by increasing awareness, knowledge, and capacity of local stakeholders, primarily in decentralized clean energy technologies. Photo: Ambika Adhikari

For example, Kenya's electrification plan benefits from strong government support for the Kenya "Vision 2030" program, which aims to modernize Kenya's entire economy. Rwanda's Electricity Access Rollout Project was also aided by strong public support and development partner backing. South Africa's grid expansion program in the 1990s was driven by the political imperative of reducing some of the inequalities created by apartheid. *Power Africa* will continue to work with senior government officials to help critical stakeholders advocate for the prioritization of grid roll-out programs on national agendas.

Similarly, cross-sector coordination is also key for major grid-roll out programs. To be successful, private sector industries, public sector entities, civil society, and the development community need to be aligned on the path forward. *Power Africa* is well positioned to help drive these coordination efforts in conjunction with partner governments.

THE PATH FORWARD

Power Africa will focus on driving end-to-end grid expansion in a select group of countries by leveraging the wide-ranging skills of various partners.

We will identify which countries to support first, most likely starting in locations where we are already involved in grid expansions, such as Kenya and Ethiopia, while considering factors such as the regulatory environment, financial feasibility, and the capabilities of the utility.

In addition, some countries that are implementing Millennium Challenge Corporation (MCC) energy sector compacts or threshold programs have demonstrated they have the political will necessary for successful grid roll-out programs and are strong candidates to start grid roll-out programs in the medium-term once their utilities become more financially viable.

We expect to phase-in grid roll-out programs in a total of 10 – 15 countries over a 3 – 4 year period in close coordination with AfDB, the World Bank Group, and other partners. Given their complexity, major electrification projects can take up to 10 years to complete. The initial phase of each roll-out is likely to be slow as the program gets off the ground. This period will be followed by an acceleration as the utilities and government build up experience in grid delivery. Completing the program will involve a longer period where connections are made to harder-to-reach communities.

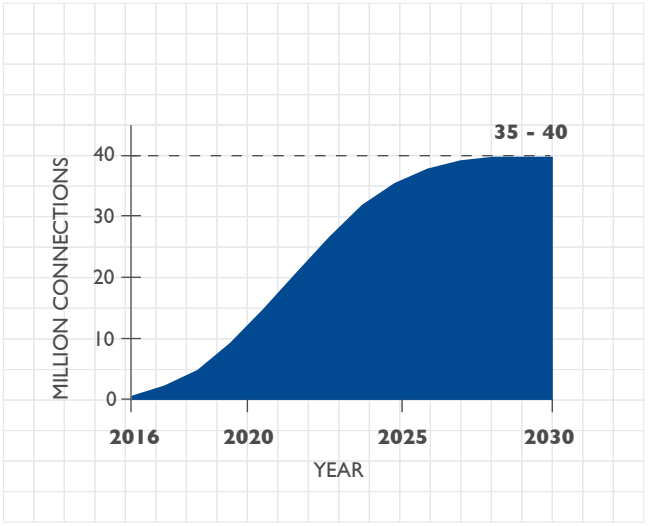
As a high-level goal, we expect that by 2020 we will have connected 10 – 15 million new households to the grid. By 2025, the majority (28 – 33 million connections) should be completed, with the remainder of the 35 – 40 million connections finalized by 2030 (see Exhibit 18).

2. INTENSIFY *BEYOND THE GRID* EFFORTS

Based on our geospatial analysis, we estimate that in 2030, 55 – 80 million households in sub-Saharan Africa will still be too remote to connect to traditional grid infrastructure. To give these rural populations access to electricity, *Power Africa* has launched *Beyond the Grid* to unlock investment and growth for off-grid and small-scale energy solutions.

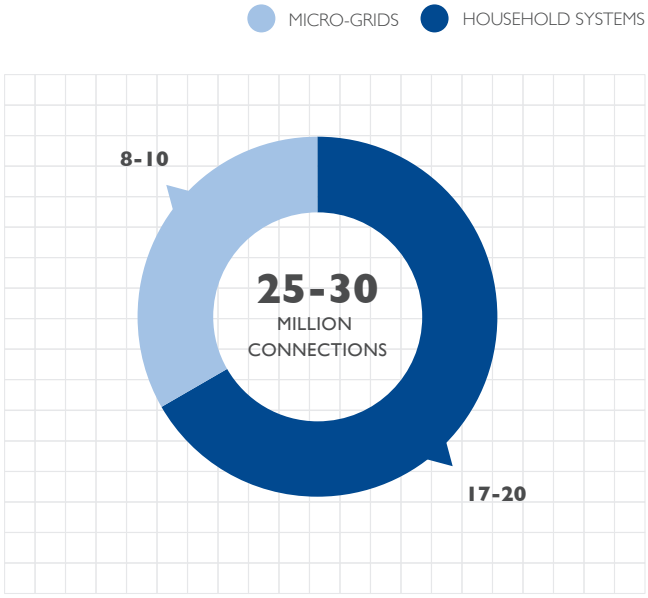
We expect to add 25 – 30 million additional connections through *Beyond the Grid*, 17 – 20 million of which we expect to come through household systems and 8 –10 million of which we expect to come through micro-grids (see Exhibit 19).

EXHIBIT 18
ILLUSTRATIVE RAMP-UP OF GRID ROLL-OUT PROGRAMS CONNECTIONS BY 2030
Connections, million



Source: Analysis based on World Bank, International Energy Agency, geospatial analysis

EXHIBIT 19
BEYOND THE GRID SPLIT
Connections, million



The split between household systems (mainly solar-based) and micro-grids reflects the current state of the market, but could shift as new technologies and deployment models emerge.

Overall, our *Beyond the Grid* target reflects not only the importance of off-grid options for meeting rural households' power needs, but also the role of the private sector in delivering power to rural communities. Our investments are designed to attract even greater levels of private sector involvement, crowding in additional investment rather than crowding it out. Currently, the off-grid space is more open to private intervention than the grid-connected sector, since many utilities that manage national grids are still state-owned.

To achieve our targets, we will focus on two levers:

- **Supporting private sector companies** that are seeking investment in off-grid and micro-grid solutions. We will do this by providing financing, risk mitigation tools, capacity building, and technical assistance to help get projects off the ground and then scale them up
- **Working with countries** to remove barriers to growth in off-grid and micro-grid energy sector projects

HOUSEHOLD SYSTEMS

Expected impact:
17 – 20 Million Connections

Household systems generally include larger solar systems that support multiple lighting points and small appliances (e.g., radios, fans, televisions).

Household system sales have grown over the past three years to now give electricity to more than 450,000 homes and businesses in sub-Saharan Africa. This market is poised to expand dramatically. Improvements in efficiency and reductions in

WHAT ABOUT SOLAR DEVICES?

Solar lanterns include portable devices that provide a single light source and may have a plug for mobile charging. Modern, high-quality off-grid products can sustainably meet the lighting and basic needs of those not connected to the grid.

Lighting Africa (a World Bank Group effort that aims to develop the market for off-grid lighting products) provides market insights, steers development of quality assurance frameworks for modern, off-grid lighting devices and systems, and promotes sustainability, in partnership with industry. Lighting Africa has observed average growth of more than 200% year-on-year since 2009, and has tracked more than 7.5 million units of quality certified products sold in sub-Saharan African markets as of early 2015.

While there is immense value in the first kWh of electricity provided by devices like solar lanterns, *Power Africa* has a strong preference for supporting higher levels of service that can power multiple lights and even appliances. *Beyond the Grid* focuses on the home system and micro-grid segments, with the goal of achieving equally high growth in the larger systems as has been seen in the lanterns market.

component prices have made it possible to provide high quality service at a reasonable cost.

Further, the advent of pay-as-you-go (PAYG) business models, facilitated by mobile phone-enabled payment systems, has made them affordable to a large number of households. As the market has converged on PAYG solar household systems, the number of companies selling these products has also grown. In Rwanda, the government has welcomed solar home system companies such as Mobisol, BBOXX, Azuri, and Off Grid Electric, to help connect the approximately 2.5 million households it expects will be electrified by off-grid solutions. To further support the expansion of solar rooftop companies, *Power Africa*'s *Beyond the Grid* initiative has partnered with DFID's Energy Africa Campaign.

In order to further accelerate growth in the off-grid energy market, *Beyond the Grid* works in three key areas: project capital, new markets/models, and enabling environment (see Exhibit 20). For the household solar market, *Beyond the Grid* prioritizes providing project capital support. Access to project capital and working capital are critical for these companies to scale their operations and their customer bases. Access to capital enables companies to make the up-front investments required to procure and install new household systems, overcoming the traditional barrier of customers who lack the savings to finance their own. The rooftop solar companies can then recoup the upfront costs through the PAYG model.

One example of how *Power Africa* is supporting project capital needs is through USAID's Development Credit Authority (DCA). The DCA gives USAID missions the authority to issue loan guarantees to private lenders, particularly for loans in local currency. A DCA partial credit guarantee thus mobilizes financing for projects but also helps to demonstrate to local banks that loans to underserved sectors can be profitable. To help off-grid and small-scale energy solutions scale-up, DCA announced in October 2015 a $75 million portfolio guarantee for loans to off-grid producers, manufacturers, and distributors across sub-Saharan Africa.

MOBISOL IS PROVIDING AFFORDABLE HOME SOLAR SYSTEMS IN RWANDA

Mobisol is providing affordable large home and business solar systems in Tanzania and Rwanda. To date, Mobisol has installed over 37,000 solar home and business systems in Tanzania and Rwanda. Mobisol's solar systems are capable of powering LED lights, mobile phones, televisions, radios, and various appliances such as fridges, beamers and irons. Households pay for these systems over 36 months using mobile phone payments. After this 36-month period, users fully own the energy source and can continue to use it.

Mobisol also offers training for local entrepreneurs, contractors, and Mobisol staff around the sales, use, and maintenance of the home or business solar systems in the Mobisol AKADEMY, education made in Germany. With the support of *Beyond the Grid*, Mobisol plans to increase access to clean and reliable power to over 10 million households in sub-Saharan Africa by 2020 with a total capacity of at least 1 GW. To achieve this they will need significant debt financing and assistance expanding into new markets.

Lucy Sakuda and her daughter Nancy listen to their chargeable radio from their M-KOPA solar home kit. Each kit contains an 8W solar panel, battery, three lights, a phone charging port, and a chargeable radio. Every night, 250,000 homes in East Africa are using M-KOPA systems to power their homes. Photo: Morgana Wingard

Power Africa provides support to help both new and existing companies enter new markets, improve their business operations, and introduce potential new business models. DFID provides support across *Power Africa*'s Toolbox, including flexible technical assistance to strengthen investment climates; catalytic investments; and mobilizing public and private actors to accelerate the market for off-grid solutions.

In addition, *Power Africa* has partnered with DFID's Energy Africa campaign, which aims to generate the policy and market shifts necessary to overcome barriers and rapidly accelerate market-driven growth in the African household solar industry. The campaign is working in partnership with donors, governments, and finance institutions across 14 countries in sub-Saharan Africa in order to identify regulatory change and targeted enterprise support to create the best conditions for the growth of the solar household sector.

Energy Africa partners are mobilizing finance across the supply chain. They provide early-stage grants and loans to new businesses seeding innovative

Power Africa will enable a continent to communicate on charged mobile phones and computers. It will enable a continent to perform better in their studies because they can do their homework after the sun goes down, enabling a more productive and healthier society.

Erica Mackey, COO & Co-founder, Off Grid Electric

solar models, in addition to grant funding from other partners to pilot new business models and project preparation support. For longer-term finance, Energy Africa is looking to working capital loans and guarantees to help established businesses increase their scale. Energy Africa will also give market information and data to investors to help them to understand the opportunity in solar, thereby stimulating investment in the sector.

MICRO-GRIDS

Expected impact:

8 – 10 Million Connections

Central generators connecting multiple households, businesses, and community services can provide grid-quality electricity with 24-hour availability and high capacity, but may be constrained by cost. In sub-Saharan Africa, micro-grids are typically run on solar, hydropower, biomass, or diesel power, and may incorporate multiple sources of power to reduce costs and increase availability.

Micro-grid projects are more diverse than solar home systems, and the market has not yet converged on a single scalable model. Some micro-grid companies have achieved success with biomass, micro-hydropower, and solar generation systems. Other companies are piloting systems with remote monitoring, smart metering controls, and mobile payment capabilities that should make scaling up easier.

HOUSEHOLD SOLAR IN EAST AFRICA

M-KOPA sells small-scale solar home systems (photovoltaic cells and rechargeable batteries) to off-grid households using an affordable 12-month mobile money payment plan. Customers acquire the solar systems for a small deposit and purchase daily usage credits for $0.45, which is cheaper than traditional kerosene lighting. M-KOPA has already connected over 250,000 homes in Kenya, Tanzania, and Uganda and with support from *Power Africa*, it plans to scale up and bring power to one million by 2018.

Off Grid Electric offers an innovative solar-as-a-service business model that enables customers to prepay for electrical services on a weekly basis via mobile money. For $5-10 per month, Off Grid Electric's solar rooftop system delivers 50 times more light to its customers for less money and at a lower risk than kerosene.

In 2013, Development Innovation Ventures (DIV), an innovation fund within USAID, provided a $100,000 grant to Off Grid Electric to test customer engagement. In 2014, DIV provided a further $1 million for last-mile distribution activities as Off Grid Electric expanded to serve multiple regions across Tanzania. In 2015, DIV provided an additional $5 million in follow-on-funding which will allow Off Grid Electric to catalyze additional financing to work towards its goal of reaching more than one million households in Tanzania. To date, Off Grid Electric has used DIV grants to test and prove its operations in Tanzania. These tests have been catalytic in attracting private and public sector investment.

EXHIBIT 20
BEYOND THE GRID TOOLS FOR SUPPORTING MICRO-GRIDS AND HOUSEHOLD SYSTEMS

- HOUSEHOLD SYSTEMS ONLY
- MICRO-GRIDS ONLY
- BOTH HOUSEHOLD SYSTEMS AND MICRO-GRIDS

PROJECT CAPITAL[1]	NEW MARKETS /MODELS	ENABLING ENVIRONMENT[2]
Early stage capital for grid-connected renewable energy projects from Africa Renewable Energy Fund (AREF) (AfDB/Berkeley Energy)	Business model mentoring from Private Financing Advisory Network (PFAN) (USAID)	Policy compacts, market building, and legal support from Energy Africa (DFID) (USAID)
Early stage grants from Powering Agriculture (USAID)	Early stage grants and loans from ElectriFI (EU)	Quality assurance frameworks from Global Lighting and Energy Access Partnership (Global LEAP) (USDOE)
Early stage grants and loans from ElectriFI (EU)	Early stage grants from Powering Agriculture (USAID)	Expert assistance for governments from transaction advisors (USAID)
Enterprise Grants from US Africa Development Foundation (USADF)	Enterprise grants from U.S. Africa Development Foundation (USADF)	Grid integration planning (USAID)
Grants for Global Development Alliances (GDA) (USAID)	Grants for Global Development Alliances (GDA) (USAID)	Tariff structures, licensing, and other regulatory assistance from USTDA and from African Legal Support (ALSF)
Innovation grants from Development Innovation Ventures (DIV) (USAID)	Innovation grants from Development Innovation Ventures (DIV) (USAID)	Legal support from the ALSF and the Commercial Law Development Program (CLDP)
Direct loans and investment guarantees from Overseas Private Investment Corporation (OPIC)	Pilot project and project preparation grants from U.S. Trade and Development Agency (USTDA)	High-level strategic assistance and advising from the Senior Advisors Group (USAID)
Loan guarantees from Development Credit Authority (USAID) and Sida	Project preparation grants from U.S - Africa Clean Energy Finance (ACEF) facility (USTDA)	Technical assistance to governments from Clean Energy Solutions Center (USDOE)
Pilot project and project preparation grants from US Trade and Development Agency (USTDA)	Project preparation grants from Sustainable Energy Fund for Africa (SEFA) (AfDB)	Technical assistance to governments via grants from Sustainable Energy Fund for Africa (SEFA) (AfDB)
Project preparation grants from US-African Clean Energy Financing Facility (ACEF) (USTDA)		
Project preparation grants from Sustainable Energy Fund for Africa (SEFA) (AfDB)		

[1] Priority for household systems
[2] Priority for micro-grids

Micro-grids may always need some degree of customization to fit community needs, so the expansion of micro-grids could happen through a scale-up of the number of developers/operators rather than in the number of systems each company can install and manage. *Beyond the Grid*'s tools for raising project capital, supporting new companies, and working with countries to remove barriers to growth are outlined in Exhibit 20.

Launched in 2013 in partnership with General Electric Africa and USAID, the U.S. African

Development Foundation's (USADF) Off-Grid Energy Challenge plays an important role in supporting micro-grids. In total, USADF has awarded 50 grants of up to $100,000 each to fund renewable off-grid energy, including micro-grids. One such example of how Off-Grid Energy Challenge winners have made use of their funding is Green Village Electricity Group (GVEG), a renewable energy solutions provider based in Nigeria. Through their award, GVEG has installed a 6 kW solar system, along with portable battery packs, to power 230 homes and businesses in a rural Nigeria community and will replicate its model to power 24 rural communities in Nigeria through its solar technology solutions.

Another mechanism used to promote innovation in micro-grids is USAID's Development Innovation Ventures (DIV), which incubates and brings new ideas to scale. DIV has already helped support micro-grid innovation in India through companies like Mera Gao Power and Gram Power, both focused on solar, community-based systems.

The AfDB's Sustainable Energy Fund for Africa (SEFA) is supporting two mini-grid programs: the Clean Energy Mini-Grids High-Impact Opportunity and the Green Mini-Grid Market Program. These programs help map public, philanthropic, and commercial sources of funding, technical, and other support available for the implementation of clean energy mini-grids.

They also provide country support on policy, legal, and regulatory frameworks. Additionally, DFID is supporting investment in green mini-grids in Kenya and Tanzania.

Micro-grids face more challenges with regard to the enabling environment because they are technically and operationally similar to the central grid, but are not typically fully included in a country's regulatory framework. This gap results in uncertainty about equipment standards, the ability to charge cost-reflective tariffs, and the implications of the grid reaching an area served by a stand-alone micro-grid. *Beyond the Grid* focuses on creating clear regulatory frameworks that address the spectrum of needs of consumers, governments, and providers, while reducing the risk created by this uncertainty.

THE PATH FORWARD

Off-grid and small-scale solutions will play an essential role in access expansion through 2030. Solar devices and household systems are extremely affordable, are scalable with limited government intervention, and can be deployed in remote regions far from the national grid. Micro-grids offer equal geographic flexibility and ensure a high quality of access. Further, community-based off-grid solutions encourage local participation in energy sector decision-making. Off-grid solutions also create new job opportunities in rural areas and enable new cottage industries.

MICRO-GRIDS IN EAST AFRICA

PowerGen Renewable Energy is a leading micro-grid developer and installer in East Africa, with offices in Nairobi, Kenya and Arusha, Tanzania. PowerGen works with partners and communities to develop micro-grids utilizing solar and storage resources in areas throughout the region that lack traditional grid access. Over the past two years, PowerGen has implemented 32 micro-grids across Kenya and Tanzania, connecting approximately 1,000 customers to electricity. Since its founding in 2011, PowerGen has installed a total of 150+ renewable energy projects across seven countries.

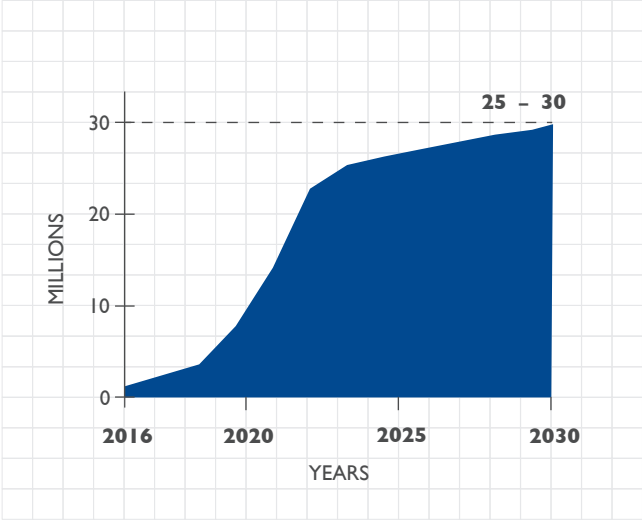
These opportunities are especially important for women, as they represent more than 50% of the rural population. Scaling up off-grid solutions will allow us to reach remote communities across sub-Saharan Africa.

Beyond the Grid aims to work in 15 – 20 countries across sub-Saharan Africa (see Exhibit 22). We will expand the nucleus of off-grid and small-scale energy projects our partners are already doing in East Africa, as well as expand targeted efforts in other regions. We will then phase-in countries in West, Central, and Southern Africa over a 2 – 3 year period.

Given the leading role that the private sector will play in delivering off-grid solutions, the ramp-up of *Beyond the Grid* connections will be faster than the ramp-up of grid-based programs. By 2020, we expect to have supported 10 – 12 million connections. By 2025, 20 – 25 million connections should be created, with the remainder created by 2030 (see Exhibit 21).

EXHIBIT 21
ILLUSTRATIVE RAMP-UP OF *BEYOND THE GRID* CONNECTIONS BY 2030

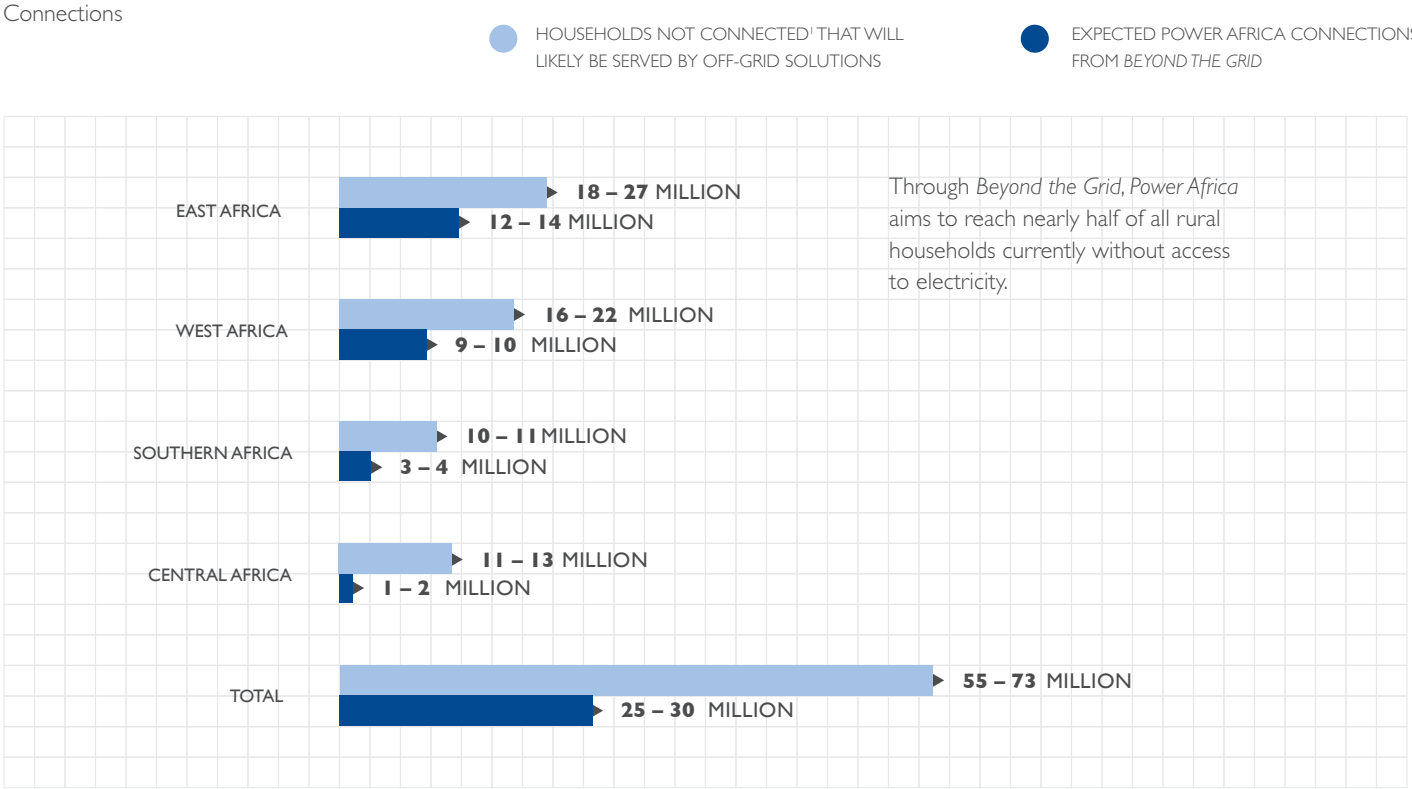
Connections, million



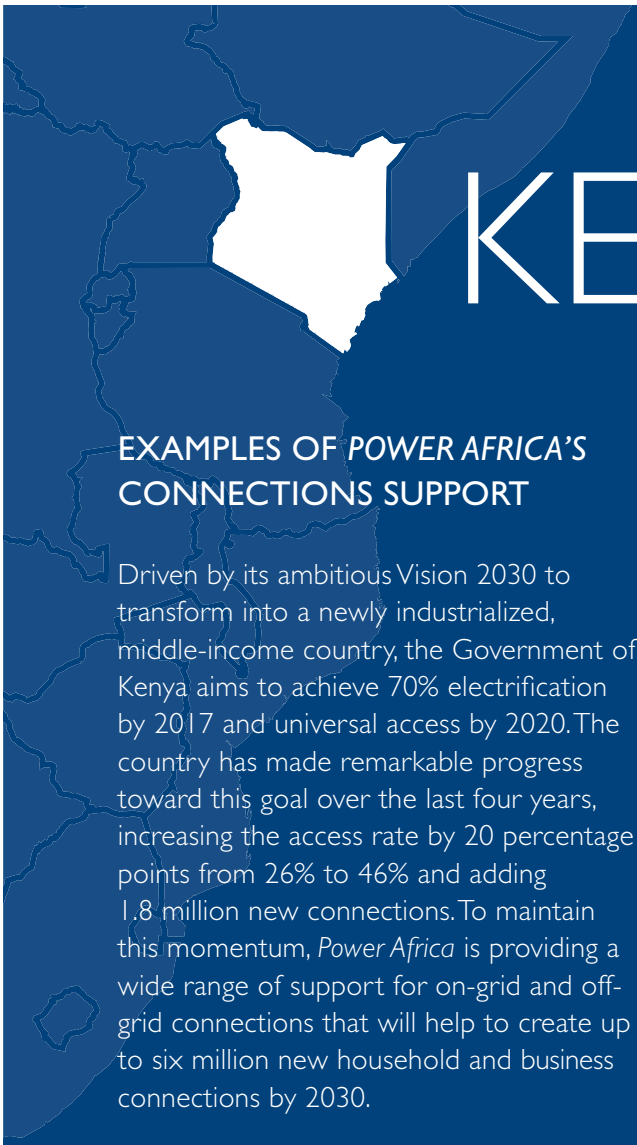
Source: Analysis based on World Bank, International Energy Agency, geospatial analysis

EXHIBIT 22
EXPECTED *BEYOND THE GRID* CONNECTIONS VS POTENTIAL RURAL OFF-GRID OPPORTUNITY, BY REGION

Connections



[1] In the 49 sub-Saharan countries, assumption of 5 people per household
Source: World Bank, International Energy Agency, AfDB transmission lines data, WorldPop, geospatial analysis



KENYA

EXAMPLES OF *POWER AFRICA'S* CONNECTIONS SUPPORT

Driven by its ambitious Vision 2030 to transform into a newly industrialized, middle-income country, the Government of Kenya aims to achieve 70% electrification by 2017 and universal access by 2020. The country has made remarkable progress toward this goal over the last four years, increasing the access rate by 20 percentage points from 26% to 46% and adding 1.8 million new connections. To maintain this momentum, *Power Africa* is providing a wide range of support for on-grid and off-grid connections that will help to create up to six million new household and business connections by 2030.

Developing a sector-wide connections strategy

Power Africa partners are coordinating to help develop a sector-wide connections strategy to define the optimal on-grid/off-grid mix for Kenya, particularly in rural areas. This work is critical to helping off-grid companies and consumers understand where and when investing in off-grid solutions make economic sense.

Supporting the financing of grid connections

Power Africa is already supporting the roll-out of grid in both urban and rural areas. The World Bank is helping to subsidize the cost of connection for customers in informal settlements through a project with the Global Partnership for Output-Based Aid. For customers in rural areas, USAID's Development Credit Authority is providing a $7 million partial credit guarantee to Stima Savings & Credit Company (SACCO) to lend to its customers for financing grid connections. The majority of households in Kenya are now located close enough to the grid to connect, thanks to the Kenya Rural Electrification Agency's (REA) efforts to connect rural schools and clinics to the grid.

Providing financing to scale off-grid solutions

Through *Beyond the Grid* and the World Bank Group program, *Lighting Africa*, we are supporting the scale-up of off-grid companies in Kenya. Specifically, we are providing working capital loans for solar home system providers and investing in new micro-grid technologies and business models. In addition, the DFID-supported Renewable Energy and Adaptation to Climate (REACT) challenge fund has provided seed funding for enterprises selling off-grid products to kick-start their businesses.

PILLAR 3: UNLOCKING ENERGY SECTOR POTENTIAL

Investors usually gravitate toward countries with an attractive enabling environment and a track record of successful projects. In some cases, however, investors see significant opportunities in countries with a less established investment climate.

In such instances, we have found that successful transactions act as an incentive to drive regulatory and policy change. When a transaction is imminent, host governments are incentivized to expedite the policy and regulatory reforms required to advance it to financial close.

To reach our 30,000 MW and 60 million connections targets, *Power Africa* will focus on enablers that seal and sustain these deals: supporting policy interventions that move transactions forward in a sustainable manner, encouraging development of regional power systems to unlock generation, providing uniquely qualified advisory support to heads of state and senior government leaders to address policy and governance challenges, and investing in institutions that will maintain progress.

These factors improve the business climate, which encourages innovation and stimulates trade USAID, Sustainable Energy for All (SE4ALL), and the Millennium Challenge Corporation (MCC) are leading the way in implementing this reform-driven approach, linking policy and regulatory reform to tangible power sector investment.

This solar field at the Agahozo Shalom Youth Village in Rwanda embraces a big range of causes: it helps the long-term sustainability of the Village, it is good for the environment, it generates local employment and education, and it empowers the country with access to electricity — which in itself results in a myriad benefits for the Rwandan population. Located on rolling green hills, east of Kigali, this $23 million project is the first utility-scale, grid-connected, commercial solar field in East Africa. The field is 8.5 MW, and it increased Rwanda's generation capacity by 6%.
Photo: Sameer Halai, Co-Founder of SunFunder

POLICY INTERVENTIONS

Laws, regulations, policies, and politically stable environments set the playing field for investment in the power sector. Investors and developers will gravitate toward countries with an attractive enabling environment, presenting an incentive to strengthen a country's policy, regulatory, and legal framework. *Power Africa* works with African governments to develop well-defined and transparent laws, policies, and regulations in order to facilitate power sector transactions. We also work to ensure that governments have the capacity to execute projects and procurements, adequately manage the sector, integrate stakeholders, and deter corruption.

> The MCC compact is the most important envelope of investment ever in the history of Benin that has created deep commitments for this and the next administration.
>
> Lionel Zinsou, Prime Minister of Benin

Coordination is key. *Power Africa* actively seeks out opportunities to support dialogue among development partners, private sector partners, and governments to ensure that all stakeholders are working towards common goals and objectives, and taking advantage of comparative advantages.

Convening bodies, such as SE4All, NEPAD, and the African Union play an important role in aligning our collective efforts. *Power Africa*'s MOUs with African governments and bilateral and multilateral development partners articulate mutual goals and objectives, and provide the foundation for institutionalizing collaboration.

Likewise, through dialogue with private sector partners, we identify key obstacles and opportunities that are critical to successful transactions and follow-on investment in sustainable power sector projects. Importantly, power sector issues involve a broad range of stakeholders — beyond the obvious power sector actors — and must be addressed through a holistic and inclusive approach. SE4All prioritizes this dimension of cross-sectoral, inter-ministerial coordination as a central tenet of the Action Agenda process.

POLICY AND REGULATORY DESIGN AND REFORM

Effective management is critical for expanding and sustaining a country's power sector. To this end, we work with governments that demonstrate the political will to implement difficult but necessary reforms, reduce corruption, prioritize commercial viability and financial soundness of the sector, open their energy markets to private investment, and improve the design and management of their power sectors. *Power Africa* provides African governments and utilities with expert technical assistance to undertake the policy, legal, regulatory, and operational reforms to create financial incentives and risk mitigation schemes. While much of this assistance is tied directly to projects and transactions, these reforms ensure that improvements contribute to a country's broader economic and social development goals.

Legislation that allows private sector involvement in the power sector is essential. Ideally, laws will allow involvement at all levels (ownership, construction, and operation, as in the independent power producer model), but alternative public-private partnership models may also define levels of allowable private engagement (e.g., allowing the private sector to operate public assets like generation plants).

Power Africa supports governments that are seeking to establish transparent frameworks that integrate best practices and allow private sector participation.

In Ghana, for example, MCC, USAID, and the World Bank are working with the Government to design

I remain proud of the partnership agreement we initiated when I was CEO of Sustainable Energy for All. Power Africa's commitment to partnerships and collaborative action are key to getting the energy poor the light and power they need to fully participate in the economic success story in Africa. I knew that we had to join forces with them in reaching the mutual goal of SDG 7: Ensure Access to Affordable, Reliable, Sustainable and Modern Energy for All.

Kandeh Yumkella, founding CEO of SE4ALL

and implement an independent power producer (IPP) procurement process covering both on-grid and off-grid options, including examination of barriers to entry into the off-grid market. This process will help the government develop standard forms of agreements for IPPs, and allow strategic advisors to lead sector planning, develop a least-cost integrated resource plan, and oversee competitive IPP transactions.

To develop an attractive investment climate, our support concentrates on critical commercial elements such as cost-reflective tariffs, import taxes, intellectual property rights, and mitigation of systemic risks such as land rights issues.

Cost-reflective tariffs provide financial incentives for private sector players to enter generation, transmission, and distribution markets. Combined with effective billing and collections systems and comprehensive loss prevention programs, cost-reflective tariffs help ensure the financial soundness of utilities so that they can expand connections and provide reliable service.

For many potential investors, clean energy solutions for sub-Saharan Africa have been cost prohibitive, as unsustainable subsidies mask the true cost of power and policies within many countries have favored the use of cheap kerosene.

BOTSWANA

PROMOTING VALUE IN BOTSWANA'S ENERGY SECTOR

In an effort to improve the outcome of energy procurements in Botswana, USTDA established a partnership with Botswana under the Global Procurement Initiative: Understanding Best Value (GPI). The GPI helps public officials incorporate tools such as life-cycle cost analysis to guide their procurement decisions and to consider the total cost of ownership of their infrastructure investments.

Two advisors are working with the Ministry of Minerals, Energy and Water Resources to help promote value-based decision-making and assist in the design of tender documents for 14 upcoming procurements. With this assistance, Botswana is now adjusting its procurement system to achieve greater value for money and ensure that the country makes sound energy investments.

Based on this success in Botswana, USTDA expanded the program to Ethiopia and is considering other markets.

G-7 ministers took to the stage in Paris to announce a combined $10 billion of support for the African Renewable Energy Initiative (AREI), an African-led initiative to promote the development of renewable energy projects. Photo: *Power Africa*

We work with governments and power sector institutions to recognize the true cost of power, the instability of subsidies, and the opportunity to attract private sector investment in more sustainable energy solutions. Sida, for example, recently provided technical assistance to the Energy Regulation Board in Zambia to review the current regulatory electricity tariff regime. In Benin, MCC is helping the government implement a plan to gradually allow the national utility to fully recover its costs (including operating expenses, financing costs, capital replacement charges, and capital expansion charges).

As we help countries establish strategies to transition to cost-reflective tariffs, *Power Africa* will also work to ensure equitable pricing structures and social safeguards for those needing low- or no-cost access to electricity. We will also provide support in communicating the logic of cost-reflective pricing to a wide range of stakeholders and assist in campaigns to engage the public.

To stimulate the flow of energy inputs into sub-Saharan countries, we also support policies that reduce import taxes. Solar products often face high import duties that increase the cost of solar power projects, deterring investment and driving up the cost of resulting power generation. Governments have already made efforts to address this issue. In Tanzania, for example, all solar systems and components are exempt from value added tax and some components face no import duties.

We must also continue to evaluate other structural, legal, and regulatory barriers to incentivize investment and innovation, such as laws to protect the intellectual property rights of companies associated with power projects, and established processes through which the private sector can transparently work with governments and communities to mitigate land rights and other environmental and social issues.

CAPACITY BUILDING FOR AFRICAN GOVERNMENTS AND INSTITUTIONS

Power Africa builds capacity by placing advisors with strong technical and management expertise directly in government institutions or state-owned utilities. These advisors work alongside host government officials, sharing knowledge and expertise for a prolonged time. They also work with utilities to improve procurement practices and power sector planning.

This support model strengthens institutions by developing local technical, regulatory, project development, and management skills. We will continue to support officials in the institutions involved in policy-making, planning, and negotiating deals to ensure that the right people get access to the right type of practical knowledge to advance projects. As part of our capacity building efforts, *Power Africa* seeks to ensure that women are empowered and integrated in these processes and in the energy workforce.

In Malawi, MCC funds capacity building initiatives within the Electricity Supply Corporation of Malawi (ESCOM) and the Malawi Energy Regulatory Authority (MERA) that are co-designed by the institutions themselves.

In Southern Africa, the U.S. State Department provides expert technical assistance to national regulators in the Southern Africa Development Community (SADC) to develop electricity tariffs and integrate independent power producers, as well as to SADC's Regional Energy Regulators Association (RERA) to promote improved power sector regulation, private sector investment, and greater use of renewable energy in member states.

In Liberia, for example, *Power Africa* is building the capacity of the Rural and Renewable Agency (RREA) to help it fulfill its mandate of expanding rural grid access. These activities will enable the RREA to absorb over $100 million in funding from the World Bank and AfDB's Scaling Up Renewable Energy Program.

In 2016, *Power Africa* and the Young African Leaders Initiative will also be launching its first class of Energy Fellows and the YALI Specialized Energy Institute. The Institute will bring young African leaders working in the energy sector to the United States for practical training to help build local capacity and leadership.

> Through our partnership with *Power Africa*, we are committed to moving key African energy infrastructure projects forward. The Africa Power Vision (APV) is working to increase access to reliable and affordable energy, and has identified a list of priority energy projects which have strong buy-in and endorsement of African leaders. *Power Africa*'s support to APV projects is critical to helping us achieve our vision to provide access to modern energy and expand the regional impact of the energy sector. With our strong joint commitment to African governments, businesses and organizations, we can truly transform lives across the continent.
>
> Dr. Ibrahim Assane Mayaki, Chief Executive Officer, NEPAD

SUSTAINABLE ENERGY FOR ALL (SE4ALL)

SE4ALL BRINGS TOGETHER LEADERS FROM ALL SECTORS TO TRANSFORM THE WORLD'S ENERGY SYSTEMS

SE4ALL unites governments, the private sector, and civil society to facilitate discussion and align strategies and responsibilities. It aspires to achieve universal access to power, improve energy efficiency, and double the share of renewables in the global energy mix. The SE4All Africa Hub, housed within the African Development Bank, promotes African ownership, inclusiveness, and a comprehensive implementation approach in the 44 member countries.

SE4ALL's Action Agendas offer a comprehensive long-term planning tool for countries to advance reforms and move projects from inception to implementation. SE4All is tasked with a coordination role in the implementation of the G20 Action Plan on Energy Access in Sub-Saharan Africa and is in the process of establishing Secretariats in many African countries to coordinate energy sector activities and follow up on Action Agenda priorities.

SE4All's support has been critical in raising the importance of energy for development at large and getting political agreement and endorsement of the Sustainable Development Goal 7: Ensuring access to affordable, reliable, sustainable, and modern energy for all, which was adopted at the United Nations Sustainable Development Summit in September 2015.

ESTABLISH EFFECTIVE 'DELIVERY UNITS' TO IMPROVE IMPLEMENTATION

One way to maximize the impact of our work is to help set up intra-governmental bodies, such as 'delivery units,' to build local project delivery and policy-making capacity. We work with governments to launch or develop delivery units charged with driving energy projects to completion. *Power Africa* supports several of these intra-governmental bodies.

In Tanzania, for example, we are supporting the Big Results Now! program that is establishing delivery units in ministries for six priority sectors, including energy and natural gas. In Nigeria, we are supporting the launch of the Advisory Power Team (APT), a delivery unit approach to operationalize power sector growth and reform. In Ghana, USAID and MCC are working with state power sector entities to establish and implement an effective regulatory framework for natural gas development and utilization.

LEGAL ASSISTANCE

Power Africa provides legal assistance to build governments' expertise and capacity to negotiate, structure, finance, and close power transactions.

For example, the U.S. Department of Commerce's Commercial Law Development Program (CLDP) has worked with some of the world's top energy lawyers to develop a guidebook on power purchase agreements. *Power Africa*'s *Understanding Power Purchase Agreements* handbook provides a comprehensive guide for African governments seeking to develop PPAs.

This handbook does not provide a one-size-fits-all template, but rather explains the standard elements, critical components, and steps required to develop a successful agreement. In addition, the CLDP has also developed a library of model transactional documents that are tailored to the unique legal challenges in sub-Saharan Africa. These documents help countries and international investors reduce the project development time cycle. CLDP along with the AfDB's African Legal Support Facility (ALSF), and other partners are using the handbook (in both French and English) to lead workshops and discussions across the globe.

One of our partners in particular, the Initiative for Global Development (IGD), has delivered a "PPA 101" workshop for government officials in Botswana, with plans for a similar workshop in Sierra Leone. In addition, IGD is working with ALSF to promote the use of standardized documents for use by public-private partnership personnel engaged in power transactions in Botswana, Guinea, Zambia, and Sierra Leone.

Power Africa also supports the ALSF, which is helping African governments negotiate complex energy transactions, many for the first time. ALSF works with governments to ensure that they have access to high quality international legal representation to negotiate on a level playing field with lawyers representing international project developers. ALSF lawyers also help train government and local lawyers, ensuring increased local capacity and sustainability. The government of Benin's energy team used *Power Africa*'s *Understanding Power Purchase Agreements* handbook to inform their deal negotiations, and *Power Africa* helped the Government swiftly access ALSF-hired lawyers to provide assistance.

> Partnerships are the essence of *Power Africa*. It is driven by private sector investments. It is supported by host country governments. And it is facilitated by multilateral and bilateral donors...We look forward to being part of *Power Africa*, to working together with African nations, with the U.S., and with all the other partners to fight energy poverty in Africa.
>
> Børge Brende, Foreign Minister, Government of Norway.

THE AfDB HELPS AFRICAN GOVERNMENTS WITH ENERGY SECTOR DEVELOPMENT

In 2013, the AfDB announced its support to advance *Power Africa*'s goals as an anchor partner, with a commitment of $3 billion. It invests in transactions, supports policy reforms, provides advisory services to developers, and implements capacity building activities for African partners. It also offers loans, guarantees, and risk insurance. From 2013-2015, the AfDB approved approximately $3 billion in power sector projects across sub-Saharan Africa through all of its windows of assistance (e.g., grants, loans, guarantees, equity investment, technical assistance, etc.).

One of the AfDB's many enabling initiatives is the African Legal Support Facility (ALSF) that helps governments negotiate power transactions. AfDB's Natural Resources Center is designing a negotiations course in collaboration with ALSF.

The AfDB is the largest multilateral finance institution in Africa and is leading the New Deal on Energy in Africa initiative, which aims to resolve Africa's energy deficit by 2025. With 54 member countries, the AfDB has a tremendous platform to engage with governments and leverage international resources to improve local power supply.

Through the New Deal, the AfDB will be addressing seven key themes through its flagship programs: (1) setting up the right enabling policy environment; (2) enabling utility companies for success; (3) dramatically increasing the number of bankable energy projects; (4) increasing the funding pool to deliver new projects; (5) funding 'bottom of the pyramid' energy access programmes; (6) accelerating major regional projects and driving integration; and, (7) rolling out waves of country-wide energy 'turnarounds.'

NATIONAL AND REGIONAL INTEGRATION THROUGH POWER POOLS

Transmission connects generation facilities to urban centers and off-takers and is a critical link in the power supply chain. Without sufficient transmission capacity, generation projects are unlikely to proceed to financial close, or in some cases do proceed but end up "stranded" until the necessary transmission capacity is built. Likewise, distribution systems will only be expanded once sufficient generation and transmission capacity are assured.

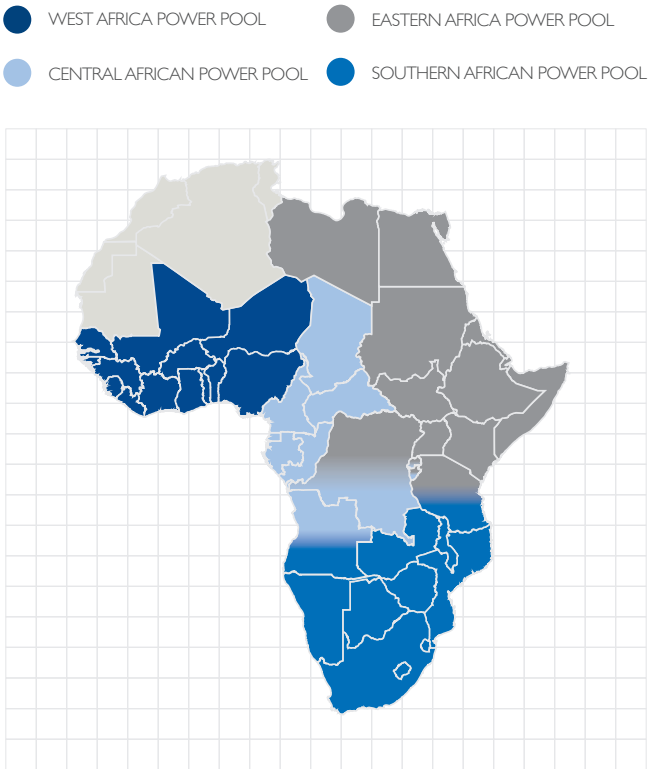
Regional cross-border transmission allows countries with surplus power production to sell power to neighboring countries. Cross-border trade helps encourage efficiency in use of natural resources and stabilizes national grids by distributing risk of outages and the effects of maintenance across more off-takers.

Sub-Saharan Africa has several regional power pools, founded by economic communities in each region. These include the Southern African Power Pool (SAPP), Eastern Africa Power Pool (EAPP), West African Power Pool (WAPP), and Central African Power Pool (CAPP).

Power Africa is actively pursuing opportunities for expansion in three of these regions:

- **East Africa:** Expanding cross-border trade from Ethiopia and Kenya to their East African neighbors; helping to ensure the success of geothermal projects in Kenya, hydro and geothermal projects in Ethiopia, and hydro projects in Uganda; and lowering the price of electricity

EXHIBIT 23
REGIONAL POWER POOLS



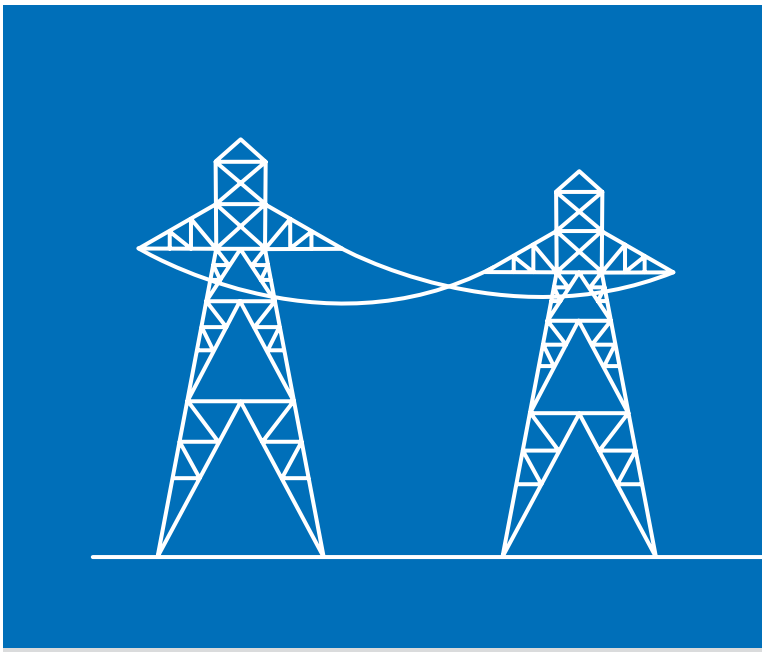
- **West Africa:** Expanding cross-border trade from Ghana, Benin, and Cote d'Ivoire to their West African neighbors, helping to make natural gas projects in Ghana and Benin successful, and reducing dependency on expensive, emissions-heavy fuel oil
- **Southern Africa:** Expanding cross border trade by unlocking utility-scale solar in Zambia, Botswana, Namibia, and South Africa; and hydropower in Mozambique

Power Africa has several roles to play in the development of regional power trade. Our development partners are key financiers of major projects, making direct investments and facilitating greater private investment through risk mitigation products.

We are also helping to develop sustainable financial models to attract private investment. Transmission projects present a challenge for financing because the risks and revenue streams may come from multiple utilities and markets. Transmission financing models on the continent have typically been through debt financing using the utility's balance sheet, concessional-type debt backed by some form of government support, direct on-lending from the government, or grant financing. In the absence of a clear revenue model, it is difficult to attract private sector investment. We have helped utilities design transmission pricing models (including wheeling tariffs) to ensure adequate revenue flows to support ongoing maintenance and operations. These pricing models attract private investment and reduce the burden on the national budget.

Transmission projects are inherently complex, both physically (as they cover hundreds of kilometers) and politically (as they require inputs and coordinated operations and management by many stakeholders). *Power Africa* helps to convene donor partners to coordinate assistance and to align stakeholders around a common action plan. These activities play an integral role in facilitating cross-border trade.

Finally, we provide capacity building support to power pools, particularly in West and East Africa, by seconding full-time staff and providing regular technical assistance on regional power pool development and management. This support ensures knowledge sharing (through exchanges), alignment of essential planning, and improved capabilities in power pools. It also establishes regional centers of excellence and helps countries jointly approach financiers to fund major projects (see features on power pools, and on Norway and Sida on page 77).



Power Pools are an example of the opportunity and imperative of a partnership approach toward investment at a regional level. AfDB, DfID, Norway, Sida, and the U.S. Government are working in partnership with the Eastern Africa Power Pool (EAPP) and other regional institutions to evolve bilateral efforts to a cooperative approach to support regional power trade.

The World Bank is co-financing a 667 km high-voltage power line from Kenya through Tanzania to Zambia, thereby linking the EAPP to the SAPP. The AfDB plays a coordinating role, co-financing a transmission line between Burundi and the Democratic Republic of Congo. In total, more than 20 transmission projects are in planning or underway in East Africa. Collectively, *Power Africa* partners have pushed for prioritization

COMPLETE REGIONAL INTEGRATION THROUGH POWER POOLS

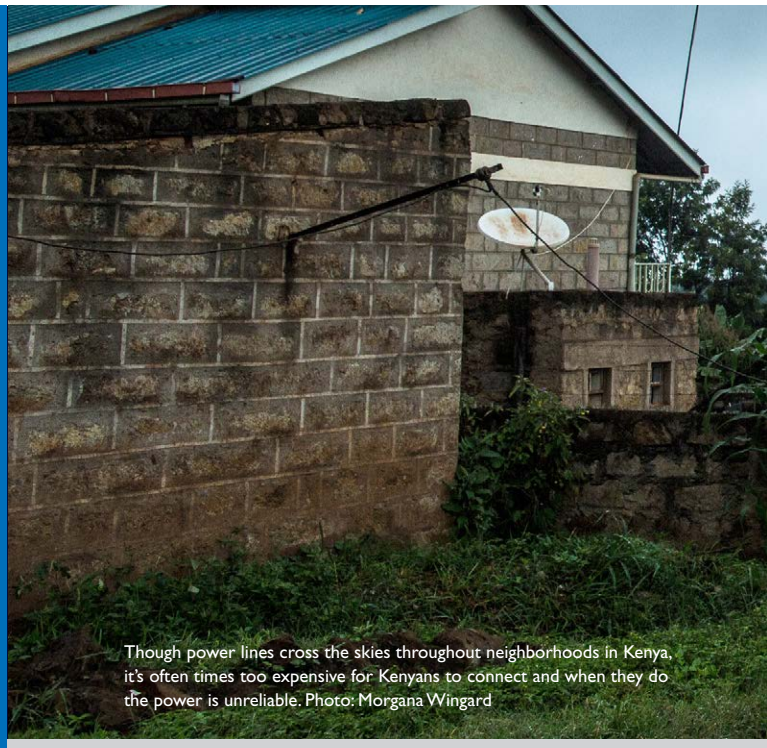
and alignment that supports the success and sustainability of these investments, in partnership with key African institutions.

The West African Power Pool (WAPP) is currently working on five major interconnectors that will facilitate regional integration. *Power Africa* supports the WAPP through full-time seconded staff working within the organization providing direct technical assistance and capacity building.

Power Africa, with support from the Africa Finance Corporation, has also provided a public-private partnership advisor offering transaction support to two regional power projects (450 MW Maria Gleta in Benin and 450 MW Domunli in Ghana). *Power Africa* also provides capacity building through USAID to support the national utilities on regional power pool management and establish regional centers of excellence, while facilitating exchange programs with power pools outside West Africa.

Over the next three years, high-voltage transmission lines will be completed among Ethiopia, Kenya, Uganda, Rwanda, and Tanzania, facilitating the trade of up to 2,000 MW. In partnership with the EAPP, *Power Africa* has helped form a working group of representatives from Ethiopia, Kenya, and Tanzania's (EKT) utilities and regulators to complete the necessary agreements for cross-border trade. The processes developed by the working group will help pave the way for future power agreements among other countries in the region. As surplus power becomes available in Ethiopia, Kenya, and Tanzania, power trade will improve the supply, reliability, and affordability of power in the East Africa region.

THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP



Though power lines cross the skies throughout neighborhoods in Kenya, it's often times too expensive for Kenyans to connect and when they do the power is unreliable. Photo: Morgana Wingard

THE WORLD BANK GROUP HAS COMMITTED $5 BILLION TO *POWER AFRICA* PROJECTS INCLUDING CRITICAL TRANSMISSION WORK

The World Bank Group has been a partner since 2014 when it committed $5 billion to the initiative. The Bank is a major investor in the African energy sector, and has a current portfolio of 46 active projects totaling $9.7 billion. The Bank's approach consists primarily of financial support through loans and guarantees, coupled with capacity building and technical assistance and on specific projects through its respective branches: WB, MIGA, and IFC.

The World Bank Group recognizes the importance of transmission lines in unlocking generation and improving regional power integration, and is a major investor in several transmission projects. In West Africa, the Bank approved a $200 million loan to fund the OMGV Interconnection Project, a regional transmission network connecting Gambia, Guinea, Guinea-Bissau, and Senegal. The project has the ambition to help

countries transition to more cost-effective and sustainable sources of energy, such as hydropower from Guinea.

In East Africa, the World Bank supported the first phase of development of the EAPP. Specifically, it committed $684 million to finance the Eastern Electricity Highway Project linking Kenya and Ethiopia. The project will allow Ethiopia to sell its surplus power to Kenya, thereby reducing Kenya's dependency on thermal power and limiting power shortfalls. The World Bank is co-financing a 667 km high-voltage power line that is part of the backbone to link Zambia to Kenya through Tanzania, thereby connecting the EAPP to the SAPP. The line will also increase the availability and reliability of the power supply in Tanzania. The World Bank financed $150 million of the total $455 million donor commitments.

IFC, the private sector arm of WBG, has built a market-leading franchise in power in Africa, having project financed over 2.5 GW of generation capacity on the continent in the past decade. In the past three years (FY13–15), on an annual average basis, IFC financed 460 MW and committed $850 million to power projects in Africa, increasing activity five times in commitment terms. In addition, IFC is a proven path-finder in markets embarking on reform, be it in generation, utilities, or distribution. As of November 2015, IFC is engaged in 26 arranging and/or financing mandates for power projects in 14 countries across sub-Saharan Africa.

SIDA SEEKS TO MOBILIZE $1 BILLION FOR SUSTAINABLE ENERGY SECTOR DEVELOPMENT WITH A FOCUS ON RENEWABLE ENERGY AND ENERGY EFFICIENCY

In August 2014, Sida announced its partnership with *Power Africa* and committed to mobilize $1 billion for sustainable energy development in sub-Saharan Africa over the next decade. Sida focuses its support entirely on renewable energy and energy efficiency and gives high priority to the avoidance of greenhouse gases.

Sida is engaged in multiple activities to address the financing gap for energy sector development in sub-Saharan Africa, including:

- **Regional integration.** A deepened integration of energy infrastructure contributing to improved efficiencies in terms of how resources are used, both financial and environmental.
- **Strengthening the efficiency of public power utilities.** Continued improvements within publicly-owned power utilities to improve efficiencies, reduce losses, and ensure cost recovery.
- **Continued energy sector reform and strengthened organizational capacity.** To ensure cost reflective tariffs, and independent, impartial, and competent energy sector agencies that enable private sector participation in expanding renewable energy infrastructure.
- **Access to financing of renewable energy investments.** Overcoming barriers to increased private investments in renewable power infrastructure including access to long-term debt financing and stimulating emergence of well-developed and bankable projects. Sida has long-term energy sector cooperation with Mozambique, Tanzania, and Zambia. In addition, specific energy projects are under development in Kenya, Uganda, and Rwanda. Sida may furthermore engage in specific energy projects if they are aligned with one of Sweden's development cooperation strategies that are in place with 15 countries and two strategies for regional cooperation in sub-Saharan Africa.

THE NORWEGIAN MINISTRY OF FOREIGN AFFAIRS WILL DEVELOP 300 MW ANNUALLY, PARTLY THROUGH REGIONAL POWER POOLS

Norwegian Ministry of Foreign Affairs

The Norwegian Ministry of Foreign Affairs and affiliated agencies (Norwegian Agency for Development Cooperation and the Norwegian Investment Fund for Developing Countries (Norfund)) have been supporting renewable energy activities in sub-Saharan Africa for several decades. Through its partnership with *Power Africa*, Norway has committed to bringing online at least 300 MW of new, cleaner power capacity in sub-Saharan Africa annually.

Norway supports African countries to promote the development and use of sustainable energy and mitigate CO2 emissions. Support is also provided through multilateral channels and programs of the World Bank, the African Development Bank, the Climate Investment Fund, Green Climate Fund, Green Africa Power, GEEREF, IRENA, ENDEV, and the Clinton Climate Initiative.

Norway provides technical assistance for power pools and regional energy collaboration (energy planning, power trade, and the expansion of infrastructure) within the framework of the Nile Basin Initiative, the EAPP, and the SAPP.

In addition to this work, Norway provides funding for investment in sustainable power to:

- **Develop generation of renewable energy** — Norway contributes to the development of renewable energy generation in several countries, with a particular emphasis on hydropower. In Liberia, Norway supports the rehabilitation of Mt. Coffee Hydropower Plant. Through Norfund, and partners like SNPower, Scatec Solar, and Statkraft, Norway has supported development of hydro, wind, and solar power projects in South Africa, Rwanda, Kenya, and Uganda.
- **Build capacity** — Norway contributes to building capacity in a variety of ways, through twinning arrangements, university cooperation, support to short-term courses, and joint efforts with multilateral institutions. Norway supports programs in Mozambique, Angola, Tanzania, Liberia, and South Sudan provides capacity building to African regulators through the African Electricity Regulators Peer Review and Learning Networks.
- **Further develop transmission and distribution** — Norway also provides funds to the development of transmission and distribution lines in several countries, including Uganda, Mozambique, Tanzania, and Ethiopia.

CONCLUSION

Not only is *Power Africa* expanding access to power, it is helping to shape Africa's energy path. This Roadmap lays out *Power Africa*'s approach to increasing generation by 30,000 MW and adding 60 million connections. It also shows the way to an energy sector that is economically and environmentally sustainable.

The Roadmap outlines a three-pillar framework in which private power sector investment creates greater opportunities on the continent.

To reach our goal, each stakeholder has important roles to play. African governments would undertake the necessary reforms to attract and sustain private sector investment. Private and public sector partners would deliver power to communities, spanning the value chain across power generation, transmission, and distribution. We provide support in the form of the *Power Africa* Toolbox to accelerate deal flow with new investment and build country capacity to sustainably develop and manage the energy sector. By working together, we can accelerate the growth of sub-Saharan Africa's power sector.

With approximately 45,000 MW of projects in our *Power Africa* Tracking Tool, our first priority is to maximize the potential of these transactions by expanding our transaction advisory assistance model. We will provide this support in new markets and will scale up early-stage project support and innovative financing mechanisms. We must also identify new transactions, particularly in gas and utility-scale solar (and geothermal and wind in certain regions), and bring underutilized power plants up to target capacity.

We match these efforts to increase generation capacity with measures to ensure that power reaches households and businesses. We will support grid expansion at scale in densely populated urban and rural areas, and will use our *Beyond the Grid* tools to connect households and businesses in remote areas.

Photo: Mathieu Young/Off Grid Electric

The Roadmap lays out critical enablers required to unlock generation and connection opportunities. We will support African governments to build capacity and to make the necessary legal and regulatory reforms to increase investment and grow the power sector. Our support for delivery units will build capacity for project delivery and energy sector reform by bolstering local capabilities. In addition, critical regional transmission projects can unlock "stranded" generation and help to strengthen national grids. We will also invest in institutions such as trade associations and engage with civil society to ensure that the private sector and local voices help to shape policy and regulatory reforms.

Our partnerships provide the resources to make this possible; the Roadmap details how we will make this a reality.

Our innovative, transaction-focused approach aims to build a thriving and sustainable power sector that no longer requires donor intervention. Our partnership approach allows us to institutionalize a strong working relationship among African governments, utilities, regulators, the private sector, civil society actors, and affected communities. Similar to a trade or business association, *Power Africa* is an essential vehicle for ensuring each constituency has adequate representation and support. We share knowledge and mitigate sector-level risks; support governments to accelerate reforms and adapt to changing circumstances; and help communicate key concerns of local communities on environmental and policy issues.

We play this role alongside existing trade and business associations and fill the gap in the many places where such organizations do not exist or are limited in size and reach. We know that we have to work with other development partners to strengthen those associations that do exist and perhaps establish new ones — so that they don't need us in the future. We know that civil society organizations and affected communities play a unique and critical role in ensuring that their energy access needs are met. By building *Power Africa*'s network and providing local capacity building, we are helping to ensure African governments and communities can execute their vision for Africa's power sector. Ultimately, we are working toward a future where local communities and leaders — without the support of *Power Africa* — will be empowered to connect the right people to the right organizations and resources to achieve universal access to affordable, reliable, sustainable electricity.

Working together we can achieve our ambitions, expand access to power across the continent, and offer brighter futures to millions of Africans.

APPENDICES

1. GLOSSARY OF ACRONYMS AND ABBREVIATIONS

ACEI	American Capital Energy and Infrastructure
AfDB	African Development Bank
AFC	Africa Finance Corporation
ALSF	African Legal Support Facility
APV	Africa Power Vision
AREF	African Renewable Energy Fund
AU	African Union
AUC	African Union Commission
CAPP	Central African Power Pool
CLDP	Commercial Law Development Program (U.S. Government, Department of Commerce)
DCA	Development Credit Authority (U.S. Government, USAID)
DFID	Department for International Development (United Kingdom)
DIV	Development Innovation Venture (U.S. Government, USAID)
EAPP	Eastern African Power Pool
ECG	Electricity Company of Ghana
ENR	Bureau of Energy Resources (U.S. Government, Department of State)
EU	European Union
EXIM	Export-Import Bank of the United States
GDA	Global Development Alliance (U.S. Government, USAID)
GW	Gigawatts
HFO	Heavy fuel oil
IDC	Industrial Development Corporation
IEA	International Energy Agency

IFC	International Finance Corporation
IPP	Independent power producer
LED	Light-emitting diode
MCC	Millennium Challenge Corporation
MERA	Malawi Energy Regulatory Authority
MW	Megawatts
MOU	Memorandum of understanding
NBET	Nigeria Bulk Electricity Trading Company
NEDCO	Northern Electricity Distribution Company (Ghana)
NEPAD	New Partnership for Africa's Development
NGO	Non-governmental organization
OPIC	Overseas Private Investment Corporation
PATRP	*Power Africa* Transactions and Reforms Program
PAYG	Pay-as-you-go
PIU	Project implementation unit
PPA	Power purchase agreement
PPP	Public-private partnership
PRG	Partial risk guarantee
PV	Photovoltaic
REIPP	Renewable Energy Independent Power Producers Program (South Africa)
SAPP	Southern African Power Pool
SE4ALL	Sustainable Energy for All initiative
SEFA	Sustainable Energy Fund for Africa
SIDA	Swedish International Development Cooperation Agency
UN	United Nations
USAID	United States Agency for International Development
USADF	United States African Development Foundation
USEA	United States Energy Association
U.S.-ACEF	U.S.-Africa Clean Energy Finance initiative
USTDA	United States Trade and Development Agency
WAPP	West African Power Pool
WBG	World Bank Group

2. PRIVATE SECTOR PARTNERS[1]

58 DEVELOPERS AND SPONSORS DEVELOP AND MANAGE *POWER AFRICA* PROJECTS

Abengoa
Aeolus Kenya Ltd
Aldwych International
Angaza Design
APR Energy
Azura Power Holdings
Azuri Technologies*
BBOXX*
BioTherm Energy (Denham Capital Management)
d.Light*
Dominovas Energy
dVentus Technologies
EA Power, Ltd
EGG-Energy
Embark Energy*
Energiya Global*
Fenix International*
General Electric
GG Energy Holdings
Gigawatt Global
Globeleq Advisors
GreenMax
Harith General Partners
Hecate Energy
Husk Power Systems
IAP Worldwide Services
KMR Infrastructure
Liberia Energy Network*
Little Sun*
M-KOPA Solar*
Milhouse
Mobisol*
Morganti
NextGen Solar
Nigeria Solar Capital
Nova Lumos
Novi Energy
Off Grid Electric*
Orchid Business Group
Ormat Technologies
Peppermint Energy*
PowerGen Renewable Energy*
Powerhive*
Proton Energy
PW Power Systems
Quantum Power
Reykjavik Geothermal
SoEnergy International
SolarReserve
Solar Sister*
Solektra*
SunEdison
Symbion Power
Upepo Energy
Vestas
Viability Africa
Virunga Power*
Vital Capital

45 PRIVATE EQUITY AND DEBT FINANCIERS PROVIDE FUNDS AND ADVISORY FOR *POWER AFRICA* PROJECTS

Abraaj Group
Acumen Fund*
AFCORP Investments
African Capital Alliance
African Finance Corporation
African Infrastructure Investment Mgmt (AIIM)
African Power Corporation
American Capital Energy Infrastracture (ACEI)
Bamboo Finance*
Barclays Africa
Berkeley Energy
Beyond Capital Fund*
Black Rhino
Blue Haven Initiative
Capricorn Investments*
Christian Super
Citigroup
Consolidated Infrastructure Group
CrossBoundary*
Denham Capital Management
Development Bank of Southern Africa
Endeavor Energy Holdings (Denham Capital Management)
Global Environment Fund
Goldman Sachs
Gray Ghost Ventures*
Heirs Holdings
Imprint Capital*
Industrial Development Corporation of South Africa
Industry Capital
Interlink Capital Strategies
Investec Capital
Invested Development*
JCM Capital
Khosla Impact*
Kiva*
Mosaic*
Nedbank
Persistent Energy Partners*
Platinum Partners
responsAbility Investments AG*
Schneider Electric*
Standard Bank Group, Ltd
Standard Chartered
SunFunder*
United Bank for Africa

15 ASSOCIATIONS, FOUNDATIONS, AND NON-PROFITS PROVIDE SUPPORT, RESEARCH, AND FUNDS TO *POWER AFRICA* PROJECTS

Calvert Foundation*
Corporate Council on Africa
Eleos Foundation*
Geothermal Energy Association
Global Off-Grid Lighting Association*
Global Village Energy Partnership*
Initiative for Global Development
LGT Venture Philanthropy*
Low Carbon Enterprise Fund (ERM Foundation)*
National Rural Electric Cooperative Association
Rockefeller Foundation*
Shell Foundation*
Tony Elumelu Foundation*
U.S. Energy Association
United Nations Foundation*

[1] List of partners as of January 2016
* *Beyond the Grid*-focused partner

3. TRANSACTION DATA AS OF Q4 2015

TABLE 1A: ALL TRACKED PROJECTS BY TECHNOLOGY (ESTIMATED MW)

Region	Natural Gas	Hydro	Solar	Geothermal	Wind	Biomass	Transmission	Other	Total
West Africa	10,600	6,500	1,400	–	550	100	–	250	19,400
East Africa	4,200	4,200	1,950	2,550	1,800	500	–	–	15,200
Southern Africa	2,450	5,300	1,400	–	150	100	–	–	9,400
Central Africa	100	1,000	–	–	–	–	100	–	1,200
Total	17,350	17,000	4,750	2,550	2,500	700	100	250	45,200

TABLE 1B: ALL TRACKED PROJECTS BY TECHNOLOGY (NUMBER OF PROJECTS)

Region	Natural Gas	Hydro	Solar	Geothermal	Wind	Biomass	Transmission	Other	Total
West Africa	24	48	25	–	5	6	15	3	126
East Africa	13	28	28	18	12	13	2	–	114
Southern Africa	10	40	32	1	3	4	–	–	90
Central Africa	2	10	2	–	–	1	1	–	16
Total	49	126	87	19	20	24	18	3	346

TABLE 2A: ALL TRACKED PROJECTS BY STAGE (ESTIMATED MW)

Region	Stage 1	Stage 2	Stage 3	Stage 4	Total
West Africa	9,400	5,300	1,300	3,500	19,500
East Africa	11,400	1,300	1,600	800	15,100
Southern Africa	7,900	1,200	300	–	9,400
Central Africa	800	300	100	–	1,200
Total	29,500	8,000	3,300	4,300	45,200

TABLE 2B: ALL TRACKED PROJECTS BY STAGE (NUMBER OF PROJECTS)

Region	Stage 1	Stage 2	Stage 3	Stage 4	Total
West Africa	66	37	19	3	126
East Africa	67	19	20	8	114
Southern Africa	78	7	5	–	90
Central Africa	9	4	2	1	16
Total	220	67	46	12	346

TABLE 3A: ALL TRACKED PROJECTS BY STAGE AND TECHNOLOGY (ESTIMATED MW)

Stage	Natural Gas	Hydro	Solar	Geothermal	Wind	Biomass	Transmission	Other	Total
Stage 1	7,300	15,500	3,000	1,900	1,100	600	–	200	29,600
Stage 2	5,000	500	1,400	500	500	100	–	100	8,100
Stage 3	1,700	300	450	200	550	–	100	–	3,300
Stage 4	3,200	600	–	–	400	–	–	–	4,200
Total	17,400	16,900	4,800	2,600	2,400	700	100	300	45,200

TABLE 3B: ALL TRACKED PROJECTS BY STAGE AND TECHNOLOGY (NUMBER OF PROJECTS)

Stage	Natural Gas	Hydro	Solar	Geothermal	Wind	Biomass	Transmission	Other	Total
Stage 1	22	103	52	12	11	15	4	1	220
Stage 2	11	12	26	4	4	3	6	1	67
Stage 3	9	9	8	3	3	5	8	1	46
Stage 4	7	2	1	–	2	1	–	–	13
Total	49	126	87	19	20	24	18	3	346

TABLE 4A: POWER AFRICA SUPPORTED PROJECTS BY TECHNOLOGY (ESTIMATED MW)

Region	Natural Gas	Hydro	Solar	Geothermal	Wind	Biomass	Transmission	Other	Total
West Africa	10,600	6,000	1,300	–	500	100	–	100	18,600
East Africa	800	2,400	1,950	2,550	500	400	–	–	9,700
Southern Africa	–	1,000	900	–	150	–	–	–	2,050
Central Africa	100	200	–	–	–	–	–	–	300
Total	11,400	9,600	4,150	1,700	1,150	500	–	100	28,600

TABLE 4B: POWER AFRICA SUPPORTED PROJECTS BY REGION AND TECHNOLOGY (NUMBER OF PROJECTS)

Region	Natural Gas	Hydro	Solar	Geothermal	Wind	Biomass	Transmission	Other	Total
West Africa	24	44	19		5	6	15	2	115
East Africa	5	12	19	11	8	5	–	–	60
Southern Africa	–	12	16	1	1	–	–	–	30
Central Africa	–	3	2	–	–	–	–	–	5
Total	29	71	56	12	14	11	15	2	210

TABLE 5A: FINANCIALLY CLOSED PROJECTS BY TECHNOLOGY (ESTIMATED MW)

Country	Natural Gas	Hydro	Solar	Wind	Biomass	Total
Ghana	340	–	–	–	–	340
Nigeria	2,770	640	–	–	–	3,410
Kenya	–	–	–	370	10	380
Tanzania	150	10	–	–	–	160
Rwanda	–	–	10	–	–	10
Total	3,260	650	10	370	10	4,300

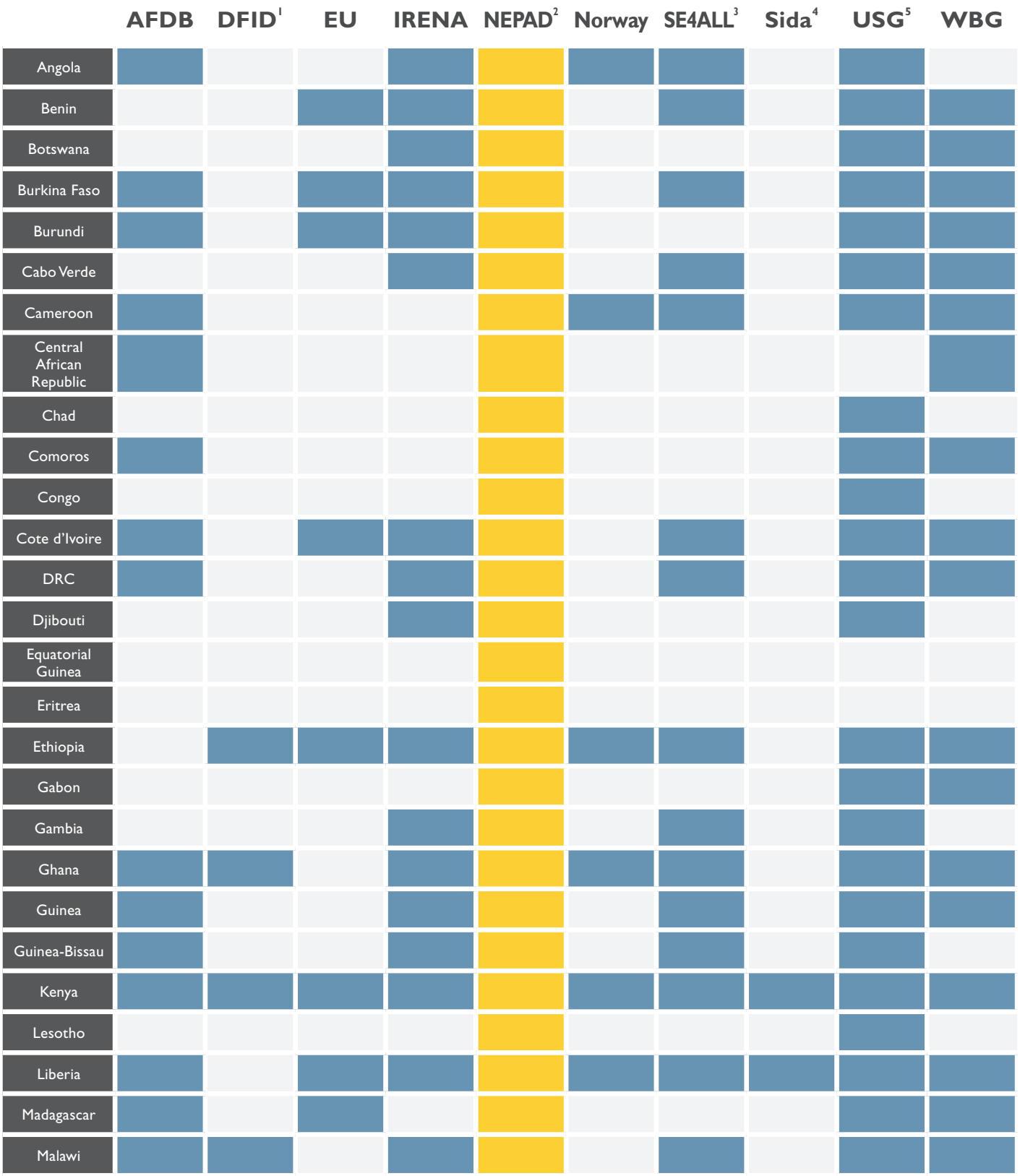
- WEST AFRICA
- EAST AFRICA
- SOUTHERN AFRICA
- CENTRAL AFRICA

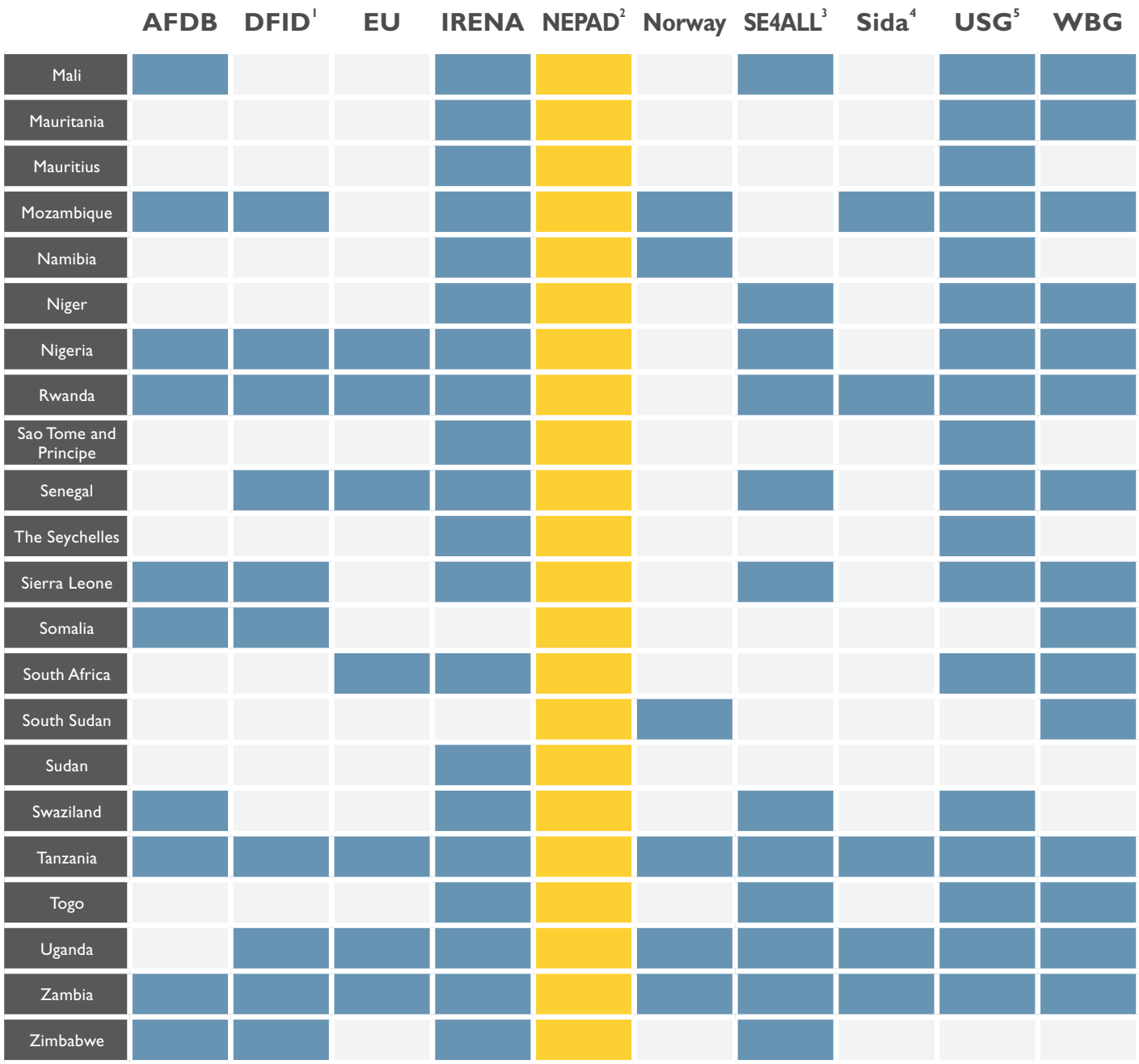
TABLE 5B: FINANCIALLY CLOSED PROJECTS BY TECHNOLOGY (NUMBER OF PROJECTS)

Country	Natural Gas	Hydro	Solar	Wind	Biomass	Total
Ghana	1	–	–	–	–	1
Nigeria	5*	1*	–	–	–	6
Kenya	–	–	–	2	1	3
Tanzania	1	1	–	–	–	2
Rwanda	–	–	1	–	–	1
Total	7	2	1	2	1	13

*In order to disaggregate by technology, *Power Africa* counts the added capacity resulting from the Nigerian privatizations as two transactions - one hydro and one natural gas.

4A. ENABLING ENVIRONMENT ASSISTANCE
ASSISTANCE BY DEVELOPMENT PARTNER





This indicative table summarizes strategic and development partner engagement since the launch of *Power Africa* in 2013, and may include gaps. Enabling environment assistance can include any support related to regulatory reform, capacity building and knowledge sharing, policies and planning, and utility strengthening. Planned activities or those currently in development may not be listed.

[1] DFID column includes NEW Energy Africa countries (Ghana, Malawi, Mozambique, Rwanda, Senegal, Somalia, Zambia, and Zimbabwe) where activities have not actually begun implementation as of 2015. The DFID column does not include countries which may be supported under other programming.

[2] NEPAD has a mandate to provide assistance across the continent. Assistance can include policy/regulatory reform and capacity building efforts.

[3] SE4ALL data indicates countries in which SE4ALL Action Agendas have either been completed or are in development.

[4] Sida is currently developing energy-specific programs in additional countries, and may engage elsewhere across sub-Saharan Africa where they have a cooperation strategy.

[5] USG data includes activities implemented by the Export-Import Bank of the United States, the Millennium Challenge Corporation, the Overseas Private Investment Corporation, the U.S. African Development Foundation, the U.S. Agency for International Development, the U.S. Department of Commerce, the U.S. Department of Energy, the U.S. Department of State, and the U.S. Department of the Treasury, including diplomatic engagement through United States Embassies, focused on advancing commercial and/or policy reforms that enable private sector investment and sector growth.

4B. USG ENABLING ENVIRONMENT ASSISTANCE

	Regulatory Reform	Capacity Building & Knowledge Sharing	Policies & Planning[1]	Utility Strengthening
Angola	■	■	■	■
Benin	■	■	■	■
Botswana			■	
Burkina Faso			■	
Burundi			■	
Cabo Verde			■	
Cameroon			■	
Chad			■	
Comoros			■	
Congo			■	
Cote d'Ivoire			■	
DRC		■	■	
Djibouti		■	■	
Ethiopia	■	■	■	■
Gabon			■	
Gambia			■	
Ghana	■	■	■	■
Guinea			■	
Guinea-Bissau			■	
Kenya	■	■	■	■
Lesotho	■		■	
Liberia	■	■	■	■

	Regulatory Reform	Capacity Building & Knowledge Sharing	Policies & Planning[1]	Utility Strengthening
Madagascar			■	
Malawi	■	■	■	■
Mali			■	
Mauritania			■	
Mauritius			■	
Mozambique	■	■	■	■
Namibia	■	■	■	
Niger			■	
Nigeria	■	■	■	■
Rwanda		■	■	
Sao Tome and Principe			■	
Senegal		■	■	■
The Seychelles			■	
Sierra Leone	■	■	■	■
South Africa	■	■	■	■
South Sudan			■	
Sudan			■	
Swaziland	■		■	
Tanzania	■	■	■	■
Togo			■	
Uganda		■	■	
Zambia			■	

This indicative table includes activities implemented by the Export-Import Bank of the United States, the Millennium Challenge Corporation, the Overseas Private Investment Corporation, the U.S. African Development Foundation, the U.S. Agency for International Development, the U.S. Department of Commerce, the U.S. Department of Energy, the U.S. Department of State, and the U.S. Department of the Treasury. It summarizes USG engagement on power sector enabling environment issues across sub-Saharan Africa, and may include gaps. Programs or activities currently in development may not be listed.

[1] Includes diplomatic engagement through United States Embassies, focused on advancing commercial and/or policy reforms that enable private sector investment and sector growth.

5. SAMPLE OF MONITORING AND EVALUATION INDICATORS

TOPLINE INDICATORS

Electricity Access	Number of on-grid and off-grid connections
MW & Transactions Reached Financial Closure	Number of MW and transactions that achieved financial closure
MW & Transactions Pending Financial Closure	Number of MW and transactions that have not yet achieved financial closure
MW & Transactions Commissioned	Number of MW and transactions that have been commissioned

ADDITIONAL INDICATORS

Regional Electricity Trade	New electricity capacity committed for regional trade through bilateral agreements
Substation Capacity Added	The total added transmission or distribution substation capacity that is energized, commissioned, or accompanied by a test report and supervising engineer's certification resulting from new construction or refurbishment of existing substations
Kilometers of Power Lines Constructed or Rehabilitated	The sum of linear kilometers of new, reconstructed, rehabilitated, or upgraded transmission lines that have been energized, tested and commissioned
Aggregate Losses	Total technical and non-technical electricity losses / total electricity generated
Energy Efficiency	Expected lifetime energy efficiency or energy conservation as a result of *Power Africa* activities
Greenhouse Gas Emissions Reduced	Greenhouse gas (GHG) emissions, estimated in metric tons of CO_2e, reduced, sequestered, and/or avoided as a result of USG assistance
National Energy Mix	% of MW from clean energy technology
Investment Mobilized	Amount of investment mobilized (in USD) for energy projects as supported by *Power Africa*
Utilization of Risk Mitigation Tools	Utilization of risk mitigation tools by developers of qualified transactions supported by *Power Africa*

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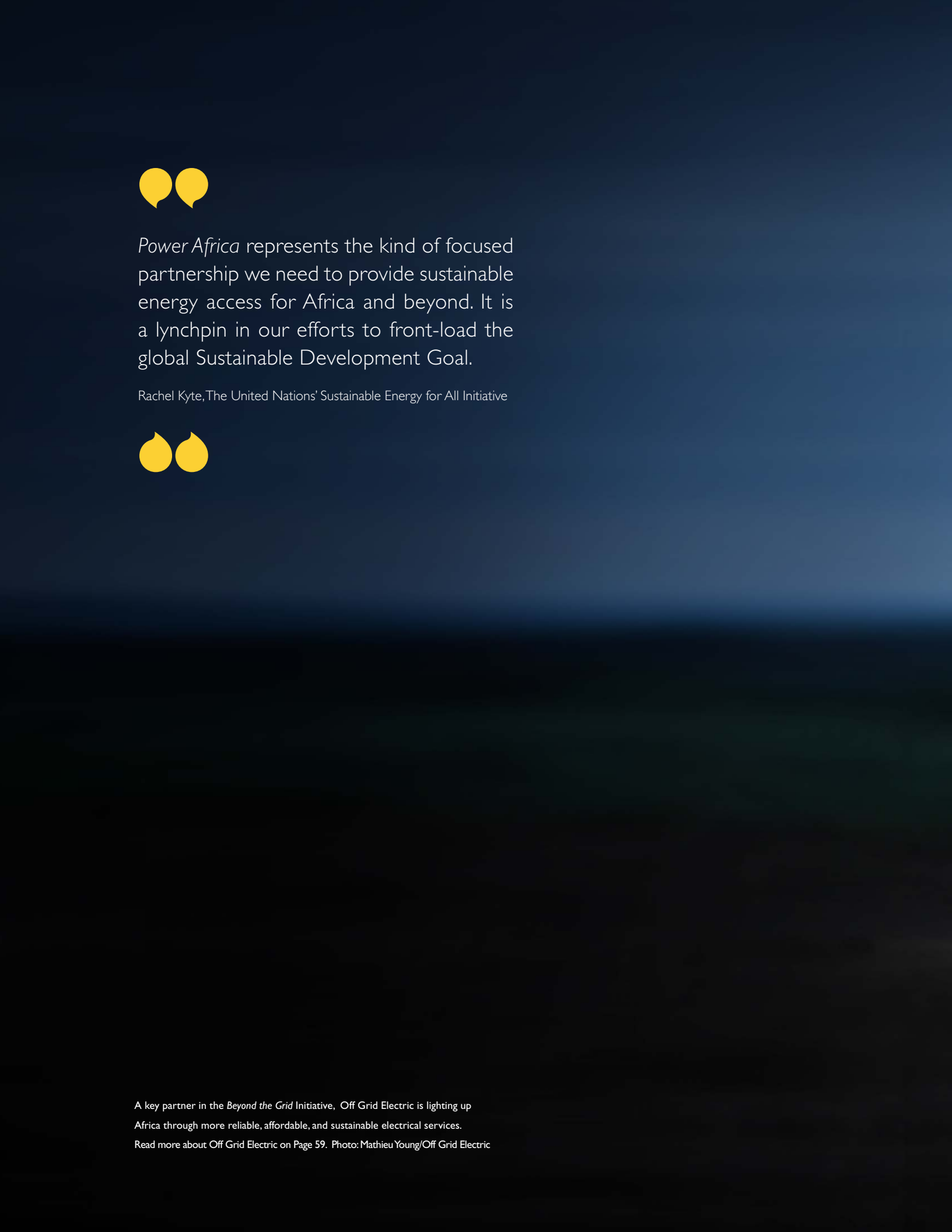
Power Africa represents the kind of focused partnership we need to provide sustainable energy access for Africa and beyond. It is a lynchpin in our efforts to front-load the global Sustainable Development Goal.

Rachel Kyte, The United Nations' Sustainable Energy for All Initiative



A key partner in the *Beyond the Grid* Initiative, Off Grid Electric is lighting up Africa through more reliable, affordable, and sustainable electrical services. Read more about Off Grid Electric on Page 59. Photo: Mathieu Young/Off Grid Electric