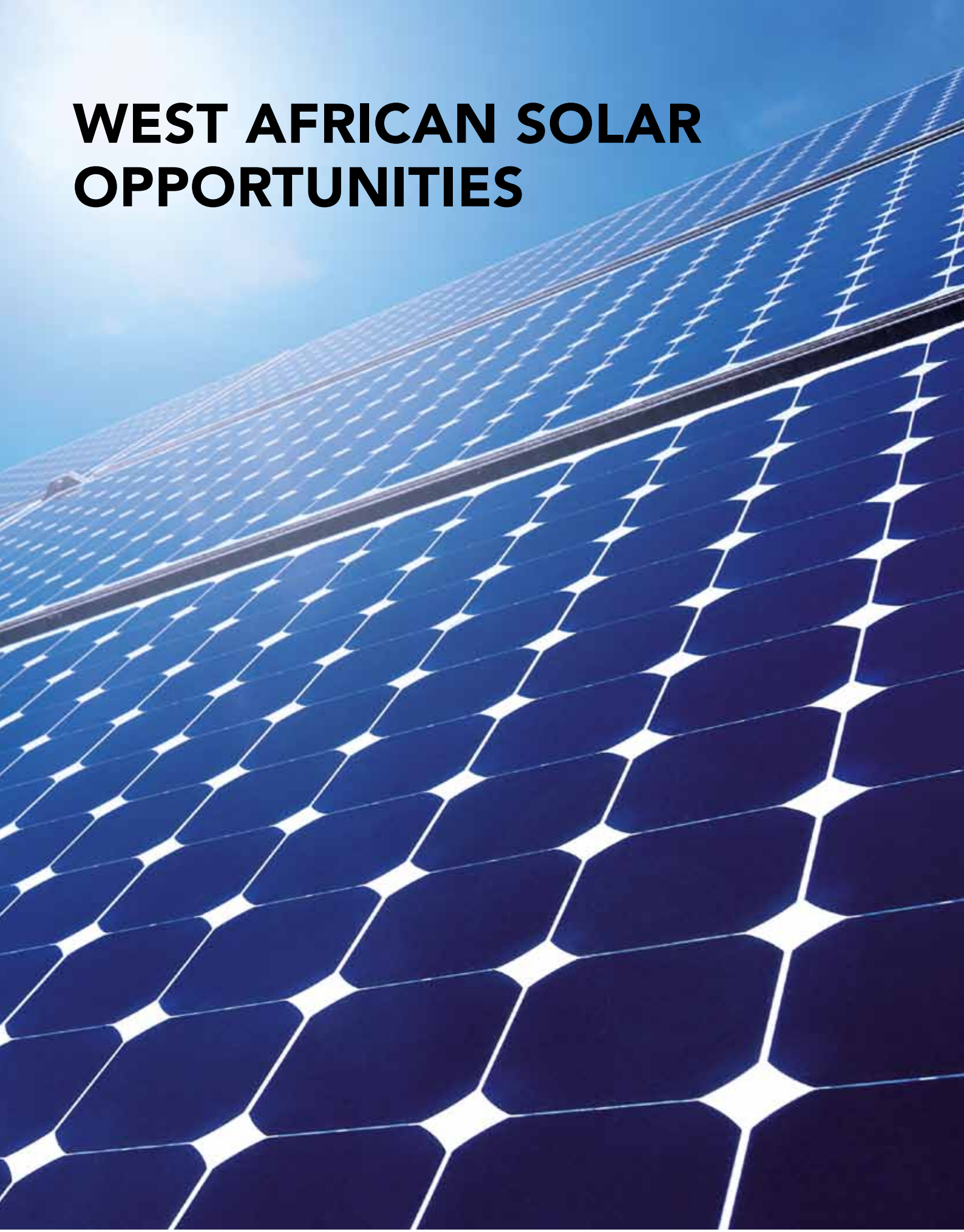
WEST AFRICAN SOLAR OPPORTUNITIES



PVTECH

SOLAR MEDIA

WEST AFRICAN SOLAR OPPORTUNITIES

West Africa has more than 5,000MW of solar in the pipeline. Earlier this month, Sierra Leone and the Abu Dhabi Fund for Development signed a $9 million deal for a 6MW project in Freetown and in Ghana, the first 40MW tranche of a 200MW project got underway. The Ghana project, worth $117 million will feed into Ghana's grid.

Ghana's feed-in tariff, announced in 2011, has attracted applications for 2,000MW of solar energy projects. Among them are Blue Energy, building the 155MW Nzema plant and International Solar Utilities, which is planning a 300MW manufacturing facility and 600MW of solar split equally across six sites in Ghana – both companies will be represented at PV Tech's **Solar & Off-Grid Renewables West Africa conference in Accra on 16-17 September 2014.**

The event is an opportunity to meet international experts working in West Africa and to examine utility-scale projects, the possibility to work with industrial off-takers such as mining companies and rural electrification projects. Storage and micro-grids will also be explored.

Ghana is the ideal location to meet in September; it was the first African nation to seek independence from colonisation and stands as a symbol of achievement and inspiration to other African countries. Ghana has the highest per capita income in West Africa and is rich in natural resources. Its established heavy industries need access to sustainable energy, offering a huge opportunity to the solar industry. Ghana's economic growth is strong, sitting at almost 9% in 2012. Ghana benefits from a strategic and central location within the West Africa sub-region providing access to a total market of around 250 million people.

Ghana has pinned its growth strategy to science and technology and already has a well-developed ICT sector as well as a strong local consumer electronics manufacturing industry.

Along with Ghana, West Africa is primed for growth and as economies strengthen, demand for energy will increase. Solar offers an ideal solution for both on and off-grid applications. Coupled with storage and micro-grids, countries across West Africa have the chance to leapfrog traditional technology such as a centralised, national grid, and roll out clean, sustainable energy that meets the needs of modern communities.

With a pipeline of more than 5,000MW, West Africa is an exciting solar market and offers a once-in-a-lifetime opportunity to provide jobs, training and electricity across the region.

My colleagues and I look forward to sharing these opportunities with you during our two-day conference in Ghana and throughout this report.

Best Regards,

Jo-Anne Duff
Conference Manager, Solar & Off-Grid Renewables West Africa

http://westafrica.solarenergyevents.com

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Introduction: West Africa sets sights on solar

By Ben Willis, Solar Media

Poverty and conflict have put West Africa behind the rest of the world in the deployment of solar. But the implementation of sweeping renewable energy goals means solar has a big chance to gain a foothold in the region, says Ben Willis

As the deployment of solar energy continues its onward march around the globe, one region that is quietly eyeing up the opportunities the technology presents is West Africa.

With few exceptions, the 15 countries that make up the region's political bloc, the Economic Community of West African States (ECOWAS), are characterised by extreme poverty and low levels of electrification. Recent ECOWAS figures put the region's average rate of household access to electricity at just over 32% and as low as 8% in Liberia and 9% in Niger.

But with GDP growth in a number of West African countries now outstripping rates seen by many of their western counterparts, demand for electricity is on the increase. A combination of rural remoteness and inadequate grid infrastructure means electrification is a difficult and potentially costly process in West African countries. But one thing West Africa has in abundance is solar energy potential, averaging 4-6.5kW/m2, making this form of generation an obvious candidate for meeting the region's growing appetite for affordable power.

"The potential for solar energy in West Africa is significant," says Mahama Kappiah, executive director of the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE). "There are opportunities to adopt small-scale, large-scale, grid and off-grid solar power systems considering the region's solar resources. In addition, electricity demand is on the increase as income and socio-economic conditions improve across the region. Solar energy can diversify the current energy mix and help to meet this demand."

Theoretically all West African countries have the potential for solar development. In terms of an abundance of resources, ECREEE identifies Mali, north-east Senegal, the Cape Verde Islands, Niger, Burkina Faso, northern Nigeria and northern Côte d'Ivoire as areas showing the most promise.

Solar power's small presence in West Africa is set to grow as more countries recognise its potential. *Source: Martin Wegmann (wikimedia user: Wegmann)*

A handful of those countries and others in the region have shown some initiative in developing the necessary policies and subsidies to help solar gain a foothold. Senegal, for example, has a standard law in place for solar power purchase agreements and is in the process of developing a renewable energy tariff framework. Burkina Faso is in the process of developing a similar mechanism. And Ghana's 2011 Renewable Energy Act has set the country a target of meeting 10% of its 2020 electricity demand from renewable resources.

But according to Kappiah, the region currently lacks uniformity in terms of concrete and operational incentives specifically to encourage solar technology adoption, such as a domestic feed-in tariff.

"At present, solar PV remains the most expensive renewable energy technology per kilowatt and so the need for incentives cannot be over-emphasised," he says. "Although the technology has reached market maturity, institutional frameworks are just being developed in most West African countries. However incentives like feed-in tariffs in many West African countries are either still upcoming, in draft stages or are not yet approved by law for implementation."

Regional challenges

Beyond the lack of incentives, the development of solar in West Africa faces a host of other technical, non-technical and financial barriers. These include a lack of skilled manpower for the design, installation and maintenance of solar projects, a lack of quality control and warranties and little local capacity for maintenance and after-sales service.

And West African solar projects are often too small to attract private capital, says Kappiah. "The private sector hesitates to take the risks and banks are also reluctant due to the small size of the investments. Financial challenges include the lack of new and real financing mechanisms in the region," he says.

A further impediment to solar energy flourishing in West Africa is its reputation for conflict and political instability. Nigeria, for example, is contending with the growing threat from the terrorist group Boko Haram, while the presence of Al Qaeda-affiliated insurgents in northern Mali and other parts of the Maghreb threatens to further destabilise the region. And away from these headline-grabbing conflicts, the whole region has a reputation for corruption that, real or perceived, is enough to deter investors

"West Africa, as with most of Africa, suffers from generally low foreign investment flows due to the perceived risks associated with doing business," says Kappiah. "Investors want transparency, longevity, certainty and consistency. The key challenges are that institutional, regulatory, legal and tariff structures and frameworks are largely non-existent or weakly implemented."

But this situation is changing, Kappiah ▶

believes. “Foreign companies are becoming increasingly active in the region’s energy sector, given the market potential that abounds,” he says. “The ECOWAS member states continue to address the barriers to foreign investments, particularly in the energy sector, and encourage public-private partnerships and independent power producers. Electricity sector reforms are also ongoing to boost investor confidence.”

Promising signs

Kappiah’s optimism is borne out on the ground, with a number of countries now forging ahead with solar projects. Cape Verde already has an installed solar capacity of 7.5MW and Burkina Faso has a 20MW European Union-funded project at an advanced stage.

In Ghana, a 2MW grid-connected solar farm in the Upper East Region being developed by power utility the Volta River Authority is scheduled for commissioning in May 2013, while the 155MW Nzema solar project being developed by the UK’s Blue Energy and billed as Africa’s largest PV plant, is in the final stages of project financing (see box overleaf). Senegal, meanwhile, has allocated 120MW of independent power producer PV capacity to be commissioned before 2017 and the country is home to West Africa’s only PV manufacturing plant, SPEC’s 15MW facility located in the capital Dakar.

So how can the West Africa move from these promising early signs to a level of solar deployment that truly reflects the region’s enormous potential?

Two mechanisms that may help stimulate greater solar energy deployment are the ECOWAS renewable energy policy (EREP) and the ECOWAS energy efficiency policy approved by the region’s energy ministers in October last year. These policies include minimum targets for renewable energy and energy efficiency and a range of measures, standards and incentives to be implemented at regional and national levels.

EREP sets targets for an increased use of renewable energy sources such as solar, wind, small-scale hydro and bioenergy. It aims to increase the share of renewable energy in the region’s overall electricity mix to 10% in 2020 and 19% in 2030.

Published alongside EREP is an implementation plan specifying that by the end of 2014, all 15 ECOWAS countries should have developed and adopted national renewable energy action plans and policies. These will include renewable energy targets based on national potential and socio-economic assessments, and, importantly, will also set out the concrete laws and incentives each country will need to implement to achieve their targets. ECREEE has been charged with leading this process and with assisting member states in implementing their plans. “This will go a long way in promoting solar energy in the region,” says Kappiah.

Capitalising on falling costs

Assuming these plans and policies are produced and, more importantly implemented, the consensus is that solar energy will enjoy widespread adoption throughout West Africa.

According to Anthony Ighodaro, chair of the steering committee of the African Renewable Energy Alliance, the big opportunity for solar is to take advantage of its falling costs to compete with diesel generation. In countries such as Nigeria, where electricity supply is intermittent, diesel generators play an important role, but are expensive.

“The prices of solar have dropped so suddenly, it’s now really competitive with diesel generation,” says Ighodaro. “And that makes more sense in places like Nigeria, where private generators produce more electricity than utilities. So you have the possibility of private PV generation substantially replacing a lot of diesel generation.”

Kappiah stresses that the adoption of PV in West Africa will rely on the costs of solar coming down even more than they already have. One sign this may happen is the recent news that the Nigerian government is looking to establish a ‘Silicon Valley’ style science park to develop a domestic PV manufacturing industry, as Senegal has.

“The market trend indicates a price decrease for renewable energy technologies on the one hand and a price increase for fossil fuel costs on the other hand,” Kappiah says. “Price reduction for solar technologies is foreseen within the next 20 years. Solar energy therefore has the potential to constitute a key component in the region’s overall energy mix and we expect to see significant growth in the coming years.”

Ghana leads the way for West Africa

UK developer Blue Energy is playing a pioneering role in West Africa by taking forward what is billed as Africa’s largest PV installation. The 155MW Nzema plant in the country’s Western Region is at an advanced stage of planning, with the company in the process of securing financing for the project.

According to project director Douglas Coleman, the prompt to look at Ghana was the national government’s approval in 2011 of a renewable energy law. This set a target of meeting 10% of the country’s total electricity demand from renewable sources by 2020 and put in place a feed-in tariff-type arrangement to be set by the national utilities regulator.

“We decided to position ourselves early in Ghana,” says Coleman. “We had people in our community who had knowledge of doing business in Ghana; set against the background of renewables becoming part of the government’s policy in Ghana, all the indicators were favourable.”

Coleman says a site was eventually chosen because of its good access to Takoradi, Ghana’s deepwater port. This was essential because of the lack of any local solar supply chain and the need therefore to import all equipment for the project.

Coleman is full of praise for the professionalism of the officials he dealt with in navigating the bureaucracy involved in getting the project off the ground and securing the various necessary licences.

“I’ve developed plants like this all over the world, and have to say Ghana is one of best jurisdictions I’ve worked in,” he says. “The regulation is clear. The various agencies are knowledgeable and experienced, but also rigorous and transparent. The challenges we’ve faced have been those you’d face almost anywhere in that people want to make sure you’ve thought through what you’re doing.

So this idea you can take shortcuts and get to a result quickly – you’d be under a false impression if you thought you could do that in Ghana.”

Coleman anticipates some future challenges when the project enters the construction phase. These will mainly be around up-skilling the local labour force, which he says lacks the capacity for a project of this scale, and the climate, which experiences very heavy rainfall during monsoon season. “But there’s a will on the part of agencies to be supportive. And when we meet those challenges there are sufficient people with intelligence to find a solution to them,” he says.

Benin			
Currency	West African CFA franc		
GDP	$8.4 billion	**Gross National Income Per Capita (USD):**	$750
Economic Growth	5% (2012)		
Primary Industries	Agriculture (32%) Industry (13%) Services (55%)		
Primary Export Partners	China 25.4% India 24.6% Lebanon 15.6% Niger 4.8% Nigeria 4.2% (2012)	**Primary Import Partners**	China 37.2% United States 8.9% India 6.7% France 5.6% Malaysia 5.3% (2012)
Population	10.3 Million		
Policy for Renewables			
Installed Generating Capacity	Just under 200 MW		
Power mix	Benin has several crude oil reserves, estimated at more than 5 billion barrels of crude oil and 91 billion of natural gas. Benin produced a modest amount of oil in the 1980s however, production has since abated. Exploration for new oil supplies is ongoing. 98.4% of total installed electricity capacity is fossil-powered. Renewable energy comprises 1.67% of Benin's electricity supply.		
Access to electricity	27% Overall 4% in rural areas 54% in urban areas (2010 figures)		
Solar highlights	Helios Energie has commissioned a 6 MW facility. The Communauté Electrique du Bénin - CEB (Electricity Community of Benin), a joint Benin-Togo utility is working on a 5 MW project. In January 2014, a project to electrify 67 villiages was launched by the President of Benin and the Minister of Energy of Benin, Barthélémy Kassa.		

DID YOU KNOW?

- The languages spoken in Benin are French, Fon and Yoruba.
- Benin gained its independence from France on August 1, 1960.
- The capital of Benin is known by three names: Porto Novo, Adjatche and Hogbonou.
- The most popular national sport in Benin is soccer.

The following articles have been provided by SNV.

SNV has been present in Africa since 1967, working with local communities to improve their livelihood by strengthening the capacities of local organisations. Our advisors work hand-in-hand with local organisations to bring together innovation and experience coupled with in-depth knowledge and understanding of local context.

In Africa, SNV works in: Benin, Burkina Faso, Cameroon, DR Congo, Ethiopia, Ghana, Guinea Bissau, Kenya, Mali, Mozambique, Niger, Rwanda, South Sudan, Tanzania, Uganda, Zambia, Zimbabwe.

The Power out of Poverty Partnership in Benin

27 February 2014

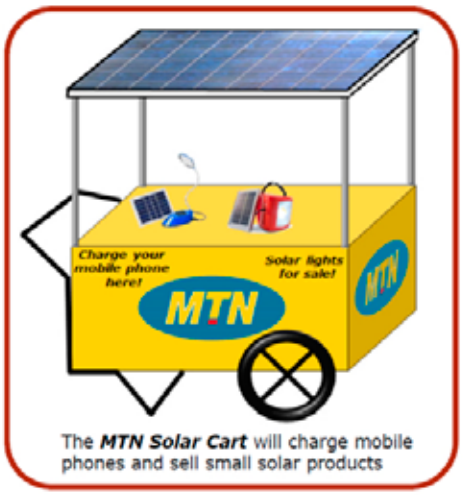
SNV Benin is teaming up with MTN, Africa's largest mobile network operator, to bring modern solar power products to the 6.5 million people in Benin who currently rely on kerosene and disposable batteries.

The Power out of Poverty Partnership will align solar power supply chains with the most penetrative technology supply chains in Africa; those of mobile telephone products. SNV and MTN will empower a network of solar micro-entrepreneurs with the skills and tools to run a profitable solar powered micro-business that sells mobile phone charging services, small solar power systems and MTN products. The solar micro-entrepreneurs will be identified within the current network of MTN agents who are already present in most rural villages throughout the country.

The MTN Solar Cart will be a highly visible example at village level of solar power at work; providing rural people the chance to interact first-hand with solar power to get their phone recharged and then the opportunity to purchase their own system.

The partnership also includes ABERME (the government rural energy agency), local solar power companies, financial institutions and other international development organisations, who will work together to build a vibrant and sustainable solar sector.

During the initial two year project period the micro-entrepreneurs will sell solar systems that will benefit an expected 300,000 individuals. The project will track the money saved on fuel costs, battery costs and phone charging fees, along with the volume of green-house gas emissions avoided and increased mobile network usage. The profitable business and supply chain model is designed to be replicated and scaled-up following the 2 year introduction, both in Benin and beyond SEMINCOLON SNV and MTN work in a combined 24 African nations.



The ***MTN Solar Cart*** will charge mobile phones and sell small solar products

Abdel Karim Traoré
Off-grid Solar Product Group Leader
SNV

will speak at

SOLAR & OFF-GRID RENEWABLES WEST AFRICA

Burkina Faso			
Currency	West African CFA franc		
GDP	10.44 billion USD (2012)	**Gross National Income Per Capita (USD):**	651.65 USD (2012)
Economic Growth	6.9% (2013) Prediction for 2014: 7%		
Primary Industries	**Agriculture:** Cotton, Peanuts, sesame, Millet, Corn, Rice 35% of GDP **Trade, transport and communications** 18% of GDP **Mining:** Gold, Copper, Iron, Manganese, Limestone, Marble, Tin Ore, Phosphates 13% of GDP		
Primary Export Partners	China 21% Turkey 16.9% Singapore 8.4% Indonesia 6.6% Thailand 4.9% Malaysia 4.3%	**Primary Import Partners**	Cote d'Ivoire 16.7% France 15.2% Ghana 5.0% Togo 4.7% Belgium 4.2%
Population	16.46 million (2012)		
Policy for Renewables	Payment of credits, based on Renewable Energy production are available. The energy plan is pro-renewables but specific policy or a feed-in tariff is absent.		
Installed Generating Capacity	252 megawatts (2008)		
Power mix	Thermal: 87.3% Hydro-electric: 12.7%		
Access to electricity	18% Overall 40% in urban areas 3% in rural locations (2012)		
Solar highlights	The European Union has approved $33 million finance for 22 MW solar plant in Zagtouli. A 33 MW plant is planned by SONABEL, the National Electricity Company of Burkina Faso will be built in Ouagadougou with finance from the French Development Agency and the European Investment bank.		

DID YOU KNOW?

- Burkina Faso is slightly larger than Colorado?
- People native to Burkina Faso are called Burkinabés
- Burkina Faso's capital is Ouagadougou which means "You are welcome here at home with us"
- Burkina Faso gained independence from france on 5th August 1960
- The official language is french but other languages include Mossi, Gourma, Fulfulde, Dioula and Tamasheq
- Mossi terms you can use in conversation:
  "Yam Kibaré?" - How are you?
  "Laafi Bala, La Yamba?" - I am fine and you?
- The Mossi language is also known Mõõré, Mòoré, Mooré, Moré, Moshi, Moore and More
- Burkina Faso is Africa's largest producer of cotton with 80% derived from genetically modified seeds

Cape Verde			
Currency	Cape Verdean Escudo		
GDP	$1.955 billion (2013)	**Gross National Income Per Capita (USD):**	$3,830 (2012)
Economic Growth	1.5% (2013)		
Primary Industries	Agriculture (9.2%) Industry (16.5%) Services (74.3%)		
Primary Export Partners	Spain 66.6% Portugal 13.9% United States 5.0%	**Primary Import Partners**	Portugal 38.0% Netherlands 21.4% China 7.9% Spain 7.0%
Population	494,401 (2012)		
Policy for Renewables	50% generation by renewables target by 2020. Cape Verde does have net metering, investment/ production tax credits and a competitive public bidding process.		
Installed Generating Capacity	116 MW		
Power mix	96.9% from fossil fuels, the remainder comes from renewables		
Access to electricity	87.0%		
Solar highlights	Martifer solar have built two plants in Cape Verde with a combined capacity of 7.5 MW. The European Union has created €55 million ($74m) fund for Cape Verde, part of which will be used to develop renewable energy projects.		

DID YOU KNOW?

- Cape Verde and and Guinea Bissau were a join country after gaining independence on July 5th 1975 until 1980
- It is illegal to catch turtles between June and February.
- The languages spoken in Cape Verde are Portuguese and Criuolo.
- Cape Verde was uninhabited on its discovery in 1456 and is an ex-colony of Portugal.
- Singer, actress, civil rights activist and dancer, Lena Horne was from Cape Verde

Côte d'Ivoire			
Currency	West African CFA franc		
GDP	$24.68 billion	**Gross National Income Per Capita (USD):**	$1,243.99
Economic Growth	7.4%		
Primary Industries	Agriculture Food and fisheries Forestry Oil refining Vehicle assembly Textiles		
Primary Export Partners	Netherlands 11% United States 11.0% France 8.3% Germany 8.2% Ghana 6.9% Nigeria 6.3%	**Primary Import Partners**	France 31% China 28% Brazil 4.4% United States 3.8%
Population	19.84 million		
Policy for Renewables	No import duty on solar PV. 20% renewables target for 2030, nothing specific exists at the time of publishing for solar PV. This is staggered from 5% in 2015, 15% in 2020. Payments to Independent Power Producers are collected by CIE and protected by law. IPP payments are prioritised and this arrangement has been in place throughout crises.		
Installed Generating Capacity	1,632 MW (2013) the goal is to double installed power by 2020 with priority going to hydro.		
Power mix	28% of generating capacity in 2011 was made up of hydro and a further 2.1% was renewable power. 2002 figures show the mix was 38% hydroelectric and 62% thermal but that was on an installed base of just 900 MW. Côte d'Ivoire is net exporter of energy, Benin, Togo, Burkina Faso and Ghana are all connected to Côte d'Ivoire's power grid.		
Access to electricity	34% Overall 14% Rural areas 77% Urban areas (2012)		
Solar highlights	Hanergy plans to invest $500 million to set up a thin film solar module factory and a utility-scale plant. A 2MW solar plant is pencilled into the government's strategic plan for implementation in 2016-20. The government's "Electrifying Rural Areas with Photovoltaic Systems" initiative seeks to develop decentralised energy by electrifying 50 communities per year with solar PV (solar home systems, and street lighting). At the time of writing this report, the initial feasibility work was still taking place. It is expected that there will be a national co-ordinator with local representatives to implement the work.		

Hanergy could build US$500 million thin-film factory in the Ivory Coast

Chinese manufacturer, Hanergy, could build a US$500 million thin-film PV factory in the Ivory Coast, according to the country's government and a statement released by the company.

The new facility would be part of a wider investment plan that could also see Hanergy developing hydropower in the West African country.

Earlier this week Alassane Dramane Ouattara, President of Cote d'Ivoire, met with Hanergy Chairman Li Hejun in the capital Abidjan.

According to the company's website the President "encouraged Hanergy to invest in Cote d'Ivoire to build thin-film solar projects and hydroelectric projects, explore the new energy market in Cote d'Ivoire with local partners and optimize the local energy supply and energy mix".

"Hanergy would increase the investment in Africa and bring the most advanced technologies to Africa by building factories of thin-film photovoltaic modules and thin-film solar power plants," Li is also quoted as saying on the company's website.

"While powering the regions which haven't been covered by electricity in Cote d'Ivoire through thin-film photovoltaics…Hanergy would boost local employment, facilitate the industrial transformation and upgrading, and propel Cote d'Ivoire and Africa to realise the rapid economic growth."

After an end to post-election conflict in 2011 the country's economy has been outstripping IMF predictions and recorded near double digit growth in successive years. Much of this can be attributed to the mining sector enjoying the new found relative stability.

Mining has proven to be a valuable driver of solar power development in South America where remote sites require large amounts of electricity.

In November 2012 the country's minister of mines and energy Adama Toungara said the country would increase its electricity capacity by 80%, or 1.1GW, within six years.

Hanergy could build a US$500 million thin-film factory in the Ivory Coast.

DID YOU KNOW?

- Cote d'Ivoire gained independence on 7 August 1960
- Côte d'Ivoire was one of the first countries in sub-Saharan Africa to privatise its electricity sector.
- Cote d'Ivoire was once called the 'teeth coast' due to the trade in ivory.
- Independence day is celebrated on 7 August.

Ghana			
Currency	Ghana cedi		
GDP	40.71 billion USD (2012)	**GDP Per Capita (USD):**	$3,256.848 (2012 est.)
Economic Growth	5% (2014 est.)		
Primary Industries	Agriculture, mining and minerals. The main exports are gold, cocoa, diamonds, timber, manganese and bauxite. Ghana also has a strong, growing local consumer electronics manufacturing industry.		
Primary Export Partners	France 13.3% Italy 12.1% Netherlands 8.7% China 7.2% Germany 4.2%	**Primary Import Partners**	China 25.8% Nigeria 10.9% United States 7.0% Netherlands 6.3% Singapore 4.5% United Kingdom 4.1% India 4.0%
Population	25.90 million (2013)		
Policy for Renewables	Tax rebates for manufacturing in certain locations. Ghana's renewable energy feed-in tariff programme was adopted via the 2011 Renewable Energy Act which seeks to increase renewable energy from 0.01% of current electricity generation to over 10% by 2020. Solar PV is expected to contribute 20MW to the energy mix by 2015. The FiT came into force on 1 September 2013 after being approved the previous month. The FiT available for solar is GHS0.43/kWh (US$0.20), the highest of any renewable energy form. Rates will be valid for 10 years, but subject to review every two.		
Installed Generating Capacity	2,443MW (2013) Ghana's current installed generating capacity is 2,443 MW. With demand expected to increase to 5,000 MW by 2016, driven by a mixture of a growing economy and the Ministry of Energy's goal to become a net exporter of power into the West African Power Pool.		
Power mix	75% hydro, biomass 25% thermal		
Access to electricity	74%		
Solar highlights	600 MW of solar planned by International Solar Utilities (ISU), split over 6 sites. ISU Ghana will add an additional 28% to Ghana's national grid upon completion. The company also plans 300 MW of PV manufacturing capability. Ghana is also in line for Africa's biggest PV plant, Mere Power Nzema at 155 MW. Hanergy have announced plans for 400 MW in Ghana. The Savannah Accelerated Development Authority (SADA) has finalised an agreement with DCH Solargiga, a subsidiary of China's Solargiga, to build a 200MW plant near Tamale, the principal town of Ghana's Northern Region. The first 40 MW has received the go-ahead. Upon completion the 40MW project will feed power into Ghana's national grid		

Blue Energy to develop Africa's largest PV project

SUK renewable energy company Blue Energy will finance and develop a US$400 million large-scale 155MW PV plant in Ghana which, when complete, is said to represent Africa's largest PV project.

Speaking to PV-Tech, Douglas Coleman, Special Projects Director of Blue Energy, said that he believed the project — which will be one of the biggest PV plants in the world — would also be the first grid-connected project in Ghana.

Blue Energy has secured all the consents it needs to push forward with the project. Ghana's electricity regulators, the Energy Commission and the Public Utilities Regulatory Commission, have awarded the project a generation licence and a feed-in tariff for the plant's 20-year operational life.

The Nzema plant will be built by Mere Power Nzema, a subsidiary of Blue Energy, on a 183-hectare site close to the village of Aiwiaso in Western Ghana. It has secured a 100-year lease on the site, planning permission and permission to connect to the grid.

The site enjoys good solar radiation and has excellent access to the major road system. The plant will be directly connected to the 161kV West African Power Pool transmission line, which runs alongside the site, linking Ghana to Ivory Coast, Togo, Benin and Nigeria.

The company is currently in negotiations with two potential EPC providers and has not yet selected the equipment suppliers. However, Coleman was able to confirm that the 155MW Nzema project will utilise around 630,000 polycrystalline 245w PV modules which will help to generate an estimated annual output of 240GWh.

In addition to selecting an EPC provider, Blue Energy will now conclude discussions with a number of international financial institutions and global equity and infrastructure funds, which have expressed interest in providing debt financing or investing in the project. It expects to reach financial close in the first half of 2013.

Construction is scheduled to begin in the fourth quarter of 2013 and sections will come online as they are completed. It is expected to be fully operational by October 2015. During the construction phase, it will create 500 jobs over the two-year construction period as well as 200 permanent jobs when it is operational. It is also expected to stimulate another 2,100 jobs in the local economy, by sub-contracting activities to local companies and increasing demand for goods, services and education.

When complete, the project will increase Ghana's current installed electricity capacity by 6%. It will also meet 20% of the government's to generate 10% of its electricity from renewable sources by 2020.

Commenting on the impact of the project, Chris Dean, CEO of Blue Energy, said: "Ghana's forward-thinking strategy puts it in a strong position to lead the renewable energy revolution in sub-Saharan Africa. Nzema is a case study in how governments can unlock the huge potential for solar energy in Africa. We are delighted that it will make a strong contribution to the national economy, provide much needed generating capacity and help develop the skills of the future. There's huge potential to develop renewable power in the region. We believe Nzema will show other countries what can be achieved and spur them to action."

The 155MW project will represent Africa's largest PV project as well as Ghana's first grid-connected PV project. *Image: Blue Energy.*

The company began working on the development plans for the project in 2010 and faced several challenges during this phase. However, much of these challenges were solved by the launch of the 2011 Renewable Energy Act in November 2011 which was key to bringing the project forward, Coleman revealed to PV-Tech. Coleman described the Act as an "elegant, transparent and open regulatory framework" that will play a crucial role in helping the government to double its installed capacity, from 2600MW to 5,500MW by 2015.

The Nzema project will be the first to go ahead under Ghana's 2011 Renewable Energy Act, which offers feed-in tariffs and seeks to attract international finance. In November, Ghana's Energy Minister Joe Oteng-Adjei announced he was seeking US$1 billion of private investment to help Ghana achieve its renewables target.

Ghana is one of the fastest growing economies in sub-Saharan Africa, with 14.4% gross domestic product (GDP) growth in 2011. Demand for power is growing at 10-15% a year, but a lack of reliable generating capacity has acted as a brake on the economy. Power shortages are estimated to have cost 1.9% of GDP in 2006. Much of Ghana's electricity is hydroelectric, but this is vulnerable to drought, and the country is increasingly reliant on expensive oil generation.

The project represents Blue Energy's first international project and it has several additional PV projects in the pipeline in West Africa but no further details were unveiled. Coleman also revealed that the company may also consider entering the South Africa solar market, which has seen a surge in PV activity in recent months.

Africa offers rich sources for renewable energy, especially for solar. However, many of the proposed African projects have failed to come to fruition for reasons including unsupportive regulatory environments, energy underpricing, a lack of technical capacity and a weak supply chain. It is believed that Ghana's Renewable Energy Act will be key to helping the country to develop skills, an improved infrastructure, and government and regulatory experience to support other PV projects in throughout the continent.

Hanergy Solar planning 400MW PV power plant in Ghana

Hanergy Solar said it was in the early stages of developing a 400MW PV power plant in the Northern Region of Ghana, Africa at an estimated cost of approximately US$1.1 billion. *Image: Hanergy Solar.*

Hanergy Solar said it was in the early stages of developing a 400MW PV power plant in the Northern Region of Ghana at an estimated cost of approximately US$1.1 billion.

The company said that Savanna Solar, in which Hanergy Solar has a 70% equity holding, had secured a 25 year power purchase agreement (PPA) with the relevant authority in Ghana in June 2013.

Hanergy Solar also noted that an investment holding company, Savanna Pride, which the thin-film firm had a 30% stake in, was also partnering on the project. The grid connection agreement as well as the transfer of land use rights from Savanna Pride were said to be pending, though such matters were expected to be completed in May 2014.

Hanergy Power Group was said to have been responsible for the investments in Savanna Solar and Savanna Pride.

The company said that the project would be one of the largest thin-film solar power projects in the world and the first large-scale project by Hanergy Solar in Africa.

The construction of the 400MW project is expected to be done in three phases with 100MW installed and operating in the first year, followed by a further 100MW in the second year. In the third phase, Hanergy Solar plans to install and operate a further 200MW.

Hanergy Solar also expects the project to act as a major demonstration of proof of the thin-film technologies it has developed and acquired.

Financing for the project has yet to be concluded.

News of the plant follows rumours Hanergy is planning to open a module plant in neighbouring Ivory Coast.

Ghana PV project pipeline hits 2GW

The Ghanaian authorities are sitting on a PV project application pipeline totalling over 2GW, PV Tech has learned.

Since launching a feed-in tariff in 2011, the West African nation has been flooded with applications for projects, the first of which – the 155MW Nzema project being built by British firm Blue Energy in western Ghana – is already underway.

Ghana, one of only a few West African countries with any current support regime in place for solar, is emerging as one of the most favourable potential PV markets in the region.

Legislation passed in 2011 set a 10% renewable energy target for Ghana by 2020, which has since been backed up by the feed-in tariff, set at US$0.20/kWh.

"The renewable energy act is meant to create the enabling environment to attract private investment," Kwabena Otu-Danquah, head of renewable energy at Ghana's Energy Commission told PV Tech. "We are looking at the entire renewable energy sector – be it solar, be it wind, be it any other renewable energy source which is available in the country."

Otu-Danquah revealed that since confirming the feed-in tariff in 2012, the backlog of PV project applications had reached over 2,000MW.

But given that solar will be competing with other renewables and the comparatively small capacity of Ghana's power system, the number of grid-connected solar projects actually being given the go-ahead under the FiT regime is likely to be only a fraction of those proposed. "It's not likely we'll be able to deploy of all that," Otu-Danquah confirmed.

Of far greater potential in Ghana are the opportunities for non grid-tied PV systems, for example those supporting farms or industrial building.

DID YOU KNOW?

- The word Ghana means "Warrior King".
- Ghana was the first African nation to declare independence from European colonization.
- By 2015, Ghana is projected to be the world's largest cocoa producer.
- Ghana's Lake Volta is the largest artificial lake in the world by surface area.
- In Ghana, between 2000 and 2009, gross domestic product (GDP) per capita rose by 63%.

Black Star rising

By Ben Willis, Solar Media

Ghana has emerged as West Africa's solar pioneer, with plans for one of Africa's largest PV plants in the works. But as Ben Willis reports, the country is still some way from being fully open for business

The small West African country of Ghana is often held up as a model of democratic stability and economic success in a region with unfortunate associations with poverty and political unrest. It has enjoyed steady governance for several decades now and seen its GDP grow at a solid 9-10% annually over the past several years.

It's perhaps unsurprising therefore that Ghana is also taking an early lead as West Africa's torchbearer for renewable energy. Like much of the rest of the region, Ghana enjoys very attractive solar resources that average 4.4kWh to 5.6kWh/m2 per day, according to the country's Energy Commission. In 2011 Ghana passed a new renewable energy law setting a 10% renewable energy target by 2020, backed up by a feed-in tariff. Underlining the country's early-leader status, UK firm Blue Energy announced at the end of 2012 plans for one of Africa's largest PV power projects, the 155MW Nzema plant in western Ghana.

"The renewable energy act is meant to create the enabling environment to attract private investment," says Kwabena Otu-Danquah, head of renewable energy at Ghana's Energy Commission in a phone interview with Solar Business Focus. "We are looking at the entire renewable energy sector – be it solar, be it wind, be it any other renewable energy source which is available in the country."

Otu-Danquah says solar is proving a particularly popular choice at the moment. He reveals that since passing the law, the government has been flooded with applications for developers wanting to build PV projects – more than the country would ever be able to absorb.

"At the moment, we have over 30 companies who have applied for provisional licences to generate electricity from solar," he says. "The total generation that they are proposing is over 2,000MW – but it's not likely we'll be able to deploy all of that, because of our 10% target."

Ghana has made some steps towards greening its energy mix, but remains a frontier market.
Source: Flickr/David Whillans.

Otu-Danquah acknowledges the general perception of African countries as risky markets. To help ease the concerns of would-be investors, he says the government has introduced a number of measures. The first of these, of course, is the feed-in tariff.

"The FiT has been determined by the regulatory commission at a rate that should give a reasonable rate of return on the investment," he says. "Solar is about 20c/kWh (40.1 cedis). It's guaranteed for 10 years. So if you get lock in, you are going to enjoy that rate for 10 years, after which there will be a review every two years."

A second element designed to entice developers is a standardised power purchase agreement (PPA) between independent power producers and the off-taker, the Electricity Company of Ghana. Industry observers have frequently pointed to a standardised PPA as one of the most important features of Sub-Saharan Africa's most successful renewable energy programme – in South Africa. It means developers are able to agree bankable projects without having to negotiate separate PPAs every time, giving them much needed clarity around the process.

"The government has come up with a regulatory framework that's very transparent," claims Otu-Danquah. "In one and a half years we've had applicants for over 2,000MW of solar. So with this is I can say there is confidence and appetite."

Indeed, speaking to Solar Business Focus shortly after the announcement of its plans for the Nzema project last year, Blue Energy's Doug Coleman specifically commended the process involved in getting the project off the ground. "I've developed plants like this all over world, and have to say Ghana is one of best jurisdictions I've worked in," he said. "The regulation is clear. The various agencies are knowledgeable and experienced, and the process rigorous and transparent."

A note of caution

Yet despite the apparent headway being made in Ghana in increasing the proportion of renewable energy in the mix, others are more cautious about heralding a green energy revolution there and in Sub-Saharan Africa more generally.

Jamie Fergusson, principal investment officer in the Global Power and Renewable Energy Group at the International Finance Corporation, part of the World Bank group, is blunt about the extent to which solar and other renewables can take off in Sub-Saharan Africa. "These are tough markets, and deals can take a long time to structure to the point of bankability," he says.

Fergusson is critical of the fashion in which, with their home markets slowing down, European and North American renewables developers are flocking into promising looking African markets without fully understanding what they're getting into. "A lot of people are responding to a slowdown in their home mar-

kets by expanding into a territory with very different dynamics and greater challenges," Fergusson says.

"Unlike in Europe or North America, developers have to think a little more like regulators, proposing project sizes that can be absorbed by often small and unstable grids, both from a sector cash flow perspective as well as from a grid stability perspective. They should propose tariff structures that are likely to remain competitive throughout the life of the PPA. Often the governments and utilities have very little capacity and so progress can be delayed by multiple developers offering unrealistic projects or tariffs."

Commenting on Ghana specifically, Fergusson says the biggest cause for concern, something Otu-Danquah also alludes to, is the credibility of the main off-taker, ECG. "From our perspective, a PPA with ECG would need to be at a tariff that can be competitive in the long term, with a bankable allocation of risk and a government back-stop undertaking, further enhanced by suitable risk products such as the World Bank's PRG," Fergusson says. "The FiT and current PPAs do not address these requirements sufficiently as yet."

Nevertheless Fergusson believes solar does have the potential to be a useful part of energy mix in Ghana and other West African countries. He says it could displace diesel generation or even hydro during the day, allowing hydro capacity to be reserved for the evening, when demand tends to be highest in West Africa, but PV is least effective.

"But for it to reach its full potential it's important to deliver the most competitive tariffs and this will only be achieved with scale, transparent competition to drive down project costs and costs of capital, and to keep the transaction costs down," Fergusson adds. "This will be tough given the lack, in many of these countries, of government and utility capacity to run sensible processes for IPP allocation. If you're going to buy 500MW in South Africa, then it's ok to have lots of developers spending money on sites and preparing, because over time most of those will get used. But if a country has capacity to absorb 20MW or 50MW over the next decade, does it make sense to have six, 10, 20 different developers all in parallel developing sites?"

Ghana PV production plans

Aside from PV power plants, Ghana is also emerging as a future PV manufacturing hub. Chinese thin-film company Hanergy mooted plans in April for a 400MW manufacturing plant in northern Ghana. Meanwhile, Sustainable Equities Group, a US-based investor, is also eyeing Ghana as the base for an operation to supply the rest of Africa with PV modules.

SEG owns PV manufacturer PN Solar and project development firm, International Solar Utilities. According to chief executive Mahmood Mufti, its plan is to open a 300MW manufacturing base in the coastal town of Tema, from which it will export PV modules to other markets in the continent.

"ISU will purchase panels from PN Solar and develop projects in Africa," Mufti explains. "We're not selling the panels to third parties; we're pretty much sold out from that factory over the next five years."

Mufti says the plants first-year inventory is earmarked for projects in Ghana itself. The next year it plans to export its products to nearby Sierra Leone.

Overall, Mufti says the company is aiming to build 600MW of PV power plant projects in Ghana over the coming years.

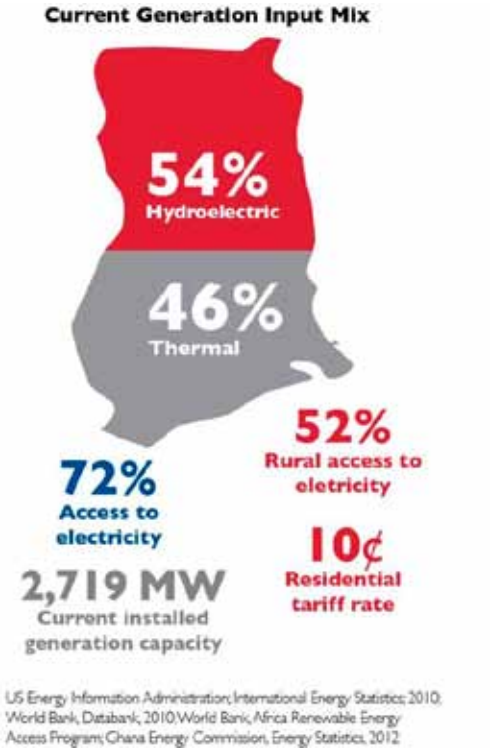
But given Ghana's comparatively limited plans for deploying renewable energy, and the fact solar is competing with other technologies, how much of that gets built is a moot point.

WHAT POWER AFRICA MEANS FOR GHANA

Ghana Energy Sector Overview

Ghana has 2,719 mega-watts (MW) of installed generation capacity to serve a population of 25 million. However, electric power supplies are unreliable and inadequate, and this is a paramount constraint to economic growth. Independent power producers (IPPs) account for 546 MW (about 20%) of generation capacity. An existing thermal IPP is being expanded to a 'combined-cycle' facility that will run on natural gas and oil, generating an additional 110 MW. Another IPP, CenPower/Kpone, is nearing financial close and will ultimately produce 348 MW. These increases in capacity will aid the Government of Ghana (GOG) achieve its target of 5,000 MW of installed generation by 2016, including 10 percent from renewable sources.

Reforms across the power sector will be necessary for Ghana to continue obtaining private-sector investment. As such, Power Africa and other partners are focused on the following priorities: (1) building a transparent framework to use the country's natural gas resources for thermal generation; (2) initiating a least-cost, competitive bidding process to acquire IPPs: (3) effective allocation and pricing of legacy hydropower; (4) integrated resource and resiliency planning among the generation, transmission, and distribution sectors; (5) transition to a wholesale electricity market; (6) improved energy efficiency and demand- side management; and (7) expansion of renewable energy sources. Power Africa is undertaking a critical action plan to improve the creditworthiness of the Electricity Company of Ghana and of the Northern Electric Distribution Company, the nation's off-takers and distributors of electric power.



US Energy Information Administration; International Energy Statistics; 2010; World Bank, Databank, 2010; World Bank, Africa Renewable Energy Access Program; Ghana Energy Commission, Energy Statistics, 2012

Power Africa Support

The U.S. Government is working closely with the GOG on several key power and energy initiatives including Power Africa, the Partnership for Growth, and the Millennium Challenge Corporation (MCC). MCC is developing a potential compact to resolve key gas supply issues, improve the creditworthiness of Ghana's gas and electricity off-takers, increase tariffs to reflect costs, and reduce inefficiencies and losses in power distribution systems. Power Africa technical assistance is advancing the CenPower/Kpone transaction toward financial close.

Highlighted Transactions

Name	Output	Type of Transaction	Value (USD Million)	Timeline	Power Africa Support	GOE Actions
CenPower Kpone	348	CCGT (Gas/Liquids)	$700 million	• Financial close, Q2 2014 • Arrange fuel supply, Dec 2013 • Construction, late 2014/early 2015	• Review of loan documents • Assistance with lender requests • PPA negotiation • Due diligence on Cenpower's financial models, and reports/recommendations for the Electricity Company of Ghana/Ministry of Finance and Economic Planning	• Approve final draft report and recommendations • Finalize financial close

Guinea Bissau			
Currency	West African CFA franc		
GDP	897.4 million USD (2012)	**GDP Per Capita (USD):**	494.31 USD (2012)
Economic Growth	0.3% in 2013. 2.8% predicted for 2014		
Primary Industries	Agriculture & food (55.7%) fish, shrimp, cashew nuts, palm kernels, peanuts, cassava, rice, corn, beans, cotton, lumber Industry (13.2%) Services (31.0%)		
Primary Export Partners	India 56.0% Nigeria 28.4% Togo 6.6% (2012)	**Primary Import Partners**	Portugal 27.8% Senegal 16.8% United States 7.1% China 4.8% Cuba 4.2%
Population	1.664 million (2012)		
Policy for Renewables	Major reforms to the energy sector were proposed in 2010 which would dramatically increase access to energy and incentivise investment into the sector.		
Installed Generating Capacity	21 MW (2011)		
Power mix	Biomass 51% Oil & Oil Products 49%		
Access to electricity	20%		
Solar highlights	The ECOWAS Centre for Renewable Energy and Energy Efficiency is partnering with government on a project to create an enabling environment for solar energy investment.		

DID YOU KNOW?

- Guinea-Bissau was liberated from Portuguese rule in 1974?
- Guinea-Bissau was once the kingdom of Gabú, which was part of the larger Mali empire
- Portuguese explorer Nuño Tristão was the first European to encounter Guinea-Bissau in 1446
- José Mário Vaz took over as president in June 2014. He won 61.9% of the vote.
- Portuguese is the official language of Guinea-Bissau

Guinea			
Currency	Guinean franc		
GDP	6.768 billion USD (2012)	**GDP Per Capita (USD):**	491.79 USD (2012)
Economic Growth	2% (2013), 4.2% estimated (2014)		
Primary Industries	Agriculture: 22.9% Mining, Metal, Minerals: 46.5% (bauxite, gold, diamonds) Services: 30.5%		
Primary Export Partners	India 10.6% Spain 9.6% Chile 9.4% US 7.1% Ireland 6.3% Germany 6.3% Ukraine 5.7% France 5%	**Primary Import Partners**	China 14.2% Netherlands 7.6%
Population	11.45 million (2012)		
Policy for Renewables	None		
Installed Generating Capacity	395 MW		
Power mix	Fossil fuel: 68.4% Hydro: 31.6 %		
Access to electricity	20%		
Solar highlights	Current solar capacity is estimated at around 800 kW.		

DID YOU KNOW?

- The people of Guinea belong to twenty-four ethnic groups. The largest groups are the Fula, Mandinka, and Susu. There are communities of small ethnic groups including Kpelle, Kissi, Zialo, Toma and others.
- The first Guinean franc was adopted as the national currency in 1959, replacing the CFA franc.
- The 2nd of October is Guinea's National Day of the republic. It is a celebration of its independence from France which came in 1958.
- Guinea is bordered by bordered by Guinea-Bissau, Senegal, Mali, Côte d'Ivoire, Liberia, and Sierra Leone.
- The name Guinea is from the Susu language and means "woman"
- Conakry is the capital of Guinea
- Guinea has the wettest capital on Earth, with 3.7 meters of rain a year

Liberia			
Currency	Liberian dollar		
GDP	1.767 billion USD (2012)	**GDP Per Capita (USD):**	413.76 USD (2012)
Economic Growth	8.1% (2013), 6.8% (2014 predicted)		
Primary Industries	Extractives: iron, diamonds Forestry & Agriculture: timber, rubber cocoa, coffee		
Primary Export Partners	China 24.2% United States 15.4% Spain 11.1% Thailand 4.5% Côte d'Ivoire 4.4% Malaysia 4.1% France 4.0%	**Primary Import Partners**	South Korea 26.4% China 24.1% Singapore 23.0% Japan 15.9%
Population	4.19 million (2012)		
Policy for Renewables	An independent agency, The Rural and Renewable Energy Agency (RREA), was established in 2010 by the government of Liberia. Their remit is to promote locally available power sources, including renewable energy.		
Installed Generating Capacity	24.6 MW (2010)		
Power mix	Biomass: 92% Oil and oil products: 8%		
Access to electricity	10% urban, 2% rural 0.1% of the population is grid-connected		
Solar highlights	At the end of 2013, 314 solar panels were installed in Liberian towns by women trained as part of a project sponsored by the UN and Government of India.		

DID YOU KNOW?

- Nelson Mandela was born in Liberia.
- Africa's second largest tropical rain forest is in Liberia.
- Liberia was founded and colonised by American slaves who had been freed.
- There are eleven red and white stripes on Liberia's flag, each represents one of the eleven people who signed the country's declaration of Independence.
- Monrovia, the country's capital city was named after American President James Monroe.
- There are 700 species of bird in Liberia.

- Mali is West Africa's biggest country.
- Mansa Musa, the Emperor of Mali in the 1300s, made a pilgramage to Mecca. He became famous for 18,000 slaves and men, 80 camels and for building a mosque every Friday during his journey. He left so much gold along the way that the regions he traveled through suffered inflation.
- Mali is the only country where bogolanfini cloth is made. It's a traditional cloth dyed with mud.
- In Gao, Mali you can stand in two hemispheres.
- The largest mudbrick building in the world, the great Mosque of Djenne is in Mali.
- Mali's capital city is Bamako with a (2012) population of 1,297,281

DID YOU KNOW?

Mali			
Currency	West African CFA franc		
GDP	10.31 billion USD (2012)	**GDP Per Capita (USD):**	699.34 USD (2012)
Economic Growth	5% (2013)		
Primary Industries	Agriculture: 45% Industry: 17% Services: 38%		
Primary Export Partners	South Africa (54%) Switzerland (11%) China (5.7%) Senegal (3.3%) Cote d'Ivoire (2.9%)	**Primary Import Partners**	Senegal (18%) France (11%) China (10%) Cote d'Ivoire (7.1%) Benin (6.6%)
Population	14.85 million (2012)		
Policy for Renewables	Mali has issued several key policy papers outlining their energy framework. The National Energy Policy, outlined in 2006 identifies sustainable energy as a key objective. By 2015, the NEP seeks to increase renewables in the energy mix to 10%. A supplementary Policy Letter provides a guiding framework for the government's energy plans. In addition to the two papers listed above, there is also a National Action Program for Adaption to Climate Change which was promulgated in 2007 also includes renewable energy as part of the policy.		
Installed Generating Capacity	21.59 MW		
Power mix	Biomass 80% Fossil Fuel 16% Hydro power and other including renewables 4%		
Access to electricity **Solar highlights**	Overall 27% Urban areas 55% Rural areas 14% (2010)		
	With almost 50% of energy coming from hydro power, Mali's electricity supply could be severely affected by climate change. Of the remaining power supply, over 53% comes from thermal (biomass and oil) and less than 1% comes from solar. Two projects are proposed; a 41 MW facility by Akuo Energie and the Mali 30 Villages project with 5 MW. Mali is one of 6 countries which is included in the Scaling-Up Renewable Energy Program in Low Income Countries (SREP) which will receive finance from Climate Investment Funds. The plan includes three major projects, one of which is scaling-up PV. Mali will also benefit from USD 120 Million from the World Bank as part of the Mali Energy Support Project which addresses transmission and distribution, energy efficiency and strengthening the capacity of local utilities and institutions. In rural locations, Mali has embarked on a project to provide around 700 PV systems to rural locations for water-pumping.		

Niger

Currency	West African CFA franc		
GDP	6.568 billion USD (2012)	**GDP Per Capita (USD):**	394.78 USD (2012)
Economic Growth	3.6% (2013), 6% (2014 estimate)		
Primary Industries	Agriculture: 39% Industry: 16.3% (uranium mining, cement, brick, soap, textiles, food processing, chemicals, slaughterhouses) Services: 41.6%		
Primary Export Partners	France 39.0% United States 14.0% Japan 10% Switzerland 9.8% Nigeria 6.9% China 4.9%	**Primary Import Partners**	China 49% France 8.5% United Kingdom 6.2% Japan 4.2% Côte d'Ivoire 3.36%
Population	17.16 million (2012)		
Policy for Renewables	Tax exemption for solar lamps. The country also has a national platform to promote renewable energy which was a result of activities in 2013.		
Installed Generating Capacity	230 MW (2011)		
Power mix	Biomass: 93% Oil and coal: 7%		
Access to electricity **Solar highlights**	Overall 7% Urban areas 41% Rural areas .28%		
	As in other countries, limited grid infrastructure could present an opportunity for off-grid solar installations.		

DID YOU KNOW?

- Niger is one of the hottest countries in the world and the largest nation in West Africa.
- Niger obtained democracy and became a multi-party state after a military coup in 2010.
- Niger is bordered by Nigeria and Benin to the south, Burkina Faso and Mali to the west, Algeria and Libya to the north and Chad to the east.
- Niger is named after the Niger river.
- Republic Day, which takes place on 18th December, was declared a national festival in 2005.

The following articles have been provided by SNV.

SNV has been present in Africa since 1967, working with local communities to improve their livelihood by strengthening the capacities of local organisations. Our advisors work hand-in-hand with local organisations to bring together innovation and experience coupled with in-depth knowledge and understanding of local context.

In Africa, SNV works in: Benin, Burkina Faso, Cameroon, DR Congo, Ethiopia, Ghana, Guinea Bissau, Kenya, Mali, Mozambique, Niger, Rwanda, South Sudan, Tanzania, Uganda, Zambia, Zimbabwe.

Tax exemption boosts solar energy market in Niger

A tax exemption for some 1,260,000 solar lamps and the creation of a national platform for promoting renewable energy. These are two direct, positive impacts of the 2013 conference and workshop focused on improving the renewable energy technologies market in Niger. The four-day event, organised by SNV in collaboration with the Government of Niger, and UNDP, provided a unique occasion to develop a roadmap for improving the enabling environment for renewable energy with a focus on solar energy.

The Republic of Niger, with only 9% of the population connected to the grid and less than 5% of the population with access to non-solid cooking fuels (Global Framework Report, World Bank 2013), has one of the lowest access rates to modern energy services in the world. This seriously impedes steps towards socioeconomic development. Whereas 40 years ago Niger was a pioneer in solar technology promotion, largely due to the work of Professor Moumouni of ONERSOL (now known as National Center for Solar Energy, CNES), regionally Niger is now lagging behind its counterparts such as Mali, Burkina Faso, and Senegal.

Given the potential for Niger to make widespread and profitable use of renewable energy, SNV, the Government of Niger, and UNDP decided to organize a large 3-day event to launch an institutional dialogue aimed at formulating long-term, national objectives acceptable to all stakeholders. Of course, this gathering was a great occasion to increase awareness about national and international initiatives in order to share knowledge and inspire solutions adapted to the Niger context. Additionally, this workshop also focused on fostering a strong commitment from Nigerien authorities and policy makers to promote renewable energy with concrete actions and decisions. To this end, the organizers involved the participants in creating a roadmap to promote and scale up renewable energy access in Niger.

The event started with a conference on the 17th of September, which highlighted the opportunities for Niger in renewable, particularly solar, energy that can pave the way for an increased access to energy for the Nigerien population, especially those living in off-grid areas. Opening speeches from the Governor of Niamey, the UNDP representative, the Country Director of SNV, and the Minister of State, Minister of Plan and Urbanism, who represented the Prime Minister, all recognised the essential role of energy, and the need to tap into Niger's renewable energy potential to bring about sustainable development and economic growth. The keynote presentation began with insights from the study 'Building an Enabling Environment for the Promotion of Renewable Energy in Niger', which launched a debate, followed by an overview of international initiatives on the SE4All programme and a presentation on the National Program on Access to Modern Energy Services (PRASE[1]). Discussions focused on the various applications of solar technologies; solar use in manufacturing, social services, agriculture and households. SNV attracted sizeable interest for its Off-Grid Dairy Project.

On September 18th and 19th, workshops focused on guiding the main stakeholders through a series of exercises to conduct a thorough environmental review of the solar sector in Niger. In addition, these two days provided an opportunity to look at best practices from a regional perspective with presentations by AMADER, ASER and FDE. Each day was specifically designed to provide insight into national and regional programmes. On September the 20th, a selected group of stakeholders composed of governmental institutions, the private sector, and academia convened to finalise the Roadmap for achieving an enabling environment for a sustainable solar market agreed upon by all stakeholders. The event closed with a reading of the Niamey Declaration for Renewable Energy to the Minister of Energy and Petroleum (MEP) and a press conference. The event succeeded in not only bringing local stakeholders together, but by also providing an excellent platform for participants to learn from best practices at the regional level with presentations by ASER, AMADER, and FDE.

As direct follow-up to this event, a tax exempt status has been achieved for some 1,240,000 solar lamps and the National Association of Solar Professionals (APE-Solaire) has become the national platform for promoting renewable energy and has organised an official kick-off meeting. A multi-stakeholder task force has been created to follow-up on the implementation of the roadmap.

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Stratified Energy Access in Niger

In April 2014, SNV released a feasibility study for the promotion of photovoltaic systems in Niger.

Shortly after the financial crises in 2008 and 2009, overcapacities in solar module production led worldwide to a sharp decline of raw material and photovoltaic module prices. Solar module manufacturers sold their modules even under production costs to stay competitive in the market which finally lead to several bankruptcies and financial difficulties of Chinese, European and American manufacturers. In 2012 to 2014, we have seen a consolidation of the production capacities and the worldwide PV market still continues to grow. The feed-in tariffs will fade out because photovoltaic power generation has reached in 2013 grid parity. Production costs of photovoltaic grid connected power generation have dropped to 14 € cents/kWh (19 US cents/kWh) in the northern hemisphere and to 8 €cents/kWh (10 US cents/kWh) in the African sun belt.

The feasibility study on stratified energy access by photovoltaic power in Niger covers two major subjects. Starting point is the insight analysis of the current situation in Niger for photovoltaic systems, recommendations for the best practice photovoltaic technologies to be applied in the context of Niger and the creation of a financial model which allows to scale up the use of photovoltaic power for rural electrification.

The market research results for instance shows that most of the future photovoltaic capacity will be added in Niger as grid connected photovoltaic power plants and small and medium sized companies (SME) will not profit from the increasing market volume as long as the market segment of small and mediums sized private photovoltaic grid connected systems is not developed.

Nigeria			
Currency	Nigerian naira		
GDP	$510 billion	**GDP Per Capita (USD):**	1,555.36 USD (2012)
Economic Growth	7.8% (2013), 6.19% (2014 forecast)		
Primary Industries	Oil & Gas Other extractives (coal, tin, columbite, uranium) Agriculture (palm oil, peanuts, cotton, rubber, wood) Textiles Construction Machinery and assembly		
Primary Export Partners	United States 16.8% India 12.1% Netherlands 8.6% Spain 7.8% Brazil 7.6% United Kingdom 5.1% Germany 4.9% Japan 4.1% France 4.1%	**Primary Import Partners**	China 18.2% United States 10.0% India 5.5%
Population	168.8 million (2012)		
Policy for Renewables	In May 2014, plans to launch a National Renewable Energy and Efficiency Policy were announced. The plan goes alongside a vision to increase renewable energy to 30,000 MW over the next ten years. The government has established the Renewable Energy Programme whose key objectives are to increase renewables in the energy mix. The government offers tax relief for R&D, tax concessions for on-site training and 20% towards the cost of essential infrastructure investment.		
Installed Generating Capacity	3,305.58 MW from a capacity of around 6,000 MW		
Power mix	83% biomass & waste 16% fossil fuels 1% hydropower		
Access to electricity	40%		
Solar highlights	The equivalent of 4.66 million barrels of oil per day could be generated by solar in Nigeria, Africa's country with the highest GDP. However, less than half of the population (falling to 10% in rural areas) have access to power. The government has put a legislative framework in place under the Renewable Energy Masterplan and liberalisation of the power markets has led to an increase in IPPs. Off-grid and distributed solar is encouraged. There is a 500 MW solar PV target by 2025. SkyPower Global and Saudi Arabian firm FAS Energy have signed a 3 GW joint venture. Synergent Powershare Group of Company is investing in a 50 MW solar farm in Kaduna which was officially launched by the Honourable Minister of Environment and Kaduna State Governor in September 2011. As in other countries, limited grid infrastructure could present an opportunity for off-grid solar installations.		

Nigeria's first module plant operational

Nigeria's first module manufacturing plant has been completed and is now operational.

The plant, in Sokoto, has been built by German firm JVG Thoma and will produce the company's 'Desert' range of modules, which have been designed to operate in extreme conditions.

First announced last summer, the plant was part financed by the World Bank and will have a 10MW nameplate capacity.

A PV array built next to the plant will supply it with regular power.

Hans Thoma, the company's managing director, said: "The installation will take on a prototype character for the entire Africa market. In particular, we have certainly not reached the end of our options with our technical developments."

JVG Thoma's module plant in Nigeria is now operational. *Image: JVG Thoma.*

Thoma said with 300 sunny days a year, Nigeria was well placed to harness solar power and reduce the frequency of power outages in the country.

Nigeria's government last year mooted plans for 500MW of PV in a joint German venture.

Saudi-Canadian solar JV signs 3GW Nigeria deal

A joint venture between Canadian developer SkyPower Global and Saudi Arabian firm FAS Energy has signed a 3GW solar development deal with Nigerian authorities.

SkyPower FAS Energy has agreements in place with the Federal Government of Nigeria and the Delta State Government to develop, construct and operate the plants.

Under the terms of the agreement, utility-scale projects would be built during the next five years with the first sites reaching commercial operation in 2015.

"The Nigerian government is pleased to partner with SkyPower FAS Energy and we look forward to creating more power and more jobs for the people of Nigeria," said Ambassador Godknows Boladei Igali, permanent secretary, Nigerian federal ministry of power.

"Foreign investment in Nigeria helps build the economy and strengthen international ties with a well-respected and viable partner such as SkyPower FAS Energy," added Igali.

The Saudi-Canadian firm has pledged to work with local firms to deliver the projects.

SkyPower claims to have built, assembled and acquired a total of 25GW of solar generation capacity globally.

FAS Energy, part of the retail and real estate firm Fawaz Alhokair Group, has a pipeline of 2,400MW across the Middle East and North Africa region.

Last month Hanergy announced plans for a 400MW PV power plant in Ghana.

A seperate proposal for 600MW plant and a 300MW manufacturing facility in Ghana were touted in February this year.

British firm Blue Energy is at an advanced stage in the development of a 155MW PV plant in Ghana.

Japan funds US$10 million PV project in Nigeria

The Japanese International Co-operation Agency (JICA), the country's overseas development body, is to fund a PV project in central Nigeria.

The US$10 million funding will go towards a PV array of undisclosed size, which will power a water treatment plant at the Lower Usman Dam in the Federal Capital Territory (FCT).

Once complete, the project is expected to provide power to the treatment plant as well as to the wider populace, according to the FCT.

The project is due to kick off in May this year, with completion due by the end of 2015.

JICA has previously been involved in rural electrification and water projects in the FCT area.

Representatives from JICA and FCT sign an agreement on the project.
Image: Nigeria Federal Ministry of Information.

An FCT spokesman said the project would be put to good use and protected from abandonment or vandalism once complete.

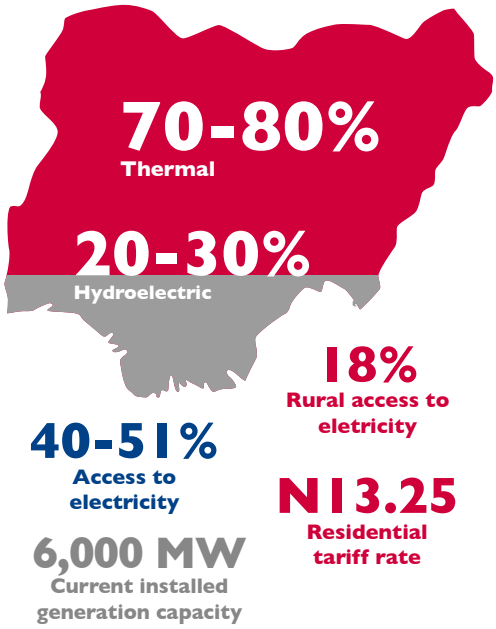
WHAT POWER AFRICA MEANS FOR NIGERIA

Nigeria Energy Sector Overview

Nigeria's energy sector has been undergoing a massive transformation in recent years as the government actively privatizes new generation and transmission projects. Although Nigeria has a growing population of more than 179 million, it generates less than 4,000 megawatts (MW) annually. As a result, scarcity of sufficient and reliable electricity is severely constraining economic growth and development. In order to combat and correct this issue, the Government of Nigeria (GON) is implementing a three phase liberalization process. In the first phase, five generation and ten distribution companies (linked to the country's main power holding company) have been privatized since 2013. In addition, the Niger Delta Power Holding Company (NDPHC) is privatizing ten newly built generation plants.

These newly privatized generation companies are contractually obligated to increase generation for each plant over the next five years, achieving a sum total of 6,000 MW of installed capacity. The government estimates the privatized NDPHC plants will generate an additional 5,445 MW. Finally, an additional 2,000 MW increase will stem from investments by new independent power producers. To help achieve these ambitious goals, the GON is focused on sustaining a stable investment climate for private sector participation in the sector, expanding transmission and distribution networks to deliver power to customers, maintaining a creditworthy off-taker of electricity, establishing cost-reflective tariffs, and reducing inefficiency in support of affordable end-user tariffs.

Current Generation Input Mix



Sources: US Energy Information Administration, International Energy Statistics, 2010; NERC, Multi-Year Tariff Order (MYTO) II, 2012-2017

Power Africa Support

In Nigeria, Power Africa supports the strengthening of the energy sector through credit enhancement, grants, technical assistance, and investment promotion efforts. Through these measures, Power Africa is working to mobilize affordable and long term financing to support capital and operational expenditure requirements for successor generation and distribution companies to accelerate electricity market development. Furthermore, Power Africa is helping to advance major infrastructure investments, promote U.S. technological solutions, and strengthen national systems through targeted technical assistance of national organizations dedicated to improving electricity procurement and regulatory functions. For example, in 2013, Power Africa partnered with Ecobank to increase lending to the renewable energy sector and thus far the bank has awarded over $500,000 in loans to clean energy companies.

Highlighted Transactions

Name	MW	Type of Transaction	Value (USD Million)	Timeline	Power Africa Support	GON Actions
Power Holding Company of Nigeria Successor Companies, 10 Distribution and 5 Generation	2121 MW	Short term Capital Expenditure Facility for contractors to the distribution companies Long term Capital Expenditure facility for the distribution companies	$20 million $1 billion	• Calendar Year End of 2014	• USAID participated in the evaluation of technical bids • Reviewed the Industry Agreements signed by the investors • Credit Enhancement facility to Commercial Banks for Short term Capital Expenditure • Credit Enhancement to unlock Long term capital through Pension and Insurance for Distribution Companies. • Trade Mission for equipment sourcing	• Political will in support of the liberalization program • Created an enabling environment to encourage private sector participation • Mechanism in place for Biannual review of the Multi Year Tariff Order • Developing strategy to increase rural access to modern energy • Diversification of primary energy sources
Azura — Edo Energy	450 MW	Green Field Open Cycle Gas to Power Project	$700 million	• Expected Financial Close Q1 –Q2 2014 • Construction 2014-2017 • Operational 2017	• USAID provided technical support to the Nigeria Bulk Electricity Trading Company (NBET), which led to the successful negotiation of the Power Purchase Agreement (PPA) and the Put Call Options Agreement (PCOA) for Azura Energy • The capitalization of NBET, a well- structured PPA, the availability of the PCOA and other risk mitigation measures from the World Bank, unlocked lenders investment for the project	• Capitalization of the Bulk Trader • Approval of the Put Call Options Agreement • Approval of the Power Purchase Agreement
JBS Wind Power	100MW	Green field Wind Power Project	$300 million	• Finalize negotiation of PPA Q2 2014 • Commence negotiation of PCOA Q2 2014 • Financial Close Q2 2014 • Construction starts Q3 2014 for completion in 2016	• USAID drafted form PPA and PCOA for Wind Project • USAID providing Technical Assistance to negotiate the PPA and PCOA	• Nominated project to Ministry of Finance for the African Development Bank Partial Risk Guarantee • Approval of PPA when due • Approval of PCOA when due

Senegal			
Currency	West African CFA franc		
GDP	14.16 billion USD (2012)	**GDP Per Capita (USD):**	1,023.29 USD (2012)
Economic Growth	4% (2013), 5% (2014 forecast)		
Primary Industries	Refined Petroleum (19%) Gold (11%) Phosphoric Acid (8.8%) Cement (6.9%) Non-fillet Frozen Fish (6.4%)		
Primary Export Partners	Mali (22%) India (11%) Switzerland (10%) Guinea (3.7%)	**Primary Import Partners**	France (13%) Nigeria (12%) United Kingdom (7.0%) China (6.4%) India (6.0%)
Population	13.73 million (2012)		
Policy for Renewables	Senegal was one of the first countries in West Africa to pass a renewable energy law and is also home to the first PV module manufacturing plant, with a 25MW per annum capacity.		
Installed Generating Capacity	584 MW (2012)		
Power mix	Biomass 47% Oil & Oil Products 48% Coal, Hydro, Natural Gas and Solar 5%		
Access to electricity	Overall 40% Urban access 70% Rural access 22%		
Solar highlights	Senegal was one of the first countries in West Africa to pass a renewable energy law and is also home to the first PV module manufacturing plant, with a 25MW per annum capacity. Renewable energy is a key component of national energy policy and it hosted the first pilot study for renewable energy readiness conducted by IRENA. Senegal has a 15% 2020 renewable energy target. The Energy Initiative Partnership Dialogue Facility is assisting Senegalese regulatory authority, CRSE to calculate renewable energy tariffs and draft PPAs. Proposed projects include Prosolia PV of 13 MW and Tenergie with 50 MW. A further 1.5 MW is being developed by Isofoton. Yingli's Spanish subsidiary has recently announced a 2MW plan. Under a contract with Senegal's state-owned utility, Societe Nationale d' Electricite de Senegal (Senelec), Yingli Green Energy Spain will provide engineering, procurement and construction (EPC) services for the solar power plant.		

Africa ready to revamp solar's image, former Senegalese minister says

Governments in Africa are in a good position to overturn mistakes made during early stage PV development and build out a strong renewable energy base, a former renewable energy minister has told PV Tech.

Louis Seck, Senegal's former renewable energy minister, said efforts to spread PV in the past had backfired and it was important to take lessons from those experiences.

"The first projects had some bad experiences. That means when you speak to the public about solar they are not entirely comfortable with it," Seck said on the sidelines of Doing Solar Business in East and West Africa.

"People came to villages and gave them a solar project, they brought the panels, and [the villages] had to pay nothing. There was no warranty, no maintenance, no monitoring so for them the technology was considered not good.

"After these failed programmes we tried to have a strategy for these kinds of projects. First you have to tell them it's not free, you have to tell them to pay so that they know that the panels belong to them and if they do not pay, they do not have electricity. Also we have to have a company in charge of the operation and management aspect. We convince them that electricity from renewables and conventional sources is the same. We also explain that if they want conventional power they could have to wait 20 years for the grid connection," he added.

Source: Jinko Solar.

On Tuesday, the US officially launched its Clean Power Africa scheme's off-grid solar project. The UN Sustainable Energy for All initiative is also gaining momentum.

Seck, who is now the regional co-ordinator for the NGO Climate Parliament in West and Central Africa, welcomed international efforts to increase electrification in Africa but stressed national government actions were vital. In particular he praised his own country Senegal, Ghana and Morocco citing one common attribute of all three.

"Political will. The King of Morocco, the Senegalese president past and present, and the Ghanaian authorities very much like renewable energy. These countries don't have oil and gas but they have a big potential for renewables so they see that they have to go for it and now the international context is favourable to develop renewable energy [in Africa]," said Seck.

Also speaking at the event, organised by PV Tech's publisher, Solar Media, was Rollie Armstrong, managing director, Cronimet Mining Solutions, which is developing diesel-PV hybrid projects.

"Three years ago we didn't see the development banks [showing interest]. Their mandate to electrify Africa is increasing and their cost of debt is decreasing. All the ingredients for us as developers are there," Armstrong said.

Sierra Leone			
Currency	Sierra Leonean leone		
GDP	3.796 billion USD (2012)	**GDP Per Capita (USD):**	634.92 USD (2012)
Economic Growth	16.3% (2013), 13.8% (2014 estimate)		
Primary Industries	Agriculture (51.5%) Industry (14.9%) Services (33.6%)		
Primary Export Partners	China 50.5% Belgium 18.0% Japan 7.6% Turkey 4.8%	**Primary Import Partners**	China 16.3% India 10.1% South Africa 7.1% United States 6.6% United Kingdom 6.6% Côte d'Ivoire 4.6% Belgium 4.5%
Population	5.979 million (2012)		
Policy for Renewables	25% renewable energy goal		
Installed Generating Capacity	90 MW		
Power mix	Biomass and Charcoal 85%		
Access to electricity	1-5% in urban areas		
Solar highlights	Sharjah-based Mulk Holdings will develop 6MW in Freetown, panels will be supplied by Masdar PV. The $18 million project was funded with loans from Abu Dhabi Fund for Development (ADFD). The World Bank has put together a $40 million package to rehabilitate the country's power sector. The country needs 500 MW of power for non-industrial consumers and aims to get 25% of that from renewables. A $500 million project by The African Development Bank (AfDB) has been undertaken to interconnect Sierra Leone, Liberia, Côte d'Ivoire, and Guinea.		

DID YOU KNOW?

- Sierra Leone is one of the wettest places along coastal, western Africa.
- The country's name is derived from the words "Serra Leao," which in Portuguese mean "Lion Mountain Range". The Portuguese explorer Pedro de Sintra named the country after the striking mountains he saw in 1462
- Formed in 2007, Sierra Leone is one of the youngest democracies in the world.
- The Queen Elizabeth II Qua, the world's third largest natural harbor is in Sierra Leone.
- English is the official language in Sierra Leone but, Mende, Temne and Krio are also spoken.

The International Renewable Energy Agency (IRENA) and the Abu Dhabi Fund for Development (ADFD) are funding a 6MW PV project in Freetown, Sierra Leone.

The project, called "Solar Park Freetown" will use silicon thin-film modules supplied by Masdar PV.

When completed, the facility is expected to provide electricity for about 3,000 homes in Sierra Leone and will stand as one of West Africa's largest solar power plants.

Sierra Leone has set high goals going forward, as it plans on generating 25% of its national energy from renewables by 2015.

The PV plant is expected to provide electricity for around 3,000 homes. *Image: Masdar*

A 6MW IRENA/ADFD funded PV project in Sierra Leone to use Masdar PV modules

Silicon (a-Si) thin-film manufacturer, Masdar PV is to supply the modules for a 6MW IRENA/ADFD funded project in Sierra Leone.

Masdar PV said that the 'Solar Park Freetown' was one of six projects selected from over 80 project funding applications in the first funding cycle of the IRENA/ADFD project facility.

The PV power plant is being project managed by the Advanced Science and Innovation Company (ASIC) a conglomerate member of the Royal Group in Abu Dhabi.

The solar park was said to able to provide sufficient energy to power approximately 3000 average type households in Sierra Leone, and one of West-Africa's largest solar plants.

Sierra Leone is said to have a goal of achieving 25% of the country's energy generation from renewable sources by 2015.

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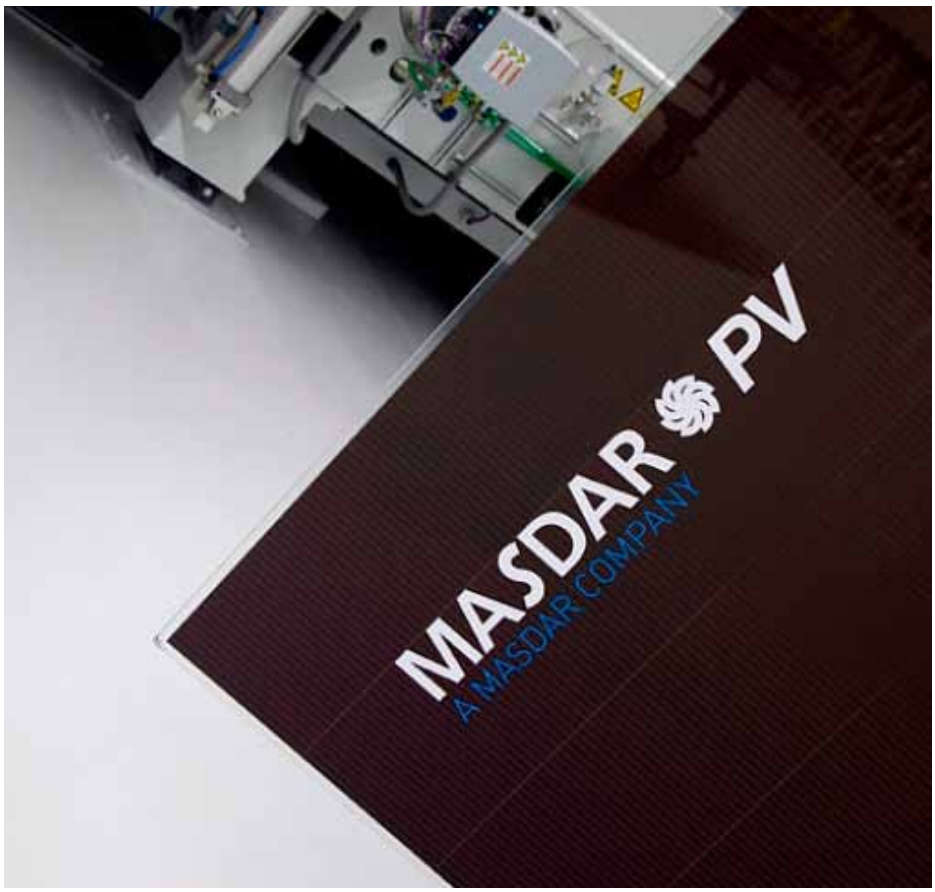

The Gambia			
Currency	Gambian dalasi		
GDP	917.3 million USD (2012)	**GDP Per Capita (USD):**	506.60 USD (2012)
Economic Growth	5.6% (2013), 7.5% (2014 estimate)		
Primary Industries	Agriculture: 33% Industry: 8.7% Services: 58.3% (2008)		
Primary Export Partners	China 57.3% India 18.0% France 4.6% United Kingdom 4.1%	**Primary Import Partners**	China 27.1% Senegal 8.4% Brazil 8.0% United Kingdom 6.3% India 6.0% Indonesia 4.1%
Population	1.791 million (2012)		
Policy for Renewables	A European Union-funded project will see the government of the Gambia develop an ambitious renewable energy law. The aim of the plan is to set 2030 renewable energy targets and provides a feed-in tariff (US ¢ 17-19 /kWh for projects of 20 kW-1.5MW. Projects above 1.5MW must apply for a PPA). Certain tax incentives already exist.		
Installed Generating Capacity	62 MW (2010)		
Power mix	Biomass 60% Petroleum 36%		
Access to electricity	35% (Huge variation in energy access from 93% in Banjul to 6% in the North Bank Region)		
Solar highlights	The government sees off-grid renewables as a potential solution to building out expensive grid infrastructure. As of 2013 the government was working on a Feed-in-Tariff (FIT) scheme, grid code modification and a standard Power Purchase Agreement (PPA) and at the time of writing, the 20 MW Gambia Solar PV, developed by CAMAC plant was approaching financial close.		

DID YOU KNOW?

- The Gambia is the smallest country on the continent of Africa.
- The Gambia is surrounded by Senegal on three sides and on the fourth side it has the Atlantic Ocean.
- February 18th is when The Gambia celebrates its independence.
- The people of The Gambia belong to various tribes such as Mandinka, Fula, Wolof, Wolof and Serahuli.

Togo			
Currency	The Togolese CFA Franc		
GDP	3.814 billion USD (2012)	**GDP Per Capita (USD):**	574.12 USD (2012)
Economic Growth	5.6% (2013), 6% (2014 forecast)		
Primary Industries	Agriculture (45.7%) Industry (21.4%) Services (33%)		
Primary Export Partners	India 13.7% Lebanon 10.5% Burkina Faso 8.0% Benin 7.9% Niger 6.0% China 5.8% Netherlands 4.9% Ghana 4.6%	**Primary Import Partners**	China 41.2% Netherlands 8.0% France 5.5% United Kingdom 5.4%
Population	6.643 million (2012)		
Policy for Renewables			
Installed Generating Capacity	85 MW		
Power mix	Hydroelectric: 78.8% Thermal: 21.2%		
Access to electricity	30% in Urban areas, 5% in rural areas		
Solar highlights	The country has no petroleum reserves so is reliant on imports. There is a large amount of energy produced off-grid by industrial companies, amounting to 8 GWh in 2006. Togo does make use of solar with smaller-scale projects.		

DID YOU KNOW?

- Togo is bordered by Benin in the east, Ghana in the west, Burkina Faso in the north, and a short coast of Atlantic Ocean in the south.
- 17% of Togo is covered with lush forests.
- French, Ewe, Mina, Kabye, and Dagomba are the languages spoken in Togo. French is the official language. Ewe is the most commonly used language in Togo. Kabiye is also widely spoken in homes and schools.
- Togo's flag symbolises hope and agriculture (green stripes), charity and fidelity (red stripes), faith (yellow) and purity (white).
- Togo means water (to) shore/edge (go).

EARLY BIRD
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SOLAR & OFF-GRID RENEWABLES WEST AFRICA

West Africa offers a huge potential solar opportunity, both on and off-grid. Ghana has more than 2 GW in the pipeline and Nigeria has over 3 GW. Both have policies in place for increasing solar installations. Across the region, countries like Benin, Senegal, Burkina Faso and are also up-and-coming solar markets. There are also significant off-grid opportunities to sell to mining companies and other industrial off-takers. Lastly, many companies have firmly established profit-making businesses serving rural customers and innovative models – from scratch cards to mobile phones – exist to monetise solar projects.

Now is the time to take a fresh look at West Africa.

September 16-17 will see a huge delegation in Accra, Ghana to discuss substantive opportunities and hear from government minsters, developers, rural electrification projects, financiers and manufacturers and over 45 speakers will outline their vision for West African Solar, including:

GOVERNMENT & POLICY EXPERTS

- **Wisdom Ahiataku-Togobo,** Director of Renewable Energy, **Ministry of Energy Ghana**
- **Dr. Joseph Essandoh-Yeddu,** Chief, Strategic Planning and Policy, **Ghana Energy Commission**
- **Louis Seck,** Former Minister for Renewable Energies, **The Republic of Senegal**
- **Dr. Ifeabunike Joseph Dioha,** Director, Renewable Energy, **Energy Commission of Nigeria**
- **Bill Clement Akouedenoudje,** Director of Renewable Energy, **Ministry of Energy and Water, Benin**
- **Ernesto Macías,** President, **Alliance for Rural Electrification**
- **Foster Osae-Akonnor,** Member Lead Founder & Chief Executive Officer, **Ghana Green Building Council**
- **Koen Peters, Global Off-Grid Lighting Association (GOGLA)**
- **Mahama Kappiah,** Executive Director, **ECREEE**

PROJECT DEVELOPERS & INVESTORS

- **Douglas Coleman,** Project Director, **Blue Energy**
- **Sidney Yankson,** Chief Executive Officer, **Ghana Capital Partners**
- **James Brown,** Chief Operating Officer, **International Solar Utilities**
- **Karim Megherbi, Independent Renewable Energy Expert**
- **Brad Sterley,** Global Head, Clean Energy Project Finance, **Standard Chartered Bank**
- **Jamie Ferguson,** Regional Manager Middle East & North Africa, **IFC**
- **Jacques Moulot,** Chief Energy Specialist, **AfDB**
- **Matthew Tilliard,** Managing Partner, **CrossBoundary LLC**
- **Godfrey Mwindaare,** West Africa Country Head, **Acumen Fund**
- **Thierno Bocar Tall,** CEO and Chairman, **African Biofuel & Renewable Energy Company**
- **Albert Boateng,** Ghana Representative, **CTI-PFAN**
- **Frank Yeboah Dadzie,** Project Manager (Solar Home systems project), **ARB Apex Bank/World Bank**

OFF-GRID EXPERTS: SOLAR FOR MINES, HEAVY INDUSTRY AND COMMUNITIES

- **Rollie Armstrong,** Managing Director, **Cronimet Mining-Power Solutions**
- **Erwin Spolders,** Chief Executive Officer, **Redavia**
- **Rick Hooper,** Chief Executive Officer, **Barefoot Power**
- **Andreas Spiess,** Chief Executive Officer, **SOLARKIOSK**
- **Rik Wuts,** Co-founder & VP Business Development, **Powerhive**
- **Robert A. Freling,** Executive Director, **Solar Electric Light Fund**
- **John Keane,** Global Development Director, **SunnyMoney**
- **Kofi Tandoh,** Director, West Africa, **Azuri Technologies Ltd**
- **Laurent Van Houcke,** Co-Founder & Chief Operations Officer, **BBOXX**

INTERNATIONAL MARKET EXPERTS

- **Dr. Philip Mann,** Senior Project Manager, **EU Energy Initiative Partnership Dialogue Facility**
- **Elisabeth Gager,** Project Manager, **GIZ**
- Senior Representative, **IRENA**
- **Abdel Karim Traoré,** Associate Renewable Energy Advisor, **SNV**

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Solar power has role in transforming Sub-Saharan economy: Commerzbank

The relatively quick deployment time of solar power could help to fix energy supply issues and get Sub-Saharan economies back on track, according to a new report by Commerzbank.

The second edition of its Renaissance in Sub-Saharan Africa research states that curing the region's energy problems could have a dramatic effect on some countries' fortunes.

"The imbalances in the domestic energy markets could be overcome by a more intense use of renewable energies, such as solar, wind and water energy, which could catapult even underdeveloped rural areas into a new age," it claims.

"…Technological 'leapfrogging' allows for the use of environmentally friendly, inexpensive and effective technologies, providing foreign investors with the necessary know-how with opportunities as well: current energy shortages are a major drag on economic growth," the report states.

"Blackouts are fairly common, even in economically well-developed South Africa. Over the past several years, energy supply problems have even increased because of robust economic growth in many countries and a subsequent increase in energy demand."

South Africa's successful procurement programme has led the way for solar in Sub-Saharan Africa but there are a number of major commitments from Uganda and Kenya and large projects in Sierra Leone, Angola and Rwanda.

Solar and other off-grid renewables could transform parts of Sub-Saharan Africa. *Source: Martifer.*

Joule Africa signs for 100MW solar power plant in Cameroon

Energy developer, Joule Africa, has signed a memorandum of understanding (MoU) with the government of Cameroon to construct a 100MW solar power plant.

Signed at the UK-Cameroon Trade and Investment Forum event, 7-9 May, Joule Africa will be working with its local telecommunications, energy, oil and gas development partner, Bethel Industrievertretung, and the Cameroon government to identify five possible sites for the 100MW solar power plant.

Site proposals are likely to be suggested in the north as solar radiance is highest there.

The project is currently at a stage of feasibility checks, and is expected to be built in stages, with the first segment predicted to be commissioned in 2015 and full commissioning scheduled by 2017.

Once complete the project will contribute to national renewable energy targets and increase generation capacity by 15%.

According to the US Energy Information Administration, Cameroon's installed electricity in 2013 was 1.01GW.

Ian McNeill of Joule Africa told PV Tech there are concerns however over grid infrastructure in Cameroon. "Grid considerations are key - and at or close to the top of our list for feasibility checks," he said.

Mark Green, president of Joule Africa, said "Cameroon is an investment destination of choice for Joule Africa". Joule Africa is already working to develop a 607MW hydroelectric project in Cameroon, known as Kpep.

"These solar PV facilities, which will ultimately sit alongside the Kpep HEP, represent an opportunity to deliver renewable generating capacity within a relatively short timeframe," he said.

Why African solar needs a new strategy

By Ben Willis, Solar Media

With one or two exceptions, the story of solar in Africa has so far largely been one of small-scale, off-grid installations and rural solar lighting projects. Although a handful of other countries have revealed plans for one-off mega projects, South Africa is still the only Sub-Saharan African country with any meaningful PV capacity under development. Despite the continent's huge potential for solar, it is still a long way from punching at its full weight.

But earlier we got a tantalising glimpse of what may be to come should African countries set their sights on deploying solar on a serious scale. Norway-based Scatec Solar announced it had reached financial close and begun construction on what will be the first utility-scale PV power plant in East Africa.

The 8.5MW project will be built in Rwanda and supply electricity to the country's central grid. The Rwandan government's aim is to significantly increase the country's generation capacity – from its current 110MW to 560MW – by 2017. As such the Scatec Solar project will make a valuable contribution towards this goal, increasing the country's capacity by some 8%.

According to Scatec Solar's chief executive, Raymond Carlsen, the company's play in Rwanda is a precursor to further ventures in Africa. "For us it's part of a larger strategic picture for Africa," he tells PV Tech. "We're extremely interested in this market."

Scatec Solar is already one of the leading players in South Africa's booming market, having won the race to grid-connect the first PV plant under the country's national renewable energy programme and with another 115MW in the pipeline. But Carlsen reveals the company is looking at other new markets and already has projects at advanced stages in a number of countries.

"We're pursuing opportunities in Burkina Faso, Mali, Ghana, Namibia and other countries," he says. "We are beyond the investigating stage in these countries; we hope to realise PPAs [power purchase agreements] before the end of the year."

For Carlsen, the chief opportunity for solar companies in Africa is in using technologies such as storage to build systems that help put some serious meat on the often fragile bones of African power networks.

"If you look at this with a five to 10-year perspective, if we continue the introduction of PV, coupled with a continued development in PV storage, you will approach a system that can provide electricity for 24 hours," Carlsen explains. "So this is a very much approaching a baseload type of system. We're not there yet, it's going to take a few years, but that is our perspective on this market. And of course then the market [in Africa] is tremendous."

Other players agree with Carlsen that the biggest opportunities for solar in Africa lie beyond small-scale rural electrification projects.

Mark Hankins, chief executive of African Solar Designs, a renewable energy company based in Nairobi, Kenya, believes that small-scale pico and off-grid solar projects in Africa are "getting way too much press". He says a conceptual shift is required in the solar industry's view of exactly what solar means in an African context.

"This is not about helping the rural poor; that problem is being solved and can be solved, but it's just one element of energy access," he says. "Another element is to do with productive energy – and that means not energy off-grid to give people light or to run their cell phones; we're talking about energy that can transform their lives: so energy to grind maize, to pump water for agriculture, for banking, energy that can transform an economic sector."

Hankins questions whether solar companies have hitherto followed the right strategy for gaining any serious foothold in Africa. Rather than focusing on rural areas he believes the industry should focus on richer urban areas, where there is both significant demand for power and the money to pay for it.

African solar needs to move away from its historic off-grid application. *Image: African Solar Designs.*

"The logic is that remote, unconnected areas are the poorest areas, so up until now the solar industry has kind of thought let's solve the rural remote people problems. So politicians, energy ministries, rural energy agencies, the World Bank, donors, solar companies, they've been really focused on off-grid energy.

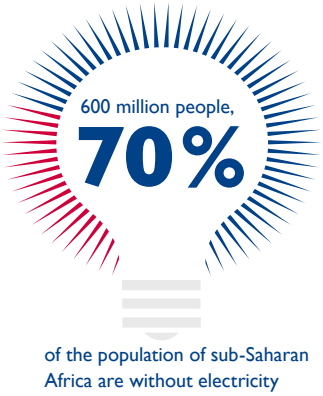
"But sending solar to the most poor people and most remote areas is not a very good business model for the solar companies. In Africa you don't pass a week without having a power outage, so there are a lot of people who would invest in solar maybe instead of generators. And so I would say from a point of view of people wanting to generate their own electricity, it would make a lot more sense to the African middle class, upper class and commercial sectors," Hankins says.

Hankins cautions that 'on-grid' solar should not necessarily mean large- or utility-scale projects. As valid, if not more so, than these mega projects are the smaller on-grid systems on schools, clinics, government buildings and so on: "I'm not against 50MW projects, but we also need the 5, 10kW systems – because that's going to create more jobs, that's going to build up a solar sector, that's going to get more companies involved."

But Hankins is in no doubt that in the medium term, the real growth opportunities for solar in Africa lie in on-grid application. "In the next five years on-grid will start to outpace off-grid in Africa, it might even be two years," he says. "On-grid is going to be the explosive area."

Leveraging Partnerships to Increase Access to Power in Sub-Saharan Africa

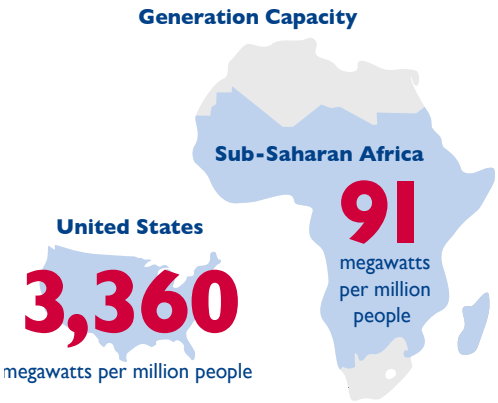
POWER AFRICA



Two out of three sub-Saharan Africans — approximately 600 million people — lack access to electricity. As a result, people spend significant amounts of their income on costly and unhealthy forms of energy. Diesel is used to run factory generators, while scarce and smoky wood or expensive kerosene is used for daily cooking.

On June 30, 2013 in Cape Town, South Africa, President Barack Obama announced Power Africa — an initiative to increase the number of people with access to power in Sub-Saharan Africa. Utilizing the combined expertise of 12 U.S. Government agencies, Power Africa is unlocking the substantial wind, solar, hydropower, natural gas, biomass, and geothermal resources in the region to enhance energy security, decrease poverty, and advance economic growth.

Power Africa is working with African governments, the private sector, and other partners in six focus countries — Ethiopia, Ghana, Kenya, Liberia, Nigeria and Tanzania — to add more than 10,000 megawatts (MW) of cleaner, more efficient electricity generation capacity by 2020. The initiative has already helped financially close almost 2,800 MW worth of transactions and has secured commitments for another 5,000 MW, representing a total of almost 75% of the initial 10,000 MW goal.



Although Power Africa's implementation varies country-by-country, as a whole, the initiative will also advance energy sector reforms, identify barriers to investment, and work with each partner country to improve efficiency and capabilities of relevant government institutions.

In addition, Power Africa aims to reduce technical and commercial electricity losses by an average of 20% in the six focus countries by 2020; it also strives to increase regional cross border energy trading through the utilization of power pools and other energy sharing resources.

Power Africa is also enhancing energy resource management capabilities, allowing partner countries to meet their critical energy needs and achieve sustainable, long-term energy security.

Power Africa is also expanding mini-grid and off-grid solutions to increase access to underserved areas through "Beyond the Grid." This sub-initiative utilizes Power Africa's innovative transaction-focused model to galvanize collaboration, engage in critical actions to accelerate transactions, and drive systemic reforms in order to facilitate future investment for off-grid and small-scale renewable energy solutions. The Power Africa initiative already supports over 25 small-scale energy projects, but Beyond the Grid will expand this significantly – facilitating over $1 billion in new private sector investments. Beyond the Grid will also unlock investment and growth for off-grid and small-scale energy solutions for millions of households, businesses and public facilities in underserved areas in Africa.

Highlighted Transactions

Kenya Aeolus Wind — 60 MW: The Government of Kenya, project financiers, and Aeolus Kenya Ltd. are closing agreements for the funding and construction of the Kinangop Wind Park. Power Africa also supports the implementation of a grid management program to assist Kenya in managing integration of intermittent renewable energy.

Nigeria Power Privatization — 2,000 MW: Fifteen companies will purchase the assets of ten electricity distribution units and five power generation units during the initial phase of privatizing the Power Holding Company of Nigeria. Power Africa is supporting these companies' efforts to improve operations and maintenance and obtain additional investment, which is projected to result in a 2,000 MW increase of power generation by 2018.

Ethiopia Corbetti Geothermal — Up to 1,000 MW: The Government of Ethiopia and the Ethiopian Electric Power Corporation entered into a project agreement with Reykjavik Geothermal to establish the Corbetti Geothermal Power Plant — the first independent power project in Ethiopia's history. Power Africa will provide transactional and technical advice to move the Corbetti project forward.

Tanzania Kiwira River Hydro Project — 10 MW: Power Africa approved a loan guarantee for the Kiwira River Hydro Project in Tanzania's agricultural corridor. This guarantee will facilitate local commercial finance for the mini-grid project.

Power Africa's Beyond the Grid: Increasing Access through Small-Scale Energy Solutions

More than 240 million people live without electricity in rural and peri-urban communities across the six Power Africa focus countries. Recognizing that Power Africa cannot achieve energy access goals through the use of large grid extension projects alone, the U.S. Government has recently launched a new framework focused exclusively on unlocking investment and growth for off-grid and small-scale energy solutions on the African continent.

Known as "Beyond the Grid", this new framework leverages Power Africa's innovative transaction-focused model to galvanize collaboration, engage in critical actions to accelerate transactions, and drive systemic reforms to facilitate future investment specifically relating to off-grid and small-scale energy solutions. Beyond the Grid has been developed in close collaboration with investors, practitioners, and donors. Beyond the Grid strives to create an effective enabling environment, as well as increase access to finance and technical assistance in order to address some of the recurring constraints in the small scale-energy space.

Over a five year period, Beyond the Grid will partner with over 27 investors and practitioners that have committed to invest over $1 billion into off-grid and small-scale solutions to this underserved market. These private sector commitments will be significant in helping Power Africa meet and exceed its objective to provide access to 20 million new connections for households and commercial entities.

Mobilizing Finance

Sustainable, private sector-led business models for off-grid and small-scale energy solutions are beginning to succeed in the marketplace — bolstered by decreasing costs of renewable energy generation, new technologies, innovative business models, and a growing cohort of entrepreneurs meeting the demand of sub-Saharan Africa's underserved populations. Building on this momentum, Beyond the Grid will utilize the various tools and resources of the 12 U.S. Government agencies which work together as part of the Power Africa team to mobilize finance to small-scale energy projects.

Enabling Environment

Growth of the small-scale energy sector hinges on the public sector providing transparent regulatory and policy regimes which provide clear, predictable rules for project development, investment and operation. However, existing policies and regulatory frameworks are not always primed to support new and emerging business models enabled by rapidly transforming energy technologies. In order to catalyze the private sector and the significant resources it can bring to bear, Beyond the Grid will support activities that create an enabling environment for development and investment in this space.

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New EU support for renewable energy and governance in Cape Verde
European Commission - IP/14/140

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Renewable Energy in Mali: Achievements, Challenges and Opportunities
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REEEP Policy Database: Mali

Wikipedia: Economy of Niger

Trinity College, Dublin: Republic of Niger-MDP

African Development Bank: Nigeria Economic Outlook

SOLAR MEDIA

EAST & WEST AFRICAN SOLAR EVENTS SERIES

Access gigawatt solar opportunities on- and off-grid in East & West Africa

SOLAR & OFF-GRID RENEWABLES, WEST AFRICA

16-17 September, Accra, Ghana

Confirmed speakers include:

- **Dr. Joseph Essandoh-Yeddu,** Chief, Strategic Planning and Policy, **Ghana Energy Commission**
- **Wisdom Ahiataku-Togobo,** Director of Renewable Energy, **Ministry of Energy Ghana**
- **Louis Seck,** Minister for Renewable Energies, **The Republic of Senegal**
- **Douglas Coleman,** Project Director, **Blue Energy**
- **James Brown,** Chief Operating Officer, **International Solar Utilities**
- **Sidney Yankson,** Chief Executive Officer, **Ghana Capital Partners**
- **Jamie Ferguson,** Regional Manager Middle East & North Africa, **IFC**

SOLAR & OFF-GRID RENEWABLES, EAST AFRICA

March 2015, Nairobi, Kenya

The 2014 speaker panel included:

- **Isaac Kiva,** Director of Renewable Energy, **Ministry of Energy, Kenya**
- **Robert Pavel Oimeke,** Director of Renewable Energy, **Energy Regulatory Commission (ERC), Kenya**
- **Stephen Mwakesi,** Policy Manager, **Kenyan Chamber of Mines**
- **Laetitia Nduwimana,** Monitoring & Evaluating Specialist, Energy Sector Wide Approach / SWAP Secretary, **Ministry of Infrastructure, Rwanda**
- **Ephantus Kamweru,** Chief Manager, Renewable Energy, **Rural Electrification Authority, Kenya**
- **Arthur Itotia Njagi,** Manager, **IFC Lighting Africa program**
- **Charles Muchunku,** Chairman, **Kenya Renewable Energy Association (KEREA)**

Contact jduff@solarmedia.co.uk for 2015 event details

DOING SOLAR BUSINESS IN EAST & WEST AFRICA

June 2015, Munich, Germany

Confirmed speakers in 2014 included:

- **Justus M.P. Mbithi,** Deputy Director of Renewable Energy, **Ministry of Energy, Kenya**
- **Louis Seck,** Minister for Renewable Energies, **The Republic of Senegal**
- **Wisdom Ahiataku-Togobo,** Director of Renewable Energy, **Ministry of Energy Ghana**
- **Adel Baba-Aissa,** Founder & Managing Director, **Renewable Energy Partners**
- **Erwin Spolders,** Chief Executive Officer, **Redavia**
- **Thomas Duveau,** Head of Business Development, **Mobisol**

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Who will attend?

- Government Ministers
- Utility Scale Developers and Project Sponsors
- Off-Grid & Distributed Solar Developers and Project Sponsors
- Development Banks
- Export Credit Agencies
- Investment Banks
- Private Equity Firms
- Venture Capital Firms
- Law Firms
- Engineering Procurement and Construction (EPC) Firms
- Transmission and Distribution Companies
- International Consultants
- International Trade Development Agencies

Previous event: Solar & Off-Grid Renewables, East Africa

- Over 200 attendees
- Speakers included: Ministry of Energy, Kenya , Rural Electrification Authority, Kenya, IFC, East Africa Solar, GIZ, Energy Regulatory Commission (ERC), Kenya, Kenyan Chamber of Mines, Kenya Commercial Bank (KCB) and Ministry of Infrastructure, Rwanda
- Sponsors included: Trina Solar, GIZ, Schneider Electric, First Solar, Rahimafrooz Solar, Premier Solar and Ubbink

"Great event with nice networking opportunities! Worldwide players in the solar industry -developers, EPC, venture capitalist- should be made aware of this event!"

Eric Kariningufu, Managing Director, 3E Power

"There was no better place to be for getting market players, decision makers and investors in one room, especially in this region that has huge potential."

Guido Baumstieger, Global Product Manager Africa, SMA Solar Technology

Gold Sponsor

Trina solar
Smart Energy Together

Founded in 1997, and listed on the New York Stock Exchange in 2006, Trina Solar specializes in the manufacture of crystalline silicon photovoltaic modules and system integration. Trina Solar is not only a pioneer of China's PV industry, but has become an influential shaper of the global solar industry and a leader in solar modules, solutions and services.

Silver Sponsors

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ATL

Amperex Technology Limited (ATL), founded in 1999, is a premier energy solution provider, dedicated to developing, manufacturing, and marketing advanced rechargeable lithium ion polymer battery cells, battery packs and systems. ATL makes safety its top priority and provides competitive industry specific warranties.

3SiL Strategic Security Systems International Limited

Strategic Security Systems International Limited (3SiL) is an independent and economically empowered business conglomerate comprising several strategic business outfits including Strategic Power Solutions that offers an array of Solar PV lighting solutions ranging from Building Integrated Photovoltaic (BIPV) Systems, Solar Streetlights/torchlights/Lanterns/Home Systems and Power Producing farms of various capacities. 3SiL has installed cumulative 4MW PV systems across Ghana under the rural solar lighting program. The company has built a fully automated 8MW Solar PV Modules Production Factory to supply solar panels with tremendous improved cell efficiencies to the local and sub-regional markets. We boast of a well-equipped PV installation/maintenance teams second to none in the sub region. Other areas of business activities include Logistics, Transportation, Estate and Business Development Services.

Supporting Sponsors

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Trojan Battery Company is the world's leading manufacturer of deep-cycle batteries that power a wide variety of renewable energy, remote telecom, golf, electric vehicle, transportation, industrial, and recreational applications.

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