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Filling the Energy Information Gap in Africa

Consumer Products

Regulatory Regimes
Angola and Cape Verde

Regional Focus
Tunisia & Island Nations

Troops Killed in Niger

According to AFRICOM (United States Africa Command), on October 4, three U.S. service members and one partner nation member were killed while the U.S. was providing advice and assistance to Nigerien security force counter-terror operations, approximately 200 km north of the capital city of Niamey, near the Mali border. AFRICOM also confirmed in a statement that two U.S. service members were injured and evacuated in stable condition to Landstuhl Regional Medical Center in Germany.

A report by CNN stated that five Nigerien troops were also killed in the ambush. The report said that US officials had stated the "Green Berets were ambushed by up to 50 fighters who are thought to be affiliated with ISIS."

U.S. Forces are in Niger to provide training and security assistance to the Nigerien Armed Forces, in their efforts to counter violent extremist organizations in the region.

Kenya's Election Commission Replaces Staff for Re-run

The Kenyan Supreme Court ruled to annul the August 8 results of the East African country's presidential election. The election results had President Uhuru Kenyatta winning at the polls over the opposition who rejected the results. The reversal of Kenyatta's win stunned the country, as well as African and global political pundits as a whole, for the most part. According to some analysts, the annulment of the vote shows a growing independence of the Kenyan courts.

The 4-to-2 court ruling came in response to a petition filed by opposition challenger Raila Odinga, 72, who alleged widespread fraud in the election. Following the judgment, people in the court broke into cheers, with Odinga raising his fists in the air in celebration. The re-run will be held on October 17.

Shortly after the decision, Kenya's election commission put a different set of staff members in charge of its planned re-run of the nullified August election. Independent Electoral and Boundaries Commission Chairman Wafula Chebukati said in a statement that it had appointed for three months a project coordinator and officials to run the information technology, logistics, operations and training as well as the national tallying center during the re-run.

The news of the change of staff came shortly after opposition leader Raila Odinga said his coalition would not participate in the re-run unless some officials were removed.

UNITA Appeals Angolan Election Results

In a move that surprised almost no one, Angola's main opposition party, UNITA, submitted an appeal to the constitutional court to annul the results of the August election. The election gave the ruling MPLA a landslide victory. According to UNITA, the electoral process failed to comply with the law. UNITA presented the appeal, accompanied with boxes of supporting documents late on September 8.

Angola's National Electoral Commission (CNE) published definitive results on September 6 giving MPLA 61% of the vote and UNITA 27%. While UNITA and other opposition groups repeatedly filed complaints throughout the two weeks of vote counting, CNE rejected them all.

"The law was completely violated and that means the results which the CNE published are invalid," Ruben Sicato, UNITA spokesman, told reporters.

Liberians Set for Presidential Elections

Liberians are set to head to the polls on October 10 to either re-elect their current president or one of her opponents. The two main contenders are 78-yr old incumbent President Ellen Johnson-Sirleaf and former Chelsea footballer George Weah. Also on the Weah ticket is Jewel Howard Taylor, once the wife of former president Charles Taylor who was accused of war crimes and inciting civil war in neighboring Sierra Leone.

Over 2.18 million are registered to vote in the upcoming elections at the 5,390 nationwide polling places. International observers from the African Union, EU, and the US will be allowed to monitor the elections.

Togo's Cabinet Sets Term Limits


Source: UN

There will be no more decades long rulers for Togo as the country's cabinet adopted a draft bill to modify the constitution and reintroduce presidential term limits."This bill to modify the constitution concerns specifically the limitations of mandates and voting procedures," a government statement, referring to article 59 of the constitution, said.

The West African country's leader, President Faure Gnassingbé has ruled since his father, Gnassingbé Eyadéma, died in 2005 after 38 years in power.

Journalist Killed in South Sudan Fighting

A freelance journalist from the US was one of 19 people killed on August 26 in South Sudan during fighting between government and rebel troops in the Yei River state. The journalist, Christopher Allen, worked for various news outlets and was killed in heavy fighting in the town of Kaya.

"On the ground, about 16 (bodies) have been found around the defensive position of the SPLA including this white man," Santo Domic Chol, a military spokesman was cited by *Reuters* as saying. Three government soldiers were also killed, he said.

The rebels identified him as Allen, who had been embedded with them for the past week. "We are sad for his family. He came here to tell our story," one rebel who knew Allen was quoted in the *Reuters'* report. He asked not to be named but said Allen had been in the middleof the fighting and wearing a jacket marked PRESS.

CONTENTS

FEATURES

DEPARTMENTS

Source: Azuri Technologies

Azuri's Pay-as-You-Go consumer solar products making a mark in sub-Saharan Africa

Publisher's Note

MESSAGE
FROM THE PUBLISHER

Exciting news has emanated out of the African alternative energy sector in recent months. First up was the announcement that the Trump administration would continue with its Power Africa initiative by program coordinator Andrew Herscowitz. "The increased involvement of the private sector in the program intrigues many people in the new administration," according to Herscowitz, who added that for every dollar invested by the US government, the private sector injects between $50 and $100 billion. "This is a model that many administrations would like to see endured," he said. I must admit I was a bit surprised given Trump is a climate change denier and has pulled out of the Paris accords. So for now, the initiative will go on, fantastic news for the African and American sides of the equation.

Second is TuNur's recent revelation that it plans to erect a massive 4.5 GW CSP complex across the Tunisian desert and export the energy to Europe. My first thought was "another Desertec-type plan in the making?" and then "will Tunisia go for it as structured?". Considering Tunisia's ambitious plans to add a significant amount of power generation from renewable resources to its energy mix by 2030, I'm not sure this project will proceed as envisaged. Perhaps a middle ground will be struck keeping a percentage of the energy for domestic use. For more on Tunisia and the TuNur proposal, see this issue's Country Focus section page 22.

And third, while plenty of investment into Africa's renewable energy sector is pouring in from the West, Chinese firms continue to ink substantial contracts around the continent. Although not surprising, it always strikes me when China comes through with "the big deal." Over just the past two months Chinese firms and financial institutions have struck big ticket deals with Angola, Cote d'Ivoire, Kenya, and Nigeria for major projects, three hydro and one geothermal. As often discussed in the petroleum sector, African governments like the little to no strings terms that come with the Chinese investors and as a result, their presence is significant across many sectors.

Within this issue you can read more on all of these developments. Additionally, the impacts consumer solar products are having around the continent can be found in our Technology article while the island nations of Cabo Verde and Madagascar along with Tunisia are featured in Country Focus. As always, your comments and suggestions are welcome. Please write us at *info@AE-Africa.com* or join us on Facebook or LinkedIn.

Dianne Sutherland
Publisher

Tanzanian Hydroelectric Project Attracts Suitors

An estimated 50 multinational firms have expressed interest in building the Rufiji hydroelectric power plant to be located in the Selous Game Reserve in Tanzania, according to the East African country's Ministry of Energy. The proposed power plant will have a capacity of 2,100 MW.

The tender for the project was launched in August 2016 and companies who had an annual turnover of at least $500 million were asked to submit applications.

While companies may be interested in undertaking the project they could face opposition from environmentalists. The construction of this power plant has led to a protest movement, particularly within the environmental community. WWF said in a report that it threatened not only the ecosystem of the park, which is home to an endangered species of black rhino, but also the living conditions of 200,000 people.

Trump Administration to Continue Power Africa

The Trump administration will continue to implement the "Power Africa" program according to Andrew Herscowitz, the coordinator of the US initiative. Several US officials, including Secretary of State Rex Tillerson, affirmed their support for the program and announced its continuation, said the official.

Launched in 2013 by President Barack Obama, Power Africa aims to double access to electricity in sub-Saharan Africa by 2030.

The increased involvement of the private sector in the program intrigues many people in the new administration, according to the coordinator. "Indeed, for every dollar invested by the US government, the private sector injects between $50 and $100 billion ... This is a model that many administrations would like to see endured," Herscowitz said.

Three-quarters of the solar and wind power projects planned as part of the implementation of the program have already started, according to its manager. The targets have been tripled with an ambition to develop 30,000 MW for the connection of 60 million households by 2030. The main difficulty, he says, is the distribution networks, but local electricity distribution actors are working to solve it.

AfDB Allocates $12 Billion for African Energy Projects

The AfDB has allocated $12 billion to fund energy projects in Africa to 2025. These funds, which will go mainly to renewable energy projects, will contribute to the reduction of the continent's energy deficit, according to Mohammed el Azizi, the managing director of the bank for North Africa.

These investments are part of the New Energy Pact for Africa set up by the financial institution in 2015. More than 645 million people, or two-thirds of the continent's population, have no access to energy.

The AfDB's objective is to facilitate access to energy for 130 million people and organizations by 2025 through national electricity grids; which would multiply by 1.6 the rate of electrification of the region. An additional 75 million people will also have access to electricity through off-grid electrical systems.

Siemens' Blade Plant Up and Running in Morocco


Source: Siemens

The wind turbine blade manufacturing plant developed by Siemens in Morocco has begun producing its first products. The project, which was first agreed upon in March 2016, will be officially inaugurated on October 11.

The €100 million plant can now supply Morocco's 200-MW wind farm project led by Nareva in Boujdour, although 85% of its production is slated for the international market.

A new technology called "Integral blade" was used to make the blades in one piece; which increases their rigidity and lifespan. A training center has also been set up by Siemens to train workers to run the infrastructure.

EETC Signs PPA with Elsewedy

Egyptian utility company, Egyptian Electricity Transmission Company (EETC), signed a PPA with Elsewedy Electric to develop, fund, establish, and operate a 50-MW solar plant in Benban, Aswan, under the terms of the second phase of the feed-in-tariff (FiT) program.

Elsewedy Electric was qualified in October 2016 to establish solar power plants in Benban, Egyptian Minister of Electricity and Renewable Energy, Mohamed Shaker, said. He added that the financial closure of the solar power plants will be ready within a year, while the financial closure of wind farms will be completed in a year and a half.

The Ministry of Electricity has signed PPA agreements with 18 firms to execute projects with a total capacity of 870 MW, Shaker noted.

Madagascar Issues RFQ for 25 MW of Solar PV

The Republic of Madagascar, through its Ministry of Water, Energy and Hydrocarbons (MEEH), has issued a Request for Pre-Qualification (RFQ) for a 25 MWac solar photovoltaic project located near the island nation's capital of Antananarivo.

For complete details, including the application process and fees, the announcement will be available on MEEH's website.

The Madagascar tender represents the fourth Scaling Solar tender in Africa to date, with two rounds initiated in Zambia and one in Senegal. It will also be the first Scaling Solar project to be tendered that will include battery storage requirements in addition to solar PV generation as part of the tender.

All interested parties are invited to register with the MEEH and purchase the RFQ document. Applications must be submitted by January 10, 2018. Pre-qualified bidders will receive the Request for Proposals in due course.

Cameroon Preparing for Memvé'élé Hydropower

Cameroon is preparing to receive a critical piece of infrastructure at the construction site of the Memvé'élé hydropower dam in the southern region. The 211 MW energy infrastructure is being built by Sinohydro.

"The works of the dam itself are completely completed. The disjunction station is ready and the four Francis turbines of the plant are installed, ready to turn to produce the expected 211 MW of energy ... We are preparing to organize a provisional and partial technical reception ceremony in accordance with under the terms of the service contract and the timetable for the execution of the works," Dieudonné Bisso, the director of the Memvé'élé hydroelectric development project, told the *Government Daily* .

The dam will not be connected to Cameroon's grid for at least a few months, as the construction of the transmission line between the dam and Douala is still ongoing.

Mozambique to Implement $500 Million in Projects

The Mozambican Energy Fund (Funae) plans to implement a portfolio of projects worth $500 million to contribute to universal access to electricity in Mozambique by 2030.

In a statement, the organization announced that it will use both solar and hydroelectricity for its various projects. These technologies can be used separately or jointly in hybrid power plants. The projects will be implemented in the provinces of Maputo, Gaza and Inhambane in the south of the country; Sofala, Manica, Tete and Zambézia in the central region and Nampula, Niassa and Cabo Delgado in the north.

Studies are currently underway to identify the sites likely to accommodate such infrastructures in the regions.

Final Turbines Arrive at Khobab and Loeriesfontein

South Africa's Khobab and Loeriesfontein wind farms saw all turbine components, totaling 280 MW, delivered by developer Mainstream Renewable Power. The final load with components arrived at the site of the Khobab wind farm in Northern Cape province on August 25. The first turbine delivery took place over a year ago.

Source: Mainstream Renewable Power

Turbine transportation was handled by turbine manufacturer Siemens Gamesa Renewable Energy SA and logistic contractors DHL and ALE Heavylift, according to a press release.

The Khobab and Loeriesfontein projects are owned by a consortium comprised of Lekela Power, a 60/40 joint venture (JV) between private equity firm Actis and Ireland-based renewables developer Mainstream. Commissioning of both facilities is planned for end-2017. Once operational, the plants will transfer all the power generated to utility Eskom's national grid.

UNCDF and Ensol Tanzania Launch Micro-Grid Project

An estimated 50 households in Tanzania's Mpale village, Korogwe District have been connected to solar micro-grid during a project launched between the UNCDF in collaboration with Ensol Tanzania Ltd.

Speaking during the launch of the project, Deputy Permanent Secretary in the Ministry of Energy and Minerals, Dr Juliana Pallangyo said connection of power to the area will improve social lives and boost economic activities. "I would like to thank UNCDF and Ensol for their efforts in promoting access to electricity and in particular renewable energy to improve local economic development and livelihoods," she said. Ensol has thus far connected 50 households in Mpale Village to the solar micro-grid.

Plans are underway to expand the project by connecting a total of 250 households by June 2018 and the Minister asked community members to properly utilize the opportunity by engaging in various economic activities.

CCECC to Build Expensive Hydro Plant in Nigeria

The China Civil Engineering Construction Corp. (CCECC) will build a 3,050-MW hydroelectric plant in the Mambila region of eastern Nigeria, according to a Bloomberg report. With a total cost of $5.8-billion, the project will last six years and will be 85% financed by the Export-Import Bank of China (Eximbank China) and the Nigerian government will contribute the remaining funds.

Babatunde Fashola, Minister of Energy, Works and Housing said, "The scope of the work is very broad. The project will require the construction of 700 km of electric transmission lines. It also includes the construction of four dams of which one is 150 meters high, two 70 meters and one 50 meters."

Muchinga to Invest $900 Million n Zambian Hydropower Station

Muchinga Power Company Ltd. (MPCL) will spend $900 million on the development of a 330-MW hydroelectric generating station in Zambia. The project, which aims to strengthen the country's renewable energy portfolio, also includes the construction of 66 km of a 330 kV transmission line. This transport infrastructure will serve to connect the power plant to the national electricity grid, the *Daily Mail* reported.

"MPCL aims to develop a hydroelectric project with a capacity of between 204 and 330 megawatts on the Lunsemfwa and Mkushi rivers. The total investment will be between $700 million and $900 million. Energy investment is a prerequisite for industrial and commercial development in Zambia. Hydroelectric power production proves that this technology is sustainable and is being actively promoted throughout the country," the company said in a statement.

The projected power plant will have a lifetime of 20 years and could be rehabilitated at the end of this period. MPCL is a company established and owned by Lunsemfwa Hydro Power Company, Zambia's largest independent energy producer. The company currently has two hydroelectric dams with a total capacity of 56 MW and plans to increase its portfolio capacity to 500 MW by 2020.

Mozambique Commits to Full Grid Connection by 2018

Mozambique has committed to giving the whole country access to the grid by 2018. According to the state utility, Electricidade de Mocambique (EdM), the remaining four districts with no access to power will be connected to the national grid by 2018.

Regions concerned are Muleva, Luabo and Derre in the Zambezia districts, and also Doa in the Tete district. Estimated cost for related works is $18 million which will be provided by the central government.

In order to boost national power output, EdM is currently building a gas-fired, combined cycle power station of a capacity of 10 6 MW in the Maputo district in order to meet growing demand. The $180 million project will be financed in part ($167 million) by the Japan International Cooperation Agency (JICA). Also, a 220kV transmission line linking Chibata to Dondo, in the central region, is being laid while works to lay another of 11kV linking Cuamba to Marrupa are expected to commence soon.

Ethiopia Biomass Plant Expected Online in December

Ethiopia expects to see its first biomass power plant to be operational by December. According to reports out of the country, the infrastructure for the biomass plant is currently over 94% complete. The plant will have a 50 MW capacity and is located in the capital of Addis Ababa.

The plant will process waste from the country's largest dump, which covers over 5.3 hectares, and is being built at a cost of $118.5 million. The project was developed by British firm Cambridge Industries Limited and the China Electrical Engineering Company (CNEEC), *Xinhua* reports. It will prevent the emission of 46,494 tons of green house gases every year.

Iowa Moves Toward 1,000 MW New Wind Energy Target

U.S. company Alliant Energy, finalized an agreement with Apex Clean Energy for Upland Prairie Wind Farm which will move the state closer to its goal of obtaining one-third of its energy from wind. The 300-MW project is located in Clay and Dickinson counties in northwest Iowa and will power around 130,000 homes per year with its 121 turbines.

"We are bringing more clean and cost-competitive wind energy to our customers," said Doug Kopp, president of Alliant Energy's Iowa energy company. "If our second wind expansion project is approved, one third of our energy in Iowa will be from wind, starting in 2020."

This project will add construction and other jobs, as well as tens of millions of dollars in additional property taxes to the local communities and lease payments to landowners.

Alliant Energy received approval in 2016 to add up to 500 MW of wind energy. The company requested a similar expansion from the Iowa Utilities Board again in 2017. The combined projects would represent a $1.8 billion investment and add up to 1,000 MW of new wind generation in Iowa. Together, that's enough to power up to 430,000 homes a year.

Siemens Gamesa Wins Order for India's Hybrid Wind-Solar Project

Siemens Gamesa has been mandated to develop India's first large commercial hybrid wind-solar project, where a 28.8-MW solar facility will be connected to an existing 50-MW wind farm. This is the first project of its kind for the company and evidences its determination to explore business opportunities that add value for its customers.

Under the terms of the agreement reached with one of the country's leading independent operators, Siemens Gamesa will provide an end-to-end turnkey solution. Specifically, it will handle the design, engineering and commissioning of the new solar plant (including the supply of photovoltaic inverters made by Gamesa Electric) and its hybridization with an existing wind farm, equipped with the Siemens Gamesa turbines. The project, located in the in the state of Karnataka, is scheduled to be up and running by the end of 2017.

"This is a very important milestone for our company. We are truly proud to be rolling out this new hybrid solution – namely the optimal combination of solar and wind power technology – on a commercial scale," underscored Ramesh Kymal, CEO of Siemens Gamesa's Onshore business in India. He also added, "With a market potential of around 15 GW in India, our customers are increasingly interested in this type of integrated renewable system."

Nexans Sets World Record to Strengthen Norway's Power Grid

Nexans will install a submarine cable in Norway at a sea depth of 526 meters, breaking its previous world record of the world's longest and deepest 420 kV XLPE submarine cable system.The cable will complete the last construction stage of a new BKK power connection in Western Norway, supplying power to around 200,000 households, businesses and industry facilities in the Bergen region.

While the Nordic countries are among the most advanced in terms of clean electricity generation, their consumption of energy per capita is also among the highest in the world due to cold climate and a sparse population distribution. To meet growing electricity demand and accompany increased energy production, BKK Nett AS, one of Norway's largest power companies, decided to install the Kollsnes-Mongstad power line to strengthen the electrical grid in Western Norway. After the manufacturing and installation of two submarine cables for Kollsnes-Mongstad connection, BKK Nett AS has awarded Nexans with a contract worth approximately 37 million euros for delivery of the third and last submarine cable to complete the Modalen-Mongstad connection.

The new 420 kV connection between Modalen-Mongstad will ensure power supply to over 420,000 residents, businesses and industry facilities throughout the region. With the extensive archipelago landscape on the west coast of Norway, Nexans submarine cable will cross the Fensfjord, which is approximately 8 km wide and 526 meters at its deepest point, thus breaking the record of the world's longest and deepest 420 kV XLPE submarine cable system.

The previous record was also set by Nexans during the construction of the first part of the connection between Kollsnes and Mongstad at the end of 2016. The Kollsnes-Mongstad

Source: Nexans

connection had to cross two fjords: the Lurefjord and the Hjeltefjord which was a mere 390 meters at its deepest.

Nexans will develop and produce the submarine cable at its facility in Halden, Norway. Installation and work on the seabed will be performed by Nexans' own cable-laying vessel *C/S Nexans Skagerrak* in the summer of 2019. After commissioning, the Modalen-Mongstad facility shall be handed over to Statnett ASA, the company with system responsibility for Norway's central power grid.

Fronius Expands Service in Ukraine

In September, German inverter provider Fronius Solar Energy erected a warehouse for spare and replacement parts at its Ukrainian site roughly 20 km south-east of Kiev, allowing the company to significantly improve its after-sales service.

"If a part needs replacing, we take care of the ordering, transport and customs obligations. What's more, our customers receive a replacement device within one day, which reduces downtimes to a minimum," explains Benjamin Fischer, Area Sales Manager for the firm.

Already established in Ukraine with its branch near Kiev where a range of services as well as consultancy are offered, the company recently celebrated its 25th anniversary in the country.

"The Business Unit Solar Energy is celebrating its 25th anniversary this year. What makes us stand out is products and services of the highest quality, along with our technical know-how and years of experience," explains Fischer. The expert has a positive outlook regarding the cultivation of the solar market in Ukraine and believes that this segment has high potential. "Our goal this year is to sell systems with a total output of 100 megawatts. We are well on our way to achieving this." Fronius Ukraine is currently working on several projects simultaneously, which

Source: Fronius

are scattered across the entire country. "Each individual system brings us closer to achieving our vision of 24 hours of sun, a future in which 100% of the world's energy needs are covered by renewable sources," enthuses Fischer.

China Taps Siemens Gamesa for 300 MW

Siemens Gamesa Renewable Energy has secured an agreement for the supply of 300 MW in China, one of its largest ever in this market. This substantial order reinforces the company's presence in the world's biggest wind power market where it has established itself as one of the leading foreign OEMs.

Specifically, Siemens Gamesa has been engaged to supply and commission 150 G114-2.0 MW turbines for the Xilinhot

complex and to service them under a long-term O&M agreement. The plan is for installation of the first turbines to begin in the second quarter of 2018 and for the complex, which is being built in Inner Mongolia, to be up and running by the end of next year.

"With this significant order, the company has achieved a new milestone in its strategy in China where it has already installed over 4.6 GW," underscored Álvaro Bilbao, CEO of Siemens Gamesa in Asia Pacific.

Gamma Receives Loans for UK Solar Farms

Triodos Bank, a leading European sustainable bank, has provided £17.9 million in loans to two UK solar projects for Spanish developer Gamma Solutions SL. The transaction combines two types of loans in one finance package, namely £15.1 million of project finance loans from Triodos Bank with £2.8 million of mezzanine loans from the Triodos Renewable Europe Fund (TREF), a dedicated renewable energy fund managed by Triodos Investment Management in the Netherlands.

Stokes Marsh and Stoneshill solar farms are located near Coulston in Wiltshire and Exeter in Devon. The ground-mounted solar projects have capacities of 15.1 MWp and 5.0 MWp, and were commissioned in March 2015 and March 2017 respectively. With over 62,000 solar panels installed over 41.5 hectares, their expected annual production of 19,973 MWh per year is sufficient to power 5,068 homes and reduce 7,716 tons of CO_2 emissions.

Cesar Gonzalez, CEO of Gamma commented: "Triodos was instrumental in providing Gamma with a financial package that could address the complexities of these two ground-mounted solar energy projects. Triodos had the flexibility and adaptability to propose a solution that maximized leverage at a reasonable cost. Triodos was also very responsive to Gamma's time constraints and was able to take the financial solution from inception to execution and completion in a record time. We are extremely satisfied with Triodos team's approachability and pragmatism and we hope this is the first of many transactions with Triodos."

Source: Eiffage Energia

Solar FlexRack Installed at Superfund Solar Site in Vermont

Solar FlexRack™, a division of Northern States Metals and an innovative leader in solar tracker, mounting and project support services, announced that its fixed tilt FlexRack Series B3P-X has been selected and installed in the Elizabeth Mine Solar Project on the Superfund site in Strafford and Thetford, Vermont. The 7-MW dc solar power generation plant developed by Greenwood Energy, Bright fields Development and Wolfe Energy and installed by Conti Solar (the turnkey EPC contractor), is the finishing touch on a major remediation project that transformed unused landfill to a renewable energy generation site delivering enough electricity to power 1,200 homes.

Work on the Elizabeth Mine Solar Project included the upgrade of the regional substation and power lines to the town of Strafford resulting in an improved electrical system that upgraded the reliability of the entire system benefitting the residents of the community. The Superfund project transformed the region into a healthier environment and turned unused landfill into a sustainable solar power generation plant.

Morlais Tidal Energy Project Gets Funding Boost

Menter Môn, developer of the Morlais tidal energy project off Anglesey in North Wales, has been awarded £4.5 million in funding from the EU and Welsh government to further develop the renewable energy project.

The funding was announced by the Welsh Economy Secretary, Ken Skates, who said of this total, £4.2 million will come from EU funds and £300,000 from the Welsh government to support ongoing work in the Morlais Demonstration Zone. It is envisioned that new tidal stream technologies will be developed and commercialized. Skates said Wales is well positioned to take advantage of the "blue economy."

Zungeru Hydroelectric Power Plant Nearing 50%

Nigeria's Zungeru hydroelectric power plant is now almost 50% complete. The $1.29 billion 700-MW hydropower plant, located in the Niger State, is 47% complete according to the CNEEC-Sinohydro Consortium handling the project.

Source: CNEEC

The deputy project manager of the company, Xiao Nie, speaking to the press in Abuja said that the plant is expected to be complete in 2020.

The project is comprised of four units of 175 MW each and the first phase will be commissioned by December 2019 while the remaining units will be launched every three months after that.

Benin to See Thermal Power Station

Benin signed an agreement with the Danish consortium BWSC / MAN for the construction of a 120-MW thermal power station in Maria-Gleta in the city of Abomey-Calavi. The combined-cycle infrastructure will run on fuel and gas. Construction of the project is expected to take at least 18 months.

The construction of this Maria-Gléta plant will be co-financed by the Islamic Development Bank, the West African Development Bank and the ECOWAS Investment and Development Bank. It will have a cost estimated at over $192 million.

The plant is the first step in a plan to produce 480 MW of electricity at the Maria-Gléta site. The Beninese government is planning in its development program called Benin Revealed to increase the country's electrical capacity by 600 MW. Renewable energies, mainly solar, with an overall capacity of 100 MW, will be added under this program.

NNPC Increases Gas Supplies to Power Plants

NNPC said that its daily supply of natural gas to power plants has increased by 123%. The news was revealed in a statement by Ndu Ughamadu, NNPC Group General Manager, Group Public Affairs Division.

Ughamadu said the supply increased to 730 Mmcf/d in June 2017, up from the 327 Mmcf/d seen in 2016.

According to the company's June 2017 Monthly Financial and Operations report, gas supplies to power plants increased just slightly, by 0.13% from 729 Mmcf/d in May 2017 to 730 Mmcf/d in June 2017.

Kusile Unit One Sees Commercial Operations

GE successfully commenced commercial operations at unit one of Kusile's coal power plant in South Africa. GE's scope in Kusile Unit One is the EPC of six turbine islands, air cooled condensers and wet flue gas desulphurization plant (WFGD). The WFGD plant is an environmental control solution and the first to be built on a power plant in Africa.

GE Steam Power System's efficient technologies help make Kusile one of the cleanest coal fired power plants in the continent. Ultra super critical power generation technology keeps raising the efficiency bar of coal power plants. It has achieved 47.5% efficiency in the world's most efficient coal power plant in Germany, well above the global average of 33%. Each percentage point improvement in efficiency is significant as each point reduces CO_2 emissions from coal power plants by 2%.

"We are extremely proud of our expert global and local EPC teams who have worked professionally to ensure that we were able to support the commercial operation of Unit one," said Nthabiseng Kubheka, GE's Executive – Project Director for Kusile's 6 x 800 MW Turbine Islands & WFGD Projects. "This great achievement definitely resonates with our goal to power everyone using clean technology," she said.

In addition to USC power generation technology, Kusile is the first power plant in the continent to deploy state of the art wet flue gas desulfurization technology. This air quality control system ensures the highest removal of sulphur and dust from the air, ensuring that Kusile coal power plant will comply with the most stringent international standards and protect the communities around it.

Source: GE

"Kusile is the first power plant in Africa to implement clean fuel technology such as flue-gas desulphurization – a state-of-the-art technology used to remove oxides of sulphur, such as sulphur dioxide, from exhaust flue gases in power plants that burn coal or oil. This technology is fitted as an atmospheric emission abatement technology, in line with current international practice, to ensure compliance with air-quality standards, especially since the power station is located in a priority air shed area," said Eskom's Interim Chief Executive Johnny Dladla.

Unit one of Kusile will deliver an additional 800 MW to the grid and this new unit will help to stabilize the South African grid. Once in full operation, Kusile power plant will consist of six units delivering 800 MW each for a total of 4,800 MW. This is enough power to meet the electricity needs of 3.5 million households in South Africa.

By Ricardo Silva and Nuria R. Brinkmann
Miranda & Associados

An Energy Efficient Future for Africa

The Advent of Renewables-Based Micro-Grid Solutions in Cape Verde and Angola

Regulatory frameworks can play a critical role in attracting investment and ultimately electrifying a nation

African Innovation

Africa has often shown the world how necessity leads to innovation, overcoming lack of resources and infrastructures with the integration of modern technologies in unexpected ways.

In early 2000 Africa made a major breakthrough in telephone communications. At that time, sub-Saharan Africa as a whole had less fixed telephone lines than Manhattan alone. Most rural settlements had no access to fixed line networks, some countries showing penetration rates of less than 3% in remote areas. One would have expected a gradual growth of fixed lines, slowly covering areas without coverage, with significant investment in fixed infrastructure. Instead, Africa leapfrogged stages of technological development by installing mobile infrastructure and directly connecting to mobile devices. In 2006, although fixed lines were still scarce, 45% of rural settlements in Africa had mobile phone coverage. More recently, coverage has reached 90% of the territory in several countries, including Comoros, Kenya, Malawi, and Uganda. In simple terms, in the flash of an eye, Africa jumped over 30 years of technological evolution and proved that less developed regions can quickly meet modern standards under the right conditions and with the correct vision.

This leapfrogging may be applied to other types of technology as well, including for electrification.

Angola and Cape Verde

Angola and Cape Verde face similar difficulties in terms of power supply to those faced in the past by the continent in the telecommunications sector. As a matter of fact, in Angola the current electrification rates are estimated at 51% in cities and less than 3% in rural areas. Although Cape Verde shows better figures, with 96% of urban population and 79% of rural population having access to electricity, both countries still have some catching up to do to reach the rates found in more developed countries. However, the infrastructure challenge is significant, as both countries suffer from insufficient generation and transmission facilities that are incapable of transporting power to most of the remote areas. In order to overcome these difficulties, the Governments of both countries are now considering investing in the creation of isolated micro-grids based on renewables instead of expanding the national high voltage grids through vast distances and/or challenging geography in order to reach remote areas.

Micro-grid Solutions and their Potential in Cape Verde and Angola

Cape Verde

In the case of Cape Verde, power transportation difficulties are easy to identify just by looking at the country's map. The national electricity system is comprised of separate and inefficient power grids on each of its nine inhabited islands. Since inter-island power transportation is not technically viable and the country does not have non-renewable resources, the power supply of each island is mainly based on thermal power stations burning heavy fuel or diesel, which has to be imported, giving rise to one of the highest electricity tariffs in the world. Overcoming this dependency on imported energy resources has been one of the main goals of the country's government over the last six years.

In order to achieve this goal, the government approved a fairly comprehensive legal framework with its main focus on renewables. It is worth mentioning that Cape Verde has an estimated potential of approximately 3,000 MW of renewable energy. To tap into this potential, in 2012, the Strategic Sector Plan for Renewable Energy was enacted by means of Resolution No. 7/2012, of February 3, 2012. This statute foresees the installation of more than 100 MW of renewable-based energy supply by 2020, which would lead to a reduction of at least €30 million in the current fuel importation costs, at the same time saving more than 200.000 tons of CO_2 (with significant additional advantages in terms of carbon trading). The plan envisages that, with the legislative framework put in place, by 2020 at least 50% (100% according to more recent estimates) of the national power supply will be based on renewable resources and transported to remote areas by more modern and efficient infrastructures.

Also with renewable generation in sight, Decree-Law No.1/2011, of January 3, 2011 (since amended by Decree-Law No.18/2014, of February 20, 2014) had already enacted new rules for the promotion, incentive and access, licensing and exploitation of activities related to independent production and self-production of energy based on renewable sources. The intention of this new regime was to decentralize national power production, defining a total of 46 special Renewable Energy Development Areas – REDA – each of which shall have least one power production center.

Another goal was to ease licensing procedures for producers, making investments in this sector more attractive. According to the above-mentioned Decree-Law No.18/2014, within the REDAs, power production may be conducted either under the general regime (subject to licensing by the General Directorate for Energy), the micro-production regime (subject to mere registration of the operator) or the simplified regime for rural decentralized electrification (subject to licensing by the member of the government responsible for energy). The statute also foresees several incentives that may be granted to companies that engage in any of the above power production activities in the country. Projects developed in the rural and decentralized areas may, in addition, benefit from a special Financing Fund, aimed at financing acquisition of equipment used for electrification programs, as well as for the maintenance of micro-grids.

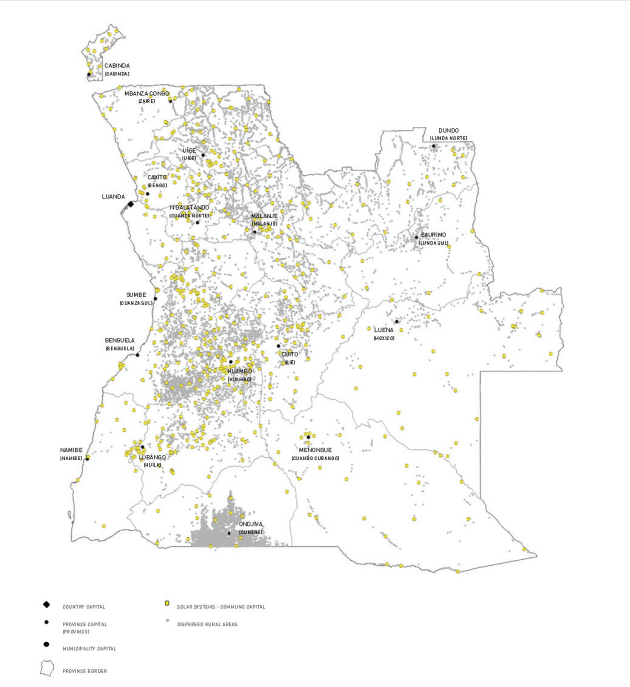
In addition to the above, the Council of Ministers more recently enacted, by means of Resolution No. 100/2015, of October 15, 2015, the National Action Plan for Renewable Energies for the period 2015-2020/2030. This statute completes the new legal framework by providing an ambitious national agenda for the sector.

Experiences have already been made with micro-grid based power transportation. In 2015 the Cape Verdean State, together with several NGO's and UN funding mechanisms, installed a total of 88 solar panels with a global production of 22Kw in the small village of Carriçal, in São Nicolau. The solar plant was connected to a micro-grid infrastructure that transports power to a number of local homes, as well as to the local school, social center and health center, making a huge impact on the community, and laying bare the advantages for other areas of the country.

Angola

Angola faces similar challenges, although for different reasons. One distinctive aspect of Angola is its vast territory. Angola is the seventh largest country in Africa, with an area of approximately 1,246,700 km². Although the majority of its 25 million citizens live in large cities (Luanda has a total of 6.5 million inhabitants) connected to the national grid, most of the populated areas, mainly in the south-east, are not yet served by the national grid. In fact, Angola's power transportation infrastructure is made up of three separate grid systems (northern, central, and southern) in addition to some isolated grids. The northern grid covers the Provinces of Luanda, Bengo, Malange, Kwanza Norte and Kwanza Sul, while the central network includes Benguela and Huambo and the southern grid serves Huila and Namibe.

Since the current electrification rate in rural areas is of only 3%, one of the main goals that the Government defined in the "Angola Energy 2025 – Power Sector Long Term Vision" released by the Ministry of Energy and Water in 2016, is implementing a rural electrification strategy. For this purpose, the Ministry opted for an electrification model known as "Balanced or Economy-based" Model, which foresees an expansion of the national grid as well as the creation of micro-grids for isolated systems, serving energy to around 31 municipalities that have been identified as being too distant from the national grid to justify its extension.



Source: Angola Ministry of Energy and Water

Map of Localities Proposed for the Installation of "Solar Villages"

In line with this strategy, Executive Decrees 304/14 and 303/14, both dated October 3, 2014 enacted the internal regulations of the National Directorate for Rural and Local Electrification, responsible for coordinating and promoting the country's electrification process – and the National Directorate for Renewable Energy – responsible for the creation, promotion, evaluation, execution and monitoring of renewable energy sector policies.

The National Development Strategy for 2013-2017 approved by the Ministry of Energy and Water also included a National Program for Rural Electrification, allocating 1,228.8 million Kwanzas to mini-hydro projects and expansion of the local grids in order to provide power for street lighting.

Regarding the requirements for these types of projects, Decree No. 47/01, of July 20, 2001 which enacted the Regulations on Power Production, sets forth that power production activities aimed at providing electricity to isolated areas of up to 1 MW capacity are merely subject to licensing by the local authorities.

In order to support the implementation of these projects, the latest amendments made to the General Electricity Law (Law no.14-A/96, of May 31, 1996 as amended by Law No. 27/15, of December 14, 2015) foresees the creation of a National Rural Electrification Fund aimed at ensuring the progressive electrification of rural areas.

In the meantime, the new framework has seen some interesting micro-grid electrification projects being launched, and in 2015 the Ministry of Energy and Waters released the National Strategy for New Renewable Energies. Under said strategy the electrification of locations not covered by the national grid should be made through micro-grids or individual systems. One of the most innovative

projects included in the strategy was the launching of public tenders for the installation of at least 500 local grids (known as solar or renewable villages) based on small photovoltaic power plants, a number of which have already been implemented.

Conclusion

In the coming years, Africa may lead another technological revolution, similar to the one that happened in the mobile telecommunications sector in the early 2000s. This time, micro-grid power generation and transportation infrastructure could be the solution to some of the biggest challenges the region is facing in terms of electrification. Although there are still several regulatory, technological and financial issues that need to be addressed, micro-grids will most certainly be a reality in future electrification projects.

Bankability difficulties are currently being overcome with sovereign guarantees and subsidies, although more autonomous financing solutions are expected to be found when technology prices drop.

In terms of regulation, the micro-grid sector demands clear legal frameworks for integration with the main grid, or as an alternative to ensure solutions that cater to off-grid systems and their specificities. Fair tariffs systems, as well as lighter regulation for the registration and permitting of micro-grid systems are also a pressing need. As described above, these efforts are already being made and, as of today, both Angola and Cape Verde have fairly comprehensive and modern regulatory systems regarding micro-grid projects.

African countries such as Cape Verde and Angola have the advantage of already counting on the prior experience of more developed nations. As a matter of fact, technologies for generation, storage, and smart metering – all critical elements of the future smart grids – have already been developed, tested and improved in other countries and can now be copied with some degree of certainty, and at a lower cost.

All these factors appear to indicate a bright future for micro-grid solutions in Africa, and interesting opportunities for foreign investors, notably as they may hold the key to unleash significant growth, mitigate carbon emissions and reduce energy poverty in these countries. AEA

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A Push for an African Clean Fuel Policy

According to a recent announcement, the African Refiners & Distributors Association (ARA) has confirmed its commitment to a 2020 clean fuel policy. The group recently held a clean fuels workshop in Togo on the Challenges and Solutions for 'Clean Fuels' on the African Continent.

The ARA Clean Fuel Policy is a road map for clean fuels and a plan for vehicle emission controls and standards in order to achieve all the benefits of clean air quality.

The ARA resolved that it remains committed towards the refining sector and for the upgrading of refineries to meet cleaner fuel standards. The time frame of meeting AFRI-4 by 2020 was confirmed and the following was recommended to its members:

- To establish import quality improvement to AFRI-4 levels by 2020, or earlier;
- To improve domestic specifications as soon as possible to be in-line with current refinery production quality levels;
- Where necessary, facing the reality of the 2020 objective, countries to consider a time-limited waiver allowing refineries to meet the clean fuel specification requirement at a later date where clear finance and action plans have been communicated.

Considering the difficulty and need to raise finance to enable large capital investments, for example in hydro-desulphurization and benzene extraction, refineries must rigorously evaluate:

- The financial return on these investments;
- The benefits of clean fuels on air quality and public health;
- The benefits of a refinery over a product import terminal as determined by the Wood MacKenzie study undertaken on behalf of the ARA in 2014

Seeing that many of the benefits of these investments mainly reside with the population at large rather than with the refinery shareholder, the ARA recommends that members seek support for these investments from all stakeholders including public, private, regional and government bodies. Consideration can be given to a combination of private and public financing and / or equity to finance the necessary investments and, where viable, pre-financing arrangements could be negotiated.

The ARA underlined the necessity for African governments and the regional economic communities to work with the refineries to put in place the implementation plans for the production of clean fuels meeting the AFRI-4 specifications. Noting the initiatives already put in place by the East African Community and ECOWAS to adopt regional specification for clean fuels the ARA encourages all its members to support these, and to promote new, regional initiatives;

In line with the ARA Clean Fuels Policy, the ARA will engage with regional bodies to promote the ARA clean fuel roadmap, the introduction of vehicle emission standards, an enforced vehicle inspection and maintenance program to meet emission standards, and the refinery improvement and necessary investment. AEA

Courtesy of African Refiners Association

EMPOWERING THE CONSUMER

Azuri Technologies is bringing power to the people of sub-Saharan Africa with its suite of practical solar consumer products.

UK firm Azuri Technologies was founded in 2012 and in five short years has made a tangible impact on the lives of the rural sub-Saharan African. Its mission was to bring energy to off-grid communities to enrich the lives of those with no access to power at an affordable cost.

Azuri acquired the IndiGo mobile phone technology from Eight19 in order to facilitate its rapid expansion across sub-Saharan Africa (SSA). The IndiGo units use mobile phone technology to turn solar power into a pay-as-you-go service. Already having a pilot distribution scheme in Kenya, Zambia, and Malawi to analyze the potential of the product, Azuri went about the business of rapidly expanding the distribution of the units.

In February 2013 Azuri secured a working capital loan of over $1.57-million from Barclays to accelerate the deployment of its Indigo home solar systems, enabling it to deliver an additional 30,000 solar home systems across SSA in 2013. A few months later, in June of 2013, Azuri Technologies announced that its Indigo Pay-as-You-Go solar technology would begin commercial production in ESCATEC's Malaysian production facilities.

The following year Azuri and GVEP International brought Azuri's Pay-as-You-Go solar technology to Rwanda. The Rwanda program aimed to support the creation of local partners to deploy the systems across the country and act as a pilot for deployment of future Pay-as-You-Go solar lighting systems in off-grid communities in other countries. In 2015 Azuri brought the technology to both Tanzania and across the continent to Ghana with local partners in both countries.

IndiGo Pay-as-You-Go Technology

The product helps charge devices like mobile phones, an enormous sector within the African continent. With the Pay-as-You-Go business model, customers pay an installation fee amounting to around $10 and purchase a weekly scratch card to input into the device.

Customers pay off the technology after around 18 months which will permanently unlock the device. Having the system offers many benefits and eliminates the need to use dangerous kerosene for lighting at a much lower cost, and the inconvenience of having to travel long distances to charge mobile phones and other devices.

Azuri continued to expand the distribution of IndiGo in SSA and also launched new products along the way. Azuri products had become so popular that its rapid expansion resulted in the launch of Azuri East Africa, based in Nairobi, in April 2016 to consolidate its growing presence in the region. By the middle of 2016 the company had sold 80,000 solar units in 12 African countries through its distribution partners.

Additional Azuri products to hit the African continent include HomeSmart, a machine-learning technology that adapts to each customer's individual needs to guarantee light at night, even in cloudy conditions. In Kenya, the company debuted the Quad solar home system which provides customers with four LED lights with mobile phone charging and a rechargeable radio at an affordable daily rate of just KES 50.

All images courtesy of Azuri Technologies

What might be thought of as a Christmas present by some, in December 2016 Azuri launched what might just be the most popular product to date. Azuri, along with home entertainment satellite provider Zuku, debuted a fully integrated Pay-as-You-Go satellite TV package for rural off-grid consumers in sub-Saharan Africa. The system combines solar home power, TV, satellite dish and Zuku Smart+entertainment. Azuri TV system, like its other products, targets households outside the power grid offering affordable TV, anytime, anywhere.

AzuriTV is also a PayGo package product. Offered again at an affordable rate, customers obtain a complete home power package including a 24-inch television with built in Satellite TV service providing up to five hours of normal viewing per day, four room lights, mobile phone charging and a rechargeable portable radio. Customers pay via mobile money, allowing customers to use the system as much as they want for the credit period. After as little as two years of payments, customers will own the equipment and continue to pay only for the satellite service. The service was initially available in selected regions of central Kenya.

Expanding on the success of Azuri TV/Zuku Smart entertainment system, this May a new partnership with Mobicom Kenya was launched to make the Solar TV system available in 87 Mobicom shops country-wide. Customers can walk into any Mobicom store and sign up, and staff will install the AzuriTV system and demonstrate its use. Weekly payments can be made using mobile money.

Azuri's CEO Simon Bransfield-Garth said: "Since we launched last year, many customers have told us Azuri's Solar TV has changed their lives. I am delighted that with Mobicom we can now make Azuri TV available to more people anywhere – from Lamu to Kisumu and Kajiado to Lodwar."

Rufus Maina, CEO of Mobicom commented: "In order to add value and enhance our telecommunication distribution business, Mobicom is adding a PayGo home TV system which will also enable our customers to conveniently charge their mobile phones. We chose to partner with Azuri because of the comprehensive nature of its product and its reputation for quality."

In February of this year, Azuri and Niger Delta Power Holding Company (NDPHC) teamed up to bring power and jobs to rural households in Nigeria's Niger Delta. The partnership launched the PayGo Solar Home Systems, aiming to deliver affordable, clean energy to 20,000 rural

"I watch news and documentaries while the kids enjoy CBeebies and my wife has her religious and soap channels. It really makes us feel that we are living in the city!"– Joseph Ndirangu, an Azuri TV customer from Ndaragwa, Kenya

households living without electricity. The deployment was also expected to create 500 direct jobs, including solar installer and agents (for a minimum of 24 months) and 5,000 indirect jobs.

NDPHC is a government-funded initiative formed to add new capacity to Nigeria's electricity supply system. Azuri's partnership with NDPHC highlights the Nigerian government's efforts to support roll out of off-grid solar systems and its commitment to renewable technologies as a sustainable way to generate electricity for rural communities.

Azuri had already carried out successful pilots within several communities in Abuja, Kwara and Osun states, installing nearly 200 solar home systems. Following the launch, NDPHC, through the project planned a phased rollout in northern Nigeria, followed by a nationwide deployment, targeting the 70 million Nigerians living in off-grid communities.

A Clear Success

It has been documented that the innovative technology and payment system have been an overwhelming success. Underscoring that fact is that by March of this year, Azuri had reached the milestone of 100,000 unit sales of its PayGo solar home systems across 12 countries in sub-Saharan Africa.

To help assure continued expansion, the company secured a $5-million debt facility from Standard Chartered Bank in February and its completion of an $11-million equity funding round in December. The funds will be used to support Azuri's sustainable economic growth across Africa and to finance its ambitious growth strategy in existing markets and to accelerate growth in new markets.

Having clearly demonstrated that it understands the energy needs of rural Africans and the market dynamics, there is little doubt that tens of thousands more Africans will enjoy the benefits of the Azuri suite of solar products and additional milestones will be reached, most likely sooner rather than later. AEA

Island Nations

Cabo Verde and Madagascar

Stand-alone island nations have unique power challenges and are coming up with unique solutions.

Cabo Verde

Located in the Atlantic Ocean about 250 miles from Senegal's capital Dakar, the island nation of Cabo Verde, or Cape Verde, has committed itself to an ambitious program to light up with renewable energy. Cabo Verde has pledged to power the entire country with nothing but renewable energy by the year 2020; taking advantage of things it has in abundance, wind and sun.

A government study released in 2010 set out the benefits of investing in solar power plants and wind turbines. Short-term targets under the study called for 25% renewable energy by 2011 and 50% by 2020. The island nation has higher ambitions and used the research from the study to come up with a plan to completely divest itself from all fossil fuel imports. More recently, in October of 2015, the National Action Plan for Renewable Energies for the period 2015-2020/2030 was adopted and outlines the new legal framework for the sector. *For a more in-depth look at Cabo Verde's renewable energy plans and regulatory regime, see our Feature on Regulatory Regimes on page 11.*

Source: Cabeólica SA

Santiago assembly

Cabeólica Project Facts

4
wind farms in operation on four islands

380,000
MWh of energy supplied to the electricity grid through 2016

15
million liters of annual fuel imports avoided

260,000 tons
of CO2 avoided through 2016

The Projects

Already a major contributor to the country's RE goals is wind energy. Cabo Verde is geographically positioned as such that it enjoys consistent mean wind speeds of roughly10m/s, making it a very attractive destination for wind energy developers.

In 2009 Cabo Verde saw its first successful wind farm project move forward with construction beginning just a relatively short time later. The project Cabeólica was established as the first commercial-scale Public Private Partnership (PPP) to deliver commercial scale wind power in sub-Saharan Africa and was the first PPP in Cabo

Source: Cabeólica SA

Boa Vista assembly

Verde. Partners in the project included the government of Cabo Verde, national power utility Electra, Africa Finance Corp., Finn Fund, EIB and the AfDB, with Cabeólica SA the company created to manage the project.

The €60-million project, consisting of four wind farms, got underway in 2011 with the facilities on the islands of Santiago (9.3 MW) and S. Vicente (5.9 MW) first up, followed with the Sal (7.6 MW) and Boa Vista (2.5 MW) island projects in 2012. In all, Cabeólica erected 30 turbines across the four island wind farms, eliminating an estimated 15 million liters of annual fossil fuel imports. The project currently delivers more than 22% of the electricity consumed in Cabo Verde.

The Sal wind farm, inaugurated on February 28, 2012, became a record setter for the project. Containing 9 Vestas V-52 850 kW turbines, the wind farm has a total installed capacity of 7.65 MW and has produced approximately 81,000 MWh of clean electricity to the local grid system. In January 2015, the Sal wind farm contributed with 55% of the total electricity produced in the island, which is the national record for wind energy monthly penetration rates.

On the solar front an in line with the National Strategic Plan 6, the government awarded a contract to Martifer Solar in January 2010 for the installation of two solar photovoltaic (PV) plants. The first solar PV project, located in the island of Sal, was commissioned in October 2010. The Sal solar farm sits on 9.75 hectares and supplies 2.5 MW of peak power with a capacity for expansion up to 5 MWp. The second and biggest of the two projects is located on the island of Santiago and spans 13 hectares with a 5 MW peak power. This facility came online in November 2010.

Another jewel in the crown cap of the country is the Monte Trigo solar PV power plant which in March celebrated five years of continuous operations. The PV plant became Cape Verde's first rural micro grid with 100% renewable energy generation. The Monte Trigo PV Power Plant was co-financed under the SESAM-ER by the EU and Municipality of Porto Novo, and was implemented by a consortium of companies specialized in renewable energies, led by Empresa Aguas de Ponta Preta. As of March, the plant had produced 169 MWh of solar electricity, of which 152 MWh were consumed, allowing for Cape Verde to forgo the consumption of 49,465 liters of diesel and the emission of 148 metric tons of CO_2.

In April of this year it was announced that an international public tender for the supply of equipment and installation of two solar PV plants had been issued by the government via its Ministry of Agriculture and Environment. The solar PV plants are to be located in two villages in the municipality of Tarrafal, Santiago Island. The award criteria will be the lowest price.

Madagascar

Madagascar, like many other developing countries, is grossly under-electrified with only 676 MW of installed generation capacity and access to electricity at around 20%. Fortunately, it has some natural resources to help change the status quo. According to US AID's Power Africa initiative, Madagascar's ability to achieve its goals under the Madagascar Action Plan (MPA) are constrained by challenges in the power sector. As a result, "Madagascar's government is working to expand its electricity supply and encourage investment in the energy sector to stimulate the economy." Although Madagascar is endowed with an abundance of natural resources and has the potential to generate 7,800 MW of electric power from hydropower sources, Power Africa states "only 2% is currently utilized." With electricity demand increasing at an average rate of 5% per year, the country has much work ahead to bring power to its more than 24 million people.

Power Africa is supporting Madagascar's energy development strategy through wide-ranging technical assistance programs in cooperation with GIZ, EU, World Bank/IFC, UNIDO, African Development Bank, the Government of Japan, and other development partners, by helping to:

- assist with the development of new laws and regulations that will facilitate private-sector led IPP investments in geothermal, solar, wind, hydro, and biomass projects;
- assist with new IPPs and transition to competitive tendering;
- assist with the planning, operation, and maintenance of generation, transmission, and distribution systems as they are expanded;
- develop the grid code that specifies the rules and responsibilities for all energy stakeholders;
- develop a plan to reduce distribution losses and assist with introduction of smart grid technology; and
- support access to off-grid electricity.

It was announced in May that Madagascar was planning to enact a new law governing its electricity sector this year. The program to review the legal framework for the electricity sector in Madagascar (PRC-ELEC) was to begin the validation phase of the proposals to be implemented in June 2017. The new legal framework will replace the law put in place in January 1999, which according to a study carried out by the consortium AIDES-Herisoa Power, left a few things to be desired. Among other shortcomings were the cumbersome procedures for awarding contracts, the lack of sanctions to be applied to defective energy companies, and the inadequacy of authorization and concession contracts alone. The future law will therefore incorporate provisions on the integration of renewable energy resources and the improvement of the security of the electricity sector and its attractiveness in order to increase private investment. Ensuring the viability of current electric operators in the country, will be the third main panel to be addressed by the bill.

The government made an important decision when it announced in September that in order to stimulate investment into solar PV, it would be offering VAT and tax exemptions. A press release from the Ministry of Finance and Budget said the new incentives are

expected to stimulate the development of rooftop solar across the country. Speaking at the commissioning of a 130-kW commercial PV system installed on a shopping mall in Ankorondrano, President Hery Rajaonarimampianina said that the Ministry of Water, Energy and Hydrocarbons will facilitate the connection of future rooftop PV projects through simplified bureaucratic procedures.

On the Books

While the government works out its laws and incentives for the sector, some projects are already in the firm planning stages. Siemens and the government of Madagascar recently signed a MoU to cooperate and identify measures to fast track power generation in the country and work towards increasing capacity by an additional 300 MW by 2019. Other key aspects of the agreement include an assessment of the electrical grid based on the new power generation sources; applying financing concepts that will ensure the long-term sustainability of these infrastructure initiatives; and creating opportunities for local upskilling and job creation during construction and operation.

"The primary goal of this agreement is to increase national power generating capacity and to connect the local population to the power grid. A reliable and extensive power supply system is the fundamental prerequisite for economic growth," says Sabine Dall'Omo, Siemens CEO for Southern and Eastern Africa. "Siemens wants to support the sustainable development of Madagascar," Dall'Omo added. "We are a company that invests for the long-term, and the opportunity for industrialization in Africa is now. With the right partner Africa's economies can develop to their full potential."

One of the short-term initiatives is the installation of a Siemens 44-MW aero-derivative gas turbine (SGT-A45) for mobile power generation in Antananarivo. This unit is packaged for rapid deployment and can be installed in less than two weeks. It is particularly beneficial for urgent power needs or in regions with less developed infrastructure making it ideal for Madagascar.

Last December, Dominovas Energy Corp.'s CEO and Chairman, Neal Allen, held discussions with the government of Madagascar for the deployment of a power plant to the island nation. This follows a reciprocal Letter of Interest (LOI) with the government for the deployment of a baseload power supply. The company's proposal for a base-load power plant would create a substantial baseload of electricity generation. In June Allen provided an update saying the "450-MW clean coal powered power plant project, as evidenced by the previously announced and executed LoI with the Republic of Madagascar and Agence Malgasy pour le Développement économique et de Promotion d'éntreprises (AMDP) is progressing at a rapid pace. Procedurally, Dominovas has identified and begun the process of engaging its strategic partners as necessary to provide this project financing, feasibility studies, EPC services, engineering services, as well as vendor identification for the providing of turbines and all other related equipment. The project in Madagascar is expected to include several global strategic partners with an expected total budget of $2.5 billion dollars."

The start of feasibility studies are necessary for the confirmation of sufficient coal supply and quality, water resources along with the identification of present supportable capacity with analyses of the future needs of Madagascar, as dictated by anticipated growth in the mining, agriculture, tourist, housing and manufacturing sectors is expected to begin in Q4. The project is anticipated to be undertaken under a Build, Own, Operate, Train, Transfer construct basis.

Source: Manentena Foundation

Solar trees

While large-scale projects will take some time to be realized due to fund raising and then construction, a number of small-scale projects are underway that aim to have an immediate impact. The Manentena Foundation is lighting up a village in Madagascar. The foundation has installed the first two solar trees, Autonomous Life Tree Electric System (ALTES), in the village of Andralanitra. The two ALTES trees each have four solar panels and provide the village with 2.24 kW of electricity, 12 kW of storage, 70 spotlights of lighting, as well as drinking water. This system can provide five to 10 days of lighting without sunlight, according to Manentena.

The system presents very advantageous costs according to its initiators who intend to transfer the kilowatt hour of electricity to 0,034 euro. Several other applications have already been received from other localities wishing to benefit from the same system.

> "The USTDA project is expected to result in the installation of a combined 10 MW peak of solar power generation and 88 MW hours of battery storage capacity, which would electrify an estimated 27,600 households and businesses in Madagascar."

Madagascar will be adding 76 MW to its grid in Antananarivo once its new thermal power station comes onstream. The power station is currently being constructed by La Jovenna. A portion of the infrastructure will be commissioned shortly, bringing 48 MW of the thermal power plant onstream by way of heavy fuel oil. The second phase of the project, with a capacity of 28 MW, will be active from September 2017. La Jovenna is also working on a project to build a 110-MW hydroelectric plant on the Volobe site in the Toamasina region.

The USTDA awarded a grant to Henri Fraise Fils&Cie, an energy company from Madagascar, for the development and implementation of mini grids in the East African island nation. The grant is aimed at supporting the technical and economic study of solar PV powered mini grids with integrated battery storage technology at up to 100 sites, as well as a pilot to demonstrate the mini grid solution. The company selected the US-based battery storage manufacturer, Fluidic to carry out the feasibility study and pilot project. Caterpillar and First Solar will also play a role in the project. The implementation of this project is expected to result in the installation of a combined 10 MW peak of solar power generation and 88 MW hours of battery storage capacity, which would electrify an estimated 27,600 households and businesses in Madagascar.

A renewable energy firm from Madagascar was one of the winners of the African Startup of the Year Award. The awards are a collaboration between OCP Group and Bonjour Idée. The two joined forces for the first African edition of the Startup of the Year/Africa 2017 competition. Mahazava was the winner of the Qwant Public Award. Mahazava is a Madagascan startup firm that finances, distributes, and ensures the monitoring of solar kits in the African island nation. "We have developed an intelligent solar kit whose battery is recharged in half a day via a solar panel, and can illuminate a fireplace overnight thanks to the high-efficiency light bulbs supplied with the kit. With its universal charger, it is possible to charge all kinds of mobile devices," the company says.

And just recently, the Ministry of Water, Energy and Hydrocarbons (MEEH), issued a Request for Pre-Qualification (RFQ) for a 25 MWac solar photovoltaic project located near Antananarivo. The Madagascar tender represents the fourth Scaling Solar tender in Africa to date, with two rounds initiated in Zambia and one in Senegal. It will also be the first Scaling Solar project to be tendered that will include battery storage requirements in addition to solar PV generation as part of the tender. All interested parties were invited to register with MEEH and purchase the RFQ document. Applications must be submitted by January 10, 2018. AEA

TUNISIA

A New Plan

President: Beji Caid Essebsi (since December 2014)
Independence: March 20, 1956 (from France)
Population: 11,134,588 (July 2016 est.)
GDP (purchasing power parity):
$42.39 billion (2016 est.)
Real GDP Growth Rate: 13.7 % (2016 est.)
Per Capita GDP: $11,700 (2016 est.)
Minister of Energy, Mines and Renewable Energies:
Hala Chikh Rouhou
Electrification - total population: 100% (2016)
Electricity - production:
18 billion kWh (2014 est.)
Electricity - consumption: 15 billion kWh (2014 est.)
Electricity - exports: 600 million kWh (2014 est.)
Electricity - imports: 500 million kWh (2014 est.)
Electricity - installed generating capacity:
4.6 million kW (2014 est.)

Various sources, including CIA Factbook

Tunisia has a high electrification rate but despite that, being a supporter of mitigating climate change, over the past year Tunisian authorities have placed increasing focus on developing the country's renewable energy sector. Lending further motivation is the fact that high power demand growth over the last two decades, has led to the country seeing some power outages. The announcement by the Ministry of Energy, Mines and Renewable Energy in November 2016 that it had completed its Renewable Energy Action Plan 2030, confirms the government's intention to address the issue, and has set the wheels in motion for the country to rapidly add new, clean and sustainable energy supplies. The plan is multi-faceted, having components to decrease reliance on fossil fuels while generating 30% of its power from renewables by 2030. The plan calls for the installation of 1,000 MW during the first phase by 2020, and another 1,250 MW during the second phase to be attained by 2030.

In pursuit of achieving its new goals under the plan, the Ministry got off to a running start in 2017, announcing a number of projects and issuing tenders for both solar and wind farms. First up, in March government announced it planned to invest $1 billion towards the installation of 1,000 MW of renewable energy in 2017 alone. According to the Ministry, 650 MW of the total 1,000 MW would come from solar photovoltaic (PV) power, with the remaining 350 MW being supplied by wind energy. At the same time, the private sector plans to invest a further $600 million into the development of renewable energy capacity in 2017, the Ministry added.

Proceeding with its plans, in May the Ministry launched a tender for 210 MW of renewable energy projects for both small- and commercial-scale projects. Solar has been allocated 70 MW, with 10 MW of that total slated for CSP projects in units of up to 1 MW. As for wind projects, 140 MW has been allocated in this tender, with 20 MW reserved for projects of about 5 MW each. The power would be sold to state-owned utility Société Tunisienne de l'électricité et du gaz (STEG) under a long-term PPA. Bids for this tender are due in November.

> Although Tunisia's population has access to modern power, electricity demand continues to increase by about 5% per annum and the need for diversification and an energy transition exists

Online or Underway

Already housing two wind farms Tunisia has a bit of experience under its belt, the 53 MW Sidi Daoud since 2000 and the 190 MW Bizerte since 2013. The Sidi Daoud, built with older technology and fixed speed wind turbines, is nearing the end of its life cycle. STEG launched a feasibility study to determine the viability of replacing the turbines with a newer, more powerful model.

In August STEG, launched the construction phase for its 10-MW solar PV plant in the governorate of Tozeur. The infrastructure is being built by the Italian firm Ternienergia, who won the EPC contract in March. The project is being financed through a subsidized loan of €12.5 million with a five-year grace period from the German Development Bank (KfW) under the Neighborhood Investment Facility (NIF) of the European Union.

On the power front, STEG signed an agreement this year with Japanese firm Mitsubishi Hitachi Power to build a 450-MW power plant. The power plant will replace the plant in Radès, that was built in 1980. The new plant will be located near the site of the old plant and will be commissioned in two phases in 2019 and 2020. At a cost of roughly $325 million, the funding will be provided by Japan International Cooperation Agency (JICA).

Solar for Export

Perhaps the most ambitious plans coming out of Tunisia were made known by **TuNur Ltd.** when on July 31 the company **filed a request with the Ministry for the approval of a 4.5-GW** CSP **export project destined to fuel Europe.**

TuNur envisages constructing a mega-solar project in a newly established solar complex in the Sahara Desert in southwest Tunisia – a site located close to Réjim Maâtoug in the Kébili governorate.

According to Daniel Rich, the COO at TuNur, the initial production costs for the first phase are estimated at $85 million, making the cost 10.1 US-cent/kWh, slightly higher than the upcoming solar CSP project that attracted the world's lowest bid for CSP at 9.45 US-cent/ kWh.

Rich said: "Today you have a market in need of low carbon dispatchable power, which has the mechanisms to import power from other countries." He went on to say that "Next door is a region with extreme solar resource and in need for investment and development. Finally, there are technologies that can satisfy the demand at very competitive pricing and have a very high local impact."

The project would be divided into three phases with three different routes through HVDC submarine cable systems to export the energy produced to Europe. The first cable would link Tunisia with Malta at a cost of approximately €1.6 billion and transfer 250-500 MW of solar energy.

Malta is already connected to the European mainland with 100 km of undersea power line that transmits electricity to Sicily, meaning that only the first part of interconnection, the line between Tunisia and Malta, is needed.

Source: Socobat

Sidi-Daoud Wind Farm

The second cable would connect Tunisia straight to central Italy, with a shoring point north of Rome. This second route is being studied and is being considered as a project of common interest – i.e. projects that are included in the EU's Energy Union vision and are given development priority and financial support. The Tunisia-Italy route would transfer 2,000 MW of solar energy.

A third cable that would link Tunisia to the south of France, possibly to Marseille, is under study, and will possibly transfer slightly under another 2,000 MW.

Kevin Sara, CEO of TuNur underlined that: "The economics of the projects are compelling: the site in the Sahara receives twice as much solar energy compared to sites in central Europe, thus, for the same investment, we can produce as much electricity."

According to Rich, the project could stimulate more than $5 billion of investment in Tunisia, and could create more than 20,000 direct and indirect jobs. AEA

Reviewed by Mark Pabst, Senior Correspondent

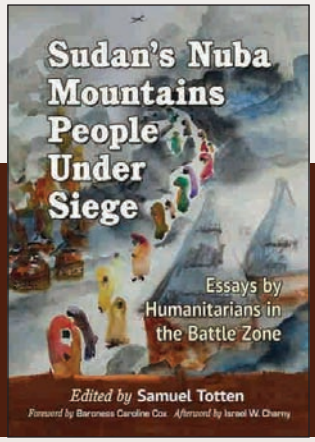
So Much War, So Little Time

Sudan's Nuba Mountains People Under Siege

Edited by Sam Totten

McFarland & Co

2017



Given the long history of civil strife in Sudan, it seems like almost every part of the country has earned the status of cause célèbre due to a humanitarian crisis at some point. In the 1980s and 1990s famine and war brought the fighting between the Sudanese Peoples Liberation Movement and the government in Khartoum to international attention. In the 2000s whispers of genocide in the country's Darfur region attracted the attention of international media outlets, celebrities like George Clooney, and the International Criminal Court, which eventually indicted Sudanese President Omar al-Bashir for his role in allegedly stoking the crisis in Darfur.

Even South Sudan, Sudan's restive southern third that eventually won independence from the rest of the country in 2011, has attracted its share of international attention for its own ongoing civil war. It seems the very name Sudan is in danger of becoming synonymous with conflict.

Yet, despite the infamy Sudan has earned on the international scene for violence and human rights violations, there are still parts of the country where misery is often overlooked. One such place is the Nuba Mountains, located near the border between Sudan and South Sudan. At first glance, the region seems like a place difficult to overlook. Both the landscape and the people are highly photogenic, something famous German filmmaker and photographer Leni Riefenstahl took advantage of for her 1973 coffee table book "The Last of the Nuba." But since the publication of Riefenstahl's book the years have not been kind to either the land or the people.

The area was repeatedly ravaged by fighting in the north-south civil war, with things getting so bad in 2002 that a special ceasefire was worked out between the government in Khartoum and rebel groups that allowed the emergency deployment of food aid to keep the population from starving to death. The government allowed delivery of food aid and the rebels promised to refrain from bombing the pipeline that transported crude from the neighboring oil fields to the Red Sea coast for export.

When South Sudan split from the north in 2011, the Nuba Mountains remained under the control of Khartoum, something many inhabitants of the mountains did not appreciate. The result has been bombings of the area by government forces. The subsequent humanitarian catastrophe has garnered some intermittent attention, but not enough to force an end to the fighting. George Clooney travelled to the region in 2012, generating some headlines at the time, but Khartoum's refusal to allow foreign aid organizations to provide humanitarian support for the inhabitants has largely kept the area out of the limelight.

However, there are a few foreigners who still make the trip to the Nuba Mountains, and some of their stories are collected in the book "Sudan's Nuba Mountains People Under Siege" edited by Sam Totten. Totten, an American university emeritus professor whose day job was lecturing on genocide, has previously written a book about Khartoum's wars in the Nuba Mountains called "Genocide by Attrition."

Trotter's earlier workused interviews with people on the ground to detail the destruction of villages and farms in the Nuba Mountains by forces loyal to Khartoum, the systematic starvation of the population, and the anger of the Nuba people at being left out of the Comprehensive Peace Agreement that ended the war between north and south. "People Under Siege" is not much kinder to Sudanese President al-Bashir and his cronies, but this time the essays focus on accounts shared by

> "Each of the 12 contributors to "People Under Siege" are technically criminals, as Sudan has barred the United Nations, the African Union and all nongovernmental organizations from entering the area. Totten refers to them as "accidental activists" because Khartoum has turned the act of providing humanitarian aid to the Nuba peoples into a de jure political statement."

foreigners who have snuck into the region to provide humanitarian aid to the population.

Each of the 12 contributors to "People Under Siege" are technically criminals, as Sudan has barred the United Nations, the African Union and all nongovernmental organizations from entering the area. Totten refers to them as "accidental activists" because Khartoum has turned the act of providing humanitarian aid to the Nuba peoples into a *de jure* political statement. However, despite their shared criminality, the writers are a surprisingly diverse group with various reasons for providing humanitarian aid in the Nuba Mountains.

Yet allof the stories in "People Under Siege" still have several things in common. Each of the contributors to the book deal with physical discomfort, minimal infrastructure, and the Sudanese government's willingness to use violence to get its way. Because of this several of the contributors share stories about their own close calls with death, and all of the writers have tales about the savage tactics employed by Khartoum and its allies.

Some of the most shocking stories center around what happens at Mother of Mercy, a Catholic Church-supported hospital in the region. Originally established to treat patients with little money or access to care, the fighting in the area has turned the hospital into something more akin to an army surgical unit. As a hospital with limited resources, including only a single doctor, it is ill equipped to treat what can be hundreds of wounded filing in on any given day. It is also surrounded by fox holes, dug so that staff and patients alike can hide from the government bombs that occasionally rain down on the structure.

With so few journalists able to get into the region, accounts about life in the Nuba Mountains are few and far between, so the details provided by "People Under Siege" are invaluable. Of course, given the isolation of the region, they are also difficult to fact check. However, the accounts in the book generally agree with the few accounts of the region produced by reporters.

The few journalists who have managed to travel to the Nuba Mountains in recent years have bandied around terms like "the next Darfur" when describing the situation. There is nothing in "Sudan's Nuba Mountains People Under Siege" to dissuade the reader from thinking the exact same thing. While South Sudan's civil war has gotten the lion's share of attention in recent years, Totten and his fellow contributors make a solid case that the Nuba Mountains are witnessing a slow-motion genocide. Hopefully their book will prove to be an important first step in stopping that genocide. AEA

Valorem General Energie Closes Doors in Morocco

Valorem General Energie, the Moroccan subsidiary of the French company Valorem, has closed its doors. The company's closure is due to the lack of enforcement of law 13-09 which was focused on the regulation of the liberalization of the Moroccan energy sector. This led to a standstill in the financing of a 50-MW solar project that was to be developed by the company.

The Valorem Group holds a portfolio of 150 MW in several countries and achieved a turnover of €53 million in 2016.

Amarenco Acquires Groupe Carré

Amarenco, an independent power producer based in Ireland, announced its acquisition of Groupe Carré, one of the leading renewable energy project developers active in France. This acquisition supports Amarenco's strategic objectives and strengthens its position in France's promising wind and solar energy markets. Operating under the brand name Amarenco France, the new entity has the depth of skills, experience and financial girth to quickly become one of the main vertically integrated IPPs active in the country.

Over the last few years, Amarenco has been developing its activities in France where it invested over 300 million euros to build its renewable energy asset portfolio in the country. In 2016, Amarenco entered a strategic collaboration agreement with Groupe Carré, whereby Amarenco gained access to the French company's extensive Asset Management and O&M expertise. Groupe Carré, founded in 2008 by Olivier Carré, has installed and operated several hundreds of commercial and utility scale photovoltaics projects in France over the last decade.

Source: Amarenco

Team Amarenco France

The respective services and capabilities of Amarenco and Groupe Carré are an excellent match. Amarenco has extensive experience in acquiring, owning and operating renewable energy assets, whereas Groupe Carré has all the required expertise to develop, build and maintain projects.

Anheuser-Busch to Buy EGP's Thunder Ranch Wind Output

American beer conglomerate Anheuser-Busch and Enel Green Power (EGP), the Enel Group's renewables division, announced that they have signed a power purchase agreement (PPA), whereby Anheuser-Busch will purchase the energy delivered to the grid and renewable electricity credits from a portion of EGP's Thunder Ranch wind project in the amount of 152.5 MW. The wind energy partnership between EGP and Anheuser-Busch will be the beer company's first contracted utility-scale project to start operations in the world, once the Thunder Ranch wind farm becomes operational, which is expected by the end of 2017. As the leading commitment to renewable power from a beer company to date, this partnership marks a vital step in delivering on the global commitment by Anheuser-Busch's parent company to secure 100 percent of purchased electricity from renewable sources by 2025.

"As we strive to bring people together to build a better world, we at Anheuser-Busch are dedicated to reducing our carbon emissions," said João Castro Neves, president and CEO of Anheuser-Busch. "Helping to grow the renewable energy market is not only good for the environment, it is a strategic business move as we strive for long-term sustainability. Now more than ever, we are excited to lead our company's global effort toward a renewable future and, partnering with Enel, set an industry example of how major companies can help to make a difference in climate change."

Through a Virtual Power Purchase Agreement (VPPA), EGP will sell to Anheuser-Busch the electricity output delivered to the grid by a 152.5 MW portion of the Thunder Ranch wind farm, substantially boosting the beer company's acquisition of renewable energy. This output is expected to amount to approximately 610 GWh of renewable energy each year, enough renewable electricity to produce more than 20 billion 12 oz. servings of beer annually. At the same time, this renewable energy output will be capable of meeting up to 50% of Anheuser-Busch's total annual purchased electricity, a substantial increase on the less than % currently generated by 7.5 MW of solar and wind facilities installed on-site at its major US operations.

The energy generated by the Thunder Ranch facility under the PPA is enough to power 50,000 US households and is expected to reduce emissions by more than 400,000 tonnes of CO_2 each year, equivalent to taking more than 85,000 US vehicles off the road every year.

The Thunder Ranch wind farm, located in Garfield, Kay and Noble counties, Oklahoma, is comprised of two phases that total 298 MW of capacity. This project will support employment in the renewables sector by creating around 400 temporary jobs at peak of construction. Once fully operational, Thunder Ranch will be able to generate more than 1,100 GWh each year, which is equivalent to the amount of electricity consumed annually by approximately 89,400 US households. The overall investment in Thunder Ranch amounts to approximately $435 million, which is part of the investment outlined in Enel's current strategic plan.

Catania Calls for Innovative Start-Ups

The Enel Innovation Hub in Catania has put out a call for startups and SMEs that develop technological solutions in the field of renewable energy. Following the upgrading of the lab announced in March, on the occasion of the visit to the Passo Martino site by Prime Minister Paolo Gentiloni, the program was announced that will give companies the chance to collaborate with Enel in the development of their technology, offering the possibility to benefit from the technological laboratories that are specialized in renewable energy.

The proposals, which can be submitted both by startups and SMEs, will be collected through the website Open Innovability and should concern innovative solutions in one of the eight fields that Enel has identified as being strategic. From new technologies for solar generation, to components and devices to improve the performance of renewable plants, extending the research also to automation and artificial intelligence for construction and maintenance. Other fields of interest concern systems of hybrid generation for renewable sources, the new technology for augmented reality and improving safety and security, to digital innovative services relating to energy (Iot, Big Data Analytics, Predictive and automatic O&M).

The selected projects must be at least in the prototype phase, and must be able to demonstrate that they have already been applied to an operative environment on a preliminary level. Also considered strategic will be the business potential and the quality of the team involved, in addition to the protection of the intellectual property (IP) and the availability of clients even in the initial phases.

The selection will be finalized between November and December. The selected startups will benefit from access to Enel's internal market and the commercial network, the laboratory specialized in renewable technology and specific testing areas, as well as synergies with universities and with specialized research centers, Enel's international network developed with other Hubs around the world, support in the search for public funding to finance the projects and the acceleration program dedicated to startups.

Siemens Names Cyber Security Chief

Siemens Gamesa Renewable Energy has appointed Alan Feeley as its new Chief Cyber Security Officer. In addition to his current responsibilities as Chief Information Officer, he will expand and manage the company's operational framework for cyber security and will consolidate all security developments in the context of the digital transformation of SGRE after the merger of Gamesa and Siemens Wind Power. In this role, Alan Feeley will work closely with the Technology and Product Security Departments, Corporate Security, and HR.

Source: Siemens Gamesa

Cyber security vulnerabilities and threats present tangible risks and challenges to companies and to the operations they support for their customers. The complexity of this topic requires coordination and orchestration across many parts of large companies, including IT, Product Design, Security, and Data Protection, to name a few. Siemens Gamesa helps its customers to take advantage of technology advancements while simultaneously minimizing exposure to risk. An optimal security solution can only be implemented if it is continuously adapted to new threats. With the new position, Siemens Gamesa has implemented cyber security in its top management to be prepared for future challenges and to address any potential security issues both internally as well as for its customers.

Total on Renewable Acquistion Spree

French oil major Total signed agreements that further entrench it in the renewable energy sector. One agreement over the period was with EREN RE, aimed at accelerating its growth in the production of power from renewable sources. Total will acquire an indirect interest of 23% in EREN RE by subscribing to a capital increase for an amount of €237.5 million. The completion of this transaction remains subject to the approval of the relevant competition authorities. The agreement also gives Total the possibility to take over control of EREN RE after a period of five years.

"Total integrates climate challenge into its strategy and is pursuing steady growth in low-carbon businesses, in particular in renewable energy. By partnering with EREN RE, we are leveraging a team that has a proven track record in renewable power production, and we are investing in an additional asset to accelerate our profitable growth in this segment, in line with our ambition to become the responsible energy major. So we welcome to Total Eren into the Total Group," said Patrick Pouyanné, Chairman and CEO of Total.

"EREN RE's momentum will allow us to accelerate our growth in solar energy and move us into the wind power market. The agreement with EREN RE is a major step towards our objective of achieving 5 GW of installed capacity in five years," commented Philippe Sauquet, President Gas, Renewables and Power. Total's stake in EREN RE complements the Group's portfolio of renewable energy businesses. In particular, EREN RE, which will be renamed Total Eren upon completion of the transaction, will allow Total to enter the wind power generation segment. Development of EREN RE's solar farm business will be mainly focused on emerging countries where the demand for electricity is growing.

In another transaction, Total expanded its holdings in green energy with the acquisition of GreenFlex, a French company that specializes in energy efficiency. The company is forecasting revenues of more than €350 million in 2017 and employs 230 people. GreenFlex combines data intelligence and equipment management and financing to help clients manage their energy consumption efficiently.

The acquisition will accelerate the expansion of Total's energy efficiency offering, over and above the growth of its affiliates BHC Energy in France and Tenag in Germany. Total intends to offer its customers integrated solutions, from optimization of energy needs and sources and finding financing solutions to energy management and emissions measurement and reduction.

WWEA Secretary General Stefan Gsänger Elected REN21 Vice Chair

On the occasion of the Mexican International Renewable Energy Conference, MEXIREC, the Steering Committee of the Renewable Energy Policy Network for the 21st Century REN21 elected Stefan Gsänger, Secretary General of the World Wind Energy Association, as new Vice Chair and Member of the Bureau. Together with the other elected Bureau Members, Mr Gsänger will serve for a two-year term and guide the operations of REN21.

Source: WWEA

Stefan Gsänger: "I feel deeply honored by being elected as REN21 Vice Chair and look forward to working even more closely with the REN21 Secretariat. My focus will lie in particular in the areas of community and citizens based renewable energy and on integrated 100% renewable energy systems. I am also looking forward to collaborating closely with the Korean government who has been chosen to host the next International Renewable Energy Conference IREC in the year 2019."

Tigo Targets High Power 700W PV Modules with Launch of TS4 DUO

Tigo®, pioneer of the smart modular Flex MLPE platform, recently announced the launch of three new "Duo" covers to its TS4 add-on / retrofit solution: TS4-R-O-Duo (Optimization), TS4-R-S-Duo (Safety), and TS4-R-M-Duo (Monitoring). The TS4-R-X-Duo brings smart module functionality to standard PV modules, adds smart features to new PV installations, and upgrades underperforming PV assets. With UHD-Core technology and expanded specifications, the Duo supports two PV modules connected in series with a combined power of up to 700W and a combined voltage of up to 90V.

Source: Tigo

Possessing a universal base and a range of covers containing flexible module-level power electronics (Flex MLPE), Tigo's Duo increases freedom of choice when selecting features for a particular project and budget. All three Duo covers work with any inverter and any module within its electrical specifications. This new addition is fully compatible with Tigo's current shipping products. Customers can design Smart PV Systems by mixing any of the TS4 products for the highest cost-efficiency. The Duo also supports Tigo's unique Selective Deployment capabilities. Both the TS4-R-O-Duo (Optimization) and TS4-R-S-Duo (Safety) are NEC 690.12 rapid shutdown compliant and pending approval by Underwriters Laboratories (UL).

"Around the world, we have received requests for an add-on product that is optimized, safe, and monitored for commercial-sized products," says Zvi Alon, CEO at Tigo. "Now, we are meeting those demands with the most flexible MLPE which is also widely recognized in the market for the highest ROI."

GE Unveils its Largest Onshore Wind Turbine

GE Renewable Energy unveiled its brand-new 4.8–158 onshore wind turbine, its largest high efficiency turbine to date. Featuring the largest rotor in the segment and innovative blade design, the 4.8-158 offers a significant improvement in Annual Energy Production (AEP), reducing the cost of energy for customers with low to medium wind speed sites.

Source: GE

Pete McCabe, President & CEO of GE's Onshore Wind Business said, "The 4.8–158 design is an important next step in turbine technology and efficiency, and we're excited to introduce this turbine at this moment in time. It is well suited for low to medium wind speed regions worldwide – examples include Germany, Turkey and Australia – as well as for mechanisms like auctions, as countries around the world are putting an increased emphasis on lowering the cost of energy."

The new 4.8-MW wind turbine, GE's first onshore entry in the 4-MW space, is equipped with a 158-meter rotor and a range of tip heights up to 240 meters. The combination of a larger rotor and tall towers enables the turbine to take advantage of higher wind speeds and produce more energy.

GE's latest turbine features high tech blades, improved loads and controls, and taller, more cost-effective towers. These new innovative features have been developed thanks to close partnerships with LM Wind Power, Blade Dynamics and GE's Global Research Center. The 77-meter-long carbon blades leverage the strong track record and material innovations of LM Wind Power, and are their longest onshore blades to date. These carbon blades will enable flexibility, allowing GE to offer its customers a high efficiency product while continuing to drive down LCOE. The blades also feature one of the industry's smallest Bolt Circle Diameters, keeping manufacturing and logistical costs to a minimum.

The 4.8-158 leverages the best of GE's 2 MW and 3 MW platforms, including the proven DFIG – doubly-fed induction generator – and a robust drivetrain architecture. The turbine meets a lower standard of noise emission levels, achieving a 104-dB level during normal operations. The newly-designed machine head reduces the needs for a larger crane while facilitating up-tower repairs and troubleshooting with its up-tower electrical system.

Solectria SLX Line of American-Made Inverters Introduced

Yaskawa Solectria Solar, a leading US commercial PV inverter manufacturer, introduced its new Solectria SLX line of American made inverters for commercial and utility-scale applications. Yaskawa Solectria Solar's SLX inverters are engineered and manufactured in United States, and are designed to achieve unmatched quality and reliability. Each individual component of the inverter is carefully selected and tested to perform reliably beyond the expected 20-year life of the inverters. This new product line will transform the 1000V DC commercial and 1500VDC utility-scale market by setting new standards in quality and reliability and vastly improving PV inverter uptime performance.

Source: Yaskawa

"Yaskawa's quality and reliability testing are unlike anything the PV industry has ever seen. Since Solectria Renewables was acquired by Yaskawa America in 2014, we have incorporated Yaskawa's quality methodologies into our PV inverter design and production processes," said Phil Vyhanek, President of Yaskawa Solectria Solar. "The SLX 1000 and SLX 1500 have endured testing to ensure that each individual component as well as the finished product will last beyond 20 years. PV project developers, owners, and EPCs will appreciate the new level of inverter reliability and durability, which drastically lowers the cost of installation and O&M, while increasing power production."

The SLX 1000 inverters are offered in 60 and 65 kW power levels and the SLX 1500 inverters

are offered in 125 and 166 kW power levels. They offer wireless HMI and connectivity, reducing the cost of installation and commissioning. Various options for the integrated combiner include fused or unfused inputs as well as PV connectors.

New Reactive Power Inverter for PV Systems and More

In order to support grid stability, German PV specialist KACO new energy introduced the blueplanet 50.0 TL3 RPonly. This unit can feed in reactive power at any time in order to maintain the grid voltage in the specified tolerance range – a key contribution to grid management. To date, no other manufacturer is taking this approach using a stand-alone reactive-power inverter, which can reduce the load on the solar inverters and prevent yield losses in the solar power plant.

Source: Kaco New Energy

When there is a lot of sunshine, solar parks feed large amounts of energy into the grid; when there is less sunshine, they naturally feed in considerably less and grid impedance can fluctuate accordingly. One useful means of compensating for the resulting fluctuations in the grid is to provide what is known as reactive power. This is where the new blueplanet 50.0 TL3 RPonly comes in: this AC-coupled inverter from KACO new energy enables operators of solar power plants, or transport networks, to provide the necessary amount of reactive power correction, by day or by night.

The correction value applied at the grid connection point is the crucial factor. This is where the park control system "reads" the measured reactive power. If the measured value deviates from the set-point – which can be set to any value between 100% active and 100% reactive – the blueplanet 50.0 TL3 RPonly inverter or inverters will be requested to supply reactive power to the extent that is required to arrive at the target value once more. Since fluctuations in the grid can result from a range of causes, the application goes beyond solar parks: the blueplanet 50.0 TL3 RPonly can therefore also be used for reactive power compensation in industrial or other large consumer sites.

Reactive power is defined using the phase offset between current and voltage, and is given as the cosine of the angle difference: if the current and voltage are completely in phase (phase angle Phi = 0 degrees), the cosine of Phi is 1, i.e. 100 per cent active power and 0 per cent reactive power is supplied. In contrast, if the current and voltage curves are completely offset (phase angle Phi = 90 degrees), the cosine of Phi has a value 0, so 100 per cent reactive power is supplied to the grid.

As a "phase-shifting" device, the blueplanet 50.0 TL3 RPonly can supply any value of reactive power between 0 and 100 per cent, current leading or lagging. The power is not given in watts (W) or volt-amperes (VA) but in var. As its name suggests, the inverter can supply up to 50 kvar. By using the RPonly as a purely reactive -power inverter, solar inverters do not have to reduce their own active power in order to match the grid reactive power. Instead, they can continue to feed in solely active power, protecting the park operator from yield losses. The blueplanet 50.0 TL3 RPonly can be used in new and existing plants, wherever reactive power is required in grid management, perfectly complementing solar inverters from KACO new energy or other manufacturers.

Wind Farmer Software Tool Debuts

DNV GL, a global resource of independent energy experts and certification body, has launched Wind Farmer: Analyst, its new software tool designed for optimized wind resource assessments. The software provides an intuitive step-by-step approach to calculating the potential energy yield of a wind farm project, delivering increased calculation transparency and accuracy. The new wind resource assessment and analysis tool, is built on the experience of conducting "bankable" energy production assessments on over 200,000 MW worth of wind farm projects globally.

Source: DNV GL

A significant feature of Wind Farmer: Analyst is the ability to extend and automate its functionality through a built-in scripting interface. Scripting is a revolutionary new feature that is not currently available on the market. The interface is bespoke and customizable, allowing for a wind farm analysis to be written and then updated at the click of a button. Scripts offer a traceable method of performing an analysis, thus reducing errors and making results repeatable. The scripting integration with existing processes and systems can boost efficiency and reduce errors. This provides more flexibility, room for innovation, and integration with customer processes.

Furthermore, the software tool provides the user with a step-by-step guide through the energy calculation method. The increased transparency enables users to demonstrates how wind energy assessment calculations are obtained, providing the required insight to adjust inputs and get more accurate outputs, enables users to achieve greater accuracy on viable projects, increase project assurance and secure project financing.

Conferences

View news items in their entirety at www.AE-Africa.com

October 2017			
2-3	Future Energy Central Africa	Yaounde, Cameroon	www.future-energy-centralafrica.com
4-5	10th Biofuels International Conference and Expo	Edinburgh, UK	www.biofuels-news.com
4-5	Bioenergy Insight Conference & Expo 2017	Edinburgh, UK	www.bioenergy-news.com
9-11	Offshore Energy Exhibition & Conference	Amsterdam, the Netherlands	www.offshore-energy.biz
26-29	Eco Expo Asia 2017	Hong Kong, China	www.ecoexpoasia.com
November 2017			
7-10	Power Purchase Agreement (PPA)	Singapore, Singapore	www.infocusinternational.com
7-9	6th West African Clean Energy & Environment Exhibition & Conference	Accra, Ghana	www.wacee.info
7-9	Future Energy Nigeria	Lagos, Nigeria	www.future-energy-nigeria.com
8-9	European Biomass to Power 2017	Aarhus, Denmark	www.wplgroup.com
9-9	Renpower Botswana	Gaborone, Botswana	www.conventionventures.com
13-17	POWER WEEK	Singapore, Singapore	www.power-week.com
15-16	Future of Biogas Europe 2017	London, UK	www.wplgroup.com
20-23	Mastering Renewable & Alternative Energies	Singapore, Singapore	www.infocusinternational.com
21-23	2nd Suriname International Mining, Energy & Petroleum Conference & Exhibition (SURIMEP)	Paramaribo, Suriname	www.surimep.com
21-23	7th International Mali Mining and Petroleum Conference & Exhibition (JMP Mali)	Bamako, Mali	www.ametrade.org
29-30	Future Energy East Africa	Nairobi, Kenya	www.future-energy-eastafrica.com
30-Dec 1	The Africa Renewable Energy Forum	Casablanca, Morocco	www.africa-renewable-energy-forum.com
December 2017			
6-7	Energy from Waste 2017	London, UK	www.efw-event.com
January 2018			
23-25	East Africa Energy & Infrastructure Summit	Dar es Salaam, Tanzania	www.energynet.co.uk
23-25	The 2nd Africa Energy Forum: Off the Grid	Dar es Salaam, Tanzania	www.aef-offgrid.com
April 2018			
25-26	Mozambique Mining, Oil & Gas and Energy Conference and Exhibition (MMEC 2018)	Maputo, Mozambique	www.ametrade.org
June 2018			
26-27	Manufacturing Indaba	Ekurhuleni, South Africa	www.manufacturingindaba.co.za
July 2018			
17-19	Power-Gen & DistribuTECH Africa	Johannesburg, South Africa	www.pennwell.com
November 2018			
6-8	5th Senegal International Mining Conference & Exhibition (SIM SENEGAL 2018)	Dakar, Senegal	www.ametrade.org

Please check with organizers directly to confirm information as dates and venues are subject to change.

OUR PORTFOLIO

EnergyNet Limited CLARION EVENTS | EnergyNet Africa | EnergyNet Latin America & Caribbean

OUR UPCOMING MEETINGS IN 2017/18 INCLUDE:

PACIFIC ALLIANCE ENERGY FORUM
28-29 September 2017 | Cartagena

The Growing Economies: Pacific Alliance Energy Forum gathers the country members of the Pacific Alliance – Colombia, Mexico, Peru and Chile – to further the group's evolving energy agenda increasing regional engagement.

www.pacificalliance-growingeconomies.com

POWERING AFRICA: NIGERIA
4-6 October 2017 | Abuja

The 6th annual Powering Africa: Nigeria meeting will focus on investment strategies, bringing together Nigeria's electricity supply industry, local finance institutions, IPP and NIPP investors, power developers and international financiers to release capital in Nigeria's power sector.

www.poweringafrica-nigeria.com

INTERNATIONAL GAS COOPERATION SUMMIT
9-11 October 2017 | Durban

As a follow on from the hugely successful South Africa: Gas Options meeting, the International Gas Co-operaton Summit (IGCS) will focus on South Africa's potential for gas procurement, distribution and utilisation nationally, regionally and globally, while integrating the GAS IPP programme with South Africa's broader economic strategy for energy.

www.igcs-sa.com

LATIN AMERICA & CARIBBEAN GAS OPTIONS
16-17 November 2017 | Panama City

The Latin America & Caribbean Gas Options (LACGO) gathers some of the most exciting Latin American and Caribbean gas markets to address the future of gas for power in the region.

www.lac-gasoptions-growingeconomies.com

GAS OPTIONS – NORTH & WEST AFRICA
29-30 November 2017 | Casablanca

The Gas Options – North & West Africa meeting will provide future stakeholders in Morocco's procurement programme a platform to engage with the government and national utility annually in an open forum.

www.gasoptions-nwafrica.com

AFRICA RENEWABLE ENERGY FORUM
30 November-1 December 2017 | Casablanca

Following the first Africa Renewable Energy Forum in November 2016, an officially endorsed side meeting of COP22, this meeting will once again focus specifically on renewable energy for African development to ensure the outcomes of COP are delivered.

www.africa-renewable-energy-forum.com

EAST AFRICA ENERGY & INFRASTRUCTURE SUMMIT
23-25 January 2018 | Dar es Salaam

The East Africa Energy & Infrastructure Summit is a platform to discuss the region's potential to attract private investment and encourage the development of IPPs. The meeting will also explore opportunities for regional collaboration within the East African region.

www.poweringafrica-tanzania.com

AEF: OFF THE GRID
23-25 January 2018 | Dar es Salaam

The 2nd Africa Energy Forum: Off the Grid meeting will come once again to Dar es Salaam from 23-25 January 2018 to focus on the topical issues concerning rolling out off-grid projects across Africa, and build on the outcomes of the first successful off grid Summit in December 2016.

www.aef-offgrid.com

REGIONAL ENERGY CO-OPERATION SUMMIT
29-31 January 2018 | Abidjan

The Regional Energy Co-operation Summit focuses on energy, infrastructure and the financing of projects in West Africa. The Summit will address opportunities for cross-border co-operation and regional integration, unlocking West Africa's investments in energy and infrastructure.

www.regional-energy-cooperation-summit.com

POWERING AFRICA: SUMMIT
8-9 March 2018 | Washington DC

Held in Washington DC each year, the 4th annual Powering Africa: Summit is a global platform to showcase power, trade and infrastructure investment opportunities across Africa, engaging investors from North America and around to world to form partnerships and move projects forward.

www.poweringafrica-summit.com

AFRICA ENERGY FORUM 2018
19-22 June 2018 | Mauritius

The Africa Energy Forum's 20th anniversary will take place in 2018, celebrating 20 years of projects, partnerships and investment into Africa's power sector. Join us for the biggest industry meet of the year at Mauritius.

www.africa-energy-forum.com

OUR TEAM SPEND OVER 220 DAYS A YEAR TRAVELLING TO MEET STAKEHOLDERS ACROSS AFRICA, SO RELATIONSHIPS AND INVESTOR INSIGHTS ARE BOTH OUR BUSINESS AND OUR PASSION.

For information on sponsoring, speaking and attending our meetings, please contact **Amy Offord on +44 (0)20 7384 8068** or email **marketing@energynet.co.uk**

WWW.ENERGYNET.CO.UK