

Alternative Energy

Vol. 12 Issue 3

ISSN 1756-4417



www.AE-Africa.com

Filling the Energy Information Gap in Africa

Africa

May/June 2019

Infrastructure & Finance Demand

HYDROPOWER: Pros and Cons

An End to Load Shedding in South Africa?

Africa Spotlight Tunisia & Malawi



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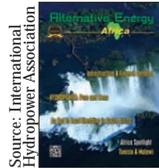
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Source: International Hydropower Association

Hydropower boosts African power output

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Publisher's Note

M E S S A G E F R O M T H E P U B L I S H E R



Perhaps two of the most notable developments in the renewable energy sector of Africa over the past couple of years has been seen with the number of oil and/or gas producing countries focusing on developing their renewable energy sectors and collaboration with the oil and gas companies on RE projects. These go hand in hand. One such example comes from Algeria with its recent construction of solar plants alongside its oil and gas projects in collaboration with Italian oil giant ENI.

While some hydrocarbon producers are already well established in the renewable sector – Egypt to name just one – others have more recently shown a keenness to diversify their energy mix. Angola stands out as a recent newcomer. Following the Angolan government's September announcement that it is looking to renewable energy technologies to lower the cost of power production and to help speed up the process of electrifying its rural areas, this year the country has made a number of moves toward that end.

The country intends to rely on renewable energy to increase its power from the current 3,334 MW to 7,500 MW by 2025. By using off-grid electrical installations and mini-grids, the country could more easily reach remote rural areas whose connection to the national electricity grid would be long and costly. In February, the government said it would engage a consulting firm to advise it on setting up a renewable energy program. A call for expressions of interest for this purpose was also launched by the Ministry of Energy and Water through the National Directorate for Renewable Energy (DNER).

Initially solar will be the focus and a number of projects are already on the drawing board. State-run oil company Sonangol will invest an estimated \$33 million to establish a solar plant in the Namibe province. The plant will be built in 2020 and will have a first phase with a capacity of 25 MW, which will be increased to 100 MW in the future.

Most recently, Sonangol and ENI signed an agreement for the development of renewable energy projects. The two firms will form a JV to handle the renewable energy projects, dubbed Solenova. The goal is to install 800 MW of renewable energy plants by 2025. The majority of these power plants will be solar powered. The first project has already been identified, a 50-MW PV plant to be located in the south of the country.

Angola is just one country making this transition. Be sure to keep up-to-date on Angola's new strategies as well as developments coming up for other African oil and gas producers in each issue of Alternative Energy Africa. Between issues, visit www.AE-Africa.com and sign up to our weekly newsletter to keep abreast. We are always keen to hear our reader's thoughts and suggestions on the renewable energy sector in Africa. Feel free to let us know the issues you would like to hear more about or share your experiences by reaching to us at info@AE-Africa.com.

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Sharm El Sheikh's First Solar Plant Commissioned

Schneider Electric commissioned the very first solar power plant in the Egyptian town of Sharm el Sheikh. The plant has a capacity of 5 MW.

The company worked on the project with Intro Energy and Gila Al Tawakol Electric, local companies that act as lead developer, site layout manager and co-developer respectively. Schneider Electric is involved in this project as a technical partner.

Expansion work is already underway to increase the capacity of the Sharm el Sheikh solar park to 40 MW.



Source: Gila AlTawakol Electric

The entire installation will operate with a digital management solution from Schneider Electric, including “EcoStruxure.” It is an open, interoperable, ready-to-use and IoT compatible architecture and platform that optimizes carbon footprint by up to 50% and engineering costs and lead times by up to 80%.

Namibia to Get Floating Solar Plant

In Namibia, independent power producer Droege Energy will establish a floating solar power plant on Lake Malawi. The solar plant, which will have a capacity of 20 MW, will be the first of its kind in the country.

Droege also signed a contract to buy production from a wind farm. The Mphamvu Mzimba wind farm will have a capacity of 50 MW.

These projects are part of the 14 power purchase agreements signed by Namibia’s Electrical Regulatory Authority to increase the country’s power generation capacity. In total, the national power sector has 20 contracts with independent generators that will build plants with a combined capacity of 367 MW.

Geothermal for Ethiopia

Reykjavik Geothermal will undertake a geothermal energy project in Ethiopia. The company is about to start drilling in the localities of Corbetti and Tulu Moye. The two power plants are planned to be located in these zones, each will have a capacity of 500 MW, which will make the company the leader in the geothermal energy sub-sector in the country.

“All results of exploration on the surface indicates that we develop projects in a large volcanic crater, with good activity that can allow us

to produce 1,000 MW of electricity or even more,” said Gunnar Orn Gunnarsson, the executive director of Reykjavik Geothermal.

The first phase of these projects will allow the installation of 50 to 60 MW of capacity on each site. It will cost \$175 million per site. This funding has already been mobilized by RG and its partners.

Transcorp Wins Bid for Afam Power Plant

Transcorp, owned by Nigerian businessman Tony Elumelu, was successful with its offer for Afam, which operates a natural-gas fired power plant in Nigeria’s southern Rivers state. Elumelu said in a statement that he plans to invest as much as \$2.5 billion in power projects in Nigeria.

Nigeria broke up its state-owned power monopoly in 2013 and began selling distribution units and the hydro- and natural gas-powered plants it ran to attract investment needed to expand supplies. Companies including Transcorp, Korea National Electric Co. and Forte Oil Plc have paid more than \$3 billion for controlling interests in 15 power generators and distributors.

Liberia to Connect 45,000 Consumers

Liberians along the corridor of the Roberts International Airport are expected to be connected to the grid soon. According to the country’s electric company, Liberia Electricity Corp. (LEC), 45,000 new energy consumers along the corridor will be connected.

This connection is part of the energy access project implemented by the government. With an estimated cost of \$31.8 million, the project was funded with the assistance of several financial institutions including the African Development Bank, the European Union and the Liberian Government.

In addition to this new customer connection, the project also includes the extension of the national electricity grid with the construction of several substations. The LEC, for its part, assured that this part of the project would be completed by 2020.

Africa Green Tec Powers Another Malian Village

Africa Green Tec has just installed a mini-network with a capacity of 45 kW in the Malian village of Fanidiama. The plant, which has a storage capacity of 60 kWh, will allow the inhabitants of this rural community to have access to electricity.

The production of the facility will be transferred to local residents at an affordable price, which will pay the operating and maintenance costs of the whole plant. The next plant is set to be installed in the rural community of Sira-Koro, in the Kayes region. Africa Green Tec’s medium-term goal is to electrify at least 50 villages in the country.

This is the 18th solar energy project that Africa Green Tec has installed in Mali and Niger. It has enabled more than 100,000 people to access electricity in rural areas.

UK Funding for Kenyan Solar

The UK has supplied £52 million in funding for a solar power plant, creating up to 250 jobs in Kenya. In addition to the £52 million, £11 million was invested by UK business De La Rue to produce high-tech identity cards, tax stamps and currency; as well as a £1.4-million package of support for creative industries in Kenya and Nigeria.

Foreign Secretary Jeremy Hunt welcomed the announcement that £52 million of UK investment has been raised for a solar power plant, with construction expected to start soon and power to come online in 2020.

This innovative project, run by British-headquartered power company, Globeleq, and funded by CDC, the UK's development finance institution, will bring clean power to the Malindi region in South East Kenya. This is set to transform the local economy, with up to 250 direct jobs being created and a further 5,600 jobs in the wider economy supported thanks to the availability of power.

Foreign Secretary Hunt said, "I have seen for myself the incredible opportunities opening up between the UK and Kenya and the close partnership which already exists between our countries. It is great to see British investment creating jobs, prosperity and growth in Kenya and across the continent."

Lower Cost Energy for Somaliland through RE

The Energy Security and Resource Efficiency Program (ESRES) of Somaliland plans to lower the cost of energy for the people in the autonomous region. Funded by the UK and led by the Ministry of Energy and Mines of the Autonomous Territory, ESRES aims to lower the cost of energy by diversifying the energy mix and enhancing energy security.

In Phase 1, which was conducted between 2015 and 2018, the program put an appropriate policy and regulatory framework in place. Six solar-thermal hybrid mini-plants have also been installed and are already in operation.

In the second phase that is to be implemented between 2018 and 2021, investments in renewable energy will be expanded through the Somaliland Fund for Renewable Energy (SREF). This second phase will be implemented in partnership with local suppliers.

Aggreko Installs Power Plant in Burkina Faso

In Burkina Faso, power generation will be boosted by an additional 50 MW provided by a temporary plant installed by Aggreko. The plant entered into service on May 15 in the community of Goughin. The establishment of the temporary power plant came at cost of about \$90 million.

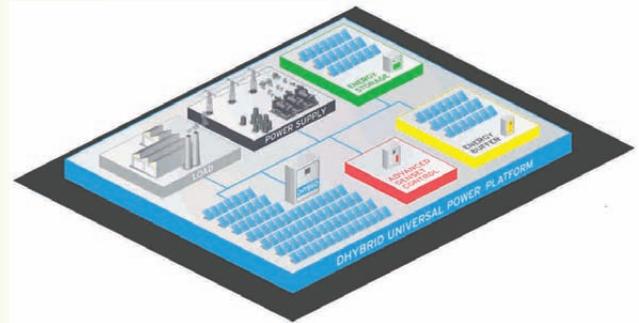


Source: Aggreko

In addition to this additional solution, the country has started construction of a 50 MW power plant in Kossodo and a 150 MW power plant in Ouaga East.

DHYBRID to Supply Hybrid Power Plant in Senegal

German hybrid specialist, DHYBRID, will supply seven PV-diesel hybrid systems in remote Senegalese locations with sophisticated hybrid control and energy storage systems. The total output capacity is 2 MW, the storage capacity 2 MWh. The plants will enable Senegal to supply power for very isolated sites and to diversify its energy mix.



Source: DHYBRID

The total project will generate enough power to cover the annual needs of 140,000 people and will avoid atmospheric CO₂ emissions amounting up to 19,000 tons per year, equivalent to the emissions of a car driven 135 million km. It will be part of a €26.8 million investment, financed by the German bank KfW and Senelec, the national electricity company of Senegal, consisting of the hybrid sites and an additional 15 MW PV-installation.

The project sites will be spread over four large regions: The Saloum Islands and the Thiès region in the western part of the country and the Tambakounda and Kolda regions in the east. DHYBRID will supply their proprietary Universal Power Platform (UPP) – a modular and manufacturer independent Energy Management System (EMS) and SCADA solution that will manage, control and monitor the interaction between diesel generators, PV inverter and energy storage system to minimize the electricity costs and CO₂ emissions. In addition to that, the German company will supply containerized Lithium-Ion energy storage systems, automatic generator controllers and the main electricity distribution panels.

Botswana and World Bank to Develop National Strategic Plan

The World Bank and Botswana authorities recently reached an agreement to develop a national strategic plan for the development of renewable energy. The strategic plan is aimed at aiding the country in gaining energy autonomy.

Botswana is looking to unleash its solar potential to contribute to the fight against climate change. President Mokgweetsi Masisi of Botswana said that his government would make massive investments in solar energy in order to position the country as a global promoter of renewable energy.

Botswana is the largest diamond miner in Africa and imports almost half of its electricity needs from neighboring countries such as South Africa, Mozambique and Namibia. To break with this the government approached the World Bank and, on the basis of a recently signed agreement, the financial institution will provide the Botswana government with its technical expertise to develop a National Renewable Energy Strategic Plan.

ENI and ETAP Join Forces in Solar

In Tunisia, ENI inaugurated its Tataouine asset in southern Tunisia. The site includes a PV plant with an installed capacity of 10 MW. The project, which was awarded to the ETAP-ENI consortium following a public tender issued by the Tunisian authorities in accordance with the country's licensing regulations, will supply electricity to the state-owned company Société Tunisienne de l'Electricité et du Gaz (STEG). The project will be carried out by a new joint venture between ENI and ETAP which focuses exclusively on the production of energy from renewables.

The plant, equipped with a solar tracking system capable of optimizing the energy produced, will provide the national grid with more than 20 GWh/year of electricity, saving a total of about 260,000 tons of CO₂ during its planned 25 years of operation.

The Italian firm will also complete its construction of the Adam PV field in Tataouine this year, which will have a maximum installed capacity of 5 MW, whose power will be used directly from the industrial site. The new site has been built with innovative hybrid and energy storage systems that will be integrated into the plant's existing turbines, reducing gas consumption, operating costs and carbon dioxide emissions into the atmosphere.

With these initiatives, ENI and ETAP demonstrate their continued commitment to the decarbonization of the Tunisian energy system towards a low-carbon scenario.

GE to Expand Work in Egyptian Electricity Sector

GE plans to expand its cooperation in the Egyptian electricity sector, mainly through renewable energy projects and wind farms.

The company will also develop transportation and distribution grids according to Joseph Anis, CEO for the Middle East & Africa Region at GE Power Service, in a *Akhbar El Yom* report.

Anis led the company's delegation visiting Egypt to meet with governmental officials.

OVO Funds £1.75 Million Electrification Project in Kenya

OVO Foundation is expanding its energy access project in Kenya, electrifying over 300 schools and health clinics in the hardest-to-reach parts of Kenya. The company is doing this through its Project Jua, which will bring solar energy to areas not supported by the national grid.

The project is in support of the Kenyan government's overall electrification program through innovative off-grid solutions. Project Jua builds on its 2017 pilot, in which the OVO Foundation installed 20 solar systems in two of the poorest counties, Turkana and Kilifi. The success of this pilot demonstrated the cost-effectiveness of delivering off-grid solar and storage on a relatively small scale in the development sector.

By installing solar systems the project aims to bring electricity to hard to reach areas that are currently off-grid or do not have access to reliable energy sources. The power will be used for educational equipment such as tablets and computers, helping to bridge the rural and urban digital divide, as well as lighting in health clinics which is especially important in a country where maternal mortality is more than double the global average.

Project Jua is now expanding to five counties where electrification is far below the national average of 56%, Turkana, Kwale, Taita-Taveta, Kilifi, and Isiolo.

EDF and BBOXX Team Up to Power Togolese Village

BBOXX and EDF Group have launched a program to power a Togolese village – Tomorrow's Connected Community. The project will bring power to the entire village of Sikpe-Afidegnon through the use of solar energy.



The village, comprised of 300 houses and 4,000 people in the south of the country, is to be powered by solar electricity including streetlights, households, schools and small shops. The community can also access other utility products and services, such as clean cooking solutions, internet services and water pumps.

It is run on a micro-grid developed by General Electric to meet higher energy consumption needs, as well as BBOXX's solar home systems to power households and SMEs. All of the services operate through BBOXX Pulse, the company's comprehensive digital management platform, which manages customer service and product maintenance using data and predictive analytics.

Sikpe-Afidegnon is the first Togolese village to benefit from BBOXX's new off-grid system, which the company hopes to expand across Togo. For now, the power is free, but residents will have to start paying market rates in a few months.

More Solar for Morocco

A consortium led by French firm EDF has won a contract to build an 800-MW solar power plant in Morocco. According to the contract signed with the Moroccan Agency for Sustainable Energy, the plant will be located in the Atlas Mountains.

The plant, called Noor Midelt 1, is the first phase of a very ambitious solar project that will be implemented in the region. It will produce energy through combined concentrated solar (CSP) and photovoltaic technologies. Its construction is scheduled to cost 7.57 billion dirhams (\$781.5 million). The work will be conducted in partnership with Emirati Masdar and Morocco's Green Energy of Africa.

The financing of the plant will be supported by the European Investment Bank, the French Development Agency, the European Commission, the World Bank, the African Development Fund and the Clean Technology Fund.

Upon completion, Noor Midelt 1 will become the largest using concentrated solar technology in the country. Currently, this record is held by the Ouarzazate solar power station, which has a capacity of 580 MW.

Egypt Considers Selling Power Plants

According to Mohamed Shaker, Egypt's Minister of Electricity, the government is considering selling three recently built power plants to private investors. Shaker, in a Reuters report, was quoted as saying that talks were still in the early stages.

"The negotiations are still in the early stages," Shaker told Reuters by telephone. He declined to disclose further details.

The plants, billed at the time as the world's biggest, were built by Siemens AG in a \$6.7 billion deal signed in 2015 and inaugurated by Egyptian President Abdel Fattah al-Sisi in July.

Companies said to be interested in the plants include the Blackstone Group and Edra Power Holdings.

Sonelgaz Invests in Distribution and Transmission

Algeria's state-run utility, Sonelgaz, allocated 2.5 billion Algerian dinars (\$20 million) to develop the electricity distribution network of the wilaya of El Oued.

This funding is being used to implement an emergency program that was launched in 2013 and carried out in 30 municipalities. It has enabled the installation of 470 aerial and terrestrial transformers, as well as the installation of 640 km of medium and low voltage power lines.

For the current year, 340 million Algerian dinars will be devoted to the installation of eight transformers in seven communities. Five new high voltage lines of 30 kV over 77 km will be installed.

All of these projects will improve the distribution network in order to remedy the disturbances experienced by certain residential areas. They will also contribute to the acceleration of the country's industrial investment dynamic, the development of small and medium-sized enterprises, and the extension of irrigated land.

ENGIE Tagged for Orange Services Data Center in Abidjan

ENGIE was selected for the operation and maintenance of the Orange Services Group's data center in Abidjan, for a five-year contract that was to begin in June. This datacenter of the latest generation, built by the Orange Service Group (GOS), is one of the few datacenters existing in West Africa complying with the Level IV classification. According to this classification, it has the required redundancies to ensure continuity of service in all circumstances. It received the award of Best Data Center from Africa at the 2017 "Datacloud Congress" in Monaco.

The perimeter of the contract includes preventive maintenance of the multi-technical lots of the datacenter buildings, including the electrical substations, high voltage, cooling and air conditioning, Central Management Technology, fire alarm systems, security and control, video surveillance and access control.

Built on the Free Zone of Grand-Bassam, located 40 km from Abidjan, the economic capital of Côte d'Ivoire, the building has a floor area of 1,450 m² including a 420 m² computer room. This next-generation datacenter has a power capacity of 1.3 MW and a design which is oriented towards reliability and energy optimization of data storage. The center represents a strategic infrastructure for Orange in West Africa and primarily hosts Orange's service platforms of its Middle

East – Africa subsidiaries, but it is also a co-location space for B2B customers' needs in this region.

Egypt Sees 6,000 MW from RE

Egypt successfully produced 6,000 MW of electricity from renewable resources, as it seeks to boost the renewable energy share into the country's energy mix. Of the 6,000 MW of renewable energy power generated, 2,000 MW is generated by solar and wind farms, according to Mohamed El-Khayat, the Executive Chairman of the New and Renewable Energy Authority (NREA).

Through its 20 solar plants, the Benban solar park in the south of the country, has been added to the national electricity grid with a capacity of 900 MW, El-Khayat stated. He added that the total number of stations planned to be built in the solar park stands at 32 stations with a total capacity of 1,465 MW.

Ethiopia Rations Power, Suspends Electricity Exports

Due to a drop in water levels in Ethiopia, the country has started to ration electricity for domestic and industrial customers. Minister for Water and Electricity, Seleshi Bekele, said the drop in water levels at the country's Gibe 3 dam had led to a deficit of 476 MW.

Speaking at a news conference, Seleshi said that the deficit was more than one-third of the country's electricity generation of 1,400 MW. In addition to rationing domestic supplies, Ethiopia has also suspended electricity exports to neighboring Djibouti and Sudan. The rationing program will run until July.

Guarantee Risk Solar and eXcess Africa Team on Solar Projects

Guarantee Risk Solar, a Zimbabwean company, teamed up with South African Bushveld Energy (eXcess Africa) to set up three solar PV plants. The plants, once constructed, will have a combined capacity of 250 MW.

A 100-MW plant will be located in Goromonzi, another plant of 100 MW capacity will be located in Bulawayo, while Harare will house a 50 MW plant. The implementation of this project will have a cost estimated by the partners of at least \$400 million. It will be implemented in successive phases until its completion.

Ethiopia Re-Works Solar Plans

Ethiopia's Public-Private Partnerships Branch re-worked the capacity of the pre-qualification application for the installation of solar plants. The country has phased down the capacity of those plants from 750 MW to 500 MW, spread over six locations. The plants will be located in the host communities of Weranso, Welenchiti, Humera, Mekele, Metema/Bahir Dar, and Hurso.

The deadline for submission of documents has also been extended to July 9, from the previous May 29 date. According to the Directorate General, candidates will be judged on "their experience, expertise, financial resources, and ability to build projects."

The setting up of these plants is part of the Scaling Solar program implemented by Ethiopia with the support of the World Bank. This is the second phase of the Scaling Solar program in Ethiopia; the first is for 250 MW of energy and the business selection for this is almost complete.

Making Wind Powered Water Injection a Commercial Reality

DNV GL is urging offshore oil and gas operators to implement a new solution using floating wind turbines to power water injection for oil recovery.

‘WIN WIN’ (WIND powered Water INjection) was conceived in 2013 by DNV GL and is now ready for prototype development after



two joint industry projects have shown the concept to be both cost efficient and technically feasible.

Water injection is an effective tool in exploiting oil reserves, but the process is often inhibited by the high costs associated with large gas or diesel generators and complicated subsea infrastructure. By using a floating wind turbine, the WIN WIN concept allows the injection system to operate independently, eliminating the need of long flowlines from the platform.

DNV GL has worked extensively with oil and gas companies since 2015 to bring the ‘WIN WIN’ concept to prototype readiness. The first phase of research explored the techno-economic feasibility of the wind powered water injection, while, the recently-completed second stage involved advanced proof-of-concept lab tests.

President & CEO of DNV GL, Remi Eriksen says, “It is always inspiring to see a great idea whose time has come edge towards reality. Wind power working for oil and gas, and oil and gas working for wind power, not only captures the imagination in these times of transition, but makes a lot of business sense. The question, now, is who is going to take this concept into physical reality?”

Project Director, Johan Sandberg, says, “From the start, this project has always had a commercial focus. Potentially substantial rewards await a first mover willing to build a prototype to increase technology readiness and optimize system integration. As operators know too well, conventional water injection is

expensive, with the power plant occupying valuable deck space and expensive flowlines running to the injection site. With WIN WIN, the power is supplied *in situ* at potentially much lower cost, with increased flexibility and without emissions.”

In the latest round of research, DNV GL conducted a joint industry project (JIP) with funding provided by ExxonMobil and Vår

Energi AS. Jayme Meier, Vice-President, ExxonMobil Upstream Research Company, says, “The completion of phase 2 of the WIN WIN JIP drives us one step closer to a technically viable and commercially deployable system.”

SGRE Launches World First Technology

In a world first, Siemens Gamesa Renewable Energy (SGRE) began operation of its electric thermal energy storage system (ETES). The innovative storage technology makes it possible to store large quantities of energy cost-effectively and thus decouple electricity generation and use.

The heat storage facility contains around 1,000 tons of volcanic rock as an energy storage medium. It is fed with electrical energy converted into hot air by means of a resistance heater and a blower that heats the rock to 750°C. When demand peaks, ETES uses a steam turbine for the re-electrification of the stored energy. The ETES pilot plant can thus store up to 130 MWh of thermal energy for a week. In addition, the storage capacity of the system remains constant throughout the charging cycles.

The aim of the pilot plant is to deliver system evidence of the storage on the grid and to test the heat storage extensively. In a next step, Siemens Gamesa plans to use its storage technology in commercial projects and scale up the storage capacity and power. The goal is to store energy in the range of several gigawatt hours (GWh) in the near future. One gigawatt hour is the equivalent to the

daily electricity consumption of around 50,000 households.

The technology reduces costs for larger storage capacities to a fraction of the usual level for battery storage. By using standard components, it is possible to convert decommissioned conventional power plants into green storage facilities (second-life option). Hamburg Energie is responsible for marketing the stored energy on the electricity market. The energy provider is developing highly flexible digital control system platforms for virtual power plants. Connected to such an IT platform, ETES can optimally store renewable energy at maximum yield.

The Institute for Engineering Thermodynamics at Hamburg University of Technology and the local utility company Hamburg Energie are partners in the innovative Future Energy Solutions project.

GE to Aid in Expanding Azito Capacity with Upgrade Solution

Azito Energie S.A. signed a contract with GE to deploy its Predix Asset Performance Management (APM) software for two GT13E2 gas turbines and two generators at the Azito III plant site, in Cote d’Ivoire. In addition, the companies announced the successful execution of GE’s MXL2 upgrade solution for the first GT13E2 gas turbine, which will increase the plant’s production by 15 MW.

The upgrade on the second unit is set to be implemented later in the year. A first-of-its kind project in sub-Saharan Africa, this flagship upgrade combined with the digital solutions, is paving the way for additional total plant solutions across the region.

GE successfully executed the MXL2 upgrade on the first unit, comprising turbine, compressor and combustor modules, without any loss time to injury and a workforce that was predominantly 95% local. Designed to be compatible with all installed GT13E2 units, the MXL2 upgrade combines GE’s latest technology developments and over 10 million operating hours of GT13E2 fleet experience. This upgrade allows operators to benefit from increased efficiency, improved power output, and significantly extended service intervals. This upgrade also helps extend the lifetime of the asset and improve availability of power with fewer C-inspections.

Under this contract, the APM software will provide real-time unified visibility into the

health of assets critical to the customer – all in one place. It can predict and accurately diagnose issues with greater accuracy before they occur with the help of predictive analytics, while generating the root cause analysis of events and providing a framework for the resolution of identified issues.

ABB to Enable World's First Hydrogen-Powered River Vessel

ABB will provide a power and propulsion solution for a newbuild vessel operating along the Rhône river in France to run entirely on hydrogen fuel cells.

ABB strengthens its position as the marine market's frontrunner on hydrogen fuel cell technology through its role in FLAGSHIPS, the EU-funded initiative to deploy commercially operated zero-emission vessels for inland and short sea operations.

Under this initiative, ABB will provide a fuel cell based power and propulsion solution for a newbuild push boat for the France-based Sogestran Group subsidiary Compagnie Fluviale de Transport (CFT), due for delivery in 2021. With hydrogen for the fuel cells sourced from shore-based renewable energy, the complete vessel energy chain will be emission-free.

"CFT has been an inland waterways innovator for more than half a century. Powering river transport in a sustainable way is a new type of challenge, but it has become vital that we cut emissions on Europe's inland waterways and specifically in the city centers. With this project, we aim to highlight that emission-free operation is both feasible and commercially viable," said Matthieu Blanc, COO at CFT.

"Taking an active role in the FLAGSHIPS initiative, ABB continues to push the boundaries of e-mobility in shipping," said Peter Terwiesch, President of the Industrial Automation business at ABB, which offers solutions for a wide range of industries, including marine. "As one of the world's leading enablers of sustainable transportation, ABB is committed to writing the future of the marine industry that will see vessels plying the world's waters more cleanly and efficiently."

As a FLAGSHIPS member since the project's start in January 2019, ABB has been working closely with Finnish research organization and project coordinator VTT and the leading global provider of innovative clean energy fuel cell solutions Ballard Power Systems Europe to develop an installation enabling a 400kW fuel cell to power vessel operations.

The project objective is to demonstrate that fuel cells are a practical and deliverable propulsion solution for owners and builders of mid-sized vessels carrying more than 100 passengers or the equivalent freight volumes inland or coastally. For this reason, the scope of FLAGSHIPS also includes assessing the operational impact of the switch to hydrogen as a fuel.

Once the fuel cell power plant has been fitted, the plan is to run the vessel daily, with special attention being paid to the refueling procedures needed to meet the operating schedule. Trials will therefore also provide insights into developing and optimizing the refueling infrastructure needed for hydrogen fuel cells in marine operations.

With maritime transport estimated to emit around 940 million tons of CO₂ annually, there is an increased pressure for the shipping industry to deploy means of reducing harmful pollutants. The International Maritime Organization, a United Nations specialized agency with responsibility for the safety and security of shipping, adopted a strategy on reduction of greenhouse gas emissions from ships by at least 50% by 2050 compared to 2008, with the aim of phasing them out entirely.

Fuel cell technology is widely considered as one of the most promising sustainable energy solutions for reducing marine emissions worldwide. Fuel cells turn the chemical energy from hydrogen into electricity through an electrochemical reaction. They convert fuel directly to electricity, heat and clean water.

The FLAGSHIPS project is supported by the Fuel Cells and Hydrogen Joint Undertaking (FCH JU), a public private partnership established under Europe's Horizon 2020 frameworks to accelerate commercial realization of the technology in a range of transport and energy uses. The three members of FCH JU are the European Commission, fuel

cell and hydrogen industries represented by Hydrogen Europe, and the research community represented by Hydrogen Europe Research. Parties involved in the CFT newbuild project also include LMG Marin, NCE Maritime CleanTech and PersEE.

Siemens and Turboden Launch the Heat ReCycle® Solution

The new Heat ReCycle solution is comprised of a Gas Turbine power plant with Organic Rankine Cycle technology (ORC). This combination of proven gas turbine and ORC-technology for efficient recovery of the waste heat is a response to the market challenges which various regions of the world are facing today.

Did you know that one billion people do not have any access to electricity, and another billion have a lack of reliable power supply; especially ones that are located in remote and isolated areas? Offering affordable electricity while taking into account the environment with water-free operation can be achieved with a reliable solution: Heat ReCycle® Solutions.

Developing remote areas. Heat ReCycle allows remote areas to be provided with highly efficient and reliable power generation. Unmanned operation in isolated regions enables deployment in desolate areas, supporting economic growth in these parts of the world.

Providing affordable electricity. Heat ReCycle offers electricity at the best possible cost over its lifetime while maintaining high efficiency. This means that both people and industries will have access to affordable energy for their daily needs.

Producing lower emissions. From an environmental perspective, highly efficient Heat ReCycle Power Plants produce lower emissions when compared to other technology that is typically used in remote areas, like diesel generators and reciprocating engines, resulting in lower NO_x, CO₂ and lower Unburned HydroCarbon (UHC) emissions.

Offering water-free solutions. Heat ReCycle is a water-free solution. In many regions in the world, water is a scarce resource. Heat ReCycle power generation allows water to be used for people, not for power.

Solar Project Racks Up 50 Farms in South Australia

A renewable energy project that started as a way to provide extra income for grape and citrus growers has built its 50th small-scale solar farm in South Australia. Renmark-based Yates Electrical Services began its Red Mud Green Energy project three years ago with the first 187kW commercial farm joining the electricity grid in September 2016.

Since then, 50 farms have been built up to 1 MW in size on sites ranging in area from 4,000 sq meters to 2 hectares. About 80% of the farms are in the Riverland but plants have also been built in other parts of the state including Eyre Peninsula and the Mid North. Yates Electrical Services Managing Director Mark Yates said the farms had delivered between 14% and 19% return on investment

for clients by selling the energy and the LG's (large-scale generation certificates) on the National Electricity Market.

"The majority of the clients are in agribusiness whether it be broad acre, vines or citrus and we've had a couple of clients doing it purely for investment purposes utilizing self-managed superannuation money and pure equity investors as well," he said

"The Red Mud side of things is still humming along – we've got about 10 sites



Source: Yates Electrical

under construction and that business is going strong. We've built about 50 plants now since we started a couple of years ago so it's been really, really busy and we've probably done a touch over 20 MW now."

EDF Renewables North America Acquires Nebraska Wind Project

EDF Renewables North America has closed on a purchase agreement with York Nebraska Wind Partners, LLC, a partnership comprised of Aksamit Resource Management, LLC and York Capital Management for 100% of the interests in the 300-MW Milligan 1 Wind Project located in Nebraska, USA. The project is currently in development with

anticipated operation to commence in late 2020. The Project, sited in Saline County in southern Nebraska, will sell its generated energy and Renewable Energy Credits (RECs) into the Southwest Power Pool. Milligan 1 Wind marks the first project for EDF Renewables in Nebraska.

The expected electricity generated at full capacity is enough to meet the consumption of up to 115,000 average homes. This is equivalent to avoiding more than 900,000 metric tons of CO₂ emissions annually which represents the greenhouse gas emissions from 190,000 passenger vehicles driven over the course of one year.

Chevron to Offer EV Charging at Retail Stations

Chevron will now offer electric vehicle charging at five of its gasoline stations in California, USA. The offering is in partnership with EVgo, which has installed fast-charging spots in a network that spans the United States.

"More than a dozen EVgo fast chargers – ranging from 50 KW to 100 KW capacity – are already operational or under construction at five Chevron stations," the company announced.



Source: EVgo

Taiwan Gives SGRE the Nod for 376 MW Wind Farm

Siemens Gamesa Renewable Energy (SGRE) has conditionally received an order for the supply of offshore wind turbines including a 20-year full-service agreement for the 376-MW Formosa 2 Offshore Wind Farm Project in Taiwan. The awarding consortium partners are Macquarie Capital and Swancor Renewable Energy Co. A firm order is subject to the consortium's final investment decision.

The project will be located in Miaoli county, and utilize 47 units of the SG 8.0-167 DD offshore wind turbine. SGRE will also be

responsible for the full servicing of the turbines for 20 years, including the provision of spare parts and tools to help ensure the reliability and optimal performance of the power plant.

Offshore construction is planned to begin in 2020. Formosa 2 will be located close to the site of the Formosa 1 power plant, which will consist of a total of 22 SGRE offshore wind turbines when installation of Phase 2 is completed later this year.

Formosa 2 is set to be one of the first projects completely built out of the Taiwanese



Source: SGRE

government's zonal development program. This initiative was launched to promote a 5.5 GW offshore wind build-out by 2025.

Rolls-Royce Gas Engines to Assist Slovakia with Greener Power Supplies

Rolls-Royce has signed a contract with EPC contractor TTS Martin, s.r.o. for the supply of a 28 MWe power plant for state-owned utility Martins kateplarenska, a.s. in Slovakia. The plant will be equipped with three Rolls-Royce Bergen B35:40V20AG2 natural gas engines and four hot-water boilers, replacing their entire existing coal operation. As well as electricity, the engines and boilers will supply over 28 MW of heat to most of the 60,000 population of the cities of Martin and Vrutky.

The upgrade of the district heating plant is part of Martins kateplarenska's strategy towards green, sustainable power supplies and the winding-down of their coal operations. They made a strategic decision to invest in gas-fuelled reciprocating engines and gas boilers as a more long-term solution than exhaust gas after treatment systems to reduce the emissions given off by coal-fired power plants. The B35:40 gas series meets the increasingly stringent emissions requirements, with exceptionally low emissions of NOx, CO and UHC combined.

"Martins kateplarenska heating plant is currently using mainly low-quality lignite for heat production – which is both low-output



Source: Rolls-Royce

and non-ecological. Especially in the conditions prevalent in the Martin region – which is surrounded by mountains and unable to dispel pollution – it is crucial to look for the most effective, most ecological solutions for heat and power production. For TTS Martin, as a specialist in combined heat and power plants using internal combustion engines, Rolls-Royce Bergen gas engines represent exactly this type of modern, green solution, and therefore we are very pleased to be working

with Rolls-Royce on this project," said Ondrej Korec, CEO of TTS Martin, a.s.

The new Martins kateplarenska plant is planned to go into commercial operation at the beginning of 2020 and will be Rolls-Royce's second power plant using B35:40 Bergen gas engines in Slovakia. The first will under commissioning in May 2019, generating a total of 37 MWe of heat and power for district heating company Teplaren Kosice, a. s.

1 GW of Dispatchable RE Approved for South Australia

The 280-MW solar Cultana Solar Farm has been signed off by the South Australian government with financial close expected to be reached by the end of June and construction to begin in the Upper Spencer Gulf town of Whyalla in the second half of the year.

The project on 1100ha of vacant land to the north of the Whyalla Steelworks will include 780,000 solar panels capable of generating 600 GWh of energy generation per year, enough to power almost 100,000 homes while

offsetting 492,000 tonnes of carbon dioxide. It will be delivered by SIMEC Energy Australia, part of Gupta's GFG Alliance. The energy generated will contribute to the national electricity grid via the existing ElectraNet Cultana substation.

SIMEC Energy Australia Marc Barrington said securing development approval was an important step in the company's goal of providing globally competitive energy for Australian business and industry.

"Delivery of this new sustainable energy generation asset will also contribute to emissions reductions, sustainability objectives, and increase the overall reliability and security of electricity supply for users across the Upper Spencer Gulf region," he said.

SIMEC Energy has amended the layout and construction methods of the farm to reduce the amount of native vegetation requiring removal from the originally proposed 871 ha down to 448 ha.

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One Million Brazilians to Benefit from Hydro Power

Brazilian company Neoenergia, an affiliate of Iberdrola, through its Brazilian affiliate Neoenergia, brought the 350-MW Baixo Iguacu hydroelectric power plant online. The plant is expected to serve over one million people in the State of Paraná, where the project is located.

During the official opening of the plant built at a cost of more than €500 million, Iberdrola Chairman and Chief Executive Officer Ignacio S. Galan said: “We are proud to contribute to the economic and social development of the country,” adding, “Over the next five years alone, we are going to invest around €6.5 billion in new projects in Brazil to continue improving country’s electricity supply and, thus, its competitiveness.”

Baixo Iguacu utilizes top technology, such as the much smaller and more efficient Kaplan turbines, allowing for a decreased footprint on the environment, and supports the betterment of the local community.



Source: Iberdrola

“This facility is of benefit to the Iguacu Falls, as it contributes to maintain the minimum water flows required. In addition, many initiatives have been undertaken in the areas

of health, education, infrastructure, public safety and biodiversity in order to preserve and enhance the well-being of the region,” Galan said.

EGP Starts Construction of Russia’s 90 MW Azov Wind Farm

Enel Green Power (EGP), the Enel Group’s global business line dedicated to renewable energy, started construction on the 90 MW Azov wind farm located in the Rostov region, southern Russia, marking the Group’s first renewable project in Russia. The wind farm, which is also the Rostov region’s first-ever renewable facility, is owned by the Group’s subsidiary Enel Russia while EGP is in charge of construction activities after having completed the development stage.

Antonio Cammisera, Global Head of Enel Green Power, said: “With this new wind project, we are embarking upon our journey towards the creation of a renewable footprint

in Russia. We are looking forward to producing energy with both our Russian wind farms, and we will continue scouting for new opportunities in this renewables-rich country. Moving ahead, we plan to further leverage on this wealth of resources and keep on fuelling Russia’s economy through an increasingly diversified generation mix.”

Enel Russia’s overall investment in the Azov wind farm amounts to approximately 132 million euros. The project is expected to enter into service by the end of 2020 and will be able to generate around 320 GWh of clean energy each year once fully operational, avoiding the annual emission of around

260,000 tonnes of CO₂ into the atmosphere. The wind facility will consist of 26 turbines spread across 133 hectares.

Enel Russia was awarded the Azov wind farm, along with the 201 MW Murmansk wind farm, for a total capacity of 291 MW, in the 2017 Russian government tender for the construction of 1.9 GW of wind capacity in the country. EGP is in charge of the development and construction of both projects. Enel Russia’s overall investment in the two facilities amounts to approximately 405 million euros, with the investment on the 201 MW wind farm amounting to around 273 million euros.

Siemens Gamesa Signs Contract with Pattern Energy for 218 MW in Texas

Siemens Gamesa Renewable Energy (SGRE) announced it had signed a four-year O&M agreement with Pattern Energy for its 218-MW Panhandle Wind 1 facility, consisting of 118 units of 1.85-87 MW GE wind turbines. The company will begin servicing the turbines later this year in Carson County, Texas.

The deal features a service and maintenance agreement, offering the best in

scale and flexibility to maximize energy asset returns. By leveraging Siemens Gamesa’s technical experience and capabilities for servicing turbines of other manufacturers, the company is able to improve the performance and reliability of the GE technology. Siemens Gamesa will implement a full range of value-added analytics, including NEM Solutions and SCADA Diagnostics.

Siemens Gamesa has been actively maintaining wind turbines from other manufacturers since 2010. The new agreement brings Siemens Gamesa’s total multi-brand turbine servicing portfolio to more than 1 GW. With nearly 57 GW under service globally, including around 1 GW of multi-brand turbines, Siemens Gamesa is a leading service provider in the industry.

Demand for Infrastructure and Project Finance in Africa Growing

The demand for infrastructure and project finance in Africa is growing on the back of some of the highest economic growth rates on the continent. The International Monetary Fund expects growth in sub-Saharan Africa to reach 3.5% despite sluggish performance of Africa's two largest economies, Nigeria and South Africa.

The appetite for funding is also in response to economic reforms being undertaken by several governments to attract job-creating foreign investment and inject open key sectors once controlled by the state to private sector participation.

It is against this background that we are witnessing continued growth in the infrastructure and project finance market in Africa, with 2018 recording more than double the number of deals (43) reaching financial close compared to the previous year. The sub-Saharan African region is following the global trend where globally, more than half of all projects reaching financial close came from the renewable energy sector alone, or equivalent to about 30% by value, according to IJ Global.

The emergence of renewable energy as an affordable source of new power generation globally, is indeed also an exciting development for Africa, where an estimated two thirds of the people still don't have access to power. In South Africa alone, more than 2 GWs of projects reached financial close as part of the governments' Independent Power Producer Program, at tariff levels in line or lower than conventional base load power.

An interesting trend has emerged over the past few years where we are witnessing the increasing involvement of Development Financing Institutions (DFIs) in providing infrastructure and project finance in sub-Saharan Africa. These include the International Finance Corporation (IFC), the African Development Bank (AfDB) and the World Bank.

DFIs have almost doubled their participation in projects to over \$5 billion out of the total of about \$13 billion closed in 2018. This trend is expected to continue, specifically as DFI's have

shown significant appetite to finance the most active sector – renewable energy.

What is very positive for Africa is that funding from the DFIs are provided at very competitive rates and also for long tenors, which commercial banks are often not able to match. The end result is competitive power tariffs in line with the best achieved globally.

Outside of the power sector, the transport and oil and gas sectors have been the most active globally, accounting in 2018 for 24% and 19% of deals respectively by value. Africa also benefits from these sectors, particularly the oil and gas sectors where deal volumes have increased over the past year.

The significant gas discoveries offshore Mozambique, will result in two of the single largest project financing deals ever on the continent to reach financial close during 2019. These projects present significant opportunities for the local economies, as well as for international and regional banks and export credit agencies to provide financing to the projects and related infrastructure developments.

Absa CIB is excited about these developments and will continue to play a leading role in structuring and arranging deals in the project finance space, particularly in infrastructure, the oil and gas sector as well as renewable energy.

We have been one of the most active commercial banks in providing funding for renewable energy projects during the past five years, having closed more than 3 GW of renewable energy projects in sub-Saharan Africa across key technologies including wind, PV, CSP, biomass and hydropower.

We hope to maintain our leading position on the sub-Saharan African Project Finance league tables (currently ranked 1st according to IJ Global's 2018 full year league tables).

We therefore remain committed to funding projects that can facilitate economic growth and environmental sustainability in sub-Saharan Africa. [AEA](#)

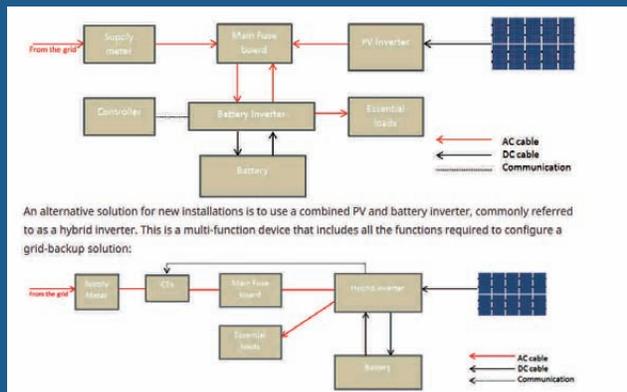
The emergence of renewable energy as an affordable source of new power generation globally, is indeed also an exciting development for Africa, where an estimated two thirds of the people still don't have access to power.

SOLAR POWER

An End to Load Shedding in South Africa ?

For residents and businesses in South Africa, Eskom has long been a source of frustration. Generating approximately 95% of the country's electricity, the company holds a state-supported monopoly on the energy supply in South Africa – where rolling blackouts are a daily occurrence as the national grid falters.

Load shedding has been a part of South African life since 2014 when it first became clear Eskom could not keep up with post-apartheid demand – and unfortunately, it seems it is here to stay. Minister of Public Enterprises, Pravin Gordhan, has previously said the government and Eskom are determined not to go beyond Stage 4 load shedding (where 4,000 MW has to be shed in). But now, it is clear that plans have been laid for Stage 5 (5,000 MW) and Stage 6 (6,000 MW) load shedding schedules, which would mean even longer periods of power outages for residents and businesses.



Officials have warned there is a race against time to ensure a national blackout and grid collapse – like those which have crippled Venezuela – do not happen in South Africa. Gordhan said: “We don’t want to remain in a vicious cycle where load shedding shifts to other crises. We are committed to rebuilding the energy supply and energy confidence.”

What’s the solution?

Almost 70% of South Africa’s energy is currently generated by coal, while solar and wind combined only make up 0.1% of the national energy supply. However, many of the country’s aging coal power stations are up to 50 years old – despite stations normally only producing sufficient electricity for 30 years, according to Eskom board chair Jabu Mabuza.

Gordhan has also admitted that Eskom’s two newest coal plants were “badly designed and badly constructed,” with many sources claiming they are only 40% reliable. As a result, the South African grid simply can’t cope with demand.

Opening up the market for Independent Power Producers would help significantly plug power capacity shortages, as competition would provide greater incentives to maintain and develop new energy systems. Unfortunately, the government is unlikely to take this action anytime soon – so residents and businesses need to prepare for the worst.

One thing South Africa isn’t short on is sunshine, which is why solar power could provide a sustainable solution to counteract the Eskom problem. A solar photovoltaic (PV) system can provide up to 30% of an average home’s energy, for example. As such, many South African home and business owners are looking to solar. Although they can be expensive to install, the cost of solar PV systems has fallen dramatically – making them a hugely beneficial long-term investment.

Choosing the right Solar PV system

The principle of yielding electricity from the sun remains the same but there are many ways a PV installation can be connected to best suit both homeowners and businesses. There are five different types of solar PV systems: grid-tied, grid-backup, enhanced self-consumption, peak-shaving and off-grid.

A pure grid-tied system with no storage or load management is a viable option for South Africa as a nation which experiences steep

energy price hikes year on year, but does not provide power in the event of a blackout. Instead, there will be continued demand for grid-backup systems – which use a battery to store power and can operate with no grid for prolonged periods of time – if frequent load shedding, or even fear of it, continues.

Enhanced self-consumption where surplus energy is stored and used to heat water could also provide a cost-effective solution. The storage option may take the form of a battery system instead; however, this could add significantly to the cost and would have a long financial payback time at current electricity prices.

Many energy users in South Africa pay a high tariff when using greater amounts of electricity than normal during peak times. A PV system can also be used to limit the amount of higher-cost electricity consumed by storing energy during the hours of sunlight

and releasing it during the high-cost periods – this is known as peak-shaving.

Finally, there is an off-grid system which requires significant investment including a large capacity battery and an inverter capable of supplying the maximum load. Operating totally off grid cannot normally be justified if there is a good-quality grid connection available but if South Africa continues down its current route it may become a viable option in the future.

Fitting a solar system is complicated and requires a knowledgeable distributor and expert installers who can advise on the most suitable system to meet the customer's requirements. SegenSolar's unique portal is a crucial tool for installers looking to fit a solar PV system onto their customers' homes or office buildings to provide power in the event of a grid failure or load shedding. **AEA**

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HYDROPOWER

Pros and Cons

Source: International Hydropower Association

As a renewable energy source, hydropower in Africa is king at present. While it is cleaner and greener than fossil fuels, it does have negative impacts on the environment. The negatives include a reduction in water quality and flow; the potential deterioration of the aquatic environment; and it can affect land use and natural habitats in the dam area. These are just a few of these impacts. Beyond this, hydropower is dependent on rainfall and during droughts, cannot produce at full capacity. In addition, commercial hydropower projects are quite costly and can take years to implement; on the other hand, mini-and/or micro-hydro plants are increasingly being considered as a faster and less costly option.

African nations are facing the most devastating impacts of the climate crisis, offsetting these impacts globally are of vital importance. Seeing as many African countries are energy poor and under electrified, they are increasingly turning to hydropower to plug the energy deficit. According to the International Hydropower Association (IHA), “Africa has the highest percentage of untapped technical hydropower potential in the world, with only 11% utilized. In 2018, over 1 GW of hydropower capacity was put into operation across the continent, with total installed capacity now exceeding 36 GW.”

The Status Quo

The International Hydropower Association says more than 21.8 gigawatts (GW) of renewable hydroelectric capacity was put into operation last year, as outlined in its “2019 Hydropower Status Report.” This report presents the latest capacity and generation data from more than 200 countries and territories.

Government ministers from Canada, Indonesia, Nepal, Uganda and Uruguay contributed policy interventions to this sixth edition of the Hydropower Status Report, each emphasizing the need for investment in renewable energy, and especially hydropower, to help countries achieve sustainable development.

Electricity generation from hydropower projects achieved a record 4,200 terawatt hours (TWh) in 2018, the highest ever contribution from a renewable energy source, as worldwide installed hydropower capacity climbed to 1,292 GW. The report further broke down contributions to this growth: China added the most capacity with the installation of 8,540 megawatts, followed by Brazil (3,866 MW), Pakistan (2,487 MW), Turkey (1,085 MW), Angola (668 MW), Tajikistan (605 MW), Ecuador (556 MW), India (535 MW), Norway (419 MW) and Canada (401 MW).

In total, 48 countries worldwide added hydropower capacity in 2018. The report shows that East Asia and the Pacific once again added the most capacity, with 9.2 GW installed last year. This was followed by South America (4.9 GW), South and Central Asia (4.0 GW), Europe (2.2 GW), Africa (1.0 GW) and North and Central America (0.6 GW).

The report features policy insights from leading government ministers responsible for hydropower development in many of the world’s top hydropower producing countries and actions that need to be taken in the sector. These included:

- Canada’s Minister of Natural Resources, Amarjeet Sohi, writes about industry efforts to build partnerships with indigenous communities and create long-term economic opportunities.
- Indonesia’s Minister of National Development Planning, Bambang P. Soemantri Brodjonegoro, explains how his country is committed to reducing GHG emissions by 29 percent by 2030 through developing hydropower and other renewables.
- Nepal’s Minister of Energy, Water Resources and Irrigation, Barsha Man Pun, writes that his government is aiming to attract foreign investment in hydropower while exploring regional energy interconnections.
- Uganda’s Minister of Energy and Minerals, Irene Nafuna Muloni, emphasized the need to raise investment capital for hydropower development as a way to widen electricity access and support socio-economic transformation.

Africa installed capacity

Rank	Country	Capacity added (MW)
1	Algeria	1,500
2	Egypt	1,000
3	South Africa	800
4	Kenya	600
5	Ethiopia	500
6	Democratic Republic of the Congo	400
7	Senegal	300
8	Madagascar	200
9	Sierra Leone	150
10	Mali	100
11	Mozambique	50
12	Guinea	50
13	Chad	50



Top 20 countries by newly installed capacity

NEW INSTALLED CAPACITY BY COUNTRY*

Rank	Country	Capacity added (MW)	Rank	Country	Capacity added (MW)
1	China	8,540	11	Austria	385
2	Brazil	3,866	12	Cambodia	300
3	Pakistan	2,487	13	Laos	254
4	Turkey	1,085	14	Zimbabwe	150
5	Angola	668	15	United States	141
6	Tajikistan	605	16	Iran	140
7	Ecuador	556	17	Democratic Republic of the Congo	121
8	India	535	18	Colombia	111
9	Norway	419	19	Peru	111
10	Canada	401	20	Chile	110

*Including pumped storage

Source: International Hydropower Association

- Uruguay's Minister of Industry, Energy and Mining, Guillermo Moncecchi, reported on the strong complementarity between hydropower and other variable renewable energy sources.

In addition, the Hydropower Status Report presented research into the multiple services provided by hydropower, the importance of building resilience to climate change, and the role of digitalization and regional interconnections in bringing efficiencies to clean energy generation. With pumped hydropower storage capacity reaching 160.3 GW in 2018 (up 1.9 GW on 2017), the report also calls for the market framework and regulatory treatment of this clean 'water battery' technology to be reformed, especially in liberalized markets.

"Four years on since the Sustainable Development Goals were agreed at the United Nations in 2015, governments increasingly recognize hydropower as playing a vital role in national strategies for delivering affordable and clean electricity, managing freshwater, combatting climate change and improving livelihoods," write IHA Chief Executive Richard Taylor and IHA President Ken Adams in the foreword to the report.

Helping Hydropower Build Resilience to Climate Change

The International Hydropower Association also launched a technical guidance to help the hydropower industry to become more resilient to the impacts of climate change. The "Hydropower Sector Climate Resilience Guide" will support investors, owners and developers to make informed decisions about how to plan build, upgrade and operate hydropower systems in the face of increasingly variable climatic and hydrological conditions.

Launched at the World Hydropower Congress in Paris, France, the guide introduces an innovative methodology for assessing climate risks and identifying corresponding climate resilience measures.

Departing from traditional approaches that rely on historical information about past climatic and hydrological conditions, the guide provides a practical framework for assessing the projected impacts of climate change on hydropower systems. This includes guidance for selecting appropriate measures and operational procedures that build climate resilience across a range of scenarios, and for the development of a climate risk management plan.

Announcing the new guide, IHA Chief Executive Richard Taylor said: "The hydropower sector is part of the solution to climate

change, providing clean, renewable electricity and vital freshwater management to help communities manage the impacts of extreme weather events such as floods and droughts.

"While providing essential adaptation services, hydropower facilities are not immune to the changing climate. This guide offers new international good practice guidance to help project operators and developers identify, assess and manage climate risks to enhance the resilience of proposed and existing hydropower projects."

The guide was developed by IHA with technical and financial support provided by the European Bank for Reconstruction and Development (EBRD) and the World Bank Group (WBG) and its Korea Green Growth Trust Fund (KGGTF).

It is intended for hydropower projects of all types, scales and geographies, and suitable for upgrade and green field projects. The six-phase methodology looks at climate risk screening, data analysis, climate stress testing, climate risk management, and monitoring, evaluation and reporting.

Both the European Bank for Reconstruction and Development (EBRD) and the World Bank Group (WBG) are heavily invested in renewable energy and better outcomes for hydropower projects. "Greater investment in hydropower is needed as part of the transition towards low-carbon and climate-resilient energy systems," said Craig Davies, Head of Climate Resilience Investments at the EBRD. "This guide will play an important role in helping financial institutions to scale up both the quantity and the quality of their investment in climate-resilient hydropower."

Meanwhile, the World Bank Group had this to say: "The World Bank Group welcomes the international hydropower industry's Hydropower Sector Climate Resilience Guide," said Pravin Karki, Global Lead Hydropower and Dams at WBG. "Climate risks, if not adequately addressed in planning and operations, could drastically undermine hydropower investments. There is an urgent need to actively prepare for the resiliency of hydropower assets in the face of increased frequency of extreme weather events and rapid changes in hydrological patterns to reduce the risk of climate-related disruptions."

"The World Bank Group works to ensure that its hydropower and other energy investments are adapted to climate change, and create financial mechanisms to encourage upfront investments in resilient hydropower infrastructure," he continued. [AEA](#)

Africa installed capacity

COUNTRIES BY ADDED CAPACITY IN 2018 (MW)*				
1 st Angola	2 nd Democratic Republic of Congo	3 rd Egypt	4 th Uganda	5 th
166	138	121	92	28

AFRICA CAPACITY BY COUNTRY*		
Rank	Country	Total installed capacity (MW)
1	Ethiopia	10,922
2	South Africa	5,995
3	Angola	3,963
4	Egypt	2,826
5	Democratic Republic of the Congo	2,754
6	Zambia	2,687
7	Madagascar	2,111
8	Nigeria	2,064
9	Tanzania	1,982
10	Mozambique	1,776

* Including pumped storage



Source: International Hydropower Association

Top 20 countries by newly installed capacity

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- Uruguay's Minister of Industry, Energy and Mining, Guillermo Moncecchi, reported on the strong complementarity between hydropower and other variable renewable energy sources.

In addition, the Hydropower Status Report presented research into the multiple services provided by hydropower, the importance of building resilience to climate change, and the role of digitalization and regional interconnections in bringing efficiencies to clean energy generation. With pumped hydropower storage capacity reaching 160.3 GW in 2018 (up 1.9 GW on 2017), the report also calls for the market framework and regulatory treatment of this clean 'water battery' technology to be reformed, especially in liberalized markets.

"Four years on since the Sustainable Development Goals were agreed at the United Nations in 2015, governments increasingly recognize hydropower as playing a vital role in national strategies for delivering affordable and clean electricity, managing freshwater, combatting climate change and improving livelihoods," write IHA Chief Executive Richard Taylor and IHA President Ken Adams in the foreword to the report.

Helping Hydropower Build Resilience to Climate Change

The International Hydropower Association also launched a technical guidance to help the hydropower industry to become more resilient to the impacts of climate change. The "Hydropower Sector Climate Resilience Guide" will support investors, owners and developers to make informed decisions about how to plan build, upgrade and operate hydropower systems in the face of increasingly variable climatic and hydrological conditions.

Launched at the World Hydropower Congress in Paris, France, the guide introduces an innovative methodology for assessing climate risks and identifying corresponding climate resilience measures.

Departing from traditional approaches that rely on historical information about past climatic and hydrological conditions, the guide provides a practical framework for assessing the projected impacts of climate change on hydropower systems. This includes guidance for selecting appropriate measures and operational procedures that build climate resilience across a range of scenarios, and for the development of a climate risk management plan.

Announcing the new guide, IHA Chief Executive Richard Taylor said: "The hydropower sector is part of the solution to climate

change, providing clean, renewable electricity and vital freshwater management to help communities manage the impacts of extreme weather events such as floods and droughts.

"While providing essential adaptation services, hydropower facilities are not immune to the changing climate. This guide offers new international good practice guidance to help project operators and developers identify, assess and manage climate risks to enhance the resilience of proposed and existing hydropower projects."

The guide was developed by IHA with technical and financial support provided by the European Bank for Reconstruction and Development (EBRD) and the World Bank Group (WBG) and its Korea Green Growth Trust Fund (KGGTF).

It is intended for hydropower projects of all types, scales and geographies, and suitable for upgrade and green field projects. The six-phase methodology looks at climate risk screening, data analysis, climate stress testing, climate risk management, and monitoring, evaluation and reporting.

Both the European Bank for Reconstruction and Development (EBRD) and the World Bank Group (WBG) are heavily invested in renewable energy and better outcomes for hydropower projects. "Greater investment in hydropower is needed as part of the transition towards low-carbon and climate-resilient energy systems," said Craig Davies, Head of Climate Resilience Investments at the EBRD. "This guide will play an important role in helping financial institutions to scale up both the quantity and the quality of their investment in climate-resilient hydropower."

Meanwhile, the World Bank Group had this to say: "The World Bank Group welcomes the international hydropower industry's Hydropower Sector Climate Resilience Guide," said Pravin Karki, Global Lead Hydropower and Dams at WBG. "Climate risks, if not adequately addressed in planning and operations, could drastically undermine hydropower investments. There is an urgent need to actively prepare for the resiliency of hydropower assets in the face of increased frequency of extreme weather events and rapid changes in hydrological patterns to reduce the risk of climate-related disruptions."

"The World Bank Group works to ensure that its hydropower and other energy investments are adapted to climate change, and create financial mechanisms to encourage upfront investments in resilient hydropower infrastructure," he continued. [AEA](#)

Hydropower Questioned Better Alternatives Now Exist

H ydropower takes years to install and it can drown vegetation creating years of methane, a potent greenhouse gas. Dams have burst in three countries recently. Fortunately, many better options are available or emerging. The strong trend now is to making electricity where you need it, from your solar watch to your village microgrid. Both are evidence of another trend which is the ability to move your zero-emission electricity generation.

Hydropower can literally become a stranded asset. For example, African nations could face devastating blackouts as rising temperatures dry up their hydropower dams. Based on recent years in which extremely dry conditions saw electricity drop off in large areas, a new report by climate scientists has warned that the trend for dam construction is misguided, particularly in a country with ample sunshine and plummeting costs of photovoltaic panels. In Uganda they even make buses that get much of their range from solar roofing. Solar is becoming so affordable that excess panels can be installed to give adequate electricity even during the evening, reducing the amount of battery storage needed.

Unwisely, countries in southern and eastern Africa are due to more than double their hydropower capacity by 2030. Scientists warn that current efforts to mobilize the region's vast hydroelectric potential will face challenges, while urging regional governments to launch their own investigations into these potential risks.

Raghu Das CEO of analysts IDTechEx contrasts that saying "Ghana has ordered 100MW of the new ocean wave power, minimally intermittent, taking no prime agricultural land with no risk to humans. Others now use wave power for desalination. Tidal power without concrete infrastructure is now looking good and it is even being proven in the flow of large rivers with almost instant installation: no dams. These are 1MW "propellers" folded out under boats and others simply dropped on the sea floor. GE has joined Atlantis on one such project." See the IDTechEx report, "Wave, Tidal and Hydro Power 1W-10MW 2018-2038".

Following behind is electricity from tethered drones rising to where the wind is almost continuous and even stronger at



Source: Matt Howard

Tidal Energy

night when solar is dead. See IDTechEx report, "Airborne Wind Energy 2019-2039".

Raghu Das adds, "First 30kW units have been sold to farmers in Norway and 1MW units are being developed. Shell recently joined a google sister company in one such project in the USA. Delightfully, cheap solar with battery storage and all the above options are zero emission and can be incrementally expanded to meet need or shut down and rapidly removed to the other side of the world if necessary. Try that with a hydro dam."

The new multiple zero-emission sources in one transportable microgrid are one topic covered in the IDTechEx reports, "Zero Emission Transportable Gensets 2019-2039" and "Desalination: Off Grid Zero Emission 2018-2028"

"Unpredictable changes in water availability clearly pose significant risks to the viability of hydropower plants, as well as the electricity security of the countries," says Professor Declan Conway from the Grantham Research Institute on Climate Change and the Environment. He observes that a single widespread drought could disrupt many countries at the same time, including those countries, such as South Africa, that are connected to the regional power pool but do not have many hydropower dams of their own. Many of the dams currently being planned will be located in the very same river basins that have been worst affected by drought in recent years. Time to think again. [AEA](#)

Africa Spotlight



Beji Caid Essebsi

President: Beji Caid Essebsi (since December 2014)

Independence: March 1956 (from France)

Population: 11,403,800 (July 2017 est.)

GDP (purchasing power parity):

\$135.9 billion (2017 est.)

GDP - real growth rate: 2.3% (2017 est.)

GDP - per capita (PPP): \$12,000 (2017 est.)

Minister of Energy, Mines, and Renewable

Energy: Khaled Kaddour

Oil - production: 48,670 bpd (2016 est.)

Oil - consumption: 98,000 bpd (2015 est.)

Oil - proved reserves: 425 million barrels (2017)

Natural gas - production: 1.575 Bcm (2015 est.)

Natural gas - consumption: 7.67 Bcm (2015 est.)

Natural gas - proved reserves: 65.13 billion cubic meters

Source: CIA FactBook

TUNISIA

Tunisia played host to some of history's most well-known empires, with the Phoenicians settling on the north African coast around 1100 BC. The city of Carthage, near the site of present-day Tunis, became a naval power in the Mediterranean, only to fall to the Romans. Prior to this, in the 600s AD, Arabs conquered the territory of present-day Tunisia only to have it wrested out of their hands three centuries later by the Berbers. Tunisia became part of the Turkish Ottoman empire, but held on to a high degree of autonomy, until French troops occupied Tunis. Tunisia became a French protectorate in 1883.

The bid for independence from the French began during World War I, but it was not for decades later that the Tunisian people were successful in getting France to recognize Tunisia as an independent state. The country became an independent nation in 1956, with Habib Bourguiba being named as the country's first president. Bourguiba hung on to that title for 31 years, seeing some success in repressing Islamic fundamentalism and establishing rights for women. Bourguiba was removed from office in 1987 and replaced by Zine el Abidine ben Ali in a bloodless coup.

Ali held onto power until street protests that began in Tunis in December 2010 started a domino effect, ostensibly giving creation to the Arab Spring that the MENA region underwent starting in 2011. The protests and subsequent rioting eventually led to ben Ali fleeing the country and "national unity government" being formed. Elections for the new Constituent Assembly were held in late

October 2011, and in December, it elected human rights activist Moncef Marzouki as interim president. The country's assembly drafted a new constitution and elections for a permanent government were held at the end of 2014. The elections resulted in the naming of Beji Caid Essebsi as the first democratically elected president under the country's new constitution. Caid Essebsi's term expires in 2019 and legislative and presidential elections are scheduled for October and November.

Tunisia's government remains under pressure to boost economic growth quickly to mitigate chronic socio-economic challenges, especially high levels of youth unemployment. Successive terrorist attacks against the tourism sector and worker strikes in the phosphate sector, which combined account for nearly 15% of GDP, slowed growth from 2015 to 2017, according to the CIA *World Factbook*. The government is seeking to increase foreign investment and is working with the IMF through an Extended Fund Facility agreement to fix fiscal deficiencies.

To generate more jobs for its youth population the government is hoping to boost growth by making fiscal and monetary reforms, floating the exchange rate, cutting the fiscal deficit, and restructuring loss-making state-run firms. Other things that the government will need to address include a burdensome regulatory regime and rigid labor markets. Many of the market-oriented reforms are opposed by political parties and trade unions that espouse statism.

Africa Spotlight

When it comes to economic freedom, Tunisia scored 58.9, making it the 99th freest in the 2018 Economic Freedom Index. In the MENA region the country is ranked 10 out of 14. Despite the challenges it faces it did make some significant improvements in trade freedom and investment freedom, the country's overall score increased by 3.2 points.

ENERGY

On Tap

The Tunisian population is already well electrified, mostly by fossil fuels, but the country is looking to develop its renewable potential to cut costs, contribute to a sustainable global environment, and export energy to its European neighbors for profit. The country has big plans to do just that!

The Tunisian government plans to reach 3,500 MW of renewable energy through a combination of both solar and wind by 2030, covering 30% of the country's electricity. Currently, the country only has about 300 MW of installed renewable energy capacity; chiefly hydroelectric and wind. In December, the Ministry of Industry and Small and Medium-sized Enterprises had tagged some 30 firms and/or consortia as part of the tender process to add 800 MW of capacity to the country's national grid. The initial call for prequalification was launched in May 2018 by the Tunisian authorities.

Among the companies selected were Masdar, EDF EN, Acciona Energia, Canadian Solar, Enel Green Power, Engie, Fotowatio Renewable Venture, ACWA Power, Total Eren and Scatec Solar. The projects under this tender are both solar and wind power plants. The solar locations are Tozeur (50 MW), Sidi Bouzid (50 MW), Kairouan (100 MW), Gafsa (100 MW) and Tataouine (200 MW). The wind farms under the call are Jbel Abderrahmane (200 MW) and Jbel Tbagha (100 MW), and 200 MW yet to be designated.

In early June, Minister of Energy Slim Feriani said its pre-qualified list of companies had been shortened to 16 and that Tunisia is set to select the winners of its solar energy concessions tender by September. He added that he expected the winners to start producing solar energy within 12 to 18 months of the announcement. "The tender will be a game-changer because we will boost the production of energy in Tunisia through environmentally friendly energy," Feriani said. "This is the way the world goes."

Germany's ABO Wind announced it had received licenses for both a solar and wind project in Tunisia earlier this year. The solar park will be located in the governorate of Gabès, approx. 400 km south of the country's capital Tunis, and will have a capacity of 10 MW. ABO Wind plans to build the project next year in close cooperation with local partners. "The solar park will produce more than 18 million kilowatt hours of electricity per year and will feed it into the grid at a distance of 2,500 meters," says ABO Wind department head Nicolas König. ABO Wind will conclude an electricity supply contract with the state-owned energy supplier STEG (Société Tunisienne de l'électricité et du Gaz), which will



Source: ABO Wind

provide a fixed remuneration over 20 years for the electricity fed into the grid.

Prior to the solar deal, ABO had already secured a tariff for a wind farm with a capacity of 30 MW in a tender, located 35 km southeast of Tunis. ABO Wind is currently working on half a dozen Tunisian wind and solar projects. "We are making good progress on our way to assemble a portfolio of several ready-to-build wind and solar projects attractive to investors," said Dr Patrik Fischer, ABO Wind's general manager responsible for international business development.

Smart Grid

The French Development Agency (AFD) is providing Tunisia's smart grid project with a \$131.7 million loan. The loan, which is to be repaid over 20 years with a grace period of up to seven years, is part of the Tunisian government's efforts to establish a strategy of energy switching aimed at reducing costs and enhancing operational efficiency.

Tunisian Company of Electricity and Gas (STEG), the state-run utility, first announced the project in 2017, but its plan to connect the entire country by 2023 stalled due to lack of funds. At the Africa Smart Grid Summit 2018 held in Tunis, STEG announced its intentions to initiate an international tender during Q1 2019 to start the project.

The AFD funding will be used to kick-start the project and be allocated to implement the first phase. The project's first phase involves the development of control and communication stations and the improvement of infrastructure. It includes installation of 430,000 "intelligent" meters over a period of three years in Sfax governorate in southern Tunisia with a population of about 330,000 people. The smart meters will be installed in homes and businesses. The second phase of the project is planned to extend the program to the other parts of the country.

The government is looking to bring its national capacity to about 8,300 MW by 2023. The smart grid project will also further the national goal of getting 30% of the nation's electricity from renewable sources by 2025.

Renewables Assisting Hydrocarbons

Italian oil company ENI inaugurated its Tatouine asset in southern Tunisia; the site includes a PV plant with an installed capacity of 10 MW. The project, which was awarded to the ETAP-ENI consortium following a public tender issued by the Tunisian authorities in accordance with the country's licensing regulations, will supply electricity to STEG. The project will be carried out by a new joint venture between ENI and ETAP which focuses exclusively on the production of energy from renewables.

The plant, equipped with a solar tracking system capable of optimizing the energy produced, will provide the national grid with more than 20 GWh/year of electricity, saving a total of about 260,000 tons of CO₂ during its planned 25 years of operation.

The Italian firm will also complete its construction of the Adam PV field in Tataouine this year, which will have a maximum installed



Source: ENI

capacity of 5 MW, whose power will be used directly from the industrial site. The new site has been built with innovative hybrid and energy storage systems that will be integrated into the plant's existing turbines, reducing gas consumption, operating costs and carbon dioxide emissions into the atmosphere. **AEA**

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Africa Spotlight



President: Peter Mutharika
(since May 2014)
**Minister of Natural Resources,
Energy and Mining:** Aggrey Masi
GDP (purchasing power parity):
\$22.42 billion (2017 est.)
Population: 19,842,560 (July 2018 est.)
Electricity Production:
1.42 billion kWh (2016 est.)
Electricity Consumption:
1.321 billion kWh (2016 est.)
Electricity - from hydroelectric plants:
93% of total installed capacity (2017 est.)
Electricity - from other renewable sources:
6% of total installed capacity (2017 est.)



Peter Mutharika

MALAWI

Politics & Economy

Established in 1891, the British protectorate of Nyasaland became the independent nation of Malawi in 1964. After three decades of one-party rule under President Hastings Kamuzu Banda, the country held multiparty presidential and parliamentary elections in 1994, under a provisional constitution that came into full effect the following year. Bakili Muluzi became the first freely elected president of Malawi when he won the presidency in 1994; he won re-election in 1999. President Binguwa Mutharika, elected in 2004 after a failed attempt by the previous president to amend the constitution to permit another term, struggled to assert his authority against his predecessor and subsequently started his own party, the Democratic Progressive Party in 2005. Mutharika was reelected to a second term in 2009. He oversaw some economic improvement in his first term but was accused of economic mismanagement and poor governance in his second term. He died abruptly in 2012 and was succeeded by vice president, Joyce Banda, who had earlier started her own party, the People's Party. Mutharika's brother, Peter Mutharika defeated Banda in the 2014 election. Population growth, increasing pressure on agricultural lands, corruption, and the scourge of HIV/AIDS pose major problems for Malawi.

Landlocked Malawi ranks among the world's least developed countries. The country's economic performance has historically been constrained by policy inconsistency, macroeconomic instability, poor infrastructure, rampant corruption, high population growth, and poor health and education outcomes that limit labor productivity. The economy is predominately agricultural with about 80% of the population living in rural areas. Agriculture accounts for about one-third of GDP and 80% of export revenues. The performance

of the tobacco sector is key to short-term growth as tobacco accounts for more than half of exports, although Malawi is looking to diversify away from tobacco to other cash crops.

The economy depends on substantial inflows of economic assistance from the IMF, the World Bank, and individual donor nations. Donors halted direct budget support from 2013 to 2016 because of concerns about corruption and fiscal carelessness, but the World Bank resumed budget support in May 2017. In 2006, Malawi was approved for relief under the Heavily Indebted Poor Countries (HIPC) program but recent increases in domestic borrowing mean that debt servicing in 2016 exceeded the levels prior to HIPC debt relief.

Heavily dependent on rain-fed agriculture, with corn being the staple crop, Malawi's economy was hit hard by the El Nino-driven drought in 2015 and 2016. The drought also slowed economic activity, led to two consecutive years of declining economic growth, and contributed to high inflation rates. Depressed food prices over 2017 led to a significant drop in inflation (from an average of 21.7% in 2016 to 12.3% in 2017), with a similar drop in interest rates.

Energy Situation

Malawi is one of the least electrified nations in the world, with access as of 2016 only pegged at about 9%. In 2018, the National Energy Policy of 2003 was revised to provide a new policy direction and guidance to all stake holders in order to spur development to attain the goals of Malawi Vision 2020 and the Malawi Growth and Development Strategy (MGDS) III in the national agenda. Further, the new policy will facilitate actions under the Sustainable

Energy for All Initiative and Sustainable Development Goals (SDGs) in the international agenda.

The overall goal of the 2018 National Energy Policy (NEP) is to provide guiding framework for increased access to affordable, reliable, sustainable, efficient and modern energy for all sectors and every person in the country. It emphasizes the importance of private sector participation in the sector and provides an environment conducive for such participation, be it in the form of direct investment, PPPs, IPPs or other participation vehicles. It also emphasizes on sustainable and clean energy which is accessible to all. Energy efficiency is another priority area and the new policy recognizes the importance of security of energy supply systems. Mitigating environmental, social, safety and health impacts of energy production and utilization is a key part of the policy. All of the steps will be pursued under a robust, investor-friendly and consumer-sensitive regulatory regime.

The 2018 NEP acknowledges that the contribution of renewables to the energy mix is still very low. Two of the major barriers to development have been identified as the prohibitive capital costs of renewable energy-based systems and renewable energy technology (RET) products, e.g. mini grid systems, solar PV systems, bagasse co-generation systems and Pico Solar Products (PSPs); and inadequate human capacity building at all levels in RET products, services, installation and maintenance, and marketing.

Malawi is well endowed with renewable energy resources including good sunshine throughout the year for solar applications, reasonable wind speeds for water pumping and power generation, a number of rivers with hydropower potential, reasonably large quantities of biomass materials for electricity generation and hot springs for geothermal power generation. The government has developed a renewable energy strategy and SE4ALL action agenda which will guide investments in the renewable energy sub-sector. Social and gender issues will also be taken into consideration in implementing renewable energy interventions.

RE Industry Updates

The government of Malawi is committed to addressing the energy shortfall and to making renewable energy a big part of the mix. Over the past 12 months, several new projects have been either implemented or added to the drawing board, and indications are optimistic for a dent to be made in this energy deficit.

Hydropower

One of the developments coming to light this year and holding great promise for the future saw the IFC sign a co-development agreement in April with Malawi for a hydroelectric plant on the Shire River. The cooperation in bringing the plant to fruition will come through the InfraVentures Fund set up by the IFC.

The Mpatamanga hydroelectric plant will have a capacity of 258 MW. The developer selection process will be led by the government of Malawi. This plant will significantly improve the power capacity of the country which is currently at about 350 MW.

InfraVentures, a \$150-million fund, is aimed at increasing the number of bankable projects in developing countries. The project

in Malawi, dubbed the Mpatamanga dam, will also benefit from the support of the Power Africa initiative and the SN Power AS hydropower developer.

Another hydropower project saw completion late last year. The successful rehabilitation of the Nkula A Hydropower Station was a major component of the MCC Malawi Compact. At the beginning of the compact, Nkula A, originally commissioned in 1966, was



Nkula A Hydropower Station

Source: MCC

not running at full capacity due to its poor condition. Through MCC's investment, the rehabilitated and modernized hydropower station now has at least an additional 30 years of operation and output capacity increased from the original 24 MW to 36 MW.

The MCC Malawi Compact was designed to increase individual and business incomes and reduce poverty by improving the availability, reliability and quality of the power supply, expanding access to power, reducing the cost of doing business, and revitalizing Malawi's power sector.

MCC's investment in Malawi established the foundation for a modern power sector and served as a catalyst through which the government of Malawi, private investors and regional partners have an opportunity to build.

MCC investments in infrastructure increased the volume of electricity and improved the stability of Malawi's electricity grid. Additionally, system enhancements were introduced across the network and at the national control center through a state-of-the-art network data monitoring system, contracted to General Electric, which provides real-time and remotely managed information on the electrical grid and power outages.

Solar

One of the most exciting projects coming up for Malawi was just announced recently. Independent power producer (IPP), Quantel Renewable Energy, says it plans to construct a 50-MW solar plant. The plant will be located in the locality of Bwengu.

The implementation of the project is expected to start in August. The plant will be built in six months and the production will be sold to the national electricity grid as part of the signing of a power purchase agreement. It will be routed through a substation located less than 1,000 meters from the plant site.

"The Bwengu Solar Park has a capacity of 50 MW, which implies a significant contribution of clean and sustainable energy to households and businesses in Malawi. We are very pleased to know that this project will also achieve the goals set by the country as part of Phase III of its National Development Strategy," Said Melvin Fields, executive director of Quantel.

The installation of this plant is part of a program to increase the national electricity capacity by 367 MW through projects that will

Africa Spotlight

be implemented by 14 independent producers. Malawi currently has an installed electrical capacity of 513.5 MW.

In October 2018, JCM Matswani Solar Corp. signed a 20-year power purchase agreement with state firm ESCOM. The agreement is for the production of a 60-MW solar power plant. Salima Solar is being co-developed by InfraCo Africa, part of the Private Infrastructure Development Group (PIDG), and JCM Power. It is the first IPP of its kind in Malawi.



Source: InfraCo Africa

According to InfraCo Africa, construction go underway in December. JCM's Philip Leferink stated at that time, "We will now work to prepare the ground, ready to install 230,000 solar panels after the rainy season and anticipate that Salima Solar will be delivering power to the grid by the end of 2019."

InfraCo Africa and JCM Power are already building on their partnership to develop Salima Solar's sister project, Golomoti Solar, in the south-east of the country. Together, the two projects will increase Malawi's installed power generation capacity by over 80 MW by 2020.

Smaller scale solar projects are having an immediate impact. One such example is the 55-KW hybrid solar project for a children's hospital in Lilongwe commissioned by Fortune CP (UK). The hospital is run by Baylor College of Medicine Children's Foundation Malawi (Baylor-Malawi) an organization sponsored by USAID and Baylor College of Medicine, Texas.

The Malawian hospital is prone to blackouts (load shedding) lasting 8-12 hours per day, the last thing needed when the hospital serves thousands of children and mothers in Lilongwe City. Power blackouts are also detrimental considering this hospital has an operating theater on site.

The system, designed, supplied and installed by Fortune is a hybrid consisting of 25 KW solar panels, controllers and inverter-chargers; 240 KWh Fortune CP battery bank (each cell is 2V 2500AH GEL);

30KVA diesel generator and the Escom electricity grid. This configuration ensures 24/7 power availability.

In February, the United States Agency for International Development (USAID), in support of the U.S. government-led Power Africa initiative, launched a "Solar Home System Kick- Starter Program for Malawi" to expand energy access in the country via solar home systems (SHS).

Power Africa will commit \$5 million of support to the program, with \$1.5 million going towards results-based grants for SHS companies. Starting in early 2019, the program will offer three pillars of support to successful program applicants: results-based grant finance, operational support and access to working capital financiers.

The SHS Kick-Starter Program aims to catalyze the increased investment and rapid growth in the sector over a three-year period. Through building coalitions within the donor community, the program complements and amplifies World Bank efforts to energize the SHS market in Malawi.

"We estimate that the program will allow 100,000 to 150,000 households with access to power, bringing in up to \$22.5 million of foreign direct investment into Malawi," said Mission Director Littleton Tazewell.

Fixing the Grid

GE's Energy Management System (EMS) will provide real-time and remotely managed information on Malawi's electrical grid and power outages. Aligning with MCA-M's Infrastructure Development Project, GE Power's Grid Solutions business completed the installation and commissioning of the EMS and telecommunications systems at 26 substations of the Electricity Supply Corporation of Malawi (ESCOM).

The project, financed through the Millennium Challenge Corp., will improve efficiency, reliability, security and planning of the transmission network in Malawi. The project will provide ESCOM with the tools to securely interconnect with neighboring countries (Mozambique, Zambia and Tanzania) and reduce technical losses in the transmission system in the medium-term while fostering economic growth in the long-term. **AEA**

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Power Africa Supports 121 Power Generation Projects

The US' Power Africa Initiative is currently supporting 121 power generation projects, with a total capacity of 10,000 MW. This support is provided by technical and financial experts who have brought their experience to mobilize the necessary funds for these various initiatives.

A total of 160 institutional and individual partners are involved in this project, which was launched in 2015. These include US government agencies, the African Development Bank and the United States, United Kingdom, France, Japan, Korea, Israel and Sweden to name a few.



Source: USAID

Andrew Herscowitz

Andrew Herscowitz, the project coordinator.

Launched in 2015, Power Africa aims to facilitate the installation of 30,000 MW of new power plants on the continent, by 2030, reaching 300 million people.

ExxonMobil Partners with NREL and Others to Advance Energy Technologies

The National Renewable Energy Laboratory (NREL) and ExxonMobil have partnered up. The two signed a \$100 million agreement that has ExxonMobil funding the partnership with NREL, the National Energy Technology Laboratory (NETL) of the United States, and other Department of Energy laboratories over a 10-year span.

The partnership will focus on “developing transformative advanced energy technologies with a focus on reducing emissions,” NREL director Martin Keller said. ExxonMobil’s commitment is “the largest single external investment in research at NREL in the laboratory’s history,” he added.

The agreement will foster research collaboration on projects with the potential to move beyond the laboratory, improving energy efficiency and reducing emissions on a global scale.

“The partnership with the national labs really goes back to the fundamental challenge that

we’re facing as a society, which is: How do you provide scalable energy to 9 billion people while addressing the risks of climate change?” said Vijay Swarup, vice president of research and development at ExxonMobil Research and Engineering Company.

World Bank to Aid Nigeria’s Rural Electrification

The World Bank has just allocated Nigeria a \$350 million loan for the development of its rural electrification projects. The funding will be used to electrify 2.5 million people and 70,000 small businesses in rural communities across the country. It will be managed by the National Rural Electrification Agency.

The loan through the International Development Agency will be repaid over a period of 30 years.

This new loan will facilitate private investments in the sector through the development of mini-grids, and the provision of solar home installations to communities. Part of the funds will also be used to staff seven universities with reliable electrical installations. Two university hospitals will also be among the beneficiaries, as part of the Energizing Education Program.

EDP and ENGIE Join Forces Creating a Global Offshore Wind Player

Antonio Mexia, EDP CEO and Chairman of EDPR and Isabelle Kocher, ENGIE CEO, have announced the signing of a strategic Memorandum of Understanding (MoU), to create a co-controlled 50/50 joint-venture (JV) in fixed and floating offshore wind. The new entity will be the exclusive vehicle of investment of EDP, through its subsidiary EDP Renewables (EDPR), and ENGIE for offshore wind opportunities worldwide and will become a global Top-5 player in the field, bringing together the industrial expertise and development capacity of both companies.

Under the terms of the MoU, EDP and ENGIE will combine their offshore wind assets and project pipeline in the newly-created JV, starting with a total of 1.5 GW under construction and 4.0 GW under development, with the target of reaching 5 to 7 GW of projects in operation or construction, and 5 to 10 GW under advanced development by 2025.

For EDP and ENGIE, offshore wind energy is becoming an essential part of the global energy transition, leading to the market’s rapid growth and increased competitiveness. The companies believe that creating an entity with greater

scale and a fully dedicated team, with global business development reach and strong power purchase agreement origination capabilities, will allow them to grow their asset base more rapidly and to operate more efficiently, assuring a stable partnership.

The JV will primarily target markets in Europe, the United States and selected geographies in Asia, where most of the growth is expected to come from. The JV’s ambition is to be self-financed and meet the investment criteria of both firms.

Globeleq Acquires Four Solar Plants in South Africa

Globeleq completed the acquisition of four renewable energy plants and the asset management company in South Africa from an affiliate of Brookfield Asset Management.

The solar assets acquired include Aries (11MW), Konkoonsies (11 MW), Soutpan (31 MW), and the Klipheuwel wind farm (27 MW). Acquisition of interests in the Boshof (66 MW) solar plant is expected shortly. The projects originally reached commercial operations in 2014 and have a 20-year PPA with Eskom.

The addition of these entities strongly complements Globeleq’s existing renewable power business in South Africa where the company already owns, operates and manages 238 MW of solar and wind projects.

Azelio and Pasante Sign Sales Agent Agreement

Azelio has signed a sales agent agreement with Pansanté AB for sustainable electricity supply to hospitals in central and southern Africa. Pansanté has developed an award-winning concept for sustainable healthcare. The agreement is aimed at off-grid areas where Azelio’s solution for electricity production with energy storage offers an alternative to diesel generators as baseload.

Pansanté is established in central and southern Africa, where the majority of the population has no access to the national grids. As part of the sustainable concept, a sales agent agreement has been signed with Azelio to ensure reliable and sustainable electricity to its own projects and projects where Pansanté AB is a supplier.

Azelio offers distributed long-term energy storage with dispatchable electricity production. Hospitals require a continuous supply of electricity and cannot rely on solutions with uneven production that are dependent on intermittent sources as sun or wind.

Xodus Grows Capabilities with Addition of Renewables Advisory Team

International energy consultancy Xodus Group has expanded its renewables capabilities with the addition of a dedicated advisory unit. The advisory team will support lenders, developers and the wider supply chain to identify and capitalize on renewable energy opportunities and mitigate against risk.

Scott Hamilton has been appointed to lead the team, with a focus on due diligence, supply chain analysis and techno-economic analysis.



Source: Xodus Group
Scott Hamilton

Hamilton will develop, manage and deliver a range of commercial consultancy services to owners and developers of renewable energy assets and wider industry participants. He will also help deliver commercially-focused business analysis, economics and due diligence services to clients. Hamilton previously worked as a special advisor supporting Scottish and Norwegian companies to assess the suitability of their products or services in the international offshore wind market.

Hamilton will be supported by Rob Clayton, who joins Xodus from Wood, where he worked as a wind and marine energy consultant. His previous project experience includes conducting bank grade energy yield assessments for international wind farms, third party technical reviews and global market assessments of marine energy technology and developing strategic commercialization plans to assist in the acquisition of grant funding.

AMMP Secures Investment for Data-Driven Advances to Off-Grid Energy

AMMP Technologies secured a funding round in mid-May from a consortium of angel investors. This funding will allow for the company to further accelerate growth in sub-Saharan Africa and beyond.

As Dr. Svet Bajlekov, co-founder and CEO puts it: "We've seen first-hand how connectivity and access to data-enabled services can really power growth in off-grid energy. At AMMP we work with one of the most comprehensive data sets in the sector, and can see this adding value not just in technical operations but across the value chain. We are excited to be at the forefront of the energy

transition in some of the world's most dynamic markets!"

AMMP Technologies works with off-grid energy companies to help advance their operational and commercial objectives. As a basis, AMMP enables clients to streamline their technical operations and reduce the costs of working in challenging and remote environments. In addition, the solution enables innovative business models in the fast-growing energy service space.

The team behind AMMP builds on a rich set of experiences in the off-grid sector. The founding team began their work together at Rafiki Power, a former E.ON company, deploying and operating mini-grids for rural electrification in Africa. Having experienced first-hand the challenges of operating off-grid energy systems in remote environments, they saw huge potential value in bringing together operational data across multiple vendors, technologies, and locations onto a unified platform.

The new investor team brings on board highly distinguished expertise in smart energy, utilities, telecom, scaling start-ups, and emerging markets.

One of the investors, Peter Molengraaf, former CEO of the Dutch distribution grid operator Alliander, summarizes his reasoning: "A few years ago I met the late Kofi Annan, and got a question from him: 'To how many people, that do not have regular access to electricity, did you bring electricity last year?' At that time I didn't have a good answer. Today, I can see how this investment will help enable off-grid electrification in many parts of the world. AMMP are tackling a core aspect of the sector's challenges, with a team that's been in the trenches."

SGRE Reaches 1 GW Sold of the SG 4.5-145 with Large EDF Order

Siemens Gamesa Renewable Energy has been awarded another order by EDF Renewables to supply 30 SG 4.5-145 and 36 SG 2.7-129 wind turbines for the 232 MW Milligan wind project, located in Milligan County, Nebraska, USA. This project marks 1 GW of SG 4.5-145 wind turbines sold world-wide and reinforces Siemens Gamesa's solid position in one of the largest wind power markets in the world.

The contract also includes a service and maintenance agreement for Siemens Gamesa's premium maintenance program, offering the

best in scale and flexibility to maximize energy asset returns. Project completion is expected for the end of 2020.

Siemens Gamesa Appoints New Onshore CEO

The Board of Directors of Siemens Gamesa Renewable Energy has appointed Alfonso Faubel as the company's new Onshore Business CEO, effective July 29. Faubel will replace Mark Albenze, who assumed this position on a temporary basis in addition to his role as CEO of the Service Business Unit. Albenze will now continue in his role as Service CEO.



Alfonso Faubel

"We are very pleased that Alfonso Faubel is joining the company and look forward to working with him. His broad industry experience will support the onshore business unit in addressing the challenging environment and continuing to deliver value to our customers," said Markus Tacke, Siemens Gamesa CEO.

Faubel, who has 30 years' experience in the automotive and energy industries, joins Siemens Gamesa from Sentient Science, where he was chief revenue officer of Energy and President of Europe. Previously, he worked for Alstom-General Electric as Senior VP, Global Sales & Marketing, based in Switzerland, and as Senior VP of the Alstom Wind Business, responsible for all activities related to Alstom's onshore and offshore wind business.

"I am honored to join a global company of the caliber of Siemens Gamesa, which has such a clear commitment to delivering clean energy.

Onshore wind will be a key element of that vision and I am ready to take on the challenge and contribute to reinforcing our leading position, delivering projects that create lasting value for all our stakeholders," said Faubel.

BBOXX Secures Funding for Solar Home System Roll-Out

BBOXX secured an \$8-million loan from the Facility for Energy Inclusion Off-Grid Energy

Access Fund (FEI OGEF). The local currency loan, one of the first to be made since the fund's launch in 2018, accelerates BBOXX's roll-out of solar home systems across Rwanda, its largest market.

The Rwandan Franc-denominated loan enables BBOXX to expand its operations and bring clean, reliable and affordable energy to many more individuals, communities and SMEs previously living without it. To date BBOXX has installed 80,000 solar home systems in customers' homes and businesses in Rwanda. The innovative local currency loan mitigates the company's medium-term FX related risks, as BBOXX customers make mobile money payments in Rwandan Francs to pay for their solar electricity.

This latest deal will help drive BBOXX's collaboration with the government of Rwanda and make strides towards meeting its national electrification targets. It also builds on recent deals BBOXX has signed this year generating investment in Rwanda's energy sector. BBOXX secured \$31 million from Africa Infrastructure Investment Managers (AIIM) in January to scale its Rwanda operations, alongside its

roll-out in Kenya and the Democratic Republic of Congo.

FEI OGEF is a \$100 million blended finance debt fund that provides predominantly secured financing to support the growth of innovative companies in the off-grid energy sector. The fund is managed by LHGP Asset Management, the asset management arm of Lion's Head Group. FEI OGEF is the off-grid window of the African Development Bank (AFDB) flagship initiative, Facility for Energy Inclusion. It has received funding from the AFDB, the Nordic Development Fund, the European Union, the Global Environment Facility and All-On Nigeria as well as debt financing from Calvert Impact Capital and the Prudential Insurance Company of America.

11 Million People Employed in RE Worldwide in 2018

Eleven million people were employed in renewable energy worldwide in 2018 according to the latest analysis by the International Renewable Energy Agency (IRENA). This compares with 10.3 million in 2017. As more and more countries manufacture, trade and install renewable energy technologies, the latest

Renewable Energy and Jobs – Annual Review finds that renewables jobs grew to their highest level despite slower growth in key renewable energy markets including China.

The diversification of the renewable energy supply chain is changing the sector's geographic footprint. Until now, renewable energy industries have remained relatively concentrated in a handful of major markets, such as China, the United States and the European Union. Increasingly, however, East and Southeast Asian countries have emerged alongside China as key exporters of solar photovoltaic (PV) panels. Countries including Malaysia, Thailand and Vietnam were responsible for a greater share of growth in renewables jobs last year, which allowed Asia to maintain a 60 percent share of renewable energy jobs worldwide. Solar photovoltaic (PV) and wind remain the most dynamic of all renewable energy industries. Accounting for one-third of the total renewable energy workflow, solar PV retains the top spot in 2018, ahead of liquid biofuels, hydropower, and wind power. Geographically, Asia hosts over three million PV jobs, nearly nine-tenths of the global total.

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Pan-African Free Trade Pact in Force

The Africa Continental Free Trade Agreement (AfCFTA) came into force in late May after being ratified by the parliaments of 24 countries. The commissioner of Trade and Industry for the African Union, Albert Muchanga, confirmed by tweet that the agreement is now in force and that a unified market would be launched July 7.

Surprisingly, Nigeria, Africa's most populous country and largest economy, has not signed on to the agreement, saying it needed to consult economic stakeholders before deciding on whether or not to participate. At present, 52 African nations are onboard with the deal, leaving just Nigeria, Benin, and Eritrea on the sidelines.

According to the Brookings Institution, "The significance of the AfCFTA cannot be overstated: It will be the world's largest free trade area since the establishment of the World Trade Organization (WTO) in 1994."

The AfCFTA is expected to greatly facilitate the movement of goods between nations and reduce tariffs dramatically. One in effect, participants will be required to drop 90% of their tariffs for imports from other African states. According to the United Nations, this could boost intra-African trade by 52.3%.

Sudan: Protestors Fired Upon

The situation on the streets of Khartoum and throughout Sudan have continued to heat up. Just prior to Petroleum Africa going to press on June 3, security forces fired on pro-democracy protesters in the capital, leaving a number of dead and many more injured.

Source: United Nations



Sudan protest

The situation in Sudan began back in December following then-president Omar Al Bashir cutting subsidies, with fuel and bread price increases igniting the country's citizenry, especially among the many poor. By April Al Bashir was forced out in a bloodless coup. The Council of Generals took over on April 11 but have been unable to quell the unrest and return the country to normality.

This latest round of violence prompted the United Nations chief's condemnation and an

appeal for "peaceful dialogue" to resume. Secretary-General António Guterres "strongly condemns the violence" and "the use of force to disperse the protestors at the sit-in site," said a statement issued by his Spokesperson, adding he was also alarmed at reports that "security forces have opened fire inside medical facilities."

Mr. Guterres reminded the Transitional Military Council of its responsibility for "the safety and security of the citizens of Sudan," and urged all parties to "act with utmost restraint," including their responsibility to uphold "the human rights of all citizens, including the right to freedom of assembly and of expression."

"The Secretary-General urges the parties to pursue peaceful dialogue and to stay the course in the negotiations over the transfer of power to a civilian-led transitional authority, as required by the African Union (AU)," the statement continued.

It concluded with the UN chief's commitment to working with the AU in support of the process, saying that the UN "stands ready to support the Sudanese stakeholders in their efforts to build lasting peace."

Libya: Opposition Hires US PR Firm

Field Marshal Khalifa Haftar and his Libyan National Army (LNA) hired Linden Government Solutions, based in Houston, according to a foreign agent registration document released by the US Justice Department. The leader of the LNA is looking to gain international support for his bid to take over Libya.

According to an AP report Linden, which would receive about \$2 million under the 13-month agreement, also will assist with "international coalition building, and general public relations" for the LNA.

Haftar is reported to have spoken to US President Donald Trump on the telephone. The two were said to have shared their vision of "Libya's transition to a stable, democratic political system."

The Linden executives leading the firm's representation of Haftar and the LNA, Stephen Payne and Brian Ettinger, have extensive knowledge of Libya, the company said in a statement. Payne, Linden's president, said he has been in communication with Haftar for the past five years, according to the statement.

Algerian Election Canceled

Political uncertainty will continue in Algeria as its planned July 4 election has been canceled. The country's constitutional council cited "a lack of candidates."

Given the current political and civilian climate in Algeria, the prolonging of the political transition could incite more anger from protesters. The move will likely extend the rule of interim President Abdelkader Bensalah, who was due to stay on only until the vote to elect a new president, following the resignation of former President Abdelaziz Bouteflika after weeks of protests.



Source: Embassy of Algeria

Abdelkader Bensalah

In a statement on state television, the constitutional council overseeing the country's transition, said two candidates had come forward but were deemed invalid. The two candidates had not met the quorum of 60,000 signatures in support, a political source told Reuters.

NOC Condemns Attack at Zallah

In Libya extremists stormed the main gate between Zallah city and a local oilfield operated by NOC unit Zueitina Oil Company (ZOC). According to reports on the state-run firm's website, the attack resulted in three casualties.

NOC Condemns Attack at Zallah

NOC, in its statement condemned the attack. The incident caused no immediate impact on operations. ZOC management held an emergency meeting to review security protocols, requesting that the local Petroleum Facilities Guard take necessary precautions.

NOC chairman, Mustafa Sanalla denounced the attack and warned of the risk to the oil sector from current hostilities: "NOC strongly condemns today's terrorist attack that could have easily endangered oil sector workers and infrastructure. The incident highlights the fragile security situation in our country and the need for an immediate ceasefire. Ongoing hostilities have created a security vacuum that extremists are now taking advantage of – potentially plunging Libya into even deeper chaos."

Buhari Sworn-In for Second Term

Muhammadu Buhari was sworn in for a second term as Nigeria's president, after winning the election with 56% of the vote. His closest competitor, former Vice President Atiku

Abubakar of the Peoples' Democratic Party (PDP), took 41%.

Buhari, now 76-year, was sworn in on May 29 amid tight security in the capital Abuja. He ran this campaign focused on tackling security threats and rooting out corruption.

Like in previous elections in Nigeria, the results are being disputed. Abubakar filed a petition which will be adjudicated in Nigeria's appellate court.

New UN General Assembly Head Appointed

Tijjani Muhammad-Bande, Nigeria's current UN Permanent Representative, was elected to head the world body by acclamation on June 4 in the General Assembly Hall in New York and will succeed Ecuador's Maria Fernanda Espinosa.

"Peace and security, poverty eradication, zero hunger, quality education, climate action and inclusion will constitute a major priority of my presidency," said the Nigerian ambassador.



Ambassador Tijjani Mohammad Bande

Source: UN Photo
Evan Schneider

When he takes the reins at opening of the 74th session in September, he committed "to promoting partnerships that are needed from all stakeholders to achieve our objectives, and ultimately ensure that we do our best to ensure peace and prosperity, particularly, for the most vulnerable."

Muhammad-Bande spoke about a number of September's high-level events that will be convened at UN Headquarters in New York to support the Sustainable Development Agenda, including a High-Level Political Forum, the Climate Change Summit, the High-Level Dialogue on Financing for Development, the High-level meeting on Universal Health Coverage, as well as the high-level meeting to review progress made in addressing the priorities of Small Island Developing States (SIDS).

"The promotion of human rights and the empowerment of women and youth deserve special attention, and I will be devoted to the promotion of gender parity throughout the whole UN system, starting from my own Office," said the president-elect.

Noting that the 75th anniversary of the UN's founding would be commemorated during his tenure, he called it "a unique opportunity for us to reduce the trust deficit between nations."

U.S. Embassy Commends Moves Toward Peace in Mozambique

The Embassy of the United States of America commended Mozambican President Filipe Jacinto Nyusi, and Renamo President Ossufo Momade for their joint announcement committing to completing the disarmament, demobilization, and reintegration (DDR) process in the months of June and July and expressing intent to sign a definitive ceasefire agreement and permanent peace accord in August. The US statement said it welcomed this news of progress toward achieving these key milestones in advance of the October general elections and urged both sides to continue taking concrete and simultaneous steps to fulfill their respective commitments to reaching a timely and complete DDR of Renamo combatants.

"The cooperation between President Nyusi and Renamo President Momade to advance the peace process, especially in the wake of the devastating and tragic cyclones that struck Mozambique in March and April, stands as a testament to the two leaders' desire to unify the country. The United States congratulates the Government of the Republic of Mozambique and Renamo, and remains committed to working within the framework of the International Contact Group to provide the support necessary to achieve the durable peace deserved by the people of Mozambique," the statement read.



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Conferences

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May 2019

08-10	5 th Africa Mini Grids Summit 2019	Nairobi, Kenya	www.africaminigrids.com
14-16	World Hydropower Congress 2019	Paris, France	www.congress.hydropower.org
15-16	3 rd Liberia International Mining, Energy and Petroleum Conference & Exhibition	Monrovia, Libya	www.ametrade.org
22-23	3 rd Edition Smart Solar PV Forum - Data Analytics and IoT	San Diego, USA	www.bisgrp.com
23-25	2 nd Solar Africa 2019, Rwanda	Kigali, Rwanda	www.expogr.com
28-29	4 th Annual Offshore Wind Operations & Maintenance Forum	Hamburg, Germany	www.bisgrp.com
28-29	7 th Edition Wind Power Big Data and IoT Forum	Houston, Texas	www.bisgrp.com

June 2019

04-05	8 th Edition Wind Power Big Data and IoT Forum	Berlin, Germany	www.bisgrp.com
11-14	Africa Energy Forum	Lisbon, Portugal	www.africa-energy-forum.com
12-13	7 th Edition Hydropower Plant Digitalization Forum	Seattle, USA	www.bisgrp.com
19-20	Asset Optimization and Data Analytics for Power Network System Operators	Berlin, Germany	www.bisgrp.com
26-27	8 th Edition Hydropower Plant Digitalization Forum	Vienna, Austria	www.bisgrp.com

September 2019

17-18	Future Energy East Africa	Nairobi, Kenya	www.future-energy-eastafrica.com
24-26	Power Nigeria 2019	Lagos, Nigeria	www.power-nigeria.com

October 2019

16-17	Renewable Energy Cyber Security Forum	Berlin, Germany	www.bisgrp.com
29-31	5 th Annual Southern Africa Power Summit 2019 (SSPOW19)	Cape Town, South Africa	www.ssapower.com

November 2019

12-13	Future Energy Nigeria	Lagos, Nigeria	www.future-energy-nigeria.com
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