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Alternative Energy Africa

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Filling the Energy Information Gap in Africa

March/April 2020

Renewables Account for 72% of New 2019 Capacity

Solar-Driven Water Desalination

Advancing Battery Energy Storage Technology

Energy Transition in West Africa

6th Africa Mini Grids Summit

15-17 September 2020 | Nairobi, Kenya

Advancing Successful Mini Grid & Solar Home Systems in Africa

"ESMAP Estimates that Achieving Universal Access by 2030 will Require the Construction of more than 210,000 Mini Grids, mostly Solar Hybrids, Connecting 490 Million People at an Investment Cost of almost $220 Billion Dollars."

In Africa, mini grids have been identified as a key platform to address critical electrification shortages. Creating successful mini grid ecosystems beyond pilot projects is now the focus of African governments facing severe shortages especially for their off-grid populations. Tanzania, Kenya, Uganda, Nigeria, and Ghana are just some of the countries with frameworks and supportive policies to expand energy access through mini grids. Foundations, donors and organizations are stepping-up their financial support for mini grids as momentum gears-up towards universal energy access by 2030.

Africa has the largest share of planned mini grids. World Bank data shows that more than 4,000 mini grids are currently being planned. The two largest markets for planned mini grids in Africa are Senegal and Nigeria – these two countries alone account for about 2,000 of the 4,000 planned mini grids in Africa.

We invite you to join us in Nairobi at the 6th Africa Mini Grids Summit to network, share and learn from governments, regulators, utilities, investors, project developers, financiers, donor agencies, and technology and solutions providers. Get the latest updates on country programs and business cases for mini grids in Africa. Analyse the building blocks and mechanics behind various implementation models and gain insights on how to overcome the pain points still plaguing the industry.

Government officers, international experts, private sector players and investors will come together to share insights and solutions, discuss case studies, and engage in robust panel debates on how to scale-up successful mini grid projects in Africa.

The 2020 Agenda includes the Industry's Most-pressing Topics:

- COUNTRY PLATFORMS & UPDATES: Learn from the Wide Range of Developmental Experiences and Challenges in Kenya, Tanzania, Ethiopia, Zambia, Nigeria, Uganda, Ghana, Rwanda and Sierra Leone
- SCALING-UP MINI GRIDS: Innovative Financing Structures and Key Issues in bringing Mini Grids To-scale
- DEVELOPERS' FORUM: Ongoing Mini Grids Projects plus New and Emerging Developments
- RESEARCHERS' FORUM: Overcoming Barriers through Innovation
- LARGE-SCALE PROGRAMMES: Kenya KOSAP Programme, DFID Green Mini Grids Support Platforms, GMG Facility Kenya
- PANEL DISCUSSIONS: Making Mini Grids Commercially Sustainable

Do not miss the Field Visit to the Oloika Mini Grid Project in Kajiado County, Kenya

This enriching site visit to a live mini grid project will enable participants to understand first-hand the social, technical, economic and humanitarian benefits of this project and how it was executed.

The project is joint-funded by Energy for Development (e4D), who provided the generation costs, and the Rural Electrification Authority (REA), Kenya, who provided the civil work and distribution grid.

Owned & Produced by: Magenta Global

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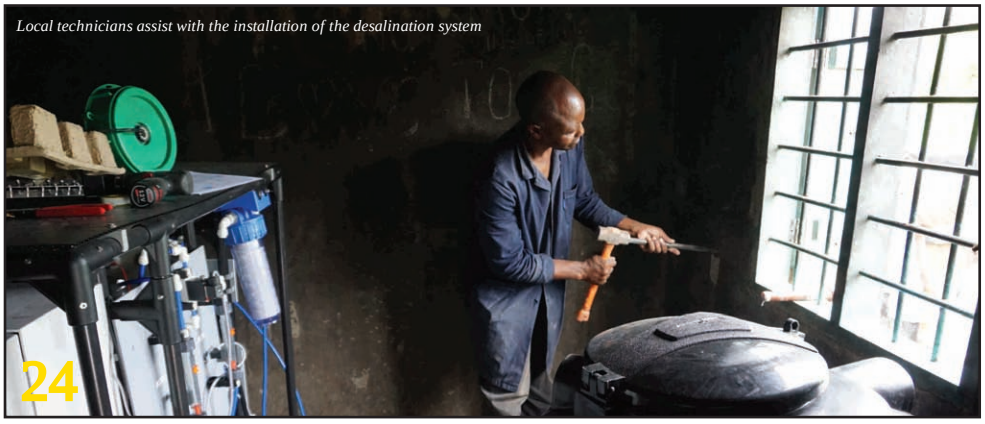

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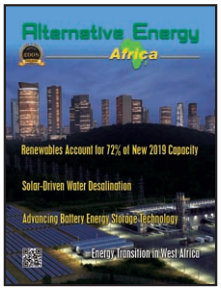


Energy transition in West Africa

Source: Wärtsilä

Publisher's Note

MESSAGE FROM THE PUBLISHER

Dianne Sutherland

With the global Corona Virus spread and the oil price crash, the world is a much different place than just two short months ago. What a difference one issue makes! At the time of writing, the continent had around 10,000 known cases, but with the proximity to Europe and many European visitors, that number is sure to soar, as it has in other continents. With millions of people sheltering in place around the world, the demand for oil products has been drastically reduced, with the oil price falling to $21.51 a barrel on March 27 and further losses expected. The current situation is a disaster for African countries heavily dependent on petroleum revenue, and more so for families affected by the pandemic, directly or indirectly. World economies, too, have been hit hard, but is there a silver lining? Perhaps!

Global emissions are significantly down as a result of the pandemic, leaving cleaner air in major pollution hotspots around the globe – Beijing, Cairo, Los Angeles, and Venice – to name just a handful. While some scientists warn that once these cities recover, the resulting pollution could be even worse, others point to the opportunity that is being presented to build upon some of the new, COVID-induced social norms, especially when it comes to more sustainable living. In Egypt, to provide just one example, governmental stay-at-home measures and curfews have led to fewer traffic deaths on its manic roadways, as well as less pollution. The measures have also led to healthier diets (this will be true for other countries, too), and the order to shut down cafes and malls during curfew hours has led to a ban on the smoking of hookahs, or *sheeshah*, as it is called in the country. Perhaps, most impactful, is the enhanced awareness the world over of the importance of washing one's hands frequently. This one simple action could slow-the-spread of existing and future infectious diseases.

The bottom line is we are all learning the "new norms" together and great minds are stepping up to create solutions to the new challenges we are presented with. Innovation is already occurring in the energy sector to solve some of the problems rural Africa is facing without adequate medical facilities and power supplies. In this issue we take a look at some of the initiatives being implemented in the continent to face the COVID crisis. In the next issue we will continue to delve into some of the more direct impacts and solutions for Africa. Until then, *www.AE-Africa.com* will cover the situation with new developments. Feel free to write us with your experiences, comments or suggestions at *info@AE-Africa.com*. Keep well!

Dianne Sutherland
Publisher

Publisher
Dianne Sutherland

Contributing Editor
Jennifer Nickle

Contributors
Cherie Adams
Wärtsilä

Advertising Inquiries
info@AE-Africa.com

Subscriptions
subscribe@AE-Africa.com

Africa Headquarters
10G Ahmed Abd El- Aziz St.
New Maadi, Cairo, Egypt
Tel/Fax: +2 02 2517 7454
Email: info@AE-Africa.com

Advertising Representatives
Austria, Germany, Switzerland
Eisenacher Medien
Erhardt Eisenacher
Tel: +49 0228 2499 860
info@eisenacher-medien.de

Ghana
Research Development &
Financial Consultants Ltd.
Tel: +233 302 767 919
kacquah@rdfcafrica.com

Italy
Ediconsult Internazionale
Anna De Bortoli
Tel: +39 02 477 100 36
energia@ediconsult.com

Rest of Africa
Jina Sellers
Tel: +27 82 414 8191
advertise@AE-Africa.com

Senegal Inaugurates West Africa's First Ever Utility-Scale Wind Farm

Parc Eolien Taiba N'Diaye (PETN), was officially inaugurated in late February by the Senegalese Head of State, His Excellency Macky Sall. The project, carried out by Lekela, the renewable power generation company that delivers utility-scale projects across Africa, is a major achievement for Senelec, Senegal's national electricity company.

Since last December, PETN has provided 50 MW to the Senelec grid thanks to the installation of 16 wind turbines. These, among the largest in the world, each peak at almost 180 meters in height, the equivalent of a 60-story building. The upcoming second phase of construction will see PETN generate an additional 50 MW. The third and final production phase will bring the number of turbines to 46 and provide Senelec with 158.7 MW of clean energy.

"This plant illustrates the benefits that the State of Senegal can derive from intelligent public-private partnerships," explained Pape Mademba Bitèye, CEO of Senelec. "The partnership between the State, local authorities and Lekela is proving to be fruitful for the country. The project will provide 15% additional energy capacity in the near future, representing half of the renewable energy available in Senegal. PETN will reduce the country's dependence on oil and its fluctuating costs."

PETN will provide more than 450,000 MWh of electricity per year to more than two million people. This will help to avoid the release of 300,000 tonnes of CO_2 annually. The project is part of the "Plan Senegal Emergent", the government's program to accelerate economic development.

"This inauguration is a very special moment for Lekela and the PETN teams," said Chris Antonopoulos, Chief Executive Officer at Lekela. "In record time, together with all our partners and collaborators, we have completed an ambitious project that places Senegal at the forefront of countries committed to the development of renewable energy."

Source: Lekela

Massaer Cissé, General Manager for Senegal at Lekela, said, "Hundreds of jobs were created during the construction phase, many of them at the local level. Young people have been trained in new trades, a 20-year local social investment program has been put in place and many achievements have already been made. It is a great source of pride to have participated in such a project for my country."

The social program, which is already underway in the areas surrounding the wind farm, involves a series of activities to improve education, enterprise and the environment for the local communities. In recent months, 34 km of track accessible to farmers has been built, enabling them to transport their produce much more easily. In addition, two markets, a pilot farm and a fully equipped IT center connected to the internet at the Taïba N'diaye High school have also been built. Finally, a library and a municipal stadium have been rehabilitated as part of this program.

Libya to see Solar Power Plant at Kufra

Under the General Authority for Electricity and Renewable Energy's 2030 vision to utilize alternative energy sources, the foundation stone for the 100-MW solar plant in Kufra was laid by Prime Minister Abdullah Thinni.

According to the reporting by the Libya Herald, the project is to be implemented by a Chinese company and will be built on an area of 200 hectares and is expected to solve the energy problems of the municipality of Kufra and adjacent areas. It is expected to provide fuel and alleviate the problems of environmental pollution and supply the agricultural project as a first stage.

Drilling Begins on Ethiopia's Tulu Moye Geothermal Project

March 4, 2020 marked the commencement of exploration drilling for the Tulu Moye Geothermal Project where three exploration wells will be drilled in the project area located in the Oromia Region, Ethiopia.

This long-awaited milestone was spearheaded by the independent energy company Tulu Moye Geothermal Operations (TMGO), a shareholding company of the investment firm Meridiam SAS based in Paris, and Reykjavík Geothermal.

The drilling marks the start of the development of a 150 MW geothermal power plant with an anticipated total investment of $800 million. The first phase is projected to be complete by 2023 with a 50 MW plant, then reaching 150 MW through the second project phase with an expected completion by 2025. Ultimately, the project will generate 150 MW towards the baseload electricity needs of the Ethiopian Electricity Grid.

The electricity that will be sold to Ethiopian Electric Power (EEP) will integrate the electricity network via a 230 kV substation and a 230 kV transmission line that will leave from Koka to Wakena. The Tulu Moye geothermal project is funded by TMGO. The company has received support from the United States Agency for Trade and Development.

Three New Solar Facilities for Guinea Bissau

Chinese conglomerate Sinohydro has been awarded the engineering, procurement and construction (EPC) contract to build the Gardete solar power plant in Guinea Bissau. The solar facility will have a capacity of 20 MWp.

Two additional small hybrid solar power plants are also to be built using solar and diesel. The first will be built in Canchungo in the west of the country and will have a capacity of 1 MW. This facility will also be equipped

with batteries for the storage of electricity. The electricity will be evacuated through a medium and low voltage transmission line that Sinohydro will also install.

The second small hybrid solar power plant will be built in the Gabu region of eastern Guinea Bissau. This facility will also be equipped with a battery storage system and backup diesel generators and will be capable of producing 1 MW. The hybrid solar power plant will supply local populations via a medium and low voltage line.

These three projects are being developed at a cost of $42.9 million by the state of Guinea-Bissau with a loan from the West African Development Bank (BOAD). This funding was granted in 2017 and the call for expressions of interest was launched in March 2019 by African Biofuel and Renewable Energy Co. (Abrec).

Floating PV Plant set to get Underway in Seychelles

Work on a 5.8 MW floating photovoltaic solar plant in Seychelles will get underway in July of this year, according to a statement by French company Qair (formerly Lucia Holdings) on Monday. The plant, on completion, will be the world's largest.

Located on the lagoon of Providence (Mahé), the project will be the first project led by an Independent Power Producer (IPP) in Seychelles and the first power plant floating in the African continent. The plant will cover 40,000 square meters of water, will be made up of around 13,500 photovoltaic modules and will represent 2% of Seychelles' national production. For 25 years, the installation will contribute to a reduction in CO_2 emissions of around 157,000 tonnes.

The work will be mainly carried out by Seychellois companies and should take six months to complete.

Source: Qair

Planned location for Seychelles floating solar

10 MW Solar Facility for Zimbabwe

German investment house Holt Holding Group will be taking on the erection of a 10 MW solar power station in Zimbabwe before the end of next year at a cost of $7 million. The company's co-director generals, Hendrik Holt and Heinz Luchterhand, announced the decision to make the renewable energy investment in Zimbabwe after a closed-door meeting with the country's President, Emmerson Mnangagwa.

Luchterhand said the company was looking initially at the 10 MW solar power station. "We are keen to do more and not just one project. We have to start from somewhere. It is important for the image of the country to show other investors that this works," he said. He further stated that they were in the country to scout for investment opportunities because they had trust in the country, the government and also the people.

Siemens Gamesa Introduces RE in Djibouti

Siemens Gamesa has sealed a contract to build the first renewable energy installation in the Republic of Djibouti. The 59 MW wind farm will almost double the country's current installed power generation capacity. The project will also help reduce the cost of electricity, increase energy independence and decrease the country's CO_2 emissions. This is also the first Siemens Gamesa project with the participation of an African investor.

Despite high resource potential in Djibouti and opportunities for cross-border export, there are still 110,000 households in the country without access to power. With a capacity of 59 MW, this new wind farm will almost double the current installed power generation capacity in the country, all of which currently comes from fossil fuel sources.

The new installation, part of an expanding national renewable energy development program, will enable clean energy supply, decrease the cost of electricity and allow the 940,000 population of Djibouti and its key industries to strengthen its electrical independence and economic development.

The 17 SG 3.4-132 wind turbines will be installed near the Goubet cove in the Gulf of Tadjoura, on a 395-hectare site in Djibouti. The wind farm electricity interconnection solution, the civil works and ten kilometers of internal road and tracks will be built as part of project. Siemens Gamesa will also provide maintenance to the wind farm, which is scheduled to be operational in mid-2021, for a minimum of 10 years, with the option to renew. The electricity generated will be sold by the consortium to Electricité de Djibouti, the national power generation company, for a period of 25 years.

The project is Siemens Gamesa's first in Africa with the leadership and participation of an African investor. A consortium of four entities are leading its development: Africa Finance Corporation, the Dutch development bank FMO, Climate Investor One (Dutch investment funds in green energy in Africa, Asia and Latin America) and local company Great Horn Investment Holdings SAS. The project is covered by MIGA, the World Bank's Multilateral Investment Guarantee Agency.

UNMISS inaugurates New Solar Panel Farm in Juba

The United Nations Mission in South Sudan has inaugurated a new solar panel farm at one of its compounds in the capital Juba. The installation is expected to significantly reduce the peacekeeping mission's use of noisy, expensive and excessively fuel-consuming generators.

"These solar panels can save the burning of about 3,000 liters of fossil fuel every day," Asharam Nhemafuki, an engineer serving with the peacekeeping mission, said.

Since 2011, the peacekeeping mission has been generating electricity on its premises across the country almost exclusively by means of expensive and environment-unfriendly fossil fuels.

The 25-year-long estimated life span of the solar panel farm, occupying an area of approximately 10,000 square meters, will meet the energy needs of nine office buildings and the accommodation units of all the military

personnel at UN House. The energy generated represents roughly 60 percent of the electricity consumed on the base, with the remaining 40 percent to be produced by two generators, as compared to the five currently in use.

Having taken fourteen months to build, the solar project is an important part of the peacekeeping mission's aim to minimize its ecological footprint.

Toyota Tsusho Inks Deal for Ethiopia Geothermal Project

Toyota Tsusho Corporation, on February 14, signed a contract with Ethiopian Electric Power for the construction of the Aluto Langano Wellhead Geothermal Power Plant with a capacity of 5 MW. The construction funds will be arranged by the Grant Aid program by the Japan International Cooperation Agency (JICA) (Grant Agreement amount: 1,842 million yen).

The key component of the plant such as a geothermal steam turbine and its generator, will be manufactured and supplied by Toshiba Energy Systems & Solutions Corporation, and the construction work for the plant will be carried out by Egesim Energy Electro-Mechanic Construction Contracting Co., Ltd., a Turkish engineering company.

This project is unique for geothermal power plants built for commercial use and is expected to be a fundamental development in geothermal power use in Ethiopia. The contract covers the installation of geothermal wellhead power system engineering, procurement and construction of the steam gathering system, wellhead power system and the connection to the substation and is slated to begin commercial operations in August 2021.

Scatec Solar Secures Guarantees for its mega-Egypt Project

Scatec Solar ASA has secured guarantees with MIGA (Multilateral Investment Guarantees), a member of the World Bank Group, covering its equity investments in six Egyptian solar power plants – also known as the 390 MW BenBan project. The guarantees cover 90 percent of investments by Scatec Solar for up to 15 years against the risks of Transfer Restrictions and Convertibility.

"The MIGA guarantees are a cost-efficient way of mitigating risk for our largest project in the portfolio. Strong partnerships are essential to our business and this agreement is further strengthening the robustness of our investment," says Raymond Carlsen, CEO of Scatec Solar.

In November 2018, Scatec Solar secured guarantees with MIGA for all six South African solar power plants. These guarantees cover 90 percent of investments by Scatec Solar for up to 15 years against the risks of Breach of Contract and Transfer Restrictions and Convertibility.

MIGA was created in 1988 as a member of the World Bank Group to promote foreign direct investment in emerging economies by helping mitigate the risks of restrictions on currency conversion and transfer, breach of contract by governments, expropriation, and war & civil disturbance; and offering credit enhancement to private investors and lenders. Since its creation, MIGA has issued over $55 billion in guarantees across 114 developing countries.

Lekela Breaks Ground on Egypt's 250 MW West Bakr Wind Farm Project

Lekela held a groundbreaking ceremony that marks the start of construction of its 250 MW West Bakr wind farm in Ras Ghareb. The event was held at Cairo's new Administrative Capital and attended by Lekela's stakeholders and partners, including the Minister of Electricity and Renewable Energy, the Minister of Environment, the Minister of planning and Country Director at the British Embassy in Cairo; in addition to senior government officials from EETC and NREA.

Located 30 kms north-west of Ras Ghareb, West Bakr Wind is a part of the Government's Build, Own, Operate (BOO) scheme. It will provide an additional 250 MW of clean energy to the grid, increasing Egypt's wind energy capacity, as the country strives to meet its target of generating 20% of its electricity from renewable sources by 2022. The project will also reduce more than 550,000 tons of carbon dioxide emissions per year.

Chris Antonopoulos, Chief Executive Officer at Lekela said, "We are thrilled to announce that West Bakr Wind has now entered the construction phase. The project marks Lekela's first successful project implementation with the Egyptian Government and we are certainly looking forward to many more opportunities in the near future."

Faisal Eissa, General Manager, Egypt, Lekela said: "The project's financial close followed in August 2019 with a commitment to create shared value with local communities. We have recently met with the Ras Ghareb community where we discussed employment and training opportunities, to benefit the local community both economically and in terms of skills and knowledge."

The Power Purchase Agreement, Network Connection Contract with the Egyptian Electricity Transmission Company (EETC) and Usufruct Agreement with the New and Renewable Energy Authority were signed in February and March 2019, shortly after the project received Cabinet approval. Financing has been provided by DFC (formerly OPIC), the US Government's Development Finance Corporation, the International Finance Corporation (IFC), a member of the World Bank Group and the European Bank for Reconstruction and Development (EBRD). Siemens Gamesa Renewable Energy will install 96 of their SG 2.6-114 turbines through a turnkey EPC contract and will provide long term maintenance services through a 15-year Long Term Services Agreement.

Source: Lekela Power

Last Perdekraal East Wind Turbine Lifted ahead of Covid-19 Lockdown

Site workers at Perdekraal East Wind Farm had cause to celebrate recently after completing the installation of all its 48 turbines in under seven months. The milestone lift, three days before COVID-19 restrictions came into force in South Africa, was achieved two weeks ahead of schedule.

Source: Mainstream Renewable Power

Perdekraal's turbines tower 168 meters into the sky at their blades' apex

Mainstream Renewable Power's Construction Project Manager, Glenn Hobson, paid tribute to his largely South African team, who had intensified

Source: Mainstream Renewable Power

operations at the Western Cape site whenever low winds allowed. He said: "We expected to only complete this major milestone on April 6, so considering the current pandemic, the early completion is an unexpected blessing as we hadn't anticipated the full impact of the COVID-19 virus."

Hobson added: "While operational wind farms are classified as essential services, being part of the country's electricity production, supply and maintenance category, the ongoing construction of Perdekraal East Wind Farm has, of necessity, temporarily ceased operations."

The achievement came just a week after the last of 61 turbines was lifted ahead of schedule at Kangnas Wind Farm, the sister Bid Window 4 project that Mainstream is constructing in the Northern Cape for its Africa Joint venture Lekela Power.

Perdekraal East's wind turbines stand 115 meters tall to allow for optimum energy production, and when one of the blades stand vertically, the tip height is an impressive 168 meters high. The three 53.2-meter blades, made from fiberglass reinforced epoxy, are connected to the rotor at ground level before being lifted to the top of the turbine tower. The heaviest component is the nacelle, which contains the generator and gearbox, and weighs 86 tons.

The 110-MW Perdekraal Wind Farm will have the capacity to generate 368,800 GWh/year of clean, renewable power into South Africa's national power grid, equivalent to the annual energy needs of 111,118 homes.

Global Wave and Tidal Stream Energy Production Surges Tenfold

Global wave and tidal stream energy production has risen tenfold over the last decade, according to a report issued by Ocean Energy Systems (OES). The OES annual report shows cumulative energy produced from wave and tidal stream sources surged from less than 5 GWh in 2009 to 45 GWh in 2019.

Numerous other wave and tidal stream devices have been deployed in open-sea waters for testing, while further 'push and pull' mechanisms are stimulating the ocean energy sector in various regions of the world.

OES chairman Henry Jeffrey from the University of Edinburgh said the new report communicates the sizable global effort to identify commercialization pathways for ocean energy technologies.

"Our latest report underlines the considerable international support for the marine renewable sector as leading global powers attempt to rebalance energy usage and limit global warming. Decarbonization has been appointed as the main strategy to tackle this challenge and many countries around the world have revised or set ambitious targets for emission reductions while ramping up the electricity production from renewable resources. The start of this new decade carries considerable promise for ocean energy. Important projects and deployments are being planned for the coming years as the mission to decarbonize intensifies and governments across the globe show increased interest in ocean energy technologies.

"In the last 12 months we have seen considerable progress in the marine renewables sphere. In North America, Canada amended its Marine Renewable Energy Act to extend feed-in-tariffs and Purchasing Power Agreements for tidal energy developers working in FORCE. Meanwhile, the US officially launched a new R&D initiative "Powering the Blue Economy" seeking to relieve power constraints in emerging coastal and off-grid markets through marine renewable energy.

"Similarly, leaders across Europe have identified ocean energy as an essential component in meeting decarbonization targets, fostering economic growth and creating future employment opportunities. Key developments include the Strategic Energy Technology (SET) Plan and the Blue Growth Strategy. In addition, Spain has drafted ocean energy targets for 2025 (25 MW) and 2030 (50 MW) while Scotland is actively supporting the development of ocean energy technologies through the £10m Saltire Tidal Energy Challenge Fund. Moreover, the UK enabled the development and testing of several prototype devices including Orbital O2, Minesto's Deep Green, Magallanes Renovables' ATIR, and Marine Power Systems' WaveSub.

"Thanks to an ongoing effort in co-founding prototypes with a cumulative public budget of more than €70 million in 10 years, French developers are also now testing tidal stream (Sabella, Hydroquest) and wave (GepsTecno) devices at scale and at sea.

"Further afield, Australia announced funding for a 10-year $330m Blue Economy Cooperative Research Center and the preparation of a new marine and coastal policy in Victoria. In Asia, India has made tidal, wave and OTEC (Ocean Thermal Energy Conservation) technologies eligible for 'Renewable Purchase Obligations' while Korea completed a short-term OTEC demonstration in the East Sea. In addition, China sought to foster the tidal current energy sector through a temporary feed-in tariff of €0.33/kWh. The LHD tidal current energy project will be the first beneficiary of this incentive."

12 MW Solar Farm Powers up in Buckinghamshire

A 12 MW solar farm in Buckinghamshire that will generate enough renewable energy to power the equivalent of 2,800 homes and save 5,000 tons of carbon every year, has officially been energized. The site, named Bumpers, was sourced, designed and fully developed by Anesco and becomes the 103rd grid-scale solar PV site to be completed by the team to date.

Located next to the Ilmer Grid substation, the solar farm has plans for co-located battery storage in the near future. The site also benefits from enhanced biodiversity measures that are designed to support local ecology, including at-risk bird and bat species.

The solar farm has been purchased from Anesco by Gresham House for one of its New Energy funds and represents the sixth Anesco solar farm and the first subsidy-free Anesco installation acquired by Gresham House. The site will be monitored and maintained by Anesco's operations and maintenance team for the next 25 years, to ensure it continues to operate at its optimal efficiency.

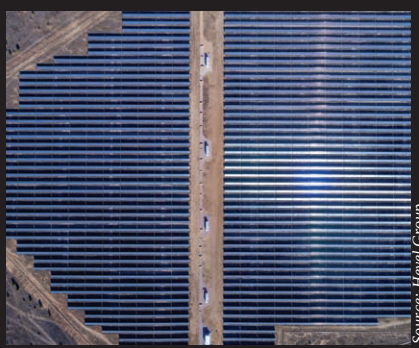
Hevel to Build Additional 480 MW of Solar by the end of 2020

Russia's largest PV cell and module manufacturer Hevel Group is set to build and commission an additional 25 solar power plants in Russia and Kazakhstan with a total capacity of 480 MW.

New capacities will roll out in six Russian regions, including 123 MW in the South of Russia (the Republics of Kalmykia, Adygea and Krasnodar region), 75 MW in Siberia (the Republic of Buryatia and Omsk region) and 25 MW in Saratov region.

In March 2020 Hevel will commission its 100 MW solar project named "Nura" in North Kazakhstan. This year the company is aiming to complete construction works at six PV plants with total capacity of 164.9 MW in southern regions of Kazakhstan.

At the moment, Hevel Group operates more than 600 MW of solar power plants in Russia.



Source: Hevel Group

LONGi picks up 908 MW Order for Hi-MO 4 Modules in Brazil

Chinese firm LONGi, a top solar technology company, has signed a partnership agreement with Solatio Energy, Brazil's leading developer of photovoltaic plants to supply 908 MW of its high performance Hi-MO 4 modules for Solatio's utility-scale solar projects in Latin America and commercial rooftop plants in Brazil.

Solatio is one of the largest developers of GW-scale solar power plants in Brazil. The conclusion of this agreement marks a breakthrough in the development of the PV markets in Latin-America for both parties.

It is estimated that the installation of the collective 908 MW in projects and rooftop plants will create hundreds of local employment opportunities.

IRENA Director-General Statement on Oil Prices and Impact on Renewables Sector

Francesco La Camera, Director-General of the International Renewable Energy Agency (IRENA) recently spoke out on the current low-price oil environment and the potential impact on the renewable energy sector.

"Oil market volatility is unlikely to have a significant impact on renewable energy plans and investments. Oil plays a negligible role in power generation and therefore does not compete with renewables in this respect. Renewables have become the dominant source of new power generation capacity over the last six years because they are competitive at the bottom end of the conventional fossil fuel power generation cost range – primarily with coal.

"Oil plays a much more important role in the transport sector, which accounts for half of total demand, and where without low-emission transport policies in place, an extended period of low oil prices may impact the speed of electric vehicle adoption.

"Conversely, oil price volatility may undermine the viability of unconventional oil and gas resources as well long-term contracts, providing a window of opportunity to reduce or redirect fossil fuel subsidies towards clean energy, while minimizing the potential of social disruption.

Source: IRENA

"Data from the previous oil price crash in 2014 shows no evidence of a link between the two. On the contrary, renewables investment reached new heights in both 2014 and 2015.

"The outbreak of COVID-19 threatens global supply chains in many sectors and is therefore likely to have an impact on renewable energy. The severity and duration of both situations remains to be seen.

"What is critical to understand, is that the long-term planning horizons involved, and the momentum that currently exists in the energy transformation, means neither low oil prices nor COVID-19 will interrupt or change our path towards decarbonization of our societies and towards the achievement of the sustainable development goals."

Clenergy Connects first PV-ezRack SolarTerraceMAC to the Grid

Clenergy announced it has connected its first PV-ezRack SolarTerraceMAC (Magnesium Aluminium Alloy Coating) solar project to South Korea's grid. Clenergy secured this 1.6-MW project in October 2019, which is located in Cheorwon-gun, Gangwon-do, Korea. The LG Solar Panels sit well and secure with the Clenergy STMAC #SolarRacking.

PV-ezRack SolarTerraceMAC is a new ground-mounting system suitable for large-scale solar power plants. Clenergy officially released this ground mounting system in July 2019.

Similar to most of Clenergy's ground-mounting solutions, PV-ezRack SolarTerraceMAC is also compatible with framed and frameless modules, allowing for installations in either portrait or landscape orientation. PV-ezRack SolarTerraceMAC ground-mounting system is far more advantageous when compared to other traditional galvanized steel solar mounting solutions.

Source: Clenergy

Benefits of this new system are better product performance, superior corrosion resistance, longer service life, no need for regular maintenance and aesthetic appearance. Additionally, PV-ezRack SolarTerraceMAC is manufactured according to AS NZS1170.2-2011, ASCE 7-10, EN1991, GB50797, and other globally acknowledged standards.

Sungrow Supplies 200 MW Wright Solar Project in California

Sungrow announced that the 200 MW utility-scale Wright solar project, utilizing Sungrow SG2500U-MV turnkey inverter solutions, has been operational since early this year in California's Central Valley, making another milestone for the company's continued commitment to utility-scale segment in the North American solar market. Notably, the project is California's largest solar installation built exclusively for a Community Choice Aggregation (CCA) agency.

Source: Sungrow

The Central Valley is home to many California solar plants due to the ample sunshine and abundant flat land. The plant is expected to power more than 100,000 San Mateo County homes per year utilizing the 1500 Vdc turnkey solution SG2500U-MV.

Featuring an integration of the 2.5 MW central inverter, MV transformer and LV auxiliary power in a 20-ft container, the solution enables simplified transportation and installation as well as quick O&M. Due to the smart forced air-cooling technology, the product can work stably without derating even if it's up to 50 degrees Celsius, being an ideal match given the high temperatures in the summer months. Developed for large-scale flat ground plants, the solution also characterizes a high DC/AC ratio and is compatible with bifacial modules and tracking systems, enabling high yields, which is recognized widely in the region.

The solar facility is being developed by Clenera and constructed by Swinerton Renewable Energy with union labor hired from the surrounding areas. "Sungrow has delivered high-performing products and reliable service on a number of prominent and successful projects throughout the country. We look forward to continued cooperation as we work toward building a stronger economy and more sustainable future through solar," said George Hershman, president of Swinerton Renewable Energy.

Financial Closure Achieved for the Largest Solar PV Plant in Oman

A consortium consisting of ACWA Power, GIC and AEPC has achieved the financial closure for the 500 MW solar photovoltaic (PV) Independent Power Project (IPP) at Ibri in the Sultanate of Oman, which is also the largest utility scale solar plant in the country to date.

The c.$400 million project will be funded on a debt to equity ratio of 70:30. A syndicate of six international and local lenders, will provide the $275 million senior debt. The mandated lead banks including Asian Infrastructure Investment Bank (AIIB), Bank Muscat, Riyad Bank, Siemens Bank, Standard Chartered Bank and Warba Bank, helped structure the largest utility scale solar PV project in Oman on a c. 16.5 year door-to-door tenor.

This deal also represents the first renewable energy financing in Oman as well as the GCC region by AIIB, the Beijing headquartered international multilateral development bank.

Paddy Padmanathan, President and CEO of ACWA Power, said: "We are pleased to partner with GIC and AEPC on the largest utility scale solar IPP in Oman. This milestone further asserts our commitment to provide low cost and sustainable electricity supply solutions to our esteemed clients like the Oman Power & Water Procurement Company (OPWP). Successfully achieving financial closure during these challenging times is a testament to the determination of all the stake holders in this project to keep doing the best we can within the constraints we all need to work within."

Rajit Nanda, Chief Investment Officer of ACWA Power, said: "We are pleased to achieve a successful closing of yet another financing in Oman which is a key country for ACWA Power's operations in Middle East. Achievement of this milestone together with our partners – co-shareholders, contractors and the bank group comprising of international and local banks - notwithstanding the trying financial and macroeconomic challenges prevalent the world over resulting from the COVID-19 outbreak demonstrates our structuring capabilities, the resilience of our long lasting partnerships and our commitment to OPWP. The project which is the largest utility scale Solar PV project in Oman, will also be the first renewable energy financing for AIIB in the GCC region, paving the way for a stronger partnership with the Beijing based international multilateral bank in the future."

The 500 MWac Ibri II solar project is an Independent Power Project which will be Oman's largest utility-scale solar PV Independent Power Project. The project, to be developed on a BOO (build, own, operate) basis, will utilize cutting-edge Solar Photovoltaic Technology to generate 500 MWac of renewable power. At peak generation capacity, the plant output will be enough to supply an estimated 33,000 homes with electricity and will offset 340,000 tonnes of carbon dioxide emissions a year. Located around 300 km west of Muscat, Ibri-2 IPP will contribute towards increasing power supplies in the Sultanate. The term of the offtake contract for the project will be 15 years from the commercial operations date.

Siemens Gamesa Secures First Order for 170-meter Rotor Onshore Turbine

Siemens Gamesa received its first order for its 170-meter rotor wind turbine. The company will deliver eight units of the SG 5.8-170 to Danish developer and wind turbine operator Eurowind Energy A/S for the Knöstad project (46 MW) located near Karlstad, in Sweden.

The landmark order will mark the debut of the onshore wind turbine with the largest rotor in the industry, capable of capturing more wind in medium and low wind sites. Additionally, the turbines will operate at a capacity of up to 6.2 MW, resulting in record high annual energy production (AEP). Siemens Gamesa has also secured a 25-year full-service agreement.

This will be the second project to feature the Siemens Gamesa 5.X platform in Sweden. In December, the company reached an agreement to supply 35 SG 5.8-155 to Arise AB and Foresight for the Skaftåsen project. In less than a year since its launch, the company has secured orders for the turbine's two variants, which have rotors of 155 and 170 meters respectively.

As one of the largest consumers of electricity per capita in the world, Sweden has pioneered the adoption of new technologies to bring down both the cost of the electricity and CO_2 emissions.

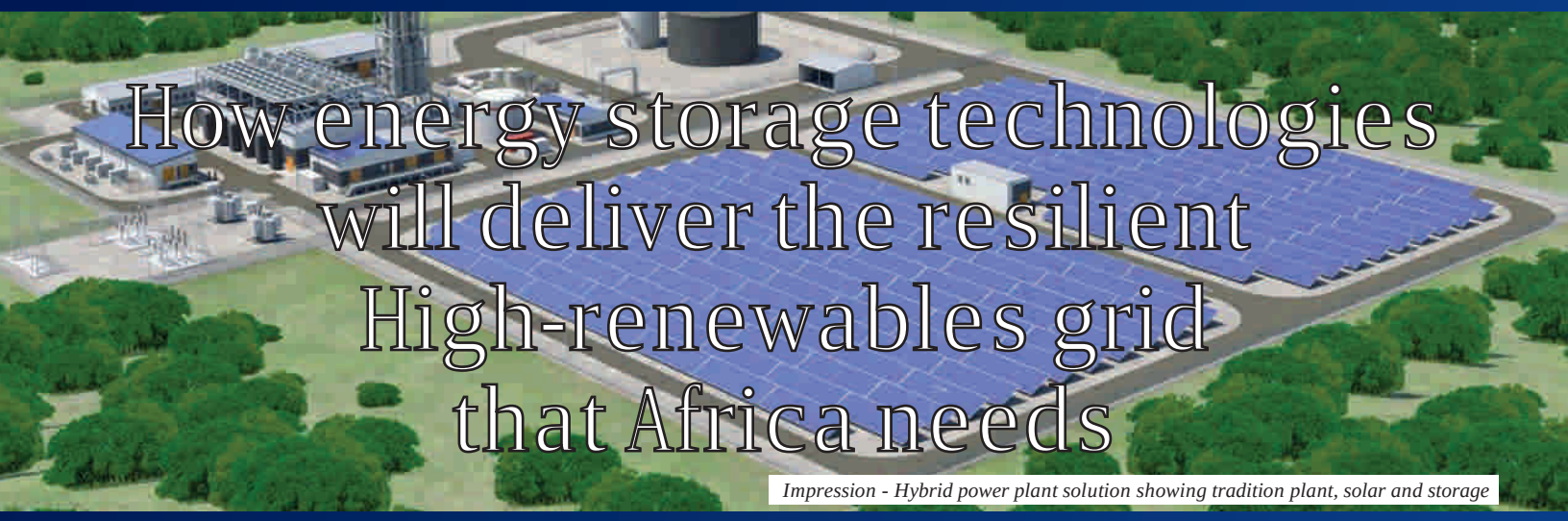
Source: Siemens Gamesa

According to WindEurope, the country is expected to double its wind capacity from 7.4 GW to 14.9 GW by 2023 and the government has set a target of 100% renewable electricity production by 2040. One single SG 5.8-170 turbine is capable of providing enough power for close to 5,000 European homes a year, while avoiding the emission of 15,000 tons of CO_2 over the same period, the equivalent to planting 200,000 trees.

The wind turbines will be installed during the second half of 2021 in an area of forest. They will have a 115-meter hub height tower, meeting the maximum height permitted even with the turbine's large rotor size. The SG 5.8-170 is ideally suited to optimize energy production from the low to medium high wind speeds found on site.

By Wärtsilä

How energy storage technologies will deliver the resilient High-renewables grid that Africa needs



Impression - Hybrid power plant solution showing tradition plant, solar and storage

Today's energy landscape is changing. There is a global energy transition underway in which renewable energy sources, led by wind and solar power, will ultimately replace legacy thermal generation. Falling supply costs, coupled with technology innovations in energy storage, software, and automation, are facilitating this change.

The International Energy Agency (IEA) estimates that by 2040, total global generation capacity will increase by 60 percent, and renewable energy sources will make up more than 45 percent of that total. Thanks to its considerable solar resources, Africa is well positioned to follow, and even beat this trend. But as the world moves toward a long-term future that utilizes 100 percent renewable energy, African utilities, independent power producers (IPPs) and other energy providers must act to harness its potential.

Underpinning the energy transition is the falling cost of renewable energy, with prices for new energy projects often less than the cost of conventional thermal generation. One thing is certain, renewable energy prices will continue to drop and unsubsidized renewables and storage will continue to expand worldwide, offering unprecedented opportunities for those able to take advantage of it.

As renewable energy drops in price, it can become the new low-cost baseload for Africa's grids. While cheap renewables create tremendous economic and environmental benefits, they also create integration challenges for grid operators. Due to the intermittent output of solar and wind generation, grid operators must deal with power reliability challenges different from those faced in the past. These challenges are distinct in different parts of the world based on each local grid's resource mix. While renewables create integration challenges, new technologies have emerged to solve these challenges. Today, the grid in most African countries is balanced primarily with thermal and hydro power generation. These power plants provide both energy and ancillary services to keep supply and demand on the grid balanced.

Increasingly, battery energy storage is used to integrate more renewable power and improve grid flexibility. In some cases, energy storage is co-located as a "hybrid" with another energy generation installation, such as a thermal generation plant, to increase the flexibility and performance of the thermal plant. The challenge for operators is that energy storage and hybrid plants have vastly different operational trade-offs from traditional solutions. The optimal energy generation resource mix has changed, and new tools are needed to deliver optimal performance. In particular, energy management systems (EMS) have evolved to solve the energy optimization problems found in different grids.

Electricity grids face diverse challenges

Electricity grids operate differently across the globe. In a small island grid or other in isolated areas, the supply of electricity may consist of a small number of thermal generators operated manually. In large developed grids, operators use sophisticated software platforms which use economic dispatch logic to determine which generators run. In open electricity markets, different energy products are sold and purchased based on offers and bids. Due to different trading strategies and physical power system limitations, sometimes generation costs are not always reflected in energy prices.

Grids also vary in their progress in the transition from traditional to renewable generation. Whereas grid operators of traditional grids must maximize the efficiency of their thermal generation fleet to minimize costs, grid operators of high renewable grids minimize costs by maximizing renewable energy output. Renewables as baseload create a new set of requirements for grid reliability.

With traditional thermal generation conditions, grid operators must minimize cost with efficient generation while meeting peak demand with sufficient generation capacity. With High renewable penetration**,** grid operators must minimize cost by integrating renewables with load following resources.

All graphics courtesy of Wärtsilä

20 MW energy storage solution with NextEra in Illinois, USA

Finally, grids have different resource mixes across both traditional and renewable resources. Renewables create challenges of intermittency and predictability, and the specific challenge depends on local renewable resource profiles. Here is a look at three different grids transitioning to high renewables penetration and their respective energy resource challenges.

For example, the net peak electricity demand can occur after sunset, when solar power is no longer available, creating a timing imbalance between peak demand and renewable energy production over the course of a day. Energy storage in this scenario is most valuable for ramp rate control and load shifting to address the evening increase in demand. In small island grids or isolated mini-grids renewable energy is even more difficult to integrate because there are no neighboring grids with which to exchange energy.

Regardless of the local market conditions, the energy generation mix can be optimized. In each case, optimization requires consideration for the unique characteristics of the local market energy mix.
For Africa to succeed in its transition towards renewables, there is a growing need to optimize the changing mix of generation assets and ensure grid reliability. The optimal generation mix in each case will be different. The unifying theme is optimization of the energy resources available. Greensmith's GEMS Energy Management system has been built to solve this challenge.

Energy resource optimization

GEMS is a software platform that can optimize energy generated from multiple sources, regardless of grid size, energy market construct, or energy generation mix. The focus is on the optimization of energy storage and hybrid resources. Resources controlled by GEMS may be part of a larger grid, or GEMS may control the entire gird as in the case of a microgrid. GEMS can maximize revenue for a single energy resource, or for objectives across a portfolio of energy resources.

Energy optimization requires a deep understanding of energy resource tradeoffs and constraints, especially those of dispatchable resources. Among dispatchable energy resources, battery energy storage presents a uniquely complex set of tradeoffs. With storage, both power capacity and energy capacity are limited, and for the leading battery technologies, energy capacity degrades over time with use. At this same time, energy storage resources offer unique benefits, including fast-ramping capabilities and accurate power output. The constraints of storage can be mitigated, and benefits enhanced when we pair energy storage with other generation resources in a hybrid configuration.

The tradeoffs of battery energy storage operation are not always well understood by existing power producers. Only in the past 5 years has battery energy storage become cost-effective enough to justify commercial investment. In the future, battery energy storage will be a critical resource to integrate renewables.

Optimization example: Graciosa island microgrid

Greensmith is delivering GEMS as a control system to an island microgrid on the island of Graciosa in the Azores. The island has a peak demand of 2.2 MW. The challenge is that the island is a small grid and the renewables output fluctuates quickly, making grid stability a challenge. In this island microgrid, GEMS must accomplish two things simultaneously: 1) maintain grid stability, and 2) integrate as much renewable energy onto the grid as possible by optimizing the usage of renewables, energy storage, and the existing thermal power plant. Prior to the deployment of GEMS, the island was run 100 percent on diesel engines. With GEMS, the island is targeted to run with 65 percent renewable energy from wind and solar.

Energy optimized

Wärtsilä's mission is to deliver integrated energy solutions that build a resilient, intelligent and flexible energy infrastructure – unlocking the way to an optimized renewable future. We use GEMS to integrate multiple-generation assets (thermal, renewables, and storage) to fully harness renewable energy as reliable baseload, the new everyday energy.

With recent cost declines of renewables and energy storage, the optimal operation of many electricity grids has changed. Without deep understanding of these energy resources, grid operation will be suboptimal and unnecessarily costly to consumers, investors, and the environment. GEMS is best suited to solve these new optimization problems. It is the future of energy storage as a competitive market resource and the enabler of a high-renewables future. AEA

Hybrid energy solution on the island of Graciosa in the Northern Azores region of Portugal

Renewables Accounted for Almost Three Quarters of New Capacity in 2019

The renewable energy sector added 176 gigawatts (GW) of generating capacity globally in 2019, marginally lower than the (revised) 179 GW added in 2018. However, new renewable power accounted for 72 percent of all power expansion last year, according to new data released by the International Renewable Energy Agency (IRENA).

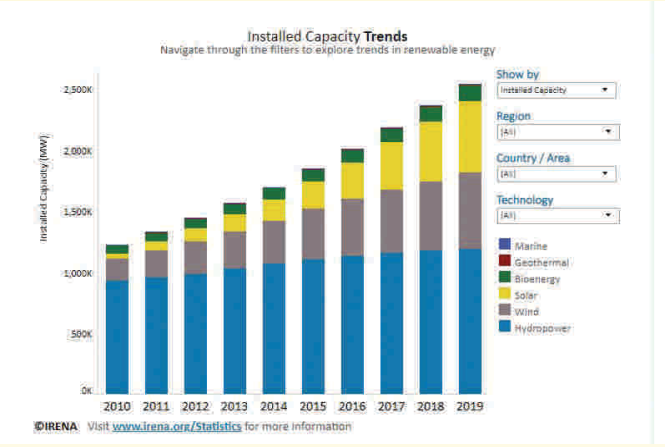
IRENA's annual Renewable Capacity Statistics 2020 shows that renewables expanded by 7.6 percent last year with Asia dominating growth and accounting for 54 percent of total additions. While expansion of renewables slowed last year, total renewable power growth outpaced fossil fuel growth by a factor of 2.6, continuing the dominance of renewables in power expansion first established in 2012. Solar and wind contributed 90 percent of total renewable capacity added in 2019.

"Renewable energy is a cost-effective source of new power that insulates power markets and consumers from volatility, supports economic stability and stimulates sustainable growth," said IRENA Director-General Francesco La Camera. "With renewable additions providing the majority of new capacity last year, it is clear that many countries and regions recognize the degree to which the energy transition can deliver positive outcomes."

"While the trajectory is positive, more is required to put global energy on a path with sustainable development and climate mitigation – both of which offer significant economic benefits," continued Mr. La Camera. "At this challenging time, we are reminded of the importance of building resilience into our economies. In what must be the decade of action, enabling policies are needed to increase investments and accelerate renewables adoption."

Renewables accounted for at least 70 percent of total capacity expansion in almost all regions in 2019, other than in Africa and the Middle East, where they represented 52 percent and 26 percent of net additions respectively. The additions took the renewable share of all global power capacity to 34.7 percent, up from 33.3 percent at the end of 2018. Non-renewable capacity expansion globally followed long-term trends in 2019, with net growth in Asia, the Middle East and Africa, and net decommissioning in Europe and North America.

Solar added 98 GW in 2019, 60 percent of which was in Asia. Wind energy expanded by close to 60 GW led by growth in China (26 GW) and the United States (9 GW). The two technologies now generate 623 GW and 586 GW respectively – close to half of global renewable capacity. Hydropower, bioenergy, geothermal and marine energy



Source: IRENA

displayed modest year on year expansion of 12 GW, 6 GW, 700 MW and 500 MW respectively.

Asia was responsible for over half of new installations despite expanding at a slightly slower pace than in 2018. Growth in Europe and North America increased year on year. Africa added 2 GW of renewable capacity in 2019, half of the 4 GW it installed in 2018. AEA

Highlights by Technology

Hydropower: Growth was unusually low in 2019, possibly because some large projects missed their expected completion dates. China and Brazil accounted for most of the expansion, each adding more than 4 GW.

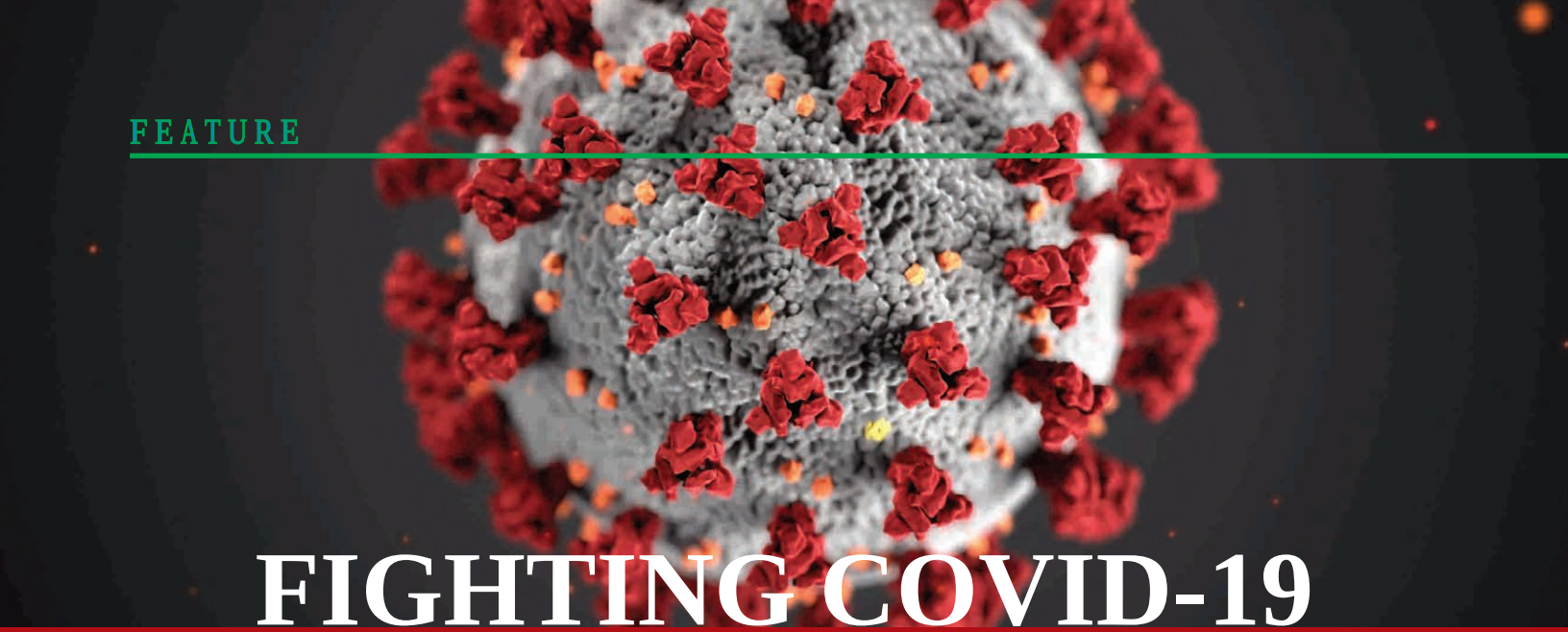
Wind energy: Wind performed particularly well in 2019, expanding by nearly 60 GW. China and the United States continued to dominate with increases of 26 GW and 9 GW respectively.

Solar energy: Asia continued to dominate global solar capacity expansion with a 56 GW increase, but this was lower than in 2018. Other major increases were in the United States, Australia, Spain, Ukraine and Germany.

Bioenergy: Expansion of bioenergy capacity remained modest in 2019. China accounted for half of all new capacity (+3.3 GW). Germany, Italy, Japan and Turkey also saw expansion.

Geothermal energy: Geothermal power capacity grew by 682 MW in 2019, slightly more than in 2018. Again, Turkey led with an expansion of 232 MW, followed by Indonesia (+185 MW) and Kenya (+160 MW).

Off-grid electricity: Off-grid capacity grew by 160 MW (+2%) to reach 8.6 GW in 2019. In 2019, off-grid solar PV increased by 112 MW and hydropower grew by 31 MW, compared to growth of only 17 MW for bioenergy.



FIGHTING COVID-19

A number of organizations are stepping forward to help fight the unseen beast spreading across the globe and devastating lives and economies

According to the World Health Organization (WHO), as of April 7 the number of confirmed COVID-19 cases in Africa has risen to more than 10,000 and caused more than 500 deaths. This number was likely much higher due to a lack of testing and preparedness as we are learning from other parts of the world. And because of the density of populations in major cities across the continent such as Cairo, Lagos, Nairobi and others, we can expect to see exponential growth in the coming months.

Private sector firms, organizations, and government entities are stepping up across the continent to assist efforts in treating COVID-19 patients, eradicating the spread of the virus, and making life more bearable while social distancing and stay at home orders are in place. These efforts are significant, and we cannot cover all of the programs and activities, but here we take a look at some efforts that we think will have a tangible impact.

Azuri Technologies

Kenyan schools have been shut down as a measure to contain the spread of the Corona Virus. With more than 15 million primary and secondary students at home, the Ministry of Education announced it would broadcast lessons up to eight hours daily through dedicated radio and television channels.

Azuri Technologies is helping off-grid children across Kenya to continue education while their schools remain closed. Azuri solar-powered satellite TV is helping rural children across the country to access the new education channels and ensures they are equally benefiting from the national initiative just as their fellow students in urban areas, where they are grid connected.

Thanks to off-grid systems like AzuriTV, rural households can access Edu TV Channel 029 featuring daily lessons including English, Kiswahili, Maths and Science, along with hygiene and nutrition lessons being broadcast to help inform students and families on best practices to help defeat the spread of Corona Virus.

Source: Azuri Technologies

"Azuri is committed to supporting off-grid households through this challenging time and we want to do all we can to ensure that children in rural Kenya are not left behind in terms of learning progress due to the crisis facing the nation and the world," said Azuri CEO Simon Bransfield-Garth.

Azuri-powered off-grid households can also access learning via Radio Taifa, with lessons broadcast throughout the day, Monday to Friday. "The children miss their friends and being at school, but thank goodness they can continue with their education from home. Thankfully we have Azuri solar TV and they can watch and learn the same as if they were at school," said Hellen Awour, mother of four from Ngunya, Siaya, Kenya.

Rose Adeny, from Kolwenge, Siaya in Kenya, who has three school children at home added: "Because we have Azuri solar at home, we are able to listen and stay up to date with the news and government information being shared, but just as important, the children can continue their studies and not be left behind."

WAPSCON19

According to the World Economic Forum, companies active across West Africa are sharing information and coordinating their responses through the West Africa Private Sector Coronavirus Platform (WAPSCON19) which is focusing on the livelihoods and health of the wider community as well as keeping employees healthy and safe and businesses running. The leading steel and mining company Arcelor Mittal, is convening private sector players, including Sierra Rutile in Sierra Leone, to play an active role in supporting the region.

The structure of WAPSCON19 allows each country to contribute and key members in Liberia and Ghana have already volunteered to chair discussions. One senior private sector executive per country will lead the work nationally, and host calls and initiate cooperation with other businesses operating in the same country. The exercise aims to create local capacity to respond to the threat of COVID-19, under the umbrella of "country hubs".

Afrika Umoja & Africa Oil & Power

Afrika Umoja, an initiative initiated by Cape Town temporary architecture specialists HOTT3D, with pan-African energy event organizer Africa Oil & Power (AOP), is tackling the COVID-19 threat in its home city and across Africa. Afrika Umoja will aim to build temporary hospitals, clinics and homeless shelters to combat the Corona Virus, in partnership with government, the private sector and local entrepreneurs.

The venture applies HOTT3D's design, construction and project management expertise to building medical facilities within days, in potentially any location across Africa. AOP is supporting Afrika Umoja through marketing, communications and outreach to its network of partners.

"Afrika Umoja is in discussions with provincial authorities and is ready to build at short notice in South Africa and internationally. Afrika Umoja invites provincial and national governments and firms interested in building or funding temporary medical buildings and shelters to contact the team via Twitter via @AfricaOilPower or email. The organization is also keen to welcome more vendors and suppliers to join the project, whether they are based in Cape Town or further afield," a statement read.

African Development Bank

The African Development Bank (AfDB) has raised an exceptional $3 billion in a three-year bond to help alleviate the economic and social impact the Covid-19 pandemic will have on livelihoods and Africa's economies. The Fight COVID-19 Social bond, with a three-year maturity, garnered interest from central banks and official institutions, bank treasuries, and asset managers including Socially Responsible Investors, with bids exceeding $4.6 billion. This is the largest dollar denominated Social Bond ever launched in international capital markets to date, and the largest US Dollar benchmark ever issued by the Bank. It will pay an interest rate of 0.75%.

The African Development Bank Group is moving to provide flexible responses aimed at lessening the severe economic and social impact of this pandemic on its regional member countries and Africa's private sector.

"These are critical times for Africa as it addresses the challenges resulting from the Coronavirus. The African Development Bank is taking bold measures to support African countries. This $3 billion Covid-19 bond issuance is the first part of our comprehensive response that will soon be announced. This is indeed the largest dollar social bond transaction to date in capital markets. We are here for Africa, and we will provide significant rapid support for countries," said

"The African Development Bank raised an exceptional $3 billion in a three-year bond to help alleviate the economic and social impact the Covid-19 pandemic will have on livelihoods and Africa's economies… This is the largest dollar denominated Social Bond ever launched in international capital markets to date, and the largest US Dollar benchmark ever issued by the Bank."

Dr. Akinwumi Adesina, President of the African Development Bank Group. Fight COVID-19 was allocated to central banks and official institutions (53%), bank treasuries (27%) and asset managers (20%). Final bond distribution statistics were as follows: Europe (37%), Americas (36%), Asia (17%) Africa (8%,) and Middle East (1%).

Organization for Migration

Children and youth whose family's income is insecure, and those who are separated from their families and live in informal settlements and camps, are at heightened risk during the pandemic. They often have limited access to basic health care, health information and water, hygiene and sanitation facilities. As such, 20 portable hand washing facilities are now accessible for homeless persons in seven locations in the Sudanese capital as part of the International Organization for Migration's (IOM) emergency response to COVID-19.

The initiative developed in close coordination with Sudan's Khartoum State Ministries of Social Development and of Health responds to the community's urgent needs for safe drinking water and adequate sanitation. Access to safe water and sanitation (WASH) in Sudan is chronically underdeveloped and further exacerbated in areas affected by conflict. Five of the hand washing facilities were placed in quarantine centers, where 169 migrants returning from the Libyan border are being quarantined.

This initiative paves the way to a COVID-19 awareness campaign targeting homeless children and youth in Khartoum implemented by the Khartoum State Ministry of Social Development in cooperation with the Ministry of Labour and Social Development, Patient Care Fund Organization, Youth without Borders, the Sudanese Association of Iraqi Institutes and University Alumni, and IOM.

National Oil Corp.

The Sustainable Development Department of Libya's National Oil Corporation (NOC) is distributing essential medical equipment such as masks, ventilators, protective coveralls and other medical items to its subsidiaries across the country, as part of the corporation's ongoing efforts to help fight the spread of the Corona Virus. This is part of NOC's Good Neighbor initiative to contribute to various communities adjacent to the operations of NOC and its subsidiaries.

Mr Mokhtar Abdedayem, manager of NOC's Sustainable Development Department, said: "We are working hard to provide more essential medical equipment such as masks, ventilators, protective coveralls and

Source: NOC

Distributing supplies in the south of Libya

other medical items. We have already sent the first convoy to the south; and municipalities will start the distribution very soon. The feedback I have had from medical experts and doctors has been very positive, saying that these are the right types of materials for the emergency."

US Agency for International Development

Also focused on education during the pandemic is the US Agency for International Development (USAID which is investing in education programming that prepares countries to adopt flexible and resilient learning systems.

Moroccan education professionals, previously benefitting from USAID-funded projects including Advancing Learning and Employability for a Better Future (ALEF), 2004-2009, and Improving Training for Quality Advancement in National Education (ITQANE), 2009-2014, trained national education experts on innovative, quality learning tools, and are now able to utilize this knowledge during a crisis.

While the country's school buildings are closed, one million students have already accessed the Ministry of Education's online learning platform and lessons broadcast nationally on TV, opening the door to continued learning for millions more of Moroccan youth. These lessons were developed previously with help from USAID.

These professionals were later prepared to respond to the country's urgent call to embark on a large-scale production of online courses once the Corona Virus disrupted Morocco's education system. Both projects collaborated with the National Center for Pedagogic Innovation and Experimentation (CNIPE) at the Ministry of National Education (MOE) to design digital learning courses, create an online learning platform at *Collab.ma*, and adapt the national curriculum content to multimedia education.

The expertise that the Ministry acquired in the field of distance education has prepared them to work around the clock and quickly produce content that is being broadcast through the national education portal: *http://tice.men.gov.ma/* and the national TV channel 4.

USAID has seen similar results from the e-learning activity under the ITQANE program. The virtual courses that were developed through on-site training sessions and web-based team interactions were all integrated into the learning portal *Collab.ma*, which has been developed by the Ministry to become what is now its distance education system platform. By the end of the ITQANE program, 26 MOE distance learning education experts were empowered to lead the design of future e-learning products in Morocco.

These experts and thousands more of the beneficiaries of USAID-funded e-learning training activities have been working hard to produce e-courses in record time, making Morocco a leader in the region by shifting quickly to online learning in response to the COVID-19 pandemic.

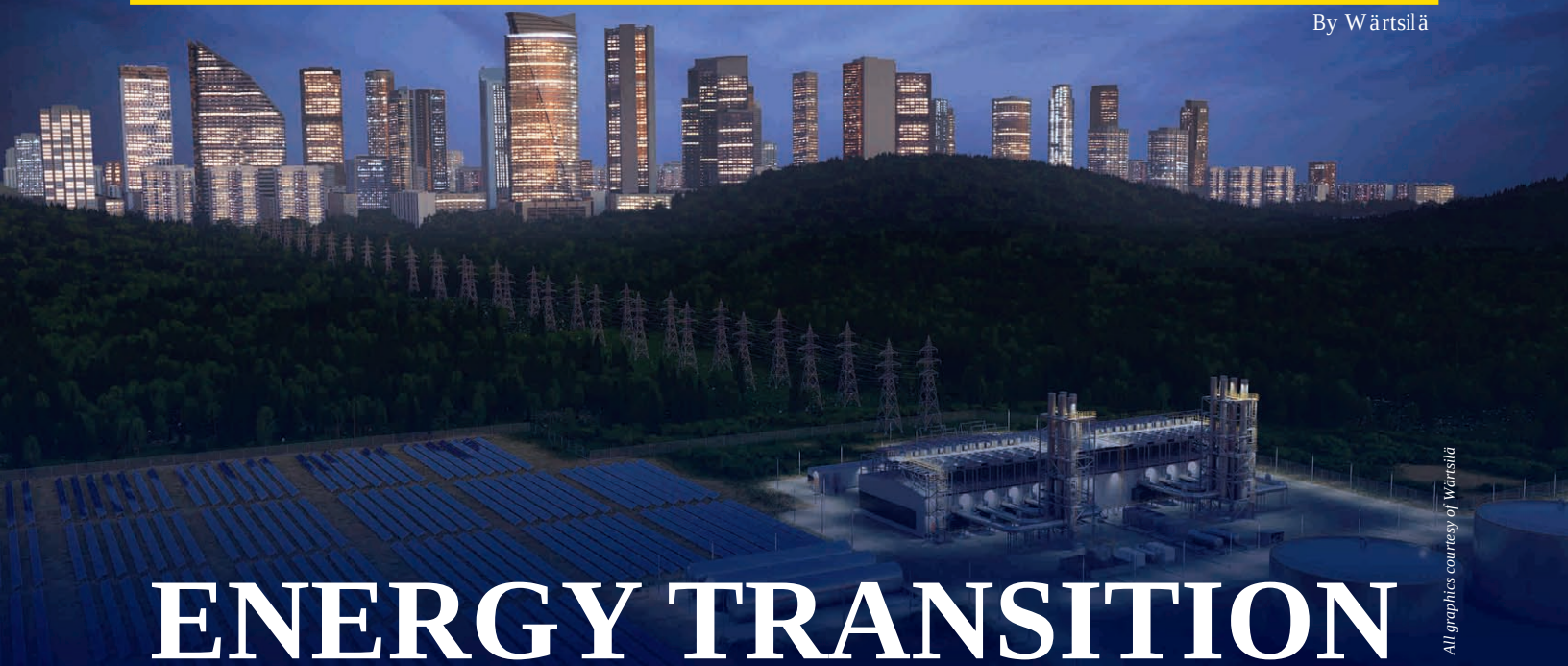
USAID continues investing in e-learning and is working hand-in-hand with MOE towards building their self-reliance in digital learning by developing an online program for teachers' professional development under its current Reading for Success National Program for Reading (2017-2022). E-learning is also one of the main priorities in the new USAID-funded Higher Education Partnership for Morocco (HEP-M), 2019-2024 activity, which plans to develop blended learning solutions for teacher training.

Future Outlook

With Africa only beginning to see the spread of the Corona Virus, a range of assistance will be needed going forward. Needs will include personal protection equipment, testing units, hospital capacity for the critically ill, food for those unable to earn an income, technical assistance in monitoring and tracking, and additional auxiliary support services. Already a number of companies and organizations are looking to provide mobile treatment centers.

In the next issue of the magazine we will look at the most recent developments in combatting the disease as well as a round up on the spread throughout the continent. In the meantime, day-to-day updates can be found on *www.AE-Africa.com*. If your organization has a program providing assistance in the battle against the Corona Virus in the continent, please let us know about your efforts by writing *info@AE-Africa.com*. AEA

By Wärtsilä



All graphics courtesy of Wärtsilä

ENERGY TRANSITION IN WEST AFRICA

West African nations are looking to electrify their rural populations and are moving toward more sustainable energy sources, resulting in an increase of renewable energy projects being implemented to diversify the energy mix.

Enabling energy for all in Ivory Coast

Ivory Coast aims to achieve universal energy access by 2025 and triple its generation capacity by 2030. Find out how its public-private energy model can help the country achieve its ambitious energy targets.

Ivory Coast is on an economic roll: since 2011, GDP growth has averaged 8% per year making it not just one of the most dynamic countries in sub-Saharan Africa, but the world. With the economy and energy demand booming, the Ivorian government has put the energy sector at the top of its agenda.

This is critical because, despite a thriving economy, the spoils of growth have not been equally shared. Three in five Ivorians have access to energy, but there is a vast discrepancy between urban dwellers (80%) and rural citizens (37%), with the rural north even less connected than their southern compatriots.

With almost half of the country below the poverty line, the high upfront connection costs to the national grid remain prohibitive for many. That's not all. For those connected, the grid – which transmits through a 5,000 km network of high-voltage power – contains outdated systems that has led to energy losses of around 22%.

Ambitious plans for the future

So how does the government plan to remedy these issues and improve the sector? Through public-private partnerships. As the first country in sub-Saharan Africa to open up its energy sector to IPPs, it's no surprise that currently 55% of its production comes from three private companies: Ciprel (556 MW), Azito Energie (440 MW) and Aggreko (210 MW).

In October 2019, the Minister for Energy, Abdourahamné Cissé, told the Ivorian parliament about the success of the PEPT (*Programme Électricité Pour Tous*) project, which would achieve electrification rates of 80% by the end of 2020 and 100% by the end of 2025. The program, which is a partnership with the public-private Ivory Coast Electricity Company (CIE), aims to electrify all villages and towns with more than 500 inhabitants through a combination of off-grid and on-grid projects. For example, CIE has introduced tariffs as low as 1,000 CFA (EUR 1.5) so the least well-off can access the grid, while off-grid villages are benefiting from solar home kits and mini-grids, further enhancing the reach of electricity supply.

The government also aims to triple power production to 6,600 MW by 2030, mostly by using IPPs. For instance, Azito recently received funds to increase one of its plants from 253 MW to 700 MW, while a deal to build a 390 MW plant named Atinkou (or Ciprel 5) was signed in

December 2018 with Ciprel. The use of IPPs shows no sign of slowing down, as when signing the deal, Cissé announced the "State's ambition to strengthen the country's electricity production capacity through new units operated by experienced private partners."

Leveraging the public-private model

Ivory Coast's engagement with private energy companies is not unique to the region. In fact, public-private partnerships are common across West Africa as they are equally popular with governments and private companies. According to Cyndo Obre, Project Development Manager at Wärtsilä Energy Business, "governments prefer such partnerships as you have a private company installing a plant and investing instead of you. Private sector intervention reduces and optimizes the use of the state's financial resources, which can then be used for other equally important uses such as health or education."

"Private companies like it for the same reason. Some projects are not financeable in the private sector as the risk is too strong or the return isn't high enough for the risk taken. In the public-private partnership model, they can share the risk."

While the Ivorian government has shown a preference for using the same private companies to expand their thermal and hydroelectric production, it also wants to increase its share of other renewables excluding hydro-power, such as biomass and solar, to 16% by 2030.

"Their ideal situation in 2030 is hydro-power, solar, biomass and flexible thermal," says Obre. "For that, the government needs the flexibility that Wärtsilä's engines provide as well as our storage capacity." Acknowledging that Ivory Coast's "biggest challenge is changing the energy mix," Obre states that "until now they have known only turbines and hydro, but the growth of renewable energy such as solar will require more flexible capacity to complement the hydro in balancing the intermittency of renewables and providing grid services. Load following, fast start reserve and frequency regulation will be needed to maintain a stable grid. The turbines don't have that flexibility, but Wärtsilä's technology does."

With the 2030 Energy Plan identifying 66 projects that will require private investment, the door is open for new private partners to stake their claim.

Energy in Senegal: West Africa's leading light

Senegal is taking steps to move away from heavy fuel oil and coal towards solar and wind while at the same time expand its energy capabilities. Read on to find out how this West African country is focusing on renewables to diversify its energy mix, boost capacity and achieve universal energy access by 2025.

Geographically, Senegal is the westernmost country of mainland Africa, pointing out towards the Atlantic. In terms of energy, Senegal is also pointing the way for its neighbors, setting an ambitious target of universal access by 2025.

Over 60% of the Senegalese population has access to electricity – one of the highest electricity access rates in West Africa. Nearly all urban dwellers have energy access, but rural electrification lags behind, and there are still 1.1 million homes nationwide without power.

In pursuit of its goal of universal access, the Senegalese government has set its sights on a modern, reliable and diversified grid: by 2030, it intends to boost its generation capacity to 2.5GW, with a greater predominance of natural gas and at least 30% renewables.

Ousseynou Ndiaye, Wärtsilä General Manager, Regional Operations, West Africa says Senegal has the right mix of factors to achieve this pioneering goal.

"Senegal has a major advantage [over neighboring countries] thanks to a regulatory framework that favours an energy mix and the quasi-liberalization of production with the entry of independent producers," Ndiaye says.

Betting on renewables

According to data from the World Bank, last year, almost 80% of Senegal's 940 MW grid capacity was made up of heavy fuel oil (67%) and coal (12%), with solar (12%) and imported hydropower (9%) accounting for the rest. In pursuit of its goal of 30% renewables by 2030, Senegal is investing in solar to take advantage of the country's abundant sunlight. In 2015, solar accounted for just 0.4% of Senegal's energy mix, but with the construction of five solar plants with a total capacity of 120 MW in 2016-2017, this number rose to 12% in 2018. With two further 30 MW capacity solar plants in the planning stages, this trend is set to continue.

Senegal also will soon be harnessing wind speeds of more than 6 m/s when West Africa's largest wind farm opens next year. Developed by Dutch renewable company Lekela Power, the 46-pylon farm at Taiba N'Diaye is set to produce 158.7 MW as of next year, providing energy to more than two million people and accounting for 15% of Senegal's energy mix.

Meanwhile, projects are underway on the Gambia and Senegal Rivers to increase the share of hydropower in energy production from 81 MW in 2017 to 256 MW in 2020.

Cutting costs and boosting electrification

Recent oil and gas discoveries off the Senegalese coast – estimated by the government at 530 million barrels and 20 trillion cubic feet (Tcf) respectively – will not only enable Senegal to phase out coal and develop more renewables, but also will vastly reduce Senegal's energy costs as the country will no longer need to import expensive HFO. Senelec – Senegal's state-owned utility, which owns around 50% of Senegal's generation capacity and also buys production from independent power producers (IPPs) – can use these savings to keep energy prices low and stable for consumers.

Marie-Andrée Truchi, Wärtsilä Regional Director, West Africa and also in charge of solution sales for Senegal says that Senegal is a "leading light" in West Africa for its stability and sound energy planning. The country has "very favorable sites for energy production and, as a stable country, there is less risk for foreign investors," she says.

Senegal was one of the first sub-Saharan countries to open up power production to the private sector in the 1990s. Since then, a raft of favorable regulatory policies – such as regional concessions and license programs – have incentivized private energy production, especially in rural areas. Private companies are building solar micro-grids, and off-grid solar energy providers, such as Oolu Solar, are providing reliable and affordable solar home systems directly to remote households.

"The decentralization of energy through mini-grids is becoming a reality with the help of renewables,'' says Ndiaye.

Senegal leads by example

Wärtsilä has been operational in Senegal since 1996 and according to Ndiaye, "around 40% of the national energy production is supplied through Wärtsilä plants." From managing and operating plants for Senelec to providing equipment and services to private manufacturers, Wärtsilä's intelligent solutions, such as the 130 MW Flexicycle plant in Mbour, help improve efficiency in the production, distribution and integration of Senegal's energy sources.

Furthermore, Senegal has put energy production and universal energy access at the heart of its flagship development program – the Plan for an Emerging Senegal (PES) – which establishes a straightforward vision, specific targets and a coherent strategy.

From increasing generation capacity to creating a range of new job opportunities, Senegal's focus on renewables is starting to pay dividends. Most predictions say that the country will hit its goal of 30% renewables before the target deadline. Achieving universal access, particularly in rural areas, is more challenging, but Senegal is trying different methods to boost the numbers while still focusing on renewables, including rural concessions and license programmes, the roll-out of off-grid solar and cutting costs for grid-supplied energy.

Massaer Cisse, Lekela's General Manager for Senegal, says: "Other countries can learn from Senegal by replicating the government's commitment and vision of how it wants the market to develop. More widely, governments should look to mirror successful renewable projects across Africa with pride. While each country has its own framework, if the technology has been tried and tested elsewhere, we see no reason why that cannot be used as a blueprint."

How renewables are electrifying Nigeria's future

Nigeria currently produces only a fraction of the electricity its growing population needs. How can renewables be part of the calculation?

Nigeria is the sixth-largest oil producing nation in the world, but it also has abundant renewable energy resources in the form of wind, hydro, and tidal power. Nevertheless, the country has serious energy deficiencies which are likely to increase as the population grows.

Although data from the Energy Information Administration shows that Nigeria has improved its energy generation in recent years, the country still lags behind peer economies such as Brazil, India, and South Africa in meeting current energy needs, much less building for future growth.

"Nigeria is a country waiting to happen," says **Udemgba Samuel Onuoha**, business hub manager at Ibadan Electricity Distribution Company, the main electricity provider in Ibadan, Nigeria's third-largest city. "Only by meeting the energy needs of the people can the economic and developmental needs of the country be fulfilled."

Nigeria currently has the capability within existing power plants to generate 12,522 MW of electricity daily, but most days is only able to generate around 4,000 MW due to a variety of factors, including an inefficient transmission network, weak government policy, and inadequate energy reforms.

Investing in renewables

In Onuoha's opinion, it is critical that Nigeria taps into its high potential for renewable energy generation to satisfy the country's needs.

"In Nigeria, petroleum accounts for 80% of the energy supply, with one of the lowest per-capita energy consumption rates in the world and a fast-growing population," Onuoha says.

Wale Yusuff, Managing Director of Wärtsilä Nigeria, shares this perspective with Onuoha. "Nigeria will only achieve its target of generating 11,000 MW daily by 2023 if the government invests in renewable energy," Yusuff says.

According to Yusuff, a 30% share of renewable energy as well as a sizable share of thermal base power as envisioned in the Nigeria

Electrification Roadmap is a robust and appropriate mix for the country at this point.

He emphasizes that Nigeria has abundant natural gas resources that have yet to be fully tapped and suggests the development of a large fleet of medium-size gas-to-power plants as a way forward.

Ultimately, Yusuff says, "the solution is to use utility-scale solar power plants integrated with engine power plants and energy storage."

Cooperation to find solutions

Onuoha says that the challenge of developing Nigeria's vast, untapped energy sources requires both public and private action. He says the government is responsible for creating a business-friendly environment through polices and laws to attract investors to the sector while also partnering with such investors, if need be, to set up targeted energy development projects.

The size of the gap between energy production and demand is a critical indicator of the vast potential and money that can be made from this sector.

The failure of the country to adequately tackle its energy challenges has led to a thriving black market in energy generation. Nigeria is the world's largest black market for electric generators with over one hundred million generators in private hands. Many Nigerians pay for fuel to run private generators as well as high electric bills to local utility companies.

In addition to encouraging capital flight, the purchase of these generators also promotes the use of crude oil at a time when the country should be developing its renewable sector. But the government will have to act to make renewables a part of filling that gap. In addition to creating a favorable regulatory environment, the government should as a matter of policy also substantially build up its local technical capacity from its international partnerships with likeminded business organizations.

Wärtsilä offers a way forward, according to Yusuff. He notes the proposals made in a recent white paper showing the way towards a 100% renewable future. The paper emphasizes the importance of incorporating a credible renewable base load strategy in order to eventually reach a fully green energy mix.

Yusuff pointed out that any serious, long-term energy strategy must embrace a number of key trends, including the rapidly increasing penetration of renewables, decentralizing energy generation, increasing the role of flexible power plants that incorporate gas and emerging storage technology, along with the latest in data and digitization.

If Nigeria can manage to create an economically viable and thriving renewable industry, the investment will benefit more than just the energy sector. The availability of reliable electricity has the potential to transform the country's economy and improve the lives of millions by encouraging entrepreneurship and small business growth. These new businesses will produce revenue that the government in turn can invest back into maintaining and upgrading the energy infrastructure.

Cameroon eyes renewable energy as it scales up its economy

All eyes are on Cameroon as the country races to industrialize and improve its economy by 2035. However, strengthening its energy grid will be key to achieving this goal.

On a blistering afternoon at the Yaounde central market, Vincent Tsimi, a middle-aged hawker, peddles assorted solar lamps and chargers. For the past three hours, he has been to every market corner hawking his wares.

Tsimi says his efforts have been significantly productive, as he has managed to sell six pieces of the solar-powered equipment. "I think it is a good day," he says, before offering up a short-lived smile. Sales have seen a steady rise over the last seven months, with most of his buyers coming from rural areas close to the capital city of Yaounde.

At first glance, one would think many are purchasing the solar lamps for decorative purposes. But that is simply not the case. These appliances are almost the only suitable alternative available to whole communities who do not have access to an electrical grid.

Prioritizing needs

Cameroon has a population of 24 million, but data from the World Bank shows that only about 61% had access to electricity in 2017. The number was even lower at 21% among the rural population.

The country's electricity power supply has over the years been erratic. Stakeholders have been fighting running battles with power outages caused by a shortage in water supply during the dry season, aged-old equipment and dilapidated transmission lines which often break down. Load-shedding in many urban and semi-urban areas is commonplace.

In a recent public address, Cameroonian President Paul Biya acknowledged that energy is at the core of any development process and has indicated he would accelerate efforts to provide access for all. "Without it, there can neither be industry nor processing of raw materials and hence, there can be no modern economy."

However, the fact remains that Cameroon is on the World Bank's list of heavily indebted poor countries. Many of its rural and semi-urban residents experience poverty daily and often perceive the cost of electricity as being exorbitant. For household consumption that does not exceed 110KWh, the lowest tariff for electricity is Franc CFA 50 (or EUR 0.076) for 1Kw. Due to this 'high' cost, low-income households are forced to prioritize spending on essentials, like food while electricity is seen as a luxury.

"Cameroon is a growing country. It has a very entrepreneurial people who are setting up businesses and driving the economy. More young people are entering the digital world and the potential for industrialization is rising**,"** explains **Christian Pisoh**, Manager – Sales Support at Wärtsilä Energy Business. "But for all this potential to be realized, the

country needs to improve access to energy, strengthen its existing transmission network, and invest in new sources of energy."

Are renewables the answer?

Experts say that strengthening the energy grid must be a top priority for the government, especially if it is to achieve its ambitious goal of making Cameroon an emerging economy by 2035. Here, they point to the development of renewable energy as a potential solution that could have a ripple effect on the economy.

"Cameroon is ready for renewables to take off. Many Cameroonians do not have access to any kind of power and renewables are good for the environment and also good for growth. It is good for the economy," says NJ Ayuk, CEO of the Centurion Law Group, a pan-African corporate law conglomerate focused on the energy and financial sector. "It (renewables) will also help Cameroon contribute its part towards the fight to stop global climate change. In a country where unemployment is a problem, this will create a lot of good jobs and also decrease air and water pollution. A lot of African countries have done this and succeeded," he adds.

The good news is that the government has set the development of renewable energy as a strategic priority in order to offset power outages which slow down production. It has committed to increasing the contribution of renewable energy to electricity supply from the current less than 1% to 25% by 2035. The distribution will be as follows: 1% for wind, 6% for solar photovoltaic, 7% for biomass and 11% for HEP energy.

A phased approach

Cameroon has the third-largest hydropower generation potential on the Africa continent at 20 GW and it accounts for the largest source of energy in the country. However, concerns over its reliability in the dry season has previously forced the government to rely on expensive fossil-fuel plants. That is changing as the government works to expand its renewable energy options.

That said, renewable energy in Cameroon is still less developed despite the enormous potentials, according to **Adolphe Njouke Tome**, Secretary-General of the Ministry of Water Resources and Energy. He says easing access to viable, affordable and reliable energy remains a major stake for the country.

One way in which the country could get a head start would be to develop its renewable potential in a phased approach. This would ensure that problems of intermittent supply associated with the use of renewables.

"Renewable energy has to deal with situations such as unseasonal weather, cloudy skies, a lack of wind etc. which can cause problems in supply, especially if you try to transition completely to renewable energy all at once" explains **Laetitia Toukam**, Business Development Manager at Wärtsilä Energy Business in Cameroon. "Our smart power plants, for example, help provide the flexibility to cover these gaps and facilitate the integration of renewables in a more efficient way."

Looking to the future

At the moment, Cameroon seems to mean business with its pledge. Plans are afoot to concretize the target with a renewable energy law which covers renewable electricity purchase tariffs and clarify the rules around the purchase of renewable electricity. It will also place a mandatory auction or tendering process.

However, the current political situation in the country has also caused many potential investors to hold back and see exactly how things go before they commit any capital.

"There are many projects in the pipeline and many stakeholders who are interested in investing here. But because there are so many uncertainties, they are being cautious," adds Toukam.

Basically, once all these tensions are relieved, and we get back to a state of normalcy, more investors are going to fly in and see the potential of the area and invest a lot," explains Pisoh. "IPPs and industries have been contacting us to carry out feasibility studies to set up new power plants and asking for advice on the best possible solution. There is definitely a lot of interest." AEA

Solar-driven water desalination system for Maasai village

The solar company Phaesun has installed a solar-powered system for water desalination and purification in the Tanzanian Maasai village of Ndedo.

Together with nine other European project partners, Phaesun is developing innovative desalination systems based on electrodialysis technology as part of the EU development and innovation project REvivED Water.

In February 2020, a pilot plant was installed at a saline well in the Tanzanian Maasai village of Ndedo and supplies the population with 2000 liters of drinking water per day.

Source: Phaesun

Phaesun Engineer Martini explains the desalination technology to the Maasai

The plants are complete systems in which the water is cleaned of dirt particles, bacteria and viruses in a preliminary stage and treated with self-generated chlorine in a post-treatment stage for sterile storage in a water tank. The core of the system is based on the membrane process of electrodialysis. In contrast to conventional desalination technologies (thermal or reverse osmosis), electrodialysis is particularly low-maintenance and is well suited for solar power supply due to its low energy consumption. Thus, a completely self-sufficient system could be developed, which does not require any additional infrastructure or power supply.

Source: Phaesun

Local technicians assist with the installation of the desalination system

Florian Martini, project engineer at Phaesun, carried out the installations in Tanzania. “It was wonderful to see how modern technology fits into the traditional way of life of the Maasai,” says Martini. “A great advantage is that, unlike other desalination technologies, no waste products are produced and no diesel is needed to operate the systems. The clean water is highly appreciated!”

The contact to the Maasai village came about through the Mission EineWelt of the Evangelical Lutheran Church in Bavaria. Eberhard Westhauser from Mission EineWelt has maintained close contacts with the Maasai people in the steppes of Tanzania since many years and supports water supply projects in this region. He reports: “When it rains enough, large catchment basins ensure a sufficient water supply for the Maasai and their herds of cattle until the dry season. However, the groundwater is salty and due to prolonged dry periods in recent years, the Maasai have had to resort more and more often to salty groundwater.”

Source: Westhauser

Maasai man with the solar system in Ndedo

The plant in Ndedo is the seventh system installed within the REvivED Water project. The previous pilot plants supply schools, temples and private households in East Africa and India with drinking water. With the plant in Ndedo, a water kiosk model is implemented for the first time. The village inhabitants pay for the water a small fee, so that a local watchman can be paid to operate the plant. Through this model, the plant is maintained on site in an exemplary manner and operation is ensured in the long term.

Phaesun tracks the performance of the plant by modem via a remote monitoring and control system and can change settings on the system, for example if the salinity of the groundwater fluctuates.

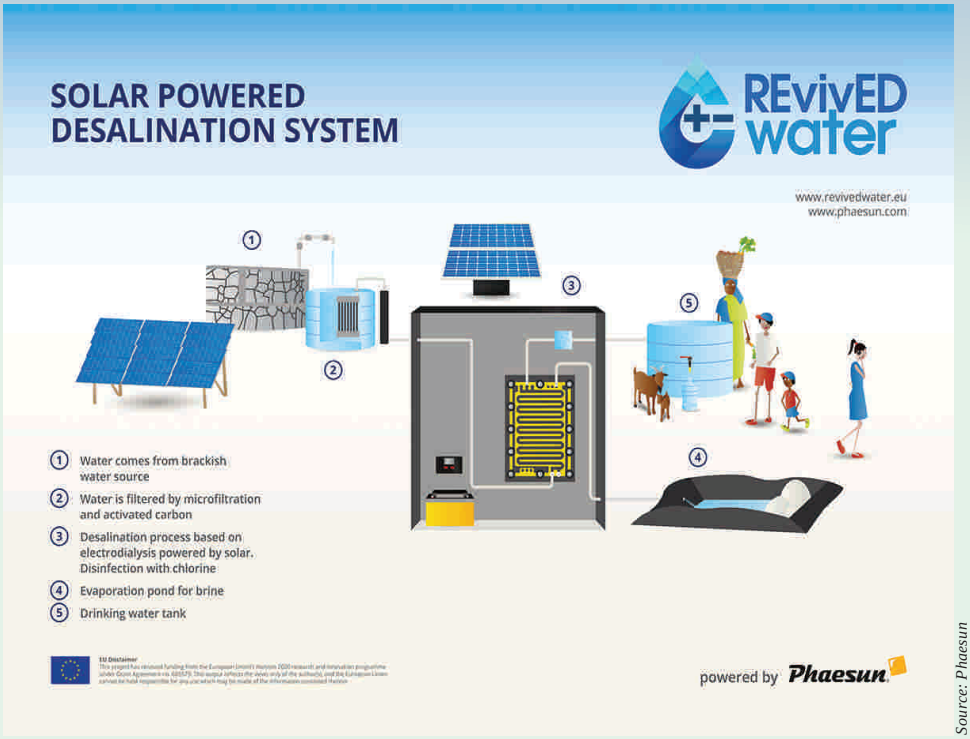
The REvivED Water project runs until May 2020, then Phaesun will offer the desalination system in its product portfolio.

About REvivED Water

REvivED water, a research and innovation project, funded under the EU's Horizon 2020 program in the field of 'low-energy solutions for drinking water', brings together 10 partners from six countries across Europe. This consortium will contribute to overcoming the drinking water challenge by establishing electrodialysis (ED) as the new standard for desalination of seawater and brackish water.RevivED water project started in May 2016 and has duration of four years. This project has received funding from the European Union's Horizon 2020 research and innovation program.

About Phaesun GmbH

Phaesun has been specializing in the sale, service and installation of off-grid photovoltaic and wind power systems since the foundation in 2001. Phaesun offers products of all reputable manufacturers of this trade. International project management, purposeful training courses for customers and technical support complete the range of services offered. Phaesun contributes to the sustainable electricity supply in the target regions of Europe, Africa, Latin America and the Middle East. AEA



Source: Phaesun

Revived water desalination system

Mubarak Goes Gently into History

Hosni Mubarak, former long-time president of Egypt, was laid to rest following a full military funeral with his family, including sons Gamal and Alaa, in attendance, along with the current ruler Abdel Fatah el-Sisi and top military officials.

Mubarak was 91 when he passed, having been released from prison just three years earlier and allowed to live out his final years with his family.

Hosni Mubarak

Despite the mixed legacy of his three-decade reign in Egypt, Mubarak was honored in a public funeral and praised as a war hero. A statement from the Egyptian presidency called Mubarak "one of the leaders and heroes," of the war against Israel. Egypt's military also released a statement lauding Mubarak's record during his time in the Egyptian air force.

Perhaps feeling nostalgic, many Egyptians are looking back at Mubarak's 30 years kindly as compared to the current rule of President el-Sisi. Aida Seif El-Dawla, of the Nadeem Center for Rehabilitation of Victims of Torture and Violence, described life under el-Sisi's rule as "revenge for having revolted against Mubarak."

Ethiopia Postpones Elections over Covid-19 Fears, Supposedly

The global Corona Virus outbreak has forced Ethiopia to postpone its much-anticipated national election that was scheduled to be held on August 29, according to the ruling party. "With the existing condition in the country, the Board said it had no choice but to suspend its current schedule and forward its resolution to the parliament," the statement from the National Electoral Board of Ethiopia read.

However, one opposition party, Oromo Federalist Congress, says Covid-19 is just an excuse to postpone as the Electoral Board was well behind schedule in organizing the polls. "The Board was already behind the schedule by weeks before the Corona Virus outbreak became an issue. There was no way they could have held the election as scheduled. The pandemic just gave them justifiable excuses," says Jawar Mohammed, the political firebrand turned candidate with the Oromo Federalist Congress.

Meanwhile, other oppositions parties support the decision. "It was expected and it is a decision that was justified considering the spread of Covid-19 and this was also our view to postpone," says Natnael Feleke, the spokesperson of Ethiopia Citizens for Social Justice, one of Ethiopia's leading opposition party.

This development is seen as a major setback for the country's democratic reforms after it allocated over $100 million and received support from international donors. The upcoming election was to be Ethiopia's first historic free and fair election. The last election in 2015 produced an overwhelming result that produced every single parliamentary seat in favor of the previous government. One of Ethiopia's autonomous regions, Tigray, had warned that postponing it will pose a danger to the federation, which now consists of nine autonomous states and two city administrations.

In order to combat the virus, the Ethiopian government has been taking measures to control the spread including banning mass gatherings, closing schools, while autonomous regional states have suspended intra and inter regional transportation services and put a ban on movements of people.

Somalia, AMISOM, AFRICOM Conduct Operations against al-Shabaab

As part of an African Union Mission in Somalia (AMISOM) and Somali National Army operation, and in coordination with the Federal Government of Somalia, U.S. Africa Command conducted five airstrikes against al-Shabaab terrorists near Janaale, Somalia, March 16-17. These precision airstrikes targeted members of the al-Qaida-aligned terrorist network as they massed and maneuvered in the vicinity of an ongoing Somali-led ground operation.

"We protect and remain committed to our partners - plain and simple," said Maj. Gen. William Gayler, director of operations, U.S. Africa Command. "We eliminated terrorists posing a direct and immediate threat, allowing our African partners to maintain the momentum on the ground."

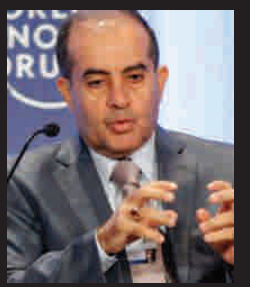
Somali security forces continue to lead operations alongside AMISOM forces to increase security and seize ground from al-Shabaab. No civilians were injured or killed as a result of these airstrikes. U.S. forces were in the area when these airstrikes occurred in order to advise and assist Somali and partner forces.

U.S. Africa Command continues to support the Government of Somalia by strengthening its security forces and promoting regional security, stability and prosperity. Al-Shabaab continues to conduct attacks in East Africa and will continue to threaten American and western interests in the region.

Concurrently, the command is building enduring relationships and strategic alliances in East Africa necessary to address future challenges and malign activity by near-peer competitors.

Libyan Rebel PM dies of Covid-19

Mahmoud Jibril, the prime minister of Libya's *de facto* National Transitional Council for a period during the civil uprising that ousted Libyan leader Muammar Qaddafi during the 2011 revolution, died on Sunday after contracting the novel Corona Virus, an aide and his party said.



Mahmoud Jibril

The 68-year old Jibril was referred to a hospital in the Egyptian capital of Cairo on March 27 after testing positive for Covid-19. He died in a private hospital in Cairo where he had been receiving treatment since being diagnosed with the virus, said Fawzi Ammar, an aide to Jibril.

Jibril was interim leader until the country held its first free elections in four decades in 2012.

Cameroon Parliamentary Elections See Ruling Party Landslide

Cameroon's ruling party emerged with a landslide victory in the country's parliamentary elections, according to results announced by the constitutional council. President Paul Biya's People's Democratic Movement party (RDPC) took 139 out of 167 declared seats in the polls held on February 9. The Social Democratic Front, the country's largest opposition party during the 2013 polls, lost a number of seats, falling from 18 to five.

According to Clement Atangana, the constitutional council's president, the estimated turnout was pegged at 46 percent. The RDPC's share of seats fell from 148 in the outgoing parliament.

Elections were not held in 13 seats covering the Anglophone regions but are expected to be held at a later date.

Sudan's PM Survives Assassination Attempt

Sudan's Prime Minister, Abdalla Hamdok, survived an assassination attempt after a blast near his convoy in Khartoum, the capital city.

Prime Minister Hamdok wrote on Twitter he was "safe and in good shape" following the attack and resultant explosions. "I would like to assure the people of Sudan that I am safe and in good shape. Rest assured that what happened today will not stand in the way of our transition, instead it is an additional push to the wheel of change in Sudan," the PM tweeted.

The PM added, "What happened will not stop the path of change, it will be nothing but an additional push in the strong waves of the revolution."Hamdok is leading a transitional government following the overthrow of long-time President Omar al-Bashir last year.

Abdalla Hamdok

Haftar's Forces Attack Facility Treating COVID-19 Patients

The ongoing civil war in Libya continues with rebel leader Gen. Khalifa Haftar's forces attacking medical facilities, including one that was treating COVID-19 patients. As a result, a generator was knocked out in the recent attack and forced patients, including COVID-19 patients, to leave the hospital. The Health Ministry of the U.N.-recognized Government of National Accord (GNA) has called for a halt to attacks on medical facilities. "We call on all local and humanitarian aid organizations to act immediately to end the attacks of Haftar militias on health facilities in Tripoli, which most recently targeted al-Khadra hospital," the Ministry urged in a written statement.

The media department of the Burkan al-Ghadab (Volcano of Rage) operation, led by the GNA, said forces loyal to warlord Haftar had specifically targeted the al-Khadra hospital which has been designated as the treatment center for COVID-19 cases.

"At a moment when people in Libya needed nothing more than a safe home and functioning medical facilities, we received the news of yet another attack on a hospital," the U.N. Office for the Coordination of Humanitarian Affairs (OCHA) Coordinator for Libya Yacoub El Hillo said in a statement.

Trina Solar announces 23.39% PERC Solar Cell made with Standard Fabrication Equipment

Trina Solar Co., Ltd. announced that its State Key Laboratory (SKL) of PV Science and Technology (PVST) has fabricated a PERC cell with 23.39% efficiency solely using standard manufacturing equipment. To the best of their knowledge, this is the highest efficiency confirmed by an ISO/IEC 17025 certified calibration laboratory for such an industrial cell.

"Progress in PERC cell manufacturing is continuing to be very fast in the whole PV industry," said Dr. Zhiqiang Feng, the Vice President of Trina Solar and the Director of SKL, "and we are delighted to announce that our R&D team is at the forefront." Dr. Yang Yang, the director of the PERC research group at SKL, adds: "Our aim is to develop processes that can be transferred to production, therefore we decided to fabricate such champion PERC cells purely on equipment that is part of standard manufacturing lines, like metallization with standard screen-printers."

The cell has an area of 252 cm2, is bifacial and has 9 busbars as used in many Trina modules. The cell was calibrated at ISFH CalTeC in Germany under full area illumination (with full front metallization taken into account) on a brass chuck contacting the whole rear area. The only difference to mass production is that, during deposition of the antireflection coating, parameters were adjusted as slightly as possible so the cell has the improved light trapping properties during calibration in air as the cell has when encapsulated in a module. Trina's Principal Scientist Dr. Pietro P. Altermatt explains the wider picture: "Each world record refers to a certain category, like 'laboratory cell', or 'cast material'. There is no precisely defined category 'industrial cell' because equipment in mass production evolves over time, and it is difficult to provide evidence of exactly how the reported cell was processed. Sometimes, higher PERC cell efficiencies are announced, but without stating details about metallization, or whether passivating contacts were used. This makes it difficult to assess progress in the field. This is why we are open about our manufacturing details."

SoliTek starts Cradle to Cradle Certification of its Glass Solar Panels

As interest for environmentally sustainable solar panels grows in Europe, SoliTek has embarked on a demanding Cradle to Cradle (C2C) certification process that will approve its Vilnius manufactured glass-glass panels as a totally sustainable product, meeting all the requirements of the circular economy. The company expects to complete the certification process in the middle of 2020 and double their sales in the European market next year.

SoliTek has been producing solar panels in a sustainable way for years, using both solar and geothermal energy in the process and recycling the majority of the waste generated during manufacturing.

"As SoliTek is constantly investing in technology and manufacturing innovation, we have matured to offer the European market an exceptional product, a Cradle to Cradle certified solar panel. We have started already the last manufacturing readjustments, supply chain evaluation and we expect to complete certification in a few months," says CEO Julius Sakalauskas.

The introduction of C2C certification has been driven by two major factors: many supply chain and manufacturing processes at SoliTek are matching this standard already; the second factor is rapidly rising demand for this type of premium solar panels in Western Europe. Especially high interest for C2C certified glass-glass solar panels is in Netherlands, possibly the most developed solar market in the EU. The Dutch market pays special attention not only to the quality of the panels, but also to their eco-friendliness, fire safety and very long lifespan, that is enabled by the highest-grade materials used for the production.

Source: Solitek

The C2C certification defines 5 components for a circular economy compatible product:
1. Safe and healthy materials – Safe and healthy product for people and the environment, from production to reuse.
2. Eliminates the concept of waste – 100% retrieval and upcycling.
3. Manufactured with clean energy – Manufacturers generate a positive impact in energy supply, ecosystem balance and maintaining soil carbon levels and vegetation.
4. Protection of water as a precious resource – Exit water is cleaner than entry water.
5. Respects human and natural systems – Responsible business from their operations to their ethics regarding supply chain and natural environment. Being a partner to all interest groups.

JinkoSolar Partners with SISP to Develop Solar Sell for Space Application

JinkoSolar Holding Co., Ltd. announced that the company has signed a MoU with Shanghai Institute of Space Power-Sources (SISP) to co-develop high efficiency solar cell technology for both space and terrestrial applications.

Innovators and engineers from both sides will co-develop space-based photovoltaic cells with a more efficient, low-cost, robust silicon wafer as the supporting bottom substrate and bottom cell.

This high-efficiency solar technology takes advantage of inexpensive silicon wafers. It is easy to manufacture at large scale and can achieve a higher conversion rate. It has a more robust and rugged design, much lower degradation required for next-generation solar cells in space. Due to its unprecedented efficiencies, it could also be used in other applications like auxiliary power units in vehicles, solar roof tiles, power plants, and smart grid systems. This is an early-stage technology requiring additional development. This partnership between two elite solar companies will fuel much needed development.

This cooperation will not only set a good example of photovoltaic technology space application, but it will also bring new opportunities for the Chinese photovoltaic industry to grow and develop abroad.

Dr. Jin Hao, Vice President of JinkoSolar commented, "The strategic cooperation with Shanghai Institute of Space Power-Sources has a great importance. In the future, we will continue to increase technical cooperation, leading our industry in the name of technical innovation and providing more efficient solar panels with a wider range of choices for global customers."

Ecodudu uses Insects for Waste-to-Value

Ecodudu, an innovative Kenya-based waste-to-value company is producing high-quality insect-based protein for animal feed and organic fertilizers from recycled organic matter. Ecodudu has developed an innovative process that harnesses nature's recycling agents, insects, to address global problems of unmet protein demand, organic waste management, and environmental conservation. Leveraging the team's more than 18 years' experience in animal feed production, Ecodudu uses fly larvae to produce sustainable and highly nutritious proteins for animal feeds and organic fertilizers.

The fly larvae convert the organic waste into high-protein biomass and leaving behind a rich residue. At the full-grown larvae stage, the flies are dried and provided in bulk to feed manufacturers for commercial use as the company's signature Dudu Meal. The residues are subsequently processed into organic fertilizer called Shamba Mix. The result is a cost-effective, safe, and sustainable waste-to-value process that produces feed with a higher protein density than soya beans.

GreenTec Capital recently invested in the company as it sees great potential in alternative protein production solutions and is very impressed with Ecodudu's team. With Maxime Bayen as lead company builder, GreenTec will work to support Ecodudu to scale their business to the next stage.

Source: Ecodudu

Canadian Solar Signs a 25 MW Module Contract with Distributed Power Africa

DPA and Canadian Solar, one of the world's largest and foremost solar power companies, have signed an agreement for the supply of PV technology to be used in hybrid product offerings for the African market. The deal is expected to help DPA to provide top tier PV panels from Canadian Solar in Africa. This is potentially over 60,000 KuMax and HiKu PV panels, which would quite easily construct 50 large industrial solar plants. DPA plans to make Canadian Solar panels their first choice of PV technology in their solutions in sub-Saharan Africa, which initially includes South Africa, Zimbabwe, Kenya, Zambia and Lesotho, with the intention to expand into other key markets. This arrangement will increase the development of solar energy solutions across Africa.

The partnership will ensure zero technology risk for DPA customers because of the long warranties and reliability of the equipment.

IEA Appoints first Africa Program Manager to Expand Engagement on Energy Issues

The International Energy Agency (IEA) hired Maximilian Jarrett as its first Africa Program Manager to help expand the Agency's reach and coordinate its work as it deepens its engagement across the continent.

Maximillian Jarret

Jarrett brings 30 years of experience in the fields of international economic affairs, media production and strategic communications. He most recently served as the Director-in-Charge of the Geneva-based Africa Progress Panel, which was chaired by the late Kofi Annan, the Nobel Peace Prize laureate and former UN Secretary General.

The IEA has long focused on Africa's energy sector, including work on the continent's energy access issues since 2002. This work has since expanded significantly and will continue to do so in the coming years. Last year, Dr Kandeh Yumkella, a former United Nations Under-Secretary-General, became an advisor to the IEA on Africa and energy access issues.

Prior to his role with the Africa Progress Panel, Jarrett spent over a decade working with the United Nations in Africa. He had started his career in 1990 as a program presenter and senior producer with the BBC World Service. He worked on Focus on Africa and Network Africa, the BBC's daily current affairs programs for its audience in Africa.

SolarPower Europe and the Tunisian Solar Installers' Association (CSPV) sign MoU

At the Emerging Markets Task Force workshop in Tunis, SolarPower Europe signed a Memorandum of Understanding with the Tunisian Solar Installers' Association (*Chambre Syndicale du Photovoltaïque*, CSPV). Both the European association and Tunisia, along with it North African neighbors, are looking to tap into European markets with an electricity interconnection.

SolarPower Europe's Emerging Markets Task Force identifies business and cooperation opportunities in emerging markets outside of Europe, with the aim of contributing to energy transitions around the world. The report on Tunisia is the seventh in a series of market reports – previous reports cover Mozambique, Senegal, Ivory Coast, Myanmar, Kazakhstan, and India.

Ali Kanzari, President of CSPV, said: "Solar resources in Tunisia are abundant. Combined with the proximity between Tunisia and southern Europe (180 km), it makes a clear case for Tunisia to become a major provider of solar electricity for the European continent. This interconnection with Europe is no longer a fiction and should be accomplished by 2027. This will help the EU achieve its climate-neutrality goal, as well as give Tunisia access to Europe's electricity spot market, which will support national demand during peak hours."

Máté Heisz, Head of International Cooperation at SolarPower Europe, said: "The Emerging Markets Task Force continues its work shining a spotlight on solar opportunities outside of Europe. This new report shows that Tunisia has strong solar potential, which the government is increasingly harnessing. However, in order to effectively take advantage of this opportunity, the report issues a series of recommendations for investors, policymakers, and local stakeholders. We are also pleased to kick off our cooperation with CSPV, which will involve exchanging industry experience and knowledge, and ultimately boosting the energy transition in Tunisia and Europe."

Antoine Poussard, Managing Partner MENA Region at Finergreen, said: "After a few years of strong commitment and support from the government, the Plan Solaire Tunisien is becoming a reality at a large scale, making Tunisia a strong renewable player in North Africa. The country managed to attract the best tariffs in all of Africa from prime global players on its concession auctions. The focus is now on successfully developing a market of mid-size projects to attract stakeholders (fund providers, developers, EPC contractors) from all over the world."

CFO David Mesonero to leave Siemens Gamesa

Siemens Gamesa Renewable Energy (SGRE) announced that David Mesonero left the at the end of March after 10 successful years at the company. Mesonero became Head of Strategy and Corporate Development at the creation of Siemens Gamesa Renewable Energy, and played a key role in the merger and integration process. He assumed the role of CFO at the end of 2018.

Source: SGRE

Davide Mesonero

Under his leadership Siemens Gamesa has made significant progress in its financial strategy, recording key achievements such as reducing the gross debt of the company by more than €1 billion in less than a year while amending and extending Syndicate Loan facilities, and financing the acquisition of Senvion. This work contributed to Siemens Gamesa earning its investment grade credit rating of BBB from the major ratings agencies.

These achievements have been realized in part through the successful introduction of Environmental Social and Governance concepts in the financial area, making Siemens Gamesa a pioneer in this area, as recognized by MSCI, which recently elevated Siemens Gamesa's ESG rating to A.

Mesonero leaves a strong finance team that will be inherited by Thomas Spannring when he takes on the role an interim basis while the company assesses its options. Spannring joined Siemens Gamesa from Siemens AG at the time of the merger as Corporate Chief Accountant and Head of Corporate Controlling.

Total Expands Renewable Energy Position with another Acquisition

French oil and renewables firm Total, through Total Quadran – its 100% renewable developer and producer in France, acquired 100% of Global Wind Power (GWP) France, a company with a 1,000-megawatt (MW) portfolio of onshore wind projects, including 250 MW scheduled to come onstream by 2025.

"Following Vents d'Oc' acquisition in 2019, this new investment demonstrates Total's commitment to expand in all types of renewable energy while contributing to France's energy transition goals. It strengthens Total Quadran's footprint adding to its existing portfolio of nearly 1,000 MW of installed and operated capacity, including over 500 MW of onshore wind and confirms its ambition to be one of the main players on France's renewables market," said Philippe Sauquet, President Gas, Renewables and Power at Total.

GWP's teams will join Total Quadran, adding to the Group's existing expertise in order to speed up the wind power development in France.

IFC Invests $200 Million in Standard Bank of SA's Green Bond Issuance

IFC, a member of the World Bank Group, invested $200 million in The Standard Bank of South Africa Limited's green bond placed on the London Stock Exchange today. It's Africa's largest green bond and South Africa's first offshore green bond issuance, which will increase access to climate finance.

The 10-year green bond facility privately placed by IFC is compliant with the International Green Bond Principles and will enable Standard Bank Group's Sustainable Finance Business Unit to on-lend to and finance climate-smart projects in South Africa such as renewable energy, energy efficiency, water efficiency and green buildings.

"This bond is a landmark placement for South Africa and will contribute to financing South Africa's green economy. We hope it will catalyze interest in green investments from other actors in the country," said Adamou Labara, IFC's Country Manager for South Africa.

Commercial banks currently provide 45 percent of South Africa's financing for renewable energy and energy-efficient projects. IFC estimates that South Africa's climate-smart investment potential, between now and 2030, is $588 billion.

"When it comes to financing, clients should be considering green, social and sustainable products as investors increasingly shift their mandates to sustainable businesses," said Nigel Beck, Standard Bank Group's executive head of Sustainable Finance.

Projects funded by the green bond have the potential to reduce greenhouse gas emissions by 742,000 tons per year, or nearly 3.7 million tons over a five-year period, IFC estimates.

IFC is one of the world's largest green bond issuers, with 172 issues in 20 currencies, totaling more than $10 billion. IFC is a member of the Green Bond Principles and is part of its Executive Committee, which, combined with its experience as an issuer and investor in green bonds, has allowed us to support several countries globally to shape the standards and guidelines of green bond issues.

BP Dumps 3 American Associations not Aligned with its Climate-Related Policies

BP has announced that, following an in-depth review examining the alignment of the climate-related policies and activities of trade associations with BP's positions, it will leave three US-based organizations – American Fuel and Petrochemical Manufacturers (AFPM), the Western States Petroleum Association (WSPA) and the Western Energy Alliance (WEA).

BP had earlier introduced its ambition to become a net zero company by 2050 or sooner and to help the world get to net zero, as well as 10 aims that underpin it. These include the aim to set new expectations for relationships with trade associations around the globe and continuing engagement with these organizations on climate is part of this aim.

BP CEO Bernard Looney said: "Trade associations have long demonstrated how we can make progress through collaboration, particularly in areas such as safety, standards and training. This approach should also be brought to bear on the defining challenge that faces us all – supporting the rapid transition to a low carbon future. By working together, we can achieve so much more.

"BP will pursue opportunities to work with organizations who share our ambitious and progressive approach to the energy transition. And when differences arise we will be transparent. But if our views cannot be reconciled, we will be prepared to part company.My hope is that in the coming years we can add climate to the long list of areas where, as an industry, we work together for a greater good."

Over the past six months, BP has conducted a review of how key trade associations' climate-related activities and policy positions align with BP's positions. Thirty associations – concentrated in North America, Europe and Australia – were selected for review and their current and recent policy positions, based on publicly available information, were assessed. As a result, they were determined to be aligned, partially aligned or not aligned with BP's positions.

For three organizations, BP found misalignments that could not be reconciled. Due to material differences regarding policy positions on carbon pricing BP will leave American Fuel and Petrochemical Manufacturers (AFPM) and the Western States Petroleum Association (WSPA). Due to material differences around the federal regulation of methane, as well as asset divestments in the states in which the organization is active, it will not renew its membership with the Western Energy Alliance (WEA).

BP has identified a further five organizations with which it is only partially aligned on climate. BP has communicated these differences to these associations. BP has also communicated clear expectations with regards to climate positions and transparency to all associations within scope of the review.This is an ongoing process – BP will actively monitor its memberships, participation and alignment with trade associations to which it belongs and will provide periodic updates, internally to the board of directors and to stakeholders as appropriate. BP plans to undertake another review in around two years' time.

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