

# Alternative Energy

Vol. 13 Issue 3



[www.AE-Africa.com](http://www.AE-Africa.com)

Filling the Energy Information Gap in Africa



ISSN 1756-4417

## Global Strategies for Recycling of Solar Panels

## Angola Enters New Frontier with RE

## Has Cheap Coal Met its Match?



## Egypt Banks on Renewables

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*Rendering of WaveRoller farm*

Source: AW Energy

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# Publisher's Note

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



*Dianne Sutherland*

It looks like four months of the Covid-19 pandemic along with weak oil demand has provided the impetus for many oil companies to advance plans toward a sustainable energy future. Announcements on new corporate strategies for greening operations and reducing carbon output are becoming the new norm, from European quarters at least.

The European oil giants – BP, Eni, Shell, and Total – have all announced over the previous few months, their intentions to become “Net Zero” energy companies by 2050. They have also, over time, begun rebranding to be known as energy companies rather than oil companies.

In April, Shell became the largest company to commit to being a Net Zero company by 2050. CEO, Ben van Beurden, explained the decision succinctly: “Society’s expectations have shifted quickly in the debate around climate change. Shell now needs to go further with our own ambitions, which is why we aim to be a net-zero emissions energy business by 2050 or sooner. Society, and our customers, expect nothing less.”

French firm Total, in May, announced its ambition to get to net-zero emissions by 2050, together with society, for its global business across its production chain and energy products used by its customers. It also announced that it has joined the Getting to Zero Coalition to support the maritime industry’s decarbonization by collaborating with companies across the maritime, energy, infrastructure, and finance sectors.

Eni out of Italy has gone bolder, launching a new business structure to become a “leader in the energy transition.” The new Eni will have two business groups – Natural Resources and Energy Evolution. Natural Resources division will have the objective of reducing its carbon footprint by scaling up energy efficiency, expanding production in the natural gas business, and focusing its actions on the development of carbon capture and compensation projects. The Energy Evolution side will focus on the evolution of the businesses of power generation, transformation, and marketing of products from fossil to bios, blue and green. In particular, it will focus on growing power generation from renewable energy and biomethane.

The UK’s BP admits it does not have all the details yet worked out, but says it will create four divisions: production and operations; customers and products; gas and low-carbon energy; and innovation to help it reach its Net Zero emissions target. The firm has also said it will provide more details in September and that its strategies will evolve over time.

While not a super major, Spain’s Repsol beat them to the punch, announcing its net-zero commitment late in 2019, laying out goals of a 10% reduction by 2025 and 20% by 2035 along the way to 2050’s 100%. Further, it is noteworthy to mention that Repsol was the first oil company to recognize the 1997 Kyoto Protocol. And other European independent oil companies are moving forward to become net zero as well, including Lundin Petroleum of Sweden which has given itself a tall target of 2030 to realize carbon neutrality.

So, the Europeans have shown up, now it looks like the hands of the American supermajors will be forced. Chevron and Exxon have sidestepped the net-zero commitment, opting for independent carbon emission reduction targets instead. However, in today’s green climate, public perception and shareholder pressure will demand they come to the table more fully. Sooner, rather than later.

Now on to this issue...be sure to catch the latest features on Angola and Egypt in the Africa Focus section. Meanwhile, Covid-19 continues to stymie investment around the globe; be sure to read the International Energy Agency’s take in this issue’s Feature section. And finally, the Alternative Focus section includes NREL’s take on the most promising approaches to end-of-life management for solar photovoltaic (PV) modules. As always, your comments and suggestions are welcome and can be sent to [info@petroleumafrika.com](mailto:info@petroleumafrika.com).

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## \$6 Billion Contract Awarded for Akon City in Senegal

Akon City has awarded the contract for building and executing the city's construction to KE International, a US-based Consulting and Engineering firm. The \$6 Billion futuristic crypto currency-themed sustainable city is founded by Senegalese-American superstar and philanthropist Akon.

With the awarding of the contract, KE International has secured \$4 billion from investors for the first and second Phases of execution of Akon City, and will have Dubai-based Bakri & Associates Development Consultants lead the architectural designs under KE International guidance. KE International is known for the design and execution of the \$2 billion Mwale Medical and Technology City (MMTC), a green city based in western Kenya, which began construction in 2014 and is expecting completion in December 2020. MMTC is powered by 100% renewable off-grid energy. A large Artificial Intelligence Cluster to run the hospital is currently under development.

Akon City's Phase 1 is expected to complete by the end of 2023, and will see the construction of roads, a Hamptons Hospital campus, a Hamptons Mall, residences, hotels, a police station, a school, a waste facility and a solar power plant.

Akon City Phase 2 will run from 2024 to 2029 and will end with a complete cryptocurrency city running exclusively on AKOIN cryptocurrency. The initial \$4 billion investment secured by KE International for Akon City, is led by leaders in healthcare and technology infrastructure and



include MMTC's Julius Mwale. Mr. Mwale's Hamptons Hospital, Mall, supermarket, solar power group, and data centers will be part of phase 1 of Akon City.

Another co-development partner is Senegal's state tourism agency SAPCO, which will fit the city into the country's tourism vision. The government of Senegal has earmarked Akon City as a special tax zone with tax breaks to be given to encourage investment.

Akon City is located on 2,000 acres astride the ocean, less than an hour drive south of the new international airport in Dakar. The new city will also have parks, universities, schools, a stadium, hotels, and an industrial complex and will be fully completed by 2030.

KE International will build Akon City to be "Leader in Energy and Environmental Design" (LEED)-certified, the second such city in Africa with this certification after MMTC in Kenya.

## COVID-19 Delays Seychelles Floating PV Project

The construction of a floating solar PV power plant in Seychelles will be delayed due to the COVID-19 pandemic, according to Tony Imaduwa, CEO of the Seychelles Energy Commission. Just recently SEC and its partners, the Clinton Foundation and the African Legal Support Facility (ALSF), awarded the project to Quadran (Seychelles) Ltd. for a 4-MW marine floating solar photovoltaic (FPV) power plant.

According to a report by the Seychelles News Agency (SNA), the SEC told SNA that due to the COVID-19 situation issuance of the notice of effective award was delayed as the selected bidder will not be able to meet all the conditions set as some of the conditions required the bidder to be in the country to finalize the technical design of the plant but this has not taken place with the restriction on travel to Seychelles.

Imaduwa did say that now that the notice of intended award has been issued, Quadran will have around five months to meet the conditions set before construction can start.

"It is a crucial stage of the process. Maybe there will be some cost implications but the project is based on an Independent Power Producer (IPP) model where the IPP will have to finance, design, construct and operate the plant and sell electricity at a fixed rate over a period of time," said Imaduwa, according to SNA.

## Ghana May Become Next Wind Farm Hotspot

Plans for a series of wind farms in Ghana have advanced with the Swiss company Nek confirming its intention to generate 1,000 MW of electricity from several wind farms in Ghana over the next few years.

The company plans to implement its project in several phases. The first phase is expected to generate 160 MW, and 75 MW for the second phase. NEK already has major concessions in Ghana, one of which is in Amlakpo, where it hopes to build a 200-MW wind farm over 58 sq km. In the south-east of Ghana at Ayitepa, the company will construct a 225-MW wind farm, with other locations still being planned.

At the end of January, the preliminary geological survey in the Konikablo Wind Farm project area was carried out. Konikablo will see up to 60 wind turbines and has a planned capacity of 200 MW. The park will not only be one of the first wind parks in Ghana, but also one of the biggest parks in the whole African continent. Once operational, the Konikablo Wind Farm will supply more than 500,000 MWh of clean, affordable and reliable electrical energy per year. It is scheduled that construction will commence in 2021.

## Algeria to Invest Billions in Tafouk Solar PV Project

Algeria plans to get a new solar photovoltaic complex underway to diversify its energy mix to contribute to meeting national energy demand and freeing up more of its petroleum resources for export along with preserving national reserves for the future.

The new project, dubbed Tafouk 1, will require an investment of between \$3.2 and \$3.6 billion, according to the Ministry of Energy.

Officials held a virtual meeting on in late May, where it was decided the project will involve construction of several solar PV power plants over an area of about 6,400 hectares with a cumulative capacity of 4,000 MW. Construction is expected to begin this year and run through 2024.

The facilities are projected to create over 56,000 jobs during the construction phase and 2,000 jobs during the operational phase.

## Perdekraal East Wind Farm Receives Main Transformer

Perdekraal East Wind Farm, in the Western Cape’s Witzenberg Municipality, has received its main transformer, via road transportation from Pretoria, marking another important milestone in its construction process. This 500-MVA mega transformer was locally manufactured in South Africa, which has added to Perdekraal East Wind Farm’s already very high local content percentage, as the turbine towers are also locally manufactured.



*Perdekraal East Wind Farm*

This is a trend within the sector, which works to meet the Department of Energy’s local content requirements, which have steadily increased with each bid window. Hence the demand for local manufacturers to

offer items previously only available through import, has proportionately increased.

The transformer will be housed in the substation that is situated outside of Ceres. Its job is to step up the voltage produced by the wind farm to 400kV, rendering it suitable for the national grid.

This is one of the country’s 12 wind farms currently under construction, which went into a sudden lockdown in March. Activity resumed on site, late May, having lost over 50 days of work.

CONCO is responsible for the electrical component of the balance of plant works, including the engineering, procurement and construction, as well as the electrical works for Perdekraal East Wind Farm, which is preparing for grid connection by the end of July this year.

## IDA Forks-Up \$193 Million for Gambia and Niger Electricity Programs

The International Development Association (IDA), a subsidiary of the World Bank Group, will be providing both The Gambia and Niger funding for their respective water and electricity programs. Niger will receive \$150 million in assistance and The Gambia \$43 million.

In The Gambia, the funds will go toward the implementation of the Gambia Electricity Restoration and Modernization Project (GERMP), aimed at improving access to electricity and water in the country. The GERMP will allow the reinforcement of the NAWEC’s transmission and distribution network. It will provide additional support to transform the company into an efficient and solvent utility. To this end, several projects are planned, including the installation of four solar photovoltaic power plants with a capacity of 200 MWp in Greater Banjul, in the west of The Gambia.

In Niger, the funding will benefit the Kandadji program to provide water and electricity to 330,000 people living in the Niger River Basin. The Kandadji Dam project is overseen by the Water Resources Development and Sustainable Ecosystem Management Program. The construction of this facility is being carried out by China Gezhouba Group Company (CGGC). The dam will be located on the Niger River, 150 km from Niamey, and is

led by the Office of the High Commissioner for the Development of the Niger Valley.

## UPC and CFM get Nod for Tunisia’s Sidi Mansour Windfarm

Climate Fund Managers (CFM) and UPC Renewables (UPC) have announced their partnership for the development of a 30-MW wind farm in Tunisia. The Project will be one of the first wind Independent Power Producers (IPP) in the country. Construction is set to begin this year.

Climate Fund Managers is participating as co-developer, sponsor, financial advisor and E&S advisor to the Project, through the development and construction financing facility under its management, Climate Investor One (CII). UPC will lead the development



Source: UPC renewables

of the Project with its local team that will lead land securitization, permitting, grid connection, wind resource assessment, and engineering and procurement contracts.

In 2016, Tunisia announced the launch of the Tunisian Solar Plan 2030 with the goal of increasing the share of renewables in the electricity generation mix from 3% to 30%. The Sidi Mansour Project will assist Tunisia in meeting its renewable energy goal, reduce reliance on imported fossil fuels, and demonstrate that Tunisia is an attractive destination for renewable energy investments.

In January 2019, UPC was selected as one of the four awarded companies under the Authorization Scheme tender for its 30-MW Sidi Mansour project in northern Tunisia and subsequently signed a PPA with Société Tunisienne d’Electricité et du Gaz. UPC has been developing the Project for more than a decade. Over its lifespan the Sidi Mansour Project is expected to lead to a reduction of 56,645 tons equivalent of carbon and create more than 100 jobs. The total investment size of the project is expected to be approximately \$40 million.

## Angola has Grand Electrification Plans

The Angolan government is getting serious about expanding electrification rates in the southern African country and will seek to increase power generation from 38% to around 60% under its “Angola Energy 2025 Vision.”

During the *Powering Forward: The Pathway to Grid Stability, Increased Capacity and a Diversified Angolan Economy* webinar hosted by Africa Oil & Power, panelists discussed the role of multilateral organizations and financial development institutions in driving Angola’s energy expansion. The opportunities in transmission, distribution and generation were also outlined, as was the role renewable energy and gas to power projects can play in increasing the country’s electrification goals.

“The Angolan government, along with multilateral donors and some bilateral donors, has invested a lot in generation,” said Paul Ghiotto, Deputy Political-Economic Chief/Energy Officer Political-Economic Section, U.S. Embassy Luanda. “The Ministry’s plan for electrification not only aims to go from 38% to around 60% by 2025, but it also aims to go from around less than

three gigawatts (GW) of installed generation to approximately 9 GW by the end of the same period. We do not know if we will get to 9 GW, but through the development of hydropower in the Kwanza River Basin, Angola has a very strong base of generation sufficient to meet future demand, even projected until to 2030. There are also additional opportunities in generation, I would argue in gas-to-power, and particularly renewables in the solar sector.”

In addition to government funding, the country is eager to attract private sector investment into its most bankable power projects, specifically in distribution to end users.

“You cannot expand the industrialization of the country without secure power throughout,” said Maria da Cruz, President & CEO of U.S.-Angola Chamber of Commerce. “The government of Angola has invested in the economy with the Angola Energy 2025 agenda, which is robust and seeks to invest in the energy sector. There is an estimate of around \$23 billion that the government would like to invest as part of the Angola Energy 2025 strategy, and it is going to need support from the private sector.”

“Angola already has a clear view of its transmission, generation and distribution sectors, which enables its Power Sector Reform Support Program,” said Frederico Martins Correia, Energy, Resources & Industrials Partner, Deloitte. “The law and regulation has been improved so that the private sector can enter, in addition to the public sector. In terms of distribution, it is quite easy to create a company and be a player, and the government is very keen to create distribution companies locally. In transmission, the vision is to provide more services or exploration and product-sharing contracts, and not to be a player. The vision for the government is to keep transmission as a state-owned part.”

### SPS and Qi-energy to Manufacture Mounting Systems in Algeria

Algeria’s SPS and Dubai’s Qi-energy have announced they will team up to make mounting structures for photovoltaic (PV) systems in Algeria. The partners said the mounting systems will comply with international quality standards. The work force will also boost local employment opportunities.



SPS Sandwich Panel Large

“Our partnership with Qi-energy is the answer to Algeria strategy to implement local content, and at SPS we have chosen to raise the bar by introducing to the Algerian market very high quality solutions for ground mounted, residential and soon for Solar PV for Seawater desalination plants that requires new material,” said SPS CEO Mehdi Bendimerad.

Neil Doe, Qi-energy CEO said: “We always look for partners in foreign markets that share our passion for growth, we place a high value on reputation and admire business’s that is adaptable in these changing times.”

### SustainSolar and Equatorial Power to Bring Solar Mini-Grids to the DRC

Despite the challenges of Covid-19 lockdown, SustainSolar, an Africa-focused solar photovoltaic (PV) off-grid system integrator and provider of turn-key solutions for rural electrification, recently started working on a

containerized off-grid solar-battery power system to be delivered to Idjwi Island on Lake Kivu in the Democratic Republic of Congo.

Equatorial Power, a Uganda-based mini-grid developer that has pioneered off-grid electrification and productive use in the region, already owns and operates a solar mini-grid on Idjwi island since 2019 which serves over 304 households and small businesses. With the new mini-grid development about 30 km from the first site, Equatorial Power will connect an industrial hub and supplementary systems to support growth of agricultural value chains on Idjwi Island; including industrial park ice, local shop refrigerators, egg incubation and juice making with over 20 new connections at the South of the island.

Equatorial Power chose a Sustain Compact™ due to SustainSolar’s turn-key offering including door-to-door logistics to site with installation and commissioning. The Sustain Compact™ is a 20-foot rugged container, equipped with SMA solar and battery inverters and SolarMD batteries with an initial capacity of 29.7 kWp PV and 88.8 kWh Lithium-Ion battery storage. The equipment is all pre-installed and tested, ready for commissioning on-site within a matter of hours. The mounting structure components to be installed on top of the container and in two ground-mounted panel arrays are included inside the container together with the solar modules, tools, cables and everything else, required to install the system within 2-3 days from arrival.

With four systems deployed across the continent to this date, SustainSolar’s standardized approach competes with traditional step-by-step solar system installation, which often takes longer, requires more complex project management and comes with higher implementation and budget risks. Serving a wide range of needs including rural electrification, C&I, off-grid and mobile rapid deployment, SustainSolar is proud to offer developers a service offering that reduces their implementation risk and alleviates any operational hassles such as sourcing, logistics and commissioning.

### IFC Investing \$10 Million in Prepaid Egyptian Electricity Scheme

IFC, a member of the World Bank Group, is investing up to \$10 million in a local Egyptian company to help it expand installation of digital prepaid and smart electricity meters in Egyptian homes. The investment will support government energy reforms to improve accuracy in billing, give consumers more payment options and provide consumers with better information about their energy use in order to encourage savings.

IFC’s financing will enable Globaltronics SAE, which manufactures electricity measurement solutions, to support government plans to replace outdated meters with prepaid and smart digital meters as part of ongoing energy reforms. Prepaid digital meters improve billing accuracy and offer more convenient payment options. Prepaid meters also contribute to overall reduced energy consumption by making it easier for consumers to track their energy use.

The investment will help Globaltronics set up a new manufacturing facility in Saudi Arabia and increase its investment in research and development to grow exports and develop new products.

As well as supporting manufacturing, the project is part of the World Bank Group’s strategy to help Egypt optimize its overall domestic electricity consumption, which in turn will help the government reduce subsidies to the energy sector.

### Adani Green Energy Wins World's Largest Solar Award

Adani Green Energy Limited (AGEL) has won the first of its kind manufacturing linked solar agreement from the Solar Energy Corporation of India (SECI).

As a part of the award, AGEL will build 8 GW of solar projects along with a commitment that will see Adani Solar establish 2 GW of additional solar cell and module manufacturing capacity. This award, the largest of its type, ever, in the world, will entail a single investment of \$6 billion and will create 400,000 direct and indirect jobs. It will also displace 900 million tons of carbon dioxide over its lifetime.

With this win, AGEL will now have 15 GW of capacity under operation, construction or under contract thereby accelerating its journey towards becoming the world's largest renewables company by 2025. This award will also take Adani Green Energy Limited closer to its target of

achieving an installed generation capacity of 25 GW of renewable power by 2025 which in turn will see it committing a total investment of \$15 billion in the renewable energy space over the next five years.

Based on the award agreement, the 8 GW of solar projects will be implemented over the next five years. The first 2 GW of generation capacity will come online by 2022 and the subsequent 6 GW capacity will be added in 2 GW annual increments through 2025. The projects will include a variety of locations, including a 2 GW single-site generation project that is tied for the rank of the largest single-site project announced globally. The solar cell and module manufacturing capacity of 2 GW will be established by 2022 and along with the existing 1.3 GW of capacity will further consolidate the Group's position as India's largest solar manufacturing facility.

### WELTEC Builds Biogas Plant for Greek Abattoir

In the summer of 2020, the German plant manufacturer WELTEC BIOPOWER will start building a biogas plant in Veria, northern Greece. The main investor and operator of the project is one of the largest abattoirs for cattle and pigs in Greece. The 500-kW plant – which WELTEC has planned in collaboration with its Greek partner Tetoros Machinery in Megara – is set to go live as early as mid-November 2020.

For many years, a lot of animal waste has accumulated in the north of Greece. According to the Greek research institute CRES, the waste from animal husbandry and slaughtering throughout Greece amounts to 17.5 million t/year. This corresponds to a potential biogas capacity of approximately 370 MW. The capacity currently installed in Greece is only about 83 MW.

The new WELTEC plant in Veria will make use part of these resources for the generation of energy. The anaerobic digestion process will mainly use cattle manure and meat processing leftovers. Apart from these substrates, the 4,903-m<sup>3</sup> stainless-steel digester will also be fed with production wastewater and fats. The input substances will come from the operator's own abattoir and farms as well as from farmers in the vicinity.



Source: WELTEC

The highly efficient digestion will start with a customized input process. For this purpose, the substrates will first be loaded into a 60-m<sup>3</sup> moving floor feeder. The feeder will transport solid substrates, such as orange peels, to the MULTIMix unit, where they will be shredded and pumped to the digester. Liquid substrates will be pumped directly into the digester from two storage units. "Following the digestion process, the entire digestate will be treated in a downstream hygienization unit," explained Alain Priser, International Sales Manager at WELTEC BIOPOWER.

### JinkoSolar to Supply 60.9 MW for the First Industrial Hybrid Plant in Chile

JinkoSolar Holding Co., Ltd. announced that it will supply 60.9 MW of bifacial modules for the first industrial hybrid plant in Chile. The hybrid plant will be located about 10 kilometers outside the city of Calama in the Antofagasta Region and will consist of a 60.9-MW PV plant and a 90-MW wind farm.

The hybrid PV plant, whose construction is expected to be finished in early 2021, will use about 154,710 JinkoSolar Bifacial panels to produce an estimated 184 GWh of electricity annually.

"This is the first project in Latin America to be equipped with our bifacial modules containing transparent backsheets," commented Mr. Alberto Cuter, General Manager Latin America for JinkoSolar. "Chile is the largest market for utility scale projects and we are continuously promoting our highest-quality modules in order to support the development of renewable energies in Chile and across Latin America. The PV plant equipped with our bifacial modules has already generated one of the lowest LCOE and is able to compete with traditional energy sources. We are expecting to sell more bifacial modules in the coming few months across the region."



## Vestas Takes Full Scope EPC Contract for 48-MW Intertidal Project

Vestas has secured its second full Engineering Procurement Construction (EPC) contract in Vietnam with a 48-MW Tra Vinh V1-3 project from REE Corporation, a Vietnamese publicly listed company. Vestas will provide a full turn-key solution with delivery, installation and commissioning of 12 V150-4.2 MW wind turbines delivered in 4.0 MW operating mode, as well as the project's civil and electrical work.

The order also includes a 20-year Active Output Management 5000 (AOM 5000) service agreement, designed to maximize energy production

for the site. With a yield-based availability guarantee, Vestas will provide the customer with long-term business case certainty. This will be Vestas' sixth 20-year long term service agreement signed in Vietnam, underlining the customers' confidence in its service capabilities.

The construction of the project is expected to be completed in the fourth quarter of 2021, ahead of the current wind feed-in tariff deadline in Vietnam.

## Minor Fire at Azelio's Energy Storage Container in Åmål

On June 16, a smoke development was reported in a container at Azelio's development center in Åmål, Sweden. Azelio's staff was first on-site followed by the fire department. A minor smoldering fire from leaked sodium outside the system generated smoke and a passive extinguishing work was performed, after which the smoldering fire went out and smoke generation ceased. Nobody was injured in the incident.

The container contained, among other things, two of Azelio's energy storage units. At first assessment, the incident is not attributable to Azelio's

technology and the damage to the container and its contents are of milder nature. The equipment will soon be restored, which is not expected to have any impact on the company's time plan for ongoing commercialization and technology verification.

"Most important, of course, is that no one was harmed. We will now do a thorough review of the incident. What we can already ascertain is that our preparedness for a fire and the collaboration with the fire department is functioning," said Jonas Eklind CEO of Azelio.

## ReneSola Power to Develop a 30-hectare Ground-Mounted Solar Project in France

ReneSola Ltd has announced that it will participate in a consortium to develop a large-scale ground-mounted solar plant in the south of France. The plant is expected to produce 46 GWh, and supply electricity to approximately 10,000 households per year.

The consortium is led by Tenergie, the second largest independent power producer in France. Other members of the consortium include a leading power consulting company and a recognized leader in project crowdfunding. The consortium will develop the power plant covering

30 hectares of leased land in the town of Aups. The plant will be owned by an entity, which in turn will be owned by the IPP, the Municipality of Aups. Local stakeholders and the individuals that participate in crowdfunding are deeply involved in the project conception phase.

The company estimates that a project of this size and design would typically have capacity of approximately 30 MW. Actual capacity will be subject to additional authorizations, such as permits needed for final project design.

## Scatec Solar Signs Solar PV Pact with Vietnamese Partner MT Energy

Scatec Solar has partnered with MT Energy, a Vietnamese energy company, to develop, finance, construct and operate large-scale solar projects in Vietnam. The strategic collaboration agreement covers three projects located in Binh Phuoc, Quang Tri, and Nghe An provinces. The projects total 485 MW and are targeted to be realized under a new feed-in tariff regime that is expected to be launched later this year.

The agreement will be presented to the Vietnamese Prime Minister, Norway's Minister of Trade and Industry and other high-level officials during a Vietnam-Norway business forum organized as part of the Vietnamese Prime Minister's official visit to Norway.

Scatec Solar is envisioned to provide the project's equity funding. In addition, the company will be the turn-key EPC provider and will be providing Operation & Maintenance as well as Asset Management services to the projects.



Source: Scatec Solar

## Azelio Signs Energy Storage MoU with partner in Mexico

Azelio has signed a Memorandum of Understanding (MoU) with Mexico's CITRUS JMK S.A DE C.V (CITRUS) to assess energy storage for the food and beverage, agricultural, mining, and the oil & gas industry as well as the tourism sector with hotels and resorts in Mexico, North and Central America. The MoU frameworks a collaboration over a 20-MW capacity of Azelio's energy storage until 2024. The parties expect to trigger further projects in addition to this initial agreement.

Azelio's long-duration energy storage system coupled to Solar PV will be part of the CITRUS offer to their clients within the C&I sector. It will increase the sustainability, cost-efficiency, and reliability of their energy systems with renewable electricity around the clock. The first projects are planned to be small scale, aiming for 150 kW in 2021, followed by 3 MW in 2022, 6 MW in 2023, and 11 MW in 2024.

CITRUS, based in Mexico, is an industrial equipment supplier and a turn-key energy project developer. The company is contributing to the sustainability of industrial process lines and providing high-tech integrated renewable energy solutions to its customers for both heat and power. With this MoU, CITRUS seeks to expand its business offerings in Mexico in particular, and in North and Central America in general. The goal is to establish Azelio as one of CITRUS' technology providers and to develop, install, and operate Azelio's technology, acting as a regional partner.

## Nordex Group Receives Order for 43-MW Project in Finland

The Nordex Group has received an order from its major customer ABO Wind for the supply and installation of nine N149/4.0-4.5 turbines for the Finnish project "Kokkoneva". The turbines will be supplied in the 4.8 MW operating mode. The contract also includes a premium service contract of the turbines for the term of 15 years with an extension option to 25 years.

The 43.2-MW wind farm "Kokkoneva" will be built south of Kestilä in the municipality of Siikalatva in north-eastern Bottnia, not far from Lake Oulujärvi. The Nordex Group supplies the wind turbines in the cold climate version and installs them on tubular steel towers with a hub height of 155 meters. This enables the turbines to generate the highest possible yield at the site, which has an average annual wind speed of 7.4 m/s. The start of the installation is scheduled for the second half of 2021.

In 2019, ABO Wind was awarded the contract to operate the "Kokkoneva" wind farm in the first technology-neutral tender for renewables in Finland. "This underlines that we are one of the leading project developers in Finland," says Aapo Koivuniemi, Managing Director of ABO Wind Oy, the Finnish subsidiary of ABO Wind. The company, which has only been active in Finland since 2013, has already connected almost 100 MWs itself to the grid and sold project rights amounting to more than 210 MWs in the development phase. In the meantime, 22 employees from the Helsinki office are working on projects with a total volume of more than 1.5 GWs.

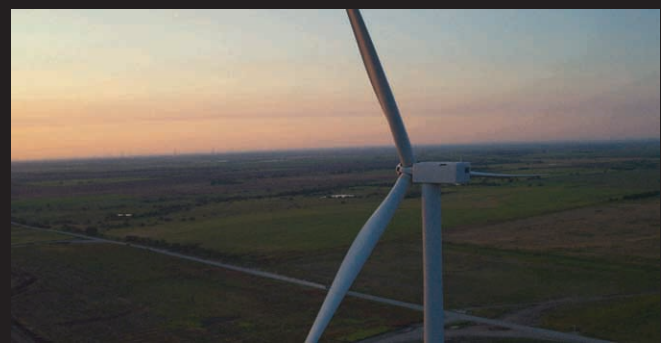
"We are very pleased with the renewed confidence in our technology and service expertise from ABO Wind. With this order, we are further expanding our position in the important wind market in Finland, where we have been active for a decade now and have achieved a leading position," said Patxi Landa, CSO of the Nordex Group. ABO Wind is since 15 years a long-standing customer of the Nordex Group with wind farm projects in Germany, France, Ireland and Finland so far.

## Enel Green Power Starts Construction of US Wind Farm Expansion

Enel Green Power started construction on the 199-MW expansion of the Cimarron Bend wind farm in Clark County, Kansas. The expansion, consisting of 74 turbines, will increase the plant's capacity to 599 MW from the current 400 MW, making it the largest wind farm in Enel's North American portfolio. Construction, which will involve an investment of over \$281 million, is expected to be completed by the end of 2020.

Cimarron Bend's first two phases entered into service in 2016 and 2017, involving an overall investment of over \$891 million. Upon completion of the 199 MW addition, Cimarron Bend will generate a total of more than 2.7 TWh per year, equivalent to avoiding 1.8 million tons of CO2 emissions.

The electricity from a 150-MW portion of the expansion is being sold under a 15-year bundled power purchase agreement (PPA) with electric services company Evergy. The PPA will include support for Evergy's



Source: GE

Renewables Direct program, which allows commercial and industrial customers to offset a percentage of their energy usage through renewable sources. In January, Evergy committed to reducing carbon emissions 80% below 2005 levels by 2050.

# REDAVIA's Free Solar Leases are a Big Hit in Ghana and Kenya

**R**EDAVIA has signed four new COVID-19 Resilience Leases in Ghana and Kenya, offering these businesses six months of free solar to withstand the COVID crisis.

Siginon Aviation is a ground handling company based at Jomo Kenyatta International Airport (JKIA) in Nairobi, Kenya. Its Corporate Social Responsibility (CSR) policy embraces environmental conservation for its communities' current and future generations, and REDAVIA's free solar power solution supports this CSR endeavor well.

"The partnership with REDAVIA comes at a time when the green agenda is a key business objective. This solar power solution gives Siginon Aviation the opportunity to reaffirm its commitment as a responsible corporate citizen," said Edwin Ronoh, Siginon Group Finance Leader.

Wonder Feeds Ltd recently upgraded its factory to accommodate its growing animal feed products business. When the COVID crisis hit the economy, management maintained the product prices for customers despite the increase of raw material costs, leaving the company with higher operating expenses. Faced with these economics, Managing Director Abdul Parkar was thrilled when REDAVIA extended the same helping hand to him that he extended to his customers.

Methodist University College Ghana President Akwasi Asabere-Ameyaw had been searching for an alternative energy solution for

some time now, but no solution fit until REDAVIA offered his institution the opportunity to reduce carbon emissions while also making savings that can be reinvested into the university.

Emigoh Ghana Ltd states that its philosophy and fundamental purpose is to make the future better and worth living by building a first-class organization that caters to Ghanaian people through quality health and nutrition.

Stephen Eku, CEO of Emigoh, said, "After working for years to create a premium, sustainable food supply chain, I am delighted to partner with a company like REDAVIA that will allow us to also reduce our carbon footprint in a cost-efficient way."

COVID-19 has disrupted African businesses significantly. In this challenging time, REDAVIA enables sound businesses to reduce their operating costs with a free solar plant leasing service. REDAVIA has introduced the COVID-19 Resilience Lease, which provides solar power plants to business customers for six months, completely for free.

Erwin Spolders, CEO & founder of REDAVIA, said, "We are glad to be able to make a difference for our business partners in this time of need and start win-win relationships that will last for decades. The COVID Resilience Lease Program is already a huge success, and we are keen to scale up the program further. We invite more companies to apply." **AEA**



By National Renewable Energy Laboratory (NREL)

# Research Points to Global Strategies for Recycling of Solar Panels

Source: NREL

**R**esearchers at the U.S. National Renewable Energy Laboratory (NREL) have conducted the first global assessment into the most promising approaches to end-of-life management for solar photovoltaic (PV) modules.

PV modules have a 30-year lifespan. There is currently no plan for how to manage this at the end of their lifespan. The volume of modules no longer needed could total 80 million metric tons by 2050. In addition to quantity, the nature of the waste also poses challenges. PV modules are made of valuable, precious, critical, and toxic materials. There is currently no standard for how to recycle the valuable ones and mitigate the toxic ones.

Numerous articles review individual options for PV recycling but, until now, no one has done a global assessment of all PV recycling efforts to identify the most promising approaches.

“PV is a major part of the energy transition,” said Garvin Heath, a senior scientist at NREL who specializes in sustainability science. “We must be good stewards of these materials and develop a circular economy for PV modules.”

Heath is lead author of “Research and development priorities for silicon photovoltaic module recycling supporting a circular economy,” which appears in the journal *Nature Energy*. His co-authors from NREL are Timothy Silverman, Michael Kempe, Michael Deceglie, and Teresa Barnes; and former NREL colleagues Tim Remo and Hao Cui. The team also collaborated with outside experts, particularly in solar manufacturing.

“It provides a succinct, in-depth synthesis of where we should and should not steer our focus as researchers, investors, and policymakers,” Heath said.

The authors focused on the recycling of crystalline silicon, a material used in more than 90% of installed PV systems in a very pure form. It accounts for about half of the energy, carbon footprint, and cost to produce PV modules, but only a small portion of their mass. Silicon’s value is determined by its purity.

“It takes a lot of investment to make silicon pure,” said Silverman, PV hardware expert. “For a PV module, you take these silicon cells, seal them up in a weatherproof package where they’re touching other materials, and wait 20 to 30 years – all the while, PV technology is

improving. How can we get back that energy and material investment in the best way for the environment?”

The authors found some countries have PV recycling regulations in place, while others are just beginning to consider solutions. Currently, only one crystalline silicon PV-dedicated recycling facility exists in the world due to the limited amount of waste being produced today.

Based on their findings, the authors recommend research and development to reduce recycling costs and environmental impacts, while maximizing material recovery. They suggest focusing on high-value silicon versus intact silicon wafers. The latter has been touted as achievable, but silicon wafers often crack and would not likely meet today’s exacting standards to enable direct reuse. To recover high-value silicon, the authors highlight the need for research and development of silicon purification processes.

The authors also emphasize that the environmental and economic impacts of recycling practices should be explored using techno-economic analyses and life-cycle assessments.

Finally, the authors note that finding ways to avoid waste to begin with is an important part of the equation, including how to make solar panels last longer, use materials more effectively, and produce electricity more efficiently.

“We need research and development because the accumulation of waste will sneak up on us,” Silverman said. “Much like the exponential growth of PV installations, it will seem to move slowly and then rapidly accelerate. By the time there’s enough waste to open a PV-dedicated facility, we need to have already studied the proper process.”

If successful, these findings could contribute one piece of a PV circular economy.

The U.S. Department of Energy’s Solar Energy Technologies Office funded the analysis.

## About NREL

*NREL is the U.S. Department of Energy’s primary national laboratory for renewable energy and energy efficiency research and development. NREL is operated for the Energy Department by The Alliance for Sustainable Energy, LLC. [AEA](#)*

# Innovative Field Shelter Delivers Off-Grid Cooling Solution for Remote Desert Base Station

*Solar power is increasingly being deployed to remote and off-grid operations*

A field equipment shelter fitted with fault-tolerant cooling is ensuring the reliability of a wireless communications link that connects instrumentation on a new gas pipeline crossing a Middle Eastern desert to the remote-control room. Fabricated from tough glassfiber-reinforced polyester (GRP) materials, the shelter houses a TETRA basestation powered by solar panels – in order to function reliably in an off-grid location some 50 km from the nearest town.

Intertec's shelter employs a 'hybrid cooling' system to safeguard the 56 m<sup>2</sup> shelter's electronics equipment, and battery power storage compartment – a Zone 1 area. The system consists of a water-based passive cooler assisted by dual-redundant electrically-powered water coolers. This approach combines the intrinsic reliability of passive cooling with active water refrigeration to increase cooling efficiency on hot days. The system can handle a cooling load of around 1.9 kW, ensuring that even during this Middle Eastern climate's summer – when ambient temperatures can climb as high as 55° C – interior shelter temperatures will always stay below a worst-case peak of around 35°C. At other times of the year, internal shelter temperatures are maintained far below these levels.

The remote location means that the basestation is far from the electricity grid and must be powered by solar energy. The passive cooling system, based on a water tank with internal and external heat exchangers, exploits the desert climate's daily temperature swing to store the coolness of the night and use it to moderate internal temperatures during the day. The water circulates around the system by natural convection, without electrical power or moving parts. This system alone manages the shelter's cooling needs during the winter months – typically keeping temperatures at around 18°-20° C. The two powered water coolers increase the efficiency of the cooling system during the hottest months – operating in an alternating sequence for fault tolerance – typically maintaining temperatures in the 20°-30° C range. Even if both water coolers were to fail, Intertec's passive system has enough cool water capacity to maintain low shelter temperatures for many days – giving maintenance staff plenty of time to access the remote site and make repairs.

The water coolers are a new variant of Intertec's novel Hybricool range that operate directly from a DC power supply – making them an efficient solution for solar-powered installations. These cooling units are specially designed to supplement passive coolers operating in process plants, with a heat exchanger element that can be installed inside the water storage tank of a passive cooling system to decrease temperature. This interior element is isolated from the rest of the externally-mounted refrigeration system, making it both an efficient and economic solution for explosion proof applications such as the battery compartment of this shelter.

Hybricool water coolers operate on the refrigeration principle. They have a closed loop system with four main components: compressor, condenser, expansion valve and coil. The coil is a heat exchanger element that can be installed inside the water storage tank of a passive cooling system to decrease temperature. The interior and exterior compartments are completely isolated from each other to stop any weather elements from entering the shelter.



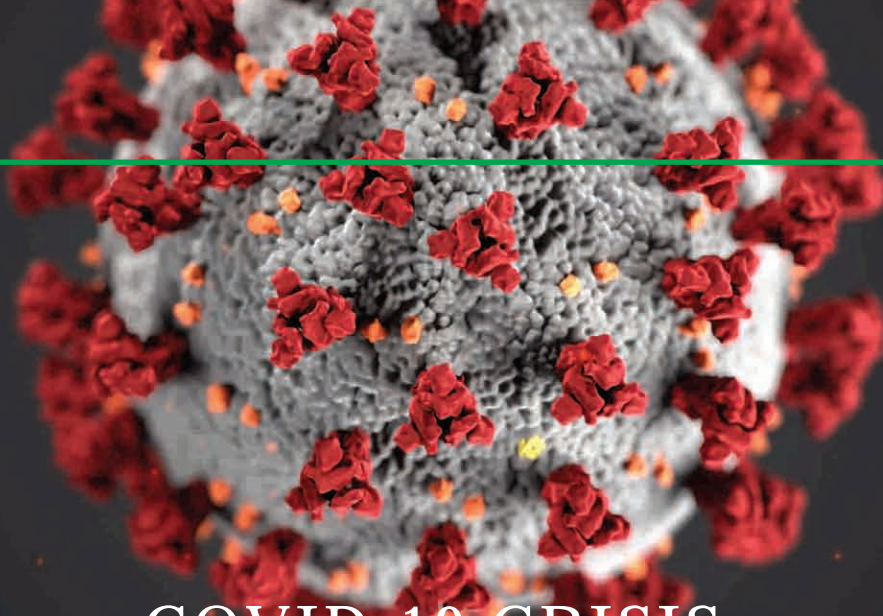
*Hybrid Base Station*

Source: Intertec

Cooling efficiency is aided by the shelter's construction, which uses composite wall panels with GRP sheets 'sandwiching' an embedded 85 mm layer of polyurethane foam insulation. In conjunction with a sunshade, this delivers very stable interior environmental conditions compared with conventional metal-based shelters. Intertec's manufacturing process allows it to fabricate composite GRP panels with many different material layers. In this application, the outer GRP layers provide exceptional resistance to corrosion – as GRP does not rust or degrade in any meaningful way. A further gel-coat layer on the exterior surface provides protection against the climate's very high levels of ultraviolet light, and abrasion from dust or sand. The externally-mounted water coolers additionally feature a centrifugal sediment separator that removes dust and sand, and flaps that close when the cooler is not operational.

A passive cooling system can typically limit the maximum internal temperature of cabinets or walk-in shelters to around 10 degrees Centigrade above minimum night-time temperatures – making it ideal for applications in arid and desert climates. The addition of Intertec's Hybricool water cooler technology reduces the dependence on low night-time temperatures, opening up applications in a much broader range of climates and geographical locations.

"Hybrid cooling for field shelters and cabinets is a major enabler for process plant operators that need to install electronics equipment in remote off-grid locations, and hostile environmental conditions," says Intertec's HVAC Project Manager, Simon Marlier. "The very high level of reliability that can be achieved by hybrid cooling, and its suitability for applications in hazardous areas, can greatly simplify many common remote and unmanned applications. Among the applications potential are wellhead control systems, SCADA stations on pipelines, battery shelters – especially for lead-acid and lithium-ion types – and off-grid mobile basestations." **AEA**



# COVID-19 CRISIS

## Causing the Biggest Fall in Global Energy Investment in History

*Source: International Energy Agency*

**T**he Covid-19 pandemic has set in motion the largest drop in global energy investment in history, with spending expected to plunge in every major sector this year – from fossil fuels to renewables and efficiency – the International Energy Agency said in a report released in late May.

The unparalleled decline is staggering in both its scale and swiftness, with serious potential implications for energy security and clean energy transitions. At the start of 2020, global energy investment was on track for growth of around 2%, which would have been the largest annual rise in spending in six years. But after the Covid-19 crisis brought large swathes of the world economy to a standstill in a matter of months, global investment is now expected to plummet by 20%, or almost \$400 billion, compared with last year, according to the IEA’s World Energy Investment 2020 report.



Source: IEA

*Dr Fatih Birol*

“The historic plunge in global energy investment is deeply troubling for many reasons,” said Dr Fatih Birol, the IEA’s Executive Director. “It means lost jobs and economic opportunities today, as well as lost energy supply that we might well need tomorrow once the economy recovers. The slowdown in spending on key clean energy technologies also risks undermining the much-needed transition to more resilient and sustainable energy systems.”

The World Energy Investment 2020 report’s assessment of trends so far this year is based on the latest available investment data and announcements by governments and companies as of mid-May, tracking of progress on individual projects, interviews with leading industry figures and investors, and the most recent analysis from across the IEA. The estimates for 2020 then quantify the possible implications for full-year spending, based on assumptions about the duration of lockdowns and the shape of the eventual recovery.

A combination of falling demand, lower prices and a rise in cases of non-payment of bills means that energy revenues going to governments and industry are set to fall by well over \$1 trillion in 2020, according to the report. Oil accounts for most of this decline as, for the first time, global consumer spending on oil is set to fall below the amount spent on electricity.

Companies with weakened balance sheets and more uncertain demand outlooks are cutting back on investment while projects are also being hampered by lockdowns and disrupted supply chains. In the longer-term, a post-crisis legacy of higher debt will present lasting risks to investment. This could be particularly detrimental to the outlook in some developing countries, where financing options and the range of investors can be more limited. New analysis in this year’s report highlights that state-owned enterprises account for well over half of energy investments in developing economies.

**“A combination of falling demand, lower prices and a rise in cases of non-payment of bills means that energy revenues going to governments and industry are set to fall by well over \$1 trillion in 2020...”**

Global investment in oil and gas is expected to fall by almost one-third in 2020. The shale industry was already under pressure, and investor confidence and access to capital has now dried up: investment in shale is anticipated to fall by 50% in 2020. At the same time, many national oil companies are now desperately short of funding. For oil markets, if investment stays at 2020 levels then this would reduce the previously-expected level of supply in 2025 by almost 9 million barrels a day, creating a clear risk of tighter markets if demand starts to move back towards its pre-crisis trajectory.

Power sector spending is on course to decrease by 10% in 2020, with worrying signals for the development of more secure and sustainable power systems. Renewables investment has been more resilient during the crisis than fossil fuels, but spending on rooftop solar installations by households and businesses has been strongly affected and final investment decisions in the first quarter of 2020 for new utility-scale wind and solar projects fell back to the levels of three years ago. An expected 9% decline in investment in electricity networks this year compounds a large fall in 2019, and spending on important sources of power system flexibility has also stalled, with investment in natural gas plants stagnating and spending on battery storage levelling off.

“Electricity grids have been a vital underpinning of the emergency response to the health crisis – and of economic and social activities that have been able to continue under lockdown,” Dr Birol said. “These networks have to be resilient and smart to ward against future shocks but also to accommodate rising shares of wind and solar power. Today’s investment trends are clear warning signs for future electricity security.”

Energy efficiency, another central pillar of clean energy transitions, is suffering too. Estimated investment in efficiency and end-use applications is set to fall by an estimated 10-15% as vehicle sales and construction activity weaken and spending on more efficient appliances and equipment is dialled back.

The overall share of global energy spending that goes to clean energy technologies – including renewables, efficiency, nuclear and carbon capture, utilization and storage – has been stuck at around one-third in recent years. In 2020, it will jump towards 40%, but only because fossil fuels are taking such a heavy hit. In absolute terms, it remains far below the levels that would be required to accelerate energy transitions.

“The crisis has brought lower emissions but for all the wrong reasons. If we are to achieve a lasting reduction in global emissions, then we will need to see a rapid increase in clean energy investment,” said Dr Birol. “The response of policy makers – and the extent to which energy and sustainability concerns are integrated into their recovery strategies – will be critical. The IEA’s upcoming World Energy Outlook Special Report on Sustainable Recovery will provide clear recommendations for how governments can quickly create jobs and spur economic activity by building cleaner and more resilient energy systems that will benefit their countries for decades to come.”

The Covid-19 crisis is hurting the coal industry – with investment in coal supply set to fall by one-quarter this year – but does not pose an existential threat. Although decisions to go ahead with new coal-fired plants have come down by more than 80% since 2015, the global coal fleet continues to grow. Based on available data and announced projects, approvals of new coal plants in the first quarter of 2020, mainly in China, were running at twice the rate observed over 2019 as a whole. **AEA**

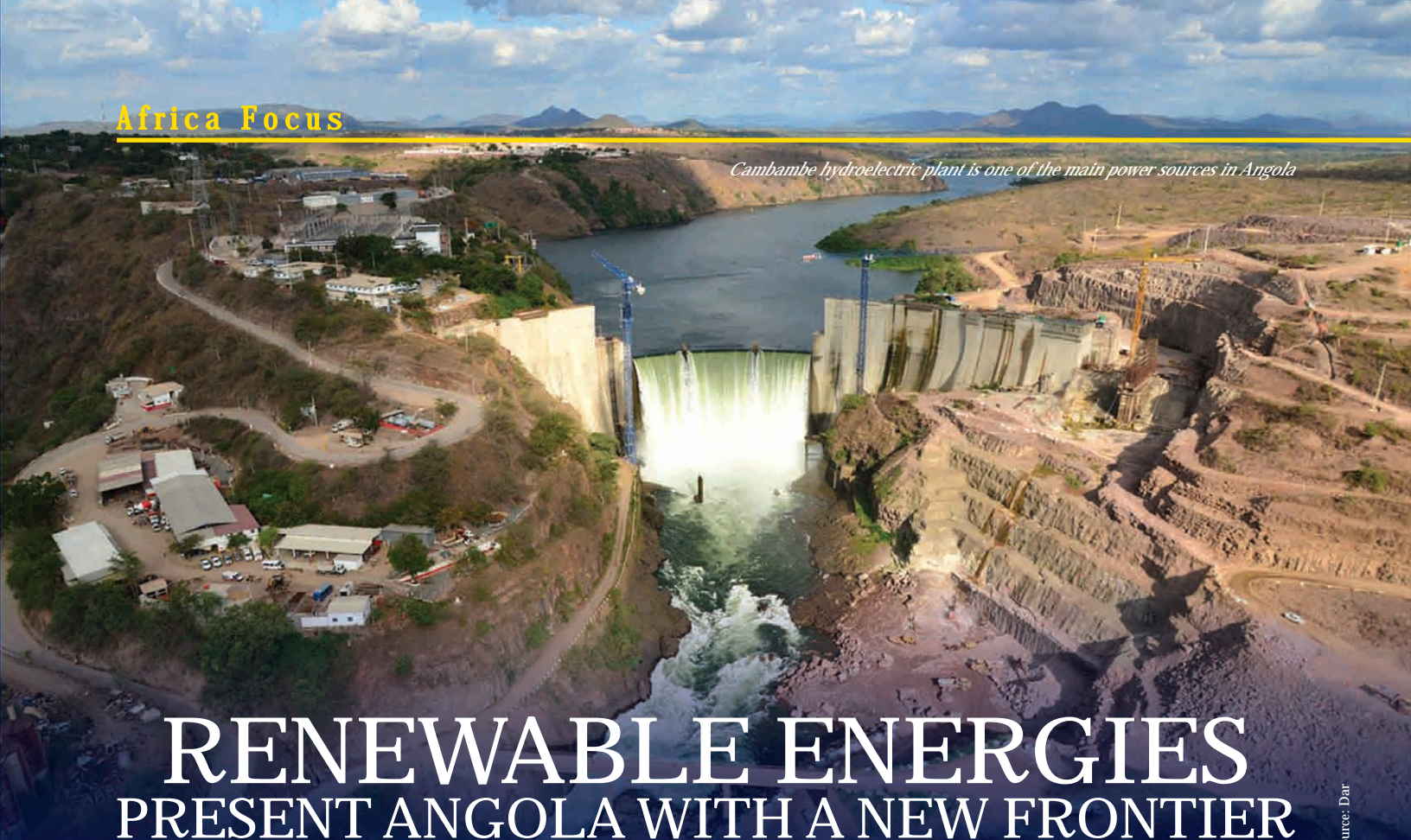
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Cambambe hydroelectric plant is one of the main power sources in Angola



Source: Dar

# RENEWABLE ENERGIES PRESENT ANGOLA WITH A NEW FRONTIER

While behind the majority of its African counterparts in the renewable energy sector, the Angolan government recently confirmed it is ready to invest nearly a billion dollars in clean and renewable energy in an effort to diversify the economy away from oil revenue dependence.

Spurring this new push is Angola’s desire to expand its power infrastructure and increase access to off-grid and under-electrified populations. The drop in global oil prices has accelerated its plans, as its incoming revenue has plummeted. The Covid-19 pandemic has served to exacerbate the issue.

While the pandemic and the oil price crash have more recently given the power and renewables sector a push, the country had started to make some moves prior to this. In 2016 the Angolan government made it clear it was looking beyond oil and gas and would aim to expand its electrification rates from 38% to around 60% under its “Angola Energy 2025 Vision.” Angola’s Energy 2025 Vision is focused on creating increased capacity and distribution capabilities, supported by new renewables and private sector investment in new power generation projects.

The construction of the Baynes hydroelectric dam falls within this vision. In March of this year, the governments of Angola and Namibia signed bilateral agreements for the construction of the cross-border Baynes hydroelectric dam. Located on the Cunene River on the border between Angola and Namibia, the 600-MW dam is planned for



Source: Ministry of Energy

According to H.E Joao Baptista Borges, Angola’s Minister of Energy and Water, the government is prepared to invest around \$500 million over the next two years in solar energy projects in the country as part of a strategy to increase clean energy generation, and bring electricity to the entire country.

Minister Joao Baptista Borges

Additionally, Angola expects to implement a \$400 million two-phase project in the clean energy segment, funded by the World Bank and the French Development Agency (AFD). The focus of the project is to improve the distribution of electricity in four Angolan provinces as well as reform the structure of public companies in the sector to increase access to affordable energy for under-electrified communities.

FACT BOX	
<b>GENERATION CAPACITY</b>	
Installed Generation Capacity:	<b>6,400 MW</b>
Current Access Rate:	36% // Rural: <b>8%</b> Urban: <b>43%</b>
Target:	<b>60% by 2025</b>
Hydroelectric:	<b>3,700 MW</b>
Thermal:	<b>2,700 MW</b>

Source: Power Africa



construction in 2021, with an estimated cost of \$1.2 billion and a completion date scheduled for 2025.

Of the 600 MW to be produced by the plant, 300 MW will be directed to Angola and Namibia, respectively. The terms of this agreement were approved by the governments of both countries in November 2014, within the framework of a feasibility study completed in 2013.

On the solar front, 300 MW of solar energy will be installed in the country, equivalent to a third of the capacity of the Cambambe hydroelectric plant (one of the main power structures in Angola), which, according to Minister João Baptista Borges, shows the government's commitment to renewable energy, especially whenever generation costs are competitive.

The government of Angola in April said it is planning to develop a 26-MWp photovoltaic solar power plant in Saurimo city, in the north-east Lunda Sud province. The project includes a transmission line and a 220kV substation. Construction is expected to commence in October and will last 17 months.

In June 2019, state oil company Sonangol and Italian major Eni established the Solenova joint venture. The purpose of this JV company is to assess and develop renewable energy opportunities in Angola. In November of that year ENI and the Angolan government announced they would jointly develop the 50-MW Caraculo Solar Plant in Namibe. The implementation of the first phase of the 25-MWp project will reduce diesel consumption by an estimated 13,500 cubic meters per year, reducing electricity production costs and greenhouse gas emissions by about 20,000 tonnes of carbon dioxide per year.

The country also reportedly has a 3-GW wind energy potential, but thus far there are no firm projects on the books. Qway Energy out of Belgium in late 2018 said it was looking to develop 500 MW of renewable energy in Angola, with wind and biomass to contribute around 200 MW of that total. Since the announcement, little has been heard about Qway's pipeline of projects.

On the power front, Angola will receive \$2 billion from South Korea for the construction of a power plant in the southern province of Benguela in February. The Africa-Korea Economic Development Association (AKEDA) and Angola's National Agency for Private Investment and Export Promotion signed the MoU. The deal is part of a global fund of \$5 billion the association plans to raise to invest in various projects in Angola.

## Getting Prepared

Drawing from its experience in the oil sector, the government is aware that Local Content will need to play a major role in developing its



*Voith training center Angola*

Source: rtdax

renewable energy sector and has taken steps to ready a work force. In February, technology group Voith signed a memorandum of understanding to build a renewable energy training center in Angola. With a view to stepping up its local commitment, the company intends to build this training center to provide training and professional development in the hydropower sub-sector.

The company will receive support in this venture from the Ministry for Energy and Water of the Republic of Angola (MINEA). The establishment of the Voith Academy and associated development of a training center are designed to provide basic and advanced training for skilled workers in Angola in technical and commercial occupations relevant to the hydropower industry.

In accordance with Voith's long-established dual training approach, it intends to build a training center for the theoretical part of the training. For the practical training component, Voith plans to work with the trainees to build a small hydropower plant in the Cuemba region. Voith will consult with MINEA in 2020 to determine a suitable location for the training center. The envisaged total investment will be in the region of several million euros.

## 2025 Fast Approaching

Angola's renewable energy industry is obviously in its nascent stages however, if political will is shown as it was with its oil sector, the country could very well leap ahead of some of its African counterparts. With just over four years left to achieve Vision 2025, it will be a wait-and-see game. While hydropower is well established and will continue to grow, creating an attractive and inviting investment climate will be key to accelerating the development of solar, wind and biomass in the country. **AEA**

By Toufik Khitous  
Business Development Manager for North Africa  
Wärtsilä Energy Business



### OPINION

# How Egypt Banks on Renewables to Meet Expected Surge of Energy Demand

*To meet its soaring demand for energy, Egypt is turning to renewable sources. Its targets, if accomplished, will see it become a pioneer in the African energy landscape. But are the plans realistic?*

**E**gypt's population has now passed 100 million. As one of the most populous and fastest-growing nations on the African continent, providing electricity to all its citizens is a matter of priority for the Egyptian government.

To ensure continuous security and stability of energy supply, Egypt has launched an energy diversification strategy, known as the 2035 Integrated Sustainable Energy Strategy (ISES), which aims to step up the development of renewable energy and energy efficiency in the country.

Egypt aims to produce 20% of its electricity using renewable sources by 2022 and 42% by 2035. For the second target, the goal is for wind to provide 14%, hydropower 2%, and solar 25%.

### Ambition driven by necessity

This is a hugely ambitious energy plan, but it is one that is necessary for Egypt to flourish. In particular, the country wants to diversify its mix of power sources. Egypt has introduced nuclear power and it is

also developing a few megaprojects that will bring a massive amount of gas into its energy mix.

This is in stark contrast to 2014, when, due to electricity shortages, Egypt was forced to introduce more coal into its energy mix in order to lower its dependence on imported gas. Rising demands, the falling costs of renewable energy, and the discovery of new natural gas resources have allowed Egypt to both diversify its energy mix and become an exporter of gas.

Furthermore, environmental concerns over the generation and use of coal have reinforced this ecological approach. Egypt has signed up to the United Nations Framework Convention on Climate Change (UNFCCC), meaning that it has no option but to reduce its dependence on fossil fuels.

### The spill-over effect

Tapping into renewable energy will benefit Egypt in ways more than one. It will enhance the country's economic growth and bring revenues



in foreign currency. The increased usage of renewable energy is expected to lead to exporting fossil fuels or using them in other areas domestically, such as industrial production.

The transition to renewable energy sources is also expected to help local businesses in Egypt, since the cost of electricity is an essential factor for business owners. While solar power and sustainable electricity are not widely available in the country yet, there is merit in Egypt's plan to tap into renewable energy resources in the long run. More factories will lean towards sustainable renewable energy if it is economical, due to the cost of production and increasing price of electricity.

### Need of the hour

But to leverage the benefits of the transition to renewable energy, Egypt needs to overcome a few infrastructural and geographic hurdles.

A report by the International Renewable Energy Agency (IRENA) provides a comprehensive assessment and recommendations for primary measures that Egypt must consider to achieve the goals set out in ISES. The report points out the need to update Egypt's electric power sector strategies to reflect the growing cost advantages and other benefits of renewable energy. It also focuses on reforming the existing market framework to improve the economic feasibility of projects.

Additionally, the country is very much split in two by the fabled river Nile, with many regions in the south still not connected to the national

grid. Egypt is very keen to invest in the tourism sector along the Red Sea, meaning there is a need for not only infrastructure but also the power to supply to these regions.

Egypt's situation has changed a lot since 2011. Nowadays, the issue is distribution rather than consumption. Egypt has a tradition of setting its energy distribution vertically. This has a rather negative impact on how the energy is consumed, but this can change since we are starting to see more industries coming into the country as Egypt is encouraging private sector participation.

### What lies ahead?

Between 2022 and 2027, Egypt plans to install an additional thermal power plant and two clean coal technology power plants. These initiatives are expected to exceed the nation's peak power and electricity demands. Of the renewable energy targets for 2022, both solar and wind are considered achievable. In particular, the Benban Solar Complex project, which is considered one of the largest solar PV power plant projects in the world, and has a total installed capacity of 1.8 GW, is foreseen to come online alongside a number of utility-scale wind farm projects in Gulf of Suez.

Egypt certainly has a lot of unanswered questions at present, but it does seem to be on the right track. Three big parts – gas, sea turbines and renewables – need to play their part going forward. Egypt has no choice; it must invest in renewables. The sector at the moment only makes up around 2% of the energy mix, but these announcements could raise it to 20% – this is almost a revolution. **AEA**



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# Green Deal to Feature at Ecomondo/Key Energy

The “Green Deal”, the new European economic policy of the Commission chaired by Ursula von der Leyen, will be covered in depth from 3<sup>rd</sup> to 6<sup>th</sup> November at Rimini Expo Centre on the occasion of the 24<sup>th</sup> edition of Ecomondo, the leading international exhibition of environmental technology and the 14<sup>th</sup> KEY ENERGY dedicated to renewable energies, smart cities and energy efficiency.

A key role is played by the two expos thanks to their top-grade informative facilities, in the form of seminars and conferences, organized by the Ecomondo Scientific Committee, led by Professor Fabio Fava, and Key Energy’s, led by Professor Gianni Silvestrini, scientific director of the Kyoto Club.

In the meantime, Italian Exhibition Group has announced new features for ECOMONDO and KEY ENERGY which will open up to further business opportunities for companies.

KEY ENERGY will host the launch of LUMIexpo, a section dedicated to “smart spaces” and “people centric” technology: the factors of strategic development of digital technologies will be based on the idea of smart spaces focused on people and therefore on their needs, where and when necessary, paying the utmost attention to reducing energy consumption and environmental impact.

LUMIexpo is a real opportunity for connecting those who buy, manage and apply integrated technology in smart systems to improve energy efficiency and safety in the environments constructed, from buildings to cities, to evolved industries, a focus on system integrators, facility/energy managers, security managers and designers.

At the 2019 edition, Ecomondo and Key Energy proposed a comprehensive showcase of over 1,600 companies, attracting 93,000 professional attendees.

Ecomondo 2020 will be formed by four expo macro-sectors: Wasteland Resources: Water (With the Integrated Water Cycle), CircularBio Economy; Remediation and Hydrogeological Risk.

These are all sectors in which Italy has already set a record: it is the European country with the highest circularity index. A virtuous cycle



with a value of 88 billion euros for country’s economy, an added value of 22 billion euros, and an overall workforce of 575,000.

However, from 2020 onwards, the challenge is becoming larger, due to the plan for the reduction of pollutant emissions prepared by the European Commission with the ambitious objective of zeroing them over the next 30 years. So the issues on which experts, public and private managers, researchers, civil society and associations will network at Ecomondo 2020 will regard Green Public Procurement; Ecodesign and the market of secondary raw materials; infrastructures suitable for the innovations of sharing economy; the role of cities and local areas; regulations on waste recycling; end-of-waste targets; soil protection and its essential role for a complete bio-supply chain of materials.

All instruments and choices that must take into consideration the general context of Climate Change, which, as well as being the setting, is also the final objective.

KEY ENERGY will also feature four expo sectors – and will have as its 2020 leitmotif “Where Energy Meets The Future”: Wind, Solar & Storage, Efficiency (distributed generation) and Sustainable City (Digital, Electric and Circular), where, as well as the topics of Smart Cities and electric transport, there will also be LUMIexpo, a thematic focus on the sustainable development of urban areas.

Key Energy 2020 is the platform at which public policies meet with the range of technology offered by the market to realize them, as well as being the opportunity for promoting legislative evolution on current issues, such as the necessity to regulate the development of energy communities as soon as possible. [AEA](#)

## Renewables Increasingly Beat Even Cheapest Coal Competitors on Cost

**R**enewable power is increasingly cheaper than any new electricity capacity based on fossil fuels, a new report by the International Renewable Energy Agency (IRENA) finds. Renewable Power Generation Costs in 2019 shows that more than half of the renewable capacity added in 2019 achieved lower power costs than the cheapest new coal plants.

The report highlights that new renewable power generation projects now increasingly undercut existing coal-fired plants. On average, new solar photovoltaic (PV) and onshore wind power cost less than keeping many existing coal plants in operation, and auction results show this trend accelerating – reinforcing the case to phase-out coal entirely. Next year, up to 1,200 gigawatts (GW) of existing coal capacity could cost more to operate than the cost of new utility-scale solar PV, the report shows.

Replacing the costliest 500 GW of coal with solar PV and onshore wind next year would cut power system costs by up to \$23 billion every year and reduce annual emissions by around 1.8 gigatons (Gt) of carbon dioxide (CO<sub>2</sub>), equivalent to 5% of total global CO<sub>2</sub> emissions in 2019. It would also yield an investment stimulus of \$940 billion, which is equal to around 1% of global GDP.

“We have reached an important turning point in the energy transition. The case for new and much of the existing coal power generation, is both environmentally and economically unjustifiable,” said Francesco La Camera, Director-General of IRENA. “Renewable energy is increasingly the cheapest source of new electricity, offering tremendous potential to stimulate the global economy and get people back to work. Renewable investments are stable, cost-effective and attractive offering consistent and predictable returns while delivering benefits to the wider economy.”

“A global recovery strategy must be a green strategy,” La Camera said. “Renewables offer a way to align short-term policy action with medium- and long-term energy and climate goals. Renewables must be the backbone of national efforts to restart economies in the wake of the

“Since 2010, utility-scale solar PV power has shown the sharpest cost decline at 82%, followed by concentrating solar power (CSP) at 47%, onshore wind at 39% and offshore wind at 29%.”

COVID-19 outbreak. With the right policies in place, falling renewable power costs, can shift markets and contribute greatly towards a green recovery,” he added.

Renewable electricity costs have fallen sharply over the past decade, driven by improving technologies, economies of scale, increasingly competitive supply chains and growing developer experience. Since 2010, utility-scale solar PV power has shown the sharpest cost decline at 82%, followed by concentrating solar power (CSP) at 47%, onshore wind at 39% and offshore wind at 29%.

Costs for solar and wind power technologies also continued to fall year-on-year. Electricity costs from utility-scale solar PV fell 13% in 2019, reaching a global average of 6.8 cents (\$ 0.068) per kilowatt-hour (kWh). Onshore and offshore wind both declined about 9%, reaching USD 0.053/kWh and \$0.115/kWh, respectively.

Recent auctions and power purchase agreements (PPAs) show the downward trend continuing for new projects that are commissioned in



Source IRENA

2020 and beyond. Solar PV prices based on competitive procurement could average \$0.039/kWh for projects commissioned in 2021, down 42% compared to 2019 and more than one-fifth less than the cheapest fossil-fuel competitor, namely coal-fired plants. Record-low auction prices for solar PV in Abu Dhabi and Dubai (UAE), Chile, Ethiopia, Mexico, Peru and Saudi Arabia confirm that values as low as \$0.03/kWh are already possible.

For the first time, IRENA’s annual report also looks at investment value in relation to falling generation costs. The same amount of money invested in renewable power today produces more new capacity than it would have a decade ago. In 2019, twice as much renewable power generation capacity was commissioned than in 2010 but required only 18% more investment.

# Global Electric Vehicle Market Expands Despite COVID-19

The number of electric cars on the road is expected to reach almost 10 million this year, as sales grow despite the Covid-19 pandemic, according to a new report by the International Energy Agency.

Electric car sales are expected to fare better than the overall passenger car market, with EV sales this year to broadly match the 2.1 million sold in 2019, according to the latest edition of the IEA's Global EV Outlook. This would account for a record 3% of the total global car sales. Based on data from January to April this year, total global passenger car sales this year are set to decline by 15%.

The Covid-19 pandemic will affect global vehicle markets, and how governments respond to the pandemic will influence the pace of the transition to electric vehicles.

Global electric car sales grew by at least 30 percent every year over the past decade except for 2019, when growth slowed down to 6% as the regulatory environment changed in China and passenger car sales contracted in major markets. Even so, electric cars had another banner year in 2019, securing their highest ever share – 2.6% – of the global car market.

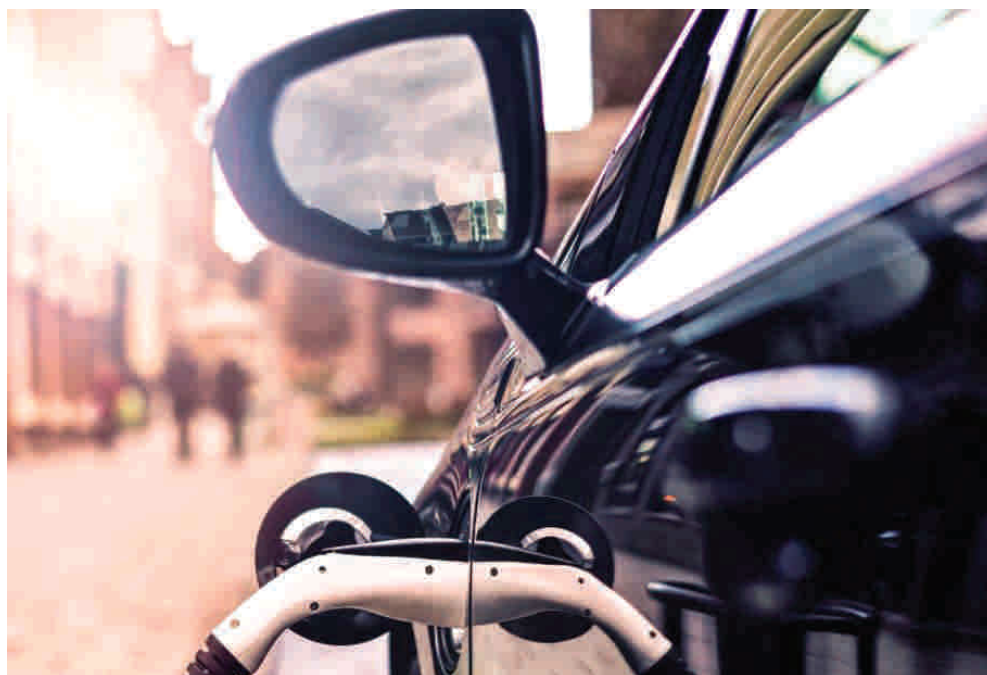
Last year, electric vehicles performed differently in markets worldwide. China remained by far the largest electric car market in the world, accounting for half sold in 2019. More than 1 million electric cars were sold in China in 2019, a 2% decrease from the previous year. Europe was the second largest market, with 561,000 cars sold in 2019. The United States followed with 327,000 cars sold.

Electric cars are expected to account for nearly 1% of the global car stock with this year's sales. However, the report explains that second waves of the pandemic and slower-than-expected economic recovery could lead to different outcomes. Ultimately, government responses to the pandemic and how consumers emerge from the crisis will determine what happens to electric car markets in 2020 and beyond.

Electric vehicles play a critical role in meeting the environmental goals of the IEA's Sustainable Development Scenario to reduce local air

pollution and to address climate change. In 2019, all electric vehicles combined avoided the consumption of almost 0.6 million barrels of oil products per day globally. Also, electricity generation to supply the global electric vehicle fleet emitted about half the amount that would have been emitted from an equivalent fleet of internal combustion engine vehicles.

In the Sustainable Development Scenario, the global electric vehicle stock (excluding two/three-wheelers) grows by 36% annually, reaching 245 million vehicles in 2030 – more than 30 times above today's level. In 2030, electric vehicles reduce GHG emissions by almost half



Source: IEA

compared to an equivalent fleet of internal combustion engine vehicles in the Stated Policies Scenario and by two-thirds in the Sustainable Development Scenario.

Global EV Outlook, the flagship publication of the Electric Vehicles Initiative (EVI), combines historical analysis with projections to 2030, providing key insights on electric vehicle and charging infrastructure deployment, ownership cost, energy use, carbon dioxide emissions and battery material demand. This year's edition analyses the development of the global EV market and the impact of Covid-19, recent policy developments from around the world, EV projections for 2030, the technology and environmental performance of batteries and potential roles of EVs in power systems.

## Vaya Africa Launches Electric Vehicle, Targets African Market

**V**aya Africa, a Mauritius-registered Transportation as a Service (TaaS) company, has launched an electric vehicle service in Zimbabwe as part of the company's rollout strategy across Africa.

"We are excited to launch the 'VAYA Electric' vehicle today as we start our journey of deploying innovative ways of harnessing clean, renewable energy to provide safe and convenient transportation services to the public on the African continent," said Dorothy Zimuto, the CEO of Vaya Mobilty in Harare. VAYA Africa plans to roll out the VAYA Electric vehicle in West and East Africa soon, and the vehicles will include a range of multi-purpose vehicles.

"Our e-vehicle fleet will include passenger vehicles, motorbikes, vans, buses and dump trucks, all utilizing our VAYA hail riding platform. We believe this dovetails well with our vision of driving inclusive technology growth across Africa," Zimuto said.

The VAYA Electric will be part of VAYA Africa's VAYA Premium service, a passenger service available on the VAYA Africa application that offers a wide variety of VAYA services – including logistics services.

Describing the customer fulfilment process, Zimuto said to enjoy a ride, one simply downloads the VAYA Africa App and looks for the Mobility Option. "They select the Electric Vehicle and this prompts them to choose the pickup and destination addresses, before requesting



Source: VAYA Africa

a ride," she said. The App provides for convenient payment options, including mobile money payment, payment by VISA, MasterCard or any other international debit or credit card option.

"Electric vehicles have zero emissions and our aim is to ensure that all vehicles we have on the VAYA platform in the next 10 years are electric vehicles," said Zimuto, whose VAYA Africa service currently operates the largest hail riding service in Zimbabwe. She also added that electric vehicles will provide cost savings of up to 40 percent on the major running costs of fuel and regular maintenance, in comparison to vehicles that run on fossil fuels. [AEA](#)

### S O C I A L   M E D I A   P O S T S

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### EETC Wins Sustainability Award from EBRD

Egypt's Electricity company has received an accolade from the European Bank for Reconstruction and Development (EBRD). The North African country's Minister of International Cooperation Rania Al-Mashat announced that Egypt won a 2020 Sustainability Award from the institution.

The Egyptian Electricity Transmission Company (EETC) won the Silver Award in the "Sustainable Energy" category for its commitment to innovation, as well as pioneering steps to promote equal opportunities and 'green skills' for women in the country's renewable energy sector.

The Minister praised EBRD for celebrating project achievements through the annual Sustainable Awards, pointing out that this encourages its members to promote environmental and social sustainability, expand renewable energy projects, and endorse women economic empowerment supporting the implementation of the Sustainable Development Goals (SDGs).

In 2019, EBRD with the Ministry of International Cooperation, supported EETC with a sovereign loan of €83 million to improve and expand the electricity grid across Egypt, which included the integration of 1.3 GW of new renewable energy, resulting in a reduction of 77,000 tonnes of CO<sub>2</sub> emissions per year.

### Investec Backs Pele Green Energy Expansion

South African and UK specialist bank Investec will provide financing to Pele Green Energy to support its plans to expand its wind and solar projects in Africa. The first round of financing was arranged through a preference-share funding arrangement that will invest in project equity and working capital, Pele Green Energy co-founder Obakeng Molabi said in an interview, according to a posting on Pele's social media.

A Bloomberg report states that Investec is providing acquisition funding to help Pele increase its 35% stake in the 36-MW concentrated solar project in the Western Cape, citing Andre Wepener, the lender's head of power and infrastructure finance.

Pele plans to invest and increase its equity in a wind-farm project currently being built and is preparing to bid on a 2,000-MW emergency renewable-energy program. It also plans to participate in the fifth round of South Africa's Renewable Energy Independent Power Producer

Procurement Program (REIPPP), expected in 2021.

### Trina Solar Recognized as a Top Performer

Trina Solar, a world-leading PV and smart energy total solution provider, has been recognized as a "Top Performer" for outstanding product reliability and performance among global PV module manufacturers by PV Evolution Labs (PVEL), the leading independent test laboratory for the global downstream solar industry.

The company is one of only two PV module manufacturers with worldwide reach to gain the recognition for the sixth consecutive time since the Top Performer designation was established.

The recognition is based on the results of the Product Qualification Program (PQP), presented in the 2020 PV Module Reliability Scorecard issued by PVEL, following factory inspections that took place over the 18 months leading up to 2020. With a focus on evaluating the performance of PV modules in terms of thermal cycling, damp heat, dynamic mechanical load, potential-induced degradation, PAN files, etc., the PQP was designed to independently recognize manufacturers who outpace their competitors in product quality and durability, and provide PV equipment buyers and power plant investors with independent, consistent reliability and performance data that supports effective supplier management.

### Building Energy Launches JV for RE in MEA

Building Energy's management, in partnership with Inspired Evolution's Evolution II Fund, has successfully closed a buy-out of Building Energy's Africa and Middle East business to launch the newly branded Red Rocket. The new joint venture will see the re-capitalization and positioning of Red Rocket to become one of Africa's leading emerging renewable energy independent power producers (IPPs). Evolution II holds a majority shareholding in the reconfigured IPP platform and is advised by Inspired Evolution, an Africa-focused investment advisory firm that specializes in clean energy infrastructure and resource efficiency investments.

The ground-breaking partnership brings together two seasoned professional teams with deep sector experience and proven renewable energy project development and auction conversion success to ramp up Red Rocket's activities across Africa. The buy-out deal leverages the resources of multiple Development Finance Institutions (DFIs) and international investors together with local

leading South African investment institutions active across Africa, secured via Inspired Evolution and Red Rocket's existing relationships, to strengthen and forge stronger partnerships for its African expansion.

Red Rocket is an integrated renewable energy IPP that develops, designs, constructs, operates, and owns utility-scale grid-connected renewable energy projects (wind, solar, hydro and biomass) with operations in multiple countries across Africa. Founded in 2012 and headquartered in Cape Town, the company now known as Red Rocket was originally set up as the Africa and Middle East business unit of Building Energy's global operations.

Its portfolio comprises 377 MW of projects in operation, under construction and awarded under public and private bids. The Group is also developing a portfolio in excess of 2 GW of additional best-in-class wind, solar, hydro and biomass projects to bid under future rounds of South Africa's renewable energy independent power producer procurement program and other procurement programs across various African countries.

### ArcVera Renewables Launches Energy Storage Project Technical Service Offering

ArcVera Renewables, a leading provider of consulting and technical services for renewable energy projects with more than 40 years of global experience, is now providing expert technical, financial, and independent engineering services for stand-alone energy storage or hybrid projects. With over 100-gigawatts of operating renewable energy projects supported across 6 of 7 continents, ArcVera is recognized as one of the top technical consultants in the industry. Leaning on its expertise in both high-frequency time series resource and energy storage, ArcVera will enable a reliable and durable integration of storage capacities into a renewable energy plant design. Its evaluations will also include assessments of the manufacture and supply chain to assure the plant can be built and performs as designed. Post-construction, ArcVera will evaluate and advise operations, asset management, software controls, and best-practice maintenance.

"Energy storage technology is fast becoming an economic standalone or hybrid solution for renewable energy project developers. With our advanced technical expertise sitting at the intersection of resource and energy storage assessment, we can deliver the accurate and bankable insights they need to deploy storage



capacities effectively. Such highly specialized skills are what clients want to be able to rely on to make confident project development decisions, lower their risks, and maximize project value,” commented Gregory S. Poulos, CEO of ArcVera Renewables.

ArcVera Renewables provides finance-grade consulting and technical services for wind, solar and storage projects worldwide. For the last four decades, ArcVera Renewables has been dedicated to delivering next-generation innovation in renewable energy to meet the needs of landowners, project developers, investors, project owners and operators globally. It provides technically sound and accuracy-driven technical services, including prospecting and resource assessment, independent technical and financial engineering, as well as plant optimization, operations and repowering.

#### **Azure Power Appoints New Non-Executive Director**

Azure Power announced that Ms. Supriya Prakash Sen has been appointed to Azure Power’s Board of Directors as an independent non-executive Director. Ms. Sen’s appointment expands the Board to 10 directors, seven of whom are independent as per NYSE guidelines and two are female.

Ms. Sen has over 30 years of experience in banking, private equity, capital markets and multilateral funding and investment as well as a significant involvement in sustainability initiatives globally and in India. Currently a Senior Advisor with McKinsey & Co, she also serves as independent director for firms and non-profits in Asia where her emphasis has been on strategy, governance and fund-raising. As strategy consultant she has also worked on differentiated

funding models for enabling private investment into green infrastructure.

Previously, she worked as a private equity investor and project finance banker on climate-smart transactions in energy, mobility, telecom, urban & water, social infrastructure, and banking sectors in India, China, South East Asia and Middle East, and in advisory and investment roles within Public Private Partnership infrastructure projects for banks and financial institutions such as Citigroup Global Markets, Asian Development Bank, and the World Bank Group.

#### **Eni Launches New Business Structure to be a Leader in the Energy Transition**

Italy’s Eni, traditionally a major oil firm and now rebranding to become an “energy company”, saw its Board of Directors, chaired by Lucia Calvosa, approve a new business structure for the company which will see it move more toward an environmentally sustainable future and reduce carbon emissions.

The new organization, presented by Eni’s Chief Executive Officer Claudio Descalzi to the Board of Directors, is a milestone in the implementation of the company’s strategy unveiled in February, which sets the evolution of the business over the next 30 years. The key, and as of today unique, element of this strategy is the combination of growth objectives with financial value creation as well as environmental sustainability, which will lead to a significant reduction in full life-cycle carbon emissions.

The new Eni will have two business groups – Natural Resources and Energy Evolution. Alessandro Puliti will lead Natural Resources and Massimo Mondazzi will lead Energy Evolution. Both were proposed to

the Board by the CEO, in agreement with the Chairwoman.

Natural Resources will continue to build up the value of Eni’s oil & gas upstream portfolio, with the objective of reducing its carbon footprint by scaling up energy efficiency and expanding production in the natural gas business, and its position in the wholesale market. Furthermore, it will focus its actions on the development of carbon capture and compensation projects. Continuous technological development, and increased efficiency will allow the maximization of cash generation, even in challenging scenarios.

Energy Evolution will focus on the evolution of the businesses of power generation, transformation and marketing of products from fossil to bio, blue and green. In particular, it will focus on growing power generation from renewable energy and biomethane, it will coordinate the bio and circular evolution of the company’s refining system and chemical business, and it will further develop Eni’s retail portfolio, providing increasingly more decarbonized products for mobility, household consumption and small enterprises. Thanks to the business group’s coordination, the company will be able to develop these activities in an integrated way, both geographically and in terms of business line, maximizing results in terms of product development, customer service and profitability.

The business group will incorporate the activities of power generation from natural gas and renewables, the refining and chemicals businesses, Retail Gas&Power and mobility Marketing. The companies Versalis (chemical products) and Eni gas e luce will also be consolidated in this business group.

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## Seal of Excellence for AW-Energy Oy and its WaveRoller® Wave Energy Project

Finnish company, AW-Energy Oy (AWE), the global wave energy technology company and developer of WaveRoller®, has received the EU Seal of Excellence award from Horizon 2020, the EU’s research and innovation funding program. It follows the company’s project submission to the EU’s EIC Accelerator program.



Source: AW Energy

Christopher Ridgewell, CEO of AWE, says: “We are delighted our project is recognized with the EU Seal of Excellence. It clearly demonstrates recognition of our commercial competence and excellence in innovation, supported by our in-house technical expertise, to deliver a market-ready device that is tested and proven as a near-shore wave energy converter (WEC).”

An international judging panel including business angels, entrepreneurs, venture capitalists and experts from innovation hubs, evaluated AWE’s wave energy project. It was judged to provide strong added-value, being commercially viable and better than existing solutions on the market. The wave energy sector represents significant opportunities for investment as global energy needs are predicted to rise, combined with the political and social pressure to supply future energy using sustainable, low carbon sources.

Wave energy is itself a highly predictable form of energy, 24/7, 365 days a year, and a CO2-free power source for hundreds of millions of people. AWE’s technology helps to extract energy from waves that are accessible to 80% of the world’s largest cities, which are in coastal areas. Theoretical estimates have recently been published which show global output of wave power to be 29,500 TWh/yr, equivalent to 125% of the current global demand for electricity.

With projects in US, Europe and Asia, AWE expect to see rapid sales for its wave energy technology as governments, operators and energy

policy strive for cleaner and more sustainable power generation solutions ahead of next year’s global UN climate talks.

It is leading this transformation across the global wave energy sector with its WaveRoller® technology that will go further and deeper into the renewables energy mix. It pushes the boundaries with exciting results and makes a valuable contribution as a hybrid ‘plug-in’ technology to the mix of wind and solar power generation.

The EU Seal of Excellence award recognizes AWE’s technology as a viable solution in the transition to ocean-based renewable energy, and as a way for the sector to create jobs and revenue internationally.

It is also the first marine energy technology to be qualified through certification by Lloyd’s Register to mitigate risks and provide investors with confidence in the delivery of functional wave energy technology.

## PowerOptimal and Electrolux Team for Solar Water Heating Solutions for Southern Africa

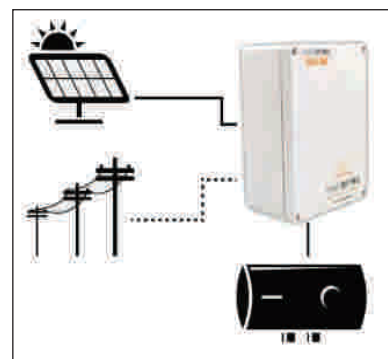
PowerOptimal, a leader in innovative sustainable energy and demand management solutions, has announced that it has partnered with the South African subsidiary of Swedish global appliance giant Electrolux, to bring cost-effective, sustainable solar photovoltaic (PV) water heating solutions to the South African market.

This exclusive partnership will see PowerOptimal’s Elon solar PV water heating technology sold alongside Electrolux’s leading Kwikot Superline electric water heaters (geysers). With deployment of the PowerOptimal Elon range, a customer can add solar capability to most standard electric geysers, without the need for an inverter or battery. It is the most straightforward and most convenient means to take advantage of solar and traditional power in an existing solution.

“We are very pleased to announce our partnership with PowerOptimal. The company’s sustainable energy solutions align perfectly with our global commitment to sustainability, which is to shape living for the better,” states Mark Moyce, National Sales & Marketing Director at Electrolux South Africa. “By including the Elon into our range of water heating solutions, we are offering developers, builders and all users of geysers a means to take advantage of the abundant solar resource we have in this country at a fraction of the cost.”

According to both parties the partnership makes perfect sense, as the organizations are an excellent cultural fit, the technologies integrate seamlessly, and the technical excellence from both are providing a superior technology solution designed to support and grow mass adoption of sustainable energy.

The innovative PowerOptimal Elon range enables direct connection of solar PV panels to standard electric geysers. It requires no inverter and no batteries, is cost-effective, offers a long lifespan and requires almost no maintenance, making it one of the lowest cost per unit of energy (kWh) solutions for water heating available on the market today.



Source: Power optimal

PowerOptimal's Elon range solution can run entirely off the grid, or with grid AC power as backup. In addition, it can be used by property developers for conformance to SANS 10400-XA's Regulation XA2, which requires that at least 50% of the annual water heating requirement for all new buildings shall be from a source other than grid electricity.

**Siemens Gamesa Launches 14 MW Offshore Direct Drive Turbine with 222-Meter Rotor**

The winds of change have never been stronger, especially when it comes to meeting the world's needs for clean, renewable energy. Siemens Gamesa's new SG 14-222 DD offshore Direct Drive wind turbine now sees the light of day as a part of the solution.

With an unprecedented 14-MW capacity – reaching up to 15 MW using the company's Power Boost function, a 222-meter diameter rotor, 108-meter long blades, and an astounding 39,000 m2 swept area, the newest Siemens Gamesa wind turbine stands tall in a world currently undergoing enormous upheaval.

The 14 MW capacity allows one SG 14-222 DD machine able to provide enough energy to power approximately 18,000 average European households every year. Approximately 30 SG 14-222 DD offshore wind turbines could furthermore cover the annual electricity consumption of Bilbao, Spain.

The 222-meter diameter rotor uses the new Siemens Gamesa B108 blades. As long as almost three Space Shuttles placed end-to-end, each 108-meter



Source: Siemens Gamesa

long IntegralBlade® is cast in one piece using patented Siemens Gamesa blade technologies. Additionally, the turbine's massive 39,000 m2 swept area is equivalent to approximately 5.5 standard football pitches. It allows the SG 14-222 DD to provide an increase of more than 25% in Annual Energy Production compared to the SG 11.0-200 DD offshore wind turbine.

Furthermore, the new offshore giant features a low nacelle weight at 500 metric tons. This light weight enables Siemens Gamesa to safely utilize an optimized tower and foundation substructure compared to a heavier nacelle. Benefits thus arise in the form of lower costs per turbine by minimizing sourced materials and reducing transportation needs.



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**Burundi Elects New President**

Voters in Burundi turned out in good numbers to cast their ballots to replace the country’s long-reigning, autocratic president. Burundi’s election commission declared the governing party’s candidate, Evariste Ndayishimiye, the winner of the country’s presidential election amid accusations of irregularities by the leading opposition challenger.



*Evariste Ndayishimiye*

Ndayishimiye, a retired army general, won 68.72 percent of the votes. The main challenger, Agathon Rwaso, reportedly garnered 24.19 percent, according to the electoral commission. There was a turnout of 88 percent.

The vote was the first competitive presidential election in Burundi since a civil war erupted in 1993.

The vote was preceded by political violence, including the arrest, torture and murder of opposition activists, according to a local rights group.

**Top Terrorist Leader Killed in Mali**

The Minister for the French armed forces, Florence Parly, announced in early June that French armed forces, with the support of their partners, killed the emir of Al-Qaida in the lands of the Islamic Maghreb (AQIM), Abdelmalek Droukdal, and several of his close collaborators, during an operation in northern Mali.

Droukdal served as the emir of AQIM and was involved in all aspects of the organization to include financing, planning, and the facilitation and execution of terrorist attacks. The operation permanently eliminated the most senior decision-maker of AQIM and the likely architect of the Sahel-based jihadist movement.

**Insurgents Killed in Mozambique**

According to the Mozambican Ministry of Interior, security forces killed around 50 insurgents in the northern Cabo Delgado region that has been plagued by violence for several years.

“On May 13 the insurgents were surprised by our forces on a road that connects Chinda to

Mbau, ... in the confrontation 42 terrorists were killed,” Interior Minister Amade Miquidade said at a news conference.

He added that security forces had killed another eight insurgents who were attacking the Quissanga district, also in Cabo Delgado.

Initial attacks were claimed by a group known as Ahlu Sunnah Wa-Jama although recently, Islamic State has claimed a number of attacks.

**DRC Court Finds President’s Chief of Staff Guilty of Corruption**

A court in the Democratic Republic of Congo has found President Felix Tshisekedi’s chief of staff, Vital Kamerhe, guilty of corruption. Kamerhe faced charges of embezzling almost \$50 million in public funds and was sentenced to 20 years’ hard labor. His lawyers have said they will appeal the verdict.

Lebanese businessman Jammal Samih was also sentenced to 20 years’ hard labor in the same trial.

Supporters of Kamerhe said the trial was a political move to prevent him from standing for president. Kamerhe will also be banned for running for the presidency for 10 years after completing his sentence.

**Libya’s GNA Retakes Tripoli**

Over late May and early June, forces for Libya’s Government of National Accord (GNA) recaptured the last major stronghold of opposition forces led by former general Khalifa Haftar. Haftar’s Libyan National Army (LNA) was forced out of the town Tarhouna near the capital city Tripoli. A spokesman for the LNA confirmed that its forces had withdrawn from Tarhouna where they had dominated in the ongoing battle for over a year.

The GNA has been backed by Turkey, while Haftar, whose LNA still controls the east and oil fields in the south, has been supported by Russia, Egypt and the United Arab Emirates.

Days earlier, the United Nations Support Mission in Libya (UNSMIL) said that it welcomed the acceptance by the GNA and LNA of the resumption of talks on a ceasefire and associated security arrangements based on the draft

agreement submitted by UNSMIL to the parties during the Joint Military Commission talks (5 + 5) (JMC) in February.

**New Evidence of Russian Aircraft Active in Libyan Airspace**

According to U.S. Africa Command, Russian aircraft delivered to Libya in late May are being actively flown in Libya. Africom stated Russia’s introduction of manned, armed attack aircraft into Libya changes the nature of the current conflict and intensifies the potential of risk to all Libyans, especially innocent civilians.

“These Russian aircraft are being used to support private military companies (PMCs) sponsored by the Russian government. U.S. Africa Command has photographic evidence of a Russian aircraft taking off from al-Jufra, Libya. A MiG-29 was also photographed operating in the vicinity of the city of Sirte, Libya,” a release on Africom’s website stated.



Source: Africom

“Russia’s sustained involvement in Libya increases the violence and delays a political solution,” said U.S. Marine Corps Brig. Gen. Bradford Gering, USAFRICOM director of operations. “Russia continues to push for a strategic foothold on NATO’s southern flank and this is at the expense of innocent Libyan lives.”

In late May, USAFRICOM reported that at least 14 MiG-29s and several Su-24s were flown from Russia to Syria, where their Russian markings were painted over to camouflage their Russian origin. These aircraft were then flown into Libya in direct violation of the United Nations arms embargo.

“We know these fighters were not already in Libya and being repaired,” said Col. Chris Karns, director of USAFRICOM public affairs. “Clearly, they came from Russia. They didn’t come from any other country.”

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