

A MONTHLY REVIEW OF ENERGY-RELATED NEWS

# SOUTH AFRICA ENERGY ROUNDUP

OCTOBER 2018

## ESKOM GENERATION AND SALES

### Eskom has coal shortages at ten power plants

Power utility Eskom said on September 17 that it had fewer than 20 days of coal supplies left at 10 of its 15 coal-fired power stations, posing a threat to national power supplies. A company spokesperson said a major supplier, owned by the Gupta family, had cut supplies as it sought insolvency protection, and Eskom was quickly trying to secure new contracts with other companies to ensure it had enough coal. Eskom, which is battling to recover from a financial and a leadership crisis, said it would transport coal from other power stations to those facing constraints and is in discussions with 12 coal suppliers to secure coal contracts.

## ESKOM CORPORATE AND FINANCES

### New Eskom strategy to include pan-African expansion roadmap

State-owned electricity utility Eskom has confirmed that its new strategy, which will involve far-reaching changes to its business model, will seek to position the company for opportunities arising in the rest of Africa. The review is also investigating the prospects of Eskom offering new products and services while responding to the technology changes under way in the electricity supply industry. The utility also insists that the delay in the finalisation of its new long-term strategy by November, rather than September, will have no negative consequences for the timing of the release of its new corporate plan, which remains scheduled for completion by the end of February 2019. It has also reiterated that the new corporate plan will be fully aligned with the revised strategy, which will aim to make Eskom's business model more responsive to technology changes in the industry, as well as the risk of a "utility death spiral".

## TRANSMISSION AND DISTRIBUTION

### AfDB extends R2.87bn loan to Eskom to expand its transmission network

The African Development Bank (AfDB) has approved a R2.87-billion loan for State-owned power utility Eskom

to upgrade and expand its transmission facilities. The funding supports the Eskom Transmission Improvement Project, which will result in the construction of 555 km of 400 kV transmission lines in KwaZulu-Natal and Mpumalanga, as well as the upgrading of substation equipment and the improvement of various substation earth mats in Mpumalanga.

The transmission lines will provide additional power evacuation paths for new generation capacity and allow for the reduction of network losses, as well as ensure the availability of power for future load growth, and the safety of personnel and assets during network operations to ensure compliance to the grid code. The AfDB's intervention will allow for the provision of additional power evacuation paths to the network from the Kusile and Majuba power stations, and its Drakensberg and Ingula pumped-storage schemes. It will also benefit Eskom's corporate restructuring and governance programme.

## PRIVATE COAL

### Marubeni says Thabametsi unaffected by group's policy to halve coal capacity by 2030

Japan's Marubeni Corporation reports that the development of the Thabametsi coal-fired power station, in South Africa, has not been affected by the group's September 18 policy decision to "no longer enter into any new coal-fired power generation business". As part of the policy change, Marubeni announced that it would halve its coal-fired power net generation capacity of 3 GW by 2030 and would expand the ratio of power generated from renewable energy from about 10% currently to 20% by 2023. Marubeni has total net power generating capacity of about 12 GW worldwide. In response to questions posed by *Engineering News Online* regarding the possible implications of the policy decision on Thabametsi, Marubeni said the policy was not applicable to Thabametsi, as it "dealt only with "new" coal-fired power generation, with the South African venture regarded as a "committed project". The 557 MW project is proposed for development near Lephalale, in Limpopo, and is one of two independent power producer (IPP) projects procured in 2016 under the South African government's Coal Baseload Independent Power Producer Procurement Programme. The other project is the 306 MW Khanyisa coal-fired power station project, in Mpumalanga, which is being developed by a consortium led by ACWA Power, of Saudi Arabia. Thabametsi and Khanyisa were the only two projects to participate in the bid window, which closed on November 2, 2015.

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The Life After Coal Campaign contends that the two proposed IPPs will never be built. The organisation is a collaboration between Earthlife Africa, the Centre for Environmental Rights and groundWork. Its main objective is to discourage the development of any new coal-fired power stations, which it believes will lock South Africa into further dependence on coal for decades to come and delay the urgent need to transition to a low-carbon future. For the past five years, the campaign has been resisting the roll-out of the coal IPPs programme, following the previous Energy Minister's determination in 2012 to secure 2 500 MW of coal-fired power from coal IPPs.

The determination was based on the dated 2010 Integrated Resources Plan, which made provision for 6 250 MW of new coal from IPPs between 2014 and 2030.

## RENEWABLE ENERGY

### Cape vulture provides inspiration for homegrown vertical-axis wind turbine

A South African start-up has developed a vertical-axis wind turbine that employs a groundbreaking morphing wing design, which seeks to mimic the movements of the Cape vulture.

A prototype of the turbine, developed by Brayfoil Technologies in collaboration with WorleyParsons, is being tested at the Council for Scientific and Industrial Research's campus, in Pretoria.

The solution is the brainchild of architect and entrepreneur Robert Bray, who developed the flexible-wing concept after studying the flight of Cape vultures and eagles during visits to the Marakele National Park, in Limpopo. "Birds have the ability to change the shape of their wings. They are able to flare out and land on the spot, which aircraft wings can't do. I focused on how the birds do it and then tried very hard to replicate the idea with a mechanical method," Bray explains. The result is a seamless wing that works without hinges, joints, panel sections or flaps. Conscious that proving the wing design on an aircraft was out of his reach financially, Bray turned his attention to the design of a wing sail for a yacht, where he was able to prove the concept of a flexible wing. The idea has since been patented in multiple jurisdictions internationally and Bray is convinced the applications could be extended well beyond wind turbines and sails to the areas of aviation and automobiles.

### Mall of Africa debuts world first in integrated solar system

Mall of Africa is set to unveil a world first in integrated renewable-energy systems, with the largest rooftop solar photovoltaic system of its kind in the southern hemisphere and tenth worldwide. The 4 755 kW installation covers most of the available mall roof space of about 45 000 m<sup>2</sup> and the energy generated will be used to power the mall's daily operations. Located in the heart of Waterfall City, in Johannesburg, Mall of Africa is owned in a joint venture by Attacq (80%) and Atterbury (20%), and is South Africa's largest shopping mall ever built in one phase, offering more than 130 000 m<sup>2</sup> of retail space. In addition to ensuring that the mall reduces its carbon footprint, this project also created temporary employment for 50 people and full-time jobs for two employees.

### Perdekraal East wind farm preparing for construction activity

The Perdekraal East wind farm, which is situated within the Witzenberg local municipality, in the Western Cape, is preparing for the start of major construction activity. Once complete, the 110 MW wind farm, which spans 3 055 ha, will comprise 48, 115-m-high wind turbines. When operating at full capacity, the farm will generate about 183 000 MWh/y of clean renewable energy. The 110 MW Perdekraal wind farm is owned by a number of equity members, which include Mainstream Renewable Power, along with a consortium of investors such as the International Finance Corporation and the Rockefeller Brothers Fund. Since achieving financial close in June, the construction team has been working on establishing site infrastructure, the clearing and grubbing of roads and turbine foundations, as well as preparing to build the 42 km road on site.

### Site clearing starts at 25 MW Ngodwana biomass power project

Official site clearing and preparation for earthworks have started at Ngodwana Energy's 25 MW biomass power project, in Mpumalanga. The project will be erected at the Sappi Ngodwana site about 40 km from Nelspruit, next to the N4 highway, and is part of the South African government's Renewable Energy Independent Power Producer Procurement Programme. The ELB-KCC Consortium, which comprises ELB Engineering Services, KC Cottrell (KCC) and the ELB Educational Trust, has been appointed engineering, procurement and construction contractor for the project. ELB will start site clearing and geotechnical drilling, building access roads and the

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connection of services such as water, power and sewage. Bulk earthworks will start thereafter so that piling can start for the power island buildings. KCC has awarded the contract for the boiler and turbine generator and they are finalising the other major packages in the power island.

Korea-based KCC will provide the power island, comprising a boiler, turbine generator, cooling towers and an air pollution control system, while ELB will be responsible for the civil work, fuel handling, electrical switchyard and site erection.

### Total to roll out solar-powered service stations in Kruger National Park

Total South Africa (Total SA) has revealed a demonstration model of its solar-powered service station at the Skukuza camp, in the Kruger National Park, in Mpumalanga. The demonstration model is in line with Total's project to install solar panels, supplied by Total Group subsidiary SunPower, at 5 000 of its 16 000 service stations globally by the end of 2021. This project drives several efficiencies for the company, including reducing carbon emissions by 100 000 t/y, and its electricity cost by \$40-million a year.

Total SA CEO and MD Pierre-Yves Sachet says the company will have about 282 solar-powered service stations by 2021, with about 60 stations across South Africa already fitted with solar installations. Total SA aims to have solar power installed at all 21 service stations in the 19 national parks within the next few years, with a service station in Lower Sabie camp and picnic spot Tshokwane, both in the Kruger National Park, next in line for the upgrades.

### UCT lecturers participate in international Solar Decathlon competition

Three lecturers from the University of Cape Town (UCT) are part of Team Mahali, the only team representing sub-Saharan Africa in the international Solar Decathlon competition, which will be held in Morocco next year. The Solar Decathlon is an international competition to design and build a fully functional, modular, net-zero-energy house that challenges teams to design and build a "green" house of between 55 m<sup>2</sup> and 110 m<sup>2</sup>, powered only by solar energy and equipped with technically advanced building and energy technologies. This should be done using local ingenuity, craftsmanship and materials. UCT School of Architecture, Planning and Geomatics senior lecturers Mike Louw and Kevin Fellingham, and UCT Department of Civil Engineering Dr Dyllon Randall have

been brought on board Team Mahali for their design skills and knowledge of innovative wastewater systems respectively. Team Mahali is based at Stellenbosch University's Sustainability Institute.

## OIL AND GAS

### Radebe moots shale gas exploration as answer to high fuel price

Energy Minister Jeff Radebe has called for all impediments to shale gas exploration to be removed as part of government's response to the record high in the fuel price. Radebe said in the National Assembly in September, that the main driving factor behind the rising fuel price was the policies of the Organisation of Petroleum Exporting Countries (OPEC) and that there was little hope that the price of crude oil would drop. The price of crude oil poses a particular predicament for South Africa, with its lack of reserves and reliance on imported crude for 80% of its fuel needs. Radebe said South Africa would be less vulnerable to price hikes if the country could produce its own oil and gas. Therefore, it was imperative to "remove any regulatory impediments to exploration and linked to this is the need to unlock the potential for shale gas in our country". He said exploration licensing should be seamless and he believed that, in future, the energy portfolio should be responsible for the legal and regulatory framework for oil and gas exploration.

## OTHER

### Hydrogen from renewables may be energy transition's missing link

Producing hydrogen from variable renewable electricity (VRE) could be the missing link in the unfolding transition to a decarbonised global energy system, a newly released report argues. Published by the International Renewable Energy Agency (Irena), the study explores the production of hydrogen from renewables using electrolyzers – devices that split water into hydrogen and oxygen using electricity.

The authors suggest that such a solution could channel large amounts of renewable energy from the power sector into sectors, such as freight transport, buildings and industrial heating, for which electrification and decarbonisation would otherwise be difficult. Irena notes that there is currently no economically viable option to

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reduce the carbon emissions produced by about one-third of the energy sector. "Combustible fuels remain critical to transport and industrial practices, from aviation to refining, where electrification is not suitable. This could make hydrogen from renewable energy the missing link in the transformation of the global energy system. Titled "Hydrogen from Renewable Power", the report states that the global energy system will have to undergo a profound transformation from fossil fuels to renewable

energy to achieve targets set out in the Paris climate agreement. In the process, the role of VRE is expected to grow materially, while electricity's share of total energy consumed by end-users is likely to increase to 40% in 2050, from about half that level in 2015. Electrolysers could help integrate VRA into power systems, as their electricity consumption can be adjusted to follow wind and solar power generation, making hydrogen a source of storage for renewable electricity.

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but we can see it coming.

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