

PHOTO ESSAY

Tracking the winds of change in South Africa's renewable energy landscape



📷 *The third blade of a wind turbine is attached at the at Brandvalley Wind Farm, under construction at a site along the boundary of the Western Cape and Northern Cape. (Photo: Tamsin Metelerkamp)*

South Africa's Renewable Energy Independent Power Producer Procurement Programme has driven an increase in the country's wind power generation. Daily Maverick visited the Brandvalley and Rietkloof wind farms that are under

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construction in the Karoo, each of which will have the ability to generate about 590 gigawatt hours of energy per year when completed.



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The white, man-made monoliths that make up the Brandvalley and Rietkloof wind farms stand in stark contrast to the rugged emptiness of the Karoo landscape. The sibling projects are located along the boundary between the Western and Northern Cape provinces, just off the R354 road that connects the towns of Matjiesfontein and Sutherland.

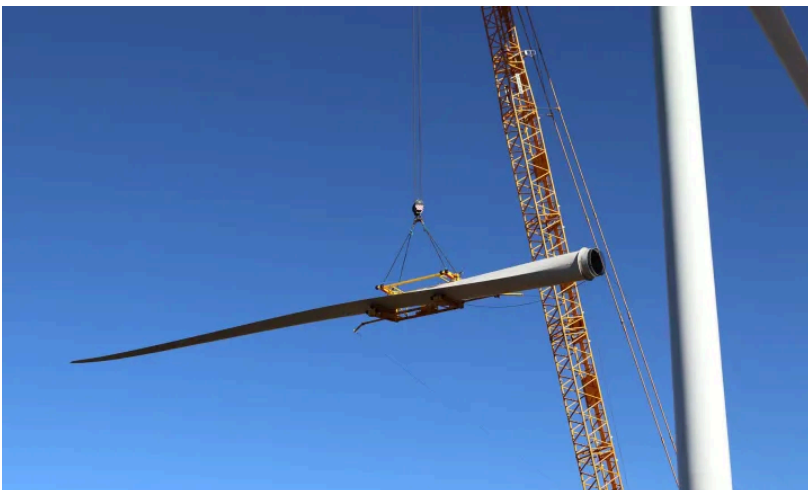
When they are completed, each wind farm will have 32 Vestas V150-4.5MW wind turbines, with the ability to generate about 590 gigawatt hours of energy per year. This will allow each project to power around 183,000 households annually while avoiding the emission of approximately 620,000 tonnes of CO₂ equivalent every year.



*A wind turbine under construction at the Brandvalley Wind Farm.
(Photo: Tamsin Metelerkamp)*

The Brandvalley and Rietkloof farms are part of a group of projects that reached financial close in February 2023, under Bid Window 5 of South Africa's Renewable Energy Independent Power Producer Procurement (REIPPP) Programme. Both are expected to be operating commercially (<https://redrocket.energy/projects/brandvalley-wind-farm/>) in the fourth quarter of this year.

When *Daily Maverick* visited the two sites, construction was well under way. A total of 44 turbines had been erected by 18 June — 23 at Brandvalley and 21 at Rietkloof.



The blade of a wind turbine is raised by a crane at the Brandvalley Wind Farm. (Photo: Tamsin Metelerkamp)



Workers around the base of a wind turbine under construction at the Brandvalley Wind Farm. The workers on the right are using long lines to adjust the angle of a blade being raised by crane. (Photo: Tamsin Metelerkamp)

Expanding wind generation sector


South Africa's renewable energy sector has expanded rapidly in recent years, with a spate of construction projects increasing the capacity for solar and wind power generation.


Eskom reported that it had purchased 11.4 terawatt hours from private wind farms under the REIPPP Programme between 1 June 2023 and 31 May 2024. There are currently 40 wind farms under this programme, 34 of which are in commercial operation with a joint capacity of 3,357.3 megawatts. The other six farms are under construction.



The Brandvalley Wind Farm under construction at a site along the boundaries between the Western Cape and Northern Cape. (Photo: Tamsin Metelerkamp)

The amount of power that wind generation contributes to the grid in South Africa each day is highly variable, according to Eskom. The highest recorded wind generation in a day was 3,100MW, while the lowest can fall to about 200MW.



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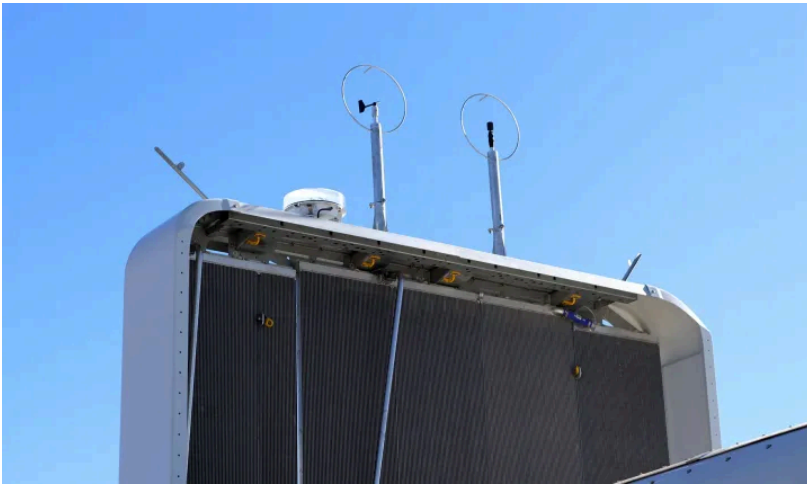
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“There is a definite seasonality to wind generation in South Africa because most wind generators are installed along the Cape coastal regions. In summer, the wind generation drops low overnight and increases to its maximum for the day at sunset.

“This is due to strong offshore winds that blow towards sunset driven by the temperature difference between land and sea. This profile matches the country’s electricity demand profile almost perfectly, since the highest demand is in the evening around sunset,” Eskom told *Daily Maverick*.



The anemometer and wind vane atop the cooling radiator of a wind turbine at Brandvalley Wind Farm. (Photo: Tamsin Metelerkamp)

“Unfortunately, in winter, the wind generation output is dictated by cold fronts moving across the Cape regions. Ahead of the cold front there are high winds and this increases wind generation output significantly. As the cold front passes the Cape regions, the low-pressure trough behind the cold front causes wind generation to drop to very low levels.

“This high output followed by low output often occurs within 36 to 48 hours and coincides with the cold weather reaching Gauteng. Eskom, therefore, must supply the additional demand due to the cold weather as well as make up for the reduced wind generation.”



The rotor hub of a wind turbine at Brandvalley Wind Farm. The rotor hub holds the blades and connects them to the main shaft of the wind turbine. (Photo: Tamsin Metelerkamp)

Built to scale

The turbines at the Brandvalley and Rietkloof wind farms have a design life of at least 20 years, but can have a lifespan of 30 years or more depending on site-specific conditions, according to Red Rocket Energy, the independent power producer responsible for the projects.

The scale of the components that make up each wind turbine dwarfs the individuals working on site. Each blade is almost 74m long, while the full rotor diameter for a completed structure is 150m, according to Ulwin Hoffmann, head of project, procurement and construction management at Red Rocket Energy. The wind turbines have a hub height of 90m and a tip height of 165m.



The blade of a wind turbine at Brandvalley Wind Farm. (Photo: Tamsin Metelerkamp)



Ulwin Hoffmann, head of project, procurement and construction management at Red Rocket Energy, in front of the blade of a wind turbine at Brandvalley Wind Farm. (Photo: Tamsin Metelerkamp)

The crane used to lift the blades into place atop the turbines has to be dismantled and transported using 25 trucks when moved between construction sites, said Hoffmann.

While the number of staff employed on the wind farm sites varies over the course of the construction process, at this stage there are an average of 600 employees on each site daily. More than 25% of these employees are from the communities surrounding the projects.

An important concern guiding work at the Brandvalley and Rietkloof sites is ensuring that all structures are designed, constructed and operated in accordance with national and international legislature, guidelines and methods of best practice when it comes to protecting the environment and conserving biodiversity, according to Red Rocket Energy.

The projects received valid environmental authorisation through environmental impact assessment processes.

“The projects strive for a ‘no net-loss’ [approach] to biodiversity, especially to threatened species and ecosystems. Although not to be viewed in isolation, avifauna impacts are those most strictly monitored and managed through the projects’ EA [environmental authorisation] and EMPrs [Environmental Management Programmes],” explained Red Rocket Energy.

“Both Brandvalley Wind Farm and Rietkloof Wind Farm have procured patterned turbine blades as a first-tier mitigation to reduce avifaunal impacts. In addition to this, Brandvalley Wind Farm will

install an industry-leading second tier of mitigation referred to as Automated Shut-Down-On-Demand technology... Other environmental technological deployments on-site include implementing pilot-activated lighting to decrease visual impacts at night in accordance with civil aviation regulations.”

Red Rocket Energy said the approved layout of the sites had been adjusted to avoid and mitigate environmental impacts. **DM**

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