





Renewable energy fact sheet







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The exponential rollout of renewable energy technologies worldwide has been boosted by the drive to fast-track the decarbonisation of economies in the pursuit of climate change objectives. Over the past decade, renewable energy has become the cheapest electricity source globally, and two technologies have stood out: solar photovoltaic (solar PV) and wind energy, which account for three-quarters of the additions worldwide.¹ Renewable energy technologies provide the least-cost avenues to generate electricity. In 2023, the amount of renewable energy capacity added to energy systems worldwide grew by 50% and reached almost 510 gigawatts (GW). This spurt is partly due to expanding policy support and increasing energy security concerns but mainly due to the improving competitiveness against fossil fuel alternatives.

Global trends

The speed with which the renewable energy sector has grown globally has galvanised investment and shaped public discourse around sustainability, energy security and the nature of development in the 21st century. Globally, the renewable energy sector has risen from 18.6% of global electricity supply in 2000 to 28% in 2021. In 2000, 849GW of renewable energy was installed worldwide, reaching 258GW two decades later.² Globally, solar photovoltaic (solar PV) and wind energy technologies reached, on average, US\$0.048 and US\$0.033 per kilowatt-hour (kWh), respectively, in 2021. During the same time frame in South Africa, they reached R0.375 per kWh for solar PV and R0.344 per kWh for wind energy technologies.³ Public policies, primarily targeted at fast-tracking the decarbonisation of economies in the pursuit of climate change objectives, have further driven an exponential rollout of renewable energy technologies worldwide, impacting other aspects of the renewable energy component value chain.

South Africa's renewable energy drive

As a signatory to the Paris Agreement on Climate Change, South Africa has committed to significantly reducing its carbon emissions by phasing out fossil fuels. The growth of the country's renewable energy industry is partly due to proactive government policy in procuring renewable energy, increases in electricity tariffs charged by Eskom, and finally, the ability of wind and solar to compete on a levelized cost of electricity basis with coal and nuclear. In its 2018 draft Integrated Resource Plan, the South African government committed to reducing its reliance on coal for energy to less than 20 per

¹ <https://www.iea.org/news/massive-expansion-of-renewable-power-opens-door-to-achieving-global-tripling-goal-set-at-cop28>

² Data from the International Energy Agency (IEA). Available at <https://www.iea.org>. Includes hydropower/.

³ These correspond to the lowest prices achieved in the fifth bid window of the REIPPPP, 2021. <https://www.ipp-renewables.co.za>.

cent by 2050. Furthermore, the country's Long-Term Mitigation Scenarios (LTMS) focussed on accelerated energy efficiency across all sectors, low-carbon technology research and development and regulatory mechanisms and economic instruments.

The Integrated Resource Plan

The IRP is an electricity infrastructure development plan based on the least-cost electricity supply and demand balance and is essentially the country's plan for procuring generation capacity up to 2030. Since the promulgation of IRP 2010, 18 000MW of new generation capacity has been committed. The most recent IRP (2023) anticipates 10436MW of private sector generation leading up to 2030, including 6314MW of solar and 2229MW of wind.⁴ However, the rollout of solar from the private sector, in particular, is likely to be much bigger than the capacity allocated. A recent 'Renewable Energy Grid Survey' conducted by Eskom, the South African Wind Energy Association (SAWEA), and the South African Photovoltaic Industry Association (SAPVIA) showed that renewable energy projects are under development, including 21GW of wind, 7.5GW of wind and battery storage, 13305MW solar PV, and 19572MW of solar PV with battery storage.⁵

The investment potential of renewables

There are numerous reasons to invest in renewable energy in South Africa. Firstly, the country has one of the highest solar and wind energy potentials. Over 80% of South Africa's land mass has enough wind potential to achieve a 30% average annual load factor, ahead of Spain and Germany, which have average load factors of their entire wind fleets at 25-27% and 20-23%, respectively. While the country's current market for energy efficiency is relatively small, it has enormous potential, with estimates that it could reach R21bn by 2035.⁶ The country desperately needs significant investments in electricity generation to prevent it from facing an electricity supply gap of between 286TWh/year and 434TWh/year. The cost-competitiveness of renewable energy technologies means there is potential to fill the rising supply gap.⁷ ESKOM is also working on utility-scale battery storage, with an anticipated 5 000MW of battery storage scheduled to be commissioned by 2030. Consequently, the Renewable Energy Independent Power Production Procurement Programme (REIPPPP) drives utility-scale projects in South Africa's clean energy sector, and since 2011, it has attracted investments of

⁴ <https://www.greenbuildingafrica.co.za/expect-dmre-to-try-bulldoze-south-africas-flawed-irp-2023-through-before-national-elections/>

⁵ <https://www.engineeringnews.co.za/article/renewable-energy-grid-survey-points-to-66-gw-development-pipeline-in-south-africa-2023-06-06>

⁶ https://www.investsa.gov.za/wp-content/uploads/2021/03/FACT-SHEET_GREEN-ECONOMY_2020.pdf

⁷ https://www.investsa.gov.za/wp-content/uploads/2021/03/FACT-SHEET_GREEN-ECONOMY_2020.pdf

close to R202bn.

Since the first REIPPP, the Northern Cape has become the country’s hub for utility-scale solar projects, although other regions, such as the Eastern Cape, have also become a focus for that sort of investment. Similarly, utility-scale wind projects have focused on the Western and Eastern Cape. The renewable energy sector experienced significant expansion in 2023, with expectations for accelerated growth in the coming years. This growth (Figure 1) is driven by private sector investment in renewable energy. By 2030, the market for large-scale renewable energy, energy storage, and component manufacturing will reach an estimated R468 billion, averaging around R78 billion annually.⁸

Figure 1 Market growth potential

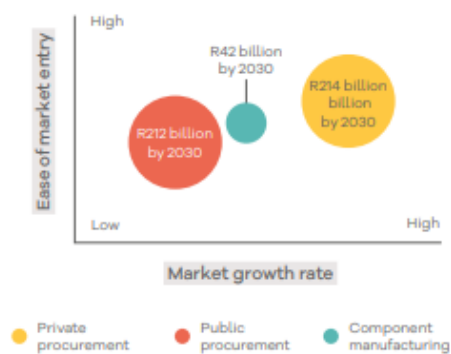
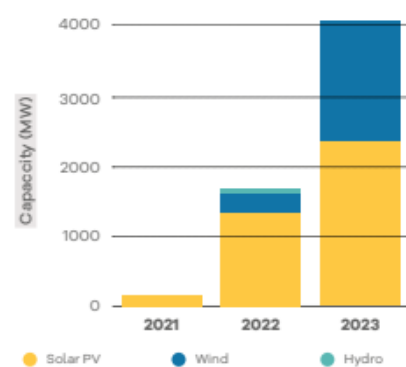


Figure 2: registered private renewable energy projects,



Source: <https://greencape.co.za/wp-content/uploads/2024/04/Large-scale-RE-MIR-2024-digital.pdf>

Support for renewable energy

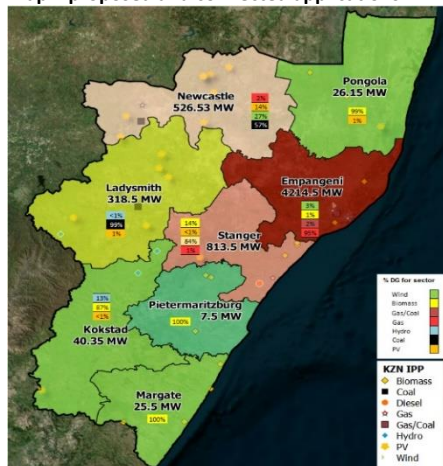
The South African government intends to improve the environment for Clean Energy investments using instruments such as the Integrated Resource Plan (IRP), whose various iterations focus on promoting a more diversified energy mix by 2030. The private procurement market has snowballed, fueled by changes to Schedule 2 of the Electricity Regulation Act (ERA). These amendments have changed the generation capacity threshold for projects exempt from requiring an electricity generation license. It was initially set at 1 MW; in 2021, this limit was increased to 100 MW. Evidence of this growth can be seen in Figure 2 above. Multiple finance mechanisms through commercial banks and development finance institutions have ensured the provision of finance for REIPPPP projects, while the National Treasury guarantees Power-purchase agreements between Eskom and IPPs. At the same time, the Property Assessed Clean Energy (PACE) model is being piloted and aims to enable low-

⁸ <https://greencape.co.za/wp-content/uploads/2024/04/Large-scale-RE-MIR-2024-digital.pdf>

cost, long-term funding for energy efficiency and renewable energy projects.

The country's densely populated metros have seen a high demand for energy-efficiency opportunities, particularly in prominent manufacturing locations. Although not as prolific as other parts of the country, there has been interest in KZN as a site for renewable energy investments, as evident in this map, which shows an overview of all actively proposed and connected applications received for the KZN operating units as well as the breakdown per technology type per Eskom sector.

Map 1 proposed and connected applications.



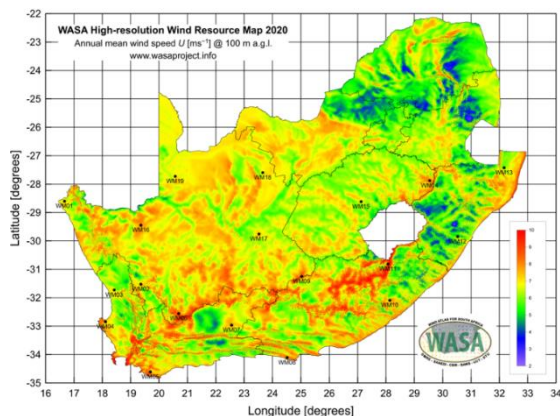
Source: Eskom KZN

South Africa has a massive pipeline of renewable energy projects, representing over 22,500 MW of new generating capacity, estimated to be worth around R400 billion in new private investment.⁹ The country's renewable energy investment opportunities span the breadth of this sector, including the roll-out and adoption of renewable energy and energy efficiency technologies. Furthermore, component manufacturing for the solar industry (solar panels, solar water geysers, timers, etc.) and wind sector (towers, blades, nacelles) have begun to take root in South Africa. In the first half of 2023, the country imported \$2.5 bn worth of solar panels, lithium-ion batteries, and inverters. While this provides ample testimony to the exponential rollout of Renewable Energy, it also indicates a missed opportunity for local industrialisation, which should be seized upon by investors. The country also hosts some of the biggest global and African renewable energy companies, such as Mainstream Renewable Power Ltd, Segen Solar(Pty) Ltd., Juwi Renewable Energies (Pty) Ltd., and EDF Renewables.¹⁰ KwaZulu-Natal is home to one of the country's biggest solar panel manufacturers, ARTSolar. This 100% locally owned module manufacturer has a 325MW manufacturing facility based in New Germany, Pinetown.

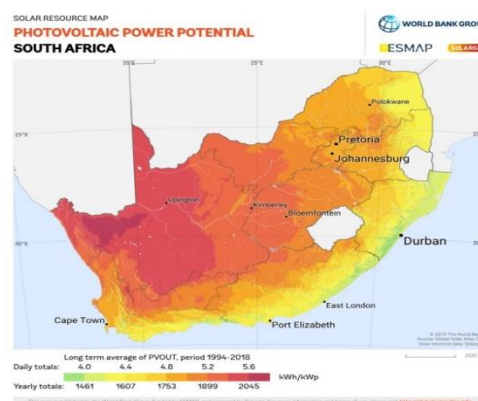
⁹ <https://www.sanews.gov.za/south-africa/south-africas-renewable-energy-revolution-tantalising-prospect#:~:text=%E2%80%9CWWe%20already%20have%20a%20huge,these%20will%20create%20many%20jobs.>

¹⁰ <https://www.mordorintelligence.com/industry-reports/south-africa-renewable-energy-market/companies>

The maps below indicate the solar and wind potential across the country. When one considers grid saturation in some parts of the country, the potential for KZN becomes apparent. Proof of this is found in expressions of interest in solar plants across the province, from 150MW plants in Bergville to 50MW Energy Park near Camperdown.



<https://www.wasaproject.info/>



<https://globalsolaratlas.info/download/south-africa>

Furthermore, Richards Bay Minerals (RBM) has signed a renewable power purchase agreement (PPA) with Khangela Emoyeni Wind Farm (Pty) Ltd to secure 140MW of wind energy from a new wind farm situated in the Western and Northern Cape Province. The project is expected to reduce RBM’s annual carbon emissions by 20%.¹¹

The grid

KZN is one of only two provinces with more than 6000MW of grid capacity available for new energy generation projects. This competitive advantage can be leveraged to ensure that the province’s growth trajectory includes investments in renewable energy. Furthermore, in the next decade, South Africa requires 14,200 kilometres of transmission lines to be built and 122,000 MVA transformers to be installed. To put this into perspective, the country constructed only 4,300 kilometres of transmission lines in the past decade and installed 19,000 MVA Transformers. This presents enormous opportunities for new entrants into the market.

¹¹ <https://www.riotinto.com/en/news/releases/2024/richards-bay-minerals-signs-agreement-for-an-additional-140-mw-of-renewable-energy>

The demand for renewables was initially driven through the public Renewable Energy IPP Procurement (REIPPP) programme within a single buyer, i.e., the Eskom model. The rise of solar PV and battery energy storage (BES) and the reduction of generation licencing regulations soon allowed large-scale wheeling of power across the Eskom grid with bilateral and multilateral wheeling contracts between IPPs and large off-takers. This new phase of energy provision and the trading thereof promises new avenues of investment and development in the renewable energy space.

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