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United Arab Emirates

UAE To Exceed 2030 Targets With Masdar's Leadership In Renewables, Expanded Solar Manufacturing And Advanced Battery Storage Solutions

Key View

- The UAE will exceed its 2030 clean power target, while being on track by the end of our forecast period to also exceed its 2035 targets.
- UAE's solar manufacturing capacity is poised for significant growth, driven by international partnerships and its industrial manufacturing strategy.
- We expect the UAE will increase its focus on developing energy storage solutions and production to support the diversification of its power mix.

The UAE will exceed its 2030 clean power target, while being on track by the end of our forecast period to also exceed its 2035 targets. By 2030, the UAE aims to achieve 19.8GW of renewable energy, enabling clean energy capacity to reach 30% by 2030, increasing to 38% by 2035 and 44% by 2050. We forecast that by 2030, non-hydropower renewables capacity will reach 24.3GW, accounting for 34% of total capacity. By the end of our forecast period, we expect non-hydropower renewables will reach 33.3GW, contributing 41% to total capacity. The rapid expansion of renewable power in the market will support this, with projects such as the 5GW Mohammed bin Rashid Al Maktoum Solar Park and the 1.5GW Al Ajban Solar Project reaching financial closure for their final phases. Furthermore, auction tenders launched over 2024 and 2025, which include projects such as the 1.5GW Zarraf and the 1.5GW Al Khazna Project, will boost renewable power growth in the market.

The motivations for the UAE to increase renewable energy include meeting climate action commitments, such as those pledged at the COP28 conference, and diversifying its energy sources to enhance sustainability and energy security. To support the targets, the UAE has introduced a comprehensive policy framework, including the UAE Energy Strategy 2050, which aims to increase the contribution of clean energy in the total energy mix to 50% by 2050, thereby reducing the carbon footprint of power generation by 70%. Furthermore, the market aims to invest AED600bn by 2050 to meet the growing energy demand and ensure sustainable growth for the country's economy.

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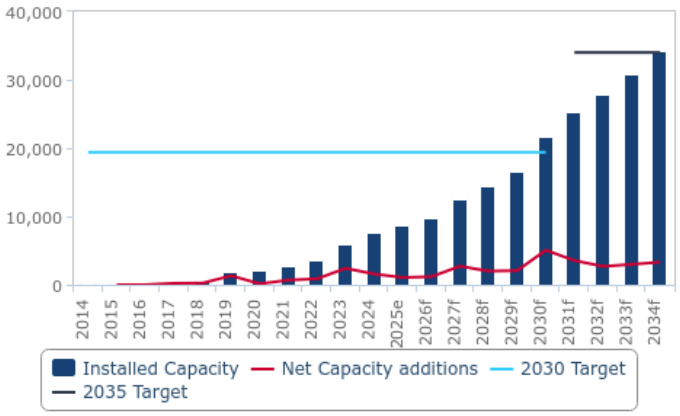
UAE To Exceed 2030 And 2035 Targets

UAE – Total Non-Hydropower Renewable Power Capacity & Net Additions Vs UAE Targets, MW



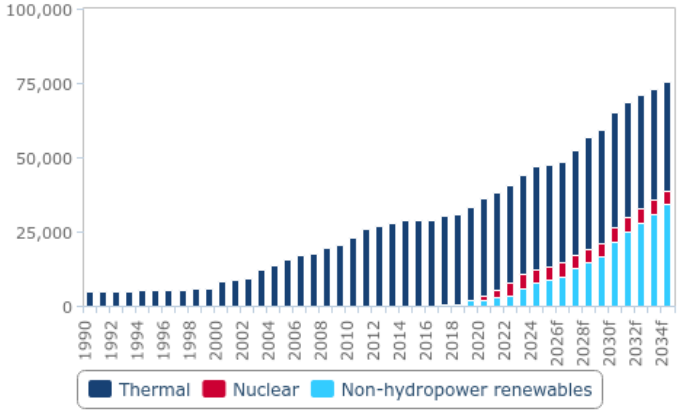
e/f = BMI estimate/forecast. Source: Abu Dhabi National Energy Compnay, BMI

Non-Hydropower Renewable Expansion Supports UAE Power Sector Diversification Plan

The UAE has the ambition to diversify its power sector away from hydrocarbons towards nuclear and non-hydropower renewables to reduce power sector emissions and meet growing demand. We expect the majority of the renewable capacity will come from solar power, with solar power accounting for more than 41% and wind power accounting for less than 1% due to its low base in the market. The growth in non-hydropower renewables will aid in meeting the market's objectives; however, thermal power will remain a prominent feature of the market's power sector, owing to growing natural gas power production. In addition to non-hydropower renewables, the UAE's completion of phase four of the Barakah Nuclear Power Plant will increase nuclear power's share of power capacity from 1.3GW in 2020 to 4.7GW by 2034. Despite this growth, we expect thermal power, particularly natural gas, will continue to play a pivotal role in the power sector, with natural gas accounting for over 50% of total capacity by 2034.

Power Mix Capacity Diversification To Increase

UAE – Total Electricity Capacity By Type, MW (1990-2034)



e/f = BMI estimate/forecast. Source: National sources, BMI

The UAE's solar manufacturing capacity is poised for significant growth, driven by international partnerships and its industrial manufacturing strategy. The UAE's solar manufacturing capacity is expected to expand from a low base due to investments in solar manufacturing by domestic and international companies like the UAE-based Abundance Solar Panels Industries, Singapore's Gstar, Mainland China-based Trina Solar, TCL Zhonghuan, Jinko Solar and GCL Technology Holdings. Abundance Solar is establishing a solar panel factory in KEZAD, while Trina Solar plans a large-scale photovoltaic manufacturing

base in Abu Dhabi. Gstar is developing a solar module facility in collaboration with the UAE's Siraj Holding, and GCL Technology is building a polysilicon production facility in partnership with Mubadala Investment Company. These investments are bolstered by government support, including the Operation 300bn initiative and Abu Dhabi's Industrial Strategy, which aim to enhance the industrial sector's GDP contribution and promote ecosystem growth. The strategy aims to raise the industrial sector's GDP contribution from AED133bn in 2023/24 to AED300bn by 2031, by focusing on future industries, including renewable energy. Furthermore, the Emirates Development Bank (EDB) has dedicated an AED30bn portfolio to support priority industrial sectors, including solar energy equipment. To encourage foreign manufacturing investment, the UAE's free zones offer full foreign ownership, tax exemptions and streamlined import/export procedures, creating an attractive environment for global manufacturers. Companies from markets like China and Singapore are keen to invest in the UAE due to its favorable business conditions, strategic location, and role as a haven from US and EU trade barriers. Chinese firms, including Jinko Solar and TCL Zhonghuan, are particularly focused on the UAE, leveraging its ambitious renewable energy targets and strategic positioning as a hub connecting Europe, Asia and Africa. In addition, the UAE is leveraging its bilateral partnerships with Asian markets like Singapore, China, India and South Korea to drive investments in solar manufacturing facilities and renewable energy projects.

International Companies To Lead Solar Manufacturing Growth

Company Name	Market Of Origin	Product Produced
Panasonic	Japan	Solar Panel
Sharp	Japan	Solar Panel
Longi	China (Mainland)	Solar Panel
Jink Solar	China (Mainland)	Solar Panel
Goodwe	China (Mainland)	Solar Panel
Solon International	Germany	Monocrystalline Solar Panel
Isofoton	Spain	Solar Panel
Renewsys	India	Solar Panel
Su-Kam	India	Solar Panel
PEIMAR	Italy	Solar Panel
Maysun Solar FZCO	China (Mainland)	Solar Panel
The South Oracle, LLC	US	Thin Film
Ekarat Solar	Thailand	Solar Panel
Power Solution Industries L.L.C.	UAE	Solar Panel
FSolar (Formost Solar Energy)	UAE	Solar Panel

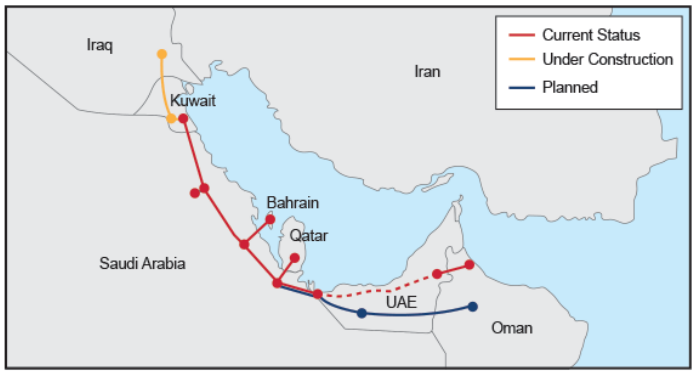
Note: May include territories, special administrative regions, provinces and autonomous regions. Source: Local sources, BMI

We expect the UAE will increase its focus on grid infrastructure investments, developing energy storage solutions and battery manufacturing to support the diversification of its power mix. Increasingly, the UAE has been expanding its battery storage capacity, with the recent launch of a 400MW battery project in Abu Dhabi. Significant developments include the Masdar and Emirates Water and Electricity Company (EWEC) collaboration to build a 5.2GW solar plant with a 19GWh battery storage system, delivering 1GW of baseload power. This project exemplifies efforts to transform renewable energy into a reliable baseload source. We expect more battery storage projects will be launched over the coming years as the UAE has a 19GW renewable power project pipeline requiring energy storage solutions to deal with the intermittency of renewable power. Complementing these efforts, Enercap Holdings and Apex Investments have formed a joint venture to establish a 16GWh supercap energy storage manufacturing

capacity in Abu Dhabi, and Statevolt plans a 40GWh battery cell gigafactory in Ras Al Khaimah, operational by 2026. The UAE's commitment to sustainability is further demonstrated through initiatives like the Kezad Group and Witthal Gulf Industries' lithium battery recycling plant, which aligns with Net Zero by 2050 goals. This facility will recycle 5,000 tonnes of battery waste annually, supporting the EV ecosystem and reducing greenhouse gas emissions by 20,000 tonnes each year. Decreasing battery costs and technological advancements are making storage solutions more feasible, aiding the UAE's plan to triple renewable energy capacity to 19.1GW by 2030. The UAE's grid infrastructure investments will support the integration of renewable energy in the market. Dubai Electricity and Water Authority (DEWA) and Emirates Water and Electricity Company (EWEC) have committed to increasing the grid by launching a project for 13 substations over 2024. We expect more grid infrastructure project announcements as the UAE has developed a PP model, which allows private companies to develop, finance, build and operate power projects. Furthermore, we expect the expansion of the GCCIA interconnector will result in further grid infrastructure projects from the UAE, particularly transmission lines and substations, as markets in the region integrate their power markets.

The GCCIA Interconnector Expansion Will Encourage UAE Grid Investments

GCC – Current & Future Status Of The GCCIA Interconnector



Source: GCCIA, BMI

South Africa

Eskom's Path To Stability Remains Challenging Despite Growing Opportunities And Pricing Restructuring

Key View

- Over the short to medium term, we expect Eskom to continue to rely on loadshedding to mitigate the risks associated with its ageing coal fleet.
- While generation and grid capacity expansion remain vital for Eskom recovery, we believe that Eskom's financial recovery remains critical to stabilising utility operations.
- We believe Nersa's approval of Eskom's tariff restructuring poses upside to the utility's long term electricity pricing outlook.
- While Eskom's targets for reflective electricity costs and tariff restructuring are beneficial, we expect that electricity prices will continue to rise, resulting in varying impacts for consumers in the short to medium term.

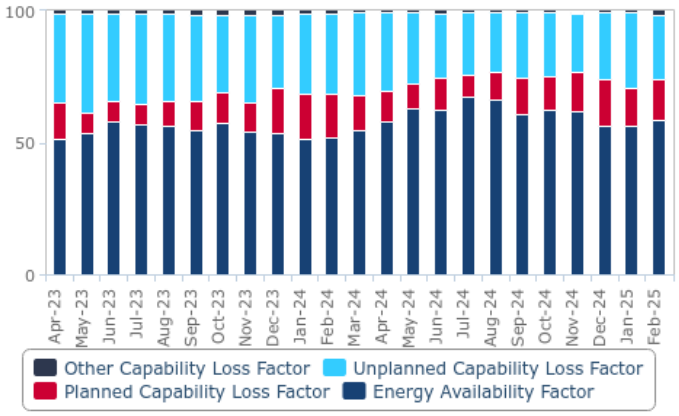
Over the short to medium term, we expect Eskom to continue to rely on loadshedding to mitigate the risks associated with its ageing coal fleet. Despite efforts to improve the reliability of the power grid, the ageing infrastructure remains a major constraint. According to Eskom, the average age of its coal-fired power plants is 41 years, with many units nearing the end of their lifespan. Eskom plans to decommission 10 power stations by 2040, including Komati, Grootvlei, Camden, Hendrina, Arnot, and Kriel, which are scheduled for decommissioning by 2030. However, the recent bout of load shedding in early 2025, which reintroduced power cuts after about 300 days without them, underscores the risks associated with an ageing fleet and the grid's

vulnerability to disruptions.

According to our latest forecasts, South Africa's coal generation share of the power mix is expected to gradually decline from 84% in 2025 to 78% in 2034. This decline is driven by the decommissioning of ageing plants by 2030, influenced by compliance with Minimum Emissions Standards. However, coal will continue to play a significant role in electricity generation in the near term due to delays in renewable energy integration and challenges in improving its Energy Availability Factor (EAF), which measures the performance of the Eskom power stations. Although the EAF improved by 7% in 2024 and 6.8% so far in 2025, it still reflects underperformance for the utility. Additionally, the Unplanned Capacity Loss Factor (UCLF), which is the ratio of energy unavailable due to unplanned outages to the total net installed capacity over a given period, stands at 25.35% for the financial year-to-date, a 7.2% improvement from the same period last year. However, this also remains vulnerable due to the growing issues with the balance of plant of Eskom's ageing coal fleet

Declining Performance Over Recent Months Due To Struggling Power Fleet

Eskom – Ratio of Availability Factor Of Eskom Plant Vs Unavailabilities, % (2023-2025*)

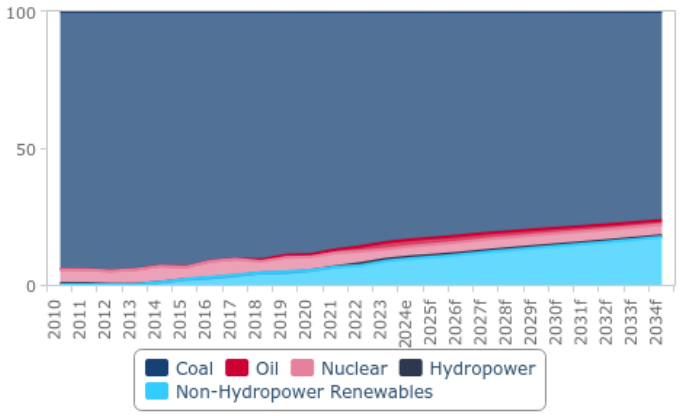


As of February 2025. Source: Eskom, BMI

Given Eskom's ageing coal fleet and its continued daily reliance on peaking capacity and emergency reserves like diesel generators and pumped hydropower, we expect that power supply instability will remain a risk in South Africa. As the demand for electricity grows, the pressure on the existing infrastructure will intensify, making it increasingly challenging to maintain a stable power supply. Therefore, we expect the utility to continue to rely on demand response programs like loadshedding to manage the power grid over the short to medium term. Over the next decade, we believe that the long-term elimination of load shedding will depend on Eskom's ability to address challenges by adding much-needed new generation capacity, such as renewables and battery storage. This will also require investment in grid modernisation and maintenance programs to mitigate the risks associated with its ageing fleet.

Continued Coal Power Dependence Despite Nuclear and Renewables Growth

South Africa - Total Electricity Generation, % Share of Power Mix (2010-2034)



e/f = BMI estimate/forecast. Source: EIA, IRENA, BMI

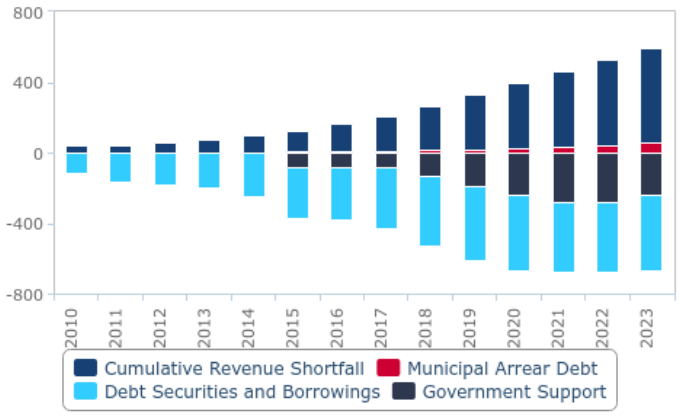
While generation and grid capacity expansion remain vital for Eskom recovery, we believe that Eskom's financial recovery remains critical to stabilising utility operations. A review of Eskom's financial performance reveals a loss before tax of ZARR25.5bn in the 2024 financial year, which is an improvement from the previous year's loss of ZAR34.6bn. Recent Eskom results also indicate a significant improvement in Eskom's financial performance for 2025, with a profit forecast for the financial year. This turnaround is largely attributed to the government's debt relief and a relatively improved operational performance for Eskom in recent months.

We highlight that the ZAR254bn debt relief from National Treasury is a positive step, enabling Eskom to manage debts and interest payments, with allocations spanning ZAR78.0bn in 2023/24, ZAR66.0bn in 2024/25. Under the terms of the arrangement, the remaining elements are the ZARR40.0bn advance, and a ZAR70.0bn debt takeover scheduled for the 2025/26 fiscal year. Although the debt relief simplifies Eskom's financial challenges, it remains insufficient for long-term sustainability. Growing municipal debt, expected to reach ZAR110bn by March 2025, continues to pose significant risks, alongside operational issues like load-shedding from unreliable plants. Additionally, restrictions on capital expenditure for new generation capacity limit Eskom's modernisation efforts, consequently affecting its long-term viability.

Over the next decade, we expect Eskom's financial recovery to depend on the combination of cost-reflective tariffs, reduced municipal arrears debt, improved operational efficiency, and a transition to a more sustainable power mix. We believe that addressing these legacy debts will allow Eskom to re-enter the debt capital markets in a much stronger financial position, thus enabling the utility to secure funding at lower interest rates, reducing overall borrowing costs. We also expect renewable energy to play an increasingly important role in reducing Eskom's reliance on coal-fired power stations and mitigating the growing impact of self-generation on Eskom's electricity demand and sales.

Eskom Debt Balance Has Largely Increased In Lockstep With The Growth In The Annual Revenue Shortfall

Eskom - Growth in cumulative revenue shortfall and debt, ZARbn



Source: Eskom, Local Sources, BMI

Nersa's approval of Eskom's tariff restructuring poses upside to the utility's pricing outlook. The utility has been working towards implementing cost-reflective tariffs since 2020, aimed at ensuring that electricity prices more accurately reflect the cost of production and distribution. This is highlighted by the recent approval by South Africa's National Energy Regulator (Nersa) of Eskom's tariff restructuring in its Retail Tariff Plan (RTP). This also follows the revenue determination that allowed Eskom an average tariff increase of 12.74% for the 2025/2026 year and 5.36% and 6.19% for the subsequent two years.

Among the major adjustments is the approval of "cost-reflective" residential tariffs with higher fixed charges independent of consumption. This includes the introduction of a fixed Generation Capacity Charge (GCC) levied per day and per Eskom point of delivery (POD). While the introduction of a fixed generation capacity charge will have a minimal immediate impact, it is expected to rise in subsequent years at a rate not exceeding inflation. The additional legacy charge for costs associated with contracts with independent power producers (IPPs) also looks to promote transparency and does not introduce additional or new costs.

Another major adjustment is the removal of the Inclining Block Tariff (IBT) structure. An Inclining Block Tariff (IBT) divides electricity prices into blocks, with each block having a specific price. As the customer purchases more electricity during the month, the electricity bought will eventually fall in block two which is a bit more expensive. This process repeats automatically as the customer purchases further electricity to move into block 2. The removal of the IBT structure and transitioning to a single energy rate structure for Homepower and Homelight tariffs is expected to simplify the pricing model and will have a positive impact on low-consuming customers.

Nersa also approved several other adjustments proposed in the RTP, with varying impacts as summarised below:

Approved Eskom Retail Tariff Plan

Tariff Adjustment	Changes
Time-of-Use (TOU) Charges	Adjustments to TOU periods and rates - Morning peak reduced to two hours; evening peak extended to three. Sunday evening adds a two-hour standard period; reduce the current 1:8 ratio of the summer (low-demand season) off-peak rate to the winter (high-demand season) peak rate to a 1:6 ratio.
Municipal Tariff Rationalisation	Consolidation of multiple municipal tariffs into three categories: Municflex (LPU), MunicRate (SPU) and Public Lighting
Residential Tariffs	Introduction of cost-reflective tariffs, phase in fixed service charge over three years, and remove Inclining Block Tariff for Homepower and

Tariff Adjustment	Changes
	Homelight.
Unbundling Energy Charges	Introduction of fixed Generation Capacity Charge (GCC), with reduced allocations for below-average users. Separate legacy charge for costs from IPP contracts.
Network Charges	Network charges to be split into fixed and variable components to better reflect cost drivers as proposed
Service Charges	Conversion of service charges into the number of point of deliveries (PODs) as this will reflect the true costs incurred
Affordability Subsidy Charge in the Gen-Wheeling/Gen-Offset	Removal of the affordability subsidy credit for customers wheeling energy so that all customers contribute fairly to inter-tariff subsidies.
Amending Transmission Loss Factors	Amendment of the current loss factors applicable to Transmission-connected generators

Source: Nersa, Eskom, Local Sources, BMI

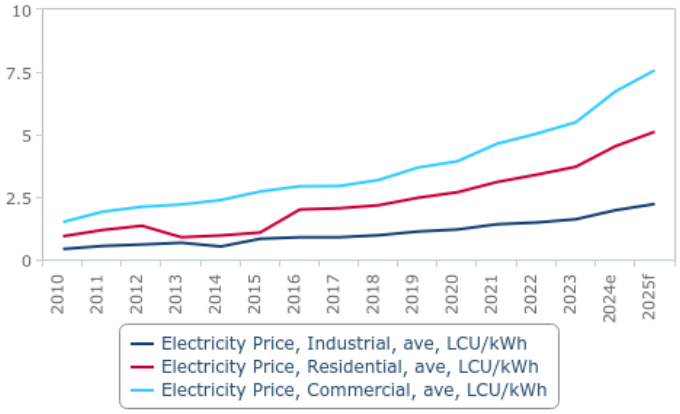
However, **while Eskom's targets for reflective electricity costs and tariff restructuring are beneficial, we expect that electricity prices will continue to rise, resulting in varying impacts for consumers in the short to medium term.** On the one hand, the unbundling of the generation cost into fixed and variable charges will align the way Eskom's clients pay with the way independent power producers (IPPs) charge for electricity, thereby preparing Eskom for a competitive wholesale market, as foreseen in the recently implemented Electricity Regulation Amendment Act. This should result in a reduction in the variable time-of-use (ToU) c/kWh energy charge and add the additional fixed capacity charge, to be implemented over three years.

In the short term, introducing cost-reflective tariffs will likely also promote energy efficiency and responsible consumption, as consumers will pay based on the actual cost of electricity generation at different times. This may encourage consumers to adjust usage patterns to times of lower tariffs, easing demand on Eskom's already strained grid. For example, reduced winter rates will result in lower costs for high consumers during winter while high summer peak users will incur higher costs. While this can reduce peak demand in South Africa, which we forecast to see a moderate 2% y-o-y growth in the short to medium term, it might also raise bills for those unable to shift usage to off-peak times, affecting residential and small business consumers used to subsidised rates. The immediate increase in tariffs may lead to financial strain for low-income households and small enterprises that are less able to absorb additional costs. However, large industrial users may benefit from more predictable pricing, aiding budgeting and energy management.

In the medium term and eventually over the next decade, as the market adjusts, higher prices due to these changes should spur accelerated consumer adoption of alternative power sources like distributed solar systems and battery storage. Additionally, as Eskom stabilises financially, the utility should be better positioned to invest in infrastructure and maintenance, leading to more reliable electricity supply. The shift towards cost-reflective tariffs should also favour the entrance of more independent power producers (IPPs), encouraging competition and innovation in South Africa. We believe that as the power market liberalises under the Electricity Regulation Amendment, consumers should benefit from more supplier choices and competitive pricing, leading to a more sustainable and resilient power sector, however this also remains contingent on supportive regulatory frameworks and consumer protections.

Electricity Prices Expected To Remain Elevated Over 2025

South Africa - Electricity Prices By Consumer Type, LCU/kWh



e/f = BMI estimate/forecast. Source: Eskom, BMI

Quick View: Eskom's Return To Load Shedding Highlights Persistent Challenges In South Africa's Power Sector

Latest Development: Over the weekend of February 22, 2025, Eskom has reinstated Stage 6 load shedding following a series of unit failures at the Camden, Majuba, and Medupi power stations, resulting in a significant loss of generation capacity. This escalation from Stage 3 load shedding has been attributed to both unforeseen unit trips and planned maintenance affecting over 11,000MW of capacity. Despite previous progress in maintaining uninterrupted power for 300 consecutive days, this setback highlights the continued fragility of South Africa's power infrastructure. Electricity Minister Kgosientsho Ramokgopa has assured the public that efforts are underway to stabilise the situation, with plans to restore the affected units and reduce load shedding by the end of the week.

Eskom Loadshedding Stages

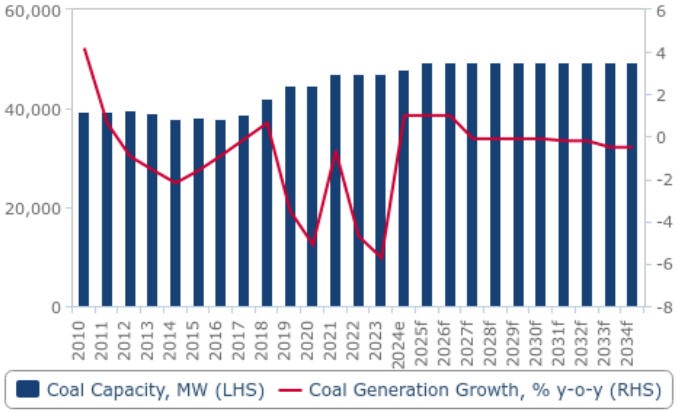
Stages	Capacity To be Shed	Duration
Stage 1	1000MW	Up to 3 times over a four-day period for two hours at a time, or 3 times over an eight-day period for four hours at a time.
Stage 2	2000MW	Up to 6 times over a four-day period for two hours at a time, or 6 times over an eight-day period for four hours at a time.
Stage 3	3000MW	Up to 9 times over a four-day period for two hours at a time, or 9 times over an eight-day period for four hours at a time.
Stage 4	4000MW	Up to 12 times over a four-day period for two hours at a time, or 12 times over an eight-day period for four hours at a time.
Stage 5	5000MW	Up to 12 times over a four-day period: 9 times for 2 hours and 3 times for 4 hours
Stage 6	6000MW	Up to 12 times over a four-day period: 6 times for 2 hours and 6 times for 4 hours
Stage 7	7000MW	Up to 12 times over a four-day period: 3 times for 2 hours and 9 times for 4 hours
Stage 8	8000MW	Up to 12 times over a four-day period for four hours at a time

Source: Eskom, BMI

Forecast Implications: South Africa's power sector continues to face significant challenges as evidenced by the sudden shift to Stage 6 load shedding. This move underscores the fragility of the market's power infrastructure, heavily reliant on coal, which constitutes about 84% of Eskom's existing capacity. Over the last year South Africa saw over 300 days without loadshedding, a feat achieved due to additions of about 1730MW of capacity from Kusile Unit 5 as well as Koberg Unit 2 last year. Recent advances in diversifying the power mix with renewable projects also helped contribute to a notable stability in Eskom electricity supply with about 1.1GW of solar PV capacity added over 2024. Similarly, accelerated maintenance efforts on Eskom's coal fleet under guidance of the Eskom's Generation Recovery Plan also helped improve the reliability of South Africa's electricity supply. The plan resulted in year-on-year diesel savings of ZAR16.20bn, which is about 65.1% less than the ZAR24.89bn spent during the same period in 2023 due to less usage of utilisation of Open-Cycle Gas Turbines (OCGTs).

Coal Power Generation Underperforming Against Total Capacity

South Africa - Coal Capacity, MW & Generation Growth, %y-o-y (2010-2034)

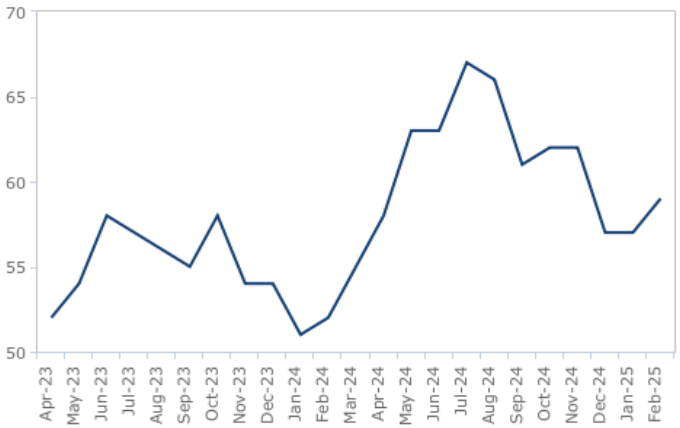


e/f = BMI estimate/forecast. Source: EIA, IRENA, BMI

However, **coal remains a dominant force,** and its operational setbacks have wide-reaching implications. According to our latest forecasts, South Africa's coal capacity is expected to see a gradual decline as aging plants approach decommissioning by 2030, influenced by compliance with Minimum Emissions Standards. However, coal's contribution to electricity generation will remain substantial in the near term due to delays in renewable energy integration and challenges in enhancing Eskom's Energy Availability Factor (EAF). In 2024, Eskom's EAF from 01 April 2024 to 26 December 2024) EAF was at 62.37%, a significant improvement of about 7.0% compared to the same period last year (55.35%). In 2025, year-to-date EAF is at 61.44%, which is still a significant improvement of about 6.8% compared to the same period last year (54.64%) however, it shows growing signs of decline in performance for the utility right at the start of the year. Additionally, transmission and distribution inefficiencies, compounded by financial constraints and policy uncertainties, continue to impede the sector's development. High levels of maintenance, necessary for infrastructure reliability, often reduce the available capacity, further exacerbating the risk of power shortages in the market.

Declining Performance Over Recent Months Due To Struggling Power Fleet

Eskom – Energy Availability Factor, % (2023-2025*)



As of February 2025. Source: Eskom, BMI

What's Next: According to Eskom group CEO Dan Marokane, Eskom is already making progress in bringing units that failed at the weekend back online, including those at Camden, Majuba and Medupi, and should have all units recovered before the end of the week. So, this should reduce the risks of loadshedding going forward. The anticipated completion of major base load units like Kusile Unit 6 and Medupi Unit 4 over March and April will also be important to bolstering system adequacy.

Although, we expect a long-standing solution to loadshedding in the coming quarters, the continued risk of load shedding in South Africa, poses notable challenges across the different consumer types with residential users facing daily disruptions, urging energy conservation. Businesses, particularly retail and manufacturing, encounter productivity and revenue impacts, necessitating operational adjustments and increased investment in backup solutions. Industrial sectors may also have to optimise processes to reduce consumption, affecting production schedules and costs. Overall, the economic impact remains notable amid rising electricity costs and overall economic pressures in the market.

As such, going forward, we believe that the market's ability to achieve and maintain an EAF above 70% will be critical to ensuring system stability and reducing load shedding incidents. Also, the government's recent reforms, including the recent Electricity Regulation Amendment Act, which aim to establish a competitive electricity market, could enhance efficiency and attract private investment in booting capacity.