<u>Key National Initiatives Underway Relevant to reducing the cost of electricity both nationally as well as in Cape Town:</u>

Market Restructuring and Deregulation

The Electricity Regulation Amendment Act (ERAA), which came into effect on 1 January 2025, represents the most significant structural reform in decades. This legislation breaks Eskom's 100-year-old monopoly by establishing an open, diversified market system. A new independent transmission system operator (TSO) is being established to replace Eskom as the sole offtaker, and private enterprises can now participate directly in electricity transactions. Notably, the legislation removes mandatory competitive bidding requirements for new generation projects, reducing bureaucratic barriers for investors.

Renewable Energy Procurement Programs

The Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) has attracted over $20 billion in investments, targeting 17.8 GW of renewable capacity by 2030. The programme is complemented by the Battery Storage IPP Procurement Programme (BESIPPPP) and the Risk Mitigation IPP Procurement Programme (RMIPPPP). By late 2024, four battery storage programmes reached commercial close, with a third bid window launched in March 2024. Current capacities include 2,500 MW of solar PV and 3,670 MW of wind energy across all renewable sources.

Rooftop Solar Incentives

The government has implemented aggressive tax incentives to accelerate residential and business solar adoption. These include a 25% rebate on solar panel costs (up to ZAR 15,000) against tax liability and a 125% capital depreciation allowance in the first installation year. The Energy Bounce Back (EBB) Loan Guarantee Scheme helps small and medium enterprises finance rooftop installations by having government assume initial losses of up to 20% of loan value if repayment defaults occur.

Transmission Grid Expansion

Eskom is implementing an ambitious Transmission Development Plan to build 14,000 km of transmission lines and add 37 GW of connection capacity between 2025 and 2033. On 28 March 2025, the Minister of Electricity and Energy published ministerial determination for procurement of approximately 1,164 km of 400 kV transmission powerlines. Importantly, draft regulations now permit private sector participation in transmission development, addressing Eskom's constrained balance sheet.

Energy Security Measures

The National Energy Crisis Committee established under the Energy Action Plan focuses on five key pillars: fixing Eskom, enabling private investment, accelerating renewable procurement, unleashing household solar investment, and transforming the electricity sector for long-term security. New regulations introduced on 1 November

2025 enforce strict electricity usage limits during peak hours to reduce strain on the grid and promote energy efficiency.

Cape Town's Pioneering Local Initiatives

Utility-Scale Solar Generation

Cape Town broke ground in October 2024 on South Africa's first city-owned utility-scale solar plant in Atlantis, a R200 million (approximately $11.3 million) project. The 7 MW facility (scalable to 10 MW) is expected to deliver first power by end of 2025 and feed directly into the grid. The city is also investigating a larger 30-60 MW solar plant at Paardevlei. As of June 2025, construction was one-sixth complete, with 2,400 of the planned 12,800 solar panels installed.

Battery Storage Pilot

Concurrent with the Atlantis solar project, Cape Town is developing its first utility-scale Battery Energy Storage System (BESS)—a 5 MW facility with 8 MWh usable capacity. This pilot project aims to demonstrate energy storage integration on the city's network and advance South Africa's clean energy development.

Cash for Power Feed-in Scheme

Cape Town pioneered the Cash for Power programme in 2024, allowing residents to earn actual cash (not just bill credits) for excess solar generation sold to the city. By 1 February 2025, the scheme had 1,842 registered users who collectively earned more than R50 million in cash or credits. This innovative programme incentivizes residential solar adoption and creates a distributed generation model.

Small-Scale Embedded Generation (SSEG) Growth

The city's SSEG programme has achieved remarkable growth: between 2014 and 2024, it grew to 6,400 authorized systems delivering 140.6 MVA capacity. More impressively, between June 2024 and June 2025, this surged to 13,398 systems with 251.6 MVA installed capacity. This demonstrates the potential when bureaucratic barriers are reduced through streamlined online application systems. Between 2014-2024, the programme created 713-1,140 full-time equivalent jobs and facilitated R1.7-2.6 billion in investment.

Gas-to-Energy from Landfill

In November 2025, Cape Town powered up the Coastal Park gas-to-energy facility (R93 million investment), which converts methane from landfill waste into electricity sufficient for approximately 4,300 households. The facility generates 1.3 million kilowatts monthly, with 1.2 million kilowatts fed directly into the municipal grid. The city plans to expand similar operations while generating carbon credit revenue.

Infrastructure Investment and Energy Strategy

Cape Town has allocated R71.2 billion over three years for electricity infrastructure, with R183 million dedicated to the SSEG programme. The city plans to invest over R4 billion in grid upgrades and maintenance and aims to add 1 GW of independent power supply to end load shedding. The city's 2050 Energy Strategy prioritizes three commitments: harnessing new energy supply, alleviating energy poverty, and optimizing energy use across the city.

Critical Gaps and Challenges

Transmission Grid Constraints—The Fundamental Bottleneck

This is the single most critical constraint limiting electricity cost reduction. Over 80% of grid capacity in solar- and wind-rich provinces (Northern and Western Cape) is fully allocated. More than R388 billion is needed for transmission and distribution infrastructure upgrades, yet Eskom has severely constrained finances. The Interim Grid Capacity Allocation Rules (IGCAR) process for assessing technical feasibility is acknowledged as long, expensive, inconsistent, and sometimes opaque. These delays caused fewer-than-expected preferred bidders in REIPPPP Bid Windows 6 and 7, with many renewable projects unable to connect despite being commercially viable. Delays in bid windows (historically significant gaps between procurement rounds) have driven investor uncertainty and company failures.

Eskom's Structural and Financial Crisis

Eskom faces mounting pressures: aging coal infrastructure prone to breakdowns, underperformance at key stations, liquidity constraints limiting maintenance investment, and extremely high municipal debt levels that constrain its overall finances. The utility's ability to invest in both generation and transmission is severely limited. While restructuring is underway, progress has been slower than anticipated. A fully independent transmission system operator separated from Eskom—essential for investor confidence and investment-grade status—faces institutional resistance.

Municipal Capacity and Role Fragmentation

Municipalities have fragmented roles and limited capacity. Regulatory frameworks emphasize large-scale independent power producers rather than municipal-level initiatives. The Municipal Finance Management Act imposes stringent financial governance rules with limited grant allocations, hindering municipalities' ability to secure funding for renewable projects. An earlier initiative from the 1990s to consolidate municipal distribution networks into regional energy distributors (REDs) was abandoned but could be revisited. Current fragmentation complicates grid planning between Eskom, municipalities, and private developers.

Policy and Regulatory Uncertainty

The Electricity Regulation Act has been only partially implemented, with the municipal reticulation section notably excluded. Eskom has taken legal action against Nersa's national wheeling framework, creating uncertainty around wheeling and trading mechanisms. The South African Wholesale Electricity Market establishment has been delayed. These regulatory gaps undermine investor confidence and slow private sector participation.

Energy Poverty and Equity

Despite progress with rooftop solar in affluent areas, rural electrification disparities persist. The benefits of grid-tied SSEG have primarily accrued to property owners with capital to invest, potentially widening inequality. Community-led renewable initiatives remain limited by policy frameworks that prioritize centralized solutions and lack mechanisms for municipal or community ownership models.

Financing Constraints and Just Transition

While international support exists (World Bank, African Development Bank funding), additional concessional financing is needed at scale. The transition away from coal presents socio-economic challenges: the electricity sector employs over 100,000 people, and coal regions face community livelihood threats in a nation with 33%+ unemployment. Balancing decarbonization with job preservation is politically and socially sensitive. Overly rigid local content rules (currently emphasized) risk increasing costs unless paired with meaningful domestic manufacturing investment.

Grid Connection Process Inefficiency

Beyond technical constraints, the application and approval process for grid connections is administratively burdensome, inconsistent in implementation, and sometimes discretionary. This particularly affects small and medium enterprises attempting to participate in decentralized generation.

Additional Ideas and Future Opportunities

Advanced Battery Storage and Hybrid Systems

Grid-scale battery systems, thermal energy storage, and hybrid renewable-storage projects—particularly in transmission-constrained areas—can reduce the burden on transmission infrastructure by enabling local energy storage and time-shifting. The BESIPPPP programme is a start, but scaling needs acceleration. Long-duration energy storage technologies should be explored.

Local Manufacturing Development

South Africa has an opportunity to develop domestic manufacturing of solar PV, wind turbine, and battery components. This could reduce costs, create employment aligned with the just transition, and improve supply chain resilience. Current policies encourage local content but lack systematic support for manufacturing capacity development. Targeted industrial policy and technology transfer partnerships could unlock this potential.

Smart Grid and Demand Management Technologies

Fourth Industrial Revolution (4IR) technologies—smart grids, advanced metering, demand-side management platforms, and decentralized energy systems—can optimize network utilization, reduce peak demand, and enable real-time balancing. Cape Town's SmartFacility programme offers a model, though broader rollout is needed.

Wheeling and P2P Trading Markets

The recent regulatory changes enabling wheeling (third-party electricity trading across the grid) and peer-to-peer trading between businesses and residents create market opportunities. However, fully operationalizing these mechanisms requires clear, predictable regulations and functioning wholesale markets. More development here could unlock decentralized market dynamics that naturally lower costs through competition.

Municipal Energy Cooperatives

Learning from Germany's Renewable Energy Act and Denmark's municipal energy cooperatives, South Africa could enable households and communities to form cooperatives that collectively own and operate renewable systems. This model empowers local ownership, can improve financing access through collective mechanisms, and ensures equitable benefit distribution. Policy frameworks would need modification to permit this.

Demand Response and Load Flexibility Programs

Beyond the Power Heroes programme (where volunteers remote-switch geysers), broader demand response could include smart appliances, time-of-use tariff structures that incentivize off-peak consumption, and industrial demand flexibility programs. Aggregated, these create virtual storage and reduce peak demand pressures on the grid.

Renewable Microgrids and Energy Independence Districts

Particularly in rural areas, renewable microgrids can provide reliable, cost-effective electricity independent of central grid constraints. Coupling solar generation, battery storage, and smart load management can create resilient local energy systems. Policy frameworks supporting municipal or community-owned microgrids (drawing on international models) could accelerate adoption.

Coastal Wind and Offshore Potential

South Africa's coastlines have substantial untapped wind resources. Offshore wind development, though requiring significant capital and technological expertise, could access wind resources without grid transmission bottlenecks in land-scarce renewable zones. Pilot projects and technology partnerships with experienced countries could be explored.

Green Hydrogen Development

While nascent, hydrogen—particularly green hydrogen produced from renewable electricity—offers industrial decarbonization and potential export opportunities. Projects like the Hydrogen Valley initiative and Mogalakwena Hydrogen Plant represent early steps. Scaling hydrogen could diversify renewable applications and support industrial competitiveness.

Streamlined Grid Connection Processes

The IGCAR could be reformed into a truly transparent, rapid, rule-based process with clearly defined technical standards and timelines. Removing discretion and bureaucratic delays would unlock billions in private investment already prepared to deploy. Technology solutions (automated technical assessment systems) could accelerate this.

Independent Transmission System Operator Acceleration

Establishing a fully independent TSO (separated from Eskom, with its own assets and balance sheet) remains critical. This entity should have investment-grade potential and the authority to plan grid expansion strategically. Clear legislative timelines and political commitment could accelerate this structural reform, which underpins all other progress.

Integrated Regional Planning

Given transmission constraints in wind- and solar-rich provinces, integrated regional planning—coordinating renewable siting, transmission expansion, local storage, demand centers, and alternative evacuation routes—could optimize resource utilization and reduce wasted generation potential. This requires coordination across national, provincial, and municipal governments with private developers.

The evidence suggests South Africa has viable pathways to significantly reduce electricity costs, but success depends critically on resolving the transmission grid bottleneck, accelerating institutional reforms, and maintaining policy certainty. Cape Town's initiatives demonstrate the potential when local governance takes decisive action, but scaling these models nationally requires complementary national reforms, particularly around grid access and independent transmission operation.