

# The South African-German Energy Programme (SAGEN)

Advancing the South African Power Sector Reform, the deployment of a sustainable electricity generation and the improvement of energy efficiency



The Republic of South Africa has some of the world's best renewable energy resources, notably wind and solar energy. These resources promise significant potential, offering both a dependable, clean energy supply and long-term economic growth. As global demand for low-carbon products is on the rise, these renewable sources stand as the most cost-effective option, capable of deployment far more swiftly than conventional power plants. Such rapid implementation provides a quicker solution to the issue of load shedding. Shifting South Africa's energy mix towards renewables not only presents an opportunity to establish a clean and reliable energy sector but also acts as a safeguard for workers and communities in coal-producing regions. This transition facilitates job retraining, introduces new employment opportunities, and provides direct financial support, ensuring a sustainable future.

## The challenge

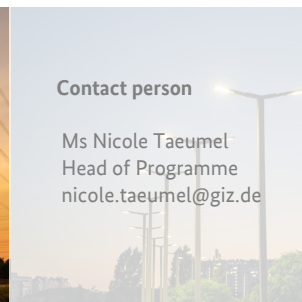
For years, South Africa has grappled with a severe energy crisis marked by insufficient electricity generation capacity, persistent load shedding, and soaring energy prices, significantly impacting daily lives, businesses, and industries. These challenges have exacerbated unemployment, inequality, and poverty. The unreliable power supply has led to substantial economic losses, resulting in job cuts and heightened social disparities. The energy crisis has proven burdensome, yet short-term fixes within the current energy system offer no enduring solutions. The country's aging power plant fleet heavily reliant on coal, the foremost carbon emitter among energy sources, remains a primary contributor to global warming. The consequential impacts of this climate crisis have been felt acutely in South Africa, with

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Financial volume	16.5 million Euro (including 1.0 million euros from Swiss State Secretariat for Economic Affairs/SECO)

catastrophic floods claiming lives, disrupting livelihoods, and damaging infrastructure. Consequently, addressing energy, economic, social, and climate challenges concurrently is imperative for South Africa's future.

## Our approach

SAGEN aims to support the South African energy transition across four key levels. Firstly, it accompanies responsible stakeholders in shaping and implementing power sector reforms. Secondly, it supports Eskom and other stakeholders in optimizing the power system's performance. Thirdly, SAGEN assists municipal stakeholders in enhancing conditions for integrating embedded generation into distribution networks. Finally, it aids municipalities in implementing municipal energy management systems, developing Municipal Energy Efficiency Action Plans (MEEAP), and undertaking pilot measures to enhance energy efficiency. These activities are closely coordinated and executed



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Photo left: Over 60 participants from 15 municipalities attending the SSEG training and a site visit to the world-class Solar PV demonstration systems at the CSIR Pretoria Campus.

Photo right: Panel discussion during a networking reception for women in green hydrogen and renewable energies.

in collaboration with the DMRE, NT, Eskom, SALGA, SANEDI, and various municipalities.

SAGEN provides technical advice and capacity building to policymakers in relevant government bodies, including the regulator. This encompasses aspects like establishing competitive markets and updating the legal and regulatory framework for the power sector. Another significant focus of the programme is enhancing the electricity distribution sector. SAGEN's approach involves a thorough analysis of the sector's current performance to craft potential scenarios and actionable strategies for the future. This analysis empowers municipalities to recognize and leverage emerging business models that may arise during reforms, aiming to bolster viable distribution companies in South Africa and ensure their sustainability.

Furthermore, SAGEN offers support to Eskom in advancing the unbundling process, identifying and cultivating future business functions like competitive electricity trading, and facilitating the development of necessary skills for these functions.

## Our results

Throughout its four prior project phases since 2011, SAGEN has significantly contributed to the advancement of the South African energy transition. The programme supported the national procurement scheme for renewable energies, resulting in private sector providers procuring power generation facilities exceeding 8,800 MW, with nearly 6,000 MW currently supplying electricity to the grid. These operational facilities have cut South Africa's CO<sub>2</sub> emissions by almost 70 million tonnes.

The installation of private and commercial rooftop PV surged from about 30 MW in 2014 to over 1,150 MWp in 2021, posing challenges for municipal electricity distributors. In response, SAGEN initiated an Embedded Generation (EG) support programme to aid municipalities in integrating EG into their networks, addressing technical, legal, and economic considerations. The programme has supported 105 out of 165 municipal electricity distributors, implementing EG tariffs in 43 municipalities. Additionally, over 90 municipalities have embraced energy efficiency measures, encompassing energy-efficient street lighting, management practices, and public building retrofitting,

collectively reducing the country's energy consumption by over 200 million kilowatt-hours annually.

Additionally, Municipal Energy Management Systems (MEMS) were introduced to municipalities, allowing self-management of electricity usage, resulting in substantial savings. The MEMS initiative has demonstrated significant energy and cost savings: +R3.5 million / annually from administrative measures alone.

The transformation of the power system, notably the distributed and embedded generation roll-out, offers opportunities for emission reduction, cost savings, and economic development. For instance, SAGEN aided the Garden Route District Municipality in devising an energy master plan, yielding a 24% cost reduction, a 53% decrease in CO<sub>2</sub> emissions, and a 49% water consumption cut compared to business-as-usual scenarios.

SAGEN has supported 8 pilot municipalities in energy management, drafting MEEAPs, formulating energy management policies, and appointing energy management committees in 6 municipalities.



70 mio. tons



106 supported municipalities



43 EG tariffs

The just energy transition promises a prosperous future for South Africa. A shift towards a decarbonised energy system is set to underpin a thriving economy, foster societal inclusivity, and preserve a healthier environment. Both industries and households stand to gain from dependable, cost-effective, and environmentally friendly energy sources. This transition will catalyse inclusive economic growth, generate well-paying employment opportunities, and contribute significantly to poverty reduction. With these changes, South Africa is poised to unlock its full potential, ensuring energy security, advancing economic growth, and championing social equity.

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