SAGEN | SOUTH AFRICAN-GERMAN ENERGY PROGRAMME

Background

South Africa's commitment to mitigating its climate impact, coupled with technological advances and declining costs, is driving the inclusion of more renewable energy in the country's electricity mix.

Market reforms to foster private sector investment in an attempt to combat the worsening electricity supply crisis have further accelerated the transformation of the South African power system.

It can be expected that within a decade, the electricity supply side will shift from a coal dominated to a renewable energy led system.

Field of Intervention:

Power System **Planning and Operation**

An expanded and renewable ready grid is the backbone of reliable, affordable and clean energy

Challenges

The rapid transformation by introducing new generation technologies, in more geographically diverse locations and at different voltage levels, brings new dimensions to power systems planning and operation.

To address this increase in complexity Eskom staff from upper management to control room technicians have to expand their knowledge and expertise. New processes and procedures will have to be developed, standards and guidelines adapted.

However, successfully managing these changes will result in greater resilience, system flexibility and a significantly improved carbon footprint. Simultaneously, it will achieve a least-cost generation expansion trajectory for the country.

german cooperation DEUTSCHE ZUSAMMENARBEIT
Implemented by: giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra
Swiss Confederation
Federal Department of Economic Affairs, Education and Research EAER
State Secretariat for Economic Affairs SECO

Activities

SAGEN supports Eskom in the development of a generator connection code summarising all connection requirements as well as preparing recommendations for further improvement of the codes. This work will make it easier for an increasingly diverse group of stakeholders from generators through prosumers to distributors to adhere to or monitor compliance with the code. Furthermore, a continuous evolution of the grid codes is the basis for a stable power system adapting to constant transformation.

SAGEN is providing technical assistance to prepare and execute studies to identify potential system stability threats - that could be the result of an increasing distribution of renewable generators and the decrease of conventional generation - and measures to counter them. The support further specifically addresses capacity building to create a cohort of Eskom experts to continuously update the studies and adjust the network planning.

SAGEN supports Eskom in the structured and continuous identification of hosting capacities as well as their visualisation in an online platform.

This work aims tohelp developers identify areas with connection capacity and avoid unnecessary project preparation expanses. SAGEN assists Eskom in the development and revision of guidelines and standards to address the planning and operation of the distribution system with increasing shares of variable and inverter-based generation. The work addresses topics like harmonic frequency emissions, network protection requirements and congestion management or overvoltages.

Based on analysis of international best practices recommendations for revisions of guidelines and standards addressing those phenomena have and are being developed and implemented.

Results

During this phase of the programme 150+ Eskom engineers have benefited from capacity building activities amongst others on system stability, power quality, protection and electromagnetic transient studies.

The South African-German Energy Programme (SAGEN) collaborates with South African partners to support the country's transition to a reliable, affordable and clean energy future. SAGEN is funded by the German Federal Ministry for Economic Cooperation and Development (BMZ), co-funded by the Swiss State Secretariat for Economic Affairs (SECO) and implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH in cooperation with the Department of Mineral Resources and Energy (DMRE), the National Treasury (NT), Eskom, the South African Local Government Association (SALGA) and the South African National Energy Development Institute (SANEDI).

GIZ Office Pretoria | 333 Grosvenor Street | Pretoria | 0028 | South Africa
Tel: +27 12 423 5900 | **Fax:** +27 12 423 6347
Website: www.sagen.org.za | www.giz.de
Contact: sagen@giz.de