

Background

Electricity supply constraints (load shedding), together with increasing electricity tariffs and decreasing prices of renewable energy technologies, have driven the substantial uptake of Embedded Generation (EG) in South Africa.

According to analyses by Eskom and the evaluation of satellite images published by the South African Photovoltaics Industry Association (SAPVIA), nearly 4.9 GW of behind the meter generation (mainly PV) is operational in South Africa.

While this fivefold increase within 18 months is to a large extent a response to load shedding, embedded generation is a viable option for an increasing number of customer segments and consequently, the market will continue to grow.

Generally most utility-scale renewable generators are connected to Eskom's grid, whereas the majority of commercial, industrial and residential embedded generation is connected to municipal distribution networks.

Field of Intervention:

Embedded Generation

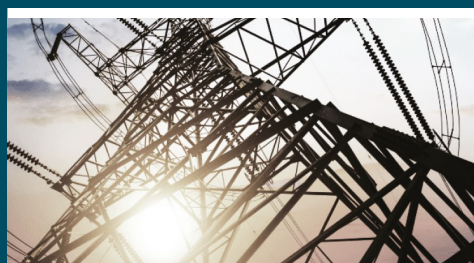
Every roof can deliver clean energy, every distribution network should integrate it



Challenges

The unprecedented uptake of embedded generation – mainly rooftop solar photovoltaic (PV) – has significant implications for network service providers, in terms of financial, technical and safety impacts.

For example, the loss in revenue caused by customers generating part of their own electricity demand is contributing to the financial distress of municipalities.



Systems connected to the grid not adhering to codes and standards can pose a safety hazard to municipal staff working on lines. Knowledge about the capacity and location of embedded generators is an essential input variable for network expansion considerations.

Since the embedded generation market will continue to grow, municipalities should encourage and incentivise customers and operators to register their systems and adhere to all codes, standards and policies.

The challenges can have far adverse effects if these systems are not registered, and municipalities do not know where they are located on the distribution network.

Activities

In order to support municipal distributors with a consistent approach to integrating embedded generation into their networks in a way that is technically, legally and economically sound, comprehensive support programme was developed and implemented. **The programme includes the following main aspects:**



A continuously updated comprehensive resource pack covering all aspects related to embedded generation, from policies and by-laws to tariff design, technical standards and commissioning requirements.



Regular basic trainings in which municipal staff start to develop a comprehensive EG package for their jurisdiction.

A range of specialised trainings covering all aspects of the integration of embedded generation including but not limited to grid impact studies, grid code compliance, metering and tariff design.



The development of an Online Embedded Generation Application Platform that allows customers to submit applications, alerts the responsible municipal representative and performs a technical assessment of the application based on the NRS 097-2-3 simplified criteria to check if the generator can be safely integrated into the network. **The system reduces paperwork and increases the turnaround time for processing of applications, improving the customer experience and reducing the workload for municipal staff.**

Maintaining a help desk and community of practise to support municipal staff on all queries around embedded generation and related topics.



Studying the anticipated future distribution grid to analyse the impact distributed energy resources (DER) like embedded generation, battery storage and electric vehicles, as well as improvements in energy efficiency and demand side management to inform the development of the distribution industry.

Results

9

annual municipal trainings and 6 specialist trainings offered.

67

municipalities with official embedded generation application processes.

Approximately

9000

registered EG systems in partner municipalities

105

municipalities (of 167 licensed municipal distributors) participate in EG support programme.

43

Embedded generation tariffs approved.

15 municipalities onboarded on the application platform with 8 active, 500 applications and just over 18 MW of cumulative generation capacity.

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