Understanding Small-Scale Embedded Generation and the benefits

Program Brochure

Eskom

Small-scale embedded generation is becoming more prevalent in South Africa. There is an increase in prosumers - electricity consumers who through the installation of the Small-Scale Embedded Generators (SSEG), both produce and consume electricity.

Investing in a generator can be costly and therefore requires careful consideration to ensure that you have the necessary authorisation (i.e. permissions), and are able to meet the technical and regulatory requirements of the network service provider. These technical requirements will ensure safe connections are made to the grid, whilst also applying the correct tariff. All customers opting to use a generator and the network supply in parallel (i.e. grid tied connections), need to be approved by Eskom.

Authorised connections offer customers a number of benefits:

- It ensures a safe connection to the grid, and thus minimises the risks associated with injury, loss of life and damage to property.
- It avoids the risk of Eskom supply being disconnected, which may then also lead to prosecution when unauthorised SSEGs are discovered.
- Use of net billing services that allow exported surplus to offset current billed consumption or bank surplus to offset future billed consumption within the financial year through appropriate tariffs and agreements.
- Supply points can, in approved circumstances, be consolidated to share exported generated surplus energy.
- Wheeling of generated energy is allowed for customers connected at MV (Medium Voltage) and HV (High Voltage).

Peddie Mall case study

Eskom is assisting customers to ensure that there are safe SSEG connections to the network in all parts of the country. One such customer is the Peddie Plaza Shopping Centre, known as Peddie Mall, in the town of Peddie in the Eastern Cape. It has numerous tenants occupying the centre, with the primary tenant being the Boxer Superstore Supermarket.

Boxer supermarket is the largest consumer of electrical energy in the retail centre, with the majority of the power being consumed by the fridges and freezers 24 hours a day, seven days a week. This site uses on average 100 MWh per month.

Eskom has worked closely with this client to understand their SSEG requirements to ensure that they meet Eskom technical requirements for a safe connection to the network. The customer wanted to produce clean energy that would also be financially viable for the shopping centre.

The customer's premises has a supply size of 500KVA on a Miniflex tariff, which met the Time of Use (TOU) tariff requirements. The customer was able to apply for a Small-Scale Embedded Generator (SSEG), limited to 75% of the notified maximum demand as a LV installation.

While Eskom has the capacity to allow customers to use the grid to offset or export surplus energy on the grid, this customer was only able to install a 150kW PV system, due to the limited roof space in the shopping centre. This limited PV capacity only catered for self-consumption, with no surplus for Eskom's grid services to export. The centre has installed a standby diesel generator to ensure continuity and improved reliability, in cases of supply interruptions.
A solar system supplier, who was already working with the customer on other similar projects had an understanding of the customer requirements for the Peddie Mall site, recommended that a PV generator be installed at the shopping centre to achieve the production of clean affordable energy. The solar system supplier then submitted the application for the proposed SSEG on behalf of the customer.

The installation would be grid-tied and sized for own use only, with no feedback onto the grid. The self-consumption of the Photovoltaic (PV) installation would still help the customer. The inverters deployed have anti-islanding protection to ensure that the generators automatically switch off when the local Distribution network is switched off or interrupted.

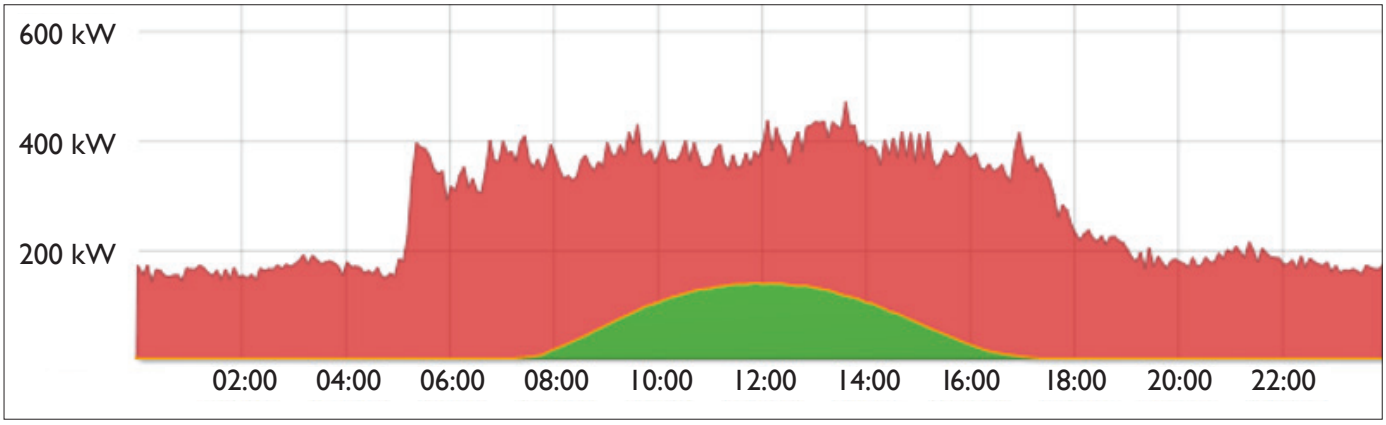
The shopping centre however will continue to keep their diesel generator in islanded mode during power interruptions, hence there being no need for any battery back-up storage.

The benefits to the customer were significant:

- *On the customer side, the main gain was the reduction in energy costs from the installed solar system for daytime consumption. Eskom's standard tariff period occurs during the day when this SSEG installation is mostly operational.*
- *Additionally, the system produces 228 080 kWh per year which also alleviate pressure on the power network.*

The cost benefit of this energy may vary from month to month as the seasons change.

- *The highest energy yield achieved by the PV system was in February 2021 where the full capacity of 150 kW was yielded at midday.*
- *The customer had a total estimated revenue savings of R18 941 per month between February and April 2021 due to the decrease in electricity energy volume used from the grid.*
- *The centre is now running on a blend of solar energy and Eskom supplied energy, as per the graph below:*



Graph 1: Solar Supply (in green) vs Eskom Supply (in red)

The solar installation project took about six months to complete. Upon completion, the customer whom Eskom worked with closely was extremely pleased with the process and outcome of the service received from both Eskom and the appointed solar installer. Eskom and the solar installer achieved the objective of ensuring that the shopping centre has clean, reliable and affordable electricity for the future.

Eskom's grid services portfolio overview:

- **Using the grid for net billing (i.e. energy offset)**
  The customer can use the grid for offsetting surplus exported energy, which means that there is no need to invest in expensive battery storage systems. Net billing allows the customer to use the exported surplus to credit their electricity bill.

- **Wheeling of generated electricity between two sites**
  The grid can be used to transmit (wheel) the energy to other sites nominated by the generator, and Eskom will provide the energy credits on the receiving customer's electricity accounts if all relevant agreements have been concluded with both the generator and the customers receiving the energy. Wheeling is only allowed for customers connected at MV (Medium Voltage) and above.

- **Assists with potential power quality challenges**
  The power output from renewable generators can change quite rapidly, but being grid tied ensures that there is adherence to regulatory standards relating to power quality for the benefit of all grid users.

Information on how to participate in customer self-generation:

Customers who are interested in investing in their own generators need to consider the detailed requirements to actively participate in the new energy market. Customers interested in installing generators smaller than 1 MW can visit the Small-Scale Embedded Generator programme website at https://www.eskom.co.za/distribution/small-scale-embedded-generators/ for more information. Customers interested in installing a generator larger than 1 MW can visit the Independent Power Producers (IPP) website for details on requirements and processes involved at https://www.eskom.co.za/distribution/ipp-and-grid-access-unit/

Alternatively, customers can also contact Eskom on **08600 37566** to arrange for further assistance to guide them with the requirements of installing SSEG at their locations.