



INDUSTRY BRIEF

The registration and application for connection processes for embedded generation

Western Cape

This brief provides information on the registration and application for connection processes for embedded generation (1 Megawatt (MW) to 100 MW) as per the Amended Schedule 2 of the Electricity Regulation Act 4 of 2006 on 5 October 2021. It is the responsibility of local installers/developers to ensure that their clients are informed of the correct procedure to avoid repercussions in the future.

Main insight

The South African embedded generation market has grown significantly over the last six years to reach an estimated installed capacity of 1.5 GW in 2021¹. Projects of less than 1 MW have largely driven this to date. The national regulatory environment has struggled to keep the pace of this growing market. This gap between local market innovation and national regulations has led to stakeholder² uncertainty, increased project risk, and ultimately increased unregistered systems.

In an attempt to maximise the positive impact potential of this market, align policy with market changes and create market certainty, the Department of Mineral Resources and Energy gazetted the Amended Schedule 2 of the Electricity Regulation Act 4 of 2006 on 5 October 2021 (third Amendment). The Amendment increases the threshold for embedded generation from 1 MW to 100 MW without a license. The intervention to reform the electricity regulation act has been hailed as a positive way forward by the energy sector and industry across the board. It is envisaged that this step will unlock significant investment in new generation capacity.

¹ This market is currently dominated by rooftop solar photovoltaic (PV) installations given the price, technology maturity and ease of installation

² Stakeholders refer to customers, installers and project developers in this context



South African energy landscape

South Africa's electricity demand is currently dominated by coal-fired power generation stations, primarily owned and operated by Eskom, the national power utility. Eskom supplies ~95% of South Africa's total electricity demand. The remaining 5% of demand is met through municipalities, imports and independent power producers (IPP). Energy demand has distinctly flattened since 2010, resulting in reduced demand for coal-based electricity (87% in 2010 versus 79% in 2019)

Over more than ten years, a historic supply and demand imbalance in South Africa's single buyer energy model resulted in intensive load shedding experienced country-wide from 2008 to 2015 and again during 2019, 2020 and 2021. According to the Council for Scientific and Industrial Research (CSIR), South Africa experienced loadshedding for 650 hours in H1-2021 (15% of the time), wherein 963GWh of estimated energy was shed (mostly Stage 2 loadshedding). This is 76% of the total loadshedding experienced during 2020, which indicates that 2021 will be the worst loadshedding year-to-date.

The extent of loadshedding experienced was largely driven by the existing coal fleet's declining Energy Availability Factor (EAF). Overall, the EAF was 61.3% for H1-2021 (relative to 65% in 2020 and 66.9% in 2019). A concerning shift of the unplanned outage component of the EAF has also been highlighted where unplanned outages of up to 15 300 MW were experienced and were greater than 10 000 MW for more than 80% of H1-2021.

Embedded Generation

The national embedded generation³ market for installations, operation and maintenance of rooftop solar PV has grown over the last decade. Rising electricity tariffs, decreasing solar PV costs and energy security remain the main drivers of this market.

In 2021 the market shows signs of accelerating as loadshedding continues amidst electricity price increases and cheaper renewable energy. It is estimated that a total of 1.5 GWp of installed solar PV rooftop systems throughout South Africa,

with close to 400 MWp of rooftop solar PV installed in South Africa in the last 12 months. The total annual available market could continue to grow at this rate to a saturation point of ~500 MWp installed per year, reaching a total of 7.5 GWp of installed capacity by 2035.

One of the barriers in the market is stakeholder⁴ uncertainty and increased project risk on the back of the indistinct regulatory landscape.

The lack of clarity will impact both future projects and projects already completed. This is particularly true

when it comes to the licensing and registration of embedded generation systems. If installed systems are found not to be correctly licensed or registered, then customers can be charged a service fee for the disconnection of unauthorised connections. The supply of electricity to the property in question may also be disconnected. It will only be reconnected once the relevant authority is satisfied that the system is disconnected, decommissioned or authorised and that the service fee has been paid.



³ Embedded Generation refers to generation of between 1 MW and 100 MW that is connected to the electricity distribution grid

⁴ Customers, project developers and installers

Registration and Application for Connection

Under the current South African policy and legal framework, any generation, transmission or distribution facility operation shall be licensed or registered with the National Energy Regulator of South Africa (NERSA). There are three stages in the process: Registration, licensing and ministerial determination.

Embedded generation with a capacity between 100 kW and 100 MW requires registration with NERSA but does not need to be part of a ministerial determination and does not require a generation license. Generation facilities with a capacity >100 MW need to be licenced by NERSA and be part of a ministerial determination and national procurement.

All generation connected to the grid needs to be registered with the relevant transmission/distribution grid operator. The relevant transmission/distribution grid

operator rules and regulations are the determining set of regulations for grid connection.

Why is compliance needed?

1. To ensure the safe connection of systems.
2. To ensure compliance with safety regulations (Safety for staff and customers).
3. To ensure the integrity of grid infrastructure.
4. To allow for appropriate planning of future grid upgrades and maintenance

Distribution utilities will assess embedded generation applications of between 1-100 MW as previously, based on NRS097-2-3 parameters, the NRS097-2-1 certification requirement and grid impact studies beyond the NRS097-2-3. Aligned with the

distribution utility's requirements, the amended Schedule 2 of the Electricity Regulation Act 4 of 2006 gives The National Regulator (NERSA) the power to vary, suspend or remove any registration that does not comply with the grid code or the distribution utilities' regulations.

Essentially, there are three separate processes to clarify:

- Registration with NERSA;
- Generation Licensing with NERSA; and
- Application for connection (distributor utility).

Table 1 below details the current NERSA licensing and registration and the application for connection (distributor registration) for different embedded generation system sizes.

Table 1: Licensing and registration for different system sizes

		<100 kW	100 kW-1 MW	1 MW-100 MW	>100 MW
NERSA	Registration	NO ⁵	YES	YES	YES
	Licensing	NO	NO	NO	YES ⁶
Municipality/ Eskom	Application for connection	YES	YES	YES	YES

⁵ For this to be true, there has to be an existing point of connection, the local distribution utility must keep a register of such installations and the local distribution utility must prescribe the conditions for connection.

⁶ If not accounted for in the Integrated Resource Plan (IRP) a deviation from the IRP may be required.

Table 2 below details the generation facilities of between 100 kW and 100 MW that require registration with NERSA and/or generation licensing with NERSA and/or an application for connection (Distributor/Transmission utility) as per the Amended Schedule 2 of the Electricity Regulation Act 4 of 2006 on 5 October 2021.

Table 2: Licensing and registration for different system types.

		APPLICATION FOR CONNECTION	REGISTRATION	LICENSING
1	Generation facilities that only provide standby or backup electricity for the duration of a blackout (no size limit and with or without storage)	✓		
2	Generation facilities that do not have a point of connection with the distribution (no size limit and with or without storage)	✓		
3	Generation facilities smaller than 100 kW	✓		
4	Non-wheeling facilities of no more than 100 MW: <ul style="list-style-type: none"> located close to or adjacent to the end-user customer or purchaser of the energy where there is import and export at the same point of supply (otherwise known as net-metering) connect "behind the meter" (the generation facility connects and feeds energy within the purchaser's connection infrastructure) do not use the transmission or distribution systems to convey energy to the purchaser's system 	✓	✓	
5	Wheeling and trading ⁷ facilities <ul style="list-style-type: none"> situated away from the purchaser, with wheeling arrangements in place to convey the electricity to a purchaser through the transmission and/or distribution system. The generator or owner of the facility must have a connection agreement with the relevant distributor or the transmission company 	✓	✓	
6	Generation facilities for demonstration purposes that have no point of grid connection and will only be in operation for less than 36 months	✓	✓	
7	Generation of greater than 100 MW (excluding 1 & 2 in this table)			✓

⁷ Trading facilities cannot charge customers more than they would have paid through another provider and must have entered into service delivery agreement or similar agreement that regulates the relationship between the trader and the distribution or transmission utility

Legally, the registration and licensing of embedded generation vests with NERSA and not municipalities. Regulation is an administrative activity, and Nersa has developed the applicable procedures. Nonetheless, there is still confusion around application for registration (by NERSA) and application for connection (by the electricity distributor).

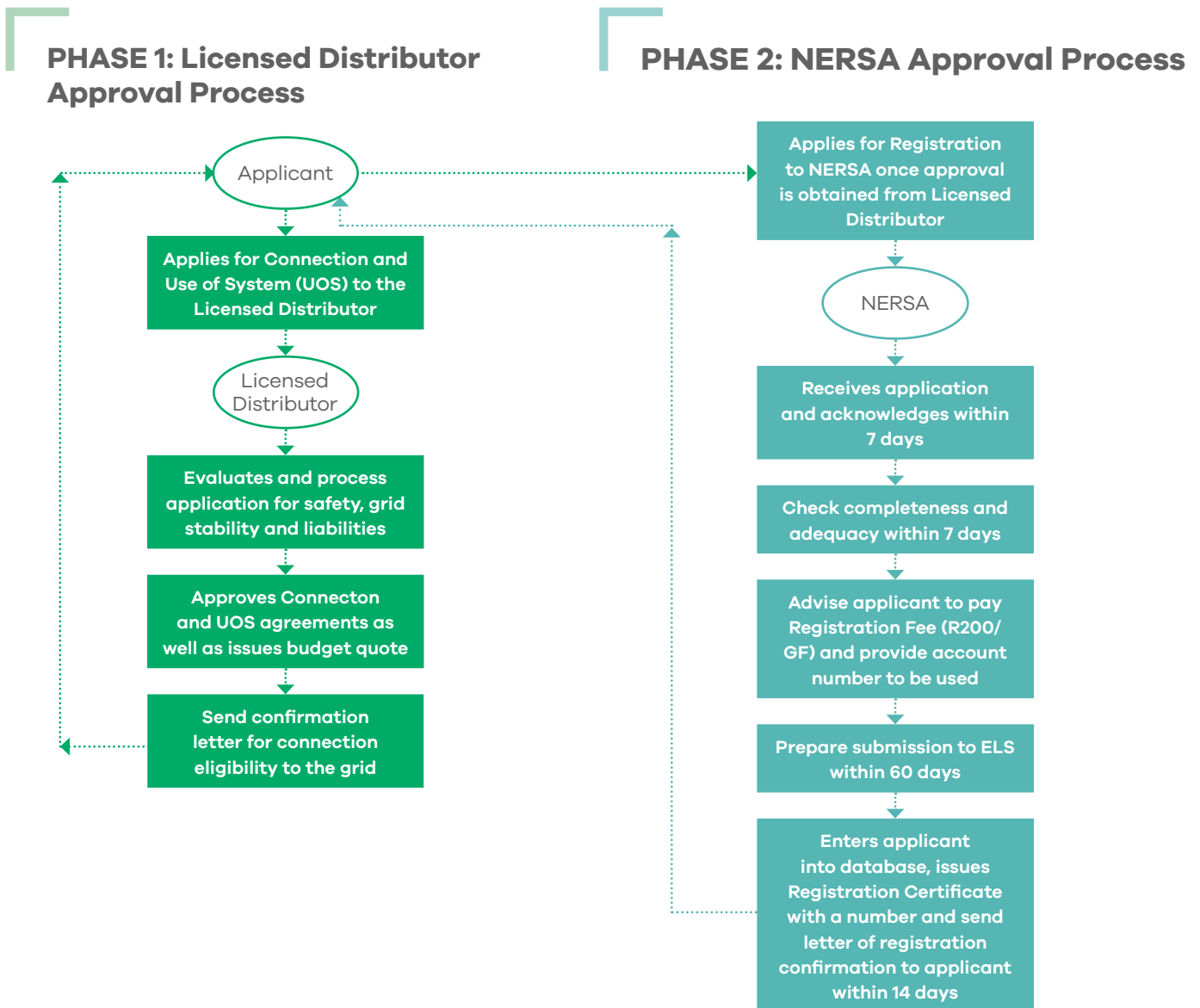
There are two stages to the registration procedure for embedded generation systems between 100 kW and 100 MW, as detailed in **Figure 1**. Firstly, the connection application must be made to the local municipality or Eskom to connect the generation facility to the electricity grid. Once this process has been completed, an application must be made to NERSA to register the generation facility.

This requires a letter from the local electricity distributor (municipality or Eskom) confirming that connection permission has been granted.

Storage by itself, charging from the network and discharging at peak periods for example, should be considered a 'generator' subject to Schedule 2 and other requirements. Where the storage is a component of a system with a primary generator, 'total generator capacity' should be determined by the technical capabilities of the system:

- If the primary generator and the storage system can both inject their full capacity at the same time, the total should be considered.
- If the primary generator is an inverter-based generator and the storage system shares the inverter, the inverter capacity will determine the 'total generator capacity'.

Figure 1: Registration procedure for embedded generators in terms of Schedule 2 of the Electricity Regulation Act, 2006 (Act No. 4 of 2006)



As the embedded generators market continues to grow, end-users and embedded generators installers need to promote the application for connection with local electricity distributors and the registration with NERSA. It is the responsibility of local installers to ensure that their clients are informed of the correct procedure to avoid repercussions in the future.

DOCUMENT LINKS FOR REGISTRATION AND LICENSING	
Third Amended Schedule 2 of the Electricity Regulation Act 4 of 2006 on 5 October 2021	https://cer.org.za/wp-content/uploads/2006/08/DMRE-6-October-2021-Amendment-to-Schedule-2-of-the-Electricity-Reg-Act.pdf
NERSA Generation License application	<p>Application procedure: https://www.ee.co.za/wp-content/uploads/2021/07/Nersa-generation-licence-process-and-requirements.pdf</p> <p>Application form: https://www.nersa.org.za/wp-content/uploads/2021/01/APPLICATION-FORMS-Electricity-generation-licence-application-form.doc</p>
Registration	<p>Registration procedure: https://www.nersa.org.za/wp-content/uploads/2021/03/Registration-Procedure-.pdf</p> <p>Registration forms: https://www.nersa.org.za/wp-content/uploads/2021/04/Registration-Application-Form-For-Small-Scale-Embedded-Generation-2021.docx</p>
Municipal registration (City Of Cape Town)	https://www.capetown.gov.za/City-Connect/Apply/Municipal-services/Electricity/apply-for-authorisation-to-install-a-small-scale-embedded-generation-system
Eskom grid-tied approval process	https://www.eskom.co.za/distribution/small-scale-embedded-generators/



Next steps

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