

Realising the Right to Electricity Through Off-Grid Power Solutions in South Africa

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Abstract

The South African government is navigating many basic municipal service delivery challenges, including a growing electricity supply deficit. Eskom Holdings SOC Limited, the state-owned power utility, is struggling to generate and supply a stable and uninterrupted flow of electricity through its grid system. The inadequate generation capacity results in rotating power outages, known as loadshedding, which occur when demand surpasses generating capability. This fundamental service delivery challenge, in conjunction with South Africa's climate change responses, including the decision to work towards energy efficiency, renewable energy and cleaner energy or a "just transition" from coal to clean energy, encourages many South Africans who have the necessary means to invest in off-grid energy solutions that operate alongside and at times independently of Eskom's grid. This paper considers from a legal perspective how and to what extent legislation on electricity supply and municipal by-laws empower household consumers to fulfil their right to electricity by going off-grid. The paper ultimately considers the import of this on South Africa's energy governance framework for electricity provision in the country.

Keywords

Right to electricity; off-grid power, loadshedding, South Africa.

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1 Introduction

The short-lived Declaration of a National State of Disaster to curb the impact of electricity supply constraints in South Africa reveals severe challenges in providing a reliable and consistent supply of electricity.¹ It affirms an inability to provide basic municipal services² and should be seen in the broader context of the collapse of municipalities,³ ineffective provincial interventions in failing municipalities,⁴ and reported service delivery failure cases calling for judgment based on the conduct of municipalities in relation to their basic service mandates.⁵ While many sectors of the economy across the country

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¹ The declaration of a state of disaster with regard to the electricity supply situation was gazetted in GN 3020 in GG 48009 of 9 February 2023. In the notice the Minister of Cooperative Governance and Traditional Affairs, who is responsible for the administration of the *Disaster Management Act 57 of 2002*, said that she declared the state of disaster regarding electricity after "[c]onsidering the magnitude, severity and progression of the severe electricity supply constraint and the substantial impact caused by the severe electricity supply constraint and following the classification of this electricity supply constraint by the Head of the Disaster Management Centre (CDMC) as a national state of disaster to prevent possible progression to a total blackout from occurring and taking into account the possibility to augment existing measures already undertaken by the organs of state to deal with electricity supply constraint". Although this paper reflects the legal position as of 13 February 2023, it is noteworthy that the declaration was eventually rescinded without any of its objectives being achieved, as is evident from the on-going constrained electricity supply situation in South Africa.

² Chapter 1 of the *Local Government: Municipal Systems Act 32 of 2000* (hereafter *Municipal Systems Act*) defines a basic municipal service as "a municipal service that is necessary to ensure an acceptable and reasonable quality of life and, if not provided, would endanger public health or safety or the environment".

³ See Pieterse 2020 *Urban Forum* for an exposition.

⁴ See Chamberlain and Masiangoako 2021 *SALJ* and Wright, Dube and Du Plessis 2022 *VRÜ/WCL* for a discussion.

⁵ See, for instance, *Kgetlengrivier Concerned Citizens v Kgetlengrivier Local Municipality* (UM 271/2020) [2020] ZANWHC 95 (18 December 2020); *Concerned Citizen of Tswaing/SIBU v Local Municipality of Tswaing* (1498/09) [2009] ZANWHC 17 (26 June 2009); *Joseph v City of Johannesburg* 2010 4 SA 55 (CC); *Mazibuko v City of Johannesburg* 2010 3 BCLR 239 (CC); *Rademan v Moqhaka Local*

such as the road and railway infrastructure are collapsing, South Africans have been hit hard by the consequences of unreliable electricity provision in recent times.⁶ As a result, Eskom Holdings SOC Limited (Eskom), the state power utility, has been sporadically rolling out rotating outages that have come to be known as loadshedding as it tries to protect the grid from collapse due to the incapacity of its power stations to provide uninterrupted power.⁷ These outages have been worse since 2022 and have not shown signs of abating, as experienced by people living in South Africa as they endure increased instances of loadshedding.

The weak capacity of Eskom was confirmed more than two decades ago in the *White Paper on Energy Policy of the Republic of South Africa*,⁸ which warned about the energy utility's inability to address the growth in electricity demand. It predicted that Eskom would need more generation capacity to avoid power cuts.⁹ Despite these warnings Eskom failed to add additional generating capacity to the grid, leading to its present inability to keep up with the increasing national demand for electricity. One of the most glaring impacts of Eskom's inability to provide consistent and reliable power is felt by municipalities, who cannot reticulate electricity to consumers for the duration of loadshedding.

While the general reliability and sustainability of basic municipal services¹⁰ are declining in most parts of South Africa, a conceptual separation between

Municipality 2013 4 SA 225 (CC); *Federation for Sustainable Environment v Minister of Water Affairs* (35672/12) [2012] ZAGPPHC 128 (10 July 2012).

⁶ See SAICE 2022 <https://saice.org.za/downloads/SAICE-2022-Infrastructure-Report-Card.pdf> for an overview of the crumbling infrastructure in South Africa. While the reasons for Eskom's inability to supply electricity are many, we have elected not to traverse them in this paper, although it suffices to say that some of them can be traced to South Africa's historical planning of electricity infrastructure, the contemporary mismanagement of Eskom, and the country's misaligned priorities when it comes to energy. See Du Plessis *Energy Law* for an extensive examination of the energy situation in South Africa and the historical and current legal frameworks that govern it.

⁷ Coupled with a predetermined schedule, Eskom has published eight stages of load shedding, each stage representing the removal of 1000 megawatts (MW) increments of demand from the national grid. Stage three load shedding therefore means that up to 3000 MW of capacity are being shed.

⁸ Department of Minerals and Energy *White Paper on Energy Policy*. For a discussion of this paper, see Du Plessis 2015 *South African Journal of Science* 3-4.

⁹ Department of Minerals and Energy *White Paper on Energy Policy* para 7.1. The failure to provide for the growing demand in electricity was not only Eskom's fault. It is trite that Eskom was unable to add additional generating capacity to the grid and could therefore not keep up with the increasing national demand for electricity.

¹⁰ While Eskom generates electricity, municipalities reticulate the electricity to consumers as part of the provision of basic municipal services, which include waste collection, the provision of water and promulgating building regulations – see schs 4

traditional public municipal services, which are left in a vacuum, and private or self-help service delivery alternatives continues to grow. Green-building¹¹ and off-grid solutions are some of the manifestations of initiatives to sidestep Eskom's loadshedding and the resultant disruptions in business and domestic processes that use electricity. In this work, off-grid or stand-alone options refer to generating one's electricity to remove reliance on the national grid, or at least to rely on the grid only in times of emergency. The term off-grid may also be used to include supplying oneself with other utilities like water, gas and sewer systems. Like green-building, off-grid options have environmental and sustainability motives, although they are mainly designed to operate independently and without reliance on one or more municipal or public utility services. Their use adds a more private, self-sustaining and autonomous perspective to the provision of basic services at the local level. Considering the service delivery challenges in South Africa, the use of off-grid systems has been increasing exponentially in areas like irrigation, water pumping, lighting and refrigeration.¹²

To date, research on off-grid solutions has primarily focussed more on rural areas and less on urban areas because cities and towns mostly had a reliable and consistent supply of electricity, unlike their rural counterparts, some of which were not connected to the grid at all. Thus, this paper arrives at an opportune moment, considering the scale of South Africa's municipal service delivery failures and the general impact of Eskom's electricity supply deficit. However, the possibility for consumers to transition from connection to the national grid to going off-grid is a matter of debate, as seen in this paper. Against this background, the paper delves into the complexities of energy governance in South Africa, specifically addressing the fact that the past paradigm of complete reliance on Eskom is changing.

The discussion is structured as follows: the first part introduces and contextualises the traditional legal framework on utility rights. It situates access to electricity as a fundamental human right within South Africa's constitutional framework and links it to the right to adequate housing and

and 5 (Parts B) of the *Constitution of the Republic of South Africa*, 1996 (hereafter the Constitution). For this reason it is difficult, if not entirely impossible, to dichotomise the failure of Eskom to provide a reliable electricity supply without contextualising its impact on the ability of municipalities to provide basic municipal services such as electricity.

¹¹ Green-building is generally associated with environmentally sustainable building designs that are meant to improve water quality and reduce energy use and waste. Its aim is to conserve non-renewable natural resources at the household and local government levels - see, in general, Wessels "Green Building" for a full exposition of the meaning of green building and its associated environmental benefits.

¹² Radley and Lehmann-Grube 2022 *Energy Research and Social Science* 1.

the fulfilment of various socio-economic rights. In the context of the legal framework, which entitles local communities to receive basic municipal services, we posit that in specific circumstances communities can take their own initiatives to fulfil their own rights. The second part provides a brief overview of off-grid options that may be used to fulfil energy needs in times of crises like loadshedding. The third part examines whether South Africa's law allows individual households to generate their own power and to effectively disconnect their properties from the grid and, if so, whether the regulatory framework is suitably tailored to effectively empower individual households to generate their own power. The discussion unlocks significant opportunities and potential challenges for local government in support of the changing governance regime. While this paper cautions against the view that grid independence overrides existing traditional municipal services and law, it highlights developments in the energy governance sector that may curb electricity provision challenges.

We dedicate this contribution to Professor Willemien du Plessis (Faculty of Law, North-West University), for her significant scholarly contributions to the field of energy law in South Africa. Her research established a nexus between energy, the environment and natural resources. This contribution to the *PER* Special Issue in her honour continues to promote sustainable energy sources and to reduce the country's dependence on fossil fuels amidst South Africa's ongoing electricity crisis.

2 The constitutional and statutory framework for the provision of electricity services

The democratic South African government is committed to improving the quality of life of everyone.¹³ To establish a society based on democratic values, social justice and fundamental human rights, Chapter 2 of the Constitution contains the Bill of Rights, of which section 7(2), read with section 8(1), imposes specific positive and negative duties. Notably the Bill of Rights does not provide for an express right to access electricity. Instead, the courts infer it from a "cluster of rights" in the Bill of Rights.¹⁴ Section 26(1) of the Constitution provides for the right to access adequate housing, which is linked to access to provision. The positive obligations of the state to realise the section 26 right was concretised in the *Grootboom* case, in

¹³ In this regard see the preambular aspiration in the Constitution.

¹⁴ See Dube and Moyo 2022 *PELJ* 9, quoting *Makeshift 1190 (Pty) Ltd v Cilliers* 2020 3 All SA 234 (WCC) para 34.

which Yacoob J held that the right of access to adequate housing entails more than "bricks and mortar" and that:

It requires available land, *appropriate services* such as the provision of water and the removal of sewage and the financing of all of these, including the building of the house itself. For a person to have access to adequate housing all of these conditions need to be met: there must be land, *there must be services*, there must be a dwelling.¹⁵

Accordingly, beneficiaries of the right to adequate housing must have access to safe drinking water, energy for cooking, heating and lighting, sanitation and washing facilities.¹⁶ In the light of the focus of this paper, it is important to note that several statutes regulate the generation, transmission and distribution of electricity. These include the *Electricity Act* 41 of 1987, *National Energy Act* 34 of 2008, the *National Energy Regulator Act* 40 of 2004 (ERA), the *Electricity Regulation Act* 4 of 2006 and the *Nuclear Energy Act* 46 of 1999.

The main statute regulating electricity and electricity services in South Africa is the ERA, the long title of which stipulates the objectives to establish a legal framework for the electricity supply industry; to make the National Energy Regulator the custodian and enforcer of the national electricity regulatory framework;¹⁷ to provide for licences and registration for the generation, transmission, distribution and trading of electricity; and to specify the duties of municipalities in that regard.¹⁸ Section 2 of the ERA concretises its objects, which include ensuring an efficient, effective, sustainable and orderly development of electricity supply infrastructure;¹⁹ ensuring that the interests and needs of electricity customers are safeguarded having regard to the governance, efficiency, effectiveness and long-term sustainability of the electricity supply industry;²⁰ facilitating universal access to electricity;²¹ and promoting competitiveness and

¹⁵ *Government of the Republic of South Africa v Grootboom* 2000 11 BCLR 1169 (CC) para 35 (emphasis added). This interpretation of the right to access to adequate housing, which includes services such as water, resembles the approach in CESCRO *General Comment No 4: The Right to Adequate Housing (Art 11(1) of the Covenant)* UN Doc E/1992/23 (1991) Annex III para 8(b).

¹⁶ For a further exposition of the requirements of an adequate house, also see *Residents of Joe Slovo Community, Western Cape v Thubelisha Homes* 2010 3 SA 454 (CC) para 10. In *Daniels v Scribante* 2017 4 SA 341 (CC) paras 209-210 the court said that the test for an adequate house is whether it would not cause the occupier to live in indignity.

¹⁷ The *National Energy Regulator Act* 4 of 2004 (hereafter the ERA) established the National Energy Regulator.

¹⁸ See the long title of the ERA.

¹⁹ Section 2(a) of the ERA.

²⁰ Section 2(b) of the ERA.

²¹ Section 2(d) of the Constitution.

customer choice.²² Section 27 of the ERA further imposes specific duties on municipalities by mandating them to exercise their executive authority and perform their duties by ensuring access to basic reticulation services through electricity infrastructure.²³ Accordingly, national legislation creates specific relationships between municipalities and individuals in that it mandates municipalities to facilitate access to electricity.²⁴

The obligation to realise access to electricity in tandem with other basic services is further fleshed out and assigned to local government in terms of the *Housing Act* 107 of 1997 and the *Local Government: Municipal Systems Act* 32 of 2000. Notably, the *Local Government: Municipal Finance Management Act* 56 of 2003 and the *Local Government: Municipal Property Rates Act* 6 of 2004 are also applicable in the delivery of services by municipalities, as they prescribe the use of municipal finances as well as the procedures and principles for setting municipal rates (including electricity rates), respectively.

Although municipalities are constitutionally responsible for the reticulation of electricity to households and other consumers,²⁵ the relentlessness with which their bulk electricity supplier, Eskom, keeps on rolling out blackouts shows that the state, through its different organs on different levels, is unable to provide a reliable and uninterrupted supply of electricity. This reality is further illustrated by the fact that some municipalities fail to pay Eskom for bulk electricity, leading the power utility to attempt to cut off their energy. In response to such attempts, consumers and municipalities have approached the courts to interdict Eskom from cutting off non-paying municipalities.²⁶ It appears that the failure of municipalities to pay Eskom for

²² Section 2(f) of the ERA.

²³ See ss 27(d) and (f) of the ERA. In terms of ss 7, 8(1) and 22(1) of the *Infrastructure Development Act* 23 of 2014, the infrastructure that supports electricity distribution throughout South Africa is designated as a strategic integrated project.

²⁴ This relationship between municipalities and individuals is unique as electricity services have a public law nature. (The public nature of electricity services has been confirmed in *Joseph v City of Johannesburg* 2010 4 SA 55 (CC).) Muller and Viljoen argue that once the infrastructure is constructed, end users - including households - may obtain access to the electricity infrastructure from their homes through servitudes registered against the title deeds of their properties. Muller and Viljoen *Property in Housing* 192.

²⁵ Section 153 of the Constitution places the responsibility on municipalities to prioritise and ensure the provision of basic services to communities, which includes electricity reticulation – see schs 4 and 5 of the Constitution.

²⁶ The most recent case in this regard is *Eskom Holdings SOC Ltd v Resilient Properties (Pty) Ltd; Eskom Holdings SOC Ltd v Sabie Chamber of Commerce and Tourism; Chweu Local Municipality v Sabie Chamber of Commerce and Tourism* 2021 1 All SA 668 (SCA). For other cases in which Eskom threatened to cut off entire municipalities for failure to pay, see *Unemployed Peoples Movement v Eastern Cape*

the supply of electricity has serious negative financial consequences on Eskom, as it is unable to pay its suppliers, service its debt and pay for day-to-day operations.²⁷

The failure of Eskom to provide a reliable electricity supply potentially violates the Bill of Rights in that the enjoyment of many socio-economic rights depends on the availability of a consistent, reliable and uninterrupted supply of electricity.²⁸ Since the provision of electricity as a basic utility service²⁹ is part of the fulfilment of socio-economic rights, the country's current power crisis raises important questions on the role of the state in enabling the people to protect, promote and fulfil their own rights – instead of relying on the state to do so when it is seemingly clear that the state is not capable of providing affordable, reliable and uninterrupted basic services. In cases such as *Kgetlengrivier*, the courts have already shown that when municipalities fail to provide basic services, communities have the legal right to take the initiative to fulfil their own rights. In this paper we argue that there is no reason in logic why similar leeway should not be granted to households who want to wean themselves from the unreliable national grid. Our premise in this regard is that while the *Kgetlengrivier* case concerned the taking over of municipal functions by the community, and while going off-grid does not constitute taking over such municipal functions, the result is the same – in both instances consumers take the initiative to fulfil their own rights. While consumers acted as a community in the former, in the latter they act as individuals to the same effect of fulfilling their own rights by directly providing services for themselves.

3 Off-grid energy developments and options

Off-grid energy solutions continue to develop and are increasingly useful when the national power grid is offline for parts of the country. Several network configurations can be identified. The first entails off-grid systems or stand-alone systems which do not have any point of connection to the Eskom electricity distribution network. The second refers to standby or

Premier 2020 3 SA 562 (ECG) para 69 and *Coetzee v Premier, Mpumalanga Province (High Court, Gauteng Division)* (unreported) case number 2799/2017 of 6 April 2018. For a discussion of the role of the courts in matters regarding energy, see in general Du Plessis 2018 SAJELP.

²⁷ For a full discussion of this challenge, see *Eskom Holdings SOC Ltd v Resilient Properties (Pty) Ltd; Eskom Holdings SOC Ltd v Sabie Chamber of Commerce and Tourism; Chweu Local Municipality v Sabie Chamber of Commerce and Tourism* 2021 1 All SA 668 (SCA), which also dealt with the legality of Eskom's attempts to recover amounts due to it from municipalities through cutting off supply.

²⁸ See Dube and Moyo 2022 PELJ 9.

²⁹ See *Joseph v City of Johannesburg* 2010 4 SA 55 (CC) paras 21-22.

back-up electrical systems that may or may not be tied to the grid. The third option entails grid-tied networks that provide electricity when required but are not designed to export energy into the Eskom power grid.³⁰ The fourth option entails installations that are designed to export power into the grid when not all generated electricity is consumed.³¹ Each type has unique legal, regulatory and technological standards, as well as tariff requirements.³²

As will be argued in more detail below, off-grid energy solutions in the form of small-scale embedded generation (SSEG) systems present some opportunities to emerge from the country's energy crisis. SSEG systems refer to power generation facilities which households and some commercial entities can purchase to generate electricity on the customer's side of the municipal electricity meter to use independently from the state's electricity grid. SSEGs are connected and synchronised with the municipal grid, i.e., embedded, and typically include diesel generators, biogas, battery and solar installations.³³ An embedded generation (EG) system includes the energy conversion device, converter, and control and protection gear in a network that synchronises with the public power utility's supply.³⁴ Although this section is technologically neutral, the discussion mainly applies to photovoltaic grid-connected systems that are interfaced through static power-converted technology.³⁵

Solar photovoltaic technology may be utilised as an SSEG installation that converts and stores direct current (DC) electricity to alternating current (AC) electricity, which the electrical grid uses. Photovoltaic panels are particularly

³⁰ The latter system is attractive because it provides a fallback to the main grid should there be unexpected interruptions or in instances where the power consumed by appliances may overrun the system.

³¹ As suggested above, this contribution understands going "off-grid" as a consumer's election to disconnect him/herself from the grid completely or to rely on the grid only in times of emergency. Its main advantage is that it enables households to offload excess power that they generate into the main grid so that they generate some income. However, this system has its own costs in that operators must pay service fees to their municipalities to maintain their connections and for all electricity consumed from the main grid - Eskom 2022 <https://www.eskom.co.za/distribution/small-scale-embedded-generators/#Licensing>.

³² Eskom 2022 <https://www.eskom.co.za/distribution/small-scale-embedded-generators/#Licensing>.

³³ SALGA 2020 https://www.sseg.org.za/wp-content/uploads/2018/10/SALGA-Status-of-SSEG_2020.pdf.

³⁴ As per the definition in NRS 097-2-1:2017, it may be necessary for households who want to remain connected to the grid, as Eskom is likely to require them to use equipment and professional services that meet all these standards.

³⁵ Static power converters are also used to convert, for example, wind power, battery storage and micro-hydro power to grid-compatible electricity. See NRS 097-2.

attractive in many parts of South Africa due to the country's relatively sunny weather for most parts of the year.³⁶

South Africa's solar resource potential is amongst the highest in the world, with most areas in the country averaging two thousand five hundred (2 500) hours of sunshine per year, combined with high solar irradiation levels (between 4.5 and 6.5 kWh/m² per day). Six (6) provinces host solar power projects.³⁷

For many households, the choice of which photovoltaic off-grid solar solution to procure depends on several factors, such as its initial cost of purchase and installation, safety and compliance with standards and laws, scalability, reliability, and compatibility with all other systems.³⁸

Households will need to purchase SSEG installations whose specifications are approved by the South African Bureau of Standards, and solar panels that comply with International Electrotechnical Commission standards.³⁹ For quality and safety purposes, they may also need to ensure that industry-approved professionals registered with the South African Photovoltaic Industry Association install their systems according to South African

³⁶ Once procured, off-grid solar energy is relatively affordable and provides a consistent and (mostly) uninterrupted supply, but only to the extent that the sun is available and when proper energy storage systems like batteries are used. Although consumers in most provinces will benefit from going off-grid, some will be particularly vulnerable due to mostly overcast winters during which solar energy will be intermittent, such as in the Western Cape.

³⁷ Mantashe 2022 <https://www.gov.za/speeches/remarks-honourable-minister%2%A0%C2%A0mineral-resources-and-energy%C2%A0mr-samson-gwede-mantashe%C2%A0-solar#:~:text=South%20Africa%27s%20solar%20resource%20potential,provinces%20host%20solar%20power%20projects>.

³⁸ Since all systems need maintenance, off-grid power supply solutions have the added costs of maintenance, whether one is connected to the grid or not. As a result, off-grid solutions provide greater levels of electricity availability than Eskom but may be costly to procure, install and maintain. Also, households need to replace their lights with more energy-efficient LED lights and procure home appliances that are rated highly for efficiency, as this will ultimately reduce the initial costs of procuring off-grid solutions and maintaining them. Another hidden cost in this regard is replacing electrical cooking and heating appliances with their gas counterparts and converting geysers from electricity into solar to maximise the benefits of going off-grid. The diversification of lighting, cooking and heating in the use of off-grid solutions ensures a mixture of energy sources to provide a high measure of reliability and efficiency, thus mitigating the challenges of solar intermittence. While homeowners enjoy considerable latitude in determining how best to live their lives in their homes as far as which energy sources to use to power their appliances, the use of off-grid solutions is not without regulations, as various laws apply to their procurement, maintenance and use. The following section looks at the main laws that deal with off-grid solutions.

³⁹ However, the NRS 097-2-1:2017 is not a law in South Africa - Eskom 2020 <https://www.sseg.org.za/wp-content/uploads/2017/01/NRS-097-2-1-2017-Edition-2.1-published-2020-07-20.pdf> 2.

National Standard (SANS) standards.⁴⁰ This is critical for ensuring that the products are certified for quality, professionally installed, safe and compliant for insurance purposes.⁴¹

The NRS 097-2-1:2017 (edition 2.1)⁴² regulations provide some guidance on EG, although they are not part of the SANS. The NRS seeks to determine—

the interface between the embedded generator [EG] and the utility, although it is expected that the specification will mainly apply to photovoltaic grid-connected systems interfaced through static power converter technology.

It also deals with the following:

- b) embedded generator [EG] requirements, which deal with product type approval, installation requirements and certificate of compliance on the [energy generator's] side of the meter; and
- c) simplified utility connection criteria, which deals specifically with the commonly designed unidirectional flow of energy in [low voltage] networks, with cumulative impacts of EGs, with substation configuration and metering arrangements.⁴³

Although NRS 097-2-1:2017 provides valuable guidance as to the practical specifications to facilitate the incorporation or interconnection of EG to a utility network, it does not guarantee that the utility will allow the connection of the EG. As will be indicated below, additional requirements may, in certain instances, be set.

4 Legal reflections on the procurement, installation and maintenance of off-grid power solutions

4.1 National legislation

Section 8(2) of the ERA, read with Schedule 2 of the Act, exempts households with SSEG solutions from complying with the requirement to operate generation, transmission and distribution facilities and import and

⁴⁰ See, for instance, ss 4 and 5 of the *Oudtshoorn Local Municipality: Solar Water Heating By-law, 2009*.

⁴¹ It may be necessary for households who want to remain connected to the grid, as Eskom is likely to require them to use equipment and professional services that meet all these standards. See Eskom's guidelines at Eskom Date Unknown <https://www.eskom.co.za/distribution/small-scale-embedded-generators/>.

⁴² Technical Governance Department "Grid Interconnection of Embedded Generation: Part 2: Small-Scale Embedded Generation".

⁴³ Eskom 2020 <https://www.sseg.org.za/wp-content/uploads/2017/01/NRS-097-2-1-2017-Edition-2.1-published-2020-07-20.pdf> 5.

export electricity without a licence issued by the National Energy Regulator of South Africa (NERSA).⁴⁴ Schedule 2 of the Act, as replaced by the Licensing Exemption and Registration Notice of 15 December 2022,⁴⁵ lists activities that are exempt from the requirement to apply for and hold a licence under the ERA. These include the operation of a generation facility for the sole purpose of providing standby or back-up electricity in the event of an electricity supply interruption;⁴⁶ the operation of a generation facility where the facility does not have a point of connection to the national grid;⁴⁷ and where the generation facility is operated to supply electricity to one or more customers, and there is no conveyancing of electricity from the point of connection to the point of consumption ("wheeling").⁴⁸ Section 3 of the Licensing Exemption and Registration Notice exempts certain activities from licensing but requires them to comply with the Distribution Code or the Transmission Code. It also requires them to be registered with NERSA.

The foregoing licensing exemptions show that households and businesses that do not feed into the grid need not obtain licensing. However, Eskom customers that have grid-connected SSEG systems must meet the necessary NERSA licence or registration requirements.⁴⁹ Depending on the size of the grid-tied SSEG system, customers may face the added requirement to apply for authorisation at their municipalities.⁵⁰

Since off-grid solutions could be classified as renewable energy systems because of their reliance on solar, wind and other renewable sources of energy, several environmental and other legislative instruments might be applicable. The *National Environmental Management Act* 107 of 1998 (hereafter NEMA), in conjunction with several Listing Notices,⁵¹ requires environmental authorisations for the development of all facilities and other

⁴⁴ Section 8(2) of the ERA.

⁴⁵ GN 2875 in GG 47757 of 15 December 2022; SALGA 2020 https://www.sseg.org.za/wp-content/uploads/2018/10/SALGA-Status-of-SSEG_2020.pdf.

⁴⁶ See para 2.1 of SALGA 2020 https://www.sseg.org.za/wp-content/uploads/2018/10/SALGA-Status-of-SSEG_2020.pdf.

⁴⁷ Schedule 2.2 in GN 2875 in GG 47757 of 15 December 2022 ;GN 3020 in GG 48009 of 9 February 2023

⁴⁸ Schedule 2.3 in GN 2875 in GG 47757 of 15 December 2022.

⁴⁹ NERSA will require information from Eskom to ensure that a grid connection is possible. Customers must apply to Eskom to become grid-tied, pay the quoted fees, and sign the required Eskom agreements. Eskom 2022 <https://www.eskom.co.za/distribution/small-scale-embedded-generators/#Licensing>.

⁵⁰ Eskom 2022 <https://www.eskom.co.za/distribution/small-scale-embedded-generators/#Licensing>.

⁵¹ *Environmental Impact Assessment Regulations Listing Notice 1 and 2* (GN R984 in GG 32838 of 4 December 2014).

infrastructure that generate electricity but only to the extent that such renewable energy generation exceeds 10MW and is less than 20MW. Since many off-grid solutions cater for commercial operations and individual houses and apartment buildings, it is unlikely that they will exceed the 10MW threshold.⁵² Hence, NEMA will not ordinarily apply. In considering the foregoing legal requirements and exemptions for off-grid solutions, it is also necessary to outline municipal regulation of off-grid solutions because municipalities are responsible for the reticulation of electricity to consumers.

4.2 *Municipal by-laws*

As argued in the second part of this paper, the role of local government, which is vested with the provision of basic services, is crucial in creating a conducive environment for households to empower themselves in mitigating the unreliability of the state's electricity supply. Municipalities play their role in terms of Schedules 4B and 5B of the Constitution, which give them specific powers that may not be limited or removed by provincial and national governments. These include the reticulation of electricity, setting building regulations and municipal planning. In the present discussion on regulating off-grid solutions, municipalities hold enormous power in regulating the norms, standards and guidelines for saving energy and reducing electricity consumption and reliance on the grid. Municipalities exercise these powers through by-laws which regulate which consumers may generate electricity for themselves and for feeding into the grid.⁵³ They also publish information on their websites regarding SSEG processes and requirements.⁵⁴ In this regard, they include contact information such as email addresses. However, not all municipalities provide this information.

⁵² On 8 September 2022 the Minister of Forestry, Fisheries and the Environment published a notice excluding the development and expansion of solar PV facilities, including any associated activity or infrastructure from the requirement to obtain environmental authorisation in terms of the *National Environmental Management Act* 107 of 1998: GN 2466 in GG 46871 of 8 September 2022.

⁵³ The constitutional basis for the municipal power to adopt by-laws is derived from s 156 of the Constitution, which empowers municipalities to make and administer by-laws for the effective governance of their areas of jurisdiction. See, for example, ss 6-7 of the *uMvoti Local Municipality: Electricity Supply By-laws*, 2019; s 8 of the *Kouga Local Municipality: Electricity By-law*, 2021.

⁵⁴ See, for instance, these websites: Polokwane Municipality Date Unknown *Registration of Connected Small Scale Embedded Generators* <https://www.polokwane.gov.za/City-Documents/Shared%20Documents/COP%20Forms/Registration%20for%20Small-Scale%20Embedded%20Generation%20Form%202017.PDF> accessed 11 March 2023; City of Cape Town Date Unknown *Saving Electricity* <http://savingelectricity.org.za/> accessed 11 March 2023; Overstrand Municipality

Although domestic and commercial consumers may pursue off-grid solutions in response to the unreliability of Eskom's power supply, they will need the consent of their municipalities, which may permit them to procure off-grid power, provided that they comply with safety and quality guidelines.⁵⁵ Generally, municipalities require consumers who elect to install their own SSEG systems, such as solar, to do so in accordance with by-laws and to register their solar panels if they want to maintain grid connection.⁵⁶ Such consumers may receive emergency power from their municipalities but will be obliged to synchronise, protect and meter their equipment to ensure the safe operation and export of power to the grid.⁵⁷

Several municipal by-laws regulate embedded energy generation and the connection of energy generation equipment to the grid in accordance with specific legislation.⁵⁸ By-laws outline pre-approval requirements and stipulate that failure to obtain such approval before installing embedded energy generation systems that feed into the grid will result in disconnection from the grid.⁵⁹ Some municipalities permit small-scale generators to feed their excess power into the grid but prohibit them from supplying their surplus to other consumers.⁶⁰

In accordance with Schedule 4B of the Constitution, which lists the functional areas of municipalities, section 4 of the *National Building Regulations and Standards Act 103 of 1997*⁶¹ requires the approval of building plans by municipalities before the commencement of construction. In the case of buildings that are less than 500m², such approval is required

Date Unknown *Electricity* <http://www.overstrand.gov.za/en/documents/electricity> accessed 11 March 2023.

⁵⁵ See, for instance, s 8 of the *Kouga Local Municipality: Electricity By-law, 2021*; s 56 of the *eMalahleni Local Municipality: Electricity By-laws, 2021*; s 36(5) of the *City of Matlosana Local Municipality: Electricity By-laws, 2022*.

⁵⁶ In this regard, examples include s 33 of the *Oudtshoorn Local Municipality: Integrated Zoning Scheme By-law, 2021*; s 31 of the *Cape Agulhas Local Municipality: Zoning Scheme By-law, 2022*; s 32 of the *Beaufort West Local Municipality: Zoning Scheme By-law, 2022*; s 32 of the *Cederberg Local Municipality: Zoning Scheme By-law, 2020*.

⁵⁷ See, for example, s 39 of the *George Local Municipality: Electricity Supply By-law, 2010*; s 36 of the *City of Matlosana Local Municipality: Electricity By-laws, 2022*.

⁵⁸ The *Occupational Health and Safety Act 85 of 1993* is one of the statutes referred to in the by-laws of different municipalities which regulate embedded power generation.

⁵⁹ See, for instance, s 64(1) of the *Overstrand Local Municipality: By-law Relating to Electricity Supply, 2016*; s 64 of the *Langeberg Local Municipality: Standard By-law Relating to Electricity Supply, 2018*; s 62 of the *Saldanha Bay Local Municipality: Electricity Supply By-law, 2022*.

⁶⁰ See s 8 of the *Overstrand Local Municipality: By-law Relating to Electricity Supply, 2016*.

⁶¹ *National Building Regulations and Standards Act 103 of 1977*.

30 days prior to the commencement of construction, while 60 days applies to larger buildings. Applications for such plans should include site plans, layout drawings, installation drawings, and other information on the installations to be made on such buildings, such as solar panels.⁶² Municipalities may also prescribe the installation of solar water heating systems in such buildings in accordance with the codes of practice.⁶³ In this regard some municipalities mandate their consumers to generate their own electricity for specific buildings using renewable energy sources such as the sun.⁶⁴

5 The local government conundrum: opportunities and challenges in a time of change

In considering the foregoing legal requirements and exemptions for SSEGs as off-grid solutions, it is necessary to bear in mind that municipalities are responsible for the reticulation of electricity to consumers and that they hold enormous power in determining various aspects of off-grid power solutions along national standards which set the specifications. Besides creating an enabling regulatory framework for the provision and acquisition of off-grid solutions, they have a further duty to provide a conducive environment for households that can procure off-grid solutions to do so. In this regard we refer to the City of Cape Town's initiatives.

In its endeavour to accelerate SSEGs through off-grid options, the City of Cape Town recently announced several incentives for consumers who procure off-grid solutions and who save electricity during peak times. Its ambitious plan in this regard entails buying surplus energy at approved City SSEG feed-in tariffs. According to the recent announcement by the City, eligible commercial electricity customers will be able to choose to be compensated in either an off-set credit against the existing electricity

⁶² See, for instance, s 4 of the *Oudtshoorn Local Municipality: Solar Water Heating By-law*, 2009, which stipulates the information to be disclosed in building plans with regard to the description of any solar water heating systems.

⁶³ See, for instance, ch VI s 20 of the *eThekweni Metropolitan Municipality: Water Supply By-laws*, 1996 as amended.

⁶⁴ See, for example, the *City of Tshwane Metropolitan Municipality: Green Building Development By-law*, 2012, which stipulates that: "All new buildings, refurbishments and major retrofits should ensure that at least 10% of energy consumption is generated from renewable energy systems. This requirement can be met by installing renewable energy systems such as photovoltaic and solar water heating systems in buildings or on-site."

account, an off-set credit against another municipal account in a customer's name, or in payment.⁶⁵

This development is significant as it recognises the need for a just energy transition (JET) which sets ambitious targets for the country's renewable energy sector. The JET aims to ensure that the country's transition to a low-carbon and sustainable energy system is fair and equitable for all citizens. However, it should be noted that neither of these municipal initiatives produces large-scale additional power - this comes only from utility-scale generation plants. Also, it is a fundamental aspect of the JET that it seeks to ease the transition away from coal and to support those working in the coal industry in the transition. For this reason it may be said that it is not entirely pro-renewables.

Off-grid energy solutions play a vital role in improving access to electricity in South African communities. Naturally, SSEGs and renewable energy options also have relevance in terms of section 24 of the Constitution, as they facilitate a shift away from coal-fired power generation, which is responsible for environmental pollution and degradation.⁶⁶ In fact, they are expected to transform the electricity sector by enabling consumers to provide themselves with reliable access to electricity while simultaneously reducing climate-related risks. This will assist in achieving the country's JET objectives. The developments are indeed also conducive to the international community's commitment to shift away from fossil fuels. The United Nations (UN) 2030 Agenda for Sustainable Development⁶⁷ dedicates one of its seventeen Sustainable Development Goals (SDGs) to energy. SDG 7 envisages that by 2030 renewable energy should provide 60% of universal electricity access and that stand-alone and mini-grid systems will provide the means for almost half of the new access.⁶⁸

However, the developmental role of local government should not be interpreted to only advance and accelerate in an unbalanced fashion. The fact remains that most of the revenue that municipalities obtain comes from

⁶⁵ See the announcement by City of Cape 2023 <https://www.capetown.gov.za/Media-and-news/Cash%20for%20power%20Cape%20Town%20gets%20Treasury%20exemption%20to%20pay%20businesses%20and%20residents%20directly>. Also see City of Cape Town 2023 <https://www.capetown.gov.za/Media-and-news/How%20to%20get%20cash%20for%20power>.

⁶⁶ Going off-grid also plays a vital role in improving the country's economic development and standard of living through access to electricity.

⁶⁷ UN *Transforming Our World*.

⁶⁸ See UNEP 2022 <http://www.unep.org/explore-topics/sustainable-development-goals/why-do-sustainable-development-goals-matter/goal-7> for the specific targets under SDG 7.

the profits they make from selling electricity to consumers. This revenue is critical for the sustainability of municipalities such that without it, most are bound to collapse. Hence, while going off the grid is beneficial for the individuals who can afford it, the introduction of SSEGs with the aim of ultimately overriding grid reliance will be disastrous for the broader society because municipalities heavily rely on profit from electricity reticulation revenue to provide for services. This was recently illustrated by the *Makana* case, in which the municipality was using electricity revenue to provide for the indigent and to finance other programmes, such that when Eskom threatened to cut off power due to non-payment, the municipality "diverted its budget and ringfenced some funds for Eskom, leaving gaps in the provision of other services".⁶⁹ One should therefore be cautious against the view that overriding grid dependence is a good thing for society when looking at its impact on the ability of municipalities to provide services sustainably. The resolution of the dilemma between going off-grid and protecting municipal revenue may require in-depth exploration elsewhere in future.

6 Concluding remarks

This paper explores the exigency for consumers to go off-grid for their electricity needs due to the failure of Eskom to provide an uninterrupted supply of electricity. The paper locates access to electricity as a statutory utility right in South Africa's human rights discourse by contextualising it with constituent elements of the constitutional right to access adequate housing – one of the main elements of which is access to a reliable and interrupted supply of electricity. Whereas electricity supply is a basic municipal service to which communities are entitled, its uniqueness lies in its role in fulfilling almost all socio-economic rights, including access to water and sanitation. For urban and semi-urban households and commercial customers, access to electricity is not only a basic utility right which consumers are entitled to have realised by their municipalities but also a question of the autonomy to decide on what systems they should use to power their homes and businesses, particularly at present, when municipalities cannot provide reliable and consistent supplies of electricity due to Eskom's inability to generate consistent power.

We identified several statutes which regulate how one may obtain access to services like electricity. The regulatory framework creates specific

⁶⁹ Wright, Dube and Du Plessis 2022 *VRÜ/WCL* 109. Also see *Unemployed Peoples Movement v Eastern Cape Premier* 2020 3 SA 562 (ECG) para 69.

relationships between municipalities and individuals by mandating municipalities to facilitate access to electricity. The regulatory framework confirms that municipal services are essential in exercising housing rights, such as electricity. In the context of South Africa's service delivery challenges and the ensuing energy crisis, this paper further reveals that the legal framework does not prohibit households from going off-grid. Hence, the legal context in which households seek alternative off-grid power reiterates the centrality of access to electricity in the fulfilment of the Bill of Rights, particularly of the socio-economic rights, and the obligation of the state to provide a conducive regulatory environment in which consumers may contribute to fulfilling their right to electricity where the state is unable to do so. This requires legislation to accommodate the needs of consumers to go off-grid. The recent declaration of a state of disaster regarding electricity and the ensuing tax and other incentives for procuring solar panels will go a long way towards helping consumers to go off-grid or at least to substantially reduce their reliance on the grid.

However, the ERA, which is the main statute on the supply of electricity, does not provide for off-grid solutions. Other relevant statutes such as environmental legislation also do not apply to SSEGs by households and commercial consumers. This means that within limits consumers may generate their own electricity using renewable sources and may even export surpluses to the grid. The conditions under which they can do so are set by municipalities through by-laws which prescribe energy saving, the reduction of reliance on the grid, and the household generation and export of electricity into the grid. The by-laws set out that energy generation infrastructure that is connected to the grid must be installed only after obtaining municipal consent, among other requirements.

We conclude that national legislation and municipal by-laws provide detailed specifications for the procurement, installation and maintenance of off-grid systems by prescribing industry standards for product specifications. Hence, municipalities play a central role in ensuring that as consumers go off-grid, they adhere to norms and standards on the operation of electricity infrastructure. The move towards off-grid solutions represents a transformative approach to energy governance in that while it affirms the state's obligation to provide energy for households, it also opens the possibility for households to realise their own energy rights by going off-grid to mitigate the incapacity of the state to meet their needs. In the result, we identify the developmental role of local government in the context of changing energy governance in South Africa as a main driver of empowering households to go off-grid. While the realities of South African

municipalities, as reflected in case law, make one caution against the view that grid independence overrides existing traditional municipal services and law, they highlight developments in the local energy governance sector that may curb the existing challenges to the provision of electricity.

Bibliography

Literature

Chamberlain and Masiangoako 2021 *SALJ*

Chamberlain L and Masiangoako T "Third Time Lucky? Provincial Intervention in the Makana Local Municipality" 2021 *SALJ* 423-459

Department of Minerals and Energy *White Paper on Energy Policy*

Department of Minerals and Energy *White Paper on the Energy Policy of the Republic of South Africa* (Department of Minerals and Energy Pretoria 1998)

Du Plessis 2015 *South African Journal of Science*

Du Plessis W "Energy Efficiency and the Law: A Multidisciplinary Approach" 2015 *South African Journal of Science* 1-8

Du Plessis 2018 *SAJELP*

Du Plessis W "Energy Efficiency: The Progress of Policy, Legislation, and the Role of the Courts" 2018 *SAJELP* 175-203

Du Plessis *Energy Law*

Du Plessis W *Energy Law in South Africa* (Kluwer Alphen aan den Rijn 2020)

Dube and Moyo 2022 *PELJ*

Dube F and Moyo C "The Right to Electricity in South Africa" 2022 *PELJ* 1-21

Muller and Viljoen *Property in Housing*

Muller G and Viljoen S-M *Property in Housing* (Juta Cape Town 2021)

Pieterse 2020 *Urban Forum*

Pieterse M "Anatomy of a Crisis: Structural Factors Contributing to the Collapse of Urban Municipal Governance in Emfuleni, South Africa" 2020 *Urban Forum* 1-15

Radley and Lehmann-Grube 2022 *Energy Research and Social Science*
Radley B and Lehmann-Grube P "Off-Grid Solar Expansion and Economic
Development in the Global South: A Critical Review and Research Agenda"
2022 *Energy Research and Social Science* 1-15

UN *Transforming Our World*

United Nations *Transforming Our World: The 2030 Agenda for Sustainable
Development* (UN New York 2015)

Wessels "Green Building"

Wessels J-A "Green Building" in Du Plessis AA (ed) *Environmental Law and
Local Government in South Africa* 2nd ed (Juta Cape Town 2021) ch 25

Wright, Dube and Du Plessis 2022 *VRÜ/WCL*

Wright J, Dube F and Du Plessis A "Judicial Enforcement of Mandatory
Provincial Interventions in Municipalities in South Africa" 2022 *VRÜ/WCL*
105-125

Case law

Coetzee v Premier, Mpumalanga Province (High Court, Gauteng Division)
(unreported) case number 2799/2017 of 6 April 2018

Concerned Citizen of Tswaing/SIBU v Local Municipality of Tswaing
(1498/09) [2009] ZANWHC 17 (26 June 2009)

Daniels v Scribante 2017 4 SA 341 (CC)

*Eskom Holdings SOC Ltd v Resilient Properties (Pty) Ltd; Eskom Holdings
SOC Ltd v Sabie Chamber of Commerce and Tourism; Chweu Local
Municipality v Sabie Chamber of Commerce and Tourism* 2021 1 All SA 668
(SCA)

Federation for Sustainable Environment v Minister of Water Affairs
(35672/12) [2012] ZAGPPHC 128 (10 July 2012)

Government of the Republic of South Africa v Grootboom 2000 11 BCLR
1169 (CC)

Joseph v City of Johannesburg 2010 4 SA 55 (CC)

Kgetlengrivier Concerned Citizens v Kgetlengrivier Local Municipality (UM
271/2020) [2020] ZANWHC 95 (18 December 2020)

Makeshift 1190 (Pty) Ltd v Cilliers 2020 3 All SA 234 (WCC)

Mazibuko v City of Johannesburg 2010 3 BCLR 239 (CC)

Rademan v Moqhaka Local Municipality 2013 4 SA 225 (CC)

Residents of Joe Slovo Community, Western Cape v Thubelisha Homes
2010 3 SA 454 (CC)

Unemployed Peoples Movement v Eastern Cape Premier 2020 3 SA 562
(ECG)

Legislation

Beaufort West Local Municipality: Zoning Scheme By-law, 2022

Cape Agulhas Local Municipality: Zoning Scheme By-law, 2022

Cederberg Local Municipality: Zoning Scheme By-law, 2020

City of Matlosana Local Municipality: Electricity By-laws, 2022

City of Tshwane Metropolitan Municipality: Green Building Development By-law, 2012

Constitution of the Republic of South Africa, 1996

Disaster Management Act 57 of 2002

Electricity Act 41 of 1987

Electricity Regulation Act 4 of 2006

eMalahleni Local Municipality: Electricity By-laws, 2021

eThekweni Metropolitan Municipality: Water Supply By-laws, 1996 as amended

George Local Municipality: Electricity Supply By-law, 2010

Housing Act 107 of 1997

Infrastructure Development Act 23 of 2014

Kouga Local Municipality: Electricity By-law, 2021

Langeberg Local Municipality: Standard By-law Relating to Electricity Supply, 2018

Local Government: Municipal Finance Management Act 56 of 2003

Local Government: Municipal Property Rates Act 6 of 2004

Local Government: Municipal Systems Act 32 of 2000

National Building Regulations and Standards Act 103 of 1977

National Energy Act 34 of 2008

National Energy Regulator Act 4 of 2004

National Environmental Management Act 107 of 1998

Nuclear Energy Act 46 of 1999

Occupational Health and Safety Act 85 of 1993

Oudtshoorn Local Municipality: Electricity Supply By-law, 2009

Oudtshoorn Local Municipality: Integrated Zoning Scheme By-law, 2021

Oudtshoorn Local Municipality: Solar Water Heating By-law, 2009

Overstrand Local Municipality: By-Law Relating to Electricity Supply, 2016

Saldanha Bay Local Municipality: Electricity Supply By-law, 2022

uMvoti Local Municipality: Electricity Supply By-laws, 2019

Government documents

GN R984 in GG 32838 of 4 December 2014 (*Environmental Impact Assessment Regulations Listing Notice 1 and 2*)

GN 2466 in GG 46871 of 8 September 2022

GN 2875 in GG 47757 of 15 December 2022

GN 3020 in GG 48009 of 9 February 2023

International instruments

CESCR General Comment No 4: The Right to Adequate Housing (Art 11(1) of the Covenant) UN Doc E/1992/23 (1991) Annex III

Internet sources

City of Cape Town Date Unknown <http://saveelectricity.org.za/>
City of Cape Town Date Unknown *Saving Electricity*
<http://saveelectricity.org.za/> accessed 11 March 2023

City of Cape Town 2023 <https://www.capetown.gov.za/Media-and-news/Cash%20for%20power%20Cape%20Town%20gets%20Treasury%20exemption%20to%20pay%20businesses%20and%20residents%20directly>

City of Cape Town 2023 *Cash for Power: Cape Town Gets Treasury Exemption to Pay Businesses and Residents Directly*
<https://www.capetown.gov.za/Media-and-news/Cash%20for%20power%20Cape%20Town%20gets%20Treasury%20exemption%20to%20pay%20businesses%20and%20residents%20directly> accessed 13 March 2023

City of Cape Town 2023 <https://www.capetown.gov.za/Media-and-news/How%20to%20get%20cash%20for%20power>
City of Cape Town 2023 *How to Get Cash for Power*
<https://www.capetown.gov.za/Media-and-news/How%20to%20get%20cash%20for%20power> accessed 11 March 2023

Eskom Date Unknown <https://www.eskom.co.za/distribution/small-scale-embedded-generators/>
Eskom Date Unknown *Small-Scale Embedded Generators*
<https://www.eskom.co.za/distribution/small-scale-embedded-generators/> accessed 11 March 2023

Eskom 2020 <https://www.sseg.org.za/wp-content/uploads/2017/01/NRS-097-2-1-2017-Edition-2.1-published-2020-07-20.pdf>
Eskom Technical Governance Department 2020 *Grid Interconnection of Embedded Generation: Part 2: Small-Scale Embedded Generation*
<https://www.sseg.org.za/wp-content/uploads/2017/01/NRS-097-2-1-2017-Edition-2.1-published-2020-07-20.pdf> accessed 30 October 2022

Eskom 2022 <https://www.eskom.co.za/distribution/small-scale-embedded-generators/#Licensing>

Eskom 2022 *Small-Scale Embedded Generation* <https://www.eskom.co.za/distribution/small-scale-embedded-generators/#Licensing> accessed 30 October 2022

Mantashe 2022 <https://www.gov.za/speeches/remarks-honourable-minister%C2%A0%C2%A0mineral-resources-and-energy%C2%A0mr-samson-gwede-mantashe%C2%A0-solar#:~:text=South%20Africa%27s%20solar%20resource%20potential,provinces%20host%20solar%20power%20projects>

Mantashe G 2022 *Solar Power Africa 2022 Conference CTICC* <https://www.gov.za/speeches/remarks-honourable-minister%C2%A0%C2%A0mineral-resources-and-energy%C2%A0mr-samson-gwede-mantashe%C2%A0-solar#:~:text=South%20Africa%27s%20solar%20resource%20potential,provinces%20host%20solar%20power%20projects> accessed 29 October 2022

Overstrand Municipality Date Unknown <http://www.overstrand.gov.za/en/documents/electricity>

Overstrand Municipality Date Unknown *Electricity* <http://www.overstrand.gov.za/en/documents/electricity> accessed 11 March 2023

Polokwane Municipality Date Unknown <https://www.polokwane.gov.za/City-Documents/Shared%20Documents/COP%20Forms/Registration%20for%20Small-Scale%20Embedded%20Generation%20Form%202017.PDF>

Polokwane Municipality Date Unknown *Registration of Connected Small Scale Embedded Generators* <https://www.polokwane.gov.za/City-Documents/Shared%20Documents/COP%20Forms/Registration%20for%20Small-Scale%20Embedded%20Generation%20Form%202017.PDF> accessed 11 March 2023

SAICE 2022 <https://saice.org.za/downloads/SAICE-2022-Infrastructure-Report-Card.pdf>

South African Institution of Civil Engineering 2022 *SAICE 2022 Infrastructure Report Card Card for South Africa* <https://saice.org.za/downloads/SAICE-2022-Infrastructure-Report-Card.pdf> accessed 13 March 2023

SALGA 2020 https://www.sseg.org.za/wp-content/uploads/2018/10/SALGA-Status-of-SSEG_2020.pdf

South African Law Government Association 2020 *Status of Small-Scale Embedded Generation (SSEG) in South African Municipalities* https://www.sseg.org.za/wp-content/uploads/2018/10/SALGA-Status-of-SSEG_2020.pdf accessed 13 March 2023

UNEP 2022 <http://www.unep.org/explore-topics/sustainable-development-goals/why-do-sustainable-development-goals-matter/goal-7>

United Nations Environment Programme 2022 *GOAL 7: Affordable and Clean Energy* <http://www.unep.org/explore-topics/sustainable-development-goals/why-do-sustainable-development-goals-matter/goal-7> accessed 13 March 2023

List of Abbreviations

CESCR	Committee on Economic, Social and Cultural Rights
EG	Embedded Generation
ERA	National Energy Regulator Act 4 of 2004
JET	Just Energy Transition
MW	megawatt
NEMA	National Environmental Management Act 107 of 1998
NERSA	National Energy Regulator of South Africa
NRS	National Reference Standard
PELJ	Potchefstroom Electronic Law Journal
SAICE	South African Institution of Civil Engineering
SAJELP	South African Journal of Environmental Law and Policy
SALGA	South African Law Government Association
SALJ	South African Law Journal
SANS	South African National Standards
SDG	Sustainable Development Goal
SOC	State-Owned Company
SSEG	Small-Scale Embedded Generation
UN	United Nations
UNEP	United Nations Environment Programme
VRÜ/WCL	Verfassung und Recht in Übersee (VRÜ) / World Comparative Law