



# Municipal Embedded Generation in South African Municipalities

**A Review of Policies, Programmes and Initiatives**

22/08/2022

## i. Abstract

Municipalities are at the forefront of embedded generation (EG) uptake in South Africa by enabling private sector projects and developing their own initiatives. Although there seems to be a policy and regulatory pathway for municipalities to develop EG projects, ambiguity from different actors still exists in this process.

Larger metropolitan municipalities spearhead city-led EG with energy plans, procurement programmes and dedicated personnel toward sustainable energy projects. These projects are helping to provide energy security, drastically reduce energy expenditures and achieve climate change commitments.

City-led EG is, however, still lacking within rural municipalities and intermediary cities. Given that 60 per cent of South Africa's population lives in intermediary cities and rural areas, coupled with the intricate link between municipal electricity revenue and other services delivery, EG can provide a mechanism to stimulate widespread regional development. In this way, small and intermediary cities are conduits of change in South Africa's just energy transition, helping to ensure socio-economic growth is not solely concentrated within the country's metropolitan municipalities.

A range of funding sources, such as contributions from the REIPPP programme and Just Energy Transition Partnership, could be harnessed to assist intermediary cities in developing programmes and leveraging climate finance investments. Novel financial models should be piloted that can assist in alleviating financial and capacity constraints within these cities.

Nationally driven support programmes have successfully developed energy infrastructure projects in partnership with municipalities. These programmes have assisted with planning, technical support and financing. A city-led EG programme, supporting the entire project development lifecycle, should be explored if intermediary cities and small municipalities are actively involved in the EG sector and unlock the benefits EG can have for their citizens.

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## 1. Introduction

The rise in electricity prices over the last 10 years, coinciding with a rapid decrease in the cost of renewable energy technologies, has seen the fruition of embedded generation (EG) technologies (small-scale renewable energy technologies predominately for own use). Electricity users (household, commercial, industrial and municipal) are using EG to reduce their electricity bills, increase energy security, and decrease their environmental footprints.

Local governments in South Africa are looking to develop EG projects for several reasons. These projects can assist in reaching climate change targets, provide cheaper electricity, reduce load shedding and, possibly, stimulate local job creation – all desperately needed within the country. Recent policy and regulatory changes now allow certain municipalities to install these projects. Many municipalities, specifically small and intermediary cities, still struggle to implement EG projects.

This concise desktop review forms part of the Alternative Financing for Municipal Embedded Generation (AFMEG) project. It explores current EG activities (such as policies, programmes and business models) relevant to South African municipalities. It further provides recommendations to see the uptake of city-led EG from a national perspective. Learnings were also drawn from the AFMEG project to supplement the resources used.

### About the [AFMEG](#) Project

The objective of the AFMEG project is to address the resource and capacity gap of intermediary cities in applying for EG funding. The project will assist four intermediary cities in applying to the [Development Bank of Southern Africa's \(DBSA\) Embedded Generation Investment Programme](#). These municipalities are:

- King Sabata Dalindyebo Municipality;
- Matzikama Local Municipality;
- Walter Sisulu Local Municipality; and
- Ray Nkonyeni Municipality.

The learnings from this project will further help financiers, municipalities and national entities understand the requirements for intermediary cities to apply for embedded generation funding. The AFMEG project was generously supported by [UK PACT](#) (Partnering for Accelerated Climate Transitions) programme, funded by the UK Government's Department for Business, Energy and Industrial Strategy (BEIS) through the UK's International Climate Finance. The AFMEG project was implemented by [ICLEI Africa](#), in partnership with the DBSA and with assistance from [3E](#) and [Rebel Group](#).

## 2. National government policies and initiatives on embedded generation

### 2.1. Policy and regulation landscape

#### 2.1.1. Integrated Resource Plan

The Integrated Resource Plan (IRP) is a development plan for new build electricity infrastructure. It aims to achieve least-cost electricity supply and meet the energy demand of South Africans, in accordance with the National Development Plan (2030), whilst meeting the climate change objectives of the country. At its core, it sets out what technology should be constructed, the power capacity of the technology and the year in which it should be commissioned. Further, all electricity generation infrastructure is required to fall within this plan for review by the public and the provincial and national governments.

In 2019 the Department of Energy (now the Department of Mineral Resources and Energy [DMRE]) published the most recent version of the IRP<sup>1</sup>. For the first time, EG (also referred to as distributed generation) was assigned annual capacity. This was due to multiple requests from industries, municipalities and individuals interested in developing their own projects but that were prohibited from doing so as the IRP did not accommodate their energy generation plans. Figure 1 shows that

	Coal	Coal (Decommissioning)	Nuclear	Hydro	Storage	PV	Wind	CSP	Gas & Diesel	Other (Distributed Generation, CoGen, Biomass, Landfill)	
<b>Current Base</b>	37 149		1 860	2 100	2 912	1 474	1 980	300	3 830	499	
<b>2019</b>	2 155	-2 173					244	300		Allocation to the extent of the short term capacity and energy gap.	
<b>2020</b>	1 433	-557				114	300				
<b>2021</b>	1 433	-1 403				300	818				
<b>2022</b>	711	-844			513	400	1 000	1 600			
<b>2023</b>	750	-555				1 000	1 600		500		
<b>2024</b>			1 860				1 600		1 000		500
<b>2025</b>						1 000	1 600				500
<b>2026</b>		-1 219					1 600				500
<b>2027</b>	750	-847					1 600		2 000		500
<b>2028</b>		-475				1 000	1 600				500
<b>2029</b>		-1 694			1 575	1 000	1 600			500	
<b>2030</b>		-1 050		2 500		1 000	1 600			500	
<b>TOTAL INSTALLED CAPACITY by 2030 (MW)</b>		33 364	1 860	4 600	5 000	8 288	17 742	600	6 380		
<b>% Total Installed Capacity (% of MW)</b>		43	2.36	5.84	6.35	10.52	22.53	0.76	8.1		
<b>% Annual Energy Contribution (% of MWh)</b>		58.8	4.5	8.4	1.2*	6.3	17.8	0.6	1.3		

Installed Capacity  
 Committed / Already Contracted Capacity  
 Capacity Decommissioned

Figure 1: The Integrated Resource Plan 2019

<sup>1</sup> IRP 2019: <http://www.energy.gov.za/IRP/2019/IRP-2019.pdf>

500 megawatts (MW) of annual capacity has been allocated to EG from 2023 to 2030, allowing up to 4,000 MW of EG onto the grid. This excludes approved current allocations to help address South Africa’s current electricity supply shortage. EG is being used to attract more investment (public, private and social) into the energy sector whilst alleviating current network power constraints.

It is pertinent to note that there is no overall implementation plan, or strategy, stemming from the IRP indicating how certain amounts of capacity from certain technologies are commissioned. Rather this seems to happen in an ad-hoc manner. Historically, Eskom has overseen new-build energy projects, predominantly through coal power plants. A recent implementation mechanism included procuring energy from independent power producers (IPPs). Arguably the most known programme with this implementation structure is the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) which started in 2011. The REIPPPP programme operates by opening bid windows, with specific capacity allocations for technologies for private developers to bid for specific amounts of capacity. Projects are adjudicated based on the price of electricity that can be supplied and the socio-economic impact that will ensue from the project’s delivery. Winning projects are then awarded a 20-year power purchase agreement (PPA) based on the price bid, with Eskom being the sole off-taker of the electricity. To date, 6,422 MW of renewable energy has been procured through the REIPPPP, with a fifth bid window now available for bidding. Successful bidders are also required to distribute between one to five per cent of revenues to socio-economic and enterprise development in surrounding communities – a substantial amount, given the scale of the REIPPPP. As of 2019, R20.6 billion for socio-economic development has been committed to flow to the communities<sup>2</sup>.

### 2.1.2. Electricity Regulation Act

#### **Amendment of Electricity Regulations on New Generation Capacity<sup>3</sup>**

In October 2020, Minister Gwede Mantashe amended the Electricity Regulation Act (ERA), giving municipalities the ability to purchase new electricity generation within the following boundaries:

- 1) The new generation capacity must be in accordance with the IRP.
- 2) The application is aligned with the municipalities Integrated Development Plan (IDP).

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<sup>2</sup> IPPPP Overview: <https://www.ipp-projects.co.za/Publications>

<sup>3</sup>Amendment of Electricity Regulations on New Generation Capacity: [https://cisp.cachefly.net/assets/articles/attachments/83662\\_43810\\_16-10\\_nationalgovernment.pdf](https://cisp.cachefly.net/assets/articles/attachments/83662_43810_16-10_nationalgovernment.pdf) (page 21)

- 3) Should the project be delivered through an internal mechanism<sup>4</sup>, a feasibility study must be conducted and submitted as per section 76 of the Municipal Systems Act.
- 4) Should the project be delivered through an external mechanism<sup>5</sup>, proof of compliance with the Municipal Finance Management Act (MFMA) and Municipal Public-Private Partnership Regulations (MPPP) must be submitted.

### Licensing Exemption and Registration Notice<sup>6</sup>

In April 2021, a licensing exemption and registration notice was released. The notice is relevant for all EG systems under 100 MW. Previously, systems over 1 MW in size were required to obtain a generation license. The exemption notices now specify that:

- 1) EG systems with a capacity of up to 100 KW do not require registration or licensing from the regulator (NERSA). Registration with the distributor and compliance with the respective point of connection conditions is required.
- 2) EG systems with a capacity from 100 KW to 100 MW are exempt from holding a generation license but require registration with the regulator. Relevant grid code compliance is needed.

More detailed requirements are included in the gazette. The most relevant requirement to municipalities wishing to establish their own EG project is 3.6.2., which states that if a municipality resells this electricity, a service delivery agreement must be entered into in accordance with the Municipal Systems Act.

## 2.2. Embedded generation support

The City Support Programme (CSP), a unit within National Treasury, aims to enable city-led transformation through capacity building and supportive policy and fiscal frameworks. CSP currently focuses on South Africa's metropolitan municipalities<sup>7</sup> (metros), assisting municipal EG under their Sustainable Municipal Energy Businesses Programme. The workstream, focussing on EG, has three main components:

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<sup>4</sup> Refers to a department, administrative or business unit established by the municipality, and operates under the control, and in accordance with, the performance mandates determined by the municipal council.

<sup>5</sup> Refers to an external service provider that has entered into a service delivery agreement with the municipality

<sup>6</sup> ERA: Licensing Exemption and Registration Notice:

[https://cisp.cachefly.net/assets/articles/attachments/85157\\_44482\\_23-04\\_minresourcesenergy\\_\(1\).pdf](https://cisp.cachefly.net/assets/articles/attachments/85157_44482_23-04_minresourcesenergy_(1).pdf)

<sup>7</sup> The metropolitan municipalities of South Africa comprising are City of Cape Town Metropolitan Municipality, City of Johannesburg Metropolitan Municipality, Buffalo City Metropolitan Municipality, City of Tshwane Metropolitan Municipality, City of Ekurhuleni Metropolitan Municipality, eThekweni Metropolitan Municipality, Mangaung Metropolitan Municipality, Nelson Mandela Bay Metropolitan Municipality

- 1) Using a survey to understand municipal readiness to develop renewable energy projects and provide support where possible. To date, not all metros feel fully prepared to procure energy, with readiness levels dependent on the procurement mechanism.
- 2) Even though new amendments to the ERA now enable municipalities to procure renewable energy, there is still a gap in understanding of how cities implement projects due to the layers of legislation (such as the Municipal Systems Act, MFMA, and MPPP). Further, there are a range of mechanisms in which municipalities can engage in renewable energy, each with their own regulatory processes that need to be followed to obtain licensing approval. In partnership with the World Bank and other stakeholders, CSP is developing a roadmap to assist municipalities in navigating the regulatory steps. When municipalities choose their procurement options, they can embark on the regulatory process. It is worth noting that regulatory processes, which can in themselves have a long lead time, can often only occur once project funding has been approved.
- 3) Advisory support to metros on any business model innovations. A Community of Practice knowledge-sharing platform for all metros to share experiences and facilitate peer learnings, best practices and possible collaborations.

## 2.3. Other energy support programmes

### 2.3.1. Energy Efficiency Demand Side Management programme

The Energy Efficiency Demand-Side Management (EEDSM) programme, run by DMRE, helps municipalities retrofit existing public infrastructure with energy-efficient technologies with the aim to reduce municipal electricity usage, expenditure and carbon footprint<sup>8</sup>. Examples of these technologies include:

- traffic lights;
- street lighting;
- lighting from high masts;
- building infrastructure (such as lighting and heating, ventilation and air conditioning);
- water service treatment infrastructure equipment (e.g. energy efficient pumps); and
- installation of energy management systems (such as smart meters, building management systems and ripple controls).

Grant funding is provided to successful municipalities for procuring these technologies, with approximately R220 million and R231 million budgeted for the 2021/2022 and 2022/2023 financial

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<sup>8</sup> Energy Efficiency and Demand Side Management Programme: <https://www.savingenergy.org.za/municipal-eedsm/index.html>



years, respectively<sup>9</sup>. Document templates are provided for municipalities at all the process stages (call for proposals, business plans, procurement of technologies, energy audits, monitoring and evaluation, installation process etc.). Furthermore, a team of dedicated officials are established within the DMRE to support municipalities with municipal projects.

### 2.3.2. Integrated National Electrification Programme

Following the fall of apartheid, a massive drive to connect households to the national electricity grid was undertaken – providing households with electricity supply and the socio-economic benefits of it. The Integrated National Electrification Programme (INEP) was launched to manage the electrification planning, funding and implementation process and is implemented by Eskom, municipalities, and other service providers. Over 7.4 million households were connected to the national grid through grant funding from 1991 to March 2019<sup>10</sup>. The DMRE is the custodian of the programme and supports municipalities through a dedicated unit of officials. Non-grid technologies, such as solar home systems (SHS), are also provided to rural communities far from the national grid – over 160,000 SHS have been installed to date<sup>10</sup>.

## 3. Local government embedded generation planning and initiatives

Municipalities are at the forefront of EG uptake in South Africa. Local governments are constitutionally mandated to distribute electricity to their citizens and businesses. Municipalities often make most of their income by purchasing electricity in bulk from Eskom, the nationally owned power utility, and selling it to customers connected to their distribution network. Electricity purchases account for an average of 22 per cent of a municipality’s expenses. After paying salaries, this is generally a city’s second-largest expense. The last decade has seen a rapid increase in electricity prices, increasing a municipality’s expenditure, and, as South Africans struggle to afford electricity, profits continue to decrease. The problem goes even deeper. Since electricity sales form the backbone of a municipality’s income, the profits from the electricity distribution business often cross-subsidise other services, such as water reticulation and waste collection. The failings of the national grid, as well as high electricity, not only put municipalities under financial pressure but also compromises their ability to provide citizens with basic services.

### 3.1. Integrated Development Plans

The Municipal Systems Act requires municipalities to formulate Integrated Development Plans (IDPs) every 5 years. These IDPs identify council visions, objectives and strategies for its citizens. The IDP development process is designed to be participatory, with communities providing inputs to

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<sup>9</sup> Division of Revenue Act: [http://www.treasury.gov.za/legislation/bills/2021/\[B3%20-%202021\]%20\(Division%20of%20Revenue\).pdf](http://www.treasury.gov.za/legislation/bills/2021/[B3%20-%202021]%20(Division%20of%20Revenue).pdf)

<sup>10</sup> Briefing by DMRE on Electrification: <https://pmg.org.za/files/191023ELECTROFICATION.pptx>

drafts before adoption by the council. Through the Department of Cooperative Governance and Traditional Affairs (CoGTA), the national and provincial governments further shape IDPs through a departmental review. This process aligns community needs with the overall plans of national and provincial governments. Stemming from the strategies published within an IDP document, a list of all planned infrastructure projects must be included in the IDP, with the relevant budget designated for the project.

EG projects must be aligned with municipal IDPs, as stated in the ERA. Studies<sup>11,12</sup> conducted by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) in partnership with the South African Local Government Association (SALGA) show that municipalities are beginning to include renewable energy projects within IDPs. In 2017, 171 sustainable energy projects were planned within municipal IDPs, an increase from 141 recorded in 2015. Notably, lack of financing was seen as a barrier to project development, and many planned climate change projects had no allocated budget by municipalities.

### 3.2. Municipal energy plans

Municipalities that are electricity distributors must develop electricity infrastructure master plans, which, amongst other items, detail the infrastructure upgrades and maintenance requirements for their distribution network. Additionally, some municipalities have begun developing their own energy generation plans and strategies that provide a vision for how they would like their energy mix to look. These are done to reduce energy costs, meet climate change targets, stimulate energy investment in the municipality and create energy-sector-related jobs within the city. Depending on the scope of these plans, they can also determine the optimal mechanism (such as private procurement of energy or customers feeding back onto the grid, etc.) to increase renewable energy penetration onto municipal networks. These plans, which feed into IDPs of municipalities, lay a foundation for developing energy programmes or projects.

#### 3.2.1. Case study: eThekweni Municipality

In 2020, the eThekweni Municipality published a draft eThekweni Integrated Resource Plan<sup>13</sup> (EIRP) for public comment. Similar to the national IRP, it aims to provide a least-cost, reliable energy supply within the bounds of the metro's energy transition goals – 40 per cent renewable energy by 2030 and 100 per cent renewable energy by 2050.

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<sup>11</sup> Sustainable Energy and Climate Change in Municipal IDPs 2017-2018: <https://www.sagen.org.za/publications/other/80-sustainable-energy-climate-change-in-municipal-idps-2017-2018/file>

<sup>12</sup> Sustainable Energy and Climate Change in Municipal IDPs 2015: <https://www.sagen.org.za/publications/other/49-sustainable-energy-and-climate-change-in-municipal-idp-2015/file>

<sup>13</sup> The draft Ethekewini Integrated Resource Plan: <https://learnwithicleiafrica.org/wp-content/uploads/2022/06/eThekweni-Integrated-Resource-Plan.pdf>

The plan begins with forecasting the municipal energy demand with five demand scenarios. Various energy supply scenarios are then modelled and crosschecked to see if they meet the municipality's

Year	Supply scenario		LCOE, ZAR/kWh	Number of jobs	% renewable	Carbon emissions, MtCO2
2050	A	Base case	959	0	56%	33.3
	B	All renewable technologies	611	15,524	100%	20.9
	C	Renewable energy, no imported energy, solar scaled to meet demand	4,620*	169,387*	100%*	5.72*
	D	All renewable technologies, biomass excluded	559	6,919	100%	18.4
	E	Biomass and imported energy	578	8,605	100%	22.0

\*includes demand that is not met by the generation capacity available – hence scenario discounted

Table 1: Draft eThekweni Integrated Resource Plan Scenarios

energy demand and climate change targets. Carbon emission, levelized cost of electricity (LCOE) and the number of jobs created are then modelled for each case (see Table 1). Details on the implementation of the plan need further refining, particularly in the mechanism in which the technologies will be commissioned, i.e. municipal-owned, sourced from IPPs, residents, community-owned sources etc. A municipal independent power producer procurement programme is mentioned as a possible mechanism for implementation, similar in setup to the REIPPPP, but with eThekweni as the procurer. Further details on an implementation strategy will be needed.

It is important to note that a business-as-usual pathway is the worst possible outcome for local government in the modelling done by eThekweni Municipality and the City of Cape Town (CoCT). Proactive solar and wind energy development, coming in at a lower cost than Eskom's grid supply, will always be better economically for the municipality<sup>14</sup>.

### 3.3. Related infrastructure planning support

#### 3.3.1. 100% Renewables Cities and Regions Roadmap

Comprehensive energy plans, similar to the EIRP, require significant development resources, which may not be readily available to small and intermediate cities. It will, however, be prudent for some level of energy generation planning to occur that can inform decisions on energy projects.

<sup>14</sup> This excludes the scenario of high penetration levels of renewable energy, where grid stability may be needed.

The 100% Renewables Cities and Regions Roadmap<sup>15</sup> project supported nine cities in three countries to develop a roadmap to transition towards 100% renewable energy consumption. The support included capacity building, technical support, review of financing sources and peer-to-peer exchange. Within the support, a detailed framework<sup>16</sup> was developed to help guide cities to develop these roadmaps thoroughly. The process is broken down into four phases:

- act and mobilise;
- data collection;
- analyse and develop; and
- plan and implement.

Detailed steps are given in each phase and guides to completing each step.

### 3.3.2. Small Town Regeneration Programme

Many larger metropolitans have forged ahead with renewable energy planning and project development to provide cheap, clean electricity that can shield against load shedding. However, the often-overlooked intermediary and rural cities are where the greatest gains could be made. As much as 60 per cent of South Africa’s population live in intermediary and small towns and rural areas (often referred to as category B municipalities). Yet, these areas make up only 40 per cent of the GDP distribution within the country and are often plagued with poor service delivery,<sup>17</sup> making this some of the most important work in the country. Rapid urbanisation is currently occurring in many of South Africa’s small towns, and it is expected to do so in the near future. Further, many small South African towns hinge upon a single industry's economic opportunity.

Launched in 2015 by the SALGA and implemented by CoGTA, the Small Town Regeneration (STR) Programme provides planning support to intermediary cities. The programme takes an "integrated and regional approach", considering all responsibilities of the municipal government (such as human settlement, job creation, infrastructure investment and maintenance, and service provision) as well as the public, private and social actors involved. Its objectives are to:

- diversify local economies and kickstart development;
- increase social service provision and infrastructure investment; and
- improve the financial viability of smaller municipalities<sup>18</sup>.

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<sup>15</sup> 100% Renewables Cities and Regions Roadmap: <https://iclei.org/100REcitiesroadmap/#:~:text=The%20100%25%20Renewables%20Cities%20and,local%20climate%20and%20energy%20action.>

<sup>16</sup> 100% RE cities and regions roadmap framework: <https://renewablesroadmap.iclei.org/resource/100-renewables-cities-and-regions-roadmap-framework/>

<sup>17</sup> Urbanization, structural transformation, and rural-urban linkages in South Africa: [https://sa-tied.wider.unu.edu/sites/default/files/pdf/SATIED\\_WP41\\_Arndt\\_Davies\\_Thurlow\\_March\\_2019.pdf](https://sa-tied.wider.unu.edu/sites/default/files/pdf/SATIED_WP41_Arndt_Davies_Thurlow_March_2019.pdf)

<sup>18</sup> Small Town Regeneration Strategy: [https://www.cogta.gov.za/cgta\\_2016/wp-content/uploads/2022/02/Small-Town-Regeneration-Strategy-2021\\_compressed.pdf](https://www.cogta.gov.za/cgta_2016/wp-content/uploads/2022/02/Small-Town-Regeneration-Strategy-2021_compressed.pdf)

Given the strong interconnectedness of cheap and secure energy provision to municipal financial sustainability and the attractiveness of an area for local economic development, a case to start including EG in the planning process of this STR can be made.

### 3.4. Innovative financing programmes for municipal sustainable energy

#### 3.4.1. City of Cape Town’s IPP procurement programme

In a similar structure to the REIPPP programme, the City of Cape Town (CoCT) launched its own IPP procurement programme to improve energy security, realise energy cost savings and help achieve clean energy commitments. The city launched a bid window in 2022 for up to 200 MW of total installed power capacity, targeting low carbon projects greater than 5 MW. Selected projects will enter into a 20-year power purchase agreement with the city. To make projects more appealing to investors without receiving financial backstopping from National Treasury, the programme will use an escrow account as a credit support instrument, where revenue for the project will need to be paid upfront to some extent. This programme is the first of its kind in South Africa, and many lessons will be learnt along the way. However, this programme structure may not be possible for all municipalities in South Africa, given their lower credit rating and inability to leverage funds similarly to the CoCT. Further, conducting a procurement programme in-house requires a lot of capacity and has many steps in the process (see Figure 2 below). Only a handful of municipalities outside of CoCT, if any, have the capacity at this stage to do so.

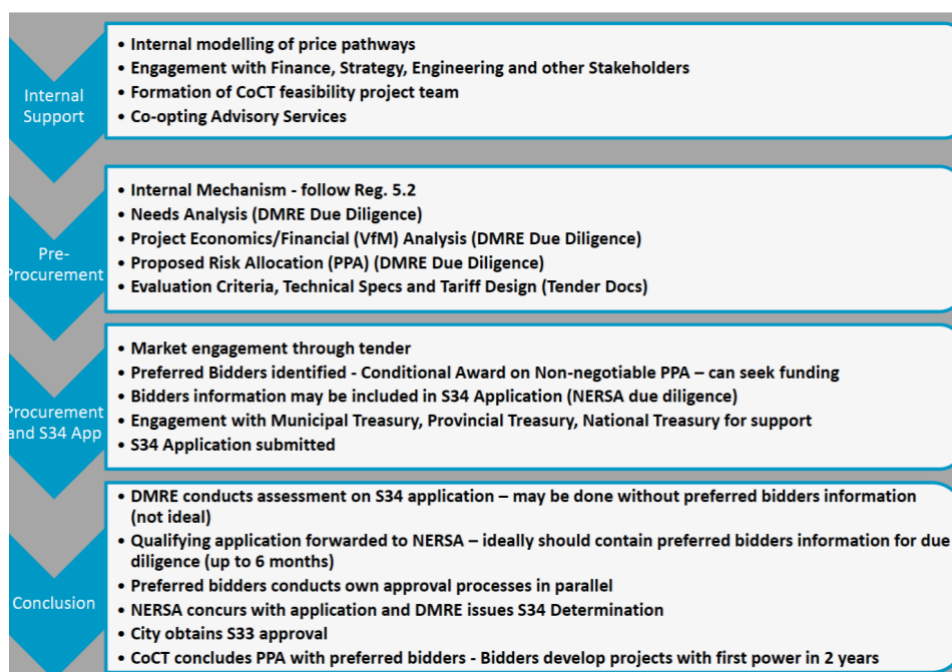
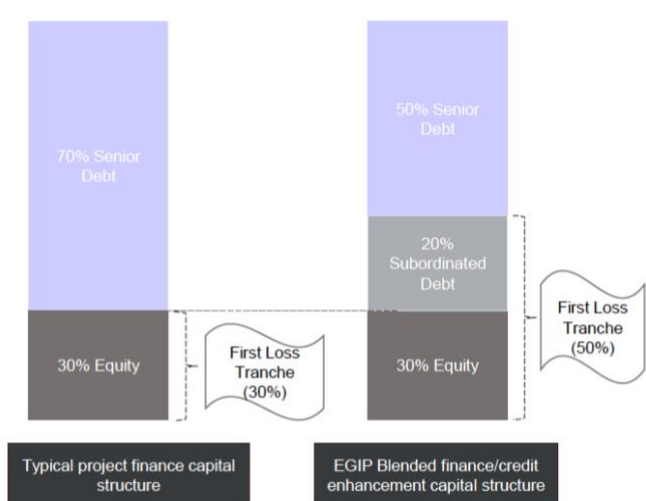


Figure 2: Steps required for the CoCT's IPP Procurement Process. Source: City of Cape Town<sup>19</sup>

### 3.4.2. Embedded Generation Investment Programme

The Development Bank of Southern Africa (DBSA), in partnership with the Green Climate Fund (GCF), has set up a \$200 million EG Investment Programme<sup>20</sup> (EGIP) to stimulate the growth of EG initiatives. EGIP offers a credit support mechanism as a first-loss facility to help de-risk EG projects not backed by sovereign guarantees. The GCF provided \$100 million, matched by the DBSA, to fund the first loss facility and project preparation support. A further \$104 million is expected to be leveraged from other financial institutions. More information is provided in Figure 3.

The project targets both the public and private sectors and aims for local community trusts to be included in the development of EG projects. Once all projects are in operation, the proposed investment is expected to add 330 MW of solar photovoltaic and wind generating capacity, thereby directly avoiding emissions of more than 700,000 tonnes of carbon per year<sup>20</sup>. Further, this fund will help create an EG market and provide a history of suitable projects, reducing the uncertainty around the financing of these technologies.



Key Features	Typical Project Finance Capital Structure	EGIP Blended Finance Capital Structure
Capital Structure	70% (senior debt): 30% (equity)	50% (senior debt): 20% (subordinated debt): 30% (equity)
First loss tranche (including equity)	30% to absorb losses ahead of senior debt	<ul style="list-style-type: none"> <li>50% to absorb losses ahead of senior debt</li> <li>Reduced Exposure At Default ("EAD") for senior debt</li> </ul>
Additional Credit Enhancement Requirements	Government Guarantee and/or Parent Company Guarantee	None or significantly reduced levels of guarantees (due to higher debt service cover ratios and level of first loss)
DSCRs and Cash Flows Available for Debt Service (CFADS)	<ul style="list-style-type: none"> <li>Senior DSCRs-market related</li> </ul>	<ul style="list-style-type: none"> <li>Robust senior DSCRs and CFADS due to lower senior debt gearing at 50%</li> </ul>
Interest Rate	<ul style="list-style-type: none"> <li>Senior interest rate-market related</li> </ul>	<ul style="list-style-type: none"> <li>Senior interest rate margin discounted due to robust CFADS, Senior DSCRs and the level of first level tranche</li> <li>First loss tranche interest rate margin fully subordinated to senior debt tranche in the cash water fall and security</li> </ul>
Additional project offerings	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Incorporates concessional BBBEE funding for ownership of Black Industrialists and Local Community Trusts in embedded generation projects.</li> </ul>

<sup>19</sup> Presentation made by City of Cape Town representative on IPP Procurement Programme

<sup>20</sup> DBSA's Embedded Generation Investment Programme: <https://www.dbsa.org/projects/embedded-generation-investment-programme-egip>

Figure 3: Finance structure of projects funded by EGIP. Source DBSA<sup>21</sup>

### 3.4.1. Energy Efficiency in Public Buildings Infrastructure Programme

The Energy Efficiency in Public Buildings Infrastructure Programme (EEPBP) is a new initiative. It is a Nationally Appropriate Mitigation Actions (NAMA) facility-supported programme that builds on the success of the EEDSM. The project capitalises on loans and financing to increase the investment of energy-efficient (EE) technologies into public buildings.

A project preparation facility will help provincial and municipal applicants develop bankable energy efficiency projects. Energy service companies (ESCOs) will then implement these projects and will be remunerated by the public entity based on the savings achieved through the project. ESCOs will need to raise the capital for the energy efficiency projects. They will be backed by a guarantee fund (funded by the NAMA facility) to de-risk the projects and get favourable interest rates. This programme has the following key benefits:

- no upfront capital is needed for the public sector entity (often difficult to mobilise), yet they will still receive the financial and environmental benefits of EE technologies; and
- NAMA and public sector funding are expected to be leveraged by a 1:3:3 ratio by private sector investment.

A service desk is also in place to assist municipalities and provinces in applying and implementing projects. €20 million has been provided to this programme for its establishment, operation and guarantee fund. It is expected to mitigate 610,000 tonnes of carbon annually<sup>22</sup>.

## 4. Discussion

### 4.1. Policy and planning

The allocation of distributed generation in the IRP 2019 and the Amendment of Electricity Regulations on New Generation Capacity provides a platform for all sectors of society to play a role in the electricity generation space. The streamlined licensing exemption and registration also remove regulatory hurdles previously needed to develop these projects. These changes are positive ones for EG development in South Africa. However, areas in this regulatory framework still need to be better detailed or shaped.

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<sup>21</sup> Presentation made by DBSA representative on Embedded Generation Investment Programme

<sup>22</sup> Energy Efficiency in Public Buildings Infrastructure Programme: <https://www.nama-facility.org/projects/south-africa-energy-efficiency-in-public-buildings-and-infrastructure-programme-eebpip/>

There is no indication of how the 500 MW per year will be allocated. Is it on a first come-first serve basis, split between a range of stakeholders, areas in the country, a mix of sizes, a public and private sector etc.? Regarding city-led generation, there is no indication of what role cities are expected to play in this field. The regulatory requirements, however, for city-led generation are significantly more onerous and time-consuming than for private sector players, which could lead to this allocation being primarily dominated by the latter. The Sustainable Municipal Energy Businesses Programme conducted by the CSP should clarify the regulatory requirements; however, these regulations may need to be refined as municipalities begin developing these projects regularly. Navigating the MFMA and MPPP to develop infrastructure projects is often seen as a hurdle to municipalities, especially smaller cities with less capacity. Hands-on support accompanying the roadmap developed by the CSP may be needed for regular uptake by all municipalities in South Africa.

New policy and regulation amendments enable municipalities to start developing EG projects. It is crucial, however, that some level of energy generation planning informs energy generation developments. An understanding of (1) energy project objectives, (2) available natural resources, (3) distribution infrastructure capacity, and (4) financial and capacity constraints within the municipality will play a major role in deciding project technologies and business models. The 100% Renewables Cities and Regions Roadmap provides a slightly simplified framework to develop city energy plans for cities that may not have the resources to conduct studies on the detail of the IRP.

Multi-level governance in the energy planning and policy area could greatly assist both the energy sector and the sustainability of cities. Strategically designed and situated energy projects can help reduce distribution network backlogs, city debt to Eskom, electricity prices to low-income households etc. By not having a more integrated energy planning approach, these opportunities to develop key projects will be overlooked. There is no consensus in government on the role cities *should* play. Greater political leadership is needed to drive work and define this area.

## 4.2. Programmes and projects

Programmes such as INEP and EEDSM show that South Africa and the DMRE can successfully manage energy infrastructure support programmes when working *with* municipalities. Three components are seen in these programmes: (1) policy and political drive, (2) municipal support, and (3) financial resources. At this stage, city-led EG lacks substantial municipal support and financial resources. There has been no indication of a support programme led by DMRE in this space. Given the positive stance from SALGA on municipal energy generation<sup>23</sup> and the work done by CoGTA in infrastructure planning, this could be a role for local government actors to play, as opposed to being driven by DMRE. During the AFMEG project’s capacity-building programme, a large attendance was

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<sup>23</sup> SALGA Energy Summit Declaration: <https://www.salga.org.za/Documents/Documents%20and%20Publications/Documents/Final-Energy-Summit-Declaration-2018.pdf>



seen by Municipal Infrastructure Service Agency<sup>24</sup> (MISA) officials, showing some level of interest in these projects. Provincial CoGTA offices already have access to municipal IDPs. They can (1) align the development of EG projects to these plans and (2) similarly provide support as seen in INEP and EEDSM. The City of Cape Town’s IPP programme shows a ground-breaking municipal energy procurement programme for South Africa. Yet, even with the city’s Sustainable Energy Markets<sup>25</sup> Directorate, extra skills and capacity are needed. Figure 2 shows the long process needed to get this programme off the ground. Should this be the ideal model for municipalities to follow, a centralised municipal IPP programme (that can provide suitable support and access to financial resources) at a provincial or national level could lead to greater efficiencies due to economies of scale. The Bethlehem Hydro<sup>26</sup> project showed that intermediary and rural municipalities could successfully be involved in IPP business models, albeit with the correct support. Furthermore, Bethlehem Hydro shows how local industries can be supported and ensure the energy transition yields local benefits.

### 4.3. Financing of embedded generation

Finding suitable financial resources and business models for city-led EG is key to getting these projects started. A strong dependency on grants exists for energy projects through INEP and EEDSM. Although there are ways to finance sustainable energy projects through the infrastructure grants provided by the National Treasury<sup>27</sup>, this does not efficiently use very limited resources. As the EEPBIP demonstrates, a greater investment could be leveraged into this sector using a project financing structure for EG projects.

Another funding channel could be the socio-economic and enterprise development contributions committed by IPPs in the REIPPP projects. With R20.6 billion to socio-economic development as of 2019 and more through further bidding rounds, this could provide a suitable pool of finances to kickstart a local, sustainable energy generation market. This arrangement is seen in Ireland, where IPPs contribute to a fund that will be used for low carbon transition projects at a smaller scale<sup>28</sup>. Directing a portion of contributions through local government or development organisations can lead to the alignment of development plans for communities and alleviate a common issue of IPPs struggling to identify areas to contribute that will have meaningful impact<sup>2</sup>. Another source of funding that could be examined is the recently announced Just Energy Transition Partnership<sup>29</sup> at the Conference of the Parties in 2021. Funds of at least \$8.5 billion have been committed through

<sup>24</sup> MISA is a technical arm of CoGTA that assist municipalities with infrastructure project development and operations

<sup>25</sup> City of Cape Town: Overview of Sustainable Energy Markets:

[https://www.capetown.gov.za/councilonline/\\_layouts/OpenDocument/OpenDocument.aspx?DocumentId=e42ce05b-2fb4-4179-a91b-fef68e2ef632](https://www.capetown.gov.za/councilonline/_layouts/OpenDocument/OpenDocument.aspx?DocumentId=e42ce05b-2fb4-4179-a91b-fef68e2ef632)

<sup>26</sup> New Roles for South African Municipalities in Renewable Energy - A Review of Business Models:

[https://www.cityenergy.org.za/uploads/resource\\_429.pdf](https://www.cityenergy.org.za/uploads/resource_429.pdf)

<sup>27</sup> How to include Energy Efficiency and Renewable Energy in Existing Infrastructure Grants:

[https://cityenergy.org.za/uploads/resource\\_435.pdf](https://cityenergy.org.za/uploads/resource_435.pdf)

<sup>28</sup> Renewable Energy Support Scheme: <https://www.seai.ie/community-energy/ress/community-benefit-funds/>

<sup>29</sup> Just Energy Transition Partnership: [https://ec.europa.eu/commission/presscorner/detail/en/IP\\_21\\_5768](https://ec.europa.eu/commission/presscorner/detail/en/IP_21_5768)

this partnership to see South Africa accelerate the decarbonisation of its economy, aiming to abate up to 1.5 billion tonnes of carbon dioxide over the next 20 years. Investing these funds at the city level could stimulate much-needed infrastructure development within small towns – helping these cities foresee the impacts of EG. In this way, small and intermediary cities are conduits of change in South Africa’s just energy transition, helping to ensure socio-economic growth is not solely concentrated within the country’s metropolitan municipalities.

The inability to finance large development projects through their balance sheet, in combination with a lack of skills, makes a project finance structure with energy procurement from IPPs a potentially suitable option for cities. The price of electricity may not be as low as municipal-owned projects; however, a project financing structure, designed correctly, can align payments with the cash flows of the municipality and place all the risk onto the private sector operating the project. Municipalities may be able to directly sell large portions of electricity by directly contracting them with large industries in the region. Many industries may want to use clean, cheap sources of power. This is a service that these municipalities could potentially provide to attract key industries within their region.

Due to city-led IPP projects being novel, international climate finance and/or development banks may be needed to support the initial projects to get off the ground and *pilot* these business models. The DBSA’s EGIP facility aims to achieve this, yet more initial development support is needed to get cities to apply. A support programme for city-led EG, similar in structure to the EEPBIP (with technical assistance, capacity building, project development support etc.), using the current EGIP facility could be what is needed to create a pipeline of projects.

#### 4.4. Municipal capacity and stakeholder engagement

An underlying theme throughout this review has been the skill set and capacity of local governments in South Africa to plan and implement EG projects. Historically, municipalities’ primary role in the electricity sector is operating the distribution network and setting tariffs. The rise of sustainable energy has, arguably, *forced* cities to start accommodating these technologies onto their distribution grids and use them for their own benefit. This change in the municipal energy initiatives requires a dedicated workforce focused on successful participation in a changing energy landscape and the complexities it brings – somewhat different to their core mandate. Developing EG projects requires more hands-on deck and different specialist skills not commonly seen within municipal departments. Throughout the AFMEG project, it was seen that EG the drive for renewable energy projects was championed by one or two staff members within their municipality, on top of their current duties. This situation is most likely to be the case for most small and intermediary cities in South Africa. Current municipal staff compliments may be able to initiate project developments; however, partnerships with the private sector will be needed to bring in the technical skills of planning, operating and maintaining projects. Additionally, there is a range of stakeholders and specialists needing to be engaged along the development and financing lifecycle of EG projects, such as:

- provincial and national government;
- transactional advisors;

- funders;
- banks;
- private investors;
- technical consultants; and
- off-takers.

Expecting municipal officials to be able to engage with *all* these actors and the functioning of these actors is a big ask. And conversely, the same applies to these new players in the energy space, understanding the machinations of municipal planning and development. Using an intermediary role player who can bridge the gap between these entities will be crucial to developing city-led EG projects, at least in the early stages.

## 5. Key recommendations

1. Multi-level government energy planning should be explored, with the role of local government well defined and agreed upon by all stakeholders.
2. Intermediary and smaller municipalities need assistance with energy generation planning to ensure EG projects are developed efficiently and aligned with municipal priorities.
3. The use of external funding sources must be explored and leveraged, along with piloting finance models suitable for the capacities of intermediary cities.
4. AEG development programme, specifically for Category B municipalities, with (1) technical support and (2) access to finance, should be developed and implemented to see greater uptake of projects.
5. The role of intermediaries in enabling EG projects and programmes needs to be recognised and explored further.
6. Knowledge exchanges on EG amongst municipalities in South Africa and perhaps other African regions should be established.

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*For any enquiries, please get in touch via email at [communications@ukpact.co.uk](mailto:communications@ukpact.co.uk)*

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