Development Bank of Southern Africa Working Paper Series | Nov 2020

Municipal Power Procurement and Generation

Richard Goode

WP/2020/01

Table of Contents

List of acronyms

AG	Auditor-General
AMEU	Association of Municipal Electricity Undertakings
CoJ	City of Johannesburg
CoGTA	Department of Cooperative Governance and Traditional Affairs
COUE	Cost of Unserved Energy
CSIR	Council for Scientific and Industrial Research
CSP	Concentrated Solar Power
CSP	City Support Programme
DBSA	Development Bank of Southern Africa
DMRE	Department of Mineral Resources and Energy
DPE	Department of Public Enterprises
DSM	Demand Side Management
EAF	Energy Availability Factor
EGIP	Embedded Generation Investment Programme
ERA	Electricity Regulation Act No 4 of 2006
ESI	Electricity Supply Industry
GHG	Greenhouse Gas
GIFA	Gauteng Infrastructure Financing Agency
GIZ	German Development Agency
GNR	Global Name Registry
GW	Gigawatt
IEP	Integrated Energy Plan
IPP	Independent Power Producer
IPPO	Independent Power Producers Office
IRP	Integrated Resource Plan
kWh	Kilowatt-Hour
MFMA	Municipal Finance Management Act No. 56 of 2003
MPPG	Municipal Power Purchase or Generation
MSA	Municipal Systems Act No 32 of 2000

MW	Megawatt
NDP	National Development Plan
NERSA	National Energy Regulator of South Africa
O&M	Operation and Maintenance
PPA	Power Purchase Agreement
PV	Photovoltaic
PPA	Power Purchase Agreement
PPP	Public Private Partnership
RE	Renewable Energy
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
RMIPPPP	Risk Mitigation IPP Procurement Programme
SAGEN	South African-German Energy Programme
SALGA	South African Local Government Association
SAPVIA	South African Photovoltaic Industry Association
SARB	South African Reserve Bank
SAWEA	South African Wind Energy Association
SCM	Supply Chain Management
SDG	Sustainable Development Goals
SOC	State Owned Corporation
SONA	State of the Nation Address
SSEG	Small-Scale Embedded Generation
SSM	Supply Side Management
STATS SA	Statistics South Africa

Abstract

The electricity industry is undergoing significant change. Security of supply problems have spiralled into a crisis. Rising tariffs, margin compression and embedded generation are challenging the municipal electricity business model. To increase generation capacity outside of Eskom, municipalities that satisfy conditions set out in new generation regulations will be able to procure power directly from independent power producers. An investigation of municipal power procurement preparedness identified issues to be resolved. Acquiring new generation capacity will be possible in municipalities that have the capacity to do the necessary preparation. Such capacity tends to be concentrated in the few large metropolitan municipalities and it will take several years of preparation. Smaller municipalities also have some options to improve security of supply and decarbonise their power sources. DBSA has the capability to assist municipalities procure new capacity in the medium-term. The Bank can also support smaller municipalities take steps to make their electricity operations more sustainable.

1. Introduction

South Africa's electricity sector is undergoing a multifaceted transformation. Energy security concerns, rising electricity prices, growing pressure on cities to decarbonise their energy systems, the emergence of renewable energy (RE) technologies, the introduction of independent power producers (IPPs) and restructuring of South Africa's Electricity Supply Industry (ESI) are key among many unfolding issues.

Cities such as Kimberley, Cape Town, Johannesburg and Bloemfontein that operated their own generation plants in the early days of the ESI ceded that role to the superior economies of scale that Eskom provided with the establishment of the national transmission grid and large-scale coal-fired generation capacity since the early 1970s. From then on municipal electrical undertakings were mainly devoted to distribution.

More recently, and at an accelerating pace world-wide, the vertically integrated electricity utility model, typically based on cheap fossil fuel as in the South African case, has experienced a threefold disruption. First, advances in competition and regulation economics have widened the scope for competition along the electricity industry value chain. Electricity supply is open to competition for the market but as a network industry, it is largely a natural monopoly which is why it requires regulation. Second, anthropogenic greenhouse gas (GHG) emissions and the imperative to reorder economic activity to sustainable practices has driven the need to clean and decarbonise energy systems. Third, technological advances and orders of magnitude cost reduction over a wide suite of renewable energy technologies have moved variable renewable energy in the form of solar photovoltaic and wind from a subsidised marginal generator in its infancy to the least cost source of energy for new generation. These new technologies have different economies of scale and some can be deployed at distributed and embedded levels not previously possible.

Changes underway in the ESI require municipalities to reconfigure their funding and operating models. Several cities have run renewable energy projects in the past on a small-scale. Such efforts to diversify supply were given more urgency following Eskom's resumption of load shedding in 2018 which worsened in 2019 and continued into 2020. A key turning point for the ESI was announced by President Cyril Ramaphosa in his February 2020 State of the Nation Address (SONA). The President

stated that government was planning to rapidly and significantly increase generation capacity outside of Eskom. Municipalities in good financial standing would be permitted to procure their own power from independent power producers as one among other means to resolve electricity constraints.

This paper examines the conditions under which municipalities will be able to purchase power from IPPs or generate their own power, hereafter referred to as municipal power purchase or generation (MPPG). Starting with a review of developments in the South African ESI, it assesses critical drivers that are changing the municipal electricity distribution business as well as the financial conditions of municipalities. In the second part of the paper regulations governing electricity distribution by municipalities are set out along with an assessment of changes proposed to pave the way for MPPG. A sample of municipalities is then assessed to identify their state of readiness for MPPG and the issues that they report as critical for the MPPG market to develop. In the final section the views of renewable energy industry associations on MPPG are introduced. Emerging themes for the development of the MPPG are reviewed together with expectations of the role that the Development Bank of Southern Africa (DBSA) could play. The paper concludes with the recommendation that the Bank should focus on five themes seen to be critical for the development of MPPG opportunities.

Sustainable municipal electrical businesses require attention to be given to tariff design and regulations for enabling legislation (by-laws) or via incentive mechanisms. This may include feed in tariffs that assist customers in their jurisdictions to take advantage of new Distributed Energy Resources technology that offers households prosumer options and can help business to become more resilient, using least cost and sustainable options for their energy needs. Essentially this requires looking at municipal electrical businesses through the lens of creating enabling conditions for households' access opportunities and firms to expand, create employment and contribute more to local and national tax revenues, and not merely seeing MPPG as an option for municipalities to diversify sources of electricity supply. Although these issues are not addressed directly in this paper, they are raised so as not to lose sight of the critical economic and social role of energy services in this discussion focused on municipalities, especially as other stakeholders in the public sector are engaged.

2. Broad developments in the ESI contextualising MPPG

Power system adequacy challenges have constrained the South African economy for over a decade. The multiple challenges throughout the ESI were so severe that by the first quarter of 2020 the electricity crisis was among the key factors that pushed South Africa's economy into its second recession in two years (SARB, 2020).

From early 2020 the electricity crisis has been overshadowed by the global COVID-19 pandemic. High level strategies for the world to accelerate the decarbonisation of energy systems disrupted by the COVID-19 pandemic have been advanced by, amongst others, the International Energy Association (IEA, 2020) and the International Monetary Fund (IMF, 2020). Domestically there are some moves in that direction through a Ministerial determination for the procurement of new generation capacity through implementing the IRP 2019, the bulk of which is advancing renewable technologies. Green industries do feature in the South African Economic Reconstruction and Recovery Plan, however the focus is on energy security (GSA, 2020).

South Africa's electricity crisis is focusing attention on the restructuring of Eskom in the absence of a broader plan for the ESI industry. A decade ago, Cabinet decided to terminate the Electricity Distribution Industry restructuring programme. Structural problems, evident then, remain unresolved. MPPG opportunities are unfolding in the context of an electricity crisis chronicled below.

Eskom, saddled with debt of R454-billion, poses substantial risks to the economy and public finances (National Treasury, 2019). Eskom is not earning enough revenue from electricity sales at current tariffs and volumes to pay off the interest on its debt. Through a combination of reduced economic growth, increasing energy efficiency, increasing primary fuel costs, a substantial wage bill and most importantly cost over-runs and delays on the new build programme along with declining coal plant availability that has required Eskom to use costly peaker generators, the state-owned corporation (SOC) is financially unsustainable. In 2019, Eskom received support of R82-billion from the fiscus. National Treasury indicated at the time that it expected to continue to support Eskom for a further 10 years and that the total expenditure would amount to R240 billion (National Treasury, 2019). Greater clarity on government's plans to split

the utility into separate generation, distribution and transmission businesses under a state holding company was provided in October 2019 with the publication of the *Roadmap for Eskom in a Reformed Electricity Supply Industry* by the Department of Public Enterprises (DPE, 2019). The timing of Eskom's restructuring events has been slowed by the COVID-19 pandemic, nevertheless it will change the ESI landscape significantly by ameliorating the current real or perceived conflict of interest inherent in Eskom as a vertically integrated power utility vis-à-vis other generators or distributors.

The Integrated Resource Plan 2019, published in October, provides long awaited clarity about capacity additions (DMRE, 2019). The plan adds 14 400 MW of wind capacity (1600 MW per year) and 6000 MW of solar photovoltaic capacity excluding embedded generation (up to 1000 MW in selective years) between 2022-2030 to the South African power system. However, this plan needs to be revised continuously.

The DMRE Risk Mitigation IPP Procurement Programme (RMIPPPP) was launched in late 2019 to deal with current power deficits. This programme aims to procure 2 000 MW of power from projects that can deliver into the grid by June 2022.

Delivering his SONA in February 2020, President Cyril Ramaphosa stated that load shedding "has had a debilitating effect on our country. It has severely set back our efforts to rebuild the economy and to create jobs. At its core, load shedding is the inevitable consequence of Eskom's inability over many years – due to debt, lack of capacity and state capture – to service its power plants. The reality that we will need to accept is that for Eskom to undertake the fundamental maintenance necessary to improve the reliability of supply, load shedding will remain a possibility for the immediate future." Committing to minimise the disruption caused by load shedding, the following measures were put forward to rapidly and significantly increase generation capacity outside of Eskom (Ramaphosa, 2020):

- Giving effect to IRP 2019 by issuing a Section 34 Ministerial Determination.
- Initiating procurement of emergency power.
- Registration by Nersa of small-scale distributed generation for own use of under 1 MW, for which no licence is required.
- Processing of applications by commercial and industrial users to produce electricity for own use above 1MW within the prescribed 120 days.

- Opening of Bid Window 5 of the REIPPPP and working with producers to accelerate the completion of Bid Window 4 projects: and
- Negotiating with existing wind and solar plants to acquire additional capacity and putting measures in place to enable municipalities in good financial standing to procure their own power from independent power producers.

In February 2020 the Minister of Mineral Resources and Energy announced that government intends to create a new power generation entity distinct from Eskom to take pressure off the public utility. The concept could be fulfilled by the public sector, private sector or a combination of the two, depending upon investor views.

In June 2020 the IPPO announced that the next bidding round for the procurement of utility-scale renewable-energy projects under IRP 2019, often referred to as Bid Window 5, would be launched in the second quarter of 2021.

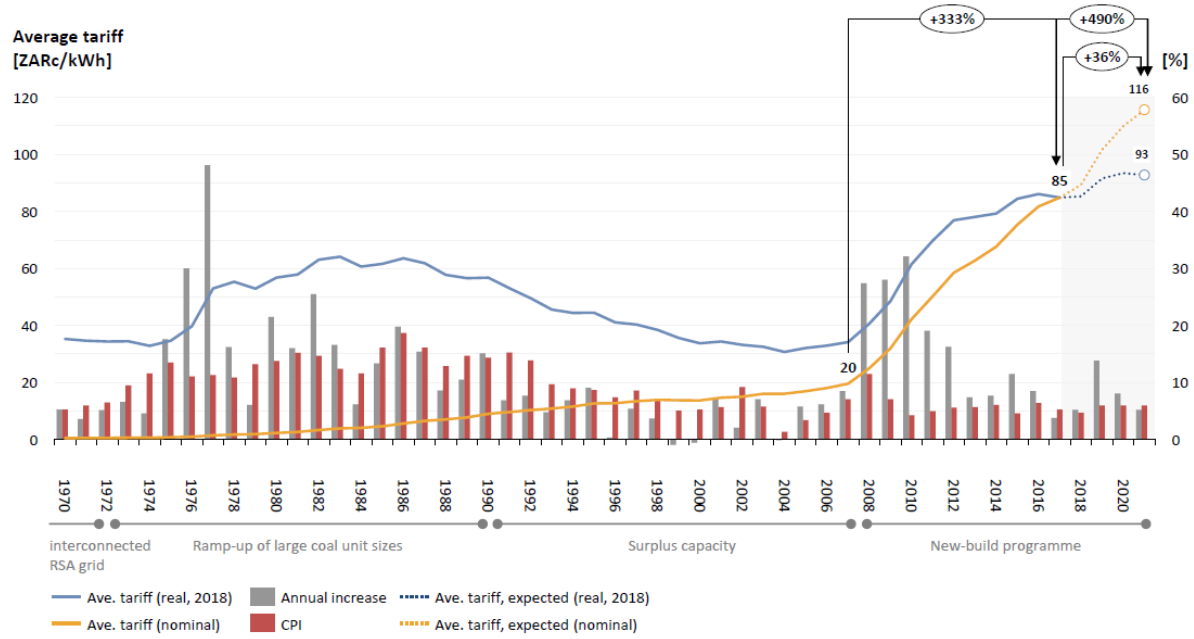
3. Critical issues directly affecting MPPG

Municipal electrical businesses and municipalities as organs of state are contending with, amongst other issues, a range of external factors on the electricity supply side and internal factors such as aging infrastructure and skills deficits. In this section eight important issues that will influence municipalities' strategies to diversify their electricity supply from Eskom and shape the emergence of an MPPG market are examined. These issues are rising bulk tariffs, margin compression, load shedding, embedded generation, decarbonising electricity sources, internal technical capacity and governance stability, declining municipal financial performance and growing debt to Eskom.

3.1 Rising electricity prices

Average tariffs have increased significantly since 2007 as Eskom commenced its new build programme, rising by 333 percent from 2007 to 2017. When tariff increases already granted by Nersa under multi-year price determination method for 2021 are included, the total increase from 2007 rises to 490 percent.

Figure 1 Evolution of Average Electricity Tariff in South Africa (1970 to 2017 Actuals and Expected to 2021)



Source: Wright (2019)

Figure 1 shows the evolution of real average prices over six decades. The structural drivers of Eskom tariffs are illustrated in distinct stages. First are the rising tariffs to fund the coal build programme of the 1970s based on demand growth projections that did not materialise. Second is a real decline in tariffs from the 1990s to the mid-2000s while demand grew in the absence of new capacity. Thirdly, the sharp rise in tariffs as Eskom struggled to add capacity through the new build programme.

Sharp tariff increases make grid electricity less affordable for households and businesses while in principle improving the attractiveness of MPPG options that can provide a discount to Eskom bulk rates.

Further electricity tariff increases in the near term are inevitable. This is shown in the higher average tariff projections made in the IRP 2019 factoring in low Energy Availability Factor (EAF) and diesel fired peakers running at high load factors (IRP 2019).

Three Nersa determinations taken on appeal by Eskom were overturned by the High Court in March 2020 and June 2020, respectively. How these judgements will translate

into new tariff determinations has yet to be decided but significant upward adjustments were implied by the rulings. They accept Eskom's argument that current tariffs are not cost reflective even if the new build is done efficiently and that the tariff price path must rise further to reach cost reflectiveness. As the IRP 2019 spells out, tariffs will increase and the choices to be made are about achieving the least-cost combination consistent with the policy objectives of government.

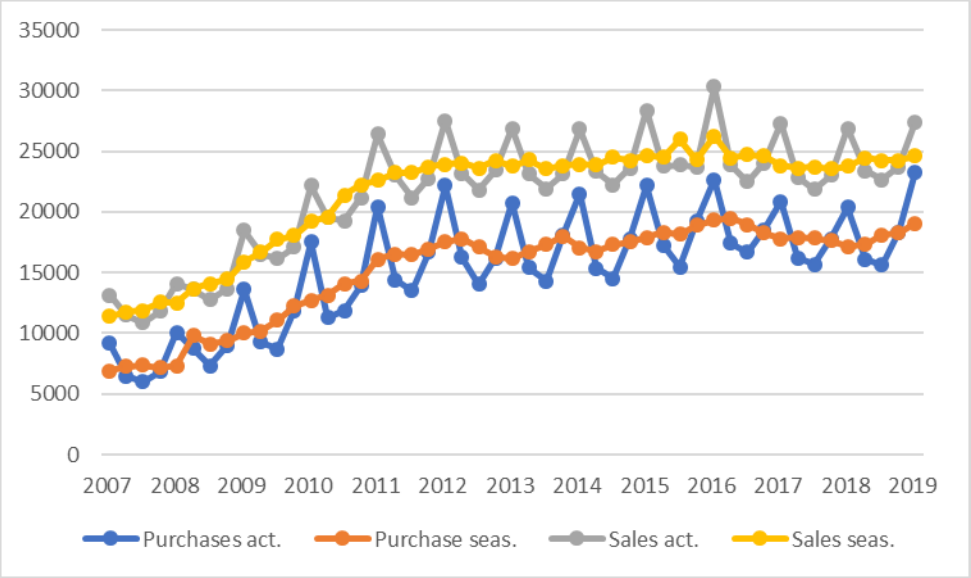
For all electricity users these rulings increase price uncertainty for Eskom power into the future, although the direction of change is clear, strengthening the business case for embedded generation for users able to exercise that option and for municipalities to diversify their supply from Eskom. Electricity tariffs paid by consumers are made up of several components over and above Eskom bulk tariffs. Procurement from IPPs would reduce only some of these components.

3.2 Declining margins on municipal electricity sales

Margin squeeze on municipal electricity sales is the corollary of rising tariffs. Electricity distribution is the largest part of municipal trading services. Historically surpluses that could be applied to other municipal cost centres have been generated, however, this no longer holds and in many cases electricity trading is loss making where tariffs are not structured to be cost reflective. The municipal electricity distribution business model recovers costs and generates surpluses based on a mark-up on the Eskom bulk supply tariff. In the residential sector this volumetric approach is coming under pressure as consumers reduce their consumption by investing in energy efficient appliances and to a lesser extent embedded generation to combat rising electricity prices leading to stagnant sales growth and margin compression.

An examination of bulk electricity purchases and sales by municipalities between 2007 and 2019 shows that municipal distributors achieved steadily rising sales in real terms from 2007 to around 2011, where after sales growth to 2019 effectively plateaued.

Figure 2 Municipal electricity purchases and sales (constant 2016) Rm

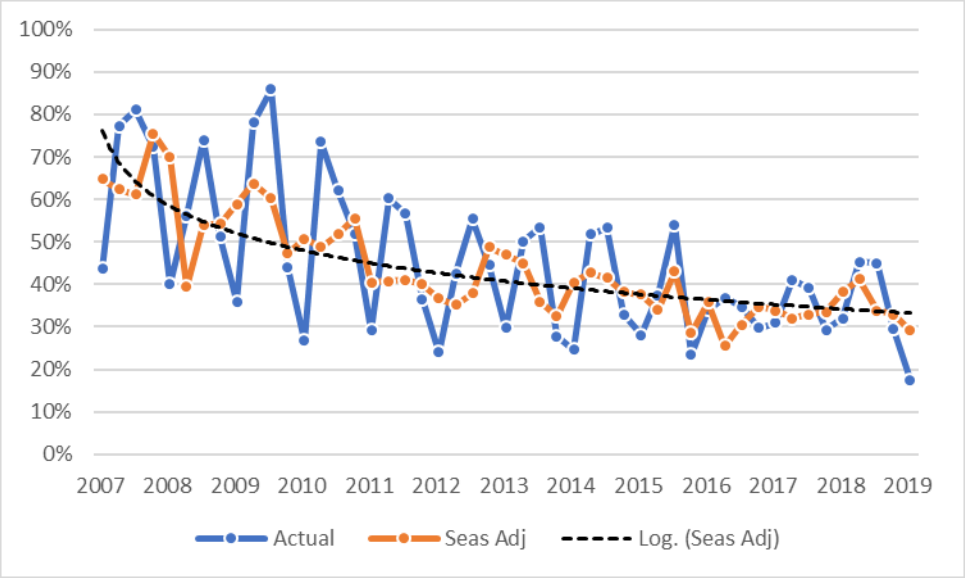


Derived from Quarterly financial statistics of municipalities, Stats SA (2019)

Note act. =actual sales, seas. = seasonally adjusted sales

Over the same period real increases in bulk electricity tariffs from Eskom and municipal tariffs set by Nersa have severely compressed municipal distributors' gross margins. Over the period between 2007 and 2019 gross margins for all municipalities combined have declined from around 75 percent to 33 percent as seen in Figure 3, this significantly reducing the surpluses (not shown in this data) municipalities have in the past been able to rely on regarding electricity trading.

Figure 3 Gross Margin on Municipal Electricity Sales 2007 to 2019



Derived from Quarterly Financial Statistics of Municipalities, Stats SA (2019)

History is important here, as Eberhard (2004) explains. Eskom's poor planning in the 1970s and build through the 1980s created generation over capacity and obviated the need for investments in new capacity for many years. Prices were kept low through to the end of the 1990s, the cost of the older plants having been mostly amortized. Crucially, rather than accumulate reserves for future investments, Eskom passed the savings onto consumers. This policy was pursued in the political context of the transition to democracy where Eskom played an important role in the electrification of unserviced households.

Municipalities were able to make substantial margins on electricity sales with the retail tariffs still being relatively affordable and cost competitive on a comparative regional and international basis. This aspect of municipal financing was important given their constitutional responsibilities of providing basic services for all. Two decades after the start of democratic local government in 2000 with generation costs increasing and normalising with international levels, the ability to make substantial margins on electricity sales no longer holds. Given that electricity costs affect business viability, municipalities are now compelled to find other sources of revenue to be sustainable. For these reasons the South African Local Government Association (SALGA) has been at the forefront of advocating that municipalities expand the scope of the energy activities to access new revenue streams, a point expanded upon below.

3.3 Load shedding

Load shedding has been the most palpable, costly and disruptive manifestation of the unreliability of Eskom's fleet of coal-fired power stations. In power system operations, emergency load reduction is a measure implemented by the system operator (Eskom) and distribution control rooms in order to prevent a national, regional or local blackout when system conditions are such that demand cannot be met by the available power system capacity, or when adequate reserves required to manage the power system adequacy cannot be maintained without a reduction in load. Emergency load reduction may take the form of load shedding (time-based interruption of supply to customers on a rotational basis), mandatory load curtailment (self-reduction by customers in response to an instruction given by the system operator), load limiting (a limit placed on the current or power consumed by a customer). All these measures are applied by

the system operator but are summed up in daily experiences as what is commonly known as load shedding.

Power constraints have, for more than a decade, dragged down the country's economic growth and have been a critical factor in reducing fixed investment (National Treasury, 2019; SARB, 2019). Load shedding on the other hand imposes high costs and disruption to existing firms and households. Businesses have been compelled to invest in stand by power systems to ensure continuity, tying up capital to protect themselves from unpredictable but costly business risks. Efforts to shield businesses from load shedding have and continue to be a major factor driving the embedded generation market in South Africa. For municipal distributors the impact of load shedding on the local economy and what they can do to mitigate these impacts is a primary driver in their plans for MPPG.

After a hiatus from the previous bout of load shedding in 2015, load reductions increased sharply at the end of 2019, reaching a nadir on 9 December 2019 when Eskom was forced to declare Stage 6, or 6 000 MW of simultaneous cuts having lost more than 40 percent of its generating capacity.

Table 1 Load Shedding Impacts 2007 - 2019

Year	Duration (hr)	Energy (GWh)	Economic impact (Rm) upper limit*
2007		176	15 462
2008		476	41 817
….			
2014	121	203	17 834
2015	852	1 325	116 401
2016			
2017			
2018	127	192	16 867
2019	530	1 352	118 773
2020 (Oct)	827	1 734	151 725

Source: Wright and Calitz (2020). * Economic Impact Based on Nersa COUS at 87.50 R/kWh

The economic value of energy given in the Cost of Unserved Energy (COUE) is useful for energy planning modelling purposes but obviously does not capture the vast range of economic values of energy to individual consumers over time: day/night, business hours/weekend, high season/low season. As a result, the monetary values in Table 1 should be discounted to reflect a wide range of appropriate monetary values to users. Wright and Calitz (2020) spread the range of estimated economic impact from 50 to 100 percent of the Nersa COUE value, thus the values in Table 1 reflect the upper limit of the costs of economic impacts.

Wright and Calitz (2020) observe that the projected energy availability factor (EAF) for the coal fleet is substantially higher than the actual EAF achieved in recent times with lower EAF expectations needing to be assessed. They warned that capacity shortfall of forecast in the IRP 2019 of between 2 000 MW and 3 000 MW for the three-year period to 2022 may turn out to be far higher.

The COVID-19 pandemic economic shocks have substantially changed the short-term outlook. Suspension of economic activity during the lockdown reduced electricity consumption by 23.3 percent year on year in April and by 13.6 percent year on year in May (Stats SA, 2020).

Load shedding risks abated in the short term, but they remain an ongoing threat to economic activity. The CSIR argues that further load shedding is expected, drawing attention to the slow progress with improving the coal fleet EAF, implementing the DMRE emergency procurement program, and implementing the IRP next bid window, Window 5 (Wright and Calitz, 2020).

3.4 Small Scale Embedded Generation

Small scale embedded generation (SSEG) epitomises many of the technological and economic changes disrupting the ESI worldwide. The growth in SSEG has been underpinned by a sharp fall in the cost of solar photovoltaic (PV) technology. As a CSIR investigation into SSEG found between 2007 and 2017, the average electricity tariff in South Africa increased by 384 percent, while solar PV technology costs fell by more than 530 percent (Creamer, 2019). This has galvanised South African companies to invest in SSEG for tariff certainty in a context of ongoing, above inflation

Eskom tariff increases and load shedding, exacerbated by failures of distribution networks as municipalities struggle to maintain aging infrastructure. Economic and financial attractiveness of an SSEG project within any given municipality is, however, dependent upon how the applicable tariffs are structured. It follows therefore that in a situation where tariffs are not cost reflective for whatever reason, SSEG projects would be mispriced and taxed, or subsidised by a municipal distributor.

Even in the absence of a supportive environment, the CSIR Energy Centre estimates that South Africa's installed base of SSEG plants, mostly in the form of rooftop solar installations has grown to above 400 MW from close to zero ten years ago. Accurate information on SSEG market dynamics is lacking. Authorities need to improve the current system for regulation and tracking of the SSEG market.

In pursuit of extending electricity services to all households in order to meet National Development Plan (NDP) targets and Sustainable Development Goals (SDGs), municipalities have higher numbers of consumers with low monthly consumption (less than 350 kWh per month) and low affordability levels as part of their customer base. This places additional reliance on high consumption users (commercial, industrial and high-income residential) to make the cross-subsidy model work. Embedded generation by these customers reduces sales volumes and thus the cross-subsidy model by placing a higher burden on a reduced consumption base. SSEG is sometimes erroneously referred to as 'grid defection' which is inaccurate because self-generators retain their connection to the grid as true grid defection is costly and rarely feasible.

For these reasons SALGA has been campaigning for several years for regulatory changes to reconfigure the municipal electrical distribution business model and for municipalities to be able to purchase electricity directly from independent power producers (IPPs). SALGA has voiced the concerns of municipalities losing revenue from electricity distribution and argued strongly that municipalities need to be able to take advantage of the decentralised initiatives happening in the energy space (SALGA, 2018b).

SSEG is a serious problem for municipal distributors prevented by regulation from engaging in a wider range of energy services. There are several shopping centres that have placed a massive amount of PV on their roofs, so they purchase less power on

the few no sun days when demand shoots up (Vermeulen, 2020). SSEG is not a problem per se, rather self-generation disadvantages municipalities where it cannot be integrated into a responsive network. Cities such as Johannesburg could help this market develop by making it viable for property developers to build generation facilities and help to wheel that power to other customers adjacent to the generator. Municipal networks derive other benefits from SSEG via peak shaving and load balancing as building blocks towards future smart energy grids.

3.5 City sustainability - pressures for and ambitions to decarbonise

Increasing sustainability is a driver for MPPG. The Constitution of the Republic of South Africa states that everyone has the right to have the environment protected through reasonable legislative and other measures that "secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development" (section 24 (b) (iii) Constitution of the Republic of South Africa Act no. 108 of 1996). Supported by environmental legislation and policy instruments, metropolitan municipalities and many secondary cities have developed energy and climate change strategies with associated energy access, renewable energy, and energy efficiency targets. eThekwini Municipality, for example has set a target of a 40 percent renewable energy supply by 2030 and a 100 percent renewable energy supply by 2050 (eThekwini, 2019). Among the metros and several well governed municipalities, energy efficiency projects have been implemented and a diverse range of renewable energy projects have been proposed, albeit with fewer implemented and none at scale.

Sustainable energy for cities is broader than electricity. City strategies on climate action and increasing resilience cover all energy carriers and are integrated into plans to reduce costs, improve resilience, create jobs and contribute to energy efficiency and security. All the issues examined above are driving changes to decarbonise energy sources as well as providing the technical and economic means to increase the use of clean energy in cities.

Many SSEG deployments, particularly those being undertaken by multinationals operating in South Africa are increasingly motivated by internal decarbonisation targets and commitments to the SDGs.

Municipalities experience pressure to clean the energy they can provide directly to customers. For example, the scenario planning and engagements with eThekwini customers shows that if the municipality does not give customers renewable energy, they will do it themselves (Ntshalintshali and Sewchurran, 2020). There is pressure to increase renewable energy because of the carbon tax requirements. These pressures are testing the attractiveness of the metro to investors.

3.6 Municipal capacity

Municipal electrical businesses contend with major technical capacity, financial resources and governance stability problems that will critically affect how they are able to respond to the MPPG opportunity. Challenges involve:

- aging distribution infrastructure which raises technical losses and frequency of equipment failure;
- lack of maintenance and refurbishment creating growing capital backlogs;
- technical skills gaps; and
- high non-technical losses from electricity theft, meter tampering and corruption.

Revenue management and credit control are cross-cutting challenges for municipalities. Technical skills are in short supply in general. Some of the skills needed to pursue MPPG opportunities require competencies that municipalities have not previously needed to negotiate power purchase agreements or structure bids for IPPs.

Developing MPPG opportunities, it must be stressed, will help municipalities with rising Eskom costs but will not solve any of the critical capacity issues and could, under a scenario where municipal leadership attention is diverted, worsen these problems.

3.7 Declining municipal financial performance

The Auditor-General (AG) released the audit outcomes for local government for the period 2018-19 on 1 July 2020. A total of 257 municipalities and 21 municipal entities were audited with outcomes for 229 municipalities reported. Clean audits were obtained by 8 percent of municipalities, while 48 percent had qualified financial statements.

Poor municipal financial performance negatively affects firms and households and this stems from administrative deficiencies rather than insufficient financial resources. The AG concluded:

> When looking across the board and after carefully analysing the financial statements we audited, we can safely conclude that local government does have enough money and assets to fulfil most of the basic needs and aspirations of its citizens. But a lot of work is needed to make sure that this is realised. Proper administration and superintendence over the financial affairs of local government were not exercised and were found, through this audit examination, to be seriously lacking with some devastating consequences already evident in certain identified areas (AGSA, 2020: 25).

A key stipulation in the draft regulations for procurement of electricity by municipalities is that only municipalities in good financial standing will be eligible for Ministerial approval to start a process to procure power. In view of the poor financial standing of most municipalities, only a small resulting pool of the better administered and more capable municipalities remains. Rising electricity prices and declining power sales margins will exacerbate the pressure on poorly performing municipalities that are incapable of participating in MPPG.

3.8 Municipal debt to Eskom

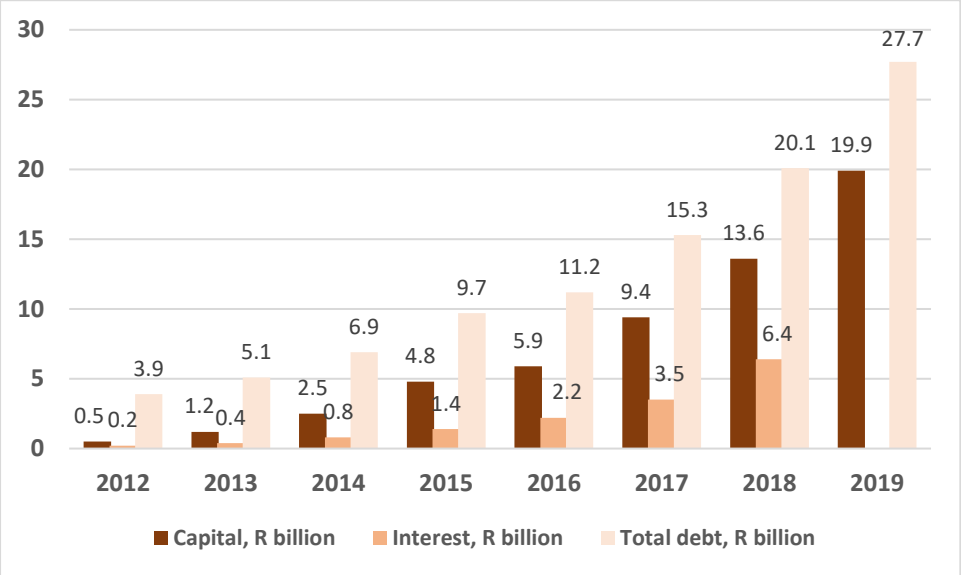
Eskom has suffered serious financial losses as a result of non-payment of electricity accounts by certain municipalities and areas in which it distributes directly, notably Soweto. Arrears have significantly escalated over the past eight years, as Figure 4 shows. The top 20 municipalities account for 81 per cent of the total invoiced municipal

arrear debt. Principle arrear debt, excluding interest, reached R28 billion at the end of March 2020, an increase of R8 billion over 12 months.

Municipal debt is both a symptom of structural problems and contributor to financial stress in the ESI. The direct impact of municipal debt on MPPG is likely to be threefold:

- upward pressure on Eskom tariffs;
- reduced maintenance of the distribution network; and
- increased grid defection for firms located in highly indebted municipalities experiencing cut-offs from Eskom.

Figure 4 Rise in Municipal Area Debt 2012 to 2019 (at 30 June 2019)



4. Regulations for municipal electricity distribution mandate

The Constitution of the Republic of South Africa, no. 108 of 1996 assigns to municipalities the responsibility for administering services to communities in a sustainable way, including electricity reticulation and streetlights.

The Municipal Systems Act (MSA), no. 32 of 1998 defines the roles of municipalities as service authorities and assigns to municipalities the right to determine the service provider that will distribute electricity within their boundaries.

The Municipal Finance Management Act (MFMA), no. 56 of 2003 outlines the requirements for municipalities to set tariffs for service provision, including electricity tariffs. Multi-year contracts, such as a Power Purchase Agreement (PPA) are regulated by section 33 of the MFMA which stipulates that a municipality can only enter a contract imposing financial obligations on the municipality beyond a three-year period if:

- A draft of the contract is publicly advertised for comment 60 days prior to the municipal council meeting at which the contract will be considered for approval.
- The municipal council has considered the financial implications of the contract and any comments received on the proposed contract; and
- The municipal council has adopted a resolution on the financial benefits of the contract and authorised the municipal manager to sign the contract on behalf of the municipality.

The Electricity Regulation Act (ERA), no. 4 of 2006 and the Electricity Regulation Amendment Act, no. 28 of 2007 stipulates that a municipality has executive authority and rights to reticulate electricity within its boundaries. These regulations provide municipalities with the 'authority function' of energy reticulation. This function includes the development of policies, drafting by-laws, setting tariffs, deciding how energy reticulation services are provided and regulating the provision of these services in terms of the by-laws and other mechanisms (SALGA, 2018a). Regulations that will govern how the MPPG market develops are examined in the following two sections.

4.1 Regulations for new generation capacity by organs of state 2011

Prior to the regulatory changes launched in 2020, the key regulations and rules that set the framework for how municipalities could deal with new generation in their areas of control were issued in 2011. Regulations for new generation capacity in terms of the ERA published as GNR 399 in Government Gazette no. 34262 dated 4 May 2011 specifically addressed government structures and outlined the rules for the procurement of new generation capacity of electricity by organs of state. The regulations state that the Minister of Energy may determine as to whether any new generation capacity shall be established by Eskom, another organ of state or IPP. If

the new generation capacity is established by an IPP then the Minister may also determine the identity of the buyer or, where applicable, the procurer and the buyer. This notice provided the legal framework for the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP).

The National Energy Regulator of South Africa (Nersa), established by the National Energy Regulator Act, no. 40 of 2004, functions to regulate the electricity, piped gas and petroleum pipeline industries by means of licences, regulatory rules, guidelines and codes. Section 7 of the ERA provides that no person may, without a license issued by Nersa, operate any generation facility, save regarding the exceptions listed in Schedule 2 of the ERA.

Further details on exemptions were made in 2018 (GNR. 653 in Government Gazette no. 41685 dated 8 June 2018) on activities exempt from the requirement to apply for and hold a licence. For municipalities an important exemption was that a system with installed capacity of no more than one megawatt (1MW), and where the electricity is supplied either directly, through wheeling or to a facility on the same property, did not need a generation licence but is required to be registered with NERSA. Such systems do have to enter into a connection and use-of-the-system agreement with the local electricity distributor. A considerable boost to the SSEG sector was provided by that change.

In March 2020 another revision to ERA Schedule 2 was published (GNR. 402 in Government Gazette No. 43151 dated 26 March 2020) that clarifies the requirements for generation for own use for facilities of under 1 MW. The schedule also set out the circumstances for exempting certain categories of generation facilities and resellers from the requirement of holding a generation licence. With respect to embedded generation, the exemption from licencing applies to the operation of any generation facility provided that the facility does not have a point of connection to the power network, irrespective of capacity (MW). The practical impact of this exemption applies to limited circumstances where a power island is technically and economically feasible.

New generation capacity for municipalities for MPPG will be drawn from the allocation classified as ‘other’ in the IRP 2019 according to the DMRE. Capacity additions by technology in the IRP 2019 are shown in

Table 2.

Table 2 Capacity allocations in Integrated Resource Plan 2019

Recommended plan IRP 2019	Coal (MW)		Nuclear (MW)	Hydro (MW)	Storage (MW)	PV (MW)		Wind (MW)	CSP (MW)	Gas/ diesel (MW)	Other (MW)
Current base	**37 149**		**1 860**	**2 100**	**2 912**		**1 474**	**1 980**	**300**	**3 830**	**499**
2019	2 155	−2 373						244	300		***
2020	1 433	−557					114	300			
2021	1 433	−1 403					300	818			
2022	711	−844			513	400	1 000	1 600			
2023	750	−555					1 000	1 600			500
2024			1 860					1 600		1 000	500
2025		−1 219					1 000	1 600			500
2026		−847						1 600			500
2027	750	−475						1 600		2 000	500
2028		−1 694					1 000	1 600			500
2029		−1 050			1 575		1 000	1 600			500
2030				2 500			1 000	1 600			500
Total installed capacity by 2030 (MW)		33 364	1 860	4 600	5 000		8 288	17 742	600	6 380	
Percentage of total installed capacity (% of MW)		43	2.36	5.84	6.35		10.52	22.53	0.76	8.10	
Percentage of yearly energy contribution (% of MWh)		58.80	4.50	8.40	1.20		6.30	17.80	0.60	1.30	
	Installed capacity										
	Committed or already contracted capacity										
	Capacity decommissioned										
	New additional capacity										
	Extension of Koeberg plant life										
	Distributed generation capacity for own use										

Source: Department of Mineral Resources and Energy (2019)

*** Allocation to the intent of the short-term capacity and energy gap from 'Other' (Distributed Generation, Cogen, Biomass, Landfill)

For MPPG opportunities, the revised schedule read together with the IRP 2019 allocations for the technology category 'Other' (distributed generation, cogeneration, biomass, landfill) simplifies development projects. By introducing a predetermined embedded generation MW allocation, the Minster of Mineral Resources and Energy can include embedded generation in the Ministerial determination and thus relieve an IPP of first having to obtain a Ministerial exemption/deviation prior to applying to Nersa for a generation license.

Over the longer term if municipalities can procure utility scale power as project sponsors, a specific municipal allocation in future iterations of the IRP would be needed when from 2023 onwards the 'Other' allocation is fixed at 500MW per annum.

4.2 Regulations for new generation capacity 2020

On 5 May 2020, the Minister of Mineral Resources and Energy gazetted for public input draft amendments to the electricity regulations on new generation capacity drawn up to give effect to the President's announcement on MPPG. Principles guiding the regulations for MPPG were set out by the Minister during the Parliamentary debate on the President's SONA. The regulations will require that a municipality should meet criteria that, amongst others, include the following:

- Alignment to the IRP 2019 and all other applicable laws.
- Good financial standing.
- For the long-term sustainability, a municipality must demonstrate diversity in its customer base and the electricity revenue collection must meet its electricity operations and energy buying costs. This is critical to ensure that paying customers - especially commercial - are not burdened with high electricity tariffs as compensation for non-paying users.
- Compliance with the Municipal Finance Management Act - particularly Section 33, which outlines the procedure for a municipality that procures a service like power generation; provided the cost is below a prescribed value.
- Approval from National Treasury under the Public Finance Management Act and Treasury Regulation 16; and
- The municipality must demonstrate either the existence of the necessary technical capacity and competence; or that they have in place convincing measures to create the capacity (DMRE, 2020:6-7).

The draft amendments published as (GNR. 500 in Government Gazette no. 43277 dated 5 May 2020) are aimed at clarifying the regulatory regime applicable to municipalities for procurement or development of power generation capacity. A comparison of the proposed draft regulations and final relation amending the ERA is set out in Table 3.

Table 3 Draft and final electricity regulations for municipal procurement or generation

Draft amendment	Electricity Regulations 2011 reflecting final amendment
the substitution for the definition of "Minister" of the following definition: " "Minister" means the Minister of Mineral Resources and Energy;"	“Minister” means the Minister of Mineral Resources and Energy;"
the insertion after the definition of "seller" of the following definition: “sound financial standing" means an organ of state must be a going concern, and that the financial commitments to be incurred acquiring new generation capacity can be met by funds - (a) designated within the organ of state's existing budget; or (b) destined for the organ of state in accordance with the future budgetary projections for the institution; ".	
Regulation 3 is hereby amended by the insertion after paragraph (a) of the following paragraph: "(aim) to permit a municipality to apply to the Minister to establish new generation capacity; ".	3. Regulation 2 of the Regulations is hereby amended by the substitution for sub-regulation (1) of the following sub-regulation: "(1) These Regulations apply to the procurement of new generation capacity by organs of state active in the energy sector including - (a) new generation capacity derived from renewable energy sources and cogeneration: (b) base load, mid-merit load [and] peak load new generation capacity, and energy storage; and (c) cross border projects. but excluding new generation capacity derived from nuclear power technology."
Regulation 5 is hereby amended by the addition of the following sub-regulations: "(3) Notwithstanding sub-regulation (1), a Municipality may apply to the Minister to establish new generation capacity in accordance with the integrated resource plan, and such application must-	Regulation 5 of the Regulations is hereby amended by the addition of the following sub - regulation: "(3) A municipality as an organ of state, may apply to the Minister to procure or buy new generation capacity in accordance with the

Draft amendment	Electricity Regulations 2011 reflecting final amendment
(a) be accompanied by a detailed feasibility study as contemplated in sub -regulation (2); (b) demonstrate sound financial standing of the Municipality; and (c) be aligned to the Integrated Development Plan of that Municipality. (4) In considering an application by the Municipality in terms of sub -regulation (3), the Minister may request additional information required to make a determination in terms of regulation 6".	Integrated Resource Plan, and such municipality must- (a) conduct and submit a feasibility study as contemplated in sub-regulation (2) where it intends to deliver the new generation capacity project through an internal mechanism as contemplated in section 76(a) of the Municipal Systems Act: (b) submit proof that it has complied with the provisions of section 120 of the Municipal Finance Management Act and the Municipal Public-Private Partnership Regulations published by Government Notice No R. 309 in Government Gazette No. 27431 of 1 April 2005, where it intends to deliver the new generation capacity project through an external mechanism as contemplated in section 76 (b) of the Municipal Systems Act; and (c) submit proof that the application is aligned with its Integrated Development Plan
Regulation 9 is hereby amended by the substitution in sub -regulation (2) for the words preceding paragraph (a) of the following words: "(2) Before the buyer concludes a power purchase agreement, the buyer or the procurer must, subject to any approvals required in terms of the PFMA, Municipal Finance Management Act and Municipal Systems Act -	(2) Before the buyer concludes a power purchase agreement, the buyer or the procurer must, subject to any approvals required in terms of the PFMA, Municipal Finance Management Act and Municipal Systems Act

Source: South African Government (2020,2020a, 2020b)

Final regulations were gazetted as amendments to the ERA on 16 October 2020 after the DMRE had reviewed public comments received. Public reaction to the proposed amendments largely welcomed the developments at the same time as flagging issues posed by putting MPPG into effect. The Western Cape Provincial Government

welcomed the intent of the regulations but expressed reservations over the lack of clarity provided in the rules on how provision will be made for municipalities to procure electricity and expressed a concern that the route municipalities needed to follow in applying to the Minister may create further delays and erode the independence of Nersa (Cremer, 2020b).

The City of Cape Town has welcomed the acknowledgement contained in the draft regulations that municipalities have a role to play in new generation development. The city has however stated that it does not expect MPPG to alleviate power constraints in the short term and it may take up to five years for any large-scale municipal IPP procurement programme to materialise. This is not only because of the prevailing uncertainty but also because of the intensive preparations that are required for implementing such a scheme. The city has called for a national programme, loosely modelled on the REIPPPP, to be developed to derisk MPPG, along the following lines.

- Cape Town and other municipalities should engage with both Nersa and the DMRE on the creation of a sustained, credible, planned and coordinated framework for a municipal renewable-energy procurement programme – one that takes account of both national supply and demand dynamics and specific municipal requirements. The goal being to establish policy and regulatory certainty that all municipalities and IPP investors desire.
- Municipal procurement process should be run centrally under the aegis of the National Treasury or the IPP Office. Any procurement should be based on a specific allocation for municipalities in a regularly updated IRP. Standardised contracts and processes could be created, which would be helpful to municipalities and investors alike as procurement of energy by municipalities from IPPs would still require the normal licences and permits; and
- The Minister of Finance could provide blanket Section 33 MFMA approvals for those local authorities that are able to meet clearly outlined criteria (Cremer, 2020a).

In a related legal matter, litigation on a long-standing dispute between the City of Cape Town, the Minister of Minerals and Energy and Nersa over the applicability and/or constitutionality of section 34 of the ERA was heard in the Gauteng Hight Court on 11 June 2020. Judgement was given on 11 August 2020 in which the application was

dismissed on the grounds that the applicant had not exhausted all avenues available to resolve the dispute through the inter-governmental mechanisms available.

Other commentary on electricity regulation with a strong bearing on MPPG has come from the South African Photovoltaic Industry Association (SAPVIA) confronting regulatory constraints to the embedded generation market. SAPVIA highlighted three issues:

- The lack of an explicit allocation in the IRP for distributed generation projects for the coming four years. Without a clear allocation, SAPVIA believes that Nersa does not have a clear mandate to grant licences to entities wanting to generate electricity outside of the proposed State procurement process.
- The prevailing 1 MW threshold in Schedule 2 of the Electricity Regulation Act (ERA) for licensing exemption, making the development of projects up to 10 MW impractical for small and medium-sized businesses; and
- The fact that projects with a generating capacity of just over 1 MW must adhere to the same onerous application system as large-scale projects. Both require a public participation process and hearings on a per project basis.

Regulations governing MPPG are not yet finalised, as such they remain an important unfinished component of the conditions for MPPG to develop. Regardless of the final form of the regulations, government is committed to act in order to unlock investments. The DMRE has indicated to the DBSA that it will solve problems brought to its attention as it is ready to help clear obstacles for embedded generation projects to proceed.

5. Method

In order to investigate key issues pertaining to MPPG, data was collected from municipalities with apparent potential to take up the opportunity and a sample of two categories of municipalities was created. Category 1 was drawn from high capacity municipalities. Category 2 was drawn from medium capacity, namely A and B1 municipalities located relatively close to sites of high potential for renewable energy or transmission networks. Four municipalities were subjectively selected for each category. Municipalities to assign to either category were selected for apparent potential defined by three factors. First, municipalities that have recorded the intention

to reduce their dependence on Eskom. The City of Johannesburg and the City of Cape Town were selected on this basis. Second, selecting municipalities that ranked in the first and second decile of the Municipal IQ's Municipal Productivity Index[1] to assign to category 1 and 2 respectively. Third, filtering for amenity for renewable energy and/or access to the national transmission grid.

Table 4 Municipalities selected for assessing views on MPPG

Research Category	Municipality	Municipal classification	MIQ Municipal Productivity Index
1	City of Johannesburg (City Power Johannesburg (SOC) Ltd)	A	1
	City of Cape Town	A	6
	Buffalo City	A	4
	eThekwini Metropolitan Municipality	A	8
2	Nelson Mandela Bay Metropolitan Municipality	A	14
	Bitou	B1	9
	Stellenbosch	B1	13
	Merafong City	B1	12

Information on plans by municipalities for MPPG together with views on material issues that will shape the development of this market as well as obstacles to its development were gathered through teleconference interviews with municipal officials, government departments, renewable energy industry associations and financiers. Published information on energy planning and the electricity industry was supplemented by the primary data gathering.

Information was sought on the following questions:

1. Regulatory issues for MPPG
2. Municipal procurement issues for MPPG
3. Market interest: are developers giving early indications of interest in this market
4. Financing: future projects will not follow the REIPPPP approach underpinned with gurantees. Is this a major obstacle to MPPG projects?

[1] Municipal productivity is measured by Municipal IQ using a combination of five factors measuring developmental and economic status of a municipality, as well as the performance and delivery trends of a municipal administration.

5. Would the city be aiming to get support from climate finance facilities for these developments?
6. Are there any indications of the broad terms of Power Purchase Agreements likely to be sought by developers?
7. By introducing a new supply source would the municipal network require material additional capex to receive power from an IPP?
8. What role should the DBSA play to support cities regarding municipal procurement from IPPs or own generation?

6. Results

This section analyses the results obtained from surveying a sample of municipalities to assess their readiness for MPPG. Only four municipalities were responsive in terms of data submission and the results are summarised in

Table 4.

Table 4 Summary of municipal preparedness for MPPG

Municipality	Regulat-ions	Procure-ment	Market interest	Guarantees	Climate finance	PPA terms	Capex	DBSA role
Johannesburg	More onerous	Capacity challenge	High	Not obstacle	Yes	TBC	No	NB support
Cape Town	More onerous	Needs regulatory clarity	High at multi - scale	Mixed views from developers	High priority	Based on REIPPPP	No	NB support
Buffalo City	Await finality	Capacity challenge	Medium	Mixed views from developers	Yes	TBC	In plans	NB support
eThekwini	Urge rapid finality	Needs internal capacity building	High	Not an obstacle	Yes	TBC	No	NB support

Evaluating responses from municipalities obtained from the survey reveals the following main trends:

- Each of the high capacity municipalities (category 1) regarded MPPG as an important strategic issue for the city irrespective of whether power projects were under consideration. Medium capacity municipalities (category 2) in contrast had not yet taken a position on the MPPG opportunity.
- Accepting that the regulations were still under development, concerns were raised that the draft regulations-imposed conditions on municipalities that previously had not applied.

- A high degree of commonality was observed regarding in principle interest in using climate financing for future projects, that grid strengthening would not be an obstacle, at least in the early stages of MPPG, and that the DBSA should actively engage in developing the MPPG market;
- Terms for PPA were considered premature to consider at this stage.
- Reponses on developing the MPPG market without guarantees were divided between those who held that it would not be an obstacle and those that agreed that the absence of guarantees would not block the market, rather they would be priced in.
- Interest from prospective developers had quickened after the announcement on MPPG by the President; and
- Responses on procurement matters converged that it was a major hurdle for the development of MPPG given the regulatory uncertainty and the lack of specialist skills in municipalities.

Responses captured in Table 4 indicate that among the category 1 municipalities surveyed a considerable amount of preparatory work is required before any among them can move ahead as MPPG project sponsors. That confirms that the MPPG market will be confined to a small pool of well governed municipalities with capacity.

6.1 Key observations on MPPG by municipalities

Pertinent observations from respondents addressing the themes surveyed are set out below.

6.1.1 City of Johannesburg Metropolitan Municipality (“City Power”)

City Power believes that the wheeling of power provides a great opportunity for the expansion of renewable energy projects in the city region. This presents a revenue generation opportunity through moving energy across the municipal grid. City Power will in future consider making use of the available roof space on warehouses in the city to install solar PV panels for power generation. Energy storage will be key in the municipal energy transition. Municipalities can gain through arbitrage charging storage

at low prices and discharging at higher prices. City Power would hope the regulations provide a simplified procurement approach. This approach could allow for aggregation of small energy projects (Vermeulen, 2020).

6.1.2 City of Cape Town Metropolitan Municipality

The City of Cape Town is concerned that there is not a nationally coordinated, transparent, and sustainable procurement process in place for buying power from IPPs. Municipalities are working in a vacuum as there are no clear rules/regulations for procuring from IPPs. Having a transparent and competitive process will help eliminate risks for municipalities. The expectation would be that National Treasury or the IPP Office could offer this coordination support to municipalities. This nationally coordinated plan should include an understanding of Eskom's grid balancing requirements and Eskom's management of grid tariffs going forward. The city would consider buying power from large scale IPPs and have this wheeled through the Eskom grid. Given that the projects would probably be located outside of municipal boundaries, the city may seek adjustments to the socioeconomic development criteria used when evaluating bids and will probably favour value flowing to customers rather than specific community projects associated with the power plants. Cape Town plans to go out to tender for small-scale renewable energy procurement (1 – 10MW) for own use in mid-2020 (Urban Energy Network, 2020).

6.1.3 Buffalo City Metropolitan Municipality

The city is getting a lot of interest from developers and IPPs for RE with battery storage which matches load needs. The municipality currently has a PPA with a 50MW solar farm (Langa Energy), which was an unsolicited bid agreed to by the city's top management without any involvement of the Electricity Department. The Electricity Department is however expected to procure power from the solar PV plant. No detailed financial modelling was done to come up to the PPA tariff. It is critical that proper tariff studies are done so rates are properly justified, fair and competitive (Ferrier, 2020).

6.1.4 eThekwini Metropolitan Municipality

The metro has targets that have been developed by the Energy Office. An RE roadmap document has been developed and an energy integrated resource plan 2030 is being developed and ties into a larger vision for KZN and links the metro to energy developments in Richards Bay. The metro is receiving a lot of interest from IPPs and developers. In the debate around municipalities procuring from IPPs, the fact that municipal procurement decisions are made by politicians and many other municipal departments, especially Supply Chain Management (SCM) and not the Electricity Departments must be noted. It is critical that the technical capacity of the SCM official is raised so procurement can be done successfully (Ntshalintshali, 2020).

6.1.5 Bitou Local Municipality

Bitou local municipality has not considered the implications of MPPG to date (Groenewald, 2020).

6.1.6 Stellenbosch Local Municipality

Stellenbosch has not adopted a formal position on MPPG yet, however the motivation would shift strongly if load shedding returned as a major supply threat. The municipality has a well-established programme for SSEG. It has done one project involving wheeling that required revising municipal by-laws. For a large-scale project Stellenbosch would follow the lead of Cape Town if they go ahead with big solar or wind farms (De Lange, 2020).

6.1.7 Merafong City Local Municipality

A solar PV project was developed for Merafong City by the Gauteng Infrastructure Financing Agency (GIFA) as part of their strategy for a provincial RE hub. A feasibility study was completed by GIFA in collaboration with Merafong City. The project failed when it emerged that Merafong City was not collecting electricity revenue properly,

had a large consumer and Eskom debt and could not realistically buy from a developer. Alternative off takers within the municipality could not be found (Ojageer, 2020).

6.2 Renewable energy industry views on MPPG

Scale and resource characteristics of wind compared to photovoltaic generation technologies strongly shape the general views of these respective industries towards MPPG. Wind power developers represented through the South African Wind Energy Association (SAWEA) observe that fixed costs of the technology favour scale thus the potential MPPG market is not yet at a stage to attract interest until it develops to utility scale procurement.

In general, the smallest viable project size is no less than 10MW, preferably 50MW or pooling of multiple sites to lower fixed costs, thus the pool of municipalities that could realistically consider wind projects was limited to three or four of the largest metros. It was felt that PPAs would be a high risk for municipalities as they lack the expertise to execute them, rather public private partnerships (PPP) should be initiated on an expedited route. At the stage that projects pass the National Treasury review and recommendation gate, they should be transferred to the IPPO to act on behalf of the municipality (Ntuli, Brindley, Moodley, Tranton and Minkoff, 2020).

Photovoltaic developers represented by the SAPVIA can operate over a wide range from small-scale to utility-scale. This inherent flexibility means there are many more applications for embedded generation within municipal power networks. Despite this flexibility, the draft regulations for MPPG were judged to apply to only five or six metropolitan municipalities that have the capacity to implement IPP deals. The rapid growth of embedded generation, increasingly coupled with storage is significantly disrupting municipal electricity businesses, making it imperative that municipalities adjust to benefit from these changes. Options for municipalities other than procuring supply from IPPs as contemplated in the regulations include supplying their own consumption needs, for example using municipal building rooftops and enabling

wheeling on their networks so energy markets develop and allow embedded generators and off-takers to meet capacity needs (Doyle, 2020).

6.3 Financing for MPPG

Wind and PV industry association members canvassed noted that finance is not a constraint, moreover that lenders could be confident that equity sponsors would be forthcoming for good projects (Doyle, 2020).

For PV developers land is of high value in project financing. As owners of public land, municipalities can consider land contributions for power projects provided that public interest is served in a transparent manner.

Fixed investment activity has been disrupted by the COVID-19 pandemic and there is much uncertainty about the pace and shape of South Africa's economic recovery. Noting that it will be some time before any municipality is able to proceed with medium or large-scale power procurement, consideration of financing potential projects can only be dealt with in broad terms. Domestic capital markets are considered well able to supply debt and equity financing for power projects. Constraints are observed for the funding of small projects where specific conditions introduce complexity and hence higher risk.

In the municipal space when future MPPG projects move to funding it is expected that financing will be easier because projects will tend towards utility scale and can carry the complex due diligence required (Ntuli, 2020).

6.4 Approaches for grant dependent municipalities

Procuring power from IPPs or generating power for sale by municipalities envisaged by MPPG will most likely only apply to the large metropolitan municipalities. Financial and technical ESI issues examined in this paper apply to all municipal electricity distributors regardless of capacity to meet the criteria set out in the regulations for

MPPG. For this large group of municipalities, albeit with widely different economic conditions, there are several options to adapt to changes in the ESI and improve the service to consumers within their jurisdiction, which options include:

- assisting municipalities to supply their own consumption needs, for example using municipal building rooftops for PV sites.
- assisting municipalities to facilitate the growth of the SSEG within their jurisdiction through enabling bylaws and tariff structures for wheeling that do not harm their distribution businesses;
- assisting municipalities to contract PPAs with IPPs in order to lower the cost of bulk purchases from Eskom; and
- assisting municipalities to facilitate power trading through wheeling terms that preserve income from power distribution while enabling embedded generators and off-takers to contract.

SALGA working with the South African-German Energy Programme (SAGEN) led by GIZ amongst other organisations, is engaged in aspects of the above options. The DBSA could complement these activities either through project preparation and/or financing.

7. Themes for development of a MPPG market

Seven themes emerged from the municipalities and associations surveyed as important issues for creating conditions for an MPPG market to develop. Giving attention to these themes should draw upon existing experience. It is suggested that effort expended in the themes would not be wasted because it should help municipalities adapt to changes underway in the ESI.

7.1 Tariff reform

Costs paid by electricity consumers are a combination of different elements including generation energy, generation capacity, generation ancillary services, transmission, distribution and retail costs. At present all licenced distributors have their own tariff,

imposing a high regulatory burden on Nersa but more importantly obscuring electricity pricing across the country. It is highly desirable for South Africa to migrate to standardised tariffs for key customer categories that accurately reflect the two key cost elements, namely the energy cost and the network cost.

The National Treasury, through the City Support Programme (CSP) has commenced with a programme of work involving conducting cost of supply studies as a prerequisite for reviewing electricity pricing in two metros. The objective of this work is to lay the basis for future standardized tariffs. SALGA working with the Department of Cooperative Government and Traditional Affairs (CoGTA) is engaged with cost of supply studies for smaller municipalities. Cost reflective tariffs are essential for sustainable municipal electrical business. Prices must be right for both municipalities and evolving embedded generators to be viable.

For MPPG opportunities tariff reform highlights the critical importance of technical feasibility studies that must consider not only projections for Eskom tariffs but a wide range of options. DBSA has the capacity to fund project technical feasibility studies that need to include tariff reviews using project preparation facilities. The CSIR (2020) noted that proposed projects require assessment, sound business cases as well as how these tariffs and cost recovery will change. Local options on generation, storage, demand response, etc. are important.

7.2 Procurement

Solving the procurement process is held to be the most critical challenge for MPPG. That the MFMA is designed for standard purchasing and not suited to handle long-term contracts was a consensus view. Some interviewees felt that there needed to be some form of special dispensation to be able to contract over the longer term for power deals. Exemptions to financial regulations are not politically feasible given the poor financial conduct of municipalities highlighted by the Auditor General. A far more viable approach is to build upon the problem-solving commitments expressed by the National Treasury and the DMRE to work with municipalities to simplify processes for power deals.

National Treasury, via the CSP, has initiated a project to do precisely that. The project involves analysing every stage in the procurement chain starting with an application by a municipality to the DMRE through to obtaining a license from NERSA. The scope of work includes a gap analysis to anticipate and clear bottlenecks to streamline the process as well as considering alternative mechanisms for government guarantees. When completed the results of this work are intended to be issued as an MFMA circular for MPPG. Public procurement reform though a draft bill is underway, and this should improve technically complex and long-term acquisitions for infrastructure and network services like power.

7.3 Standardised contracting documents

Building on precedents set with the REIPPPP, the creation of standard documents for MPPG was held to be necessary for the benefit of municipalities and developers alike. Work has commenced, coordinated by the CSP, to prepare standardised documentation in collaboration with SALGA and the Association of Municipal Electrical Undertakings (AMEU).

7.4 Pooling expertise accumulated by the IPPO

Many interviewees felt that it made sense to run MPPG projects through the IPPO. For utility-scale PV and wind projects this was taken as a given. Proponents of this view observed that the IPPO has the expertise and that it gives national government comfort through visibility over the process. However, the IPPO is already occupied with the DMRE REIPPPP and will soon be fully occupied with REIPPPP Bid Window 5 as well as other IPP procurement processes expected as part of implementing the IRP 2019. Furthermore, as MPPG is likely to span a range of project sizes below utility scale, it is arguably more fruitful to consider how the model of pooling expertise and lowering transaction costs can be adapted for the specifics of the municipal sector.

7.5 Climate finance

For the small-scale projects that are expected to be developed as the MPPG market develops, access to climate finance is seen as an important facilitating factor. Renewable energy developers observed that climate finance is becoming more and more vital to power projects. Here the DBSA can offer new products, tenor extension and risk mitigation alongside private lenders.

Few of the interviewees were aware of the Embedded Generation Investment Programme (EGIP) located at the DBSA. Wider marketing of the EGIP is needed. The positive responses evoked on hearing about the scope of the EGIP indicates that it will be well received.

7.6 Learning

Shocks from COVID-19 are revealing critical gaps between the goal of resilience in systems and their actual performance. Creative responses to these challenges are required to build more flexibility into approaches and to shift into smaller projects that are more resilient and responsive to changing needs. Municipal officials interviewed saw considerable potential for projects in the 1-10 MW range that could develop internal capacity and test approaches. Experience and learning could also be shared among municipalities.

7.7 Non generation options

The research revealed that storage is rapidly emerging as a new theme for municipal electricity departments to consider in advancing battery technologies. Up to now only where fortuitous geography made pumped storage possible has this been an option. Buffalo City and eThekwini saw benefits of placing storage at points in their network that would improve their load profile. These preliminary observations suggest that storage and not only new capacity be included in a broader view of improving security of supply in large cities.

8. Role of the DBSA

The DBSA is well positioned and capable of playing a major role to support municipalities improve security of supply, cushion tariff increases, decarbonise their power sources and facilitate embedded generators to fill supply gaps. This examination of the potential MPPG market has found strong grounds for DBSA to be active in supporting both categories of municipalities investigated

8.1 Public-public partnerships

For the large metropolitan municipalities that are candidates for MPPG focusing on creating new generation capacity, considerable preparatory work is required for such municipalities to ready themselves to procure power. The DBSA is well positioned to provide project preparation services followed by project financing over the next few years to prepare utility scale projects. This is strongly aligned to the work being led by the CSP at the National Treasury with which there are ongoing discussions with the Project Preparation division on the EGIP and options for credit enhancing municipal projects. This collaboration should be strengthened to directly contribute to the CSP work and to share in learnings that are generated under regulatory, technical and financial activities.

8.2 Build an MPPG product and service offering

The DBSA should build an MPPG product and service offering to municipalities and IPPs anchored on DBSA climate financing strengths. EGIP should serve as the anchor supported by vigorous marketing to build awareness of the programme. Services should include project preparation, tenor extension and risk mitigation alongside private lenders and non-generation options for sustainable power supply.

8.3 Support municipalities make their energy business more resilient

The DBSA has a role to support smaller scale projects involving generation for municipal consumption, structuring PPAs and assisting municipalities to restructure

their electricity business models to facilitate embedded generation. The challenge for the Bank in such an advisory rather than lending activity should be conducted in a financially sustainable manner.

8.4 Exercise leadership in the Just Transition

The DBSA is uniquely positioned to leverage its position as a government owned development partner to advise municipalities and protect public interests. This is a well-established role the Bank plays as part of its mandate. The Bank could help by providing impartial or objective advisory expertise to municipalities who are dealing with unfamiliar renewable energy projects and business models.

9. Conclusion

Each of the themes identified as important for the development of an MPPG market lie within the mandate of the DBSA to finance sustainable energy infrastructure and support municipalities. It is expected that it will take a few years of preparation to develop utility scale projects. DBSA has a major role to play, in collaboration with partners, to create the conditions to bring MPPG opportunities to fruition. At the same time the Bank has a significant role to play in assisting municipalities not yet capable of starting MPPG projects to improve the resilience of their electricity business and facilitate embedded generation by their customers.

10. References

Auditor-General of South Africa, 2020. Media release municipal audit results for 2019/19 under the theme - “not much to go around, yet not the right hands at the till” Pretoria, 1 July.

Cremer, T. 2019. Jobs spin-offs in focus as South Africa’s rooftop solar installed base grows beyond 400 MW, Engineering News, 25 June.

Cremer, T. 2020a. Cape Town proposes national renewables procurement scheme for municipalities as it pushes ahead with IPP legal case, Engineering News, 26 May.

Cremer, T. 2020b. Western Cape says draft rules on municipal power unclear on procurement provisions, Engineering News, 8 June.

CSIR, 2020. CSIR Energy Center comments on draft MPPG paper, 3 November 2020.

De Lange, L. Operations and Maintenance interview, Engineering Services, Stellenbosch Municipality, 26 June.

DMRE, 2019. Integrated Resource Plan 2019. Government Gazette 42784, 18 October.

DMRE, 2020. Remarks by the Minister of Mineral Resources and Energy, Mr Gwede Mantashe (MP) Debate of the State of the Nation Address (SONA) 2020, Pretoria, 19 February.

Doyle, R. 2020. Treasurer interview, SAPIA, 25 June 2020)

DPE, 2019. Roadmap for Eskom in a reformed Electricity Supply, Department of Public Enterprises, Pretoria.

Eberhard, A. 2004. Working Paper WP-06 Programme on Energy and Sustainable Development, Stanford University, April.

eThekwini, 2019. Durban Strategic Roadmap Report for Renewable Energy 2019-2030, eThekwini Metropolitan Municipality, Durban.

Ferrier, R. 2020. Electricity and Energy Services interview, Buffalo City, 30 June.

Groenewald, G. 2020. Corporate Services interview, Bitou Municipality, 25 June.

GSA, 2020. The South African Economic Reconstruction and Recovery Plan, Presidency, Government of South Africa, Pretoria, October.

IEA, 2020. Sustainable Recovery - World Energy Outlook Special Report, International Energy Association, June.

IMF, 2020. World Economic Outlook: A Long and Difficult Ascent International Monetary Fund, October.

Municipal IQ, 2020. Municipal Productivity Index™ online database https://www.municipaliq.co.za/index.php?site_page=showindex.php&IndexCode=MPI, Accessed 8 May.

National Treasury, 2019. Budget Review 2019, National Treasury, Republic of South Africa, Pretoria 20 February.

Ntshalintshali, S. and Sewchurran, S. 2020. RE Unit interview, Electricity Department, eThekwini Metro, 30 June.

Ntuli, N., Brindley, B., Moodley, D., Tranton, M. and Minkoff, K. 2020. SAWEA interview, 2 July.

Ojageer, K. 2020. Project Development interview, Gauteng Infrastructure Financing Agency, 12 June.

Ramaphosa, C. 2020. State of the Nation Address by President Cyril Ramaphosa, National Assembly, Parliament, Cape Town, 13 February.

SALGA, 2018a. Renewable Energy Scenarios for Municipalities in South Africa. Pretoria, January.

SALGA, 2018b. Energy Summit Declaration, Johannesburg, 7-9 March.

SARB, 2019. South Africa Reserve Bank Quarterly Bulletin, No 293, Pretoria, September

SARB, 2020. South Africa Reserve Bank Quarterly Bulletin, No 295, Pretoria, March.

South African Government, 2020. Government Gazette No. 43277, 16 October.

South African Government, 2020a. Government Gazette No. 34262, 16 October.

South African Government, 2020b. Government Gazette No. 43810, 16 October.

Stats SA, 2019. Quarterly financial statistics of municipalities, P9110, Pretoria.

Stats SA, 2020. Electricity generated and available for distribution May 2020, P4141, Pretoria.

Urban Energy Network, 2020. Municipal IPP Procurement Targeted Consultation Discussion (Virtual meeting), 20 April. Urban Energy Network comprises SALGA, National Treasury's Cities Support Programme in partnership with Sustainable Energy Africa (SEA), South African Cities Network (SACN) and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)

Vermeulen, P. 2020. DSM and SSM interview, City Power, 2 July

Wright, J. and Calitz, J. 2020. Setting up for the 2020s Addressing South Africa's electricity crisis and getting ready for the next decade. CSIR Energy Centre Pretoria. January.

Wright, J. 2019. Tips for households to mitigate loadshedding and save on electricity costs CSIR Energy Centre, Pretoria. 28 March.