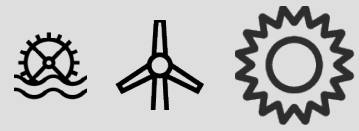


# The cities' role in managing the energy supply challenges



**pwc**



# The need for a concerted effort

South Africa is experiencing an energy shortage that is having a profound impact on its cities. It is affecting economic growth and jobs at a time when the country's cities urgently need to recover from the COVID-19 crisis to retain their competitiveness and attractiveness. By September of 2022, loadshedding had reached over 90 days.<sup>1</sup>

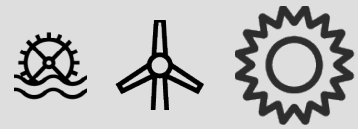
Resolving the energy shortfall requires a collective effort across private and public sectors, including, and especially, by cities, who play a key role in the development of sustainable energy strategies. Municipalities can play a key role in resolving the energy supply gap and thereby contribute to local economic development and job creation. Municipal efforts to close the energy supply gap and bring down energy prices can also set the course for sustainable municipal revenue sources to finance municipal spending.

In this article we outline what can be done in the municipal sphere to help fix the energy shortfall. We also discuss the potential benefit (and risk of non-action) for sustainable municipal finances that are associated with the solutions.



<sup>1</sup>ESKOM August 2022 "Presentation to the Joint Portfolio Committee on Public Enterprises & Mineral Resources and Energy" <https://www.eskom.co.za/wp-content/uploads/2022/08/PortfolioCommSystemStatus29Aug2022.pdf>





# The higher cost, lower supply cycle in South African cities

South African municipalities have a constitutional mandate to distribute electricity. They predominantly purchase electricity directly from the state-owned energy utility Eskom and distribute and sell this on to local consumers or reimburse Eskom for direct distribution. The electricity service fee that municipalities charge for the on-sell of Eskom's electricity is a major source of municipal revenue accounting for around a quarter of municipal revenue.

The on-sell of electricity has traditionally left municipalities with a surplus which they have come to rely upon to cross-subsidise other debt and expenditure items.<sup>2</sup> More recently, however, that surplus has been diminishing or turning into a deficit, owing to a range of issues that include the following:

- **Years of underinvestment in repairs and maintenance in municipalities' distribution infrastructure.** This is now making breakdowns more frequent and repairs more expensive for municipalities. Technical losses are rapidly going up not only due to backlogs of maintenance and investment but also from the pressure that load shedding is putting on power systems such as transformers and switchgear. In the City of Johannesburg, for example, the MMC for environment and infrastructure services announced that City Power was faced with a backlog of R26bn in infrastructure repairs and restoration.<sup>3</sup>
- **Losses from cable theft, vandalism of substations, illegal connections and other forms of evasion.** These have been on the rise as electricity has become a scarce commodity, including through organised criminal groups. The City of Johannesburg, for instance, estimates that illegal connections and other non-technical losses have amounted to R2bn per year, which could be reinvested into the system to make up for shortages while also reducing costs and lost revenue.<sup>4</sup> City Power reported that it spent R190m replacing stolen cables in the past five years.<sup>5</sup>
- **Increasing number of indigent households.** Municipalities are mandated to provide low-income households with free basic energy or reduced tariffs. Each municipality uses different criteria to classify a household as 'indigent' or unable to meet basic services needs. However, generally, an indigent household earns a combined income of R3200 or less. In 2019, approximately 3.6 million were classified as indigent and received free basic services. This number was expected to increase as unemployment has also risen. As households fall out of the paying category and into the category of those receiving free basic services, municipal revenue is further diminished.
- **Rising cost of electricity provided by Eskom.** Municipalities are highly reliant on Eskom, which has held a monopoly over the generation and transmission of electricity, generating 95% of electricity consumed in South Africa. From 2007 to 2021, electricity tariffs increased by 753%. Inflation over this period was 134%, meaning that electricity tariffs increased more than five-fold in real terms. While municipalities are largely able to pass off higher prices to end-users, they are themselves large consumers of electricity and thus affected by the price increase.

The above culminates in a cycle whereby the rising cost of electricity leads to rising prices for consumers, which in turn leads to increased evasion or inability to pay service charges. The latter then further increases costs and reduces revenue for municipalities, increasing the negative impact on municipal finances (see image).

<sup>2</sup> Elsasser, Hickman, and Stehle, 2018, "The Role of Cities in South Africa's Energy Gridlock", Case Studies in the Environment (2018) 2 (1): 1–7.

<sup>3</sup> Ngcuka, Onke, 2022, "Joburg council has a plan to fix power infrastructure and find new energy sources: 'There are options out there'", Daily Maverick, 3 July, <https://www.dailymaverick.co.za/article/2022-07-03-joburg-council-pumps-money-into-fixing-power-infrastructure-and-finding-ipp/>

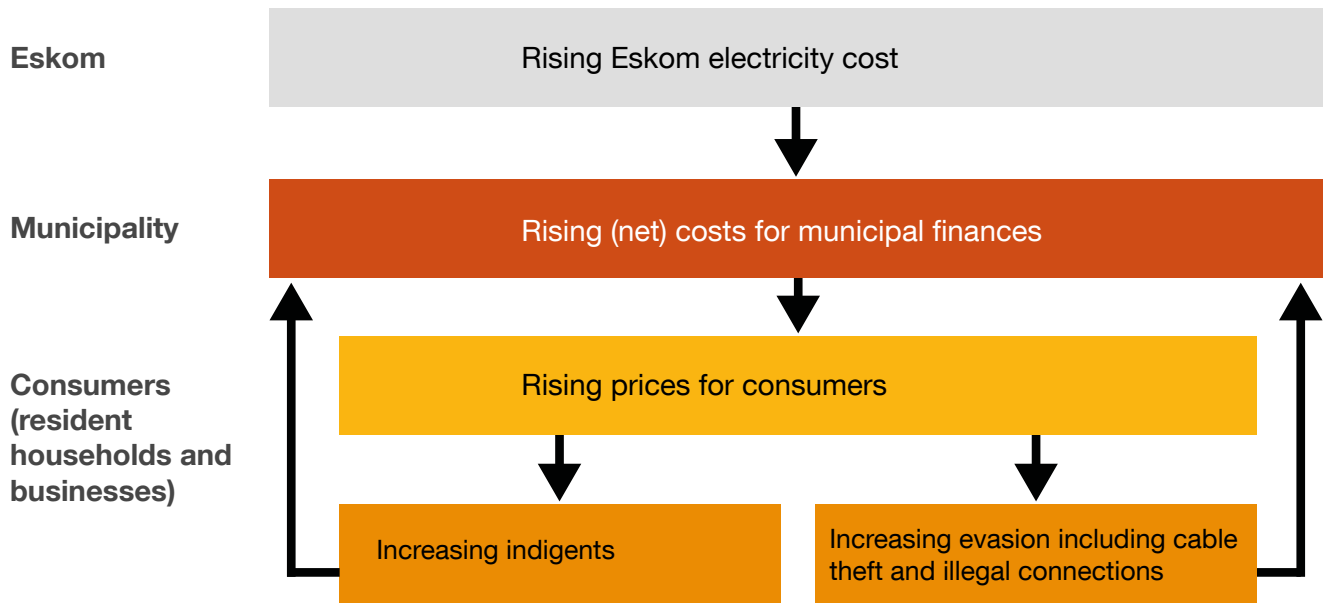
<sup>4</sup> Seleka, Ntwaagae, "City Power loses about R2bn due to illegal connections and non-technical issues" 13 Aug 2020 <https://www.news24.com/news24/southafrica/news/city-power-loses-about-r2bn-due-to-illegal-connections-and-non-technical-issues-20200813>

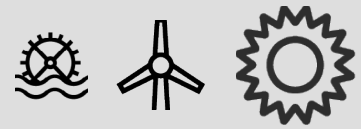
<sup>5</sup> Duma, Nkosikhona, 2022 "Nearly R200m spent replacing stolen cables in last 5 years, City Power reveals", EwN, 23 May, <https://ewn.co.za/2022/05/23/nearly-r200m-spent-replacing-stolen-cables-in-last-5-years-city-power-reveals>

<sup>6</sup> Elsasser, Hickman, and Stehle, 2018, "The Role of Cities in South Africa's Energy Gridlock", Case Studies in the Environment (2018) 2 (1): 1–7.

<sup>7</sup> Power Optimal, Tag: Eskom, <https://poweroptimal.com/tag/eskom/>

### Relationship between the cost of electricity and municipal finances





# What cities can do to help mitigate the energy shortfall



What can cities do to help resolve the energy crisis and turn this cycle into a virtuous one?

Cities' energy strategies will play a key role in achieving sustainability and energy stability in the long run. The ideal scenario would be for municipalities to purchase electricity from different suppliers in a competitive market at competitive prices, allowing resale at a surplus and transmission to households

and businesses at lower cost to consumers. Efforts are underway to achieve this through the unbundling of Eskom and opening up of the energy market to competition from the private sector.

However, in the interim, while these efforts are underway, cities must also take immediate measures in the short-run both to bridge the energy supply gap and to secure their role as suppliers of energy with its corresponding revenue base. Here are some options:



**Municipalities can generate electricity themselves on a large scale.** Generating electricity for distribution is very expensive at a time when municipalities are struggling with capital expenditure. They may also be unable to match private sector producers in terms of the cost-effectiveness of generating electricity.



**Municipalities can generate power themselves on a smaller scale** via microgrids, small-scale embedded generation (SSEG), and other sources such as biogas from wastewater treatment works, waste to energy through dry fermentation, landfill gas and SSEG, including for the municipalities' own usage. This helps them keep their own institutions functioning during load shedding and prevent the interruption of public services as a result.



**On a smaller scale, municipalities can support the installation of microgrids and SSEG.** This would allow for increased energy security, especially during downtime on the national grid. For example, PwC conducted an analysis of the potential electricity that can be generated if commercial and industrial properties were to install rooftop solar PV systems. The firm examined the potential roof space in the Midrand area from industrial and commercial properties with a total of approximately 638,000m<sup>2</sup> and the potential to produce solar power at 2,000 kWh / m<sup>2</sup> per year for 2,500 hours per year. Based on this assessment, the rooftop solar potential in the Midrand area would produce approximately 500 kWh of electricity for 2,500 sunlight hours per year, which could be fed into the grid at local substations and alleviate load-shedding in that local jurisdiction.





**Support and purchase electricity from independent power producers (IPPs).** In September of 2021, the government loosened restrictions on IPPs. IPPs were previously limited to production of 1MW and then 10MW before requiring approval from the department of energy and a licence from the National Energy Regulator South Africa (NERSA),<sup>8</sup> which generally took between 120 days and 2 years to obtain.<sup>9</sup> This minimum threshold was raised to 100MW in September of 2021 and it was recently announced that this limit will now be removed entirely to allow for large scale power projects. This is expected to make energy generation by IPPs more financially viable and open up the market.

President Ramaphosa stated in his 2022 SONA that approximately 1,400 MW was currently in the process of being secured by various municipalities. Cape Town is tendering to provide 3,00MW of renewable energy through IPPs.<sup>10</sup> The City of Johannesburg Metropolitan Municipality aims to procure about 500MW from IPPs and opened its first round of tender procurement for IPPs earlier in 2022.<sup>11</sup> Such programmes need to be scaled up at least six-fold to meet local load demand and more cities must urgently follow suit.

Agreements should be linked to investments in battery storage to ensure efficiency and consistency of supply. Where IPPs are drawn on non-renewable energy sources, this can help to close the energy gap in the short term. However, investment in 'grey energy' and away from 'green energy' may create problems for the cities' growth and competitiveness in the medium to long-term given the increasing attention paid to national and international net zero targets. By contrast, a focus on renewable energy holds positive prospects for commercial opportunities and competitiveness in the marketplace of the future. It also brings opportunities for city promotion, attracting green investment, green travellers, and meeting international commitments of organisations like those made by the C40 Cities Climate Leadership Group which Cape Town, Durban and Johannesburg are members of.



**Enable wheeling of energy generation (both the infrastructure and the policy framework).** Municipalities can provide the infrastructure for wheeling energy of private consumers into the municipal grid, including from medium producers (between SSEG and utility scale producers). Municipalities have the opportunity to be involved in the wheeling of electricity and this can become a future revenue source to pay for municipal services. This requires municipalities to invest in and set up the infrastructure to enable wheeling (allowing electricity to come into the municipal grid (currently from Eskom) as well as to set up the systems and policies for this to function (including tariff setting, applications, etc.).



**Minimise leakage and non-technical losses.** Municipalities need to continue to ramp up security measures and draw on community involvement to help protect local energy infrastructure. They also need to prioritise spending on repairs and maintenance and should be measured and held accountable on this.

<sup>8</sup> Republic of South Africa, 2005. National Energy Regulator Act 2004. Pretoria: Government of South Africa.

<sup>9</sup> Generation Licensing and Registration Frequently asked questions <https://www.nersa.org.za/wp-content/uploads/2021/03/Generation-Licensing-and-registration-frequently-asked-questions.pdf>

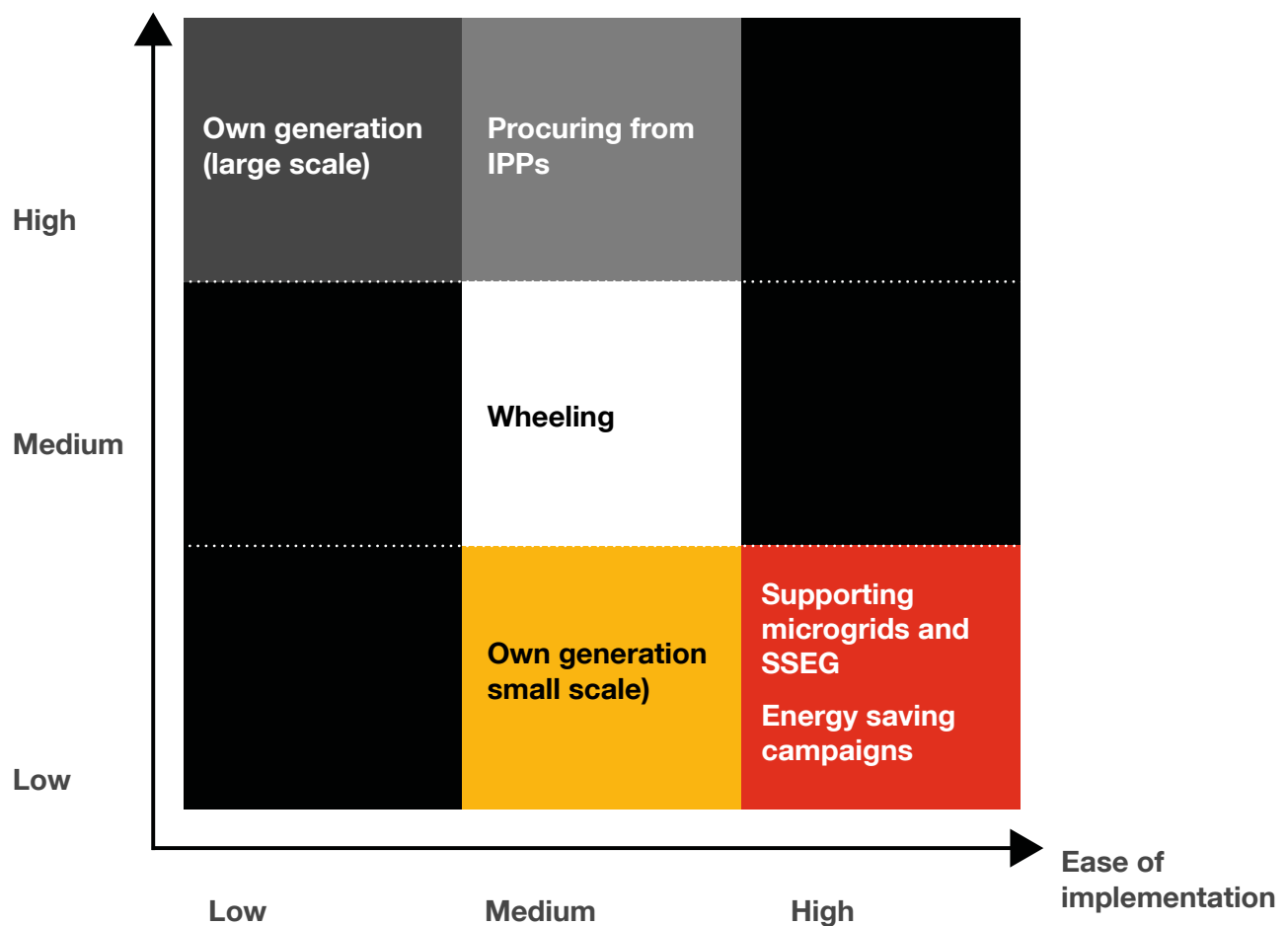
<sup>10</sup> City of Cape Town to Procure 300 MW of Renewable Energy From IPPs <https://www.whitecase.com/publications/alert/city-cape-town-procure-300mw-renewable-energy-ipp>

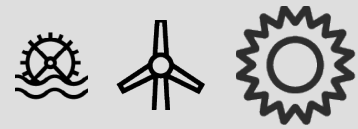
<sup>11</sup> Joburg aims to partner with IPPs on R26bn electricity investment strategy <https://www.whitecase.com/publications/alert/city-cape-town-procure-300mw-renewable-energy-ipp>



**Municipalities can also encourage households to alleviate pressure on the grid.** Municipalities can encourage households and businesses to save power, similar to the way that the City of Cape Town encouraged behavioural changes through water saving campaigns during its 2017 water crisis. Municipalities can also incentivise renewable energy generation such as through solar PV and incentivising households to save power.

**Summary of options with estimated impact on supply and cost/complexity of implementation**





# Opportunities for municipal revenue in a sustainable future

As indicated above, In an ideal scenario, both the private sector and Eskom generate renewable energy and distribute it more cost effectively to consumers through municipalities. The municipalities would have long term contracts with private IPPs to purchase (renewable) electricity at guaranteed prices that are lower in a competitive market. Municipalities win because they obtain revenue for their role in distribution. Consumers win because electricity prices are likely to come down through a competitive system. The lower cost of electricity and higher certainty of supply will then contribute to the virtuous cycle of economic growth, rising property values, more customers paying accounts, more employment, and greater socioeconomic development outcomes.

Cities need to act now to mitigate supply gaps in the short run, notably by putting in place the policy frameworks and mobilising the resources that will enable wheeling, re-entering small and medium scale generation into the municipal grid.

There is particular urgency around resolving this as households and businesses are importing and installing renewable energy that is going unnoticed by municipalities. According to analysis of customs data by Reuters, South Africa imported solar PV panels worth nearly R2.2bn in the first five months of 2022 alone, amounting to around 500 Mw of peak generation capacity.<sup>12</sup> It is critical that municipalities act now to retain their role in energy generation, to both meet supply gaps and to be part of a sustainable energy solution that works for producers and consumers. Through non-action, Cities risk losing important parts of their revenue base.

There is currently an insufficient municipal framework for how IPP and embedded generation should be dealt with. Different municipalities currently have different

approaches to wheeling charges, feed-in-tariffs, etc., which makes transition less efficient and is associated with higher risk. To help guide coordination and allow for differential approaches to finance, Municipalities could leverage the District Development Model. The District Development Model (DDM) is a coordination and implementation vehicle for strategic investments amongst the three spheres of government. With a deliberate emphasis on local economic development, its aim is to integrate service delivery that will be more practical, achievable, implementable, measurable and clearly aligned to the key priorities of the government.

Crucially, in addition to mitigating supply gaps in the short run, municipalities need to establish a long-term strategy for their own role in electricity provision going forward.

- Municipalities will need to model the optimal mix of different energy sources required to optimise supply and meet demand in their jurisdictions (optimising sales, transport, etc.). Through financial modelling of scenarios, they will need to find the right mix of different activities across purchasing, selling, transmitting, and wheeling. A key challenge is to understand what the business model for electricity is likely to look like over five-year and ten-year horizons (with the first being more precise) to understand the implications of (a) new markets and new purchasing agreements, (b) the reliance that will still be needed on Eskom purchasing, (c) differential options for tariff structures and time-of-use tariffs, (d) new maintenance costs, (e) changing consumer patterns, and (f) potential effects of changes in electricity revenues on other municipal services. They will also need to understand how the changing profile of reduced purchasing from higher end homes and commercial users generating their own power affects the financial model of their municipality and how this can be accommodated in long-term financial plans.



<sup>12</sup> Bavier, Joe and Promit Mukherjee, 2022, 'South Africa's 'silent revolution' as those with cash go solar', Reuters, <https://www.reuters.com/world/africa/south-africas-silent-revolution-those-with-cash-go-solar-2022-08-15/>; Business Tech, 2022 "Boom in small-scale solar installations in South Africa", 15 August. <https://businesstech.co.za/news/energy/616983/boom-in-small-scale-solar-installations-in-south-africa/>



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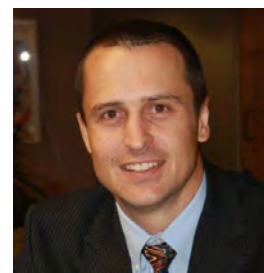
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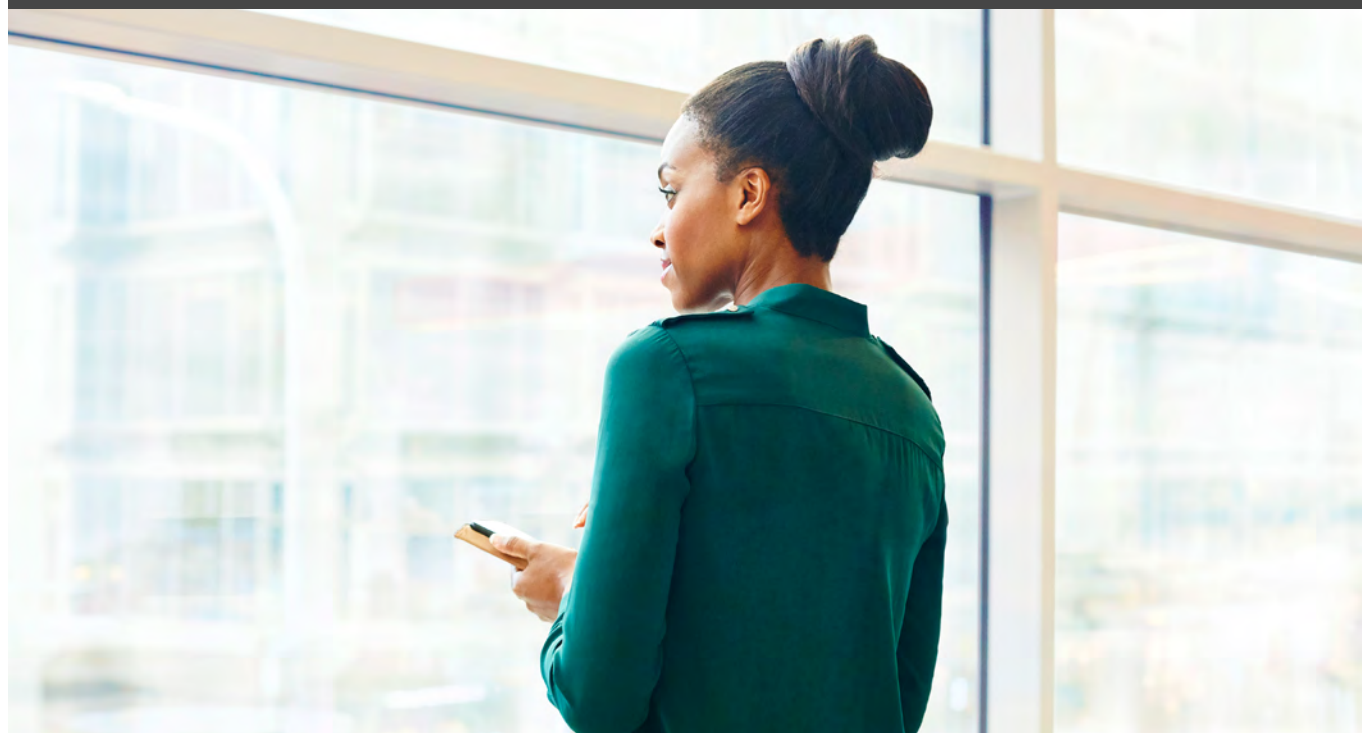
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