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ENERGY

Rapid electricity supply diversification in municipalities is the key to economic recovery, municipal financial sustainability and a permanent end to load shedding

POLICY BRIEF

NOVEMBER 2023

ABOUT THIS BRIEF

This policy brief was developed by PARI's Energy Transition programme, whose overarching goal is to contribute to the successful implementation of a Just Energy Transition (JET) in South Arica; a transition that will contribute both to decarbonisation goals and an equitable energy system that reduces poverty and inequality.

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1. Load shedding prevents economic development, job creation and poverty reduction

Access to electricity is a critical input supporting economic growth and development: there is almost no economic activity that does not require a reliable and affordable source of electricity. Load shedding is, therefore, a substantial obstacle to increasing growth and reducing poverty in South Africa.

Figure 1 below indicates the number of hours of load shedding in each year from 2018 to 2023, together with the number of GWh (gigawatt hours) lost due to that load shedding. The latter increases significantly relative to the hours of load shedding when the stage (intensity) of load shedding is higher: for example, four hours of load shedding at stage 6 results in a much greater loss of electricity to the economy than four hours of load shedding at stage 2.

The positive relationship between energy and economic growth is clear: income and energy consumption are tightly correlated on every continent and across every time period for which data exists. [...] There are no low energy consumption countries that are rich.

Energyforgrowth.org

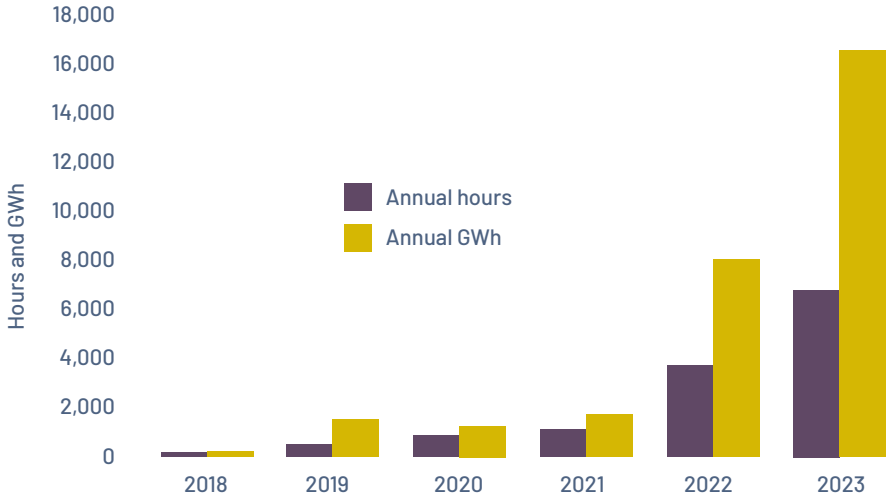

Figure 1: Annual hours and total GWh of load shedding: 2018 to 2023

Source: Eskom

Figure 1 shows not only the significant increase in the total hours of load shedding in 2022 and 2023 from previous years, but also the enormous impact of the much higher average stages of load shedding that were prevalent in 2023. The amount of electricity lost to the economy in 2023 was double that of the previous year.

Load shedding is caused by a mismatch between electricity demand and electricity supply (generation): when the country is unable to produce enough electricity to meet demand, load shedding is initiated to reduce effective demand (i.e. by disconnecting users) in order to prevent a total electricity system collapse.[1]

The impacts of steadily increasing levels and duration of load shedding have been devastating, and have directly contributed to increasing levels of poverty and inequality. The local economy has been struggling since the 2009 global financial crisis, and the continual increase in load shedding over the past few years has made a recovery almost impossible. A number of studies have suggested that the impact on economicgrowth (gross domestic product – GDP) of load shedding *just in 2022* was more than 2 percentage points.[2] That is, without load shedding the economy would have grown by 4 per cent in 2022, rather than the actual 2 per cent recorded. The sharp increase in electricity lost to load shedding in 2023 has increased this negative impact on the economy: it is estimated that from 2020 to 2023, load shedding subtracted a cumulative 15 percentage points from GDP growth.[3] The manufacturing sector has been the worst impacted.

The current cost of load shedding is estimated to be R12.61/kWh (ibid). That is, the economy loses R12.61 for every kWh of load shedding. That translates into a cost (in lost economic activity) of **R224 billion** for the period 2020 to 2023.

At the beginning of 2023, various calculations estimated that approximately 650,000 jobs had been lost by the end of 2022 due to load shedding, with that number expected to rise to 800,000 in 2023.[4]

1 A useful (although not entirely accurate) analogy is the electricity supply system in your house: it is designed to supply a certain amount of electricity. If you exceed that limit with too much demand – by using too many appliances at the same time – the system will trip. Switching your house back on after it trips is usually a simple and quick process. Trying to switch an entire country back on after a trip could take weeks. Load shedding is designed to prevent that system 'trip' by matching demand with available supply.

2 https://www.resbank.co.za/content/dam/sarb/publications/occasional-bulletin-of-economic-notes/2023/oben-2301-contents-june-2023-combined.pdf

3 https://www.novaeconomics.co.za/our-work/re-estimating-the-economic-costs-of-loadshedding-in-south-africa-in-2023

4 https://dailyinvestor.com/energy/39636/800000-south-africans-can-lose-their-jobs-due-to-load-shedding/

Extended periods of power disruption tend to have a disproportionately more severe impact on small and very small enterprises, since they are less likely to have the resources to invest in alternative or back-up power. In this way, load shedding contributes directly to increasing inequality, and reduces the opportunities for people to earn livelihoods in small and micro enterprises.

In addition to these macroeconomic effects, load shedding has **significant negative impacts on the operational and financial sustainability of the delivery of basic services by municipalities** – particularly in the metro areas, where population and economic activity are concentrated. These impacts are combining to create considerable additional barriers to current and future economic growth, employment and poverty reduction:

i. The severe **negative impact on municipal electricity infrastructure, which creates additional power outages, and adds to the cost of supply**. Electricity distribution infrastructure is not built to be switched on and off multiple times each day and load shedding thus creates significant strain. When the infrastructure is already old and inadequately maintained, the results can be severe. During load shedding infrastructure is also more easily vandalised and/or stolen. Both of these factors – damage to infrastructure from load shedding, and theft and vandalism during load shedding – **contribute directly to additional power outages, on top of load shedding**. These often last more than 24 hours. The result is that the actual availability of electricity to households and businesses is (often much) lower than what is indicated by load shedding levels, and the cumulative negative economic impact is greater than that of load shedding on its own.

ii. **Extended power cuts** – directly and indirectly caused by load shedding – have had a severe impact on water supply in many areas, notably in Gauteng, as bulk water pumping stations lose operating time. Unpredictable and/or restricted water supply has a detrimental impact on standards of living and many business operations.

iii. The local government fiscal framework (LGFF) was designed on the assumption that the surplus earned by municipalities on the sale of electricity (particularly in the metros) could be used to subsidise the delivery of a range of other services. Income earned from the sales of electricity was intended to provide 37 per cent of total local government operating expenditure requirements. Extended load shedding and additional power outages caused by load shedding have significantly reduced municipal income from electricity (fewer hours of available power mean fewer hours that can be billed, plus businesses that close down because of load shedding are lost as municipal customers). Preliminary data for the 2022/23 local government fiscal year indicate that electricity revenue only contributed just under 32 per cent of operating expenditure, leaving an effective R24 billion hole in revenue requirements.

    At the same time, increased damage to electricity infrastructure from load shedding, and vandalism and theft of infrastructure – which is much easier during load shedding – has resulted in additional infrastructure replacement and repair costs that municipalities often have not budgeted for.[5]

    Declining municipal electricity sales – compounded by increasing Eskom supply costs (see below) which have reduced the surplus earned on those sales – have additional negative implications for local economic development: by law, municipalities must have funded budgets. That is, they cannot budget for expenditure that is not matched by revenue. As income from electricity declines dues to load shedding, so other municipal services charges must increase to fill the gap. Load shedding thus drives significant increases in property rates and taxes, and other service charges. As households and businesses are forced to pay more for services and property taxes, so less money is available for expenditure on goods and services in the wider economy.

5 https://www.news24.com/news24/politics/parliament/cost-of-load-shedding-sas-municipalities-spend-billions-on-infrastructure-repair-vandalism-20231003-2

In summary, load shedding is having an enormous direct and indirect negative impact on all aspects of socioeconomic life, imposing a hard limit on any plans to grow the economy, create jobs and reduce poverty. And it is here to stay for the foreseeable future, based on current electricity policies. The national plan for the local energy sector – the Integrated Resource Plan (IRP 2023) – only forecasts a permanent end to load shedding by 2028, but even this forecast is based on the very optimistic assumption that the energy availability factor (EAF) of the Eskom fleet will improve by 35 per cent (to 70 per cent from a current 52 per cent) and be maintained at that level. Given that the EAF has been on a clear downwards trajectory for the past few years, despite a strong commitment to increased maintenance, the likelihood of achieving that target appears slim. There is thus a high risk that load shedding will persist beyond 2028, in the absence of additional policy responses.

Load shedding might be the most visible serious electricity system problem that we currently have, but it isn't the only one. **A reduction in the frequency and intensity of load shedding will give significant relief to the economy, and reduce the damage to electricity infrastructure and water services, but it won't automatically mean that we have enough electricity to support a substantial economic expansion.**

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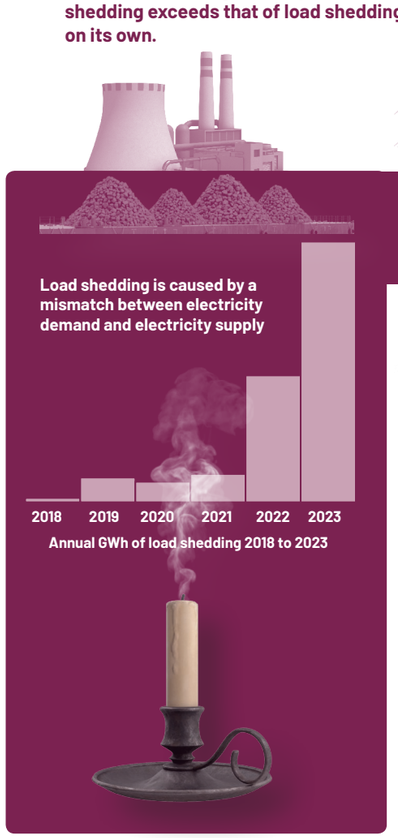
RAPID ELECTRICITY SUPPLY DIVERSIFICATION IN MUNICIPALITIES IS THE KEY TO ECONOMIC RECOVERY, MUNICIPAL FINANCIAL SUSTAINABILITY AND AN EARLY END TO LOAD SHEDDING

LOAD SHEDDING VS. THE SA ECONOMY

LOAD SHEDDING

LOAD SHEDDING HAS A KNOCK-ON EXPONENTIAL EFFECT

The cumulative negative impact of load shedding exceeds that of load shedding on its own.



MUNICIPALITIES

LOAD SHEDDING DESTABILISES THE SYSTEMS THAT UNDERPIN ECONOMIC GROWTH

Load shedding hampers economic development, job creation and poverty reduction

MUNICIPAL ELECTRICITY INFRASTRUCTURE

Infrastructure is damaged by load shedding, theft and vandalism

↓

Additional power outages

↓

Infrastructure is repaired or replaced

↓

The cost of electricity increases

MUNICIPAL REVENUE

Income from electricity declines → Charges for other municipal services are increased to fill the gap → Property rates and taxes, and other service charges increase → Households and business have lower gross income

WATER

Intermittent power supply → Pumping stations lose operation time → Unpredictable and/or restricted water supply

Rising costs
Cost of living
Job losses
More inequality

THE SA ECONOMY

SOME ECONOMIC OUTCOMES

4% → 2%

Without load shedding the economy would have grown by 4% in 2022, rather than the actual 2% recorded.

The SA economy loses R12.61 for every kWh of load shedding:
R224 billion
for the period 2020 to 2023

Estimated jobs lost because of load shedding: About 650,000 jobs by the end of 2022 projected to rise to
800,000 in 2023

Projected electricity revenue = 37 per cent of total local government operating expenditure requirements. Real electricity revenue (with load shedding) = 32 per cent of operating expenditure
R24 billion shortfall

THE DISPROPORTIONATE EFFECT ON SMALL BUSINESSES AND HOUSEHOLDS

Households and businesses pay more for services and property taxes

↓

Less money for goods and services in the wider economy.

↓

Lower economic growth

↓

More poverty and less equality

↓

Less opportunity for people to earn livelihoods in small and micro enterprises

2. A significant expansion in electricity supply (beyond what the current Eskom fleet can deliver) is needed for long-term development, employment creation and poverty reduction

Almost every single economic activity requires electricity: in order to ramp up economic activity to the point where it will support significant reductions in poverty and inequality we need more electricity – a lot more than will be provided by the end of load shedding. It is important to remember the underlying reason why we have load shedding: it has not been caused by a significant increase in electricity demand that has outstripped available supply. Instead, the critical system constraint has been declining supply of electricity.

Total electricity demand in 2023 was almost 8 per cent lower than it was in 2011 and we still required the highest level of load shedding ever because the system was unable to reliably meet even that demand.

The different economic development trajectories of Southeast Asia and Africa indicate very clearly the impact created by the failure to rapidly increase electricity supply. In 1990, per capita electricity consumption in Africa[6] was 40 per cent higher than in Southeast Asia; by 2023 it was 70 per cent lower.[7] The rapid increase in electricity consumption has supported strong growth in Southeast Asia – way above that of Africa – resulting in significantly lower poverty levels.

In South Africa, electricity consumption per capita declined by 17 per cent from 2000 to 2021.[8] In a developing country context, declining per capita consumption reflects the inability of electricity supply to keep pace with domestic demand,[9] as well as the declining affordability of the electricity that is available. Over that same period, per capita electricity consumption in China increased by 489 per cent,[10] and is now 61 per cent higher than in South Africa.

Total electricity demand in 2023 was almost 8 per cent lower than it was in 2011 and we still required the highest level of load shedding ever because the system was unable to reliably meet even that demand.

6 Which consumption was dominated by South Africa.

7 https://www.iea.org/reports/electricity-2024

8 https://www.iea.org/countries/south-africa

9 In a developed country context, a decline in per capita consumption may indicate increased energy efficiency and/or a shift towards less energy intensive industries such as services.

10 https://www.iea.org/countries/china

The main causes of falling electricity supply in South Africa have been:

The steadily declining ability of South Africa's aging coal-fired power plants to produce electricity. The energy availability factor (EAF) of our coal fleet has been falling, a predictable result of its increasing age and poor maintenance over an extended period of time. Notwithstanding the highly optimistic view of the state, all the evidence suggests that the EAF will not increase significantly any time soon. For the first six weeks of 2024, the EAF was below 55 per cent, and declined to just above 51 per cent in week six, based on Eskom's own data. Eskom's target of reaching an EAF of 60 per cent for the first quarter of 2024 (i.e. by the end of March 2024) seems unattainable. The decline in EAF has occurred despite the return to service of three units at Kusile power station in late 2023.[11]

The government has indicated that it intends to build a nuclear power plant to address Eskom's supply constraints and thereby end load shedding. However, the construction time for nuclear plants is considerable. The *World Nuclear Report 2023*[12] (p63) indicates that the average time between starting construction and grid connection for seven reactors that are connected across the world in 2022 was **nine years**.[13] The comparative time period for a solar photovoltaic (PV) farm is **one** year.

Nuclear build programmes are also notorious for being behind schedule: over the three years from 2020–22, **only 2 of 18 units connected to the grid in seven countries started up on time**. Given South Africa's extremely poor track record of managing large scale electricity generation projects – Medupi was completed six years behind schedule, and Kusile is now eight years behind schedule – there is a very strong possibility that we could be looking at a 12–15 year wait for any electricity from a nuclear plant.

The failure to bring new utility-scale power on to the grid, to increase available supply. Specifically, South Africa has failed to take advantage of the global renewable power opportunity, notably in solar PV. Utility-scale solar PV is the most rapid (and cheapest – see below) way to significantly increase the supply of electricity in South Africa. The international Energy Agency forecasts that renewables[14] will contribute more than one third of global electricity supply by 2025, replacing coal as the largest source of supply.[15]

In manufacturing and heavy industry-intensive China, renewables now make up just over 50 per cent of total installed electricity generation capacity. Australia (which has a mining sector larger than South Africa's) produced 38 per cent of its electricity from renewables in 2023, and has a target of 82 per cent of electricity from renewables by 2030. Vietnam, one of the fastest growing economies in the world, derives 25 per cent of its energy from renewables, and is rapidly growing that share.

Even in established economies with considerable fossil fuel resources, renewable power is growing rapidly: in the United States, renewable energy produces more than 20 per cent of all electricity;in 2022 renewable energy generation exceeded energy generation from coal, for the first time in the country's history. Solar energy generation in the United States is forecast to increase by 75 per cent from 2022 to 2025 (United States Department of Energy).[16]

11 https://businesstech.co.za/news/energy/752873/eskom-is-going-backwards/#:~:text=Eskom's%20energy%20availability%20factor%20(EAF,use%20when%20it%20was%20needed.

12 https://www.worldnuclearreport.org/-World-Nuclear-Industry-Status-Report-2023-.html

13 The mean construction time for nuclear plants in Russia was almost 18 years.

14 Which definition excludes nuclear.

15 https://www.iea.org/reports/electricity-2024

16 https://www.energy.gov/eere/renewable-energy#:~:text=Renewable%20energy%20generates%20over%2020,the%20first%20time%20in%20history.

In contrast, South Africa only has a 7 per cent renewable share in electricity production, despite enormous local potential, particularly for solar PV.

In order to rapidly increase development and create large numbers of employment and livelihood opportunities, South Africa requires electricity generation capacity between 35 and 50 per cent greater than current installed capacity by 2030. That is, even if our coal fleet produced at optimum levels (an event extremely unlikely to materialise) it would still not produce enough electricity to permanently shift the economy onto a higher development path. New electricity supply is required as a matter of urgency. Renewables – particularly solar PV – offer the shortest development time to come on stream.

The failure to significantly increase electricity supply – which has effectively set a fixed limit to economic growth – has had an enormous opportunity cost. To the growth and jobs actually lost by load shedding should be added the potential growth and employment that could have been created if the state had been able to significantly increase installed generation capacity ten years ago.Every year that we continue to fail to increase generation capacity, the gap between actual and potential socioeconomic development widens even further.

3. While the supply and reliability of electricity declines, the cost is increasing

The bad news keeps coming: economic growth and social development not only require sufficient and reliable electricity (which we do not have), but also that it is affordable – for households and for enterprises. Unaffordable tariffs increase the cost of doing business and result in self-rationing of electricity usage in poor households that undermines development.

While the supply of electricity has been declining, electricity tariffs have increased significantly over the past 20 years, way above the increase in inflation or average wage increases. The current regulated method for setting electricity tariffs – both for municipal customers and Eskom customers – is directly tied to Eskom's costs, which have been hugely inflated by years of mismanagement and corruption. **Household electricity costs increased by 60 per cent for the five years from 2017 to 2022. For the 15 years from 2007 to 2022, the average Eskom tariff increased by 450 per cent (SARB, 2023c).**[17]

Unaffordable tariffs impact poor households and micro enterprises the most: high electricity costs reduce the amount of electricity that people can use to improve their standards of living, and also forces them to divert expenditure from other basic necessities – notably food – to pay for that electricity.[18] Rapidly rising electricity prices increase the cost of running a small enterprise, over and above the strain caused by load shedding. It also creates effective barriers to small entrepreneurs who want to expand their businesses, or to engage in additional value-added activities (most of which require electricity). In this way, **expensive electricity contributes directly to both poverty and inequality**.

Rising electricity costs have additional indirect negative impacts on poverty: high electricity costs have contributed to the rising cost of water – and thus its unaffordability for many poor households, since electricity is a key input into water distribution services. Research[19] indicates that the average cost of accessing basic water and electricity services for an indigent household in 2020 was approximately R1,000 – R1,050 per month. This does not represent an excessive amount of services – most poor households consume 200kWh or less of electricity each month and no more than 10 kilolitres of water (i.e. about 300 litres per day).

17 https://www.resbank.co.za/content/dam/sarb/publications/special-occasional-bulletins/2023/special-occasional-bulletin-of-economic-notes-2301-august-2023-combined.pdf

18 https://pari.org.za/wp-content/uploads/2022/09/Hungry-for-Electricity-Digi-19092022.pdf

19 https://pari.org.za/wp-content/uploads/2021/09/PARI-Short-Report-Access-to-Basic-Services-V3.pdf

That amount of money for water and electricity bills – R1,000 per month per household – represents a significant share of total household income. In the same year for which that calculation was done (2020) one quarter of South African households (4.3 million in total) had a total monthly income of less than R1,989 per month[20] at April 2020 prices. For these households, **the cost of basic electricity and water services represented more than half of total household income**. Clearly this is unaffordable, given that these households do not have enough income to purchase a basic basket of food. The result is that households either consume much less of the service than they actually need (which is particularly the case with electricity given the high penetration of pre-paid meters) or they are forced to steal water and electricity. Neither of these outcomes supports development or poverty reduction: in order to engage in economic activities and maintain a minimum standard of living, households require a minimum amount of basic services. The theft of electricity imposes enormous costs on municipalities and Eskom, driving up tariffs even further.

The situation isn't much better for the additional 4.5 million households that live above the food poverty line, but below the upper bound poverty line[21] (R4,311 per month for the average size household at 2020 prices). For these households, basic water and electricity services constitute between 23 and 50 per cent of total household income.

The monthly legal minimum wage for a full-time worker in April 2020 was R3,155.52. If we assume one worker in a household earning the minimum wage (a reasonable assumption given our very high unemployment rates and the informality of work which means that a significant number of workers actually earn less than the minimum wage), **the cost of a minimum basket of household water and electricity services made up almost 30 per cent of that minimum wage**. Clearly these costs are unaffordable.

The rise in municipal tariffs have been driven by:

- Substantial growth in the tariff increases allocated to Eskom by NERSA, which has resulted in rapidly increasing bulk charges that municipalities must pay. National Treasury Section 71 data[22] for 2023 indicates that the share of bulk electricity in total operating expenditure was 27 per cent for Tshwane, 28 per cent for eThekwini, 30 per cent for Ekurhuleni and a very significant 35 per cent for Nelson Mandela Bay. **In Ekurhuleni, Tshwane and Nelson Mandela Bay, bulk electricity costs were by far the largest expenditure item for the municipality**, and significantly higher than total employee costs, across the entire municipality and all municipal functions.
- Using Eskom data, we have calculated the average Eskom Wholesale Electricity Price (WEP) applicable to a typical metro demand profile.[23] The average WEP was 63.52 cents/kWh in the 2018/19 year, which **increased by 81 per cent** to 114.99 cents per kilowatt hour in the 2023/24 year. We forecast that the average WEP tariff for metros will increase to R2.16 per kWh by 2030. If Eskom remains the sole electricity provider for municipalities, the implication for municipal tariffs is significant. All consumers can expect to pay significantly more for electricity, with the poorest households and small enterprises the worst affected as the share of income that they must allocate to pay for electricity will increase sharply. Rising electricity costs will also drive up the cost of water.
- Eskom's time of use tariffs (which impose a very substantial surcharge on electricity supplied to municipalities during peak demand times – morning and evening) have been particularly onerous for municipalities as they are significantly higher than the average tariff, and higher than almost any tariff that a municipality could charge its customers. **The high demand peak tariff charged by Eskom to municipalities for the 2023/24 year is R4.79 per kWh**.

20 Based on an average South African household size of 3.4 persons. Although households tend to be larger in rural areas, they are often smaller in low-income urban areas, where the majority of South Africans live.

21 Together, these two groups constitute 55 per cent of all South African households.

22 http://mfma.treasury.gov.za/Media_Releases/s71/Pages/default.aspx

23 Each municipality has a different demand (use) profile and thus will pay different tariffs to Eskom, which are determined by the amount of power used at different times of the day.

As a result, municipalities are making a loss (and sometimes a significant loss, given that this is where the bulk of consumption is concentrated) on electricity sold during the peak charge times. Although it has been proposed that municipalities try to recover some of these costs by charging their own time of use tariffs, this would have a significant negative impact on the poorest households: the main source of electricity demand in low-income houses is for activities during the peak demand periods – getting ready for school and work in the mornings, and cooking in the evening.

- Eskom's high demand peak tariff has increased by a greater percentage (84 per cent) than the average WEP over the period 2018/19 to 2023/24. This suggests that, **by 2030, the high demand peak tariff could be close to R9 per kWh.** The estimated increase in Eskom WEPs – and particularly the high demand peak tariff – will seriously threaten local government financial sustainability: it is impossible that these tariff increases can be fully passed on to most consumers, and grid defection will be accelerated, as the relative cost of embedded generation decreases.

The reliance of municipalities on Eskom as their sole provider of expensive and unreliable electricity undermines local economic development and the financial sustainability of municipalities, and deepens poverty and inequality.

In summary, significant economic growth, job creation and poverty reduction are critically dependent on a significant increase in the supply of electricity, and more affordable electricity than Eskom is able to supply, either now or in the foreseeable future. While eradicating load shedding will obviously have a positive impact on development, the full benefits of electricity as an input to South African economy and society will only be realised when there is significantly more energy available to the economy than Eskom can provide, at a significantly lower cost than Eskom currently is able to deliver.

4. Renewables (particularly solar PV) are now the cheapest source of electricity available to South Africa

It is a development imperative that South Africa has access to more reliable and significantly cheaper electricity. Poverty reduction and greater equity cannot be delivered without a decline in the real cost of electricity for all users. Lower electricity costs should be a national development priority, and they cannot be delivered by the Eskom coal fleet, which has a one-way cost trajectory – up.

The levelised cost of energy (LCOE) of nuclear – which the South African government is proposing as a big part of the solution to our electricity crisis – varies enormously in different contexts, although much research suggests that the cost of nuclear is increasing (while the cost of solar PV is decreasing). The LCOE of nuclear is heavily influenced by the cost of building the plant. That is, the less efficiently the capital project is managed, the longer the construction takes and the larger the cost overruns (exactly what happened with Medupi and Kusile under Eskom's management), the more likely the eventual tariff that needs to be charged to cover these costs will be significantly higher than the cost of electricity from solar PV.

The *World Nuclear Report 2023*[24] indicates that at discount rates above 5.4 per cent, nuclear power is always more expensive than renewables. At a 10 per cent discount rate, nuclear is approximately **four times more expensive than renewables**. The discount rate commonly applied to South African electricity projects is 8.2 per cent, indicating that nuclear will never be the cheapest option. Instead, a combination of Eskom's already-expensive coal fleet and new expensive nuclear will almost certainly guarantee future electricity prices that are unaffordable for the majority of South African households, and which will present a significant barrier to development and employment growth. **What South Africa urgently needs are additional sources of electricity that are as low-cost as possible, not more expensive.**

24 https://www.worldnuclearreport.org/-World-Nuclear-Industry-Status-Report-2023-.html

While the cost of the electricity supplied by the Eskom coal fleet rises (and will continue to do so for the foreseeable future), the cost of electricity generated by utility-scale solar PV is rapidly declining. Figure 2 below compares the Eskom average WEP tariff for a metro municipality, compared to the (LCOE) for wind and solar PV. It shows actual costs to 2024, and estimated costs to 2030.

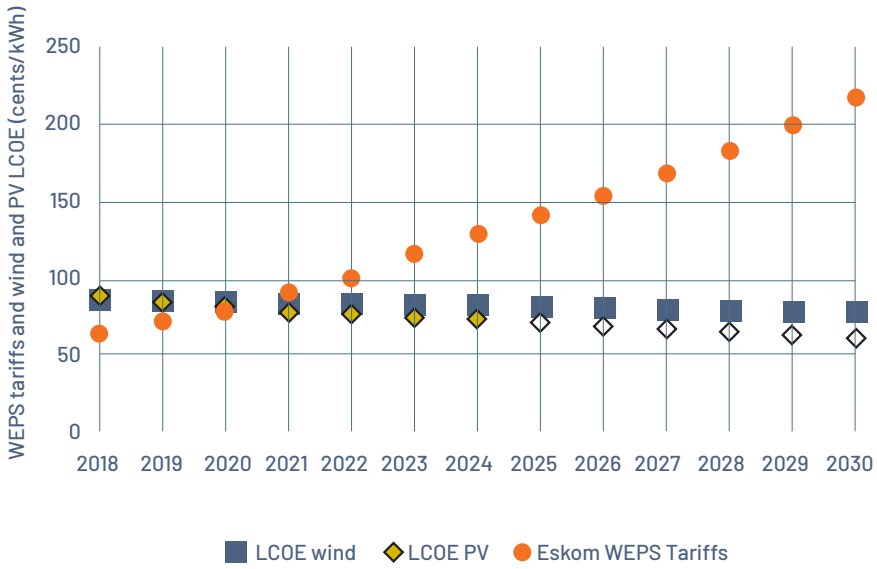


Figure 2: Eskom average WEPS tariffs for typical Metro demand profile
LCOE for wind and solar PV; 2018-2024 actual, 2025-2030 forecast

Source data: Eskom, Meridian Economics,[25] own calculations.

Figure 2 indicates that Eskom's WEP tariff was roughly equivalent to wind and solar PV tariffs in 2020, but since then the gap between the different tariffs (particularly between Eskom and solar PV) has widened considerably. In 2023, electricity produced by solar PV was 35 per cent cheaper than that produced by Eskom. In 2024, the difference was 43 per cent. It is estimated that **by 2030, the cost of electricity supplied by solar PV will be less than one third of the cost of that supplied by Eskom.** The cost comparisons for wind are almost as good.

In addition, if municipalities plan to include battery storage as part of their renewables diversification,[26] they can provide part of peak demand from that battery storage, making significant additional savings by not paying the full peak demand rate charged by Eskom for that portion of supply. This will further reduce the municipal cost of supply.

25 https://meridianeconomics.co.za/our-publications/comparative-analysis-of-irp-2023-cost-assumptions-2/

26 Either through an own investment, or as part of a package deal with an IPP.

Figure 3 below maps the average peak tariffs that Eskom charges municipalities against the cost of one example of potential battery storage (BESS).

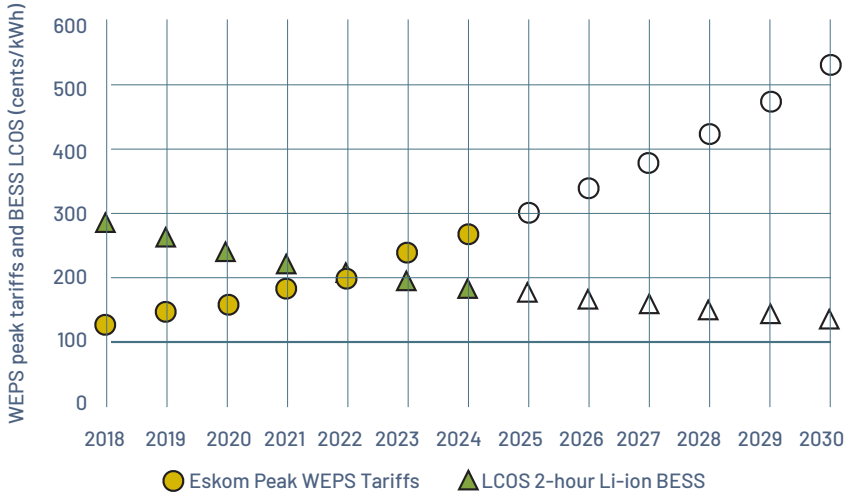


Figure 3: Eskom average peak tariffs for typical metro demand profile; LCOS for 2-hour Li-ion BESS cycled twice per day; 2018-2024 actual, 2025-2030 forecast

Source data: Eskom, Meridian Economics:[27] *own calculations.*

Figure 3 shows how battery storage costs have declined since 2018, while Eskom's peak tariffs have risen sharply. In 2024, the gap between the Eskom average peak demand tariff and the BESS rate was 51 cents/kWh, while the gap between the high demand peak tariff and the BESS rate was R2.90/kWh. By 2030 those differences are estimated to be R3.91/kWh and R7.62/kWh respectively, as Eskom's tariffs continue to increase and the cost of BESS declines. **The future savings for municipalities investing in BESS now will thus be considerable, with significant positive implications for both lower tariffs and reducing the losses that municipalities make on peak electricity sales.**

The cost benefits for both consumers and municipalities of having a share of supply provided by renewables is notable: households and businesses would have access to cheaper electricity, and municipalities would see a significant reduction in their bulk purchases costs. Our research indicates that at a 22–24 per cent share of renewables, combined with battery storage, the eight metros would have saved a combined R5 billion per annum on bulk purchases[28] in the current financial year, and largely eradicated load shedding. Given that the cost from Eskom is projected to increase and that of renewables to decrease, the quantum of this saving will increase in each future year. Much greater benefits would accrue – to the wider economy as well as the municipality – because of the end of load shedding and an increase in electricity supply.

27 https://meridianeconomics.co.za/our-publications/comparative-analysis-of-irp-2023-cost-assumptions-2/

28 Including the cost of the battery storage.

There is a commonly held myth that electricity generated from renewables – notably wind and solar – cannot support a growing economy because it is 'unreliable' and 'not baseload'. This is completely untrue, as the empirical evidence clearly shows. China would not be developing its solar PV capacity at the current rate – and threatening its own future as the world's biggest manufacturing and heavy industry economy – if it believed that this was an unreliable source of power. In 2023, China commissioned as much new solar PV as the entire rest of the world combined did in 2022 (IEA).[29] From 2023 to 2026, installed capacity of solar PV in China will double to 1 TW.

An economy does not require baseload – it requires dispatchable power; power that is immediately available in the form required. Renewables such as solar PV and wind are variable sources of power, meaning that they vary in intensity and availability depending on actual wind and solar radiation. The technological challenges involved in transforming variable renewables into dispatchable power have been considerable, but have generally been solved. While there are still challenges to be overcome in achieving a 100 per cent electricity-from-renewables goal, achieving a 50 per cent electricity-from-renewables goal is within reach of many countries, none of which are planning to risk their economic prosperity on supposedly unreliable technology. All of these countries will enjoy the benefits of cheaper electricity, and will have a considerable competitive advantage over South Africa in global export markets.

The main development in this area has been the rapid development of grid scale energy storage systems, which include both pumped hydro-storage (the biggest share of energy storage worldwide) and battery storage, which is growing rapidly (IEA).[30]

5. Energy supply diversification in local government can achieve multiple positive developmental outcomes

Municipalities can play a significant role both in increasing the supply of electricity – which will end load shedding and support socioeconomic development – and reducing the cost of that supply. The means whereby this can be achieved is through diversification to include a greater share of renewables:

- Municipalities can increase their total electricity purchases to match actual (and potential) demand by purchasing additional electricity from non-Eskom sources.
- Municipalities can reduce their overall cost of supply by purchasing that power from renewable electricity generators, and investing in battery storage technology.

29 https://www.iea.org/reports/electricity-2024

30 https://www.iea.org/reports/electricity-2024

Since 2020, the regulatory environment has permitted municipalities to procure or generate their own electricity. Prior to this, municipalities were legally bound to purchase all their electricity from Eskom. Purchasing additional electricity from renewable generation companies is a much lower risk and cost option for municipalities than attempting to build, own and operate their own facilities:

- Municipalities do not have access to the skills required to successfully design, build and operate electricity generation systems.
- Technological advances in the renewable power sector are most likely to continue to be rapid, resulting in continuous improvements that will increase efficiencies and reduce costs. If a municipality is *de facto* locked into its own power plant it will be unable to obtain the full benefits of these advances. If it purchases power from an IPP, it will be free to move its purchases to the cheapest and most reliable service provider. This will ensure the lowest cost of bulk purchases, which will be to the benefit of the municipality and its electricity consumers.
- From the perspective of electricity consumers, a municipal–owned electricity generator raises the real prospect of another mini-Eskom scenario: the municipality will be in a position to simply pass inflated costs on to consumers, since its priority will be to recover the costs of its own plant and not to ensure the cheapest possible supply for consumers.

Although the regulatory changes permitting municipalities to benefit from additional (non-Eskom) sources of electricity supply create the opportunity for significant improvement in South Africa's electricity system, there are a wide range of conditions that municipalities must comply with before this goal can be realised. While it is obviously desirable that electricity supply diversification is carefully planned and well-managed, and does not create more problems than it is designed to solve, it is also in the national interest that progress is as rapid as possible.

Recommendations

1. It should be a national priority to ensure that municipalities are able to rapidly increase their bulk purchases of electricity from renewable power suppliers. This will make a significant contribution to multiple national development goals – ending load shedding, increasing the supply of electricity to support rapid economic expansion, and a decline in the cost of electricity.
2. Although there is regulatory space for municipalities to diversify their bulk electricity purchases and increase electricity supply at a lower cost through supply agreements with renewables generators, there is limited capacity within local government to successfully be able to do so. In addition, municipalities require capital funding support to invest in the upgraded infrastructure needed to support higher levels of renewables penetration.
3. South Africa's JETIP Implementation Plan[31] (Chapter 10) includes a roadmap for supporting municipalities in this respect, but it requires funding support for implementation. The cost of this support – increasing capacity, providing technical assistance and funding infrastructure development – should be compared against the national economic benefits that will be created.

31 https://www.stateofthenation.gov.za/assets/downloads/JET%20Implementation%20Plan%202023-2027.pdf