**Technical Notes on Engagement with Eskom on the Energy Crises**

01 November 2022

**1. Governance**

Eskom faced several challenges in the past which includes governance, operational and financial. Eskom face an enduring problem of poor utility performance, i.e., it has failed to deliver adequate, reliable, and competitively priced electricity to consumers.

To address Eskom’s problems, the President’s Eskom Sustainability Task Team formulated a restructuring proposal, some of which was taken forward by Department of Public Enterprises (DPE) in the Roadmap for Eskom in a Reformed Electricity Supply Industry (2019). The Roadmap outlined specific steps and timelines for restructuring Eskom, including the incremental process of separating Eskom into three state-owned subsidiaries: Generation, Transmission, and Distribution. The first step outlined by the document is the creation of a fully Eskom-owned transmission subsidiary, responsible for purchasing, system operation, and grid management. According to the President, Eskom has established a separate transmission subsidiary, and is on track to complete its unbundling by December 2022. The Minister of Finance in his speech outline that, the Electricity Regulation Amendment Bill has been finalised. It provides for the establishment of an independent transmission and system operator, which will fundamentally transform the electricity sector. Reducing South Africa’s reliance on a single monopoly utility and unlocking massive new private investment in generation capacity will contribute significantly to long-term energy security. This will have implications on how Eskom conducts its business and need to be outlined within a specific context.

The emergence of distributed generation due to Eskom’s inability to meet electricity demand and rising electricity tariffs is further disrupting and changing South Africa’s electricity landscape. The regulatory reforms and policy decisions required to unlock this market were initially slow to develop and incomplete. However, the increasing severity of the power crisis has prompted the government to be more decisive in creating a conducive enabling environment for increased investment.

**2. Appointment of New Board Members at Eskom**

The appointments of the new Eskom Board of Directors with effect from 1 October 2022 included the following individuals:

1. Mr Mpho Makwana as Chairperson  
2. Dr Busisiwe Vilakazi  
3. Mr Lwazi Goqwana  
4. Mr Clive Le Roux  
5. Mr Leslie Mkhabela  
6. Mr Mteto Nyati  
7. Ms Fathima Gany  
8. Ms Ayanda Mafuleka  
9. Dr Tsakani Mthombeni  
10. Dr Claudelle von Eck  
11. Ms Tryphosa Ramano  
12. Mr Bheki Ntshalintshali

**3. Financial Highlights**

**Table 1: Eskom's dire financial situation (Source: Eskom, 2022)**



To address Eskom’s financial challenges the Minister of Finance has outlined key interventions through his Medium Term Budget Policy statement (MTPS).

**4. Medium Term Budget Policy Statement**

*The 2022 Medium Term Budget Policy Statement Speech by* the Minister of Finance outlines the following: For at least a decade, government has spent billions of rands supporting Eskom, with limited improvements in the reliability of the electricity supply or the financial health of the company. To ensure Eskom’s long-term financial viability, government will take over a significant portion of the utility’s R400 billion debt. While the selection of the relevant debt instruments and the method of effecting the relief is still to be determined, the quantum is expected to be between one-third and two-thirds of Eskom’s current debt. The debt takeover, once finalised, together with other reforms will ensure that Eskom is financially sustainable. The programme will allow Eskom to focus on plant performance and capital investment and ensure that it no longer relies on government bailouts. Importantly, the programme will include strict conditions required of Eskom and other stakeholders before and during the debt transfer. These conditions will address Eskom’s structural challenges by managing its costs, addressing municipal and household arrears due to the utility, and providing greater clarity and transparency in tariff pricing. In addition, the conditions will be informed by a Treasury led independent review of Eskom’s operations, in particular the performance of its generation fleet. Further details of the programme will be finalised following consultations with all relevant stakeholders and lenders and will be announced in the 2023 Budget.

**5. Municipal debt**

A culture of non‐payment, particularly among municipalities, has become a systemic problem. In its 2021 Integrated Report Eskom it states the following; despite Eskom best efforts, limited success has been achieved in managing municipal arrear debt, which continued to escalate to unacceptably high levels, increasing by 26% to R35.3 billion at year end. Payment levels are showing early signs of improvement because of Eskom municipal debt management strategy and ring-fencing arrear accounts, leading to lower interest charges. Eskom continue to pursue existing debt management processes and enforce its rights through legal action.



**6. Residential arrear debt**

While arrear municipal debt has grown rapidly over the past few years, Soweto arrear debt has increased at a slower rate. Nevertheless, small power users, particularly in Soweto, comprise tens of thousands of residential customers, presenting a much greater challenge to manage and collect individual outstanding amounts compared to the few hundred municipal customers. Average payment levels in Soweto remain low, at 20.6% for the year (2020: 20.7%). Total invoiced Soweto debt has decreased to R7.5 billion (including interest) at year end (2020: R12.8 billion).

Of this, only R536 million is deemed collectable and is reflected as trade receivables in our annual financial statements. The reduction in Soweto debt is mainly due to

the write-off of prescribed debt of R5.3 billion and write back of non-compliant “in duplum” interest of R3.3 billion. During the year, the Board granted approval for management to engage with the City of Johannesburg for the proposed transfer of customers in Eskom's licensed areas of supply to City Power. These include Soweto and Sandton. Negotiations have commenced; the Soweto debt balance, regulatory processes as well as social, human resource and financial implications are being considered.

**7. Power Interruptions and Loadshedding**



**Figure 1: Annual loadshedding (2007 - 2021) (Source: CSIR)**

In its 2021 Integrated Report stated that, the low plant availability resulted in Eskom having to make extensive use of peaking capacity to meet demand during periods of poor base-load generation capacity to avoid or minimise loadshedding. Eskom spent R7 billion utilising Eskom’s and IPP OCGTs to support the power system, which, given its financial position, is not sustainable. We regret the 47 days of loadshedding we had to implement during the year, given the cost to the economy and the disruption to customers.

South Africans are facing loadshedding challenge, this disrupts economic development and growth placing risk in the economy. The challenge will take longer to resolve according to the Chief Operating Officer. Recently, the group said that the continued load shedding is necessary as its emergency reserves are almost depleted. The emergency generation reserves are almost depleted, both the diesel and pumped storage dam levels. These, together with persistent high levels of breakdowns of generating units, are among the major contributors to the continuing generation capacity shortages. The utility currently has 5,683MW on planned maintenance, while another 1, 585MW of capacity is unavailable due to breakdowns.

**7.1 The cost of loadshedding**

A study by Nova Economics on behalf of Eskom estimates that 1% loadshedding (as percentage of electricity sales) is associated with a 0.4% decrease in GDP growth.

The cost of an entire day of loadshedding to the economy is estimated as:

• Stage 1 (or loadshedding 1 000MW): R235.5 million

• Stage 2 (2 000MW): R471.3 million

• Stage 3 (3 000MW): R706.7 million

• Stage 4 (4 000MW): R942.4 million

Estimates indicate that the energy-intensive primary and secondary industries, such as agriculture, utilities and manufacturing, are the worst affected by loadshedding. By contrast, the more service-oriented industries are less significantly affected. The agricultural sector seems to be the most adversely affected, because of its heavy reliance on electricity for irrigation and refrigeration purposes. Furthermore, the manufacturing sector is most affected in absolute terms.

**8. Koeberg Nuclear Power Station**

The long-term operation (LTO) project will extend the life of Koeberg Nuclear Power Station for an additional 20 years to 2045, in line with the IRP 2019 expectations for continued energy security beyond 2024. Compared to the cost of new build, the extension of Koeberg is economically viable and will secure 1 860MW for another 20 years. Extending the station's operating life is an investment into sustainable and less carbon-intensive electricity generation infrastructure.

The LTO activities are progressing in accordance with the baseline schedule, except for the seismic hazard analysis, which has been delayed. An alternate approach is being developed to mitigate against the effect of the delays. The impact of the COVID-19 lockdown and the reduction in the budget for capital expenditure due to financial constraints had a negative impact on the progress of LTO activities. The risk is being addressed by optimising scope and engaging with the National Nuclear Regulator (NNR). The extension will include the replacement of Koeberg's six steam generators, which have been in operation since 1984, during the next refuelling outage on each of the units. Once removed, the current steam generators will be stored on the Koeberg site, where they will be packaged and dismantled for final disposal at a national nuclear waste repository.

The three steam generators for Unit 1 have been delivered to Koeberg. Two of the three steam generators for Unit 2 are nearing completion of manufacturing and factory testing, and are scheduled for delivery during the last quarter of 2021. The third steam generator has been delayed due to a factory mishandling issue and is undergoing analysis of its future usability. Following the readiness review during December 2020

for the Koeberg Unit 1 refuelling outage, it was concluded that the steam generator replacement (SGR) project posed a significant risk of a prolonged extension to the outage due to certain work packages and plans still being reviewed, and the licence for the original steam generator interim storage facility not being complete. The decision was made to delay installation of the steam generators to the next outage, as it had the least impact on the overall generation energy planning. The revised plan is to install the steam generators during the respective outages in 2022.

**9. New Build Program**

According to reports, it will cost Eskom around R33 billion more and take another four years to complete its two newest power stations — Kusile and Medupi. That was revealed in the utility’s latest update to Parliament’s Standing Committee on Public Accounts (Scopa). Construction of the power stations began in 2007, and both were initially supposed to be completed by 2014. But with Eskom’s latest timelines, only one of the power stations will be ready a decade later than originally planned. Eskom said it was planning to reach full project completion at Medupi, which is located near Lephalale in Limpopo, in November 2023.

However, the return to service of Medupi Unit 4, [which suffered an explosion](https://mybroadband.co.za/news/energy/409128-photos-show-devastation-at-medupi-after-explosion.html) just over a week after it reached commercial operation, is now only slated for September 2024.That means Medupi will only have five operational generating units by its supposed project completion date. It estimated the remaining investment cost for this power plant would be R18.95 billion, adding to the R126.05 billion Eskom claims to have spent on the plant as of August 2022.

Should Eskom stick to this budget, the total cost will be R145 billion, R10 billion more than Eskom said it would cost in August 2021. That is R65 billion more than its original budget of R80 billion.

Kusile, near Emalahleni in Mpumalanga, has been even more expensive and is now only set for completion by May 2026, instead of 2025 as previously planned. That is barring any further delays. It currently has four units operational, the last of which reached commercial operation at the end of May 2022. The remaining two are only set to come online in December 2023 and May 2024, respectively. As of August 2022, Eskom had already spent R147.4 billion on this plant. It is set to invest another R14 billion in Kusile, bringing its total budgeted cost to R161.4 billion.

Combined, Medupi and Kusile will cost Eskom around R146.4 billion more than initially budgeted. But the amounts Eskom have used in its presentation to Scopa exclude capitalised interest during construction and expenditure on flue gas desulphurisation technology. The big reason for the excessive costs is severely flawed designs that have required, and will require, major reworks of all the generating units at Kusile and Medupi.

These issues have resulted in both plants having much lower energy availability factors (EAF) than anticipated, meaning they have struggled to come anywhere near their nameplate capacities of 4,800MW each.

In an attempt to rectify this, Eskom had to embark on several costly refurbishment projects, including:

* Eleven modifications to each mill for each unit
* Redirecting the flue gas inlet to the bag filter, and equipment changes to the pulsing systems for the pulse jet fabric filter
* Addition of internal erosion protection and modification to the pin rack driving the rotation of the gas-air heaters
* Implementing erosion protection in the various hot air ducts.

The modifications have resulted in a significant performance improvement, at least at Medupi. Its EAF increased from 46% in May 2020 to 73% by May 2022. Excluding the out-of-service Unit 4, the actual EAF would have been 82% by April 2022. Ongoing work at Kusile is also expected to improve overall reliability and reduce the likelihood of trips. So far, the modifications have resulted in Kusile Unit 1’s average load losses of 171MW in three months being reduced to 24MW in seven months.

**10. Just Energy Transition**

Eskom’s current investment in renewable generating capacity is modest, with one wind facility, hydro stations and a number of small solar PV projects. Eskom aim to drive the Just Energy Transition to introduce more renewable capacity, to reach its long-term objective of attaining net zero emissions by 2050, with an increase in sustainable jobs. Eskom submitted a MES exemption application in September 2020, which aimed to balance environmental impact and financial affordability. However, it was withdrawn based on high-level discussions with DPE and DFFE. Eskom is preparing a comprehensive Just Energy Transition and emission reduction alternative approach to present to DFFE. Leading the Just Energy Transition by using generating plant approaching the end of life, through repurposing and repowering as alternatives to full decommissioning of power station sites. Thereafter, JET will be used as the key enabler to set the course for a Generation of the future.

The Just Energy Transition (JET) Office is responsible for identifying and assessing JET-related risks and opportunities, controls and treatment plans. Progress is reported directly to the GCE and the JET Steering Committee on a monthly basis. These risks and opportunities are directly linked to Eskom's climate change imperatives. South Africa is a proud signatory to the Paris Agreement on Climate Change and is fully committed to meeting its local and global obligations in terms of the treaty, a commitment which Eskom fully supports.

In November 2021, the nations of the world met at the COP 26 summit in the United Kingdom to assess the progress on the fight against climate change and to develop strategies for the future. This was an opportunity for South Africa to highlight its contributions, including the initiatives aimed at a Just Energy Transition. As Eskom moves away from its reliance on coal, it will shift its focus to the implementation of the Just Energy Transition. This also considers the impact of decisions on workers in the coal industry and communities invested in the coal value chain and associated economies. Eskom, by virtue of the size of its operations, plays a central role in facilitating such a transition, while also ensuring equitable access to affordable electricity for all South Africans.

Eskom’s long-term strategy positions it as an enabler of the Just Energy Transition, or JET, as well as a key role player in executing the latest Integrated Resource Plan. Eskom was the first business in South Africa to establish a JET Office dedicated to this strategic imperative, evidence of its commitment to decarbonising in a socially and economically just manner. JET will act as a pivot point to enable the strategy to deliver growth. Eskom will repower and repurpose power stations, and build on the success of our Renewable Business Unit. Eskom is engaging with key stakeholders to negotiate a Just Energy Transition Transaction to fundamentally reorganise our balance sheet based on a green commitment. Such a transaction is expected to facilitate the refinancing of existing facilities on a concessional basis for a longer period, providing a level of relief its debt service requirements and cost of funding.

Eskom will apply repowering and repurposing of power stations, and build on the success of our Renewable Business Unit as catalysts for the Just Energy Transition, focusing on industrialisation, job creation and the continued socio-economic development of communities and settlements established around our power stations. The initiatives that are beginning to emerge from the ongoing strategy review will be pursued over the short, medium and long term. This will ensure that timely and appropriate strategic decisions are made to catalyse opportunities that will improve our sustainability and resilience, and also benefit the South African electricity industry. Consequently, our turnaround plan remains the key enabler that must be successfully delivered so that we can pursue a trajectory towards a sustainable, low carbon future. However, unless the tariff methodology is properly applied, our ability to execute these strategies

will be compromised.

**11. Long-term strategy**

The long-term strategy positions Eskom as an enabler of the Just Energy Transition and a key role player in executing the IRP. Eskom intend to remain a critical player in the electricity sector and make a vital contribution to economic growth, job creation, socio-economic development and the creation of a stable, equitable and cohesive South Africa.JET is about leveraging the opportunities presented by the transition towards a cleaner and greener energy future, while enabling the creation of new job opportunities for those displaced by the replacement of coal by these cleaner technologies. Therefore, it means a transition towards a low-carbon, climate-resilient economy and society in a manner that does not impede socio-economic development, but results in an increase in sustainable jobs. It is not a sudden shift in economic activity, but occurs in a phased manner over time. By following a JET pathway, it will be possible to simultaneously spur economic growth, create sustainable jobs and put emissions into structural decline, as opposed to an electricity supply that is seen to compromise economic growth. Eskom is a key enabler of South Africa's transition towards an economically inclusive and lower carbon future. The JET vision is net zero emissions by 2050, with an increase in sustainable jobs. The JET Office has been established to drive this vision. JET is a key lever to unlock the potential for local manufacturing and industrialisation, which includes meeting the demand for electric vehicles. The JET social impact will be addressed by retraining staff in the required skills.

**12. Issues for consideration by the Committee.**

1. How far is Eskom in the implementation of the Department of Public Enterprises (DPE) in the Roadmap for Eskom in a Reformed Electricity Supply Industry (2019).
2. Are we likely to see changes in the electricity industry or the role of Eskom’s, mandate resulting from the Electricity Regulation Amendment Bill?
3. The Committee notes positive feedback from the rating’s agency on Eskom resulting from the announcement made by the Finance Minister. How is Eskom likely to distribute its allocations after receiving the announcement to improve on it operational and financial results?
4. How is Eskom resolving the issues relating to municipal and residential arrear debt?
5. What is the current costs of IPP OCGTs in powering the system?
6. What’s the recent cost of loadshedding to the economy and what are the mitigating mechanism to contain such risks?
7. Eskom should explain to the Committee what is causing delays in the SGR project?
8. Are the delays in the SGR not having a negative impact on the long-term operation (LTO) project?
9. Eskom should explain to the Committee key challenges at the Medupi and Kusile. Eskom should also outline the total budget for the projects and what are causes of budget overruns.
10. Eskom should explain to the Committee what are they intentions of the Just Energy Transition. How many coal power stations have been earmarked for repurposing and what will it mean to the grid?
11. How much is Eskom spending on different power sources?