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South African National Energy Development Institute

SANEDI PLAN TO STOP LOADSHEDDING IN SIX (6) MONTHS

Problem Statement:

Eskom Energy Availability (EAF) factor is currently around *51%*. By increasing the EAF to above 70%, loadshedding will stop immediately. This is considered a low hanging fruit. By focusing on the EAF does not mean all other plans, including adding new capacity must be stopped or slowed down. In fact, the other plans must be accelerated. However, if the objective is to stop loadshedding in 6 months, then improving the EAF is the quickest and least-cost option. The big question is how to achieve this improvement in EAF from about 51% to above 70% in six months?

Assumptions:

1. Eskom has detailed and robust plans to improve plant performance for all its power stations, especially the 14 coal-fired power plants. Given the adequate capacity of technical skills at Eskom, one should not doubt that they know what needs to be done per power station, per unit and per system to improve plant technical performance;

2. Adequate maintenance budgets have been allocated and released for the next 3 years. Maintenance contracts are in place. All these contracts are structured on the basis of risk-benefit sharing model. It is now just a matter of units being

released at the right time for planned maintenance (PCLF). Units currently out for planned maintenance amount to about 8000 MW (as of 18 Feb 2024), which is significant. Therefore, it is assumed that there are no budget constraints and maintenance opportunities are adequate;

3. Each power station is led by a competent, experienced and committed General Manager. Power Station General Managers are fully delegated to deal with all aspects of running a power station (i.e. Human Resources, Finances, Procurement, Security, etc). If so, this means there are no delays associated with consulting Head Office before an operational decision is made by the Power Station Manager;

4. It is assumed that Eskom is acutely aware that the effectiveness of the maintenance that is being done is not great. This is an observation borne by the fact that Eskom bumped up PCLF to above 5000 MW since Dec 2023. However, the unplanned outages (UCLF) continue to deteriorate. As of the10th of Feb 2024, the unplanned outages stood at approximately 18000 MW. At face value, this seems to suggest that plant condition has deteriorated so badly, that it will require a step change in PCLF (removing substantial amount of capacity for deep maintenance) for quite some time (up to six months in some cases) in order to catch up with all the deep maintenance required to restore plant condition to a relatively good state. Of course, this will also require painstaking attention to the quality and priorities of the maintenance, including addressing emissions compliance.

What then needs to happen?

1. Eskom must identify and select 6 of the large and worst performing power stations (i.e. EAF below 70%) for strategic and focused specialised intervention. This intervention must involve deploying up 200 resources to various power stations. Breakdown of how these resources could be deployed is outlined below. Power stations to be considered include Duvha, Matla, Kriel, Tutuka, Kendal and Majuba. Each of the above-named power station must have a special intervention plan and weekly targets to improve EAF.

2. Set up, per power station, a *Plant Performance Recovery Oversight Team*, led by a Senior Project Manager who reports directly to the Power Station General Manager. The other Managers at the power station will continue to deal with day- to-day operations, but will work very closely with the Plant Performance Recovery Team Senior Project Manager. The Plant Performance Recovery Team Senior Project Manager will have a leeway in assembling a multi-disciplinary team drawn from internal and external resources to provide oversight and manage various recovery sub-teams (as proposed below) at the power station. ***It is important that this team is based 100% on site to avoid wasting time travelling. More importantly, this team will be available at short notice to support the Power Station General Manager as and when necessary.***

3. Set up a sub-team of the Plant Performance Recovery Team which will focus on reducing *Partial Load Losses*. Ideally, this sub-team must be led by an experienced Senior Process Engineer reporting directly to the Plant Performance Recovery Team Senior Project Manager. As a minimum, the scope of work for this site-based recovery sub-team should cover implementing interventions to reduce partial load losses, process engineering, trouble-shooting, conducting in-depth investigations and analysis of unit trips, proactive identification and technical management of single point of failures, and providing primary energy oversight (coal quality, diesel management and accounting, fuel oil management and accounting). This sub-team must also track and expedite actions/interventions to reduce partial load losses on a daily basis, focusing on online partial load losses and load losses requiring outages. ***It is important that this sub-team is based 100% on site to avoid wasting time travelling. More importantly, this sub-team will be available at short notice to support the Power Station General Manager as and when necessary***.

4. Set up a *Boiler Tube Failures* sub-team of the Plant Performance Recovery Team which will focus on reducing boiler tube failures. Ideally, this sub-team must be led by an experienced Senior Boiler Specialist reporting directly to the Plant Performance Recovery Team Senior Project Manager. This sub-team must track and expedite actions/ interventions to reduce boiler tube failures on a daily basis, focusing on preventative measures and technical oversight during outages. This sub-team must also conduct in-depth boiler failure investigations and analysis, proactively provide technical management of boiler health. ***It is important that this team is based 100% on site to avoid wasting time travelling. More importantly, this sub-team will be available at short notice to support the Power Station General Manager as and when necessary.***

5. Set up *Outages* sub-team of the Plant Performance Recovery Team which will focus on ensuring outage scopes are adequate and prevent poor workmanship during outages. Ideally, this sub-team must be led by an experienced Senior Maintenance Specialist reporting directly to the Plant Performance Recovery Team Senior Project Manager. This sub-team must track and expedite actions/interventions to avoid poor workmanship, expedite the return to service of units, eliminate outage slips, drive maintenance (be it on breakdowns and/or planned) quality control and engineering assurance, ensure correct spares are specified and procured, and ensure outage scopes are correct. ***It is important that this sub-team is based 100% on site to avoid wasting time travelling. More importantly, this sub-team will be available at short notice to support the Power Station General Manager as and when necessary.***

6. Set up a *Security* sub-team of the Plant Performance Recovery Team which will focus on reducing theft of coal, diesel, fuel oil and copper. Ideally, this sub-team must be led by an experienced Senior Security Specialist reporting directly to the Plant Performance Recovery Team Senior Project Manager. This sub-team must track and expedite actions/interventions to theft of critical items on a daily basis, focusing on coal accounting, diesel accounting, fuel oil accounting, copper theft prevention and preventing plant vandalism. ***It is important that this sub-team is based 100% on site to avoid wasting time travelling. More importantly, this sub-team will be available at short notice to support the Power Station General Manager as and when necessary.***

7. Set up a *Procurement Support* sub-team of the Plant Performance Recovery Team, which will focus on expediting and supporting procurement. Ideally, this sub-team must be led by an experienced Senior Procurement Specialist reporting directly to the Plant Performance Recovery Team Senior Project Manager. This sub-team must track and expedite actions/interventions to ensure procurement takes place timeously. ***It is important that this sub-team is based 100% on site to avoid wasting time travelling. More importantly, this sub-team will be available at short notice to support the Power Station General Manager as and when necessary***.

8. Set up an *Environmental Compliance and Minimum Emissions Standard (MES)* sub-team of the Plant Performance Recovery Team which will focus on environmental compliance. Ideally, this sub-team must be led by an experienced Senior Environmental Specialist reporting directly to the Plant Performance Recovery Team Snr Project Manager. The sub-team must be made up of Eskom specialists, Independent Specialist Engineering Companies and OEMs. This team must also advise on abatement technologies for retrofitting. ***It is important that this sub-team is based 100% on site to avoid wasting time travelling. More importantly, this sub-team will be available at short notice to support the Power Station General Manager as and when necessary***.

9. Set up a *Stakeholder Management* sub-team of the Plant Performance Recovery Team which will focus on stakeholder management (both internal and external). Ideally, this sub-team must be led by an experienced Senior Stakeholder Management Specialist reporting directly to the Plant Performance Recovery Team Senior Project Manager. Internally, this sub-team will focus on boosting staff morale. Without a motivated workforce, no plan will work. This intervention is crucial to get buy-in from Eskom guardians, especially organised labour. Of course, having a proper performance management system that is aligned with the strategic direction of the organization and key performance indicators, goes without saying. ***It is important that this sub-team is based 100% on site to avoid wasting time travelling. More importantly, this sub-team will be available at short notice to support the Power Station General Manager as and when necessary***.

10. Set up a *Project Controls* sub-team of the Plant Performance Recovery Team which will focus on project controls to manage and report on outages. Ideally, this sub-team must be led by an experienced Project Controls Specialist reporting directly to the Plant Performance Recovery Team Senior Project Manager. This sub-team can use the existing Project Reporting System (PRS) tool which serves as a comprehensive tool to present the current status of projects consistently. Capabilities of this tool cover various performance indicators such as cost and schedule performance indices, quality, risks and claims tracking. ***It is important that this team is based 100% on site to avoid wasting time travelling. More importantly, this sub-team will be available at short notice to support the Power Station General Manager as and when necessary.***

Monitoring and Evaluation:

1. Weekly EAF improvement targets must be set per power station and per unit at the power station. If these targets are met and sustained for at least a month, then the entire power station personnel should be rewarded through a monthly performance bonus incentive scheme;

2. A Technical Advisory Board must be set up to monitor EAF improvements, progress per power station and provide guidance where necessary. This Technical Advisory Board must report to the Group Executive Generation at Eskom. Members of the Technical Advisory Board must be drawn from within and outside South Africa. More importantly, the members of this Technical Advisory Board must be Engineers and Scientists who have an in-depth practical understanding of how power stations operate. Each power station Plant Performance Recovery Team Senior Project Manager will be expected to provide feedback to this Technical Advisory Board on a monthly basis.

Concluding Remarks:

South Africans deserve better. All efforts must be made to stop loadshedding. **The quickest option to stop loadshedding is by improving the EAF to above 70%.** The plan outlined above will achieve this objective, utilising the already allocated budgets. By the same token, other plans to build new capacity must not be stopped, in fact the other plans must be accelerated.

Submitted by Dr Zwanani Titus Mathe (Pr. Eng), CEO of SANEDI