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MEDIUM TERM SYSTEM ADEQUACY OUTLOOK (MTSAO) 2018

1. BACKGROUND

Section 2.1.2 of the Grid Code contains a provision that requires the System Operator to publish a review (called the 'Medium-Term System Adequacy Outlook') of the adequacy of the Interconnected Power System (IPS) to meet the long-term (five-year future) requirements for electricity consumers [see Grid Code: System Operator Code, version 9, section 2.1.2, System security, (7, 8)].

Section 2.1.2 System Security requires that:

(7) *On or before 30 October of each year, the System Operator (SO) shall publish a review (called the "Medium Term System Adequacy Outlook") of the adequacy of the IPS to meet the long term (5 year future) requirements of electricity consumers.*

(8) *In preparing the Medium Term System Adequacy Outlook, the SO must consider:*

- *the most recent information provided by generators, embedded generators, NTC, TNSPs and distributors;*
- *possible scenarios for growth in the demand of electricity consumers;*
- *possible scenarios for growth in generation available to meet that demand;*
- *committed projects for additional generation;*
- *demand management programs;*
- *Any other information that the SO may reasonably deem appropriate;*
- *Reasonable assumptions for the imports and exports.*

2. FINDINGS

The System is found to be adequate if the Eskom Fleet Availability (EAF) is above 75% for moderate demand growth and if the EAF is above 73% for the low demand growth assumed in the MTSAO 2018 study.

The Report highlights that the following risks could result in the system being inadequate in the medium term:

a) insufficient plant maintenance would result in the deterioration of the plant performance to a level that would lead to system inadequacy;
b) earlier-than-planned shutdown of Eskom or non-Eskom plants could result in the existing generation not being able to meet demand;
c) insufficient coal stock due to the coal procurement challenges would lead to system inadequacy; and
d) failure to comply with air quality standards, as well as any Planned Capacity Loss Factor (PCLF) that might be necessary to implement any retrofitting needed to comply with the air quality standards, would result in reduced capacity, which would impact system adequacy.

3. NERSA CONTEXT

The South African electricity system has been constrained for the greater part of 2018. Eskom projected that the Plant Availability, as measured by the EAF, would be 78% by the end of the financial year. However, by end of October 2018, the EAF was at 74.1% and continuing to decline.

The decline started in March 2018 when the system became constrained as a result of many Eskom generation units being out of service due to unplanned outages. It was also during that time that the Eskom System Operator notified the Energy Regulator of the shortage of coal across a number of coal power stations. This resulted in the minimum stockpile days prescribed by the Grid Code being violated by coal generators.

In June 2018, Eskom experienced further constraints when its workers took industrial action. This resulted in the worsening of the coal shortage problems, as well as load-shedding being implemented during that month. This month also saw a high utilisation of Open Cycle Gas Turbines (OCGTs). In July 2018, Eskom sent a second notification to the Energy Regulator, citing its inability to comply with the minimum coal stockpile day requirement of the Grid Code, subsequent to the recovery plan, communicated to the Regulator in March 2018, failing to bring the situation to normality.

Load losses due to coal shortages were experienced from the end of July 2018 to September 2018. The over-utilisation of OCGTs continued over this period due to the combination of coal shortages and unit plant failures. In October 2018, Lethabo had a failure of one of its units that resulted in a fatality. The unit is still on outage for

repairs, with the anticipated repair time projected at between three and six months. The final report on the failure has not been finalised and shared with the Energy Regulator.

The load-shedding experienced during the month of November was sparked by the loss of three large units overnight on 30 November 2018. This loss resulted in a total of 1800 MW being unavailable for generation. This, combined with the already constrained system due to several units being out of service for unplanned as well as planned maintenance, together with the loss of half the import from Cohara Basa (660MW), resulted in the supply being unable to meet demand. Subsequently, this called for rotational load-shedding to be implemented by the System Operator. The situation was exacerbated by the depletion of diesel to run OCGTs due to the over-utilisation of these units in the preceding months. OCGT utilisation was already above the allocation provided by NERSA in its One-Year Revenue decision for FY2018/19. In November 2018, Eskom sent a third notification to the Energy Regulator, mentioning the continuing coal shortages and its non-compliance with the minimum coal stockpile days.

Eskom has further highlighted that it has placed several of its most inefficient units on cold storage. These include three units from Grootvlei, two units from Hendrina, as well as four units from Komati. The reasons cited for the cold storage of these units is a lack of funds to implement maintenance activities. These units can be made available within 12 months of being required, provided that the maintenance work is implemented. The risk created by cold storage is that the room required to perform maintenance on units that need maintenance is further constrained. Eskom has experienced challenges in recent years in implementing good quality maintenance on their plants to ensure their performance can be restored to acceptable levels. Eskom has cited that the poor performance and unavailability of operating units restricts the capacity room required to implement maintenance activities. The Medium Term System Adequacy Outlook (MTSAO) 2018 indicated that should the availability deteriorate below 73% EAF with low demand growth or deteriorate below 75% with moderate demand growth, the cold stored units would be needed for generation to meet the system demand.

Furthermore, Eskom has placed Hendrina Unit 3 on extended inoperability, due to a major incident that occurred on the unit, which resulted in major failure that would require significant investment to repair. The prolonged unavailability of units from the capacity base worsens the supply-side constraint challenge.

The system is highly constrained as indicated by the recent load-shedding. The risks highlighted in the MTSAO 2018 report, which would move the system into inadequacy, are materialising with detrimental effects. Eskom has failed to plan effectively to ensure and sustain security of supply – from the failure to sustain plant performance improvements, to the failure to plan for procurement of coal in time and the inefficient use of OCGTs. The Energy Regulator is highly concerned about the impact of system insecurity on the country's economy especially under the country's already constrained economic growth.