# Eskom Presentation to the Joint Portfolio Committee on Public Enterprises & Mineral Resources and Energy

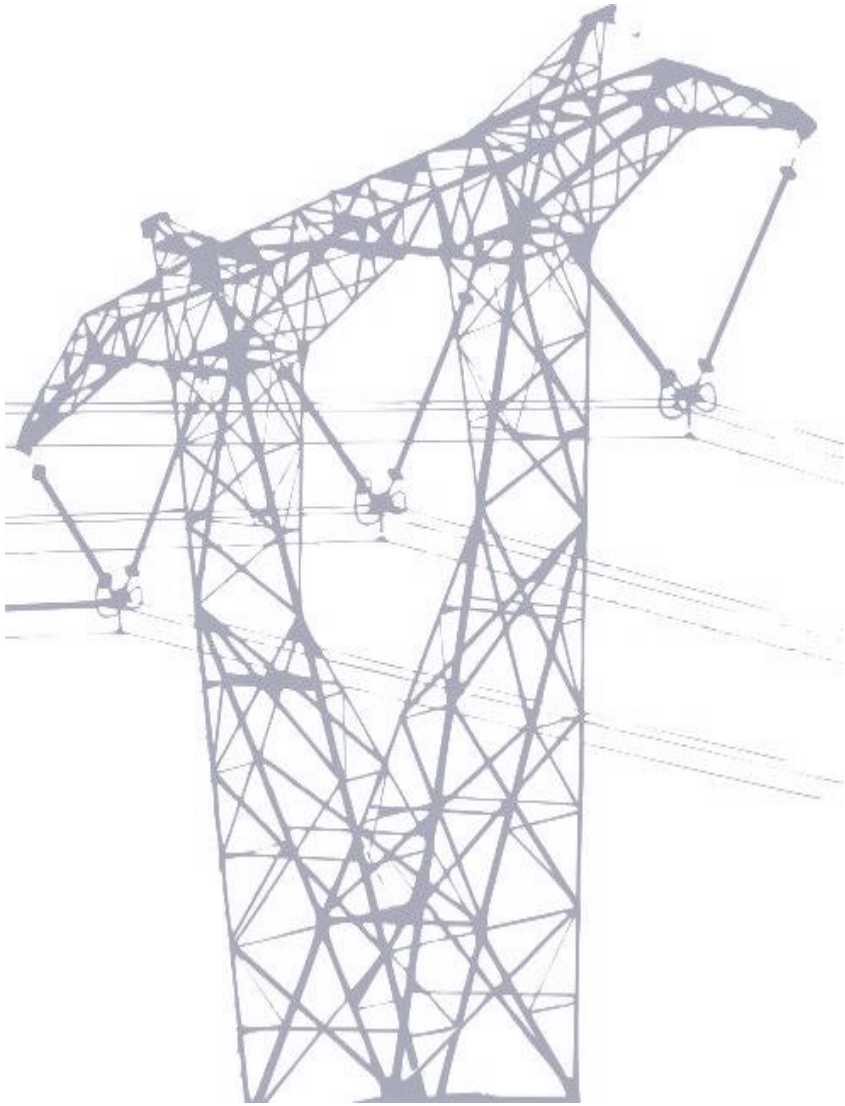
## System Status and Outlook

System Operator

31 August 2022

# Overview

- Summary of system status
- Summary of Load shedding and curtailment
- Power System Outlook



# Summary of system status

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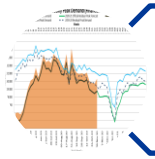
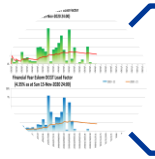


Financial year-to-date energy sent out from dispatchable plant is 1.4% lower than for the same period last year. (0.67% lower for dispatchable and renewable)



IPP OCGT load factor is 9.9%, Eskom OCGT load factor is 16.4% (Financial year to date)

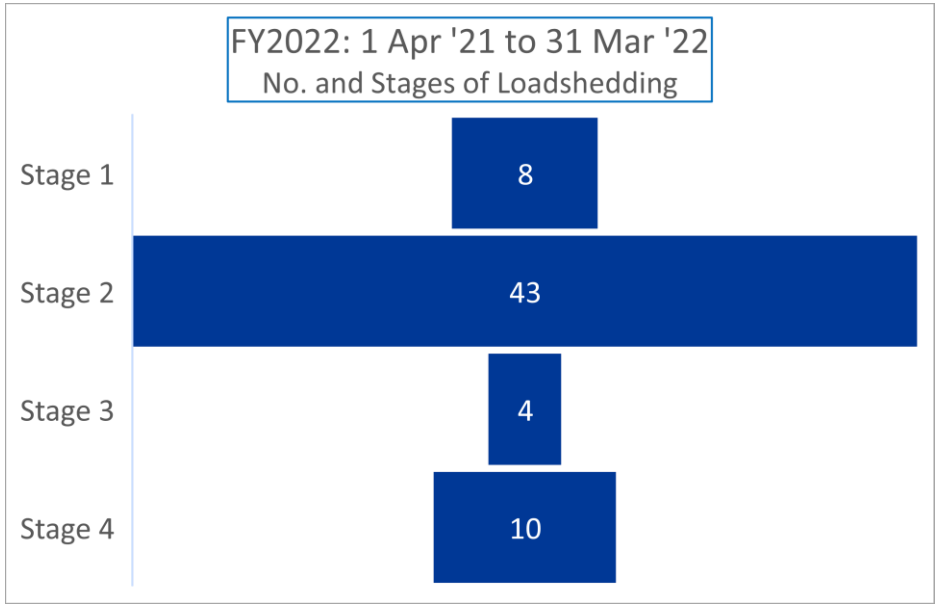
There were 24 wind generation curtailment events in the financial year.

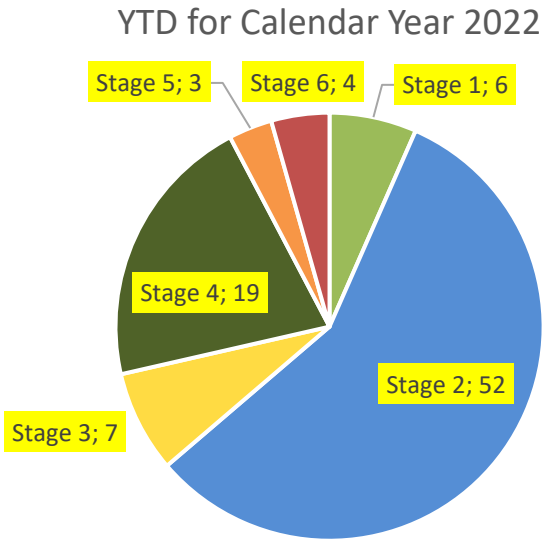
There were 77 days of load shedding in the financial year.

The highest residual demand (demand supplied by dispatchable generation) for 2022 was 33 136 MW

The highest contracted peak demand (demand supplied by dispatchable and renewable generation contracted to SBO) for 2022 was 34 666 MW

# Loadshedding and load curtailment summary




- For FY2022, there have been a total of 65 days of loadshedding, with 22 days of load curtailment at Stage 1&2
- Since 01 January 2022, there have been 91* days of loadshedding, with 18 days of load curtailment at Stage 1&2 and 2 days at Stage 3

In general, some of the following conditions led to the above load reductions:

- Shortage of generation;
- Increased unplanned unavailability;
- Limited fuel availability at peaking stations;
- The need to conserve and replenish depleted emergency resources;
- Poor coal and compromised emissions performance.

*Load curtailment is the load reduction obtained from customers who are able to reduce demand on instruction and satisfy the requirements of NRS048-9 for load curtailment*

** As at 29 Aug 2022*

# Power System Outlook

## (Summer Plan 2022/23)

# Planning process

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Capacity plan uses 10 000 MW UCLF

18 month residual demand forecast

UCLF + OCLF forecast

Summer Plan uses 13 000 MW UCLF


- Power stations determine their maintenance requirements
- Gx Production and System Ops in consultation with other stakeholders iteratively optimise the plan
- IPP dispatchable generation included by System Operator
- Emergency reserves such as ILS, VPS included by System Operator
- Estimated diesel requirement
- Estimated stage and frequency of load shedding

**All reliability maintenance outages are catered for in the 12 month planning period**

The maintenance outage optimization is done in the **Capacity Plan** using an unplanned unavailability provision of 10 000 MW. Anything higher than this does not make sense because there would be no room to schedule maintenance. The difference between the **Capacity Plan** and the **System Outlook (Summer Plan)** is that the Capacity Plan contains risks in the assumptions while the System Outlook Plan shows the consequences should those risks materialize.

# Components of the Plan

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- Four critical components make up the Plan and determine the need for OCGT generation usage and load shedding.
- Due to the 4 000MW uncertainty in unplanned unavailability, scenario planning is necessary to determine the likely outlook.

**Installed generation capacity:** This includes new build non-commercial generators and dispatchable IPP OCGTs but excludes self-dispatch renewable generation.

**Demand forecast:** The residual demand forecast (total demand less demand supplied by renewable generation) is used.

**PCLF:** Planned generation outages for maintenance.

**UCLF + OCLF (Unplanned unavailability):** Unplanned generation outages.

# Cumulative Monthly Unplanned Outage Levels

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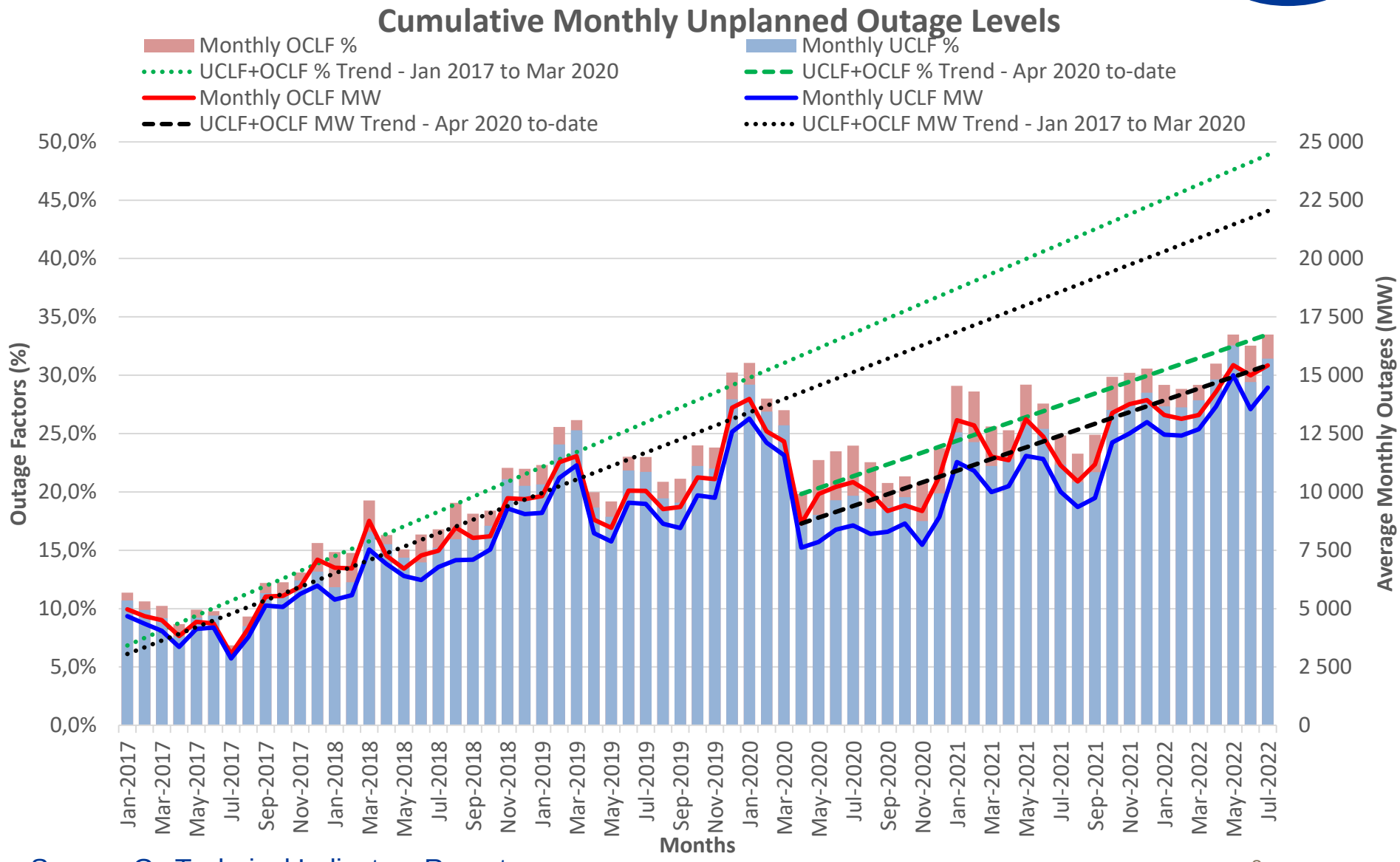
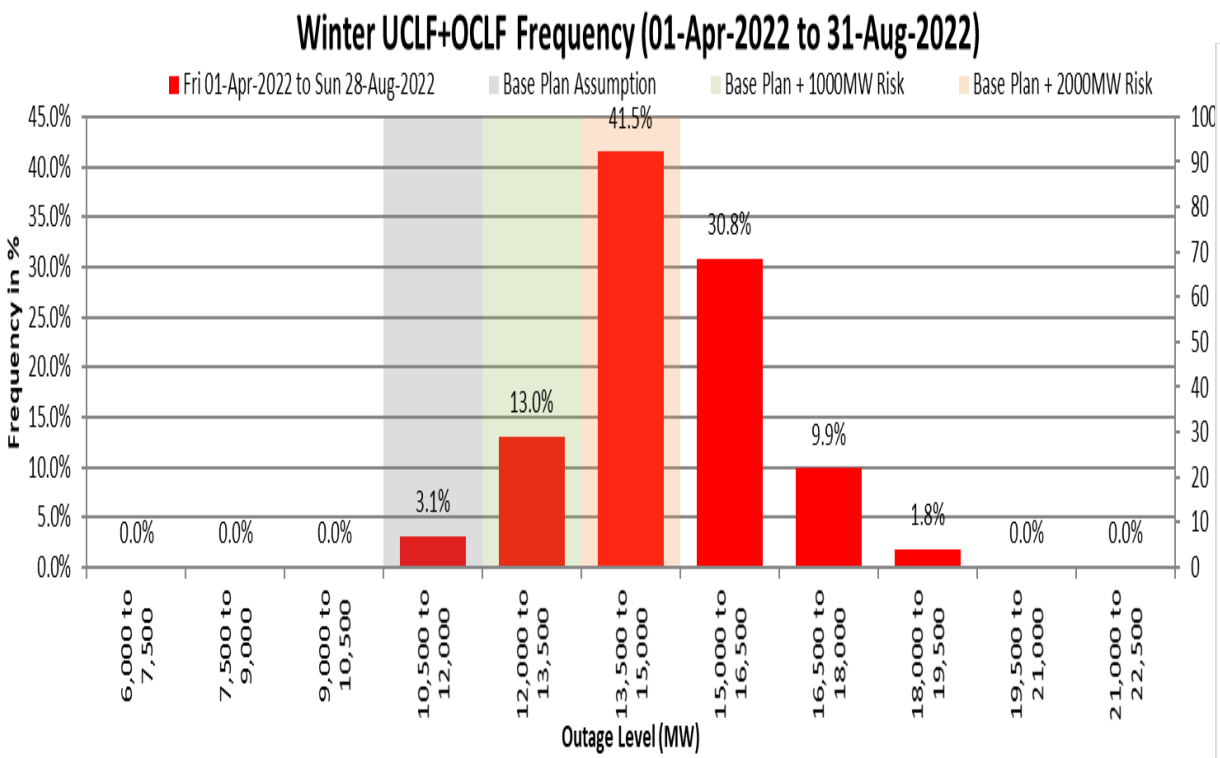



Source: Gx Technical Indicators Reports

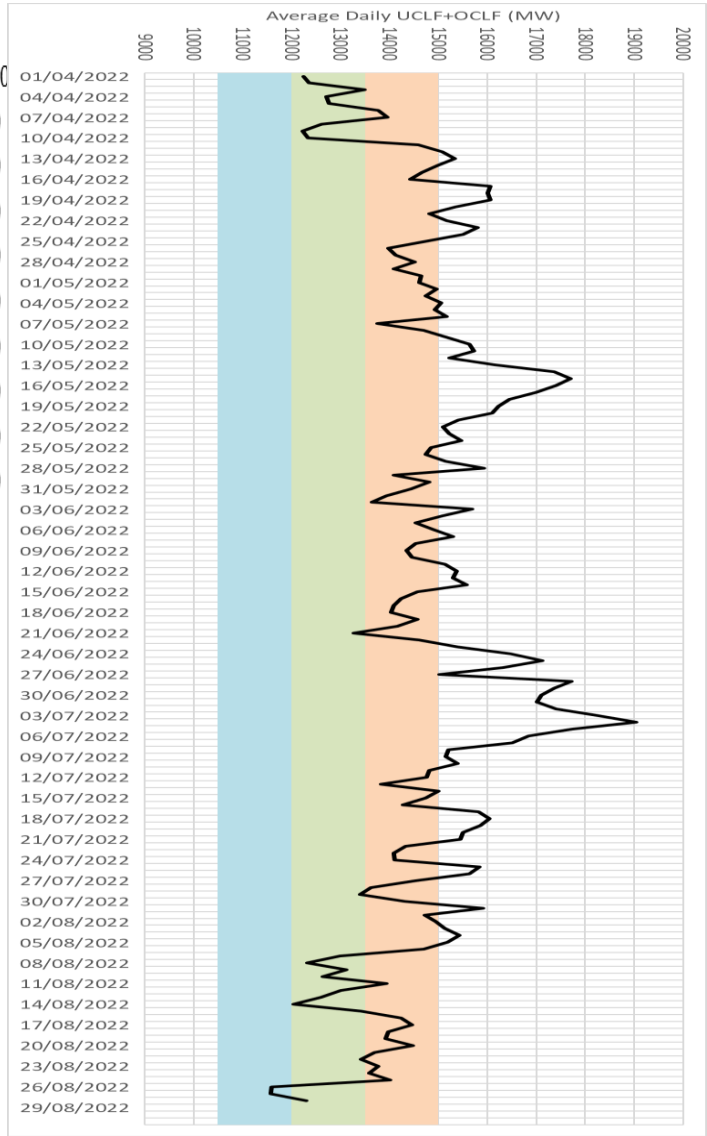
# Unplanned Outage Performance: Winter 2022




42.5% of the time we operated above the maximum assumption for the Winter Plan

The **average** UCLF+OCLF over evening peaks was 14 864 MW over the winter period

Total view unplanned outages during Winter



# Summary of the Plan

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All reliability maintenance required in the 12-month planning period has been accommodated in the plan. This has resulted in a “full” plan with little room to move, extend or add outages.

This outage plan was stress tested with 3 scenarios by the System Operator to estimate the OCGT usage and level of load shedding. For summer 2022/23, 13 000 MW, 14 500 MW & 16 000 MW of UCLF + OCLF provision was used.

For the most part the System Operator will need to source operating reserves from Demand Response (DR) products as well as from emergency reserve sources such as Interruptible Load Shedding (ILS) and OCGTs.

The Plan requires OCGT usage over weekdays, and low diesel usage on some weekends. The failure of Medupi 4 has increased the dependency on diesel generation to manage the power system.

# Risks & uncertainty

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The plan is “tight” and any significant outage slips will have a knock-on effect that will influence the plan from that point forward.

The plan does not cater for difficulties that could arise at power stations due to industrial action or other employee protests.

There is a ± 2 000 MW variance in UCLF (4 000 MW). This is often the variance in one week (168 hours). This cannot be predicted and makes planning uncertain.

This is equivalent to four stages of load shedding. In practical term it mostly means we operate in the range of having 2 000 MW of reserve to needing Stage 2 load shedding to create sufficient reserves.

Demand response was added to the plan in anticipation of signing up new customers. The demand forecast was reduced by 150MW for September 2022 – February 2023 and 400MW for the rest of the planning period.

The uncertainty of the Plan must be clearly communicated and understood by all stakeholders including government and the public.

# Critical success factors

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All resources and funding must be made available as needed to execute this plan. Any changes to this will have a knock-on effect that will influence the plan from that point forward.

The success of the plan relies on sufficient diesel to support the power system during periods of high UCLF. Without sufficient diesel to power the 3 000 MW of OCGT, 3 additional stages of load shedding *could* be added to the scenarios shown below.

Prolonged diesel usage may result in delays in getting fuel to the OCGT stations (approval of funds, procurement of product & logistics to move fuel). Failure to supply sufficient diesel will lead to further load shedding.

Outage 126 (SGR and refuelling) at Koeberg will significantly increase the risk of load shedding for 240 days.

# System Operator Capacity Outlook for the next 12 Months (Base Case)

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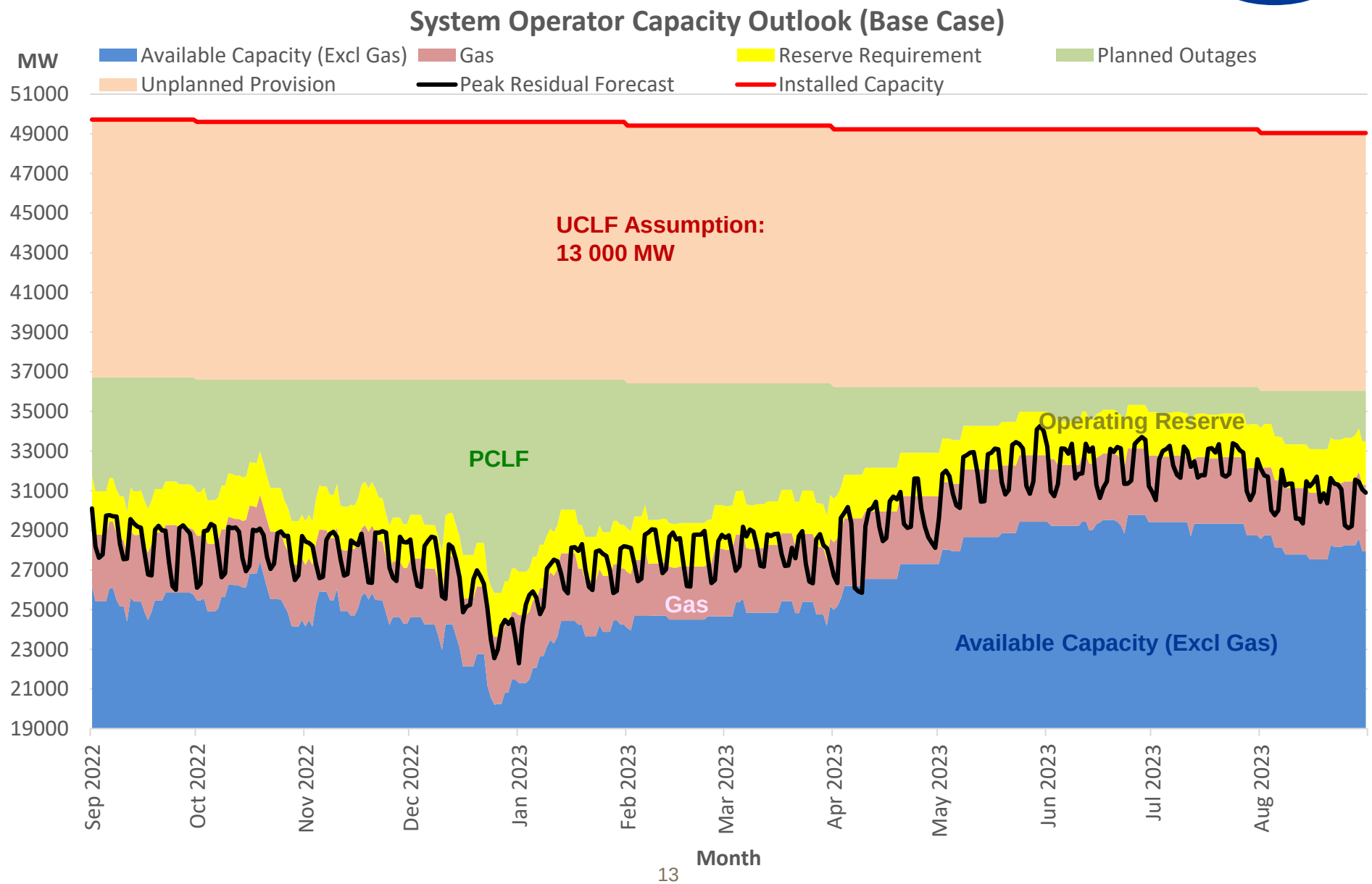

# Monthly System Status Outlook to March 2023

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| System Status Including 2200MW Operating Reserves | | | Base Case | | | | Base Case + 1500 MW Risk | | | | Base Case + 3000 MW Risk | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Month | Peak Residual Forecast | Unplanned Provision | Load Reduction Days | Max Load Reduction Stage | Estimated Monthly Gas Generation | Estimated Gas Generation Cost (Rm) | Load Reduction Days | Max Load Reduction Stage | Estimated Monthly Gas Generation | Estimated Gas Generation Cost (Rm) | Load Reduction Days | Max Load Reduction Stage | Estimated Monthly Gas Generation | Estimated Gas Generation Cost (Rm) |
| September 2022 | 30,109 | 13,000 | 0 | | 119,468 | R665.43 | 19 | 2 | 354,136 | R1,972.54 | 27 | 3 | 831,408 | R4,630.94 |
| October 2022 | 29,325 | 13,000 | 0 | | 92,986 | R517.93 | 10 | 2 | 293,245 | R1,633.37 | 22 | 3 | 716,259 | R3,989.56 |
| November 2022 | 28,959 | 13,000 | 4 | 1 | 139,976 | R779.66 | 17 | 2 | 524,211 | R2,919.85 | 26 | 3 | 1,047,261 | R5,833.24 |
| December 2022 | 28,687 | 13,000 | 3 | 1 | 369,908 | R2,060.39 | 19 | 2 | 992,008 | R5,525.48 | 30 | 3 | 1,606,074 | R8,945.83 |
| January 2023 | 28,311 | 13,000 | 2 | 1 | 386,768 | R2,154.30 | 20 | 2 | 960,217 | R5,348.41 | 28 | 3 | 1,438,280 | R8,011.22 |
| February 2023 | 29,058 | 13,000 | 13 | 1 | 309,414 | R1,723.44 | 20 | 3 | 799,608 | R4,453.82 | 28 | 4 | 1,144,764 | R6,376.34 |
| March 2023 | 29,185 | 13,000 | 0 | | 217,311 | R1,210.42 | 18 | 2 | 737,022 | R4,105.21 | 28 | 3 | 1,323,497 | R7,371.88 |
| April 2023 | 31,621 | 13,000 | 0 | | 95,376 | R531.24 | 13 | 2 | 310,969 | R1,732.10 | 23 | 3 | 711,408 | R3,962.54 |
| May 2023 | 34,267 | 13,000 | 2 | 1 | 135,735 | R756.04 | 19 | 2 | 313,830 | R1,748.03 | 30 | 3 | 617,546 | R3,439.73 |
| June 2023 | 33,710 | 13,000 | 0 | | 103,916 | R578.81 | 16 | 2 | 258,355 | R1,439.04 | 28 | 3 | 544,987 | R3,035.57 |
| July 2023 | 33,397 | 13,000 | 0 | | 107,663 | R599.68 | 17 | 2 | 272,627 | R1,518.53 | 29 | 3 | 577,283 | R3,215.47 |
| August 2023 | 32,111 | 13,000 | 0 | | 95,656 | R532.80 | 15 | 2 | 273,460 | R1,523.17 | 27 | 3 | 599,437 | R3,338.86 |

Note: The base case unplanned unavailability provision (UCLF+OCLF) has been increased to 13 000 MW for summer based on the performance over the past year. The scenarios stress tested are at 1 500 MW intervals above the base case.

History has shown that it is not possible to use more than about R 2.4bn of diesel in a month due to the physical limitations of moving the diesel to the OCGT stations. Where the Plan shows a diesel usage greater than this, additional stages of load shedding should be expected

# Interventions to contribute to the National Energy Crisis Committee

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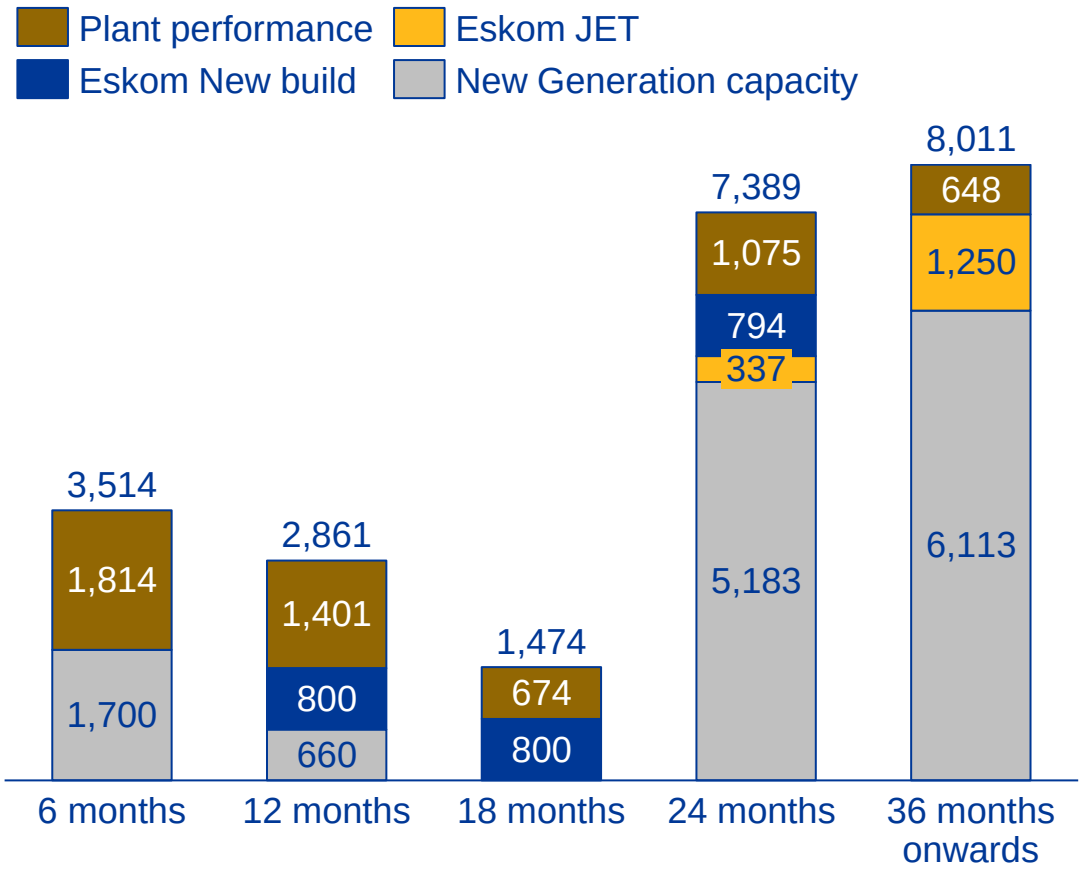
## Overview of estimated additional capacity over 36 months (MW)




## Notes

- Plant performance is based on Generation recovery plan to address load losses and includes Kusile units currently in operation
- New build includes commissioning of units 5 and 6 at Kusile, and recovery of unit 4 at Medupi (Aug 2024)
- Procurement of new Generation capacity consists of:
  - Standard offer, emergency procurement, imports from the region ~ 2300 MW in the next 12 months.
  - **Land leasing initiative and Section 34 procurement** (RMIPPPP, battery storage and bid window 5,6 included in the latter part of the plan), **24 months onwards**
- Additional ~1450MW of demand management interventions over 3 years

- **Successful implementation of all the initiatives will greatly reduce the risk of load shedding**
- **Timing of new generation capacity is dependent on the market response and regulatory processes**

# Thank you