System Status and Outlook Briefing

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Megawatt Park: Franklin Auditorium
25 October 2021

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2 Generation Overview – GE: Generation

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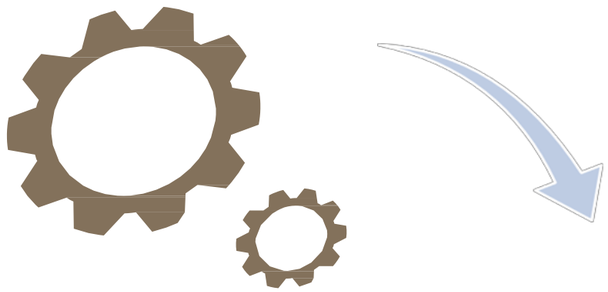
Overview and summary of Eskom system year-to-date performance (1/2)

- We have seen a **varied performance** by our operating divisions year-to-date, with generally good performance from Transmission and Distribution, however, there remain concerns on the Generation side.
- The **Distribution technical performance** is positive in terms of **duration and frequency of outages** as well as **restoration times.**
- On the **Transmission side,** the severity of a few incidents impacted results, however **positive performance** was attained with a low number of interruptions and **no major incidents** year-to-date.
- We continue to drive for improved **Transmission system reliability** through our **Transmission Sustainability Plan,** doing sufficient maintenance and focusing on replacement of older assets.
- Since February 2021, **1 594 MW new generation capacity** was commissioned. On 31 July 2021, Unit 1, the last of six generation units at Medupi was successfully commissioned and handed over to the Generation Division.
- Kusile Power Station is 50% complete, with **three of the six units completed and commissioned**. On 29 March 2021, Kusile Unit 3 achieved commercial operation.
- **First ash deposition** was achieved at the Camden Power Station Ash Facility on 02 October 2021 and the **first coal train** was successfully offloaded at the Majuba Power Station **coal tippler facility**.
- **Koeberg Nuclear Power Station** is fully operational and the project to replace the steam generators is on track for 2022.

Overview and summary of Eskom system year-to-date performance (2/2)

- Our **coal stock levels** are healthy - we have done a lot of preparation to avoid **wet coal** this coming summer and making good progress in **reducing the rand/ton costs** of coal.
- **Environmental matters** such as emissions and water consumption have shown good improvements year-to-date, but are not yet at the set targets.
- **Safety** is well below the tolerance levels, however, regrettably, we have had one employee and one contractor fatality year to date.
- The Generation side of the business remains a concern, specifically the **availability of the coal power stations**. YTD Energy Availability Factor (EAF) at 65.3% is not at the targeted level of performance.
- A key contributor to the low EAF was **high levels of planned maintenance** over the summer months. That said, the **recent high levels of unplanned outages** is a concern, but we continue to drive our **Reliability Maintenance Recovery Programme**.
- Unfortunately, as at 25 October 2021 increasing breakdowns and low plant availability meant that Eskom was **forced to implement load shedding totaling 32 days since 01 April 2021,** compared to **47 days for the 2021 financial year ended 31 March 2021**.
- Due to the system constraints, we have used more that the anticipated levels of diesel for our **Open Cycle Gas Turbines** (OCGTs).
- We had the unfortunate incident of **Unit 4 at the Medupi Power Station.** The detailed investigation is under way, and we have started the process to replace it.

Nuclear Performance YTD September 2021

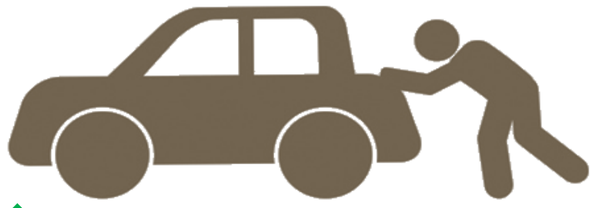


76.30%

EAF Actual YTD vs YTD Target of 89.83%

1

UAGS Trip vs. target of 1 for Q2 YTD FY22



2.55%

Forced Loss Rate vs. YTD Target of 3.55%

98.5%

SGR Readiness vs target plan

100%

LTO Readiness vs target plan

- The low year to date **EAF** is primarily due to delays experienced in returning Unit 1 to service during the recent refuelling outage – planned for 110 days vs.164 days actual, which includes 35 days due to the early forced shutdown.
- **Steam Generator Replacement** (SGR) - Three of the six SGs (for 1st unit) are on site. The remaining three are nearing manufacturing completion, with installation activities recoverable for the revised schedule.

Koeberg Nuclear Power Station

Recent noteworthy items related to Koeberg:

- **Unit 1 tripped** after being on line for 75 days **on 30 Aug 2021** due to a protection relay failure on a primary pump breaker. The unit was **returned to service on 3 Sep 2021**.
- **Unit 2 has been on-line for 344 days** (as at 30 Sep 2021) since completing its last refueling outage in October 2020.
- The **Reactor Pressure Vessel Head** arrived at Koeberg on 11 Oct 2021.

- **Steam Generator Replacement** (SGR)
  - Three SGs are already on site and are being prepared for installation during the Unit 2 Outage starting in Jan 2022.
  - The remaining three SGs are nearing manufacturing completion and will be delivered to site in time for the next Unit 1 Outage scheduled to start in Sep 2022.

- **Koeberg Long-Term Operation** (LTO)
  - The LTO activities to enable Koeberg to operate for another 20 years beyond 2024/254 continue as per schedule. The formal application to extend the operating license has been submitted to the National Nuclear Regulator and accepted for further processing.

Group Capital Performance YTD 30 September 2021

1 594 MW YTD

vs YTD target of 1 594 MW

(Jan 2021 to Sep 2021)

Execution of Major Plant Defects Correction

vs plan

Execution of Emissions Control Projects

Execution of Ash Dam Projects

- **Commercial Operation of new units:** On 31 July 2021, Medupi Unit 1, the last of six generation units, was successfully commissioned and handed over to Generation. On 29 March 2021, Kusile Unit 3 achieved commercial operation
- **Major plant defects correction:** At Medupi, boiler plant modifications have been implemented on all six units, except for the long lead time milling modifications and the duct erosion modifications on Unit 6. At Kusile Unit 1, the boiler plant modification outage that commenced in June 2021, was completed.
- **Execution of emissions control projects:** Steady progress is achieved on the projects, however some construction, contractual challenges, including COVID-19 constraints are impacting execution.
- **Execution of ash dam projects:** Significant progress achieved with ashing at Camden and Majuba, however some commercial, construction issues, including inclement weather and COVID-19 constraints are impacting execution.
- **Other:** Tender evaluations for Phase 1 of the Battery Energy Storage Systems (BESS) project is complete. At Majuba the coal tipler was successfully commissioned.

Medupi and Kusile major boiler plant defects correction

- Eskom is correcting all the major **boiler plant defects** (i.e., mills, gas air heaters, fabric filters, air and flue gas ducts, and reheaters) at both Medupi and Kusile.
- A defect correction program was established in **collaboration with the original boiler contractor**, to test, develop and implement technical solutions in all Medupi and Kusile units.
- **Medupi Unit 3 was used as a pilot** for the initial implementation of these solutions, which require extended unit outages to execute. Similar solutions were rolled out to **all Medupi units and Kusile Unit 1**. Effective from 2021/2022, this roll-out will be implemented on the **remaining Kusile units,** as unit planned outages become available.
- Similarly, defect correction on the **milling plants** are done during planned mill refurbishment outages and as modified spares become available.
- Eskom is also developing **enhanced boiler plant solutions**, independently and in liaison with the boiler contractor and other parties. These modifications will be rolled out during standard **planned unit maintenance outages starting in 2022**.

Interim Results: the availability and reliability of the Medupi new units is steadily improving.

Status of GCD New Build Programme (inception to date):

Focus is on bringing new capacity online and driving plant defect corrections

Target schedule ✓ Achieved CO on or earlier than target

Completed Units

FY 2015 – FY 2022

Latest Eskom Board Approved Target Dates

FY 2022 – FY 2025

Sere Wind Farm Mar-15 ✓		**Ingula Unit 4 Mar-17** Jun-16 ✓		**Ingula Unit 2 May-17** Aug-16 ✓		**Medupi Unit 5 Mar-18** Apr-17 ✓		**Kusile Unit 1 May-18** Aug 17 ✓		**Kusile Unit 2 Jan-21** Oct-20 ✓		**Medupi Unit 1 Jul-21** Jul-21 ✓		**Kusile Unit 4** Jan-23		**Kusile Unit 6** May-24	
100		333		333		794		800		800		794		800		800	
794		333		333		794		794		794		800		800			
Medupi Unit 6 Jun-15 Aug-15 ✓		**Ingula Unit 1 Jul-17** Aug-16 ✓		**Ingula Unit 3 Jan-17** Jan-17 ✓		**Medupi Unit 4 Jul-18** Nov-17 ✓		**Medupi Unit 3 Jun-19** Jul-19 ✓		**Medupi Unit 2 Dec-19** Nov-19 ✓		**Kusile Unit 3 Mar-21** Mar-21 ✓		**Kusile Unit 5** Dec-23			

8 596 MW installed since 2015 &
14 733 MW installed since 2005 ….

… 2 400 MW to be installed over the next 4 years

Transmission Performance as at end September 2021

SM<1 of 2.01

vs YTD target of 1.75

96.8% Maintenance Completion

0 Major Incidents

vs YTD target of 1

10 Interruptions

vs YTD target of 17

- **System reliability performance:** Although there have been a low number of interruptions YTD, **System Minute <1** performance has been negatively impacted by one large event involving a transformer failure.
- **Nil Major Incidents** (defined as System Minute loss of >1) have occurred YTD.
- **High levels of maintenance completion** has been sustained
- Asset condition risks require **increased asset renewal investment** going forward for future operational sustainability
- **Ongoing theft** and **vandalism** has **impacted operations** creating risks for interruption incidents

Distribution Performance as at end September 2021

Electrification

38 256

vs.

YTD Target of 34 742

SAIDI

36.68

vs.

38.00 Tolerance

SAIFI

13.00

vs.

19.60 Tolerance

Planned Maintenance Completed

90.68%

vs.

YTD Target of 93%

Refurbishment Spent

R150m

vs.

YTD Target of R230m

Restoration Time

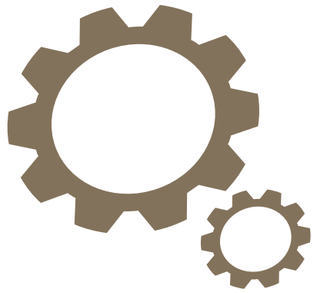
91.5%

vs.

90% Target

- **System performance**, measured **by SAIDI and SAIFI** remains positive and within the desired levels.
- **Planned Maintenance** and **Refurbishment** execution are below target but have not adversely impacted system reliability. Completion of the planned programs remains a key focus area for the business.
- **Theft** and **vandalism** of network equipment continues to impact operations and system reliability.
- **Electricity theft** continues to manifest as an operational, financial and public safety risk.

Generation Performance as at end September 2021



65.3%

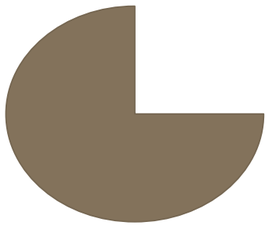
Availability vs. 70%
target for FY22

342

UAGS Trips vs. 196
YTD target for FY22

23.1%

Unplanned load losses vs.
18% target for FY22



4612 MW

Partial load Losses vs.
3969MW target for FY22

9.1%

Planned maintenance vs.
9.2% YTD target FY22

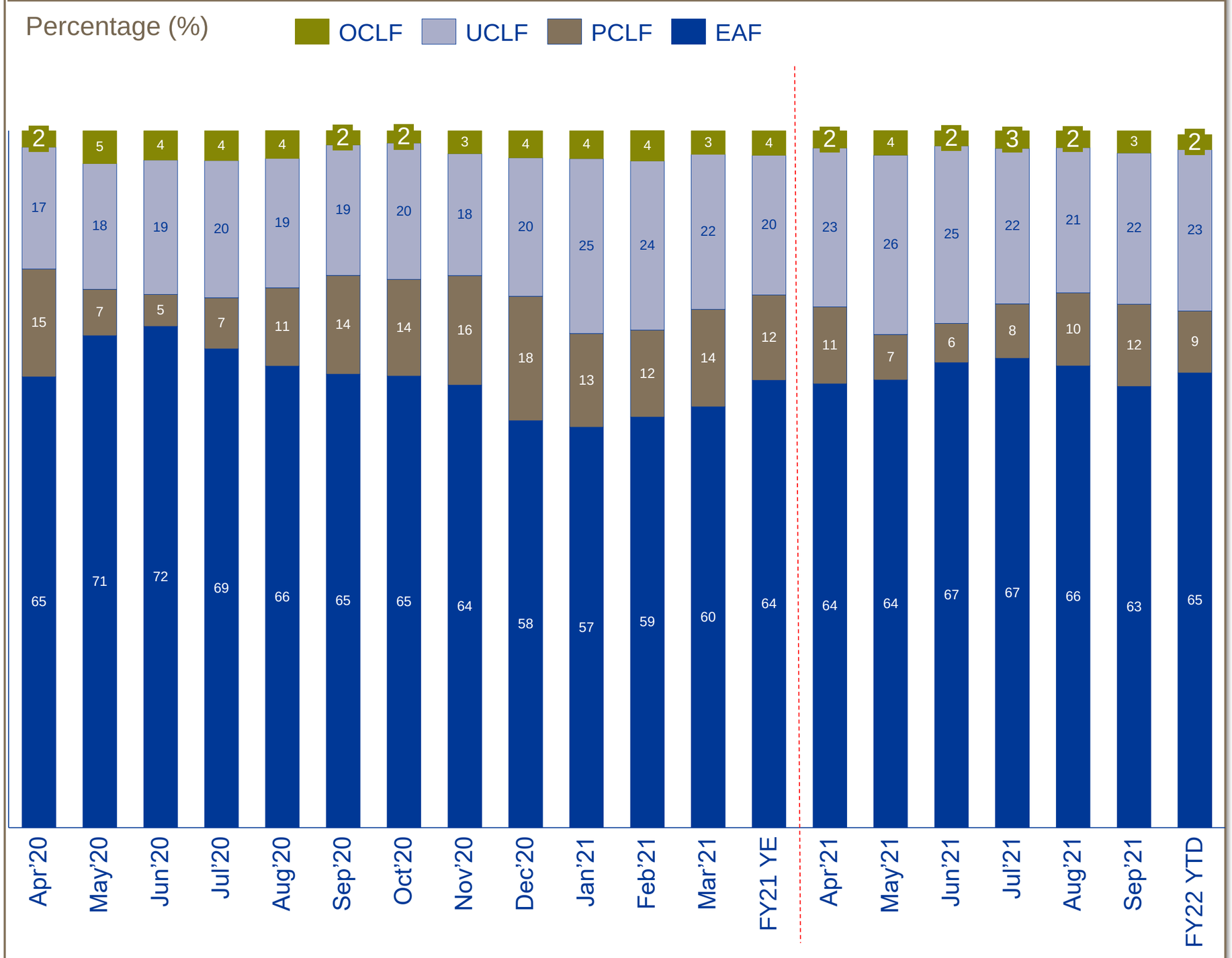
R2,44bn*

Open Cycle gas turbines cost
vs YE projection R4,1bn

* Eskom OCGTs only as at 11 Oct 2021

The FY2021 EAF performance was lower overall compared to the FY2020 performance. The FY2022 performance continues to be lower than the aspiration resulting in intermittent load shedding.

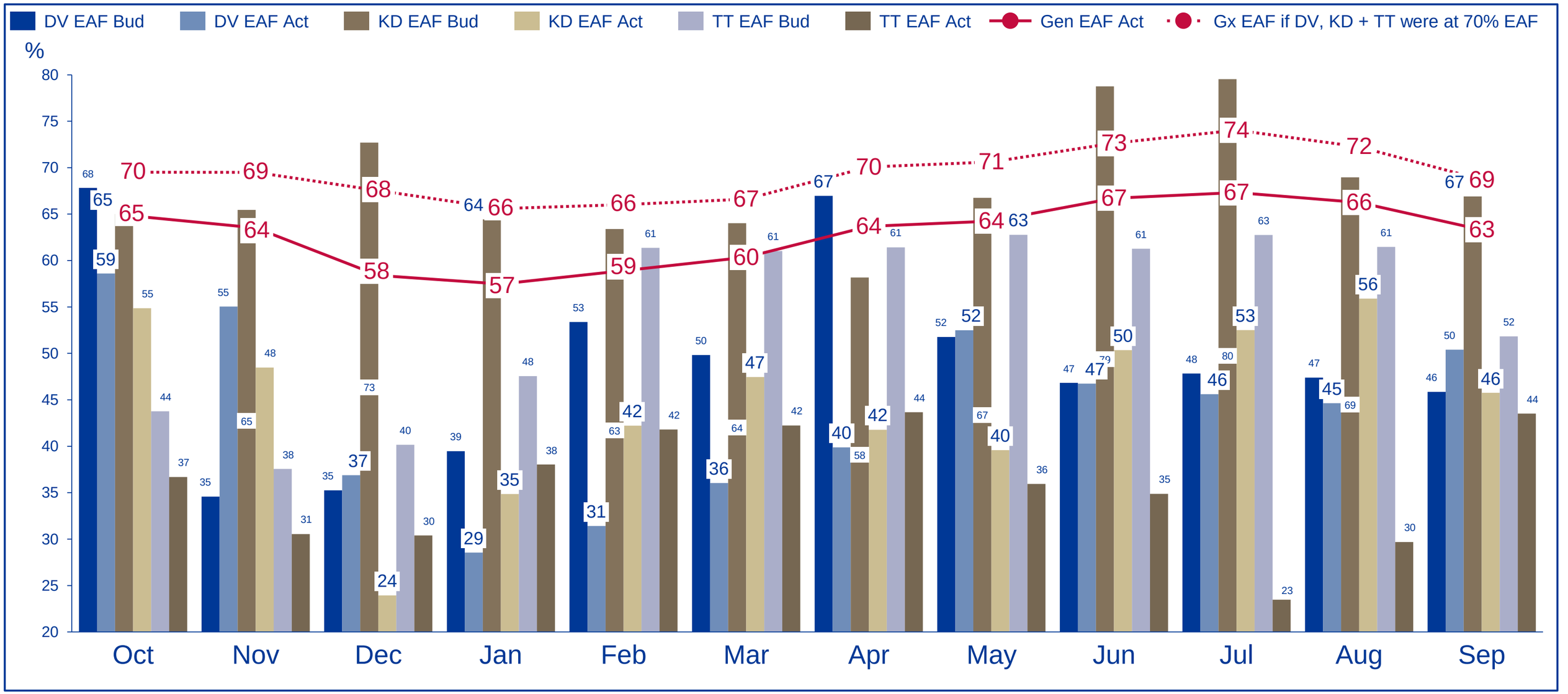
Generation monthly and YTD performance



Contributing factors

- Camden's ash constraint contribute about 39% to total YTD OCLF of 2.68%.
- Slips, trips, boiler tube failures, partial and full load losses all contributed to the high UCLF.
- Generation fleet YTD EAF at 65.42% is below the YE target of 70%.
- During the year, a delicate balance was required to giving the plants opportunity for planned maintenance and the having the plants available to support the system. The ratio of short-term to long-term is about 1:2

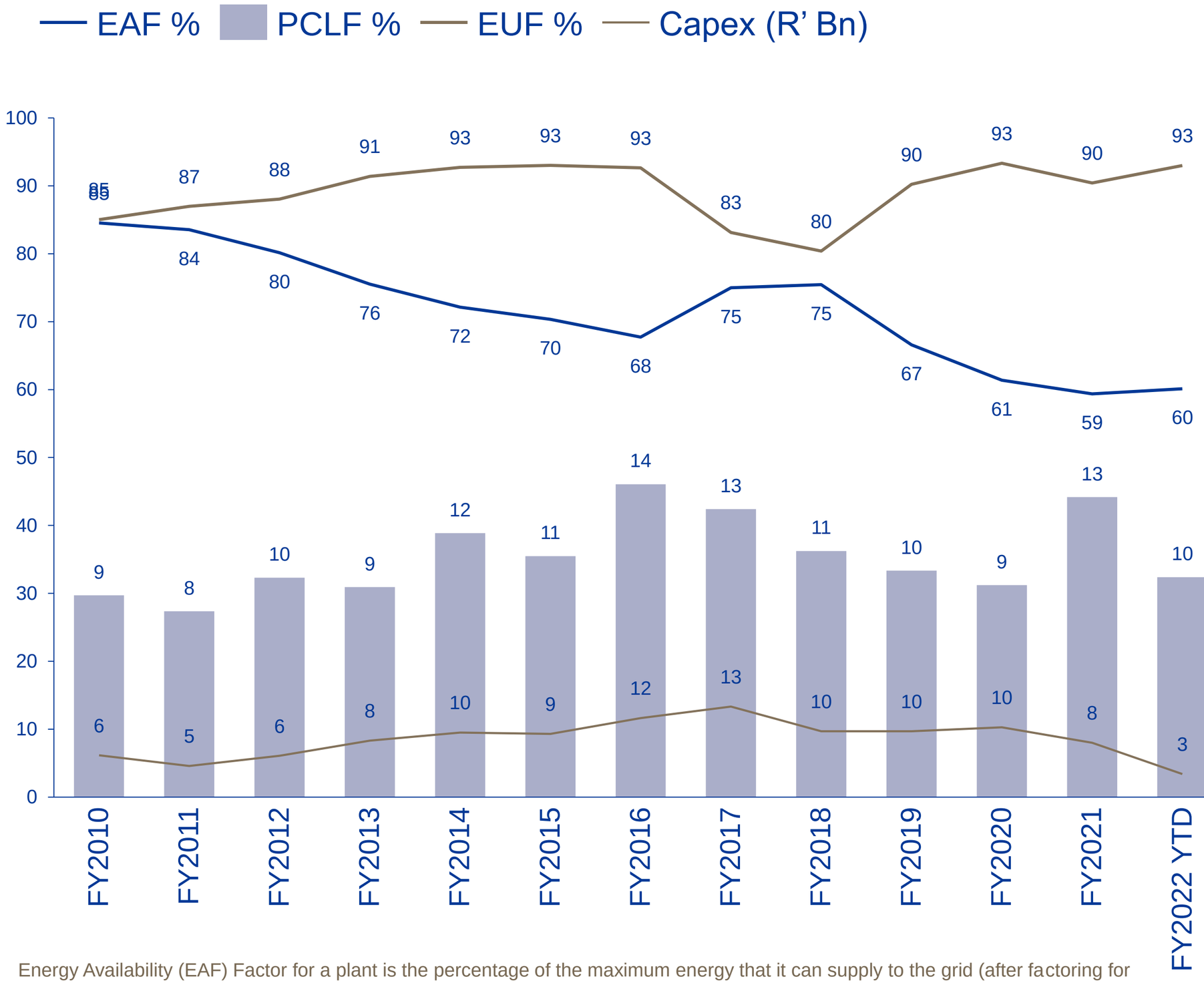
The impact of performance at Duvha, Kendal and Tutuka on Generation EAF (%)



Key Insights

- Kendal and Tutuka's performance have constantly been below the budget for the review period.
- Duvha had a better performance vs the budget in November, December and May, otherwise the EAF performance has been constantly below the budget.
- The lower than expected availability of Tutuka, Duvha and Kendal reduced Generation's EAF by between 5% and 9%, assuming they could perform at the targeted EAF.

Coal Fleet Yearly EAF Performance shows that the performance has continually been declining

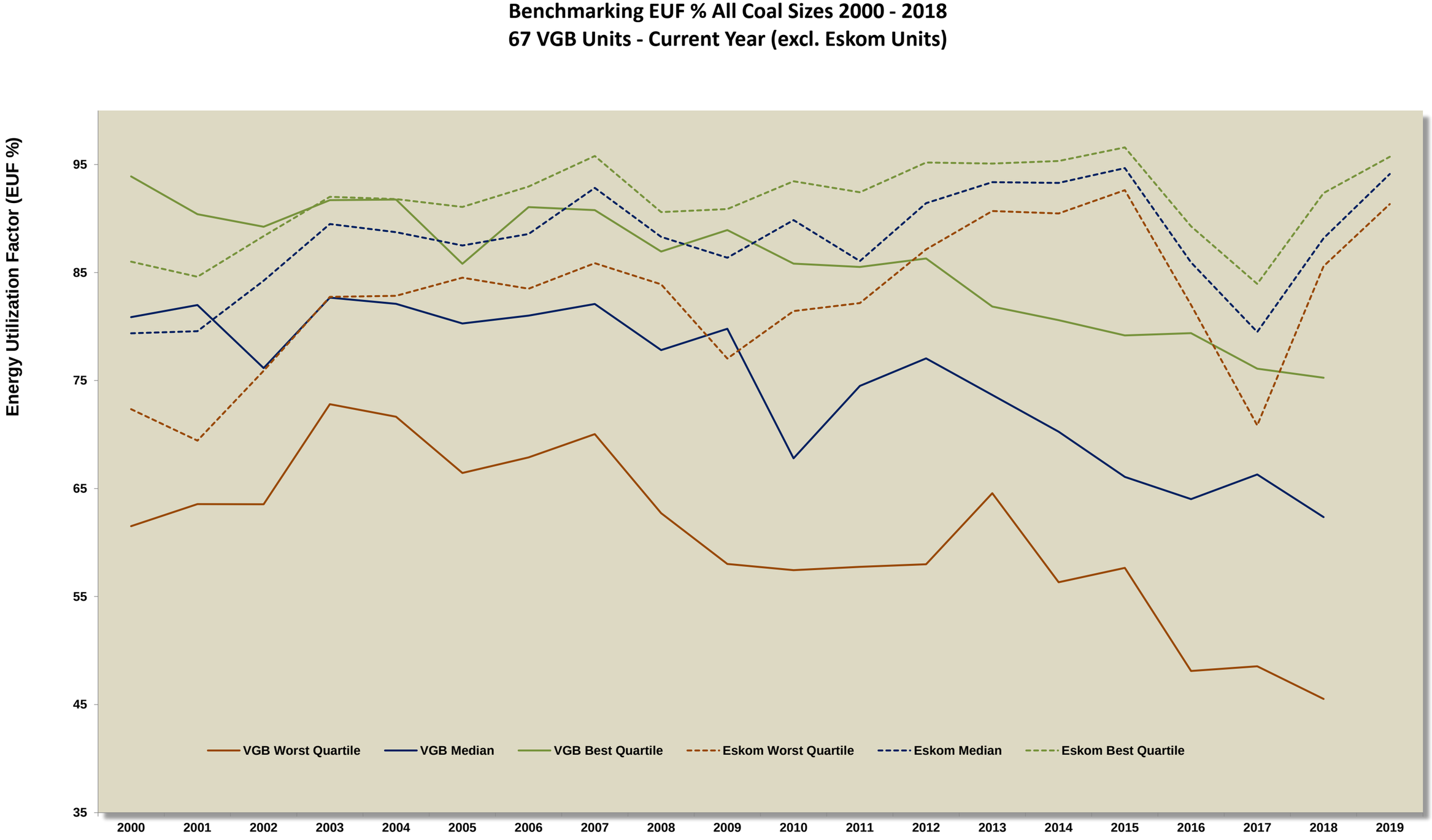


Key Insights

- Yearly **Coal** EAF has been steadily declining since FY2010 with an improvement in FY2017 and FY2018.
- The improvement could partly be related to increased maintenance in FY2016 and FY2017.
- Performance shows a direct relation between EAF and EUF, i.e. the drop in availability, results in higher utilisation of the available plants capacity.
- Recent availability has significantly reduced resulting in the need to run the available coal plant hard to meet the demand.
- The load factor has been declining with years

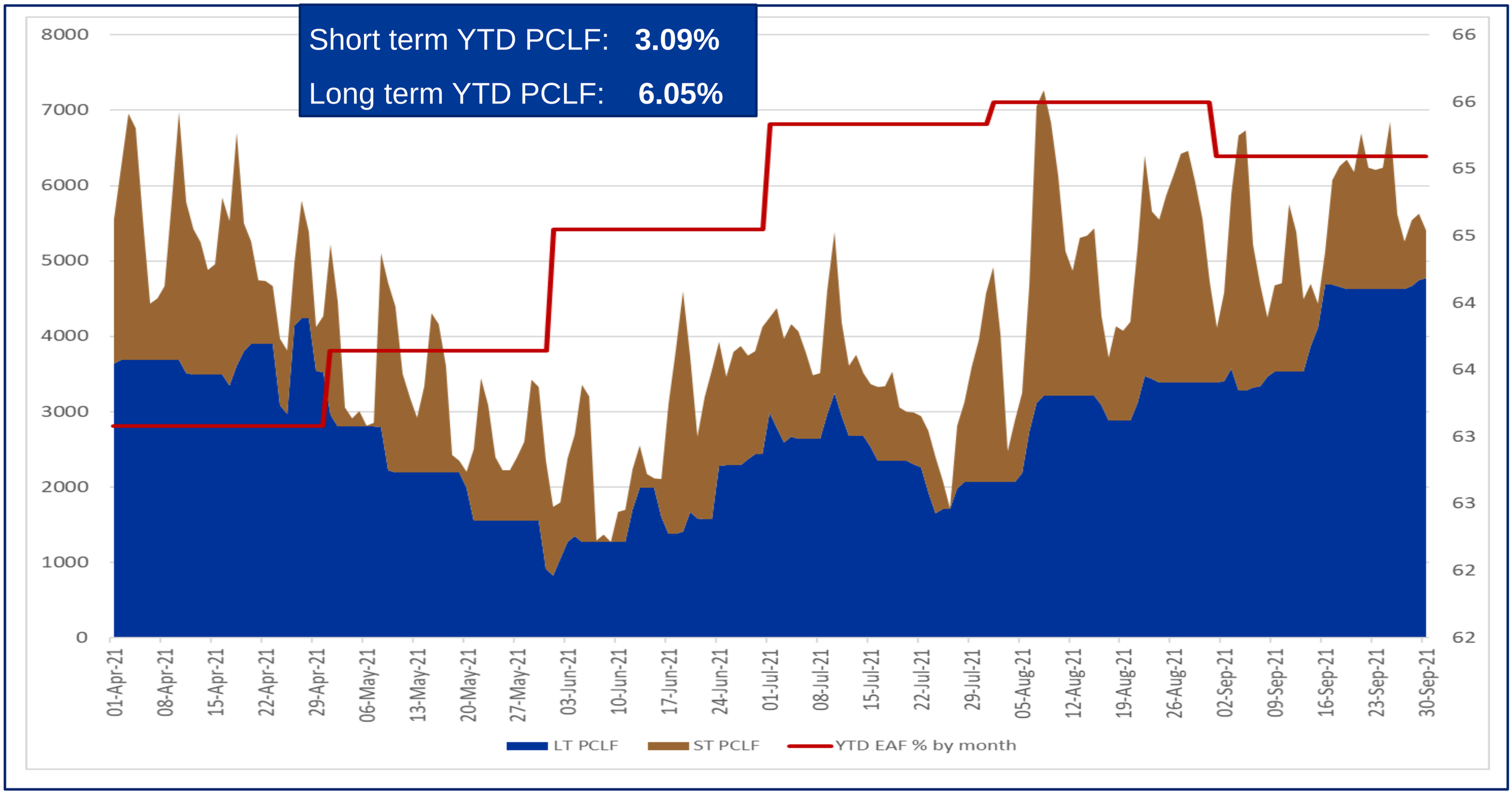
- Energy Availability (EAF) Factor for a plant is the percentage of the maximum energy that it can supply to the grid (after factoring for planned and unplanned shutdowns)
- Load Factor (LF) measures how hard the plant is running against its maximum possible output (i.e. when EAF is 100%).
- Energy Utilisation Factor (EUF) measures how hard the plant is running when it is available (using the actual EAF).

Benchmarking Energy Utilisation Factor (EUF) % - Eskom units typically run much harder than benchmark units



Calendar years
Latest VGB benchmarking data - 2018

Long Term maintenance decreased from mid May 2021 to end June 2021, which typical for the winter period, and has increased since the beginning of August 2021

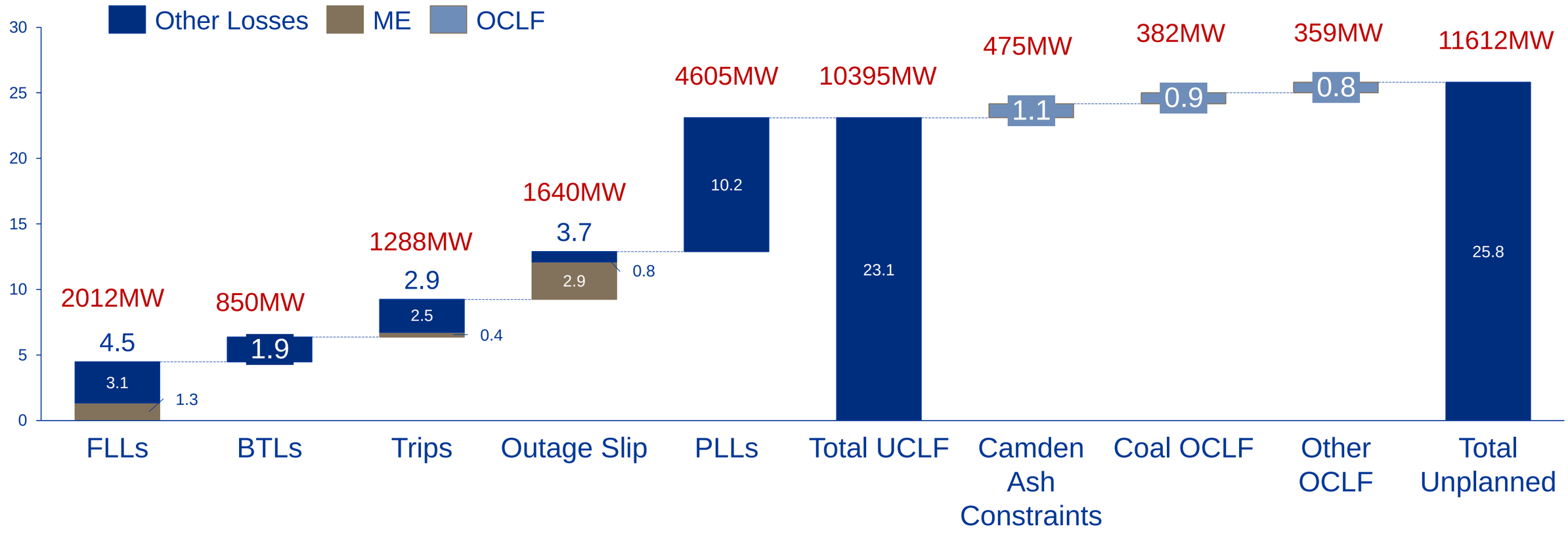


Overview

The maintenance is still showing seasonal trend which is typical for planned outages, reducing in the winter and increasing in the summer period. However short term is fluctuating depending on the space available in the system.

Partial Load Losses, Full Load Losses, trips, slips, major incidents and the Camden Ash Dam constraints have been the major contributors to the increase in total unplanned losses

Build-up of Unplanned Losses for FY2022 September YTD from major contributors



Key insights

- Plant performance is highly unpredictable with multiple failures experienced continuously
- Current UCLF of ~23% is unsustainable for the business resulting in load shedding incidents
- Partial Load Losses (PLLs) continues to be the biggest contributor to UCLF for FY2022
- **Resolving the issues sustainably requires extensive maintenance Outages and implementation of refurbishment projects**

Conclusion - COO

- We have seen strong performance from our **Transmission and Distribution** businesses,
- We continue to invest in our networks to replace old assets in order to sustain **network reliability,**
- **Koeberg Nuclear Power Station** is fully operational and provides a reliably supply of electricity to the network,
- Our **Generation business** remains a concern - mainly due to its age and a legacy of poor maintenance,
- We continue to drive our **planned maintenance programme**, with a very specific focus on the effectiveness of our outages,
- Our Group Capital division is making steady progress on the new build programme, with all the **Medupi** units and 3 of the **Kusile** units now in commercial operation,
- The process to address the **design defects of the Medupi and Kusile** are progressing well and from next year we will implement additional enhancements,
- We are doing out utmost to limit **load shedding**, but not at the cost of doing effective planned maintenance,
- **Additional capacity** (4 000 MW to 6 000 MW) required,
- Again, we appeal to customers to **continue to use electricity sparingly.**

Something Important to Note

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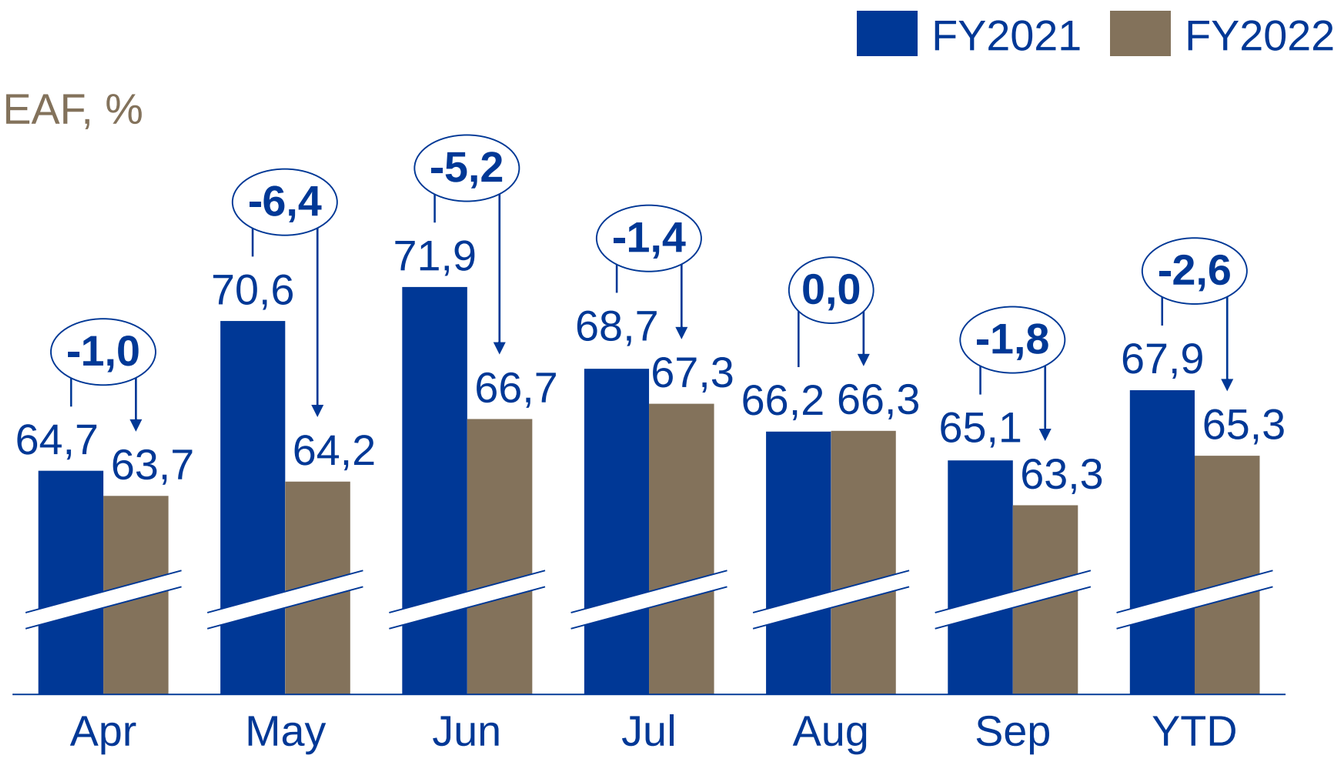
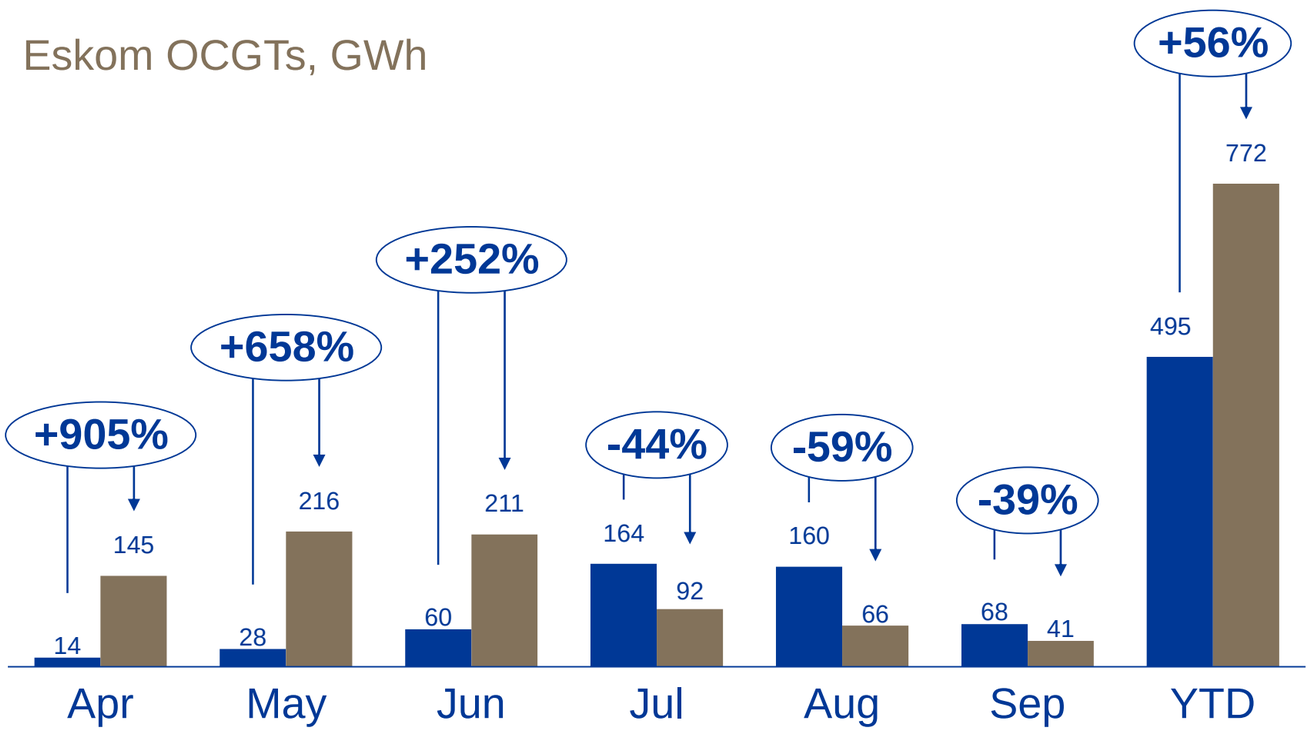
FY2022 Generation System Performance





Official System EAF

- Current financial year **Sep 2021 MTD** is **63.3%** which is more than one percentage point lower **(actual: 65.1%)** compared to last financial year September actual.
- Current financial year **YTD Sep 2021** is **65.3%** which is more than two percentage points **(actual: 67.9%)** lower compared to last financial year YTD figures.
- **FY2022 YE EAF** target is **70%** versus **65.3% YTD**

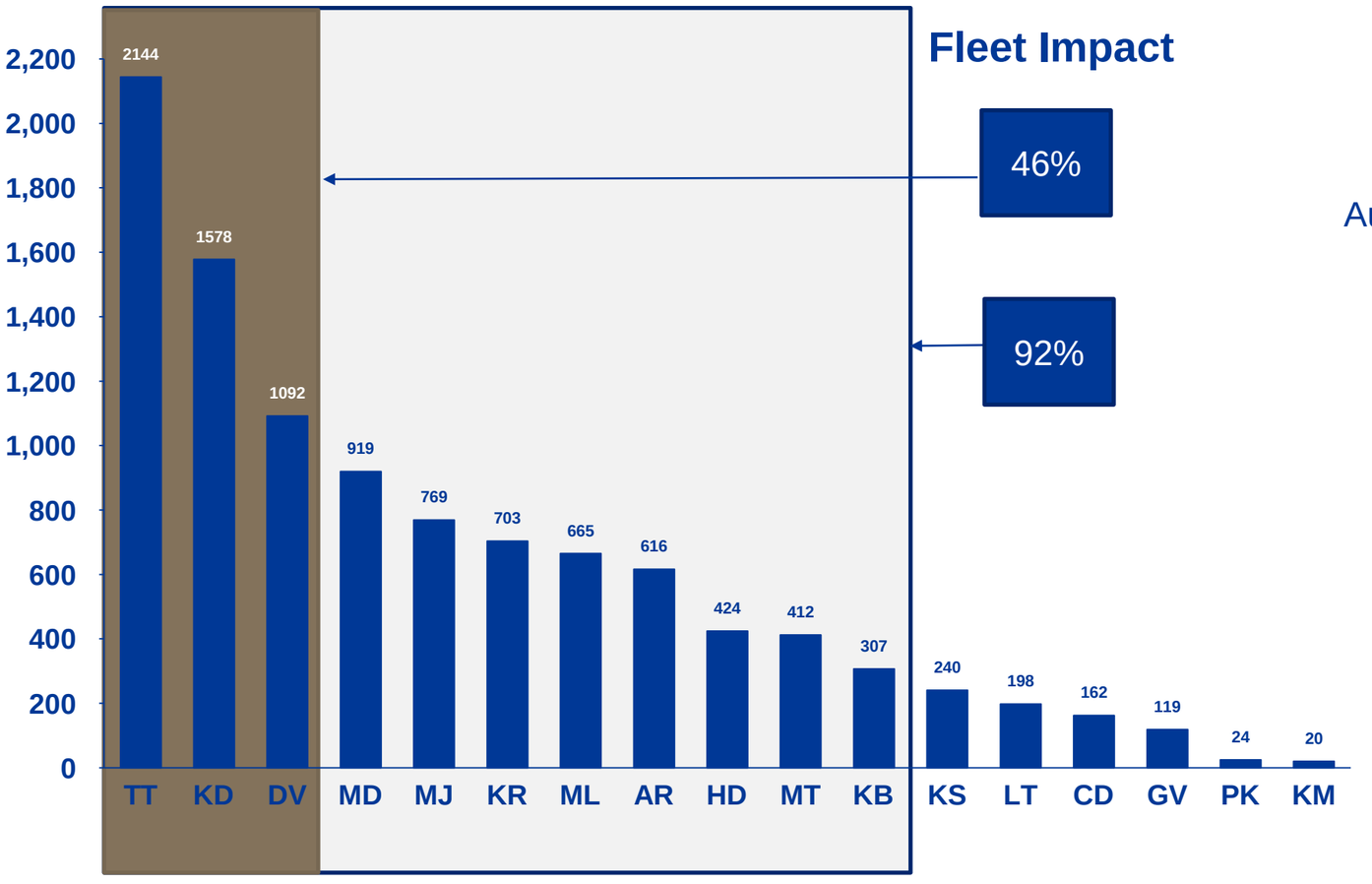
Eskom OCGTs

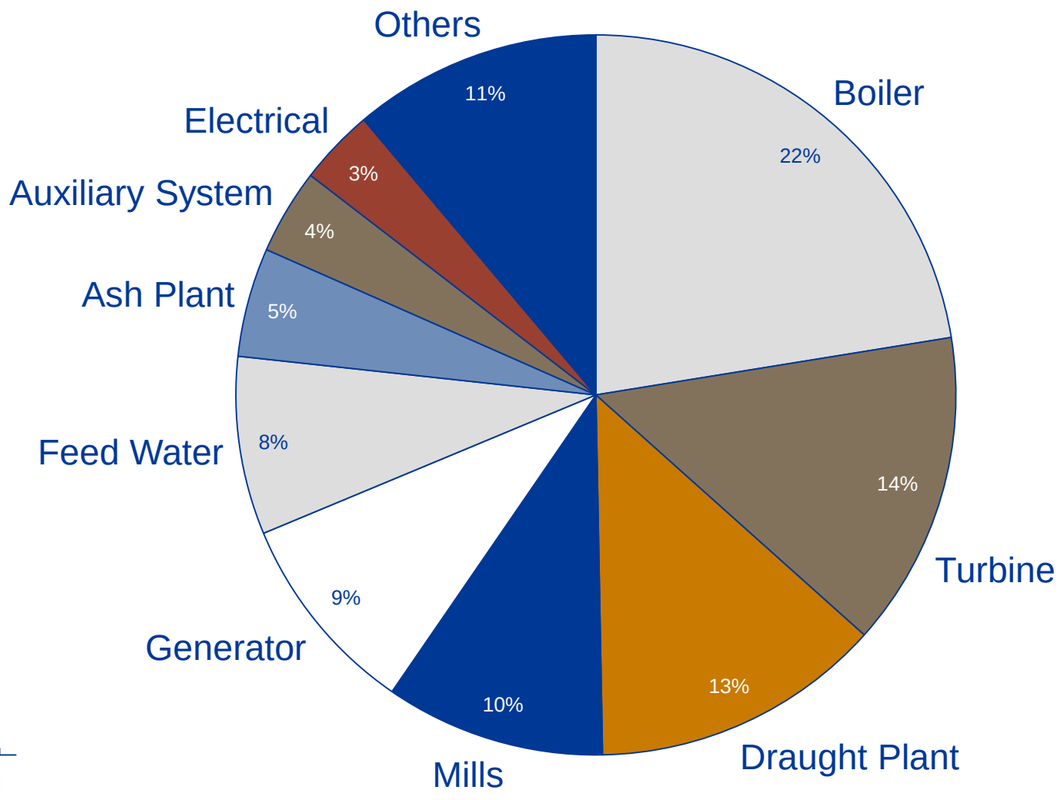
- **MTD: Sep 2021** is **41 GWh** (2.4% load factor) up to the end Sep 2021 compared to **68 GWh** actual for Sep 2020.
- **YTD: Sep 2021** is at **772 GWh** compared to **495 GWh YTD actuals** for last financial year.
- **FY2022 YE provision** is **211 GWh** (1% load factor) versus **772 GWh YTD** (7.3% load factor)**.**

Station Contribution to Total UCLF

F2022 30 September YTD – 23.14%

Average MW loss YTD 30 September 2021



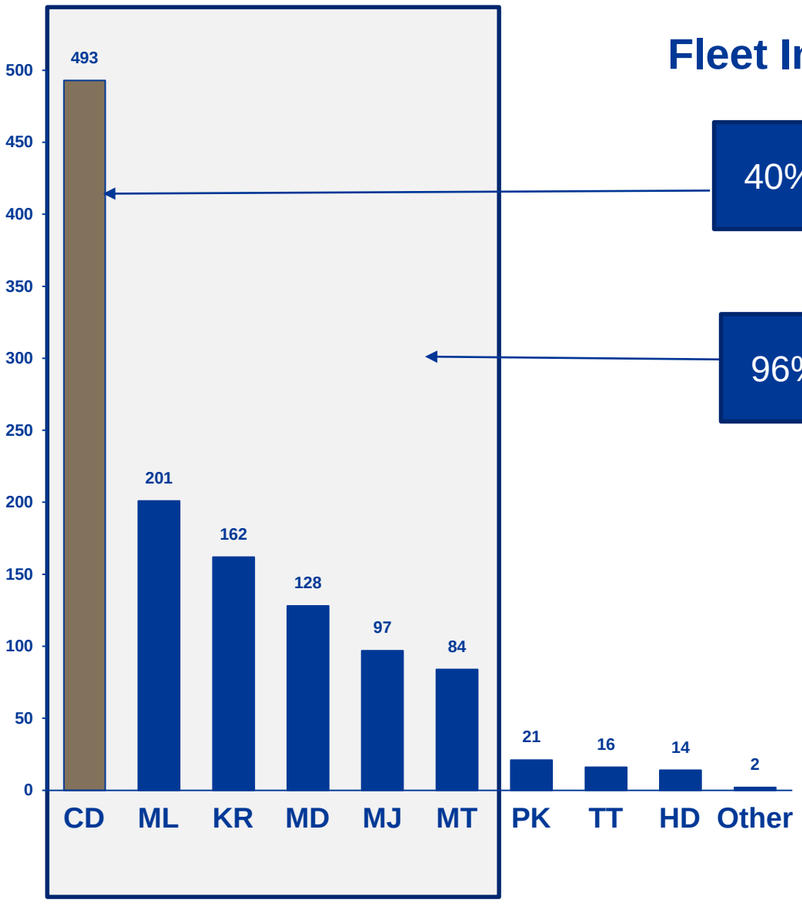


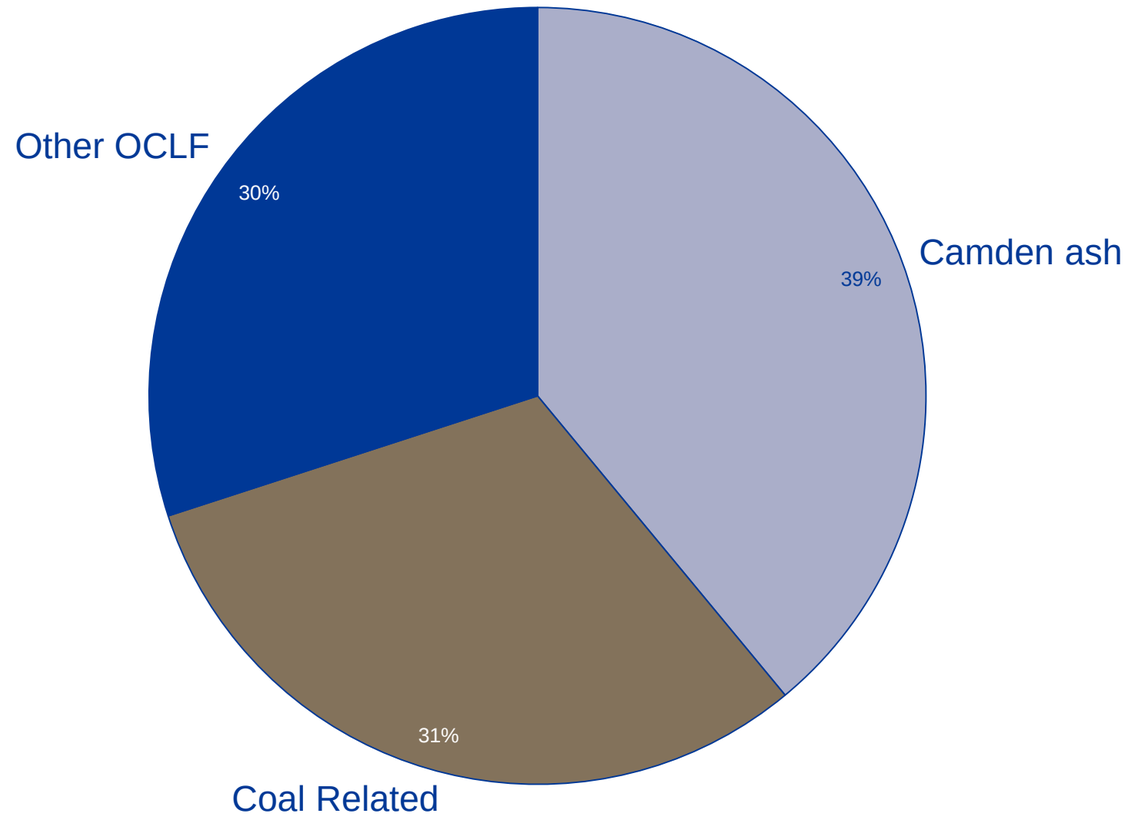
Key Insights

- **Tutuka, Kendal and Duvha** contributed about **46%** of the total UCLF YTD.
- **Boiler, Turbine, Draught and Milling Plants** were the main contributors 60**%** contribution) for the period of 30 September FY2022 YTD.

Station Contribution to Total OCLF
F2022 30 September YTD – 2.71%

Average MW loss YTD 30 September 2021





Key Insights

- **Camden** contributed about **40%** of the total OCLF YTD.
- **Coal related losses** at **0.85%** contributed about **31%** of the total OCLF YTD, with Matla at 195MW (51%) and Kriel at 148MW (39%) being the biggest contributors.
- **Camden Ash constraints** at **1.06%** contributed about **39%** of the total OCLF YTD

The Generation Improvement Plan focus areas and initiatives

1 EAF improvement

- Power Station Improvement Plans
- 9-Point plan and MTTR actions
- Driving Partial Load Losses down
- Accelerate resolution of New Build defects
- Outage preparation / readiness improvement
- Coal Quality improvement drive
- Recover procurement performance
- Establish Gx Turnaround Plan Steering committee

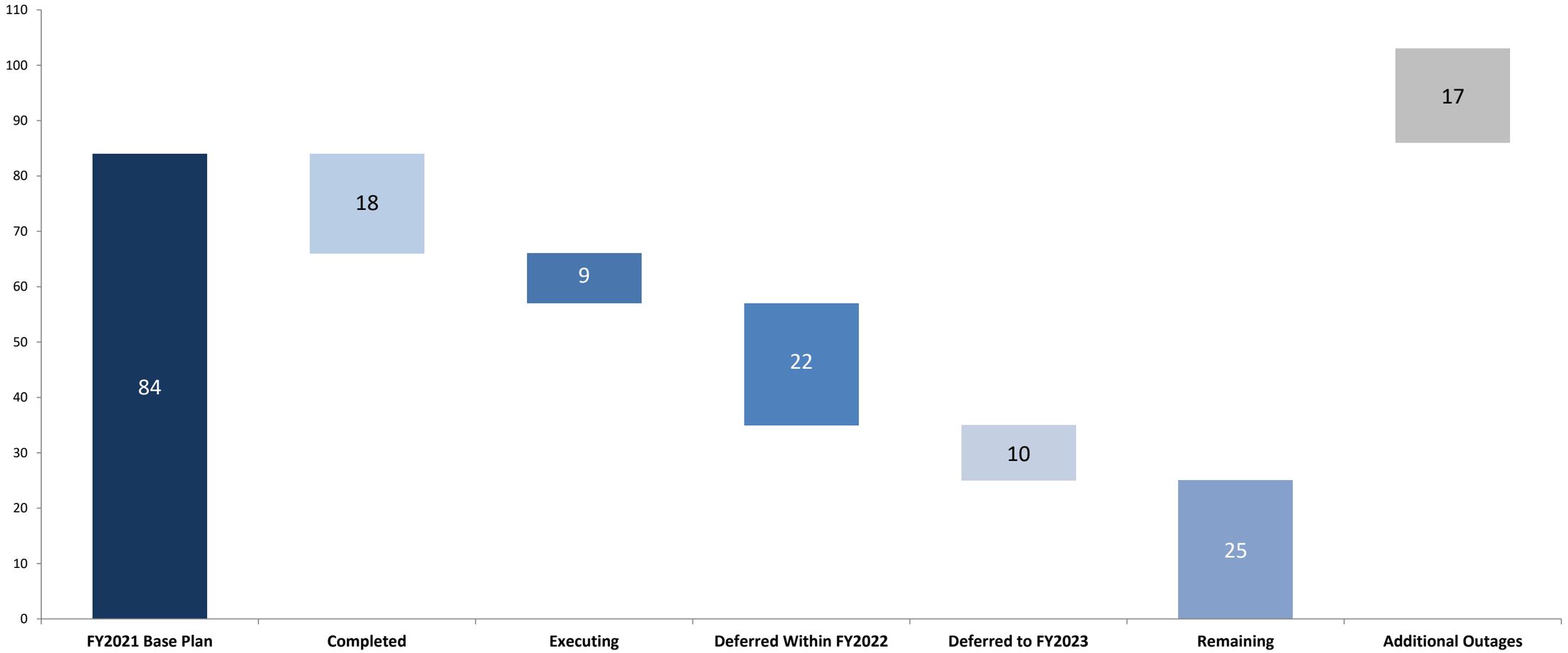
2 Leadership and culture

- Clarify expectations at a senior level and drive accountability
- Drive technical focus
- Improve housekeeping
- Power Station visits
- Active risk management
- Power station assessment drive
- Enhance knowledge at a senior level
- Drive Gx communication plan
- Restore pride in employees

3 Skills and resourcing

- Reaffirm ‘Specialist Group’ function
- Augment specialised skills
- Drive capability building
  - Project R and PCM training
  - Engineering Practitioners training
  - OEM training
- Develop resourcing strategies – technical roles
- Fill Vacancies

Reliability Maintenance Recovery (RMR) Programme Status at 30 September 2021



- Status of Reliability Maintenance FY2022:
  - A total of 84 outages are scheduled from 1 April 2021 to 31 March 2022
  - As at 30 September 2021, of the 84 outages planned for FY2022, 18 have been completed, 9 are in execution, 25 are remaining and 22 have been deferred within the financial year while a further 10 outages have been deferred to FY2023.
  - An additional 17 opportunity maintenance outages have been executed.
- The current plant performance is poor, with little confidence in any predictability in performance. The biggest opportunity to fix the plant is during Outages – hence the importance of the RMR Programme
- The main work impacting plant reliability and predictability is carried our during Mini-Overhauls and General Overhauls. There are on average 20 MGO's and GO's p.a. for coal fired power stations
- There will be a 3 year lag period to have completed MGO's or GO's on the coal fleet units

Reliability Maintenance Recovery Interventions Strategy (Analogy)

ONLINE: Continuous

- Minor maintenance activities focused on performance sustainability like oil top-ups, tire inspections, windscreens etc. This is done frequently to ensure safety and road worthiness while still allowing to drive your vehicle safely.
- Such on-line work allows one to plan, observe car condition and budget for any potential intrusive work that may be required.
- This work is done on a continuous basis to track the condition of your vehicle and look for any possible anomalies: what you find during on-line maintenance is used for future maintenance interventions and budgetary provisions.

OFF-LINE Inspections:

- Thorough inspections should be done on your vehicle in preparation of major services.
- Such inspections allow one to have a comprehensive understanding of what work is required on your vehicle, what critical spares parts need to be available and the level of the skill that needs to be secured to carry out very critical activities.
- Such inspections offer the owner the time to shop around, negotiate best products at the best prices, best people, timing and durations for the major service.

OFF-LINE: Mini General Overhaul (60 months); General Overhaul (120 months Major vehicle service

- Intrusive well planned long duration philosophy maintenance intended to restore the vehicle to it's original design performance
- Much work during an MGO/GO is on specialized equipment and linked to safety and specific technical criteria (don't use Toyota spares in Mercedes vehicle)
- Philosophy work should be aimed at predictable vehicle performance till next major service
- Intensive work on critical components of the vehicle requiring specialized skill and original manufactured equipment that require a long lead time to secure.
- Such outages have 24 month planning window to scope and plan
- Timely budget provision and release of funds is key to outage success

20 & 40 Months

60 & 120 Months

PIT-STOP

Opportunity Maintenance

- This requires planning and excellent execution but should take the shortest possible time to allow you to get back on the track.
- Work carried out during opportunity maintenance is swift and deals with fixing immediate performance issues. Tire changes, wheel alignment, replacing of windscreen, inspecting for any possible pending performance issues.

Tech Plan Projects OFF-LINE:

- Projects aimed at plant performance improvement (environmental &Technical) are carried out during MGO's and GO's. (major service)
- These projects also address obsolete equipment upgrades and end of life components that require full replacement.
- Such projects either improve the vehicle performance (against design) or extend the life span of the vehicle.
- Such projects have a long lead planning window

Continuous improvement to feedback into all Maintenance Strategies aimed at maintenance effectiveness and efficiencies (quality, cost & duration)

Key requirements to execute a successful Unit Outage

Outage Planning

- User Requirements defined
- High Level Scope of Work defined
- **Budget Available**
- **Long Lead Spares ordered**
- **Standard work orders in SAP**

Outage Preparation

- Scope Freeze achieved (T-6)
- Quality Control Plans in place
- Spares Ordering (T-6) & **Delivery (T-3)**
- Initiated (T-6) & **Concluded Contracts (T-3)**
- **Integrated Outage Execution Schedule**
- **Work orders released in SAP**

Outage Close-Out

- Outage **incident investigations** finalised and actioned
- **Finalised contracts and claims (Financial close out)**
- Formal **Post-Outage Review** & Lesson's Learnt Session completed

T-24 – T-18 months

****24 months to breaker open**

T-9 to T-7 months

T-6 to T-1 months

Outage Execution

Post Outage Reviews

Continuous Review of Outage Readiness Indicator

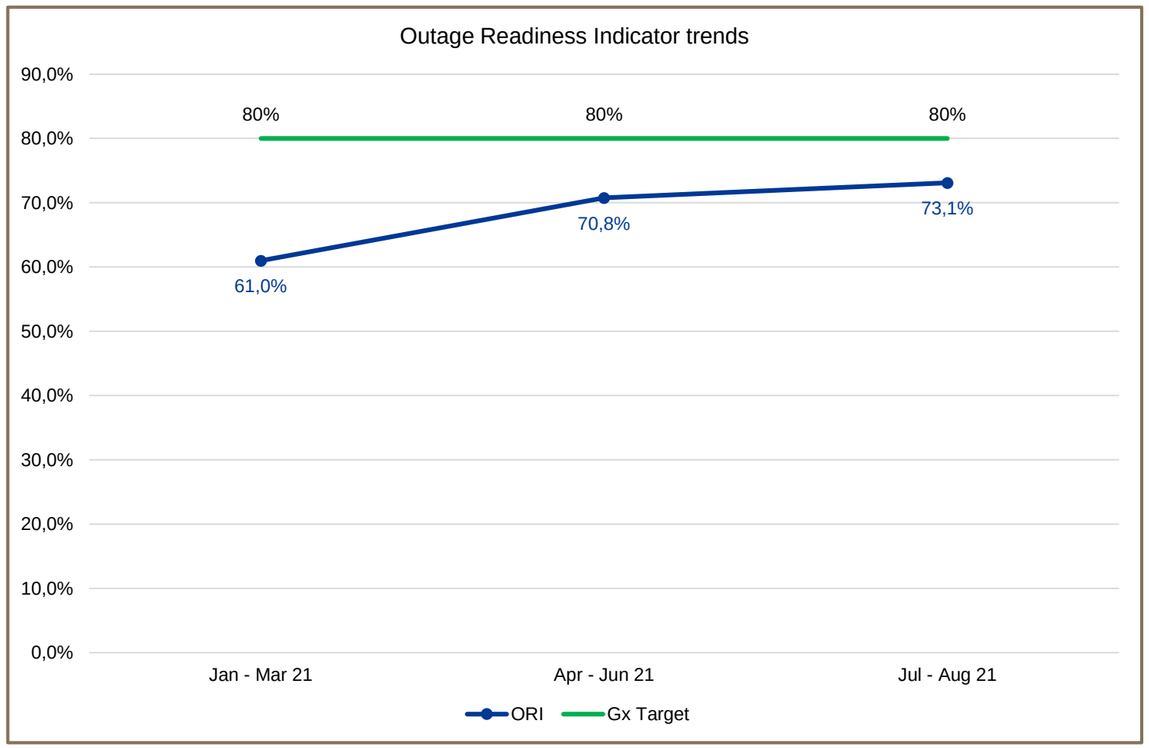
Outage Scoping

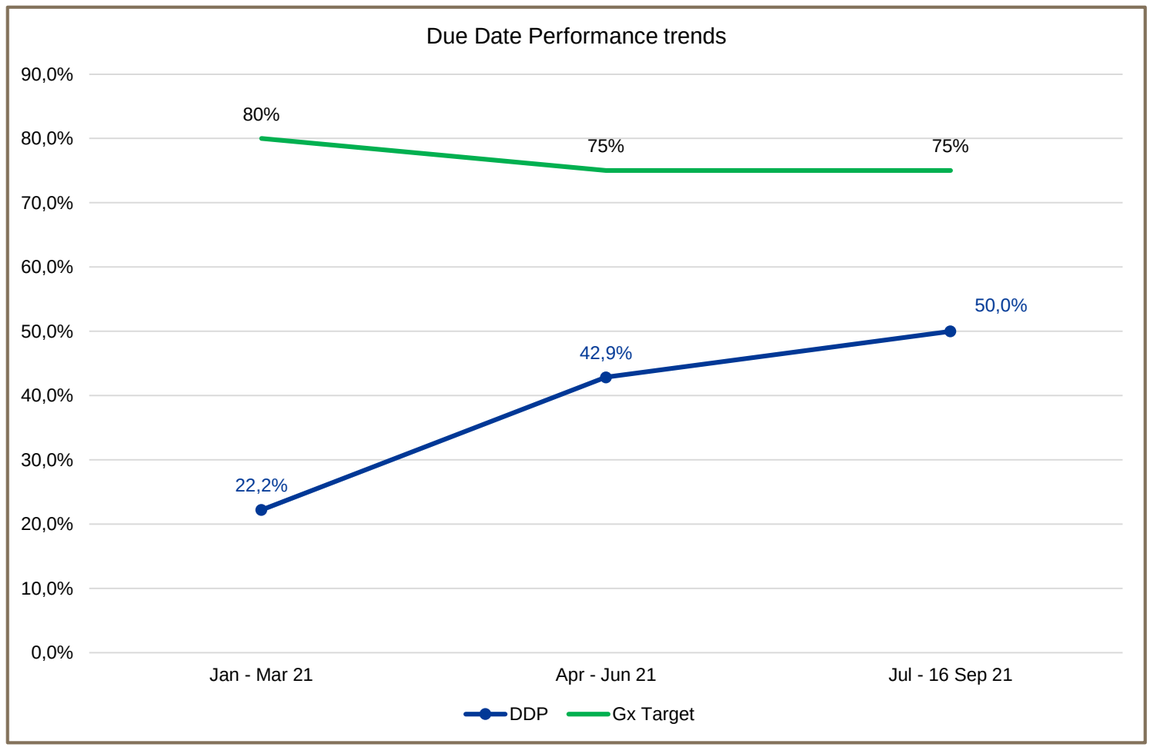
- Defined Outage Scope of Work
- Scope Challenges held and scope optimised
- Fully developed Resourcing Plan
- High Level Integrated Outage Schedule
- **Full Funding secured**
- **Actively Monitoring Outage Readiness (ORI)**
- **Work orders added or removed in SAP**

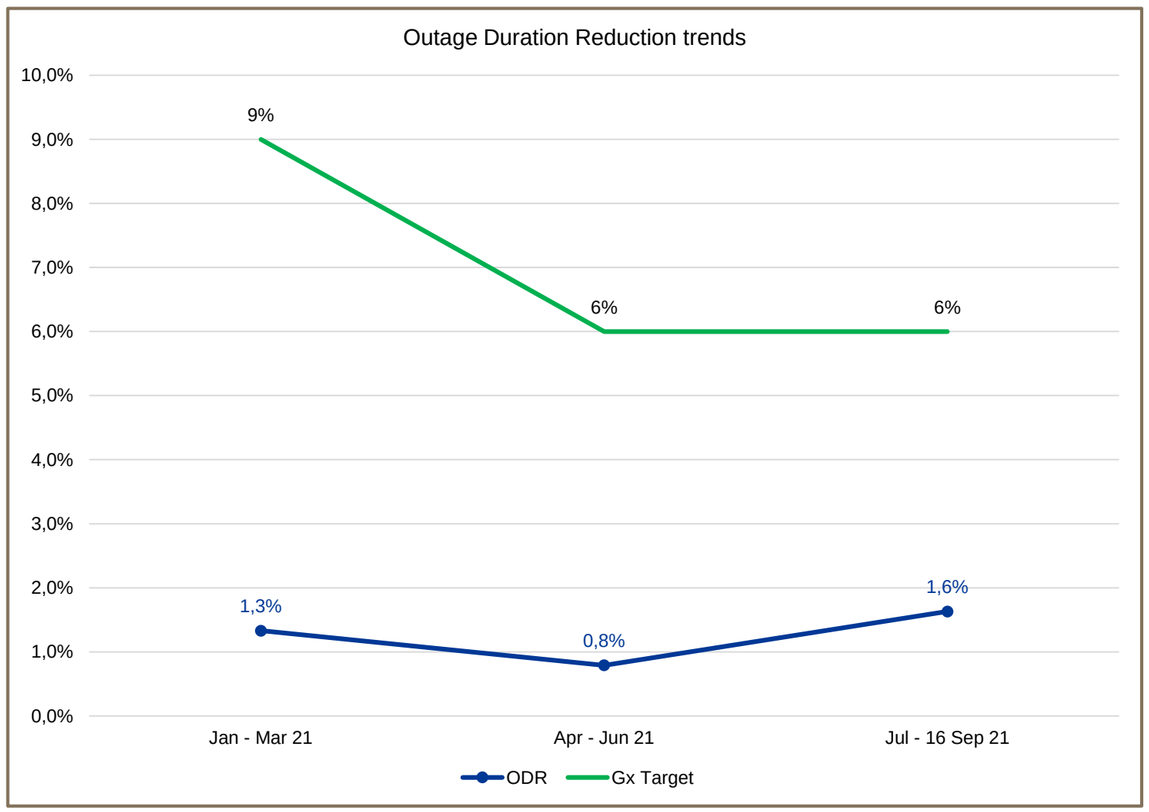
Outage Execution

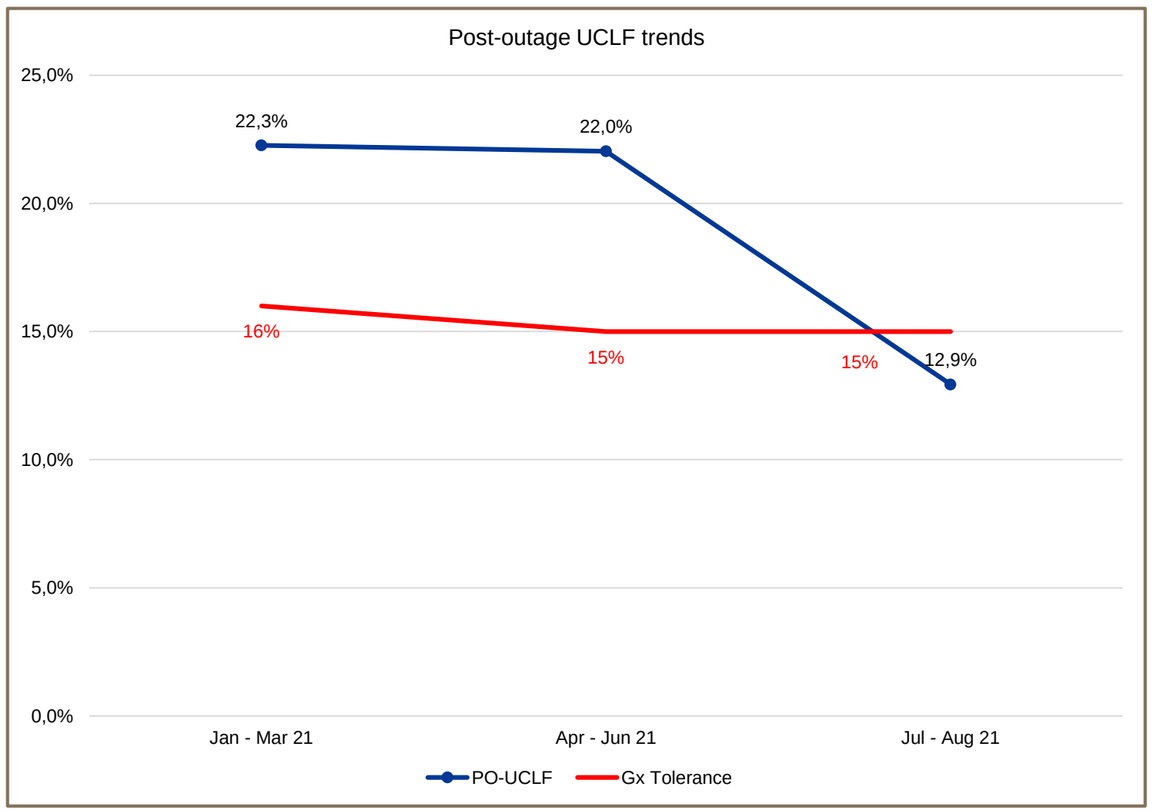
- Active **management of Outage Scope, Plan, Cost & Quality**
- Outage **Risk Management** & Mitigation
- Outage **Resource Management**
- Coordinate **Recommissioning** activities
- Handover Plant & Outage **Documentation Management**

Generation is starting to see an improvement in the Outage performance indicators





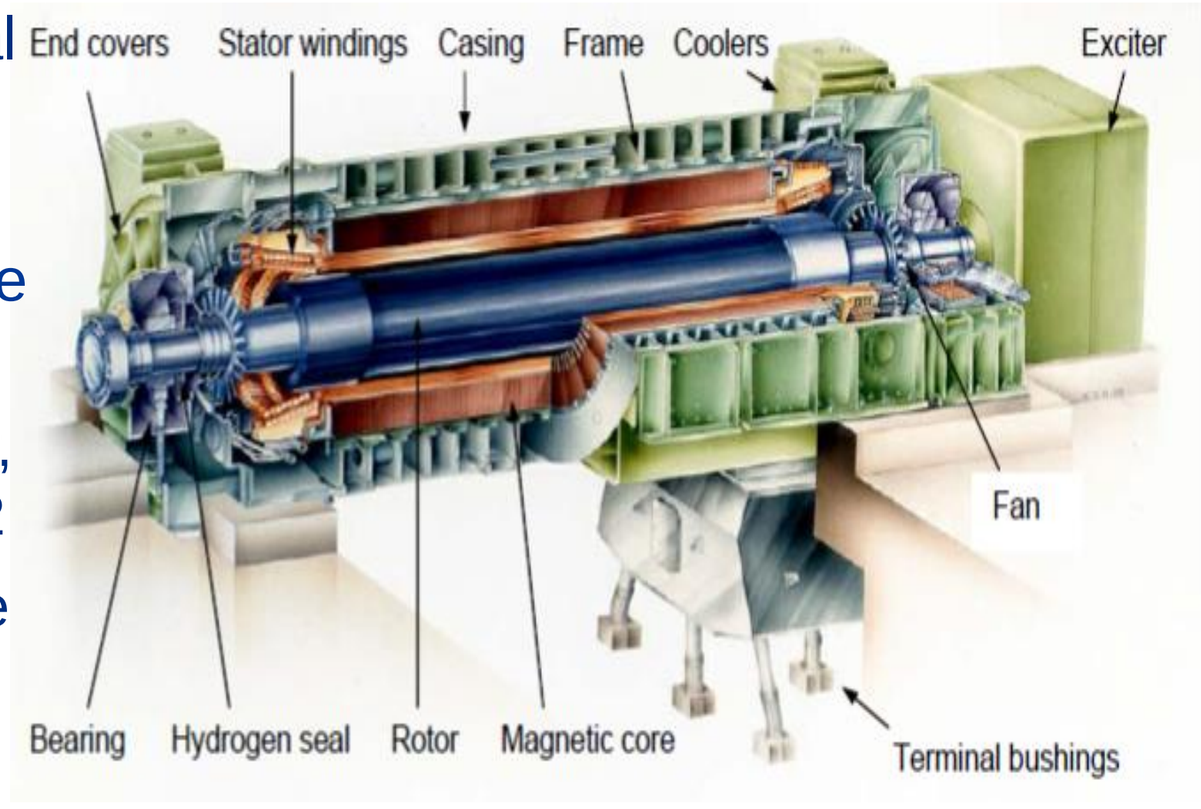




Medupi U4: High level overview of the generator

Understanding the Generator and purging process

- Steam from the boilers turns the turbine. The turbine is connected to the generator which converts rotational energy to electrical energy
- Hydrogen is used as cooling agent in the generator, circulated in the casing to cool the current carrying components,
  - During filling and re-gassing of the generator, CO_2 is required to purge the generator of H_2
  - CO_2 is used because it will not react with the hydrogen.
- When degassing the generator for shutdown, hydrogen is first displaced by CO_2 and then the CO_2 is purged by air. This way no explosive mixture of hydrogen and oxygen can occur.



Medupi U4: Background to the incident

- Medupi Unit 4 was on outage for mill repairs and scheduled as follows:
  - Actual Start Date : 06 Aug 2021
  - Planned End Date : 15 Aug 2021
- There was additional scope requested to identify and repair an external Generator Hydrogen leak.
- As part of the search for the leak, scaffolding erection underneath the generator was required, hence the Generator had to be purged.
  - Purging involves displacing one gas with another to prevent a combustible mixture. In this case hydrogen (H2) is purged with CO2 to prevent the hydrogen from mixing with air/oxygen.
- The Operating Department was tasked with the purging of Hydrogen from the Generator prior to the leak search.

- Based on analysis and preliminary investigations, it appears air was introduced into the generator at a point where hydrogen was still present, creating an explosive mixture
- Unit 4 Generator experienced an H2 explosion when H2/Air mixture reached spontaneous combustion level, resulting in:
  - Severe damage to the Generator and Exciter and the Turbo-Generator auxiliaries - extent yet to be confirmed.
  - Damages to the Fire Systems and Civil Structures
  - Damages to Fire doors at Unit 4 and 5 equipment as well as battery rooms
  - 7 employees were treated for shock (no injuries or fatalities)

Medupi U4: Impact and critical next steps to be taken

- Detail Major Event Investigation in progress
- Extent of plant damage to be established, including opening and inspections of the 4 main turbine cylinders, structural integrity of adjacent plant etc.
- Detail scope of work to be compiled for the recovery of the Unit
- Full time recovery manager and multi-disciplinary team appointments being finalised
- Schedule which will inform Unit 4 return to service date to be compiled (unit is not expected to be returned within the next 12 to 18 months)
- Like for like replacement
- Opportunity maintenance to be conducted on all other plant areas
- Preservation procedure to be activated where necessary
- This incident is being used as a case study going forward

Kendal U1: Preliminary findings on Main Generator Transformer fire

At 03:36, 11 September 2021, Unit 1 Main Generator Transformer failed and caught fire

- The Unit tripped on “GEN Transformer PRD trip” and “Transformer DIFF” protection & activated GEN Transformer BUCHHOLZS GAS Trip
- The burning oil from the transformer flowed into the Main Cooling (MCW) ducting, burning cables that affected Units 2 and 3.

Recovery Plan

- Units 2 and Unit 3 cable repaired and both units returned to service (RTS) on 14 September 2021.
- Unit 1 Recovery Scope of Work (SOW) frozen 14 October 2021
- Unit 1 transformer and associated systems work and cold commissioning scheduled for completion 2 December 2021
- Unit 1 return to service expected on the 22 December 2021

Preliminary investigation response:

- All requested investigation data captured and sent to A&F (Investigation in progress)
- Transformer failed on blue phase (fault directly down to earth), root cause of failure under investigation by Eskom Forensic Team
- Civil structure damage assessment due to fire concluded & repairs are in progress (estimated completion 15 November 2021)
- Lessons learned from preliminary investigation have been shared with other power station personnel

Key concluding messages

- Generation plant performance is still unreliable and unpredictable
- Improvement initiatives are being driven hard to get to acceptable levels
- Leadership effectiveness is at the core of our ability to turn performance around
- To ensure system stability and to meet demand a minimum 4000 MW of additional generating capacity is critical:

  - This will ensure the space for Generation to continue with the planned reliability maintenance and refurbishment programme, and

  - That the operational recovery is timeously funded and resourced to enable maximum readiness to execute successfully

Contents

1 Performance Overview - COO

2 Generation Overview – GE: Generation

3 System Outlook: Apr 2021 – Mar 2022 GE: Transmission

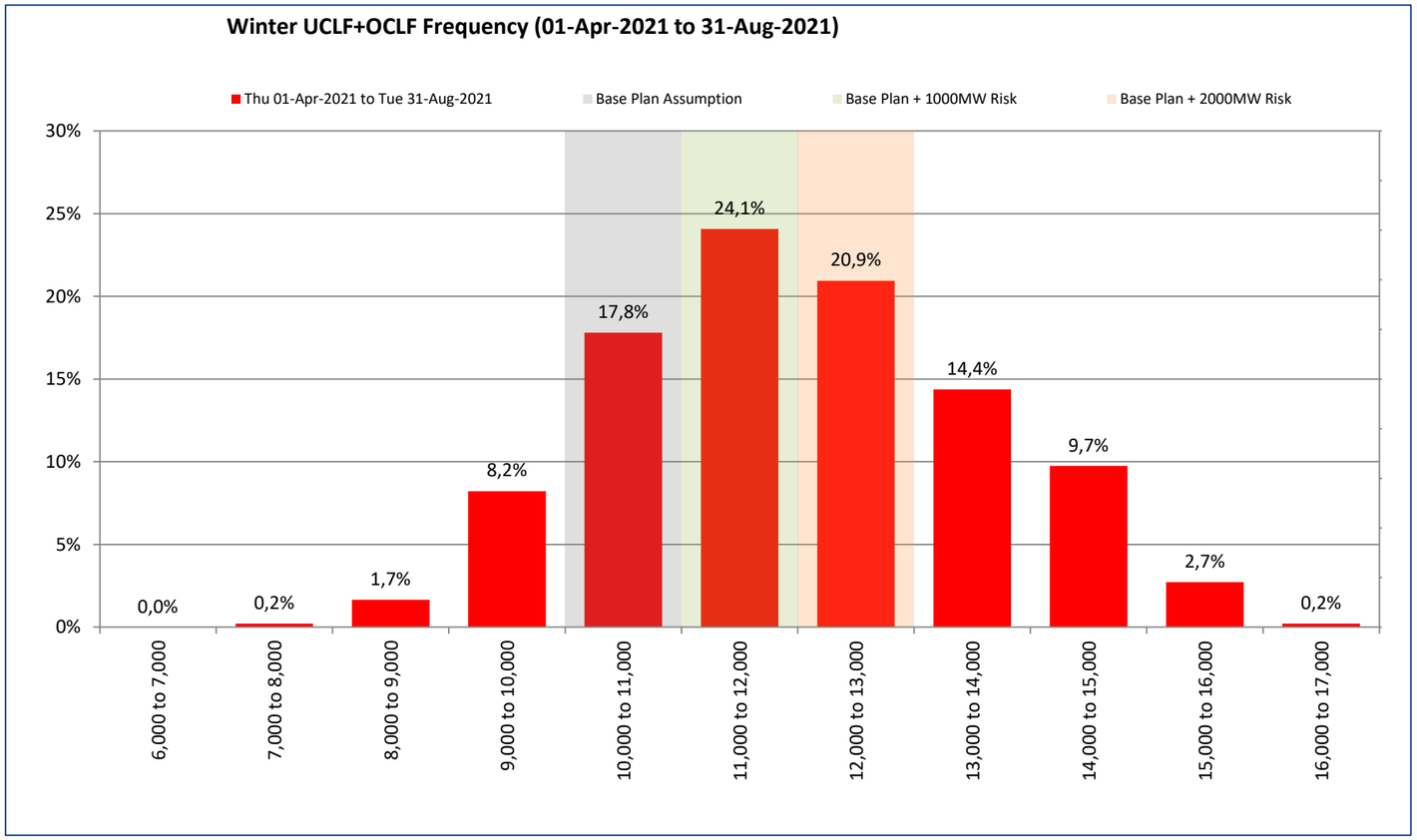
System Outlook - context

- The **majority of the coal power stations** are **operating past** the **midway** of their **operational life**, resulting in high levels of breakdowns.

- The **drive** to **implement** the **reliability maintenance** and **refurbishment projects** in order to **address** the **unreliability** is under way to get the plant performance back to **acceptable levels.**

- The **public** is therefore **cautioned** to **expect** an **increased risk** of **loadshedding while the Reliability Maintenance program is being implemented**.

System Performance - Winter 2021



Key Insights

- Unplanned unavailability > 11GW for ~72% of the time during the winter period
- Loadshedding occurs when:
  - High demand periods coincide with high unplanned unavailability
  - High unplanned unavailability for a prolonged period of time depletes emergency generation reserves
- Total of 21 days of Loadshedding between 1 Apr to 31 Aug 2021 compared to 12 days of Loadshedding the previous year.
- Total of 11 days of Loadshedding since 1 Sept 2021

Potential contributing factors

- Shortage of generation capacity;
- Increased *unplanned unavailability*;
- Increased planned maintenance;
- The need to conserve and replenish depleted *emergency resources*;
- *Poor coal* quality and compromised *emissions* performance.

Summary of the Summer Plan

After the failure of Medupi Unit 4, the Capacity Plan was revisited and minor changes were made to optimize the plan. No outages were cancelled. The Medupi 4 failure continues to have significant impact on Generation's UCLF allowance.

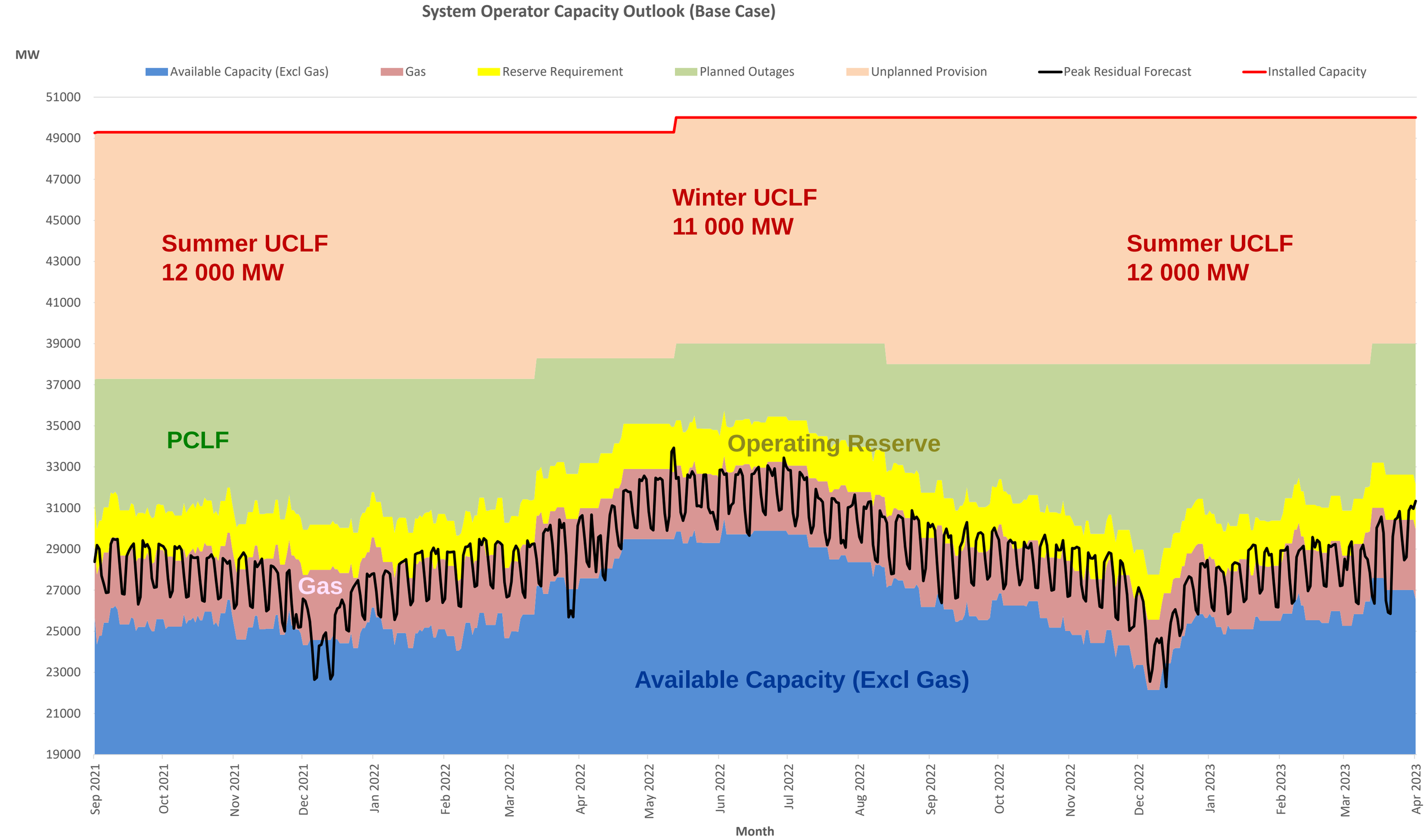
All feasible reliability maintenance required in the 12-month planning period has been accommodated in the plan. This has resulted in a "full" plan with little room to move, extend or add outages.

This outage plan was stress tested with 3 scenarios by the System Operator to estimate the OCGT usage and level of load shedding.

For 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.

System Operator Capacity Outlook for the next 18 Months (Base Case)



12-month outlook to 31 August 2022

Unplanned unavailability	Better than plan	Base case	Base case + 1000 MW	Base case + 2000 MW	Worse than plan
Summer 2021/22					
% of time spent in each scenario last summer	50.4%	19.3%	13.0%	9.8%	7.5%
Number of LS days Highest stage of LS OCGT costs		1 day Stage 1 R 2.5bn	40 days Stage 2 R 6.7bn	94 days Stage 3 R 13.5bn	
Winter 2022					
Number of LS days Highest stage of LS OCGT costs		0 days N/A R 0.8bn	3 days Stage 1 R 1.8bn	65 days Stage 2 R 3.5bn	

Dramatic increase in load shedding days and OCGT cost for only 1 000 MW change in UCLF + OCLF

History has shown that it is not possible to use more than about R 1.2bn 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

Summer: 1 September 2021 – 31 March 2022. UCLF+OCLF: 12 000 MW – 14 000 MW
Winter: 1 April 2022 – 31 August 2022. UCLF+OCLF: 11 000 MW – 13 000 MW

Thank You