System Status and Outlook Briefing

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Megawatt Park: Franklin Auditorium
15 November 2022

Group Operations Overview

Overview and summary of Eskom system year-to-date performance (1/3)

- We continue to see a **varied performance** by our operating divisions year-to-date, with generally good performance from **Transmission, Distribution and Group Capital**. The **unsatisfactory performance from the Generation division continues.**
- The **Distribution technical performance** is **sustained at better than tolerance levels** for both duration and frequency of systems interruptions.
- **Municipal debt** and **Energy losses** remain a challenge. Eskom is working closely with government, communities and the public to implement the strategies towards resolution.
- On the **Transmission side, we see good performance** with **system reliability** and maintenance execution that meets planned objectives.
- **Koeberg Nuclear Power Station Unit 1** continues to operate safely and has been online for 380 days (to 11 Nov 2022). **Unit 2** commenced with a returned to service from a short duration outage to remedy the **control rod slippage issue** and had been operating for 47 days (on 11 Nov 2022).
- **Coal stock levels** are healthy – average **of 35.0 days of stock, 69.7 stock-days** when including Medupi, which has excess coal.

Overview and summary of Eskom system year-to-date performance (2/3)

- The **Generation** side of the business remains a concern, specifically the availability of the coal power stations. **2022 Energy Availability Factor (EAF) at 58.53% is below the targeted performance level.** A key contributor to the low EAF was **high levels of planned maintenance** over the summer months.
- Since 01 April 2023, there have been **a total of 141 days of loadshedding.** The high levels of unplanned outages remain a concern, however, we continue to drive our **Reliability Maintenance Recovery Programme to reduce these**. However, available capacity remains a challenge.
- The **Reliability Maintenance Recovery Programme:** More effort has been applied to ensure that the key funding and enabling contracts are in place to support the objectives of this critical programme within the maintenance space that can be made available – ensure 80% outage readiness.
- **Rain Readiness plans** have generally held up against high summer rainfall in the previous year and actions continue to improve the plans for this rainy season. All Coal Stations plans are being stress-tested to ensure they will be ready again for this high rainfall period.
- Due to the system constraints, we have used more that the anticipated levels of diesel for our **Open Cycle Gas Turbines** (OCGTs).

Overview and summary of Eskom system year-to-date performance (3/3)

- **Environmental matters** such as emissions have shown good improvement. However, the industrial action in July 2022 has unfortunately **contributed to a significantly worse** YTD performance with **relative emissions at 0.45 kg/MWh** against a **target of 0.30 kg/MWh**.

- **Safety performance positive –** Eskom a) employee LTIR @ 0.26, b) Eskom contractors LTIR @ 0.22 and c) Eskom combined @ 0.24 against a tolerance LTIR of 0.30. Regrettably, however, we have had **one employee** and **one contractor fatalities**

- On 01 June 2022, **Kusile Unit 4 achieved commercial operation (CO)**, earlier than the expected CO target date of January 2023.

- In the period June - September 2022, **Kusile Unit 5 successfully achieved key milestones,** namely: boiler chemical clean, first fires on oil and first fires on coal.

- However, on 17 September 2022, whilst executing the third steam blows, the **gas air heater (GAH) caught fire internally**, resulting in the discontinuation of all commissioning activities. A **technical investigation is underway** to determine the cause and extent of the damage and to finalise the repair programme. Current forecast (without the schedule impact of the GAH incident) for the first synchronisation and commercial operation of Unit 5 is **targeted for June and December 2023,** respectively.

Distribution Division

Distribution Performance as at end October 2022*

Electrification Connections

40 385

vs.

YTD Target of 44 764

SAIDI

36.22*

vs.

38.00 Tolerance

SAIFI

12.39*

vs.

19.00 Tolerance

Planned Maintenance Completed

85.46%

vs.

YTD Target of 93%

Refurbishment Spent

R135m

vs.

YTD Target of R204m

Restoration Time

92.81%

vs.

90% Target

- **Network performance,** as measured by **SAIDI** and **SAIFI** is sustained at better than tolerance levels.
- The **Electrification** programme achieved **90% of the YTD target**; the program delivery has been impacted by material availability however plans are in place to achieve the year-end target.
- **Planned Maintenance** and **Refurbishment** execution are below target but have not adversely affected system reliability. Completion of the planned programmes remains a key focus area for the business.
- **Increased theft** and **vandalism** of network equipment continues to impact operations, safety and system reliability.
- **Electricity theft** and **non-payment** continues to manifest as an operational and financial risk.

*The official September 2022 and October 2022 results for SAIDI and SAIFI are not yet available due to system issues. The results reported on the slide are as per end of August 2022.

Transmission Division

Transmission Performance as at end October 2022

SM<1 of 1.60

vs YE target of 3.53

97.1 % Maintenance Execution

2 Major Incidents

vs YE target of 2

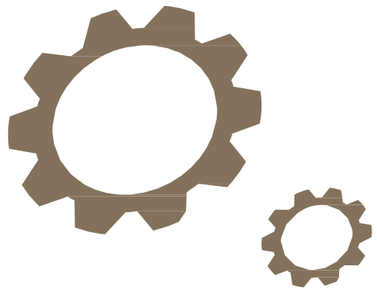
21 Interruptions

vs YE target of 34

- **System reliability performance:** Good **System Minute <1** performance was achieved, supported by the relative low impact of interruptions.
- **Two Major Incidents** have occurred YTD mainly due to plant failures and restoration challenges.
- **High level of maintenance execution** has been sustained.
- Asset condition risks require **increased asset renewal investment** for future operational sustainability.
- **Ongoing theft** and **vandalism** has **impacted operations,** creating risks for interruption incidents.

Nuclear Operating Unit

Nuclear – Koeberg Performance end October 2022



61.36%

EAF Actual YTD vs.
YTD Target of 76.78%

1

UAGS Trips vs. YTD
target of 1 for FY23

11.08%

Forced Loss Rate vs.
YTD Target of 4.12%

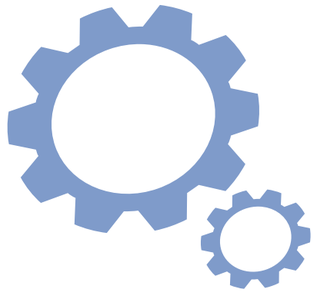
- The **lower than planned EAF is primarily due to the delays experienced** in returning Unit 2 to service during the refuelling and maintenance outage completed in August 2022. The original outage plan included replacing the three steam generators (SGRs) and the reactor pressure vessel head (RPVH).
- Due to a significant risk of outage overrun, a decision was taken in March 2022 to **defer the SGR from the outage scope to the next Unit 2 refuelling and maintenance outage**, without impacting Koeberg's LTO programme. Inspections to justify continued operation of the unit with the current steam generators for another cycle were carried out successfully. **The RPVH has been replaced.**
- The high **Forced Loss Rate** is mostly due to two forced shutdowns following the Unit 2 outage, due to reactor control rod slippage events **associated with the RPVH replacement**, one of which resulted in a reactor scram and the UAGS trip reflected above.

- **Koeberg Long-Term Operation (LTO):**
  - The LTO activities to enable Koeberg to **operate for another 20 years beyond 2024/25 continue**. The formal application to extend the operating license was **submitted** to the National Nuclear Regulator and **accepted for further processing during 2021.**
  - On schedule, Eskom submitted the safety case for LTO in support of the application on 21 July 2022 to the NNR for their evaluation. As expected, **no safety concerns** have been identified that would preclude long term operation. The NNR has 2 years to conclude the review and provide an outcome. The NNR will assess the Eskom safety case for Koeberg NPS LTO to ensure that it meets the national and international regulatory requirements, standards and practices for LTO before issuing a License variation enabling operation beyond July 2024. The NNR review will most likely include a public participation process.
  - As part of the review of Koeberg life extension progress, **an International Atomic Energy Agency team of nuclear experts carried out a review of the life extension activities** during March 2022. The IAEA expert team reported good progress on the work to extend the life of the plant and the final report has been provided to Eskom and has been unrestricted, enabling the report to be accessible to the public. Both recommendations and the suggestions contained in the report are included in the scope of work that needs to be completed.

- **Upcoming Unit Outages and Steam Generator Replacement (SGR):**
  - Unit 1 will commence a long refuelling and maintenance outage in December 2022 during which the three steam generators will be replaced.
  - Unit 2 will undergo a similar long SGR refuelling and maintenance outage towards the end of 2023.
  - Preparation activities, including completion of the required facilities for SGR, have been completed and the outage plans finalized to enable successful implementation.

Generation Division

Generation performance for FY2023 to October 2022 reflects the challenges being faced with plant availability and reliability



58.53%

Availability vs 65%

YE target for FY23

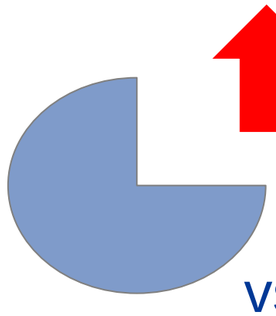
468

UAGS Trips vs 392

YE target for FY23

30.76%

Unplanned load losses vs 22% YE target for FY23



5 930MW

Partial load Losses

vs **3 695 MW YE target** for FY23

9.24%

Planned maintenance remains on track for 10.5%

YE target FY23

R11.2bn*

Open Cycle gas turbines cost vs YE provision of YTD R11.0bn

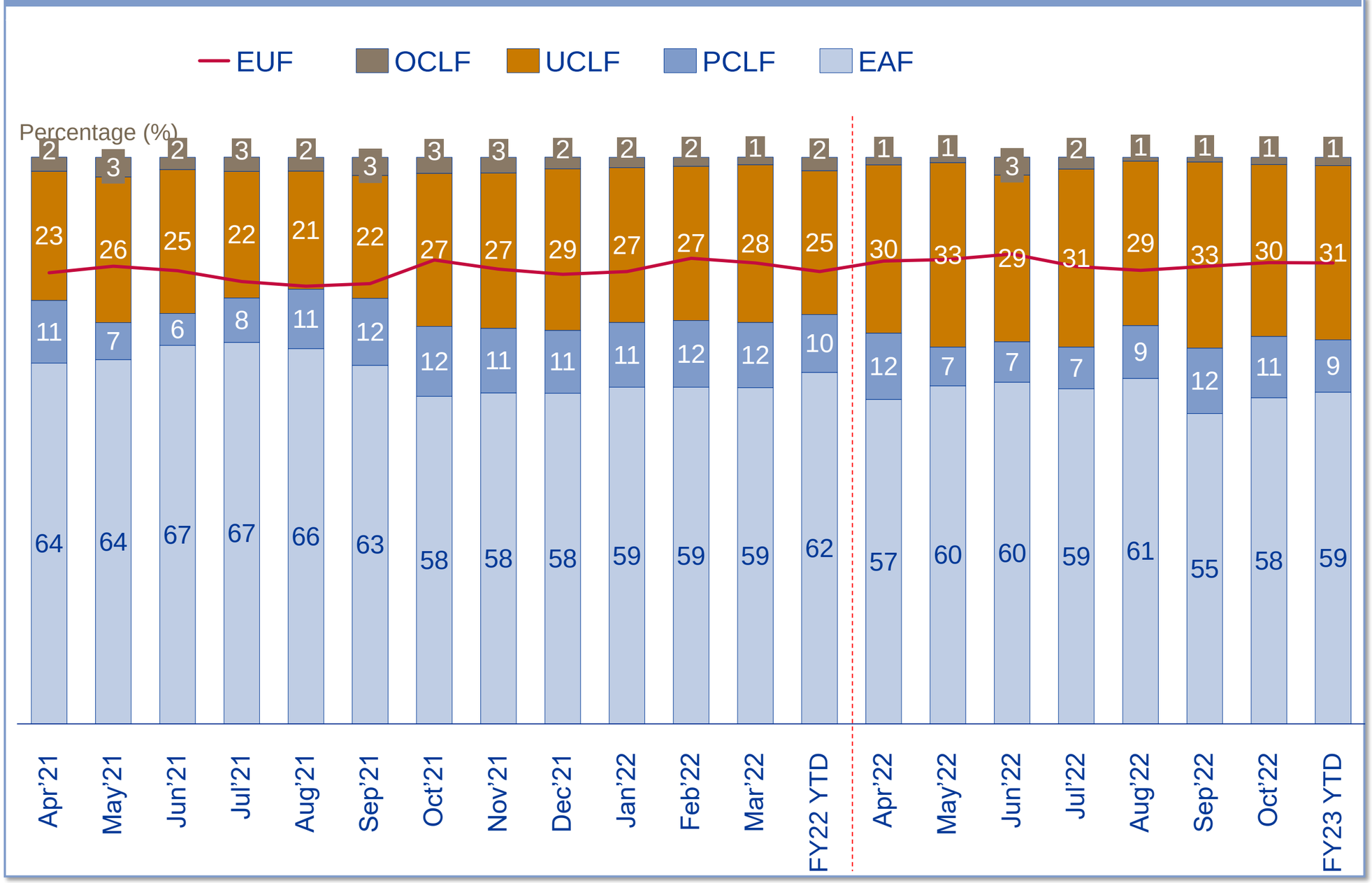
Technical Targets as per FY23 SHC

Figures as at end Oct 2022, though it must be noted that figures are still to audited

*** Eskom OCGTs only as at end October 2022**

The FY2023 performance continues to be lower than the aspiration resulting in regular load shedding

Generation monthly and YTD performance

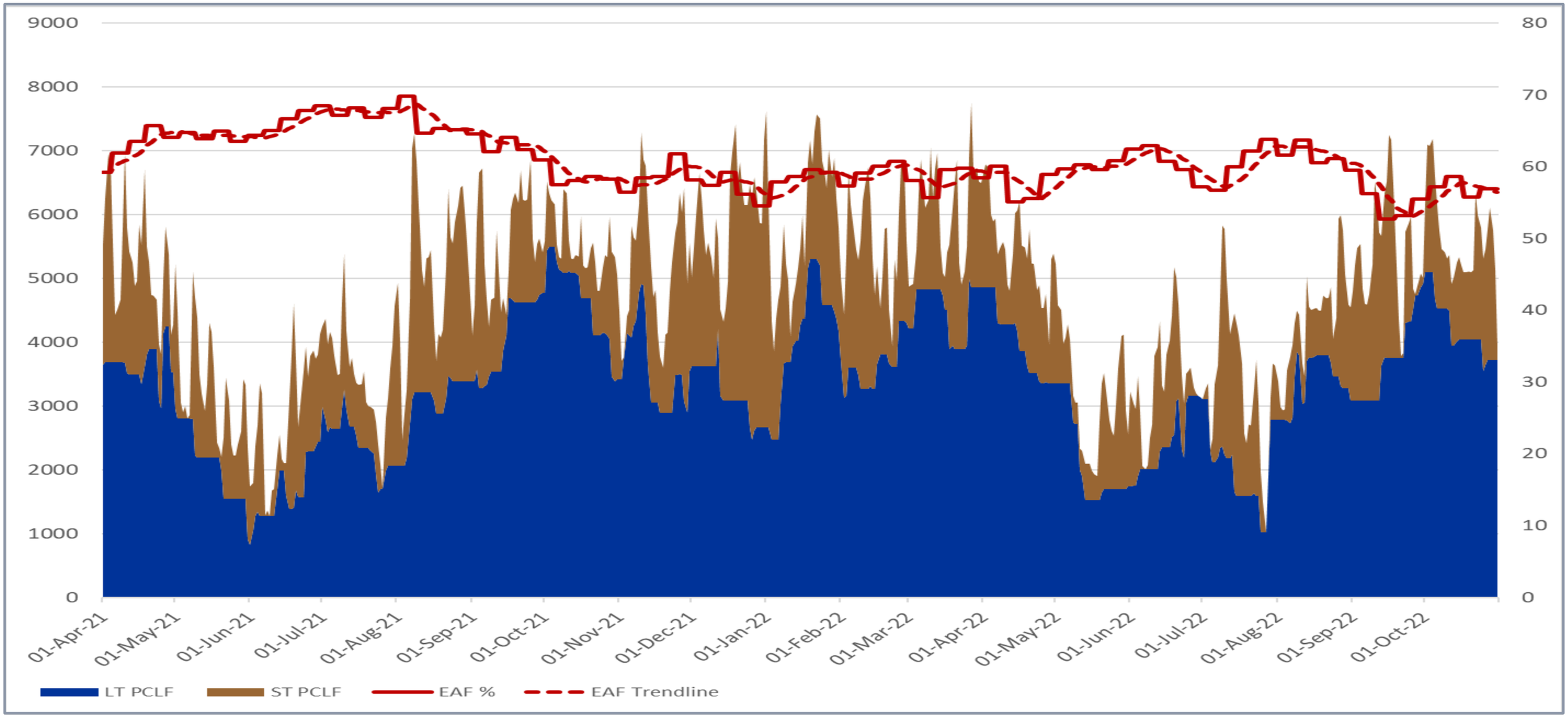


Contributing factors

- Slips, trips, boiler tube failures, partial and full load losses all contributed to the high UCLF.
- Although August MTD EAF is the highest for this financial year, it is still below the same period last year.
- Gx fleet YTD EAF at 58.53% is below the YE Business Plan target of 65%.
- 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

Long term maintenance in FY2023 is marginally higher than FY2022 with short term maintenance being lower due to the lower space available

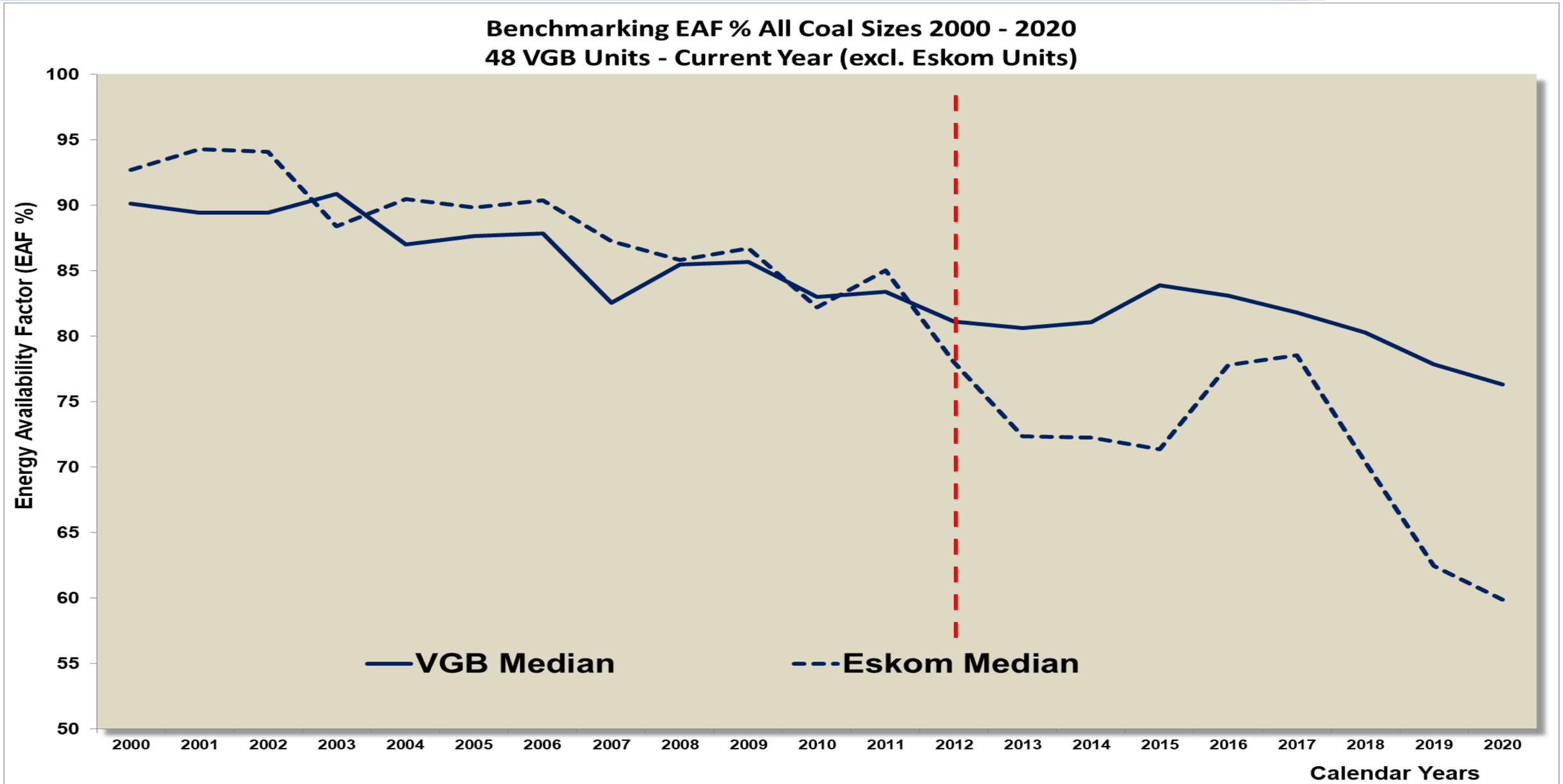
	FY2022 Oct YTD	FY2023 Oct YTD
Short term PCLF %	2.91	2.70
Long term PCLF %	6.61	6.54



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.

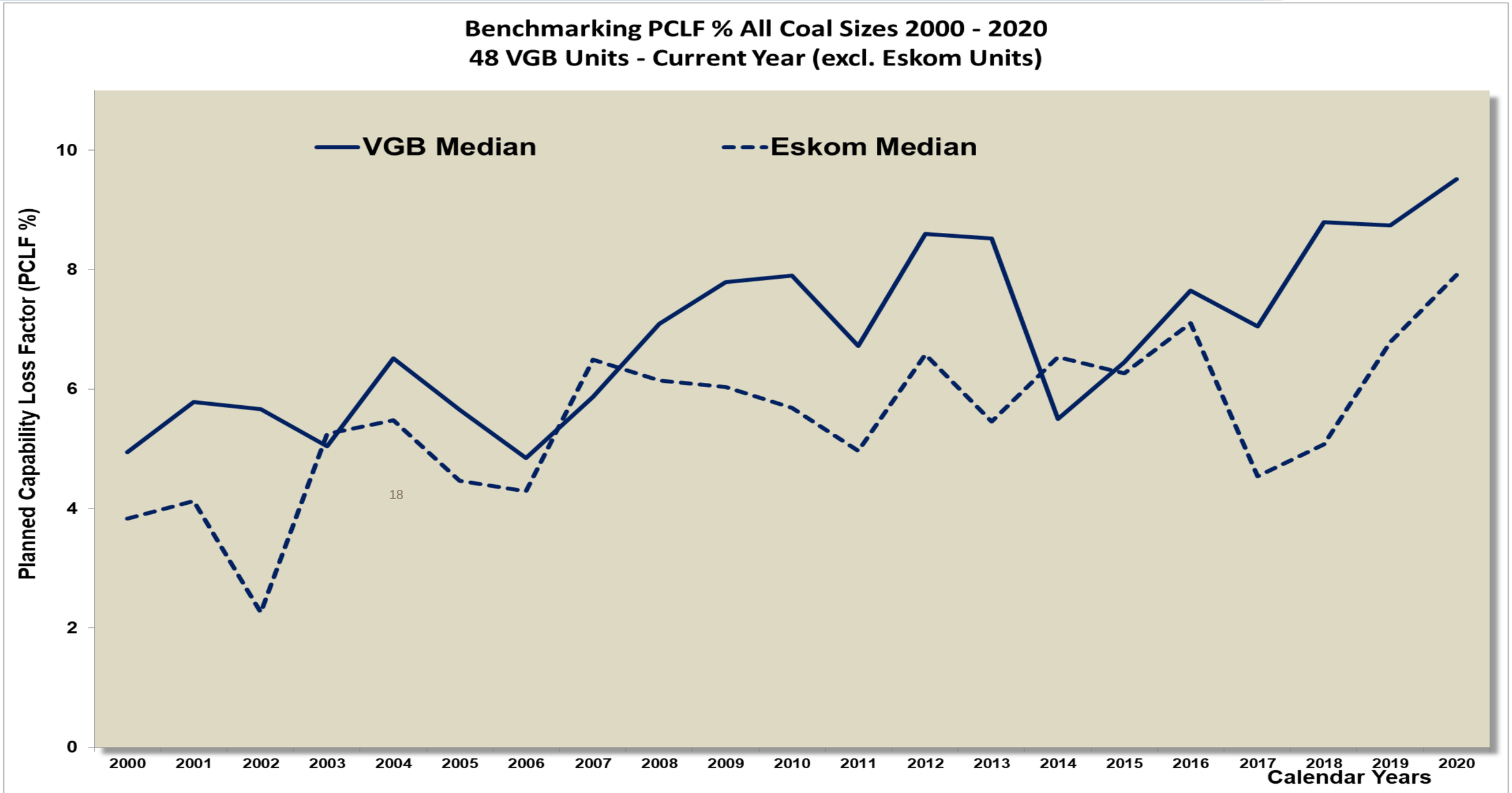
Eskom's plant availability (EAF) was better than or in line with peers until 2012



- The general trend, for **both Eskom and the VGB benchmark* units is that of reducing availability.**
- This is **consistent with the expectation due to ageing fleet** with few or no new units being commissioned in this period.

* Note: 2021 VGB benchmark is in process and may be available in the coming month

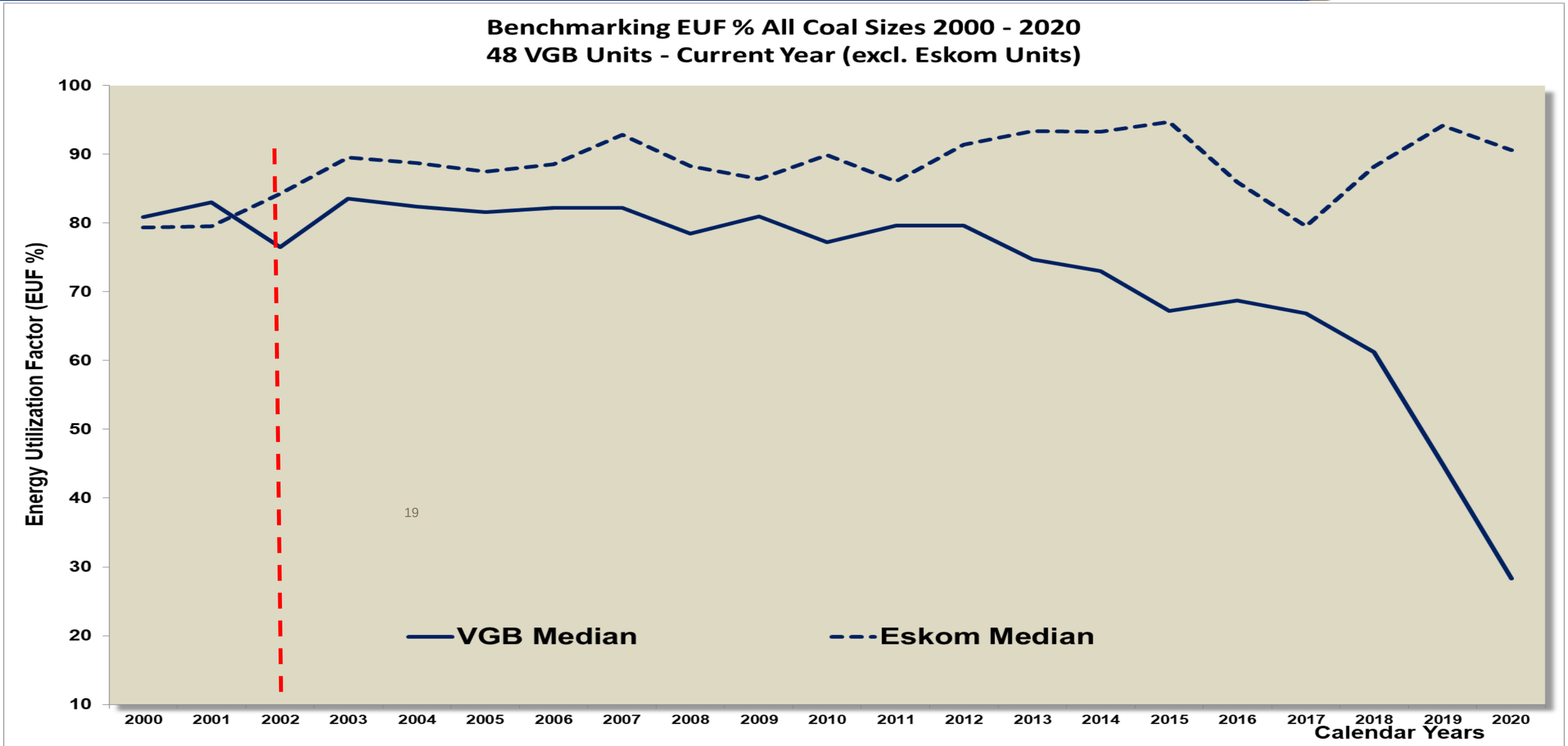
Eskom plant's planned maintenance time (PCLF) below peers



- The general trend, for the top quartile, for **both Eskom and the VGB benchmark units is that of increasing PCLF**. This is consistent with the expectation, due to ageing fleet with few or no new units being commissioned in this period.
- Since 2012, Eskom PCLF for top quartile units increased significantly

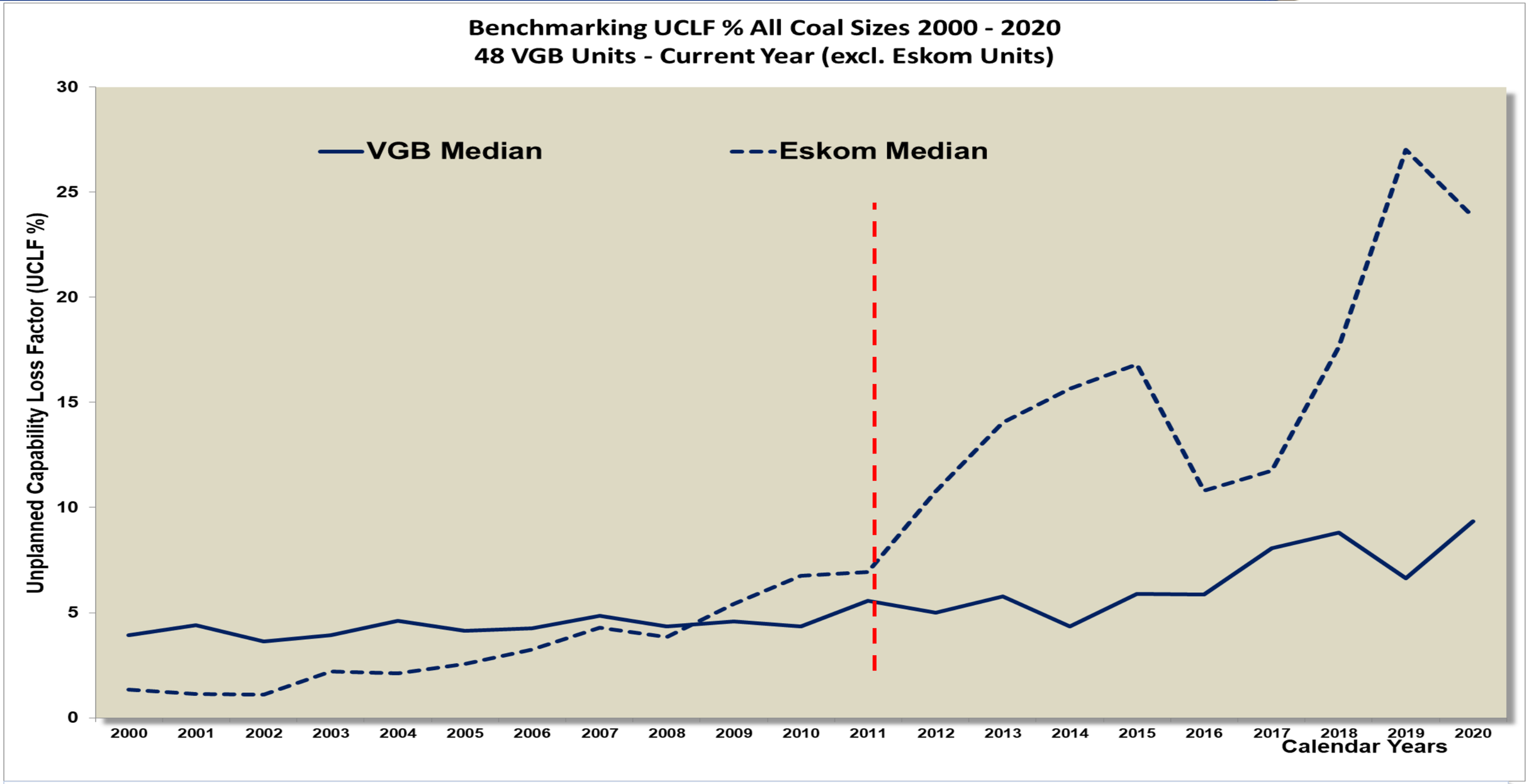
* Note: 2021 VGB benchmark is in process and may be available in the coming month

From 2002 there simply was insufficient generating capacity. In response Eskom created ‘virtual capacity’ by running coal units harder than those of VGB members since 2002



- EUF measures “how hard” the units are being run – an indicator of stress on systems and components. From 2003 Eskom’s median stations were running at similar or higher EUF than VGB best quartile, and since 2012 Eskom’s lowest quartile stations have been running at higher EUF than VGB best quartile
- **High utilisation** means plant systems are required to operate at their limits, leading to **strain, increased wear-and-tear, decreasing plant reliability** and **requirement for increased maintenance**
- * Note: 2021 VGB benchmark is in process and may be available in the coming month

Eskom plant's Unplanned Capacity Loss Factor (UCLF) was in line with or better than peers up to 2011, from which point the 10 years of high EUF and EAF started taking its toll



- The general trend, **for both Eskom and the VGB benchmark* units is that of increasing UCLF**. This is consistent with the expectation, due to ageing fleet with few or no new units being commissioned in this period.
- Many influencing factors, but main **root cause is consistently running at high utilisation over many years** due to late start in building new capacity.

* Note: 2021 VGB benchmark is in process and may be available in the coming month

Generation Performance in context - root cause is shortage of both system capacity and funding

1. First contributor to capacity shortage is the **delay of adding new capacity** to the system**:**
   a. 1998 Energy White Paper stated that **investment decision** to build new capacity was needed by **not later than 1999 "to ensure that demand does not exceed available supply capacity".**
   b. Investment decision (business case) was **only made in June 2007** => needed capacity not available in time. This was exacerbated by **delays in commissioning** of both Medupi and Kusile.
   c. Therefore from 2002 onwards 'virtual' capacity was created by **running existing plant above normal design parameters to 'Keep The Lights On'.** In addition, particularly since 2008, necessary **philosophy maintenance was delayed** to avoid loadshedding caused by lack of capacity as units would have to be taken offline for maintenance.
2. As a result, **plant performance** and **availability started deteriorating** from 2nd half of FY 2012/13**:**
   a. Caused by the mechanism of creating **virtual capacity** from 2002, thus for 10 years by 2012 **.**
   This led to **even higher utilization** and **less time available** for maintenance outages**:**
   b. High utilisation of deteriorated plant and deferred maintenance created cycle of deteriorating availability
   c. Cycle could only be broken with **adequate funds** and **system space** in which to perform required maintenance.
3. Third contributor was **sub-cost-reflective regulated revenues** thus insufficient funds to create system space and to perform the required maintenance.
4. **Summary: Underlying cause of deterioration in fleet's performance is lack of sufficient generation capacity, aggravated by equipment age, insufficient funds for maintenance and additional system space.**

Ten focus areas being addressed to ensure a holistic approach to improving Generation performance

10 Focus areas	What we are doing
Plant Condition	Increased maintenance within limitations. Establish War room, accelerated spares sourcing. Establish long term contracts.
Inadequate Capacity	Defer maintenance. Engaged to expedite IPPs, Risk Mitigation, etc. Planned repowering of stations shutting.
Skills & Experience	Appointing Plant Managers. Engaging experienced external experts. Ramping up training and development. Skills/competency audit.
Fraud & Corruption	Eskom has increased governance controls and performs trending analyses on volumes and prices. Investment in technology, QSs, training.
Policies & Procedures	Engaged government (DPE, NT) for relaxation of some requirements.
Funding	Aggressive cost cutting. Making funds available for outage and midlife refurb
Environmental Compliance	Proposed an emission reduction plan that is achievable. Appealed DFFE decision.
Coal	Engaging mines re quality & quantity. Renegotiating agreements. Investing in cost-plus mines. Increasing verification and monitoring.
New Build Defects	Solutions for some areas developed and tested on Medupi 3. Rolled out to other units. Additional solutions to be rolled out to achieve desired performance.
Eskom Rotek Industries	OEM engineering support and oversight on turbine centreline. Improved Quality Assurance process. De-scoping ERI contracts and approach OEMs on specific plant areas, e,g, Kusile FGD,

Successes made thus far

1. National Treasury has relaxed some requirements which will speed up procurement
2. The allocation of Outage budgeting has improved, seeing signs of improved Outage Readiness
3. Receiving a lot of collaboration among external stakeholders with a willingness to assist Eskom
4. On the 9 Point plan we have seen success in the following areas:
    I. The new build defect repair. Medupi performance is improving
    II. Achieving coal stock days and rain readiness program in place

Additional focus to prioritise maintenance at the **Top Six Stations;** Duvha, Kendal, Kusile, Majuba, Matla & Tutuka,

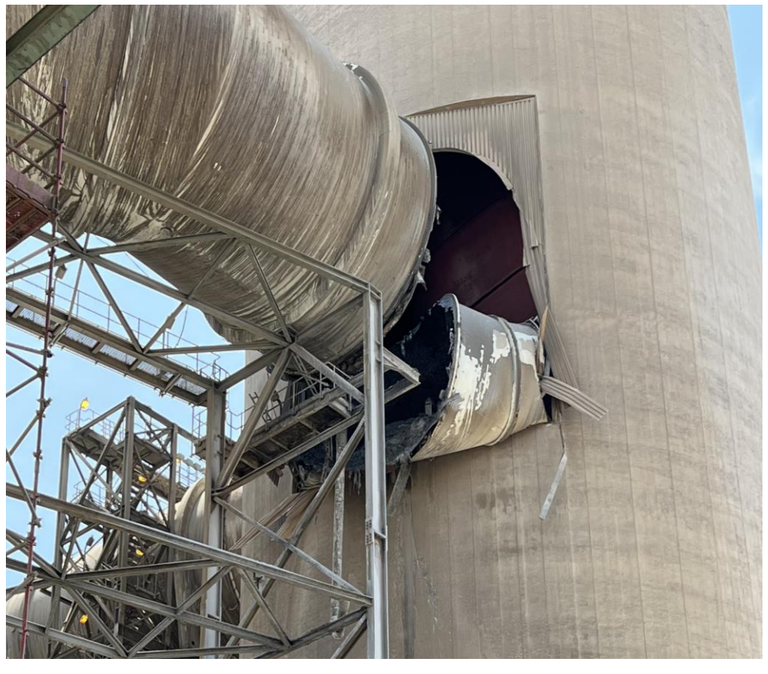
These stations where specifically selected as they are amongst the highest contributors to unplanned load losses. **Any improvement in these stations will result in massive gains in EAF** for Generation as a whole

Progress Regarding Medupi Unit 4 Recovery

- All Assurance and Forensic **investigation technical recommendations have been closed**;
- The **consequence management was concluded and two employees that were under investigation have since been dismissed.**
- The property damage assessment commenced on 15 August 2022 and the bill of quantities based on the assessment of the components has been submitted to the OEM mid-September 2022 with the **response expected before end November 2022.**
- **The generator rotor refurbishment has commenced.** The contract for the assessment of the generator stator has been awarded and work to remove and inspect the stator is in progress. The scope will entail the dismantling, transport, technical assessment and proposal of the technical solutions for repair;
- The preservation of the major balance of plant components is in an advanced stage of completion;
- The Insurer (ESCAP) has **accepted the admissibility** of the claim report issued by the Loss Adjuster; Sedgwick South Africa (Pty) Ltd;
- Based on preliminary results from the property damage assessment and long-lead items, **the commercial operation of Medupi Unit 4 remains on track for August/September 2024**.

Kusile Unit 1 Duct Structural Failure - Background

- On Sunday, 23rd October 2022 while Kusile unit 1 was on a forced outage, the flue gas duct experienced a **structural failure** of the steel bend connecting the horizontal and vertical ducts at the 55m level.
- The collapsed duct on Unit 1 is currently resting on the windshield, supported by the **Unit 2 and Unit 3 ducts housed in the same chimney.**
- Due to the collapse, **Unit 2 and 3 ducts are compromised and are at the risk of collapsing,** as the support platform for U1 is the same as for the other units. As a result, **a decision was taken to keep Unit 2 off**, which was scheduled to return to service.
- Unit 3 was running at a stable load but has since tripped on 3rd November due to a recycle pump issue. **Assessments are currently ongoing to determine whether Unit 3 can be returned to service.**



Group Capital Division

Group Capital Performance as of 30 September 2022

800 MW YTD

vs YTD target of 1 594 MW

(April to September 2022)

Execution of Major Plant Defects Correction

vs plan

- **Kusile Unit 4 commercial operation achieved** on 01 June 2022
- **Kusile Unit 5 successfully achieved the boiler chemical clean, first fires on oil and coal fires milestones.** Whilst executing the third steam blows, the **gas air heater (GAH) experienced a fire incident**, resulting in a **discontinuation of all commissioning activities**. Investigation underway to determine schedule impact
- **Major plant defects correction: Rollout of the major boiler plant defect solutions agreed with the contractor in 2020 for Medupi and Kusile have been completed**. At Medupi, the gas air heater, pulse jet fabric filter (PJFF) and boiler plant modifications by the boiler contractor have been implemented on all six units, except for the long-lead milling modifications on all units and the duct erosion modifications on Unit 6.
- First phase of the roll-out (PJFF, GAH mechanical, mill short-lead items) has been **completed for all Medupi units and for Kusile Units 1, 2, 3 and 4**. At Kusile, the major boiler plant modifications have been completed on four units (Units 1 to 4). **Modifications on Units 5 and 6 are being rolled out during construction before commercial operation.**
- **Execution of emissions control projects:** Steady progress achieved in the high frequency transformer (HFT) and electrostatic precipitator (ESP) projects; however, some construction, commercial challenges and earlier impact of COVID-19 constraints have impacted execution
- **Execution of ash dump facility (ADF) projects**: Good progress achieved on Majuba and Kendal ADFs. Construction commenced at the Kusile 10-year ADF and early civil works contract placed for the Kusile 60-year ADF.
- **Battery Energy Storage Systems (BESS) Project: Contracts awarded for three of the four packages of Phase 1 (800MWh), with contract placement for the fourth package forecasted by end of the current financial year (FY2023). NERSA licenses approved for the various packages**. PFMA pre-notification documents for Phase 2 (640MWh) have been signed-off and sent to DPE.
- **Medupi Flue Gas Desulphurisation:** Change in strategy from technology agnostic to approaching the market, using a single stage procurement strategy with an option of wet FGD

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 2023

Latest Eskom Board Approved Target Dates

FY 2023 – 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 May-22** ✓ 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	

9 396 MW installed since 2015 &
15 533 MW installed since 2005 ….

… 1 600 MW to be installed over the next 3 years

- **The process to address the design defects of Medupi and Kusile is progressing well, and we are looking at additional enhancements**

Use Electricity Sparingly : Together we can make a difference

Minimise workplace energy use with these six super savings tips

- Don’t leave machines and equipment in standby mode; **switch off at the power button**.
- Use natural light where possible
- **Use efficient light bulbs**. Replace failed light bulbs with energy efficient lights / LEDs.
- When you leave the facility or building, **remember to switch off the lights, printers and air-conditioners.**
- Set air-conditioners’ average temperature in summer to **around 23ºC**
- Encourage staff to rather use the cold water taps to **reduce the energy consumption by geysers**

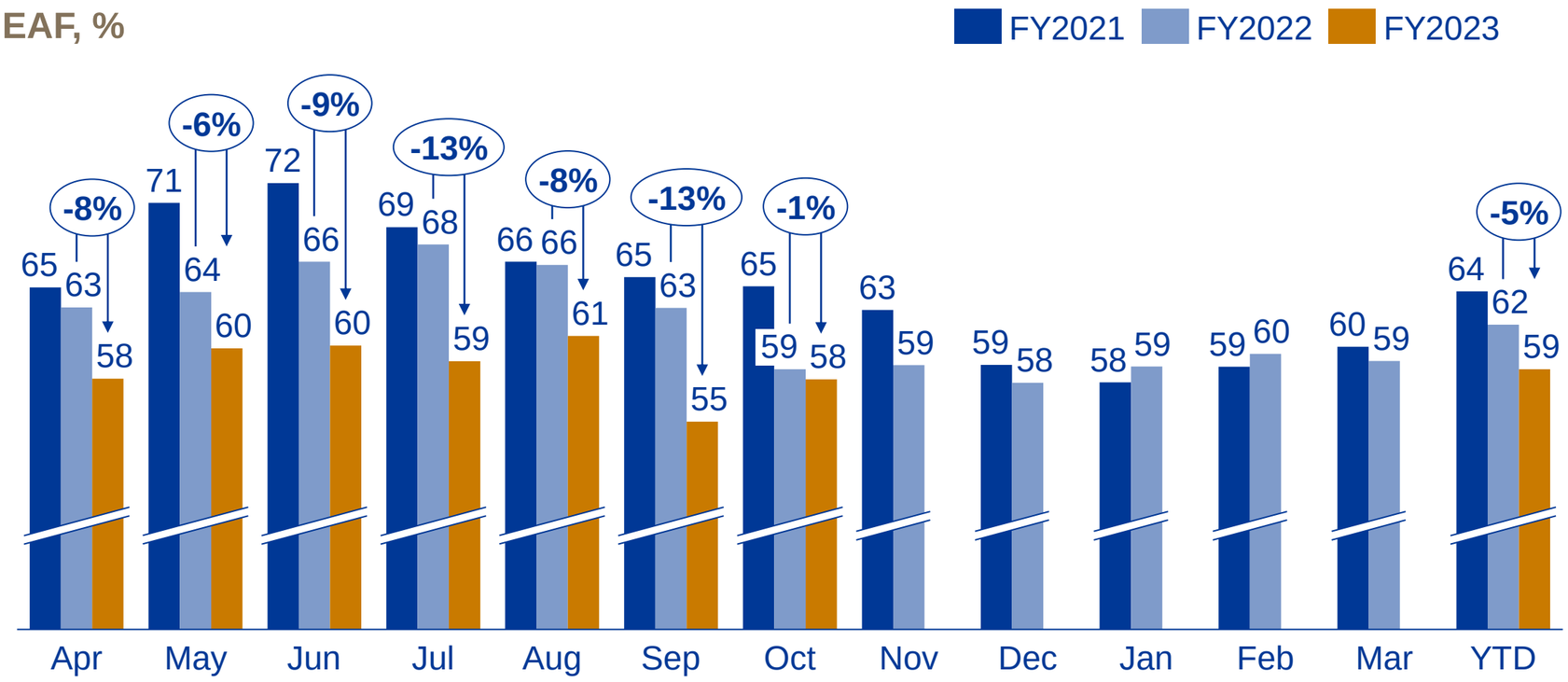
Please Use Only What You Need!

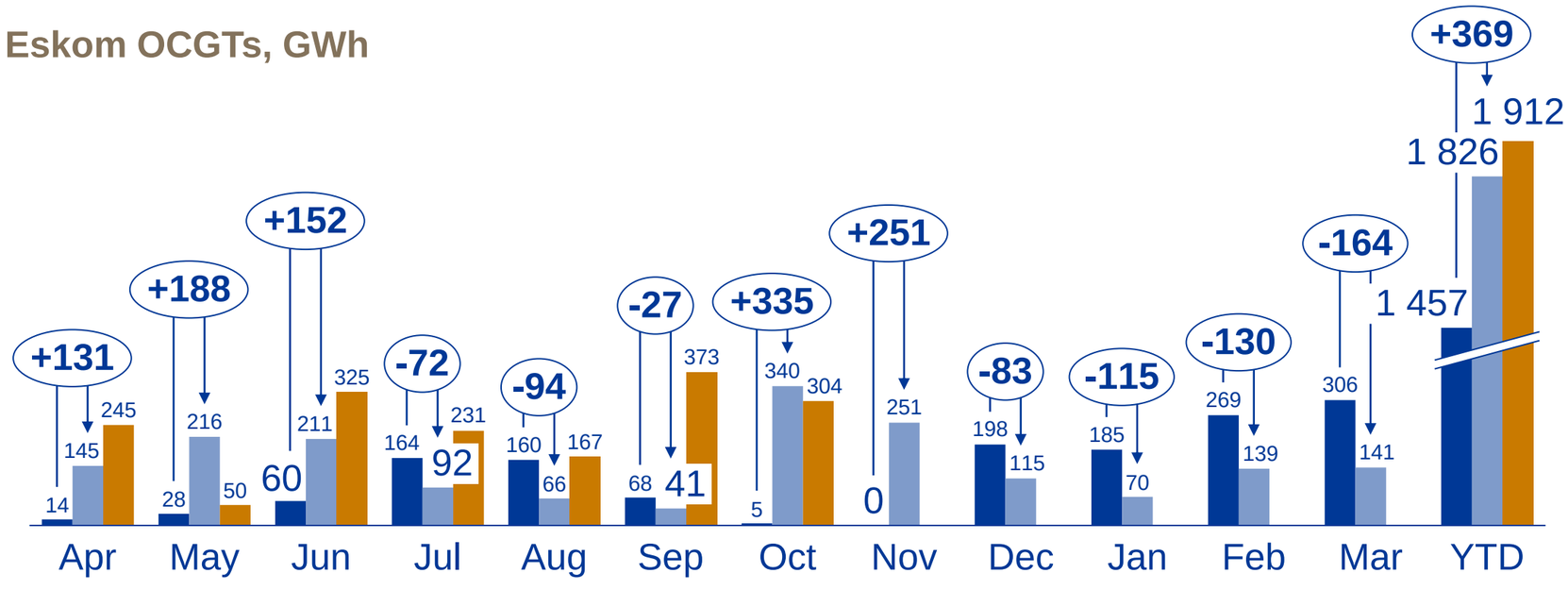
Generation

We remain committed to improving Generation performance – however the external market can play a key role in addressing the current capacity gap

- Generation has key **turnaround plans** in place to **improve performance** and these are being driven hard
- There is a current **capacity gap** of at least **4 000MW** in order to **service the country's demand**
- **This gap will need to be closed by external power suppliers** to provide the space to effectively execute on the Reliability Maintenance Programme
- Due to the backlog in maintenance, this shortage of generating capacity in the country and the age profile of Eskom's generation fleet, **the risk of load shedding will remain until there is adequate capacity in the country**
- **Eskom will continue to drive performance improvement of its fleet within the constraints** of an inadequate system and inadequate funding, which is negatively impacted by below prudent and efficient cost reflective tariffs. However, this, on its own, will not be enough to fully mitigate the risk of load shedding.

FY2023 Generation System Performance





System Performance

Commercial System EAF

- Financial year **Oct 2022 MTD** was **57.84%** which was ~1 percentage points lower **(actual: 58.6%)** compared to last financial year actual.
- Current financial year **YTD October 2022 is 58.6% which is lower than last financial year** YTD figures.
- **FY2023 YE EAF budget is 65%** versus 58.6% YTD

Eskom OCGTs

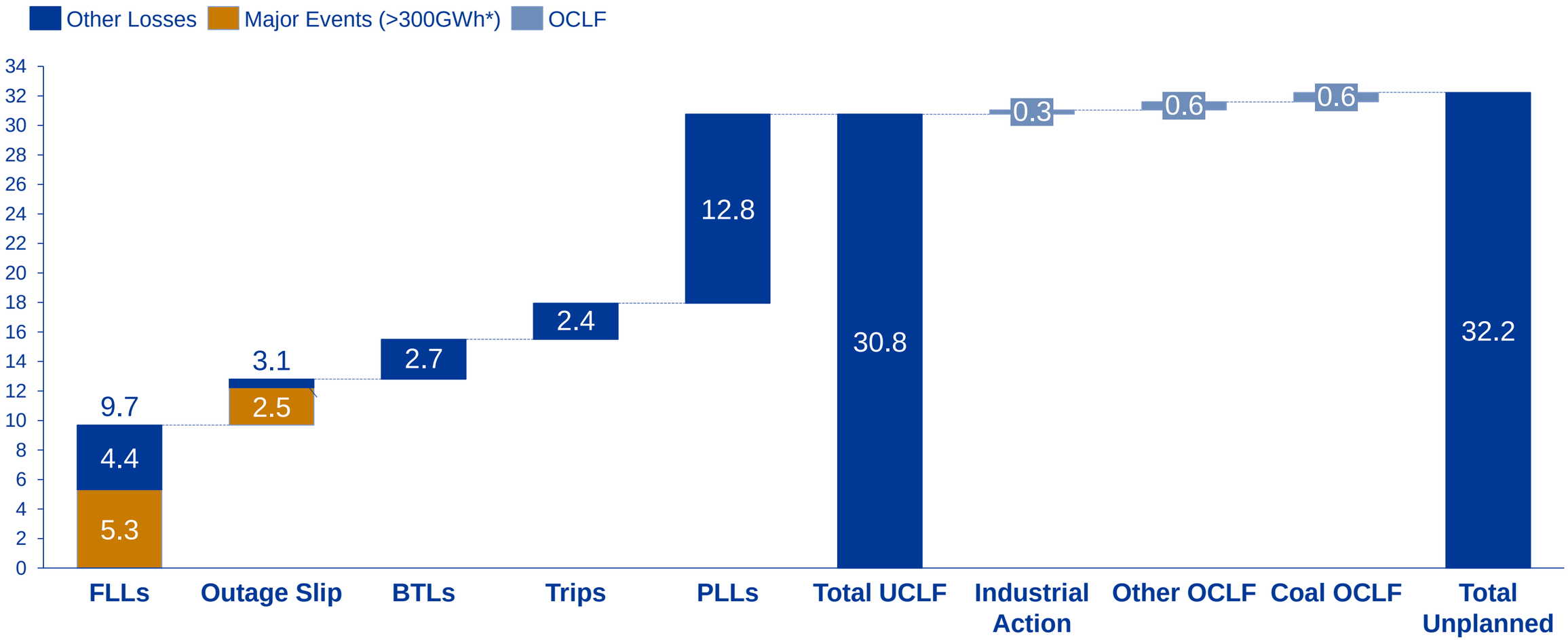
- **End October 2022 is 304 GWh (16.9% load factor)** compared to 340 GWh actual for October 2021.
- **YTD: October 2022 is currently** at 1 912GWh
- **FY2023 YE budget is 1 466GWh (**7% load factor) versus **1 912GWh YTD (**15% load factor).

YTD Figures as at end October 2022

31

Lower Generation performance is largely driven by high UCLF

Build-up of Unplanned Losses for FY2023 October 22 YTD from major contributors

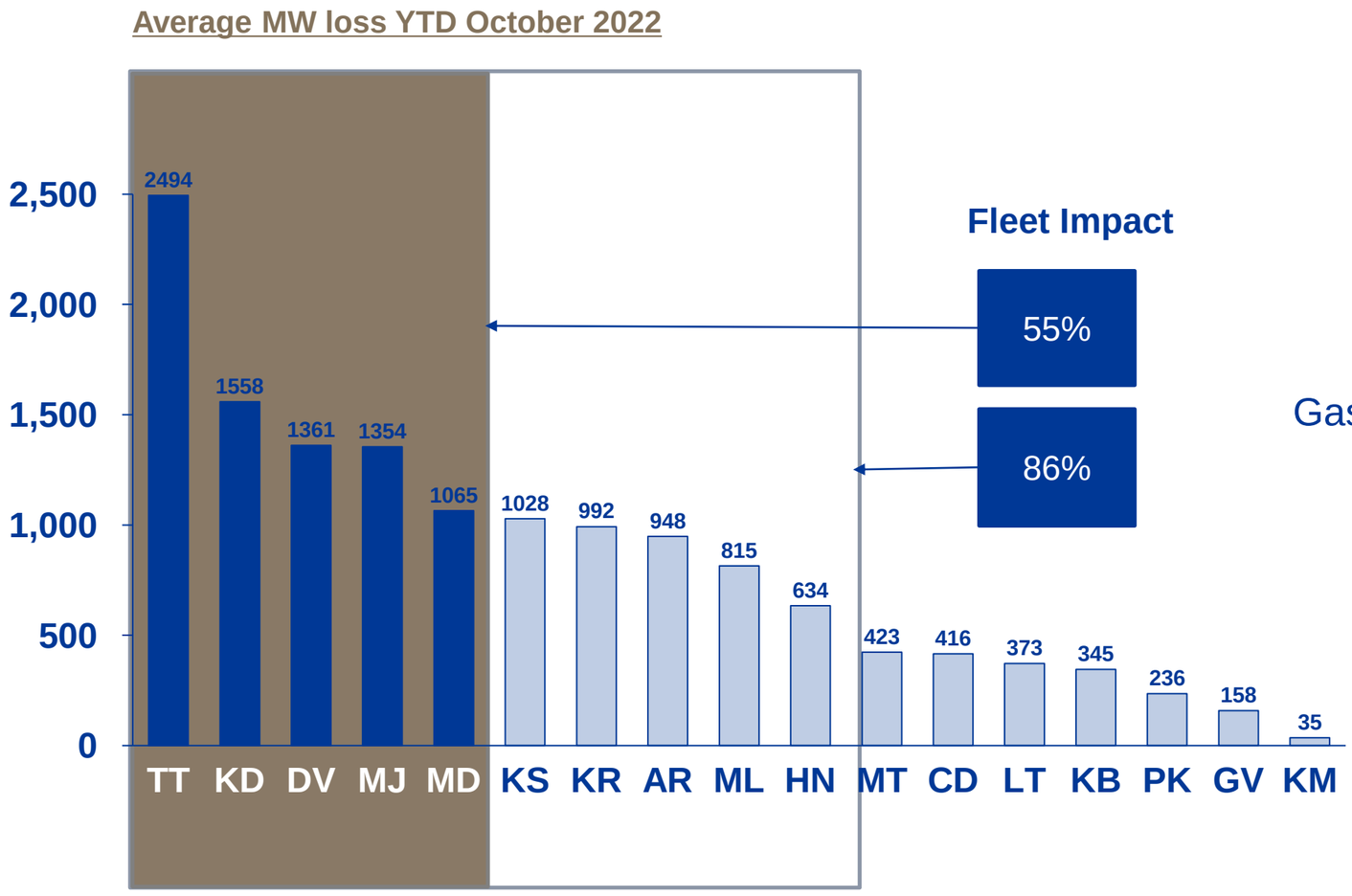


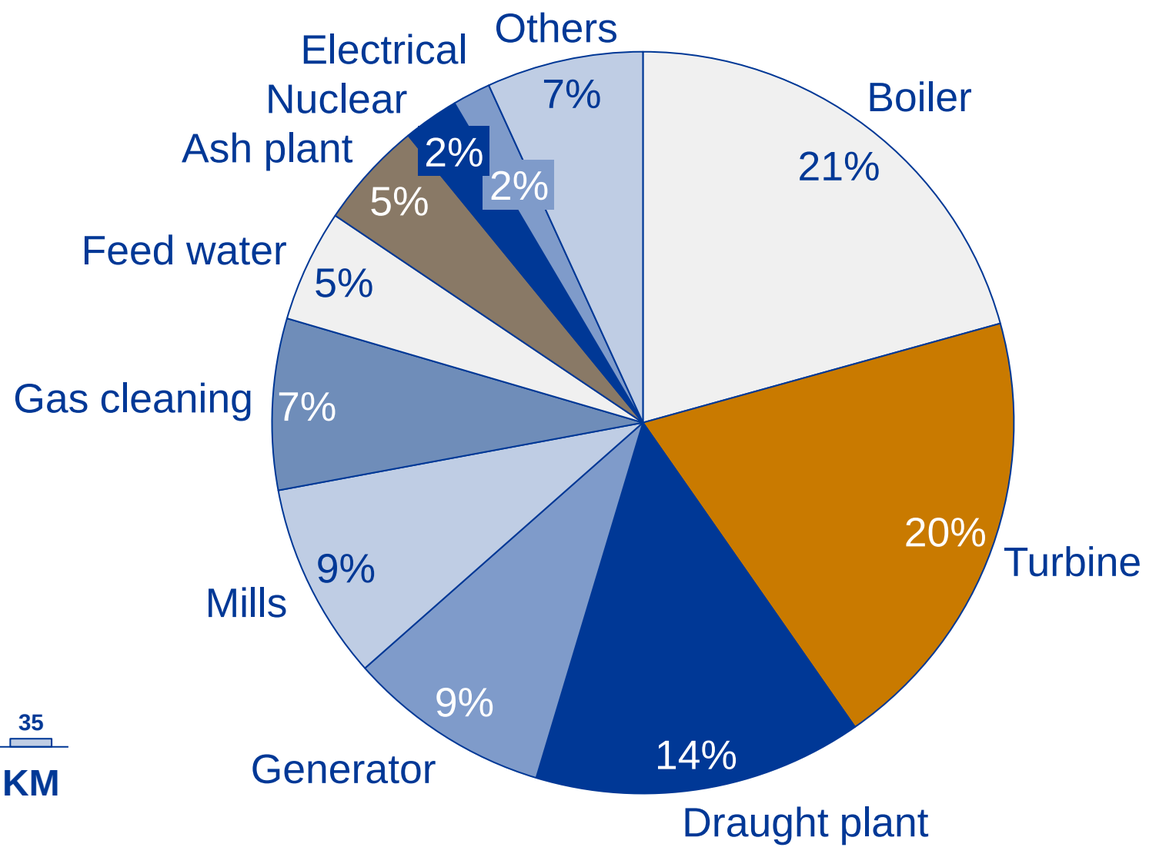
Key insights

- **Plant performance is highly unpredictable** with multiple failures experienced continuously
- Current **UCLF of ~31% is unsustainable for the business resulting in loadshedding** incidents
- Partial Load Losses (PLLs) continues to be the biggest contributor to UCLF for FY2023
- **Resolving the issues sustainably requires extensive maintenance Outages and implementation of refurbishment projects**

YTD Figures as at end Oct 2022; *300GWh is equivalent to energy from 600MW generated for a 3-week period

While Generation has a myriad of challenges to resolve, the greatest impact is in load losses concentrated in five coal stations





Key Insights

- **Tutuka, Kendal, Duvha, Majuba and Medupi contributed about 55% of the total UCLF YTD**. These stations together with **Kusile and Matla** form **the Top 6 stations** of focus. Medupi not included due to signs of improvement and the focus on recovering Unit4 to yield greatest benefit.
- This implies that these **stations contribute ~8600 MW of the unplanned load losses –** based on the average UCLF of ~14200MW.
- **Boiler, Turbine, Draught Plant and Generator** were the main contributors (63**%** contribution) for October 2022 YTD.

YTD Figures as at end Oct 2022

The Generation Improvement Plan incorporates key areas of the 9 Point Plan as well as strong focus on improving the culture

1. OPS Improvement Levers

Reliability Maintenance and **Technical Plan Projects**

9-Point Plan and **Station EAF Improvement actions**

Primary Energy Strategy and **Coal quality improvement drive**

New Build performance and **operationalizatio n of remaining units**

Partial load loss recovery and turnaround of unit trips

Furthermore

2. Culture Transformation - 1.1.6.10.

Six Culture Cornerstones

- People Prioritisation
- Operational Excellence
- Financial Prudency
- Customer Centricity
- Accountability
- Values Driven (ZIISCE)

3. 7-Strategic Initiatives

1. People
2. Training and competence development
3. Technical excellence
4. Station Rhythm
5. Supply Chain Management
6. Focus on the Future
7. Supplier Management

1 Interventions directly linked with the Presidential plan to improve the availability of existing supply and increase generation capacity

Action	Description	Responsible
1 Bring outstanding Medupi and Kusile units online	• Bring the remaining units at Medupi and Kusile online as quickly as possible – **Kusile Unit 4 reached commercial operation on 1 June 2022.** – **Unit 5 will come online in December 2023 (Air heater fire), and Unit 6 in November 2023** – Return **of Medupi 4 from long term forced Outage on 31 August 2024**	• Kusile Projects GM • Medupi GM
2 Implement Reliability Maintenance	• Continue implementing reliability maintenance across the fleet during the next 12 months **to prevent a further decline in its energy availability** • **Recruitment of experienced former** Eskom staff and offers of support from the private sector • Procurement improvement – **better availability of spare parts and expertise** from Original Equipment Manufacturers (OEMs) through more agile procurement.	• Maintenance GM • Generation GE • Power Station GMs
3 Address Debt	• National Treasury working on a **sustainable solution** to deal with Eskom's debt in a manner that is **equitable and fair to all stakeholders** • Solution should be finalised before the Budget Statement in February 2023 and will provide **Eskom with the space that it needs to undertake necessary investments**	• CFO
4 JET Projects	• Use climate funding provided through the Just Energy Transition Partnership to **invest in the grid and repurpose decommissioned power stations** • **Implement solar and battery storage projects** at Komati, Majuba, Lethabo and several other power stations will result in **over 500MW being added to the system.**	• Climate Change GM • Projects GM
5 Law Enforcement	• A coordinated effort with law enforcement agencies to **address sabotage, theft and fraud at Eskom**	• Security GM

1 The coal stations have been categorized to ensure focus and optimal allocation of resources

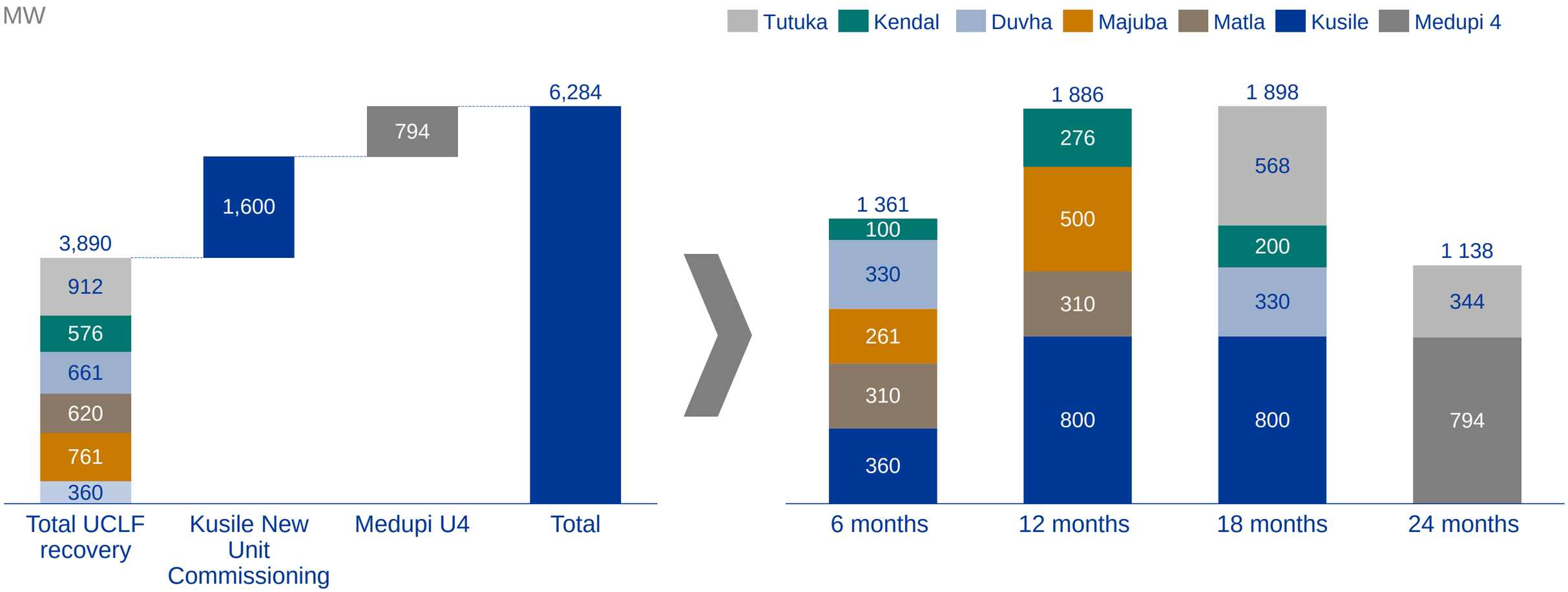
Category	Criteria	#[1]	Strategy	MW installed	Ave. MW unavailable
a Good Performers (sustain/ improve)	• Stations that are: – Performing above 70% EAF, or – Showing good improvement over time	3	• Sustain current interventions • Ensure lessons learnt are shared with other stations in the fleet	11 565MW	1 861MW
b Priority Stations (focused interventions)	• Stations that have: – large installed capacity (>3000MW) – consistently high UCLF – More than 5 years remaining life including in construction	6	• Focused interventions to address UCLF • Prioritising outages and budget allocation • Ensure new build remaining units are commissioned address defects	19 642 MW	8 610 MW
c Prepare For Repurpose	• Stations that are: – Shutting down by 2025 – Small, expensive to operate and maintain	4	• Safety and statutory compliance • Risk based inspections • Preparation of repurposing plans	3 263 MW	1 243 MW

Focus on Top 6 stations is for prioritization purposes. Generation will also continue to conduct maintenance on the entire fleet as the current electricity constraints requires as much megawatts as possible

1 - Number of stations (coal stations only) ; 2 stations Kriel and Arnot to be next focus of priority interventions

1 By recovering capacity, commissioning New Build, ~6000 MW can be delivered by Generation in the next 24 months

Capacity that can be recovered by Eskom generation within the next 24 months

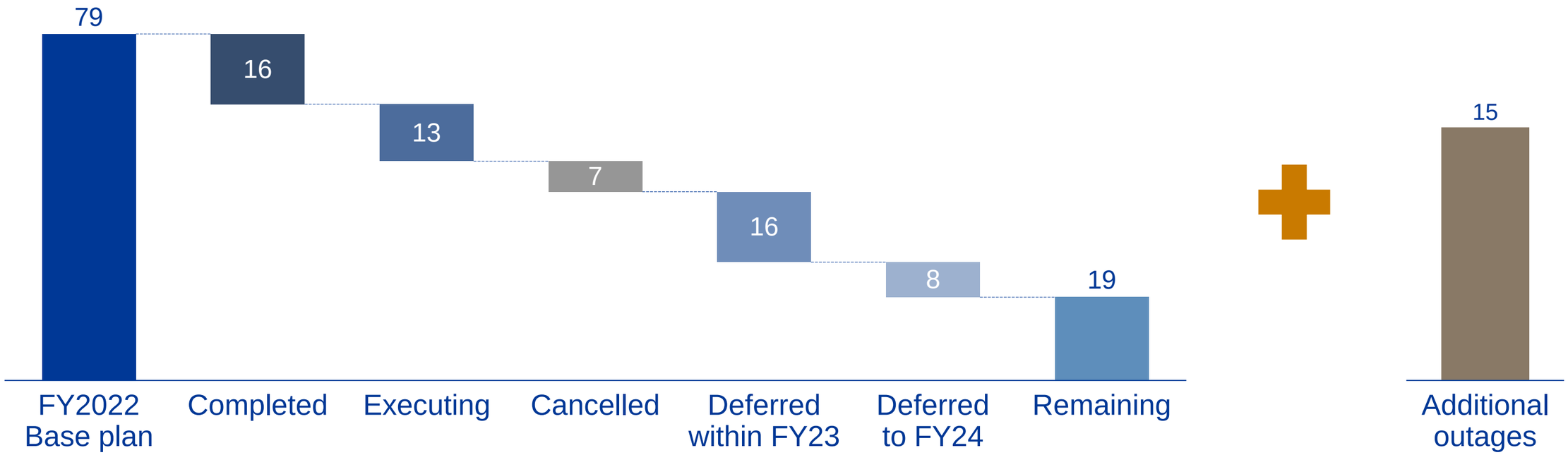


Notes:

- Numbers are based on UCLF reduction committed, given the current YTD performance levels, and resultant availability factoring in planned maintenance.
- Total of 1 960MW from Kusile (360MW performance improvement and 1 600MW commissioning of 2 units)
- Medupi to return unit 4 from long term forced Outage by 31 August 2024
- The plan with timelines is being developed to address the Kusile U1 duct failure and consequent damage to Unit 2 and 3 and will offset the potential gains in the near term and until the units are fully recovered.

1 The biggest opportunity to fix the plant is during Outages – hence the importance of the RMR Programme

Reliability Maintenance Recovery (RMR) Programme Status at end September 2022



Key insights

- **Status of Reliability Maintenance FY2022**:
  - **At the beginning of FY22 a total of 79 outages were scheduled from April 2022 to 31 March 2023.**
  - **As at 31 October 2022 16 outages have been completed, 13 are currently in execution, seven have been cancelled and 16 have been deferred to later within the current financial year, eight to the next. An additional 15 short-term outages have been executed.**
  - The main work **impacting plant reliability and predictability is carried out during Mini-Overhauls (70 days) and General Overhauls (86 days).** There are on average 20 MGO's and GO's per annum for coal fired power stations
- Proper **outage planning remains a high focus** with the Outage Readiness Reviews directing sites to meet the minimum 80% target

1 Eskom system maintenance overview

- **Maintenance** remains a challenge: (It would be difficult to argue our regime is effective given the current performance and current PO-UCLF, much is still to be done)

- We currently have **2 station out of 14 Coal stations that are performing above 70% EAF.** This results in **unpredictability of current plant (high UCLF) that limits the space/opportunity on the system to invest in PCLF**. There has also been an extended period of underinvestment in maintenance that cannot be addressed in a short period of time.

- **Benchmarking the coal fleet against Industry Maintenance Effectiveness Standards has also identified other areas in the Maintenance value chain that require attention**: (These are all part of the recovery program as can be seen in next slide)

  - Depth and stability of Maintenance Leadership and Management (PLOC)
  - Supply Chain Management
  - Human Capital investment
  - Revision of Maintenance Strategies and Work instructions given age and circumstance of plant. (MS& MW)
  - Use and integration of Centralized Computerized Management Systems (CCMS)

- **Lack of secured capital funding to cater for Maintenance over the last 2 years** (and the years ahead) is a challenge. Affordability budgets have required that reliability maintenance scope be sacrificed to allow for safety and statutory maintenance. The timely release of funds once made available has also compromised the ability to plan appropriately for required outages as per capacity plant. This leads to Outages being differed also impacting the expected speed of fleet recovery. Currently this remains a challenge for FY24 which is being addressed by the new Eskom Board.

1 Key actions to improve delivery of improved outage performance

Gx Strategic Initiatives led by Outage Sponsor in Support of Outage CoE (RMR)

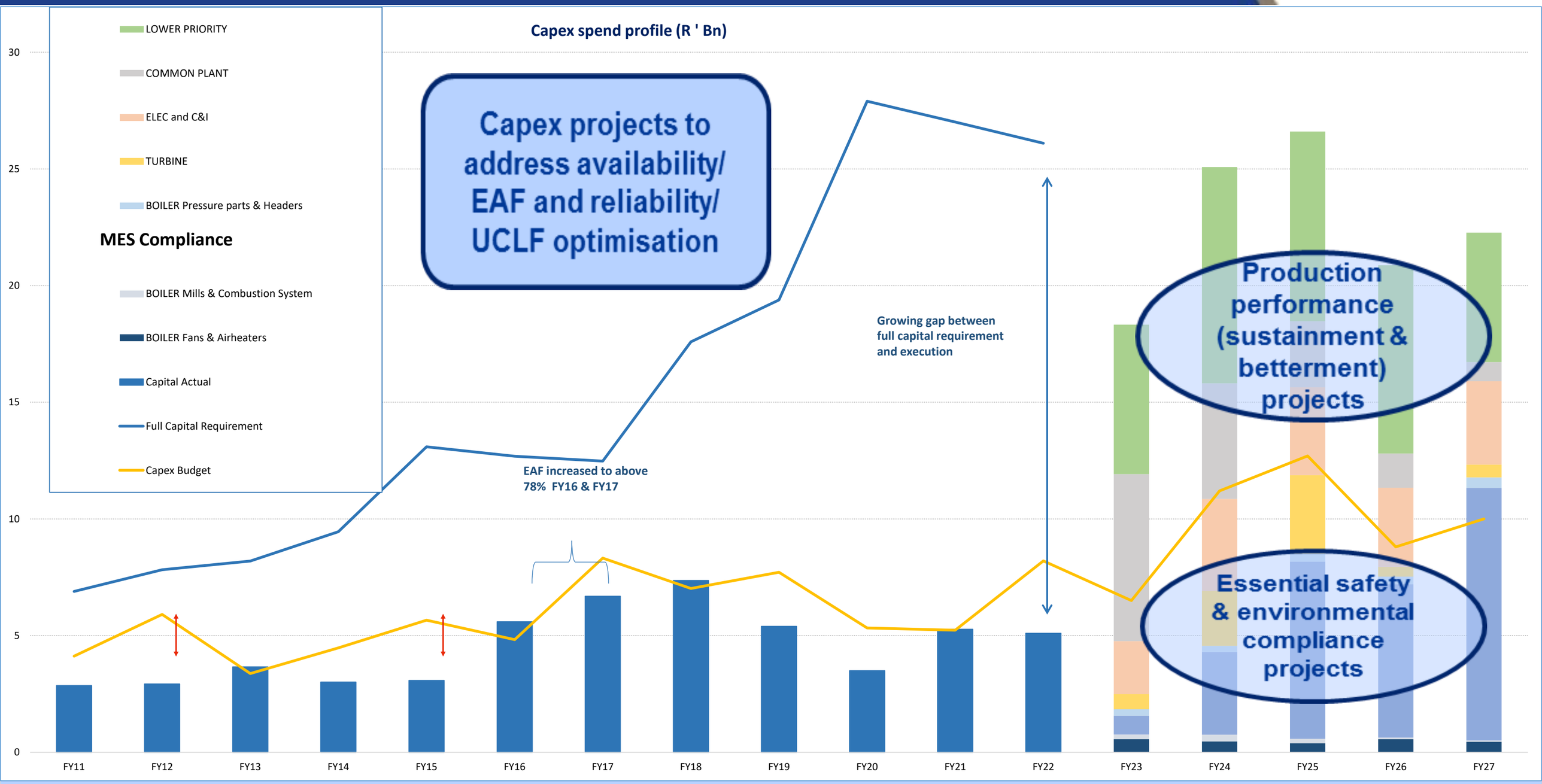
1. Establishment of Generation Outage Steering Committee
2. Enhance functioning of Site Outage Implementation Committees
3. Improved outage planning with specific focus on critical spares measurement in ORI process
4. Conduct deep dive into Post Outage UCLF (Deep dive will initiate Corrective Action Plan)
5. Implement Project Controls methodology across stations
6. Enhance Outage Execution & monitoring of Outage Performance

Actions in support of and supplementing Strategic Initiatives addressing critical risks in the Outage value chain…

- Expedite approval of site Outage Blue-Print structure so that stations can address issue of under-resourcing
- Drive JIT spares for outages with procurement warehouse management
- Improve Outage post-mortems to have lessons learnt incorporated in future outages
- Funding release 24 months prior to breaker open
- Facilitate improvement of outage scope reviews with Engineering CoE
- Hold contractors to account
- Improve contract administration / management
- Completion of MSMW to have scopes drawn from SAP in the future
- Use transversal contracts where there is a need to expedite services and spares
- Contract commissioning resources for skill transfer

Key Factor to consider: Above initiatives have detailed project plans with due dates and accountable individuals, monitored in Gx Turn-around and Gx Outage Steering Committee

1 Capex profile & projected funding requirement

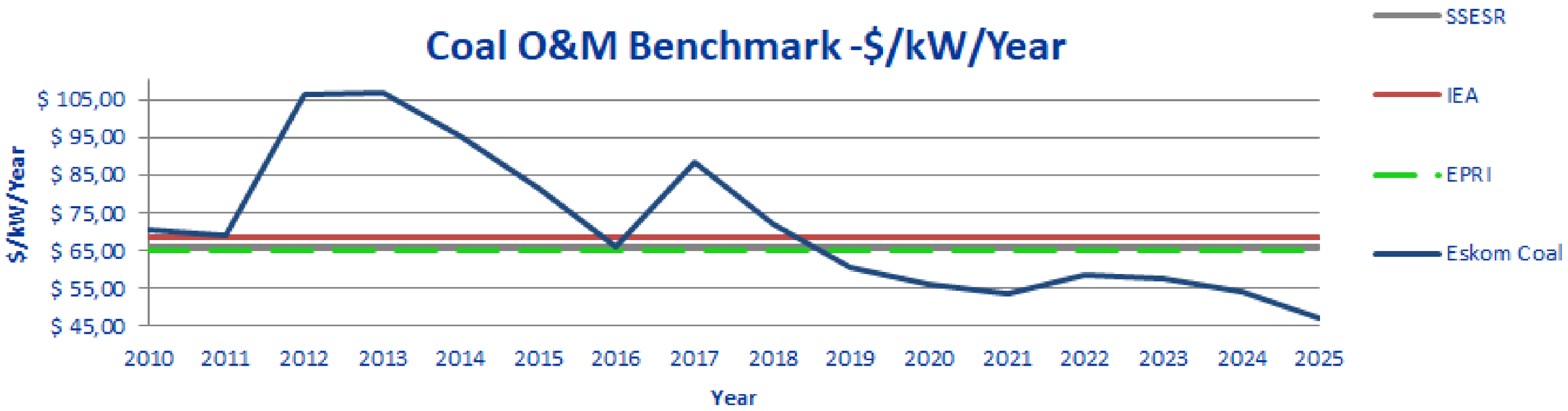


- **<u>Prioritisation of funds</u> allocated for production performance (sustainment and betterment) needs to be effectively managed, over and above the essential requirements for safety & environmental compliance.**
- **<u>Development to support plant refurbishment</u> will improve availability/ EAF and reliability/ UCLF going forward.**

1 Overall Non-fuel O&M Benchmark

Generation's coal fleet O&M compared to benchmarks

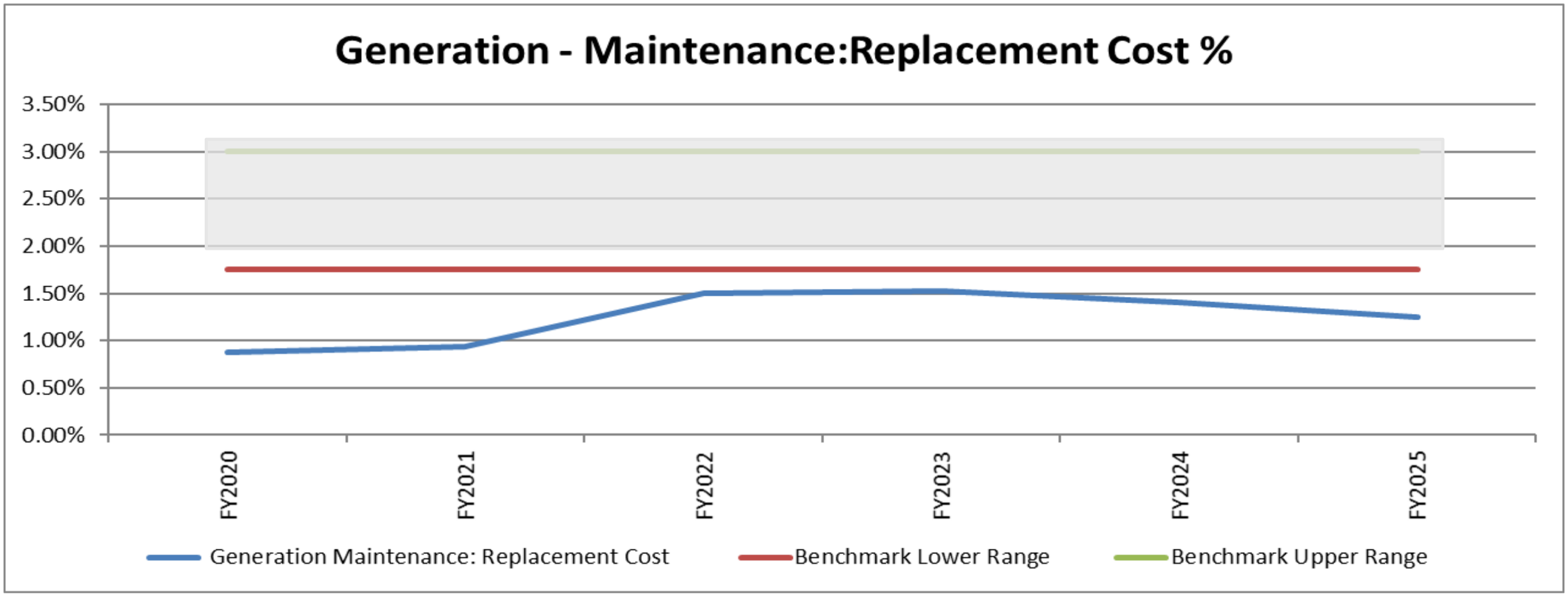
($/kW/year, constant currency, base 2020)



- Gx coal fleet's non-fuel O&M costs could be expected to exceed benchmark due to:
  - mid-life-cycle for most of fleet
  - catch-up of maintenance backlog
- However, since 2016 (except for one year) costs have been < international benchmarks
- Higher costs were incurred for a period from 2012 following onset of unreliability due to 10 years of high load factors (since ~2003) and deferral of maintenance (since ~2008), however this programme could not be sustained due mainly to:
  - insufficient system capacity to allow required PCLF;
  - lack of funding due to sub-cost-reflective regulated tariffs

1 Maintenance Cost Benchmark

How does Generation compare to benchmark?



Generation's recent and planned maintenance spend is consistently <u>< benchmark lower range</u>

Extracts from reports**:**

- ***"****…. common knowledge that spending too little is to operate a wasting asset; spending too much is hurting profitability; … you can bet if it is either 1% or 6% you are in the process of putting yourself out of business";*
- *"… a few brand new facilities running in countries with cheap labor that claim to be operating as low as 1.75% of RAV per year, but ..*[we]*.. have* [n]*ever seen it sustained without serious problems"*

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2 Eskom has recently launched the 1.1.6.10. Culture Transformation Programme in recognition of the need to establish a High Performance Culture

The aspirational Eskom organisational culture is a **high performance culture** that can enable Eskom to **power growth sustainably.** In doing so, **6 culture cornerstones** (characteristics of a high performance culture) is supported by **10 culture levers** will drive and enable a high performance culture over the next 3 – 5 years.

1 Purpose: Powering growth sustainably

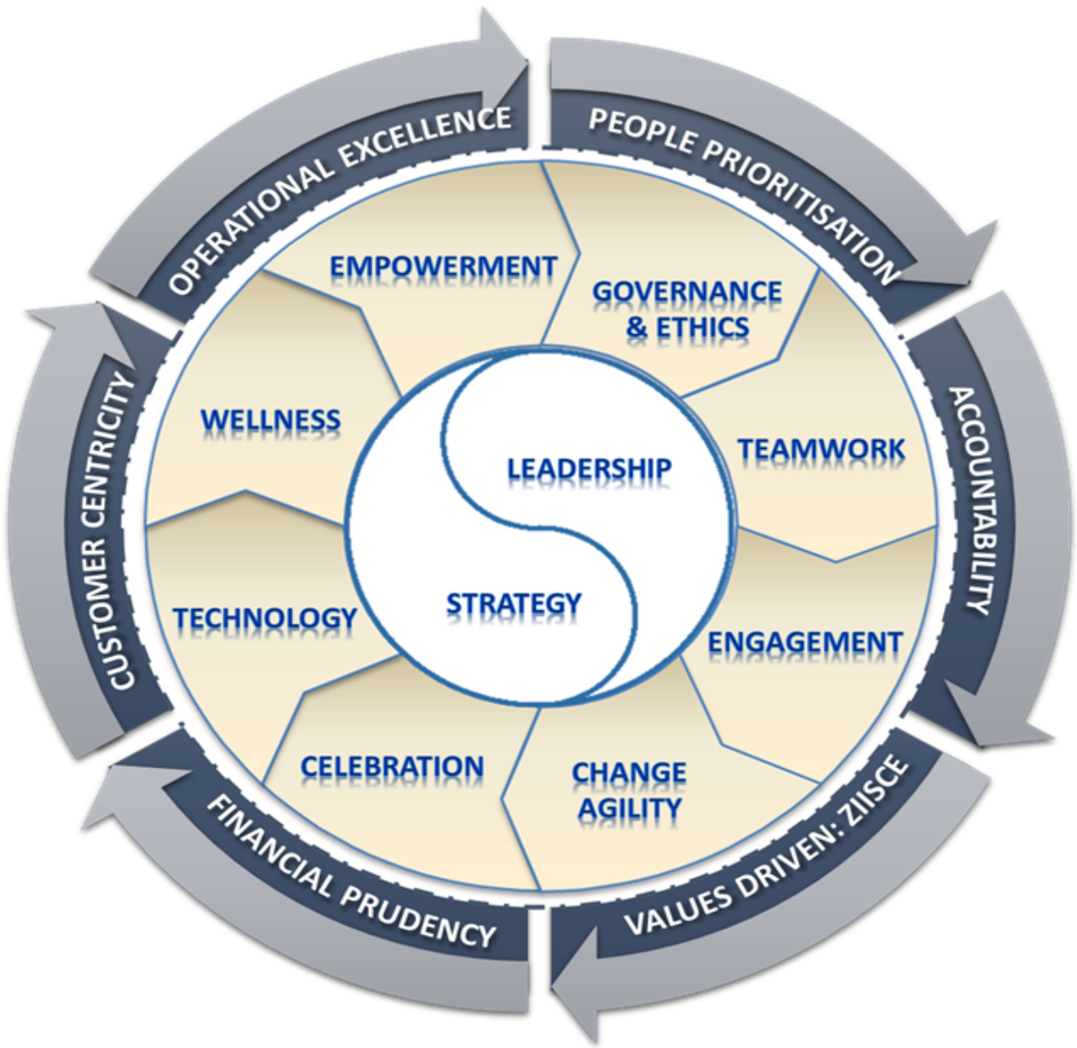
1 To-be culture: High performance culture

6 High level culture cornerstones. A culture characterized by:

- Accountability
- Operational Excellence
- People Prioritisation
- Financial Prudency
- Values driven culture
- Customer Centricity

10 key levers of organisational culture:

- Empowerment
- Governance & Ethics
- Teamwork
- Engagement
- Wellness
- Technology
- Change Agility
- Celebration
- Leadership
- Strategy



A high performance organisational culture is characterised by these 6 culture cornerstones

Eskom's Organisational Culture Programme
Powering growth…sustainably

3 Generation Strategic Initiatives Programme has been rolled out and progress is being made in action implementation

Completed | In progress | Not Submitted

Initiatives	FY23 KPI Status	Strategy status	Roadmap status	Initiative Owner	Risks Identified	Implementation	Description
People							• Improve employee morale and productivity • Reward and recognise employee good performance • Drive change management strategies • Implement findings from Organisation Effectiveness Survey • Implement actions from Gx Operations Excellence and Gx Board
Training and Competency development							• Drive Technical and Non-Technical training • Minimum required training to be compulsory • Institutionalise the use of EAL • Drive supervisory, managerial and leadership training, development and assessments
Technical Excellence							• Improve Operating and Maintenance indicators • Improve Outage Planning as per ORI Score • Set Quarterly targets and assurance for the above • Re-establish engineering function • Measure effectiveness assessments at each site • Develop and drive operational plans • **Security – *NEW ADDITION***
Station Rhythm							• Establish power station guidebook • Establish daily plant status checklist for sign-off by each PSGM • Mandate established institutional knowledge
Supply chain management							• Drive placement of long-term contracts • Improve cataloguing of spares and management • Improve buyer productivity • Stores management and digitisation (bar coding)
Focus on the Future							• Align all actions with Eskom 2035 Strategy • Ensure Gx has a sustainable role to play in the future energy market
Supplier management							• Supplier performance • Contracts management capability

3 A crowdsourcing digital platform developed by Eskom, was launched and aims to attract a talent pool of highly skilled and experienced persons

- **Crowdsourcing differs from recruitment in that it is triggered by specific technical challenges**, is not linked to a permanent position
- To date, the **database includes 238 individuals, of which 153 have been shortlisted as potentially active, skilled, and willing candidates.**
- Approximately **25 individuals have been selected for the first phase** of the crowdsourcing intake. These individuals will **commence work between November and December 2022.**
- **Additional recruitment will take place as and when required by the business**, to meet specific technical needs. To ensure sustainability and to maximise the impact of these skills, each **crowdsourced individual is required to transfer skills to the permanent Eskom team that they will work with.**
- The **platform aims to attract people meeting the following criteria**:
  - Highly skilled electricity generation expert or technical professional (e.g. engineer, power plant operator/controller, artisan, technician)
  - More than 10 years of related experience
  - Able and willing to support Eskom
  - Willing to transfer your skills and expertise

Generation's Operational Recovery plan is geared towards improving EAF from 59% YTD to at least 70% from FY 2025 onwards

1 Set up for success

- ❑ **Set-up the enabling structures**
  - Turnaround plans
  - War Room
  - Reliability maintenance
- ❑ **Guard performance** at current **flag ship stations**
  - Medupi, Lethabo, Matimba and Peaking
- ❑ Focus on the **Top 6 priority stations**
  - Tutuka, Duvha, Majuba, Kusile Matla, Kendal
- ❑ Return of **Koeberg** unit 2 (complete) and **planning of next Outage**
- ❑ **Drive skills development** through internal and external recruitment

2 Execute excellence

65% EAF

31 Mar 23

- ❑ **Focus on the next priority stations**
  - Kriel & Arnot
- ❑ **Successful execution of Koeberg unit 1 Steam generator project**
- ❑ **Sustain Excellent Medupi performance**
- ❑ **Embed principles of Operational Excellence**
- ❑ **Address internal skills gaps**

3 World class performance

+70% EAF

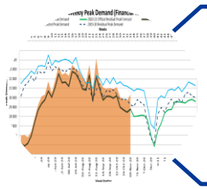
31 Mar 24 onwards

- ❑ **Kusile fully operational** and **return of Medupi 4** from long term forced outage
- ❑ Closure of old stations as per the approved dead stop dates
- ❑ **Continuous focus on current and future skills**
- ❑ **Ensure successful implementation of Koeberg 2 steam generator and long-term operating projects**

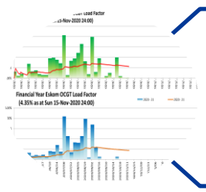
Continuous execution of Culture transformation and 7 Strategic Initiatives

Transmission

Summary of system performance



(2023) Financial year-to-date energy sent out from dispatchable plant is 0.9% **lower** than for the same period last year. (0.4% **lower** for dispatchable and renewable)



IPP OCGT load factor is 11.0%, Eskom OCGT load factor is 17.5% (Financial year to date)

There were **25 wind generation curtailment** events in the financial year.

There have been **141 days of loadshedding so far** since April 2022 and **155 days of loadshedding so far** since January 2022 up to **11 November 2022.**

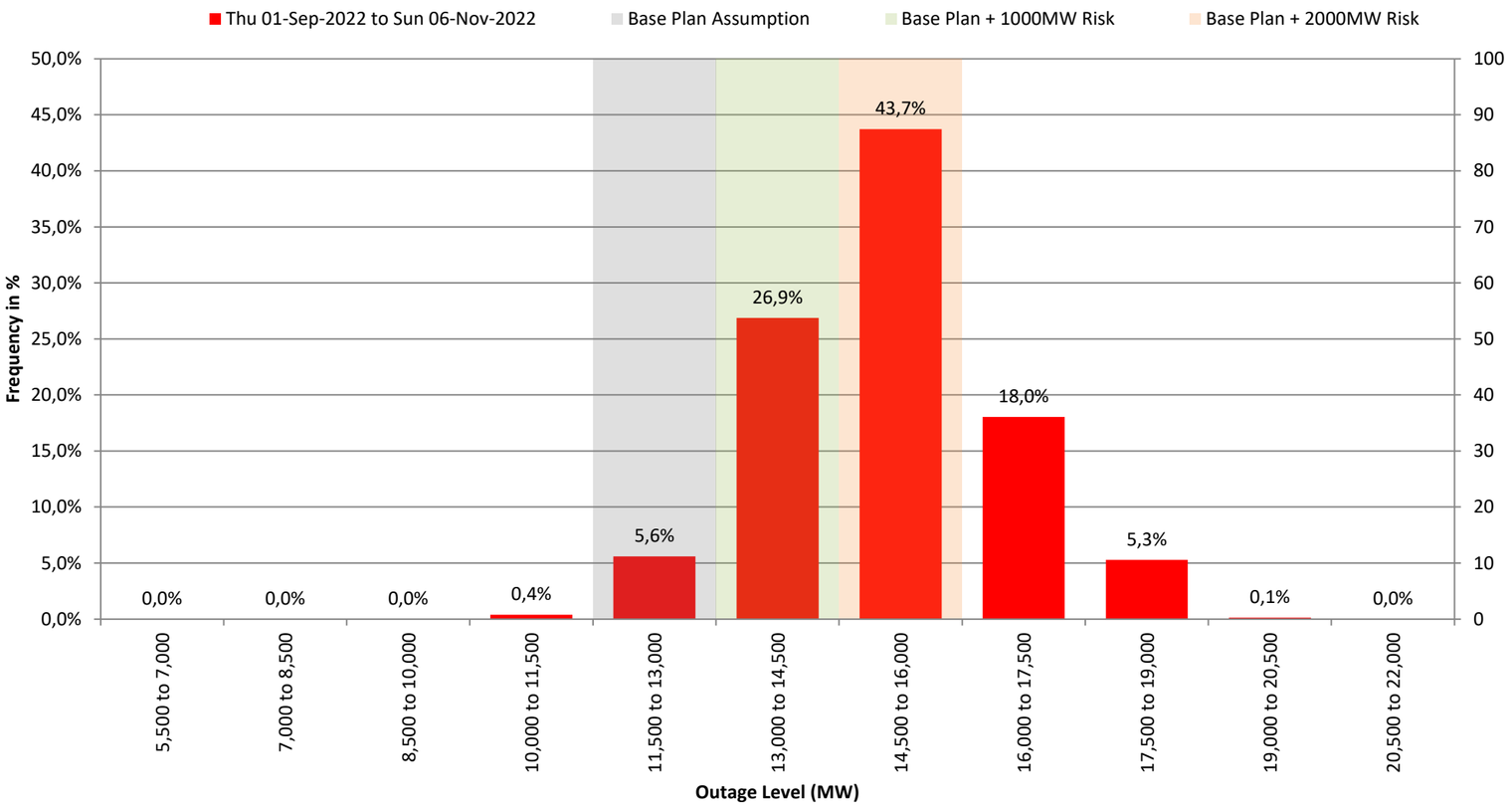
The **highest *residual demand*** (demand supplied by dispatchable generation) for Calendar 2022 so far was **33 136MW** on 23 June 2022

The **highest *contracted peak demand*** (demand supplied by dispatchable and renewable generation contracted to **SBO**) for 2022 so far was **35 005MW** on 23 June 2022

Currently there is **6 280 MW of renewable generation** contracted to the **Single Buyer Office**. 500 MW of CSP, 2 287 MW of PV and 3 443 MW of wind

Unplanned Outage Performance: Summer 2022/23

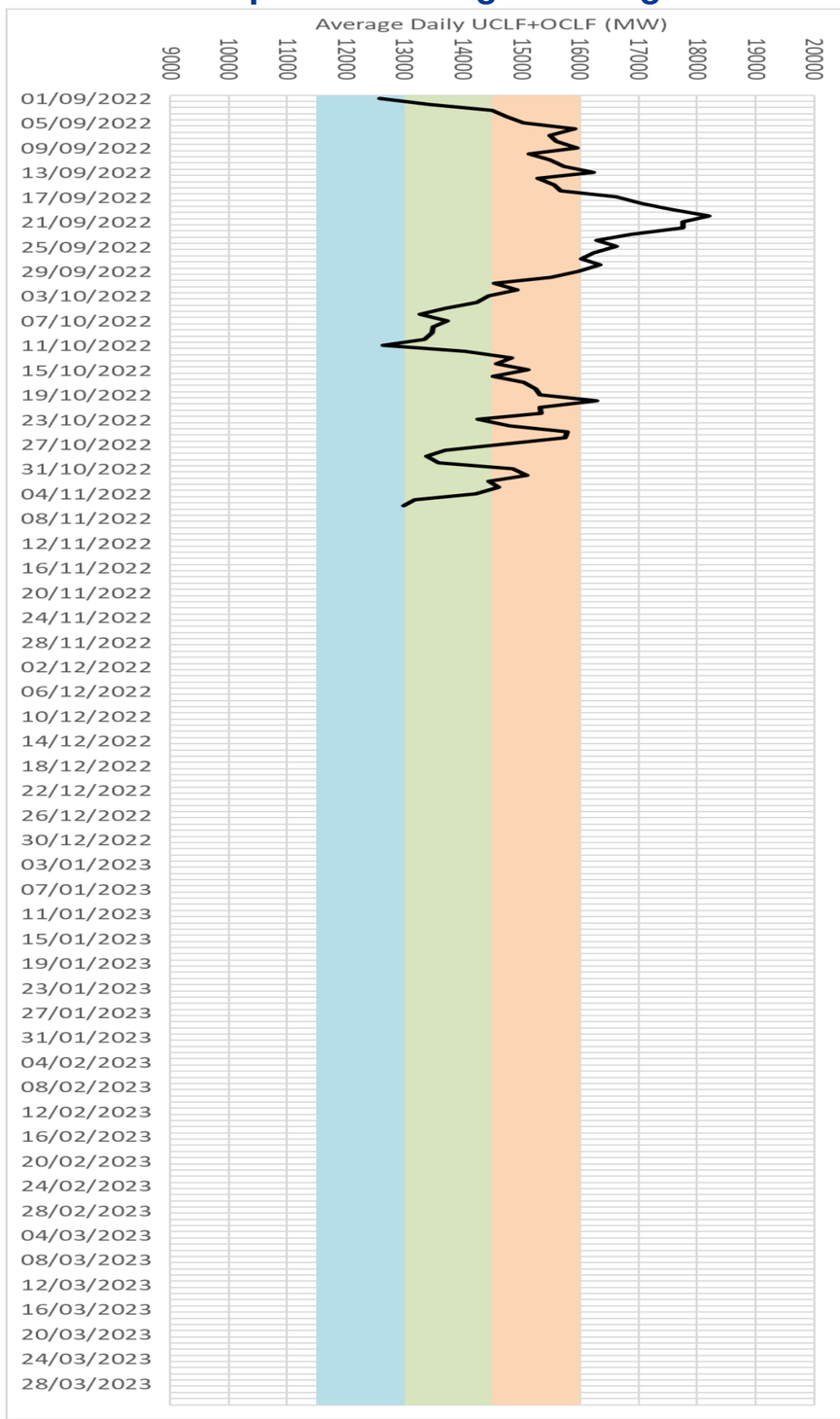
Summer UCLF+OCLF Frequency (01-Sep-2022 to 31-Mar-2023)



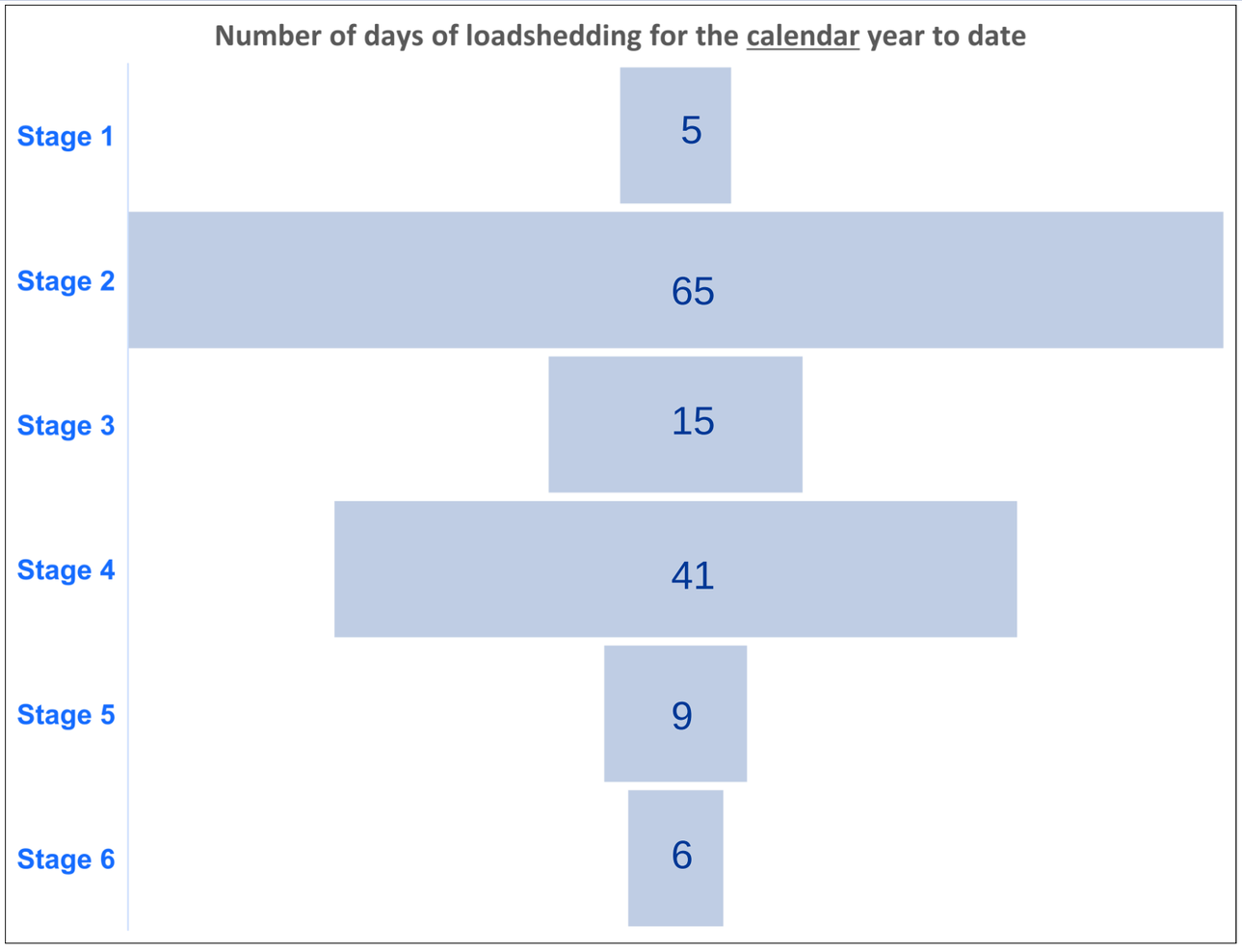
23.4% of the time we operated above the maximum <u>assumption</u> for the Summer Plan

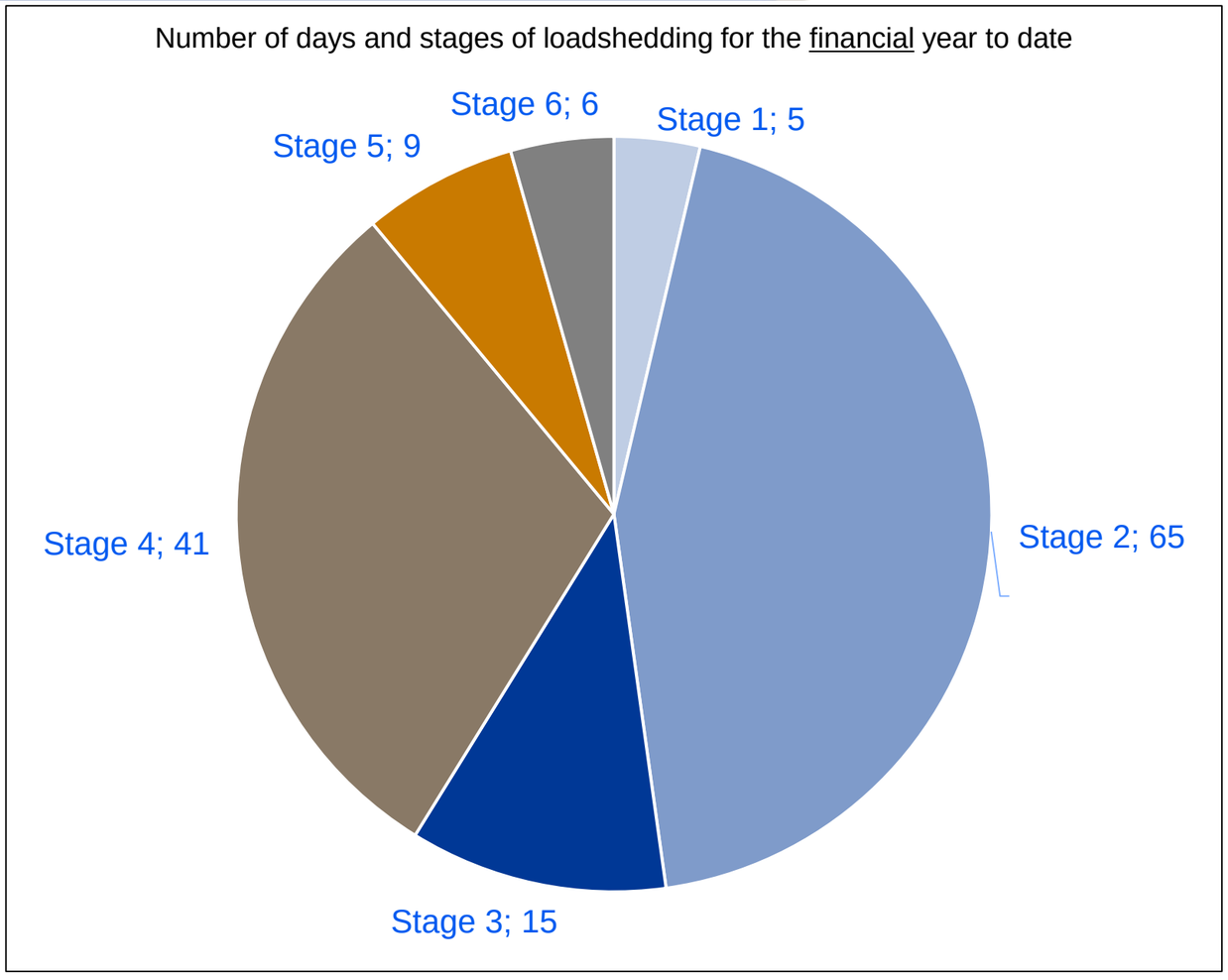
The **average** UCLF+OCLF over evening peaks was 15 182 MW over the summer period

Total view unplanned outages during Summer



Loadshedding and load curtailment summary (Up to 11 November 2022)





- Since 01 January 2022, there have been 155 days of loadshedding, with 51 days of load curtailment
- For FY2023, there have been a total of 141 days of loadshedding, with 44 days of load curtailment

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

Power System Outlook

(Summer Plan 2022/23)

Planning process

Capacity plan uses 10 000MW UCLF

18-month residual demand forecast

UCLF + OCLF forecast

Summer Plan uses 13 000 MW UCLF

Eskom Generation maintenance requirements for 18 months ahead (Capacity Plan)

- Power stations determine their maintenance requirements
- Environmental outage requirements are included

Schedule maintenance and optimise available capacity excluding OCGTs

- Gx Production and System Ops in consultation with other stakeholders iteratively optimise the plan

Optimised Capacity Plan with UCLF assumption

Include IPP dispatchable generation and emergency reserves

- IPP dispatchable generation included by System Operator
- Emergency reserves such as ILS, VPS included by System Operator

Optimised Plan with stress tested UCLF scenarios

- 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.

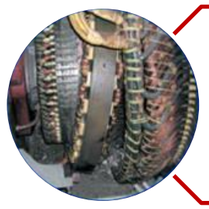
Components of the Plan

- System Operator and Generation do a **detailed plan (updated weekly) for 18 months ahead.**
- **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 UCLF**, 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.

Risks & uncertainty

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

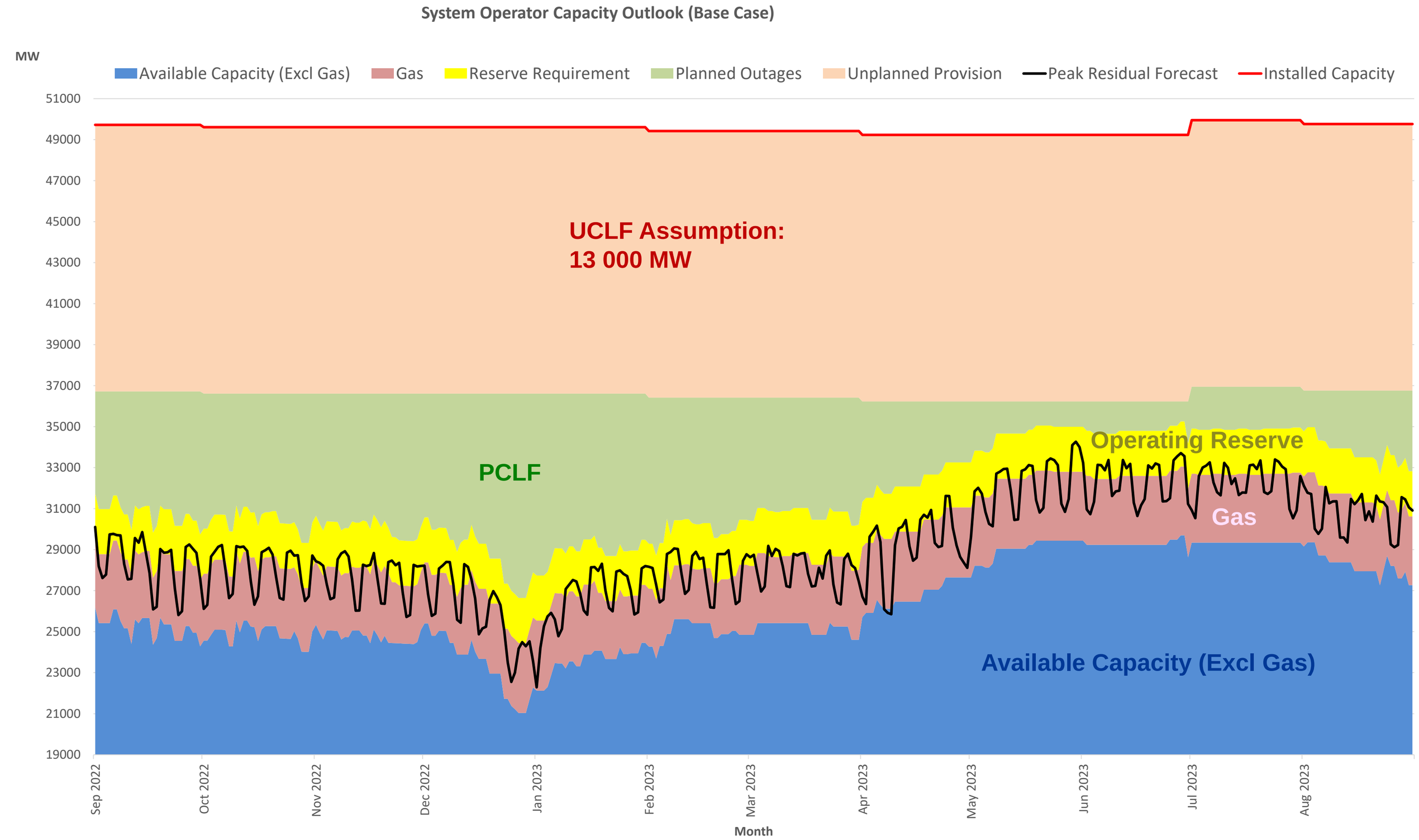
The plan does not cater for **difficulties that could arise at power stations** due to industrial action or other employee protests.

There is a ± 2 000 MW **variance** in UCLF (4 000MW). 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 000MW of reserve to needing Stage 2 loadshedding** to create sufficient reserves.

The **uncertainty must be clearly understood by all stakeholders including government and the public.**

System Operator Capacity Outlook (Base Case)



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Monthly System Status Outlook to August 2023

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		138,392	R770.84	20	2	408,889	R2,277.51	28	3	913,265	R5,086.89
October 2022	29,223	13,000	0		142,880	R795.84	18	2	412,494	R2,297.59	30	3	968,202	R5,392.88
November 2022	28,922	13,000	0		134,711	R750.34	18	2	540,441	R3,010.26	27	3	1,095,845	R6,103.86
December 2022	28,402	13,000	0		190,365	R1,060.33	16	2	668,154	R3,721.62	24	3	1,303,407	R7,259.98
January 2023	28,311	13,000	2	1	361,783	R2,015.13	19	2	917,114	R5,108.32	29	3	1,400,601	R7,801.35
February 2023	29,058	13,000	5	1	192,288	R1,071.04	18	2	655,377	R3,650.45	27	3	1,075,496	R5,990.51
March 2023	29,185	13,000	0		156,917	R874.03	17	1	654,993	R3,648.31	28	3	1,262,501	R7,032.13
April 2023	31,621	13,000	0		86,867	R483.85	12	1	292,521	R1,629.34	21	3	677,690	R3,774.73
May 2023	34,267	13,000	2	1	110,911	R617.77	18	2	266,842	R1,486.31	26	3	541,066	R3,013.74
June 2023	33,710	13,000	0		110,976	R618.14	16	2	275,611	R1,535.15	28	3	574,378	R3,199.28
July 2023	33,397	13,000	0		102,838	R572.81	16	2	264,076	R1,470.90	28	3	561,276	R3,126.31
August 2023	32,111	13,000	0		86,912	R484.10	12	2	242,619	R1,351.39	23	3	548,376	R3,054.45

Note: The basecase 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 basecase.

Summary of the Outlook

	Basecase	Basecase + 1500 MW	Basecase + 3000 MW
Summer 2022/23			
Number of LS days Highest stage of LS OCGT costs	7 Days Stage 1 R 7.3bn	126 Days Stage 2+ R 23.7bn	193 Days Stage 3+ R 44.7bn
Winter 2023			
Number of LS days Highest stage of LS OCGT costs	2 days Stage 1 R 2.8bn	74 days Stage 2 R 7.5bn	126 days Stage 3+ R 16.2bn

Dramatic increase in load shedding days and OCGT cost for only 1 500 MW change in UCLF

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

Summer: 1 September 2022 – 31 March 2023. UCLF+OCLF: 13 000 MW – 16 000 MW
Winter: 1 April 2023 – 31 August 2023. UCLF+OCLF: 13 000 MW – 16 000 MW

Thank You