



System Status Briefing

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21 May 2020



1 Overview

2 Performance Review February 2020 to May 2020

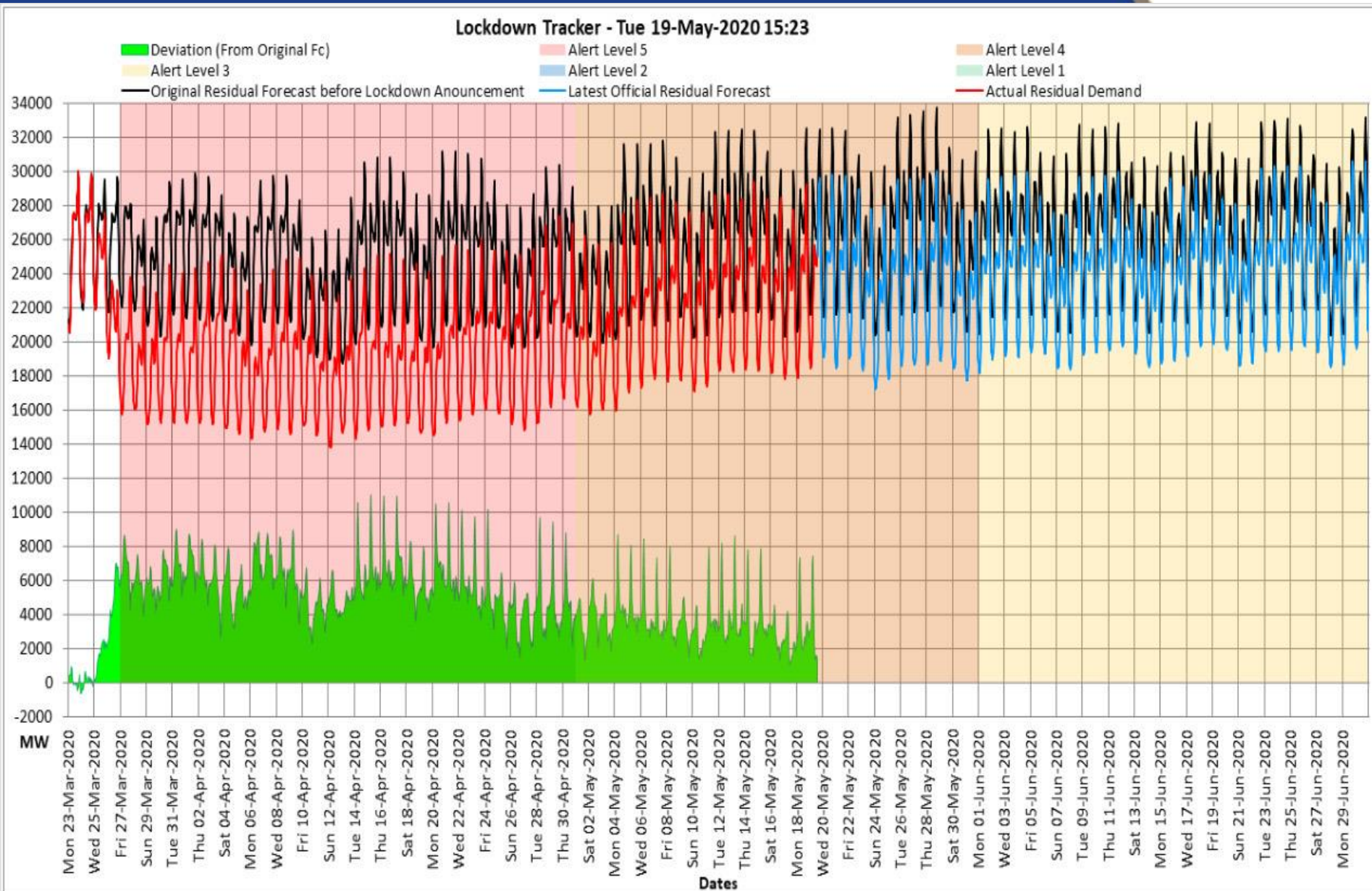
3 Progress with existing 9-Point Recovery Plan

4 Generation Optimized Capacity Plan Winter Outlook (FY2021)

5 Conclusion

-  The **impact of COVID-19**, and especially the **lockdown**, have **reduced demand** by an average of **6 000 MW up to a maximum of 11 000 MW**
-  This has created the opportunity to **execute additional short term maintenance** to address emergent issues, including those that are **contributing to partial load losses (PLLs)**
 - **Planned maintenance** has roughly **doubled to more than 9 000 MW** on occasion
-  This also had **significantly reduced the need for OCGT usage**
 - In the first 28 days of April, **R 22.2m was spent on OCGT fuel**, with a load factor of 0.34%
 - In FY20, **R 2.67bn was saved on OCGT fuel** vs. the **provision of R 6.98bn**
-  On the other hand, the lockdown and COVID-19 related restrictions have meant that some **reliability outages have had to be delayed**
-  In particular, **Koeberg unit 2 was placed in cold reserve in April** in order to delay the start of its next refueling outage to:
 - Allow the unit to be **available when most needed** – in the months after lockdown (June or July)
 - **Improve the certainty** for required **international resources** (specialists and spares) to arrive
-  Eskom has plans in place to **gradually ramp up its power stations** in line with government's **risk adjusted COVID-19 strategy**

Impact of COVID-19 Lockdown



Overview of Transmission, Distribution, Koeberg and New Build performance

Division

Performance Status

Transmission

- Sustained high levels of maintenance
- Performance negatively impacted by a number of abnormal events at large load centers due to high voltage plant failures as well as operating incidents:
 - 2 Major Incidents occurred in Q4 taking the YE total to 3, against the annual limit of 2
- Ongoing theft and vandalism incidents impacted operations

Distribution

- 163 073 customers connected as part of the Universal Access Programme, well over the target of 157 900
- There is an increase in non-technical energy losses. Deterioration due to illegal connections, tampering with meters and culture of non-payment
- Technical Performance continues to remain steady with a SAIDI Act of 36.88 vs a Target of 38hrs and a SAIFI Act of 14.44 vs a target of 19.6 Interruptions

Koeberg

- Koeberg continues to operate safely as confirmed by oversight bodies. Nuclear Safety Review Board of nuclear experts instituted (additional oversight)
- Unit 1 trip 10 March, RTS 14 March. Unit 2 in Cold Reserve due to low demand
- Koeberg 20-year life extension studies in progress and on track. The first 2 of 6 Steam Generators ready to be shipped to South Africa

Station	Defect status
Medupi	• Unit 3 reaches full 793 MW capacity after 75-day outage for boiler plant modifications to design defects • Unit 6 undergoing similar modifications, to be followed by Unit 1 during May 2020 • Units 4 and 2 to be taken off grid July 2020 and August 2020 • Unit 5 to go on 75-day outage November 2020 • Unit 1 optimisation in progress, Commercial Operation forecast in Q4 of FY2021
Kusile	• Boiler plant modifications to start Q1 2021 • Construction suspended on Kusile Units 4 to 6 due to COVID-19 lockdown • Kusile Unit 2 and 3 on load and supporting the grid while commissioning is in progress • These units (2 & 3) are forecast for Commercial Operation in Q2 of FY2021
Ingula	• Design defects: Ingula units rerated from 245 MW to full design capability of 333 MW in February 2020



Maintenance **increased from 3 600 MW**, prior to national lockdown, **to 9 800 MW** in the second week of April 2020



6 776 MW capacity currently being maintained against a pre-lockdown plan that averaged **4 200 MW**



Partial load losses target reduction **from 4 615 MW to 2 638 MW**, an improvement of **1 977 MW in available capacity**



Due to the above, the resulting base case scenario after lockdown shows an improvement from an envisaged **31 days of Stage 1 loadshedding to 3 days during the winter period (P80)**

- It is important to recognise that due to the **unreliability and unpredictability** of the system, the risk of loadshedding remains
- This will be the **reality** until after the 18 months of reliability maintenance to August 2021



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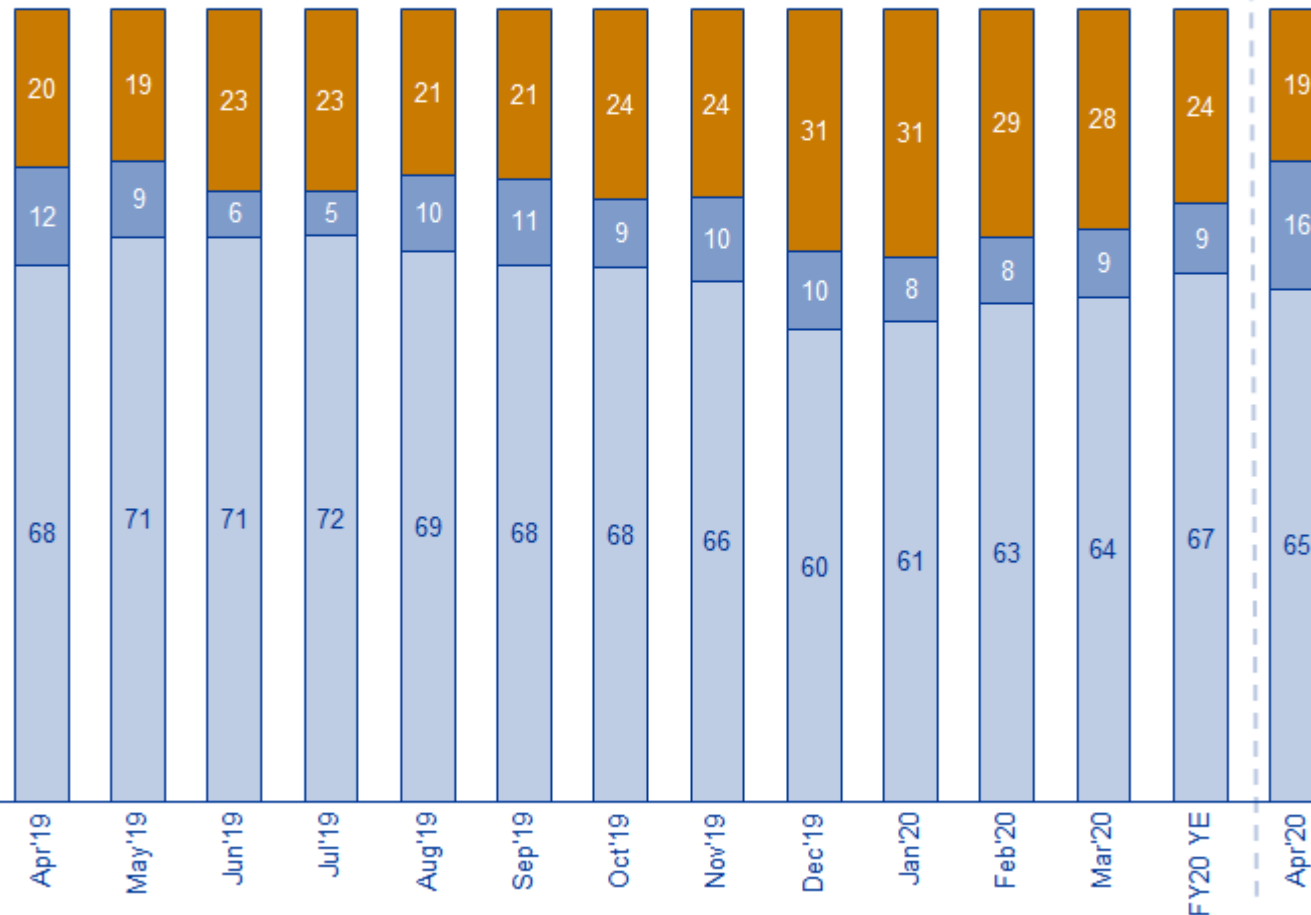
5 Conclusion

While the FY20 YTD performance is following seasonal trends, the unplanned losses are higher than targeted, but reducing

Generation monthly and YTD performance

Percentage (%)

Unplanned Breakdowns Planned Maintenance Availability

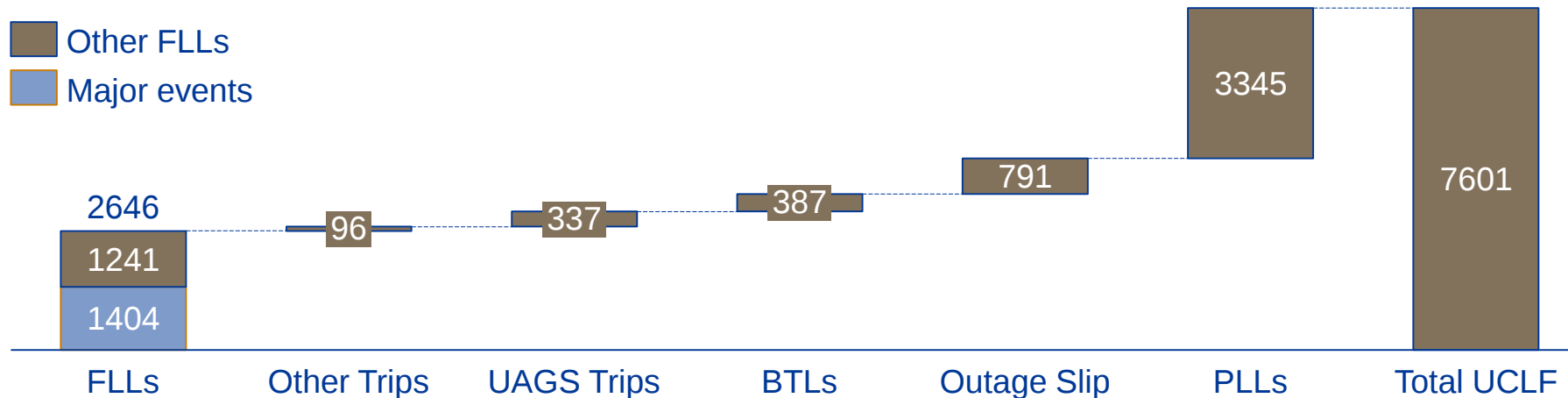


Key insights

- EAF improved slightly in March 2020, with a small reduction in UCLF
- During the year, a delicate balance was required in giving the plants an opportunity for planned maintenance and the having the plants available to support the system
- The national lockdown has allowed space for extra maintenance, which is being optimized
- PCLF so far in April, at 17%, is roughly double that of previous months

Partial load losses, full load losses, slips and major incidents have been the biggest contributors to the unplanned losses

UCLF (MW) for FY2021 April YTD from major contributors



Key insights

- Partial Load Losses (PLLs) continues to be the **biggest contributor to UCLF for FY2021 YTD**
- The lower demand**, since the COVID-19 lockdown, has enabled Eskom to **execute additional short-term outages**, mainly focusing on emergent issues to address PLLs
- This will enable the **generation fleet to be in a better situation once the demand picks up as lockdown restrictions are incrementally lifted**
- In April 2020, PLLs have so far **reduced from the FY20 annual average of 10.6% (4 651 MW) to 7.7% (3 345 MW)**
- Although some of this improvement is due to **units in cold reserve**, there have been gains due to the **increase in planned maintenance to address PLLs**
- Major events** were attributed to the following three units: **Tutuka Units 1 and 3, and Kendal Unit 5**

Camden Ash Dam Risk

- During April 2020 we took a decision to shut Camden down in response to an assessment we had undertaken on the status of the ash dam
- Generation had been tracking the status of the ash dam for several months – and reduced Camden output as ashing limitations increased.
- Camden is not expected to return to operation until after the winter.
- Critical maintenance undertaken while stations is shut
- All technical principles to safeguard and preserve units applied
- Review of other ash dams underway



Emissions poor performance has been mainly due to Kendal power station

Stream

Progress to date

8

Reduce Emissions

We have done the following:

- Unit 1 – 14 day outage focusing ESP and DHP repairs, ESP Washing. The unit is currently compliant, correlation tests also completed (Feb 2020)
- Unit 2 – 14 day outage focusing ESP and DHP repairs, ESP Washing. The unit is currently compliant. Correlation tests also completed (Jan 2020)
- Unit 3 – 22 day outage focusing ESP and DHP repairs, ESP Washing (April 2020), the unit currently being optimized after outage, to be completed end May 2020

Currently doing the following:

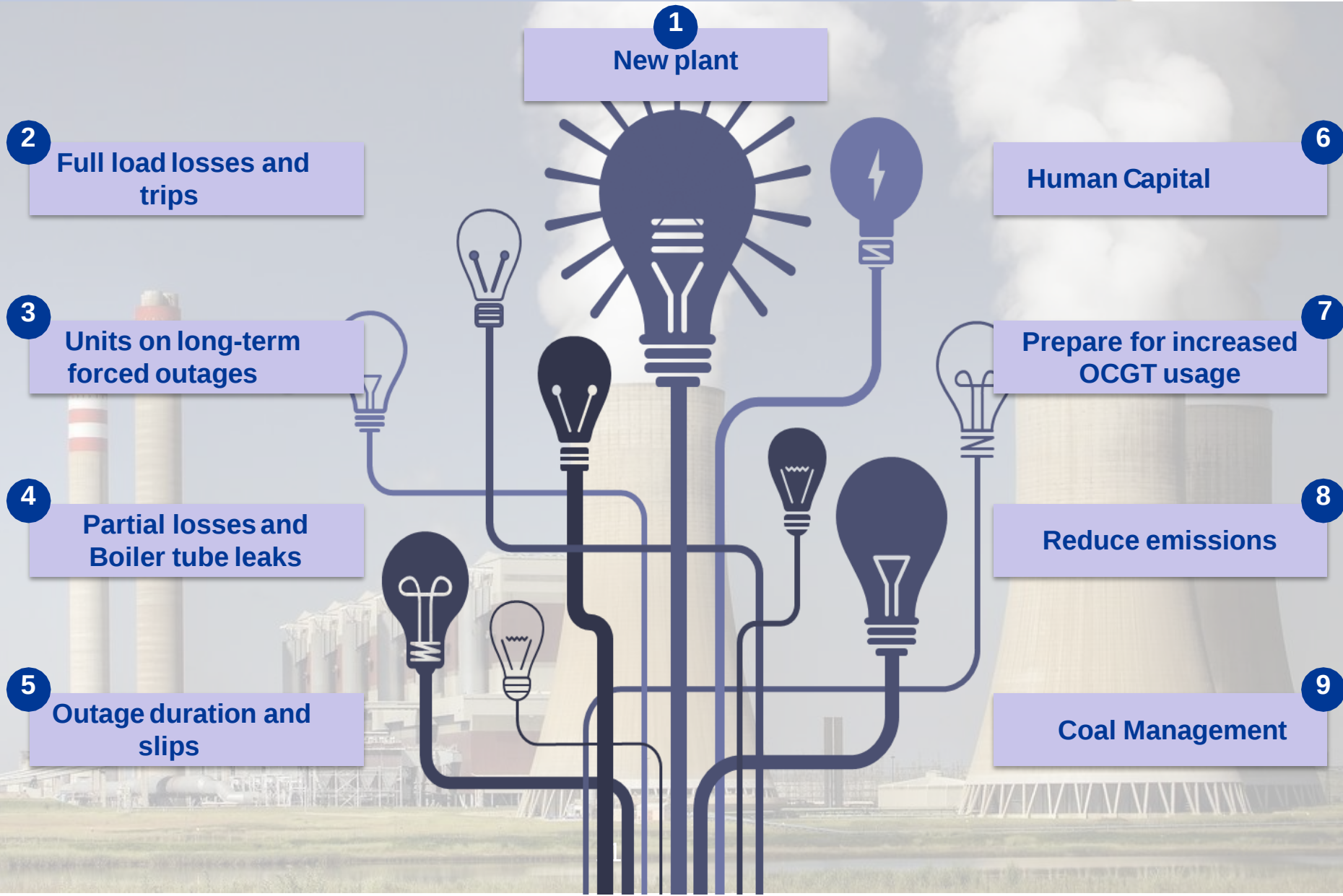
- Unit 5 is on long duration outage for ESP field replacement and DHP repairs, return to service date is April 2021
- Unit 6 – 22 day outage focusing ESP and DHP repairs, the Unit RTS date is end May 2020 – correlation tests to be done
- EPRI is currently reviewing our 100mg/Nm³ action plans (Phase 1)

The following is on the plan:

- **Initiated forensic investigations into emissions reporting**
- Unit 4 – 22 day outage to be executed for ESP and DHP repairs and unit optimised
- EPRI is supporting to develop 50mg/Nm³ action plans (Phase 2)

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The plan covers load losses, coal stock, people issues and preparation for adverse circumstances and is aligned to the Maintenance Recovery project



Since inception, we have made progress (1/6)

Stream

1

New plant

Status in November 2018

- Steercom between Eskom and MHPSA has been established
- Design defects at Kusile and Medupi have been identified



Progress to date

- Ingula dual load rejection defect resolved, units at full load
- Technical solutions have been agreed between Eskom and MHPSA for the boiler defects at Medupi and Kusile
- The technical solutions were implemented on Medupi Unit 3 during the 75 day shutdown
- Medupi unit 6 is currently shutdown while Medupi units 2, 4 & 5 and Kusile unit 3 are to implement similar technical solutions in FY21

2

Unit trips

- The trip performance remains a challenge. Top 4 contributing power stations (Duvha, Kriel, Majuba, Tutuka) to develop and implement a trip reduction strategy customised for their sites to address performance gaps .
- FY20 trip performance was 593 compared to a target of 560
- Tutuka was the largest contributor to trips and showed the biggest improvement by March '20
- The implementation plans for the Top 4 Power Stations have been assessed & in execution with KPIs to monitor progress, trip investigation support and improvements to unit testing
- Focus extending to New Build and Matla

Since inception, we have made progress (2/6)

Stream 3 Units on long-term forced outages

● Assessment phase

● Progress in line with plan

● Progress at risk

● Returned

Description

Status/progress

**Lethabo
Unit 5
(600MW)**

- High Pressure steam pipe failure on 10 October 2018
- The High Pressure pipework completed , busying with extensive commissioning

Returned



**Duvha
Unit 4
(600MW)**

- On 23 August 2017, turbine tripped on generator stator earth fault – returned on 06 Nov 2018 but was shut down again to address a Generator H₂ leak

Returned



**Grootvlei
Unit 2
(200 MW)**

- Auxiliary steam range pipe burst on 26 January 2018
- Also experienced generator issues
- Initial delay due to funding constraints

Returned



**Kriel
Unit 2
(600MW)**

- Stator earth fault on 03 May 2018

Returned



**Matla
Unit 5
(575MW)**

- Cold reheat non return valve leak experienced on 05 February 2019

Returned



**Duvha
Unit 1
(600MW)**

- Generator Stator fault on 17 Jul 2019
- Stator rewind completed, busy with commissioning activities

Returned



**Duvha Unit 3
(600MW)**

- Outcome of legal action pending finalisation

To be confirmed



**Kendal Unit 5
(640MW)**

- Emission plant refurbishment outage that will include a major General Overhaul

RTS April 2021



Since inception, we have made progress (3/6)

Stream

4

Partial losses (PLLs) and Boiler tube leaks

Status in November 2018

- Year to Date partials were 4 215 MW
- Boiler tube failure reviews in progress in progress

Progress to date

- Major PLL improvements projects with long supply lead times close to finalisation for cooling towers and feedwater heaters
- The Boiler Tube Leak Reduction Program reviews have been completed for all stations
- Potential reduction of > 2 000 MW from short-term opportunity maintenance into the winter period, with a further 2 000 MW opportunity from the outage plan post winter to the end of FY21

5

Outage duration and slips

- Engineers **identified to be** redeployed to power stations
- Developed plan to focus on **ERI performance** – enabling contracts, skills, spares and quality management & **Maintenance Recovery**



Upfront
planning



Outage
readiness



Execution
quality

- **Outages** are currently a **key focus** for the ERI performance improvement. The **Outage steering committee** was set up to look into the area of improvement.
- Rotek has entered into partnership agreements with **multinational OEMs and international companies** to support with outage execution and technical support on the turbine centreline
- Maintenance recovery will focus on specific priority FY2021 philosophy outages with enabling contracts in place, improved scoping and execution oversight.

Since inception, we have made progress (4/6)

Stream

Status in November 2018

Progress to date

6

Human Capital

- Identified critical vacancies and skills gaps at power station management, operations and maintenance areas



- 1384 of the 1 852** critical positions identified were filled by April 2020
- All the **Power Station General Managers** and **Tier 1 Manager** positions have been filled
- 204** of Eskom qualified Learner Plant Operators have been appointed to date.
- Engineering resources have been deployed to power stations to build technical capacity and experience.

7

Optimise OCGT usage

- Tank levels for diesel were low with constrained supply and excessive usage
- Finance developed plan to secure supply of diesel



- Actual spend for the 2020 financial year was R 4.3bn against a provision of R 6.98bn with actual average load factor of 6.28%
- Average tank levels are currently above 95%
- Contracts for supply and storage finalised with focus in FY21 to optimise diesel usage from 7% load factor to about 5%

Since inception, we have made progress (5/6)

Stream	Status in November 2018	Progress to date
8 Reduce Emissions	- Eskom delays to implementing emission retrofit projects within committed timelines could lead to medium term risk of 9 000 MW - Non-compliance with Atmospheric Emission License limits could lead to a short term risk of 6 633 MW	- Focus on 10 of the 87 generation units where emissions are high - a potential risk of 6 633 MW - Contracts have been placed for Lethabo and Tutuka High Frequency Power Supply (HFPS) and Tutuka dual conditioning pilot plant - In process of tender evaluation for Tutuka low NOx burners, Fabric filter plant for 3 units and Kendal HFPS - Internal approvals obtained for Lethabo and Kriel SO3 and ESP's - Performance for the past two years has been poor at 0.48kg/MWh sent out, this is mainly due to Kendal's poor performance. - February and March 2020 showed promising improvement at 0.33kg/MWh sent out, this trend is expected to continue with improvement at Kendal

Continuous engagement with Department of Environment, Forestry and Fisheries (DEFF)

Since inception, we have made progress (6/6)

9

Stream: Fix coal stockpiles

	Status in November 2018	Progress to date
Challenge	• 10 stations below Grid Code Requirement • 5 of the 10 stations below 10 days	• No power station below the Grid Code requirement or below the Eskom prescribed minimum level
Stations impacted	• Arnot, Tutuka, Majuba, Matla, Kriel, Camden, Duvha	• Significant improvements with the stock days recovery were achieved. All Power Stations are at their Eskom prescribed Expected Levels
Stock pile levels *Excl. Medupi & Kusile	• Actual stock days 22 days	• > 55 days as at middle May 2020 • The plan is to manage the Total System average stock to not less than 37 days
Risks	• In the light of the COVID-19 pandemic, mines, transporters and other suppliers in the coal supply value chain are operational. Should the suppliers' employees be infected, supply from the respective mines would be at risk, however the risk is being managed	
Coal Quality	• Good progress regarding initiatives to reduce coal quality related OCLF was made over the latter part of FY20. High levels of load losses started reducing from December. Kriel and Matla combined accounted for 75% of total coal related OCLF which will remain the focus of the team. The FY20 coal related OCLF was 0.75%	

Maintenance Recovery project aims to improve EAF, drive midlife refurbishment and reliability maintenance

1

Achieve **EAF** targets of **70%** in **FY2021**, **72%** in **FY2022** and **74%** in **FY2023**

2

Achieve saving targets in line with the **financial sustainability** targets

3

Clear out all **midlife refurbishment** and **reset reliability maintenance**

4

Ensure a **sustainable recovery** by focusing on drivers which include **health indicators, maintenance and operations excellence**

Update on current activities for April and May 2020 (1/2)

Activity	Status update
Reliability Maintenance Recovery Steering Committee (RMRSC)	- Terms of Reference approved in the April 2020 Steering Committee - Eleven Power Station Implementation Committees approved in April 2020 Steering Committee - Implementation Committee's kick-off in May 2020 after TOR approval at RMRSC
Power station visits	- All eleven Power Stations in scope visited – including the RMDC - No delay in progress during the “LOCKDOWN” period
Project Office's Roll Out (Eleven Power Stations)	- Cluster and Power Station General Managers approval obtained - Risk review to be conducted in May 2020 at all Power Stations
Reliability Maintenance Schedule	- Outage schedule updated weekly in line with lockdown - The outage scope will be locked down for twelve months to execute the outages - Risk review in progress to address possible mitigation factors
Original Equipment Manufacturers (OEM's)	- Contracts concluded in May/June 2020 - Contractors on site D-Day 01 July 2020
Reliability Maintenance Scope (Power Stations)	- Arnot, Duvha, Kendal, Kriel, Kusile, Lethabo, Majuba, Matimba, Matla, Medupi and Tutuka

Update on current activities for April and May 2020 (2/2)

Activity	Status update
HR Appointment Progress Project Offices	- Human Resources manages this process as a project to be completed in July 2020 - Group Technology and Group Capital resources to be identified first for possible placements - Re-grouping the PMO Structure to support Project Offices at each Power Station - External FTC's to be awarded a maximum of 15 specialized resources for 3 years
D-Day 1 July 2020	- Take over all outage scopes to be executed as per locked down plan for twelve months - Do risk review to determine the loadshedding impact for 3 months
D-Day – 30 on 01 June 2020	- All resource allocations for project structure to have identified names - All risk reviews to be completed and to start final preparation for Day 1 - All Implementation Committees at Power Stations to be active bi-weekly
Communication Plan	- Communication plan being drafted to address day one of recovery Programme - Organized Labour communication to be approved in May 2020 Steering Committee - External communication plan to be approved in April 2020 Steering Committee

- **Force majeure notice declared** in April 2020 following the low electricity demand during national lockdown
- Force majeure **triggered by** the following:
 - Significant **reduction in electricity demand** as a result of the national lockdown, compelling Eskom to reduce its power generation.
 - High energy users and/or key customers **operations being put on care and maintenance** during the national lockdown period
 - **Stockyard levels** at some Power Stations have reached maximum capacity. The design limit of the coal stockpiles capacity as per licenses can not be exceeded.
- Eskom declared the force majeure after the **extent of the electricity demand reduction** was experienced and **coal burn for April 2020 was revised down by 2 Mt**, i.e. reduced from planned 9.2 Mt to 7.2 Mt.
- Industry start up in May 2020 post the **lock down expected to be slow**, hence expectation that lower coal demand will continue through May 2020.
- The force majeure is **effective** from **16 April 2020 to 31 May 2020**.

Force Majeure - Conclusion

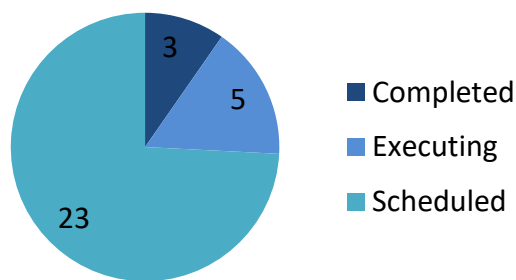
- No coal offtake has been **suspended** yet
- Force Majeure declaration meant to **protect Eskom** when unable to offtake coal due to current events outside Eskom's control
- Eskom manages the entire coal supply system on a **daily basis** to reduce impact of low electricity demand and reduced coal burn, e.g. by diverting coal to alternative stations, where possible
- **Coal stockpiles** as at 15 May 2020: **> 55 days** vs Eskom prescribed minimum of 37 days
- **No risk of non-payment** to suppliers for coal received during the Force Majeure period.
- With economic activity expected to contract post the COVID-19 lockdown and the impact of the pandemic expected to last for a while, Eskom foresees **lower electricity sales** and concomitant reduction in coal burn.
- Eskom **engaging suppliers to cut back deliveries due to stockpiles being full and low demand**

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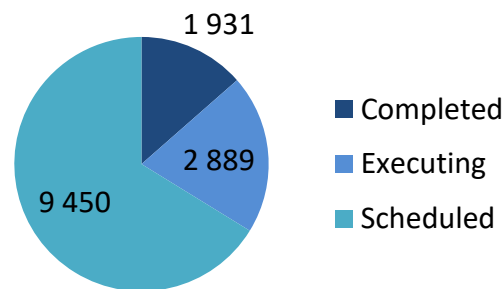
Generation Reliability Lockdown Maintenance Plan (March to August 2020)

Of the 31 unit outages totaling 14 270 MW that is in the maintenance plan from March to August 2020, 10 were shifted while 4 were brought forward to respond to the lockdown.

Generating Unit, #

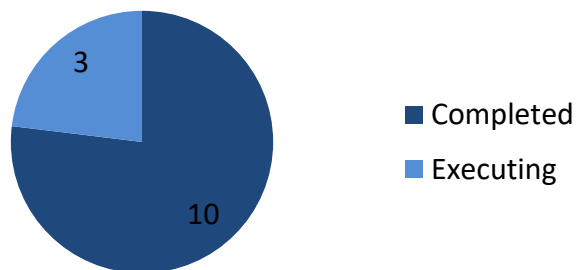


Generating units, MW

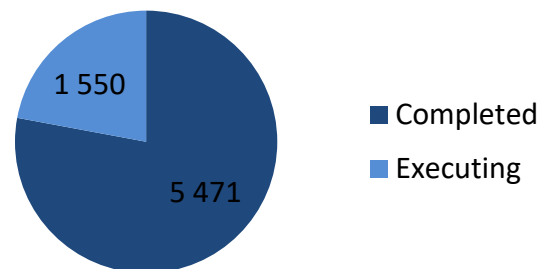


A further 13 short-term outages were undertaken during the reduced load during lockdown.

Generating Unit, #



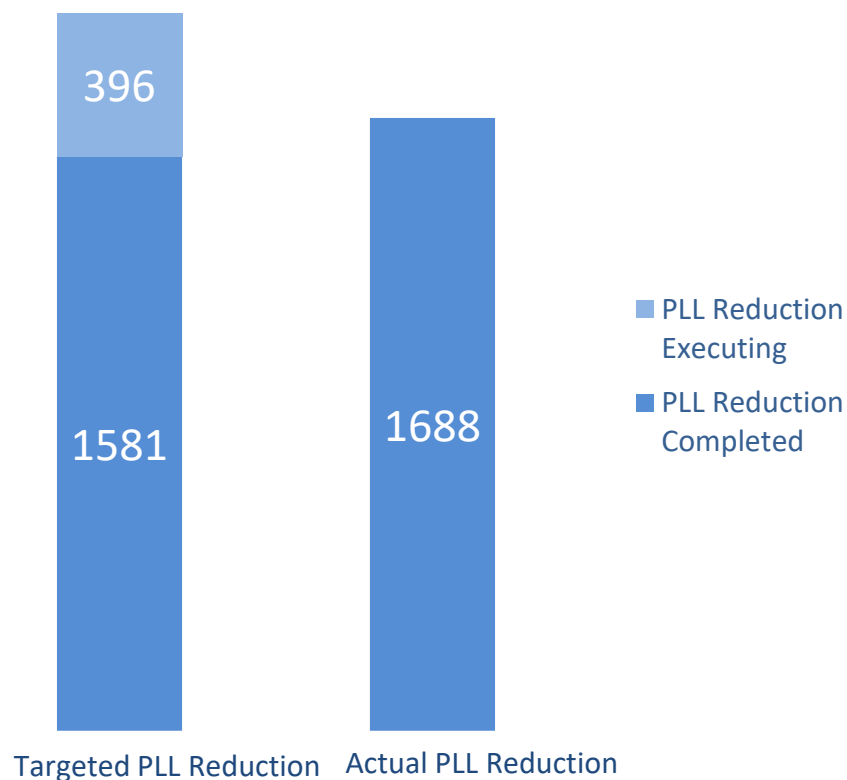
Generating Unit, MW



Partial Load Loss benefits realised from ongoing short term maintenance during lockdown

Build-up of UCLF for FY2019 YTD

Percentage(%)

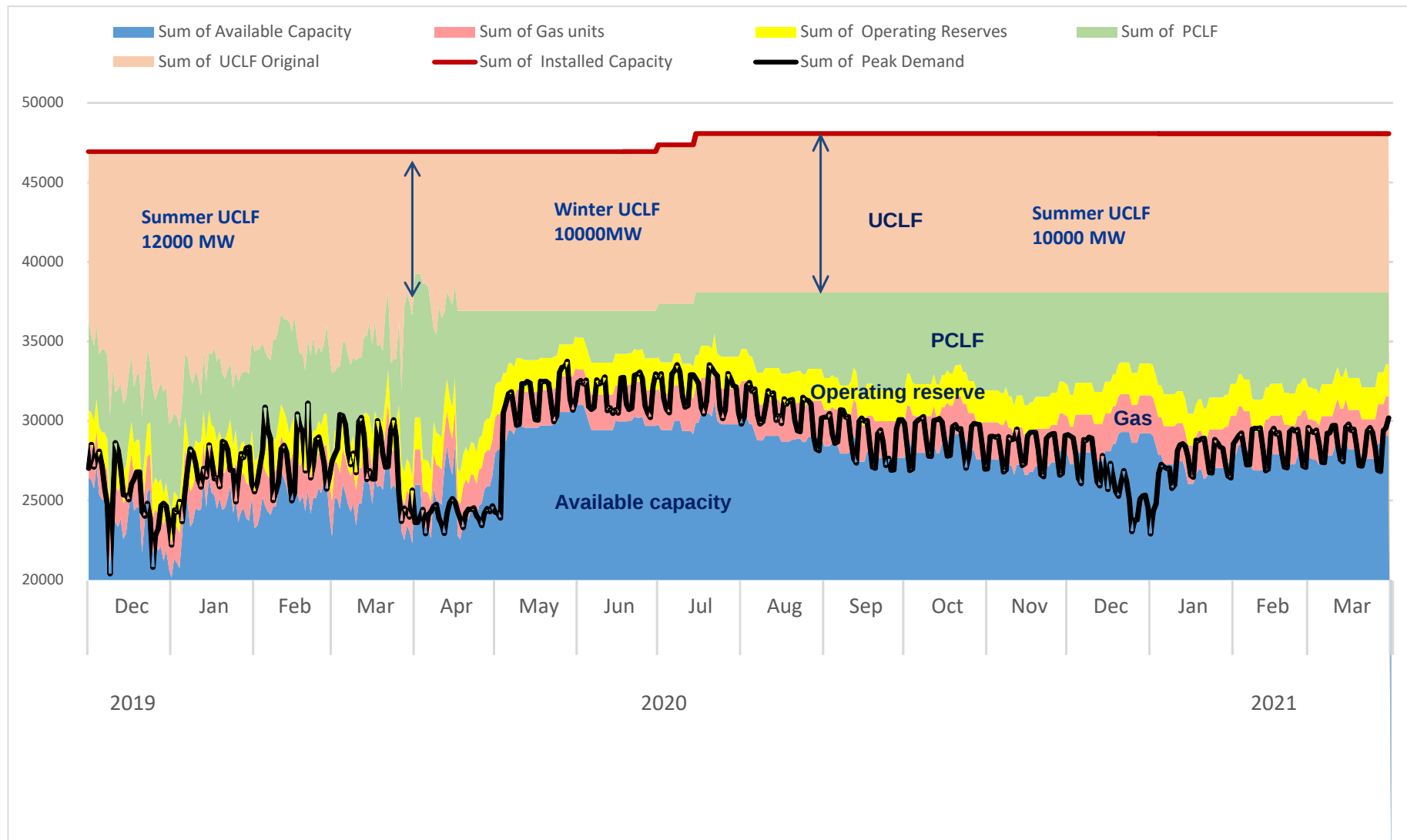


Key insights

- **3 planned maintenance and 13 short term maintenance outages** were scheduled since the start of lockdown
- These **16 outages had a cumulative opportunity of 1 977 MW partial load losses to be cleared** of which 1 688 MW (assessed in the first week of May) have been realised from completed and returned units
- **Remaining units likely to ensure that the full target of 1 977 MW will be achieved** and possibly exceeded.

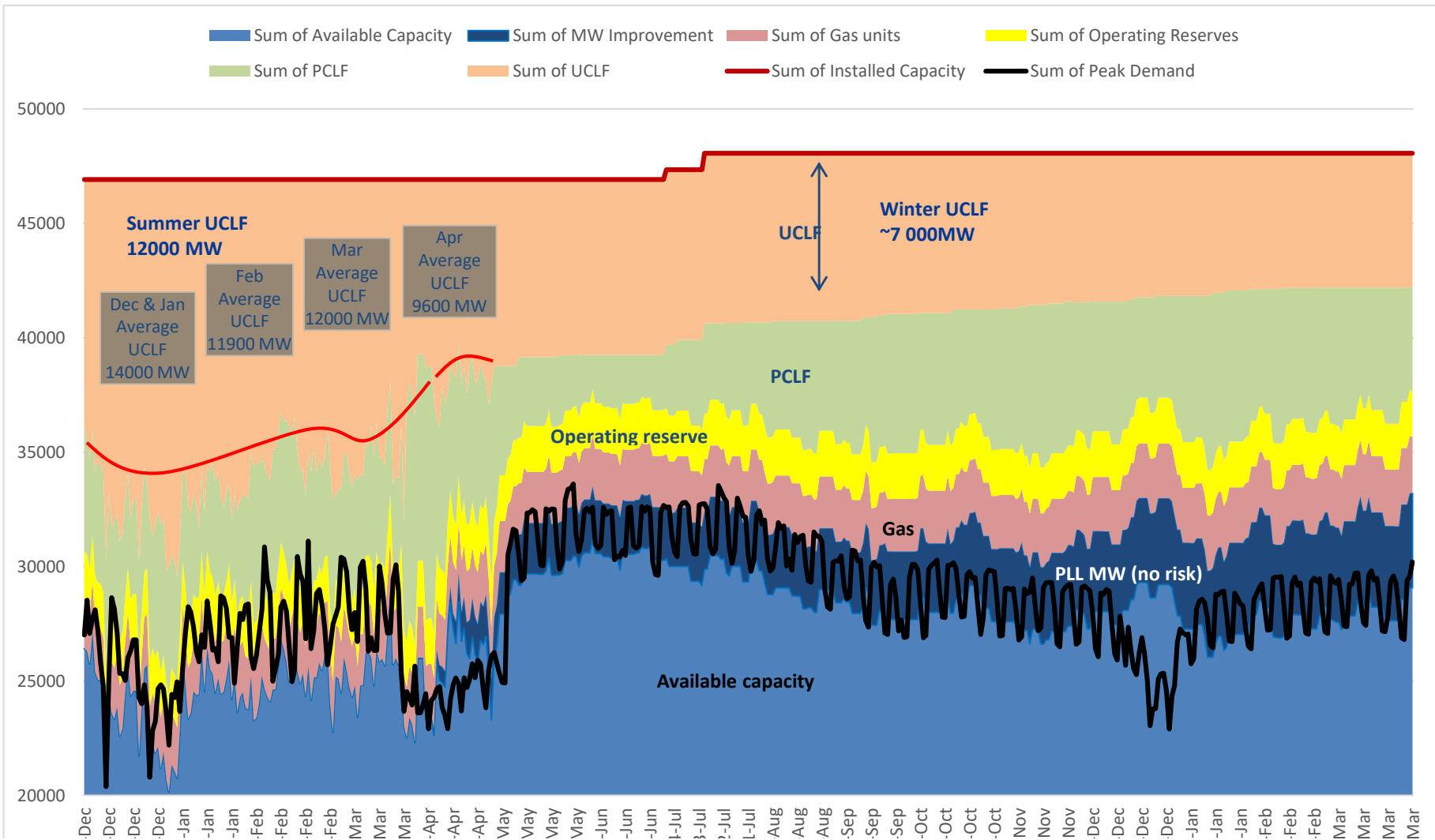
Capacity Outlook

December 2019 to March 2021 – **Before** Lockdown



Capacity Outlook

December 2019 to March 2021 – **After** Lockdown



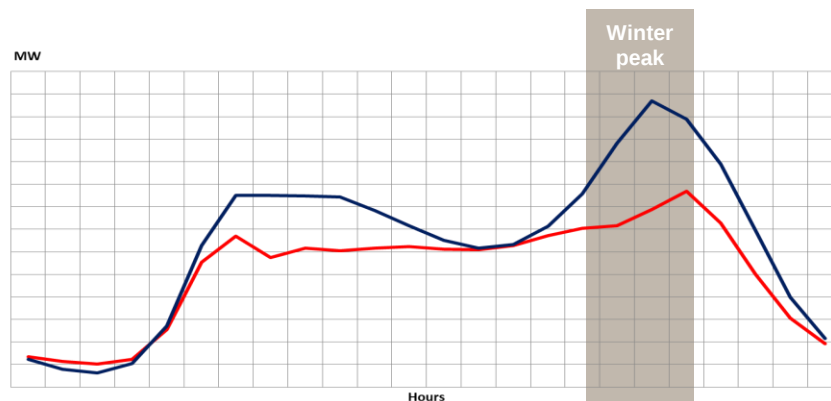
*The planned 'Summer 2019' UCLF was projected as 12000 MW, 'Winter 2020' is projected at 10 000 MW and the 'Summer 2020' at 10000 MW considering the higher risk of PLL over summer months

UCLF range

<11 000 MW

System Outlook
(P80)

- Days of Stage 1 loadshedding: **3**
- Days of Stage 2 loadshedding: **0**
- Days of Stage 3 loadshedding: **0**
- Average monthly diesel usage:
✓ **R 334 m**



Note on economic impact of load shedding in winter – due to winter profile:

Stage 1 & 2 load shedding, if required in winter has a lesser impact on the economy than in summer, because:

- It is likely to only be required **over evening peak** (usually 17:00 to 20:00).
- Load shedding schedules are staggered * – therefore customers are **not affected on consecutive days**.
- **Large industrial customers** are not called on to curtail demand in Winter under Stages 1&2 – only from Stage 3*

(*) In terms of the rules in the Regulatory Code for Emergency Demand Reduction (NRS 048-9 Ed 2).

- The focus on increasing **short-term maintenance**, especially to address partial load losses, during the lockdown will improve Eskom's ability to meet the gradually increasing demand as the lock down restrictions are incrementally lifted
- Approximately **2 000 MW of partial load losses** will be recovered in time for the Winter Peak demand
- Some **reliability maintenance** has had to be deferred due to lockdown restrictions and these will have to be incorporated into the capacity plan in future months
- Due to the **uncertainty** in the rate at which **lockdown restrictions** will be lifted and thus the increase in demand, Eskom is evaluating various scenarios and plans are in place to ensure flexibility in our ability to "ramp up" as required
- **6 776 MW of capacity being maintained** in addition to pre-lockdown plan by short term maintenance intervention
- **Partial load losses (PLL's)** to be reduced from 7 858 MW to 4 434 MW until March 2021, an improvement of 3 424 MW in available capacity
- **Commitments signed** by power station managers, generation cluster managers and GE (GX)
- Although the base case scenario (P80) after lockdown maintenance results in an **improvement from 31 days of Stage 1 load shedding to a possible 3 days** – it is important to recognise that due to the current unreliability and unpredictability of the system, the risk for load shedding remains
 - ✓ This will be the **reality until after the 18 months of reliability maintenance**

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- Eskom is **committed** to recovering its **operational performance** and will **not compromise** on **reliability maintenance** and **mid-life refurbishment**
- This is in order to ensure South Africa has a **reliable and sustainable generation plant** fleet going forward
- There will be heightened focus on **sustained transmission and distribution network performance** in order to manage other potential threats to the reliability of electricity supply
- Eskom **commits to keeping South Africa informed** early in the event that loadshedding is necessary – a detailed schedule is being developed and will be synchronised with the national calendar
- While we **don't expect to implement loadshedding** this winter, the **risk** of loadshedding does remain
- We appeal to customers to **continue to use electricity sparingly, particularly over the peak hours of 17:00 - 20:00** to avoid or limit the probability of loadshedding



**PLEASE
SWITCH
OFF**

**UNNECESSARY
LIGHTS
GEYSER
POOL PUMP
NON-ESSENTIAL
APPLIANCES**



Thank you

