UPDATE : ESKOM ELECTRICITY SUPPLY

03 April 2019

Minister Opening Remarks

Overview

1. We committed to report back to you in 10 – 14 days
2. Our objective: supply electricity to businesses and households
3. We have a better understanding of key challenges and solutions
4. The Eskom Technical Review Team has made preliminary observations
5. We have a plan –
   - 5.1 Winter plan
   - 5.2 The next 9 months and long term
6. A more rigorous and disciplined implementation with greater accountability
7. Reducing our use of electricity to decrease demand
8. We aim to stick to no loadshedding or to a maximum of stage 1

Our Objectives

1. To be transparent and frank with South Africans
2. Ensure energy security
3. Impact positively on the economy: production in mines, factories, secure growth
4. Supply electricity to households and to minimise disruptions
5. Better understanding of root causes of breakdowns
6. Develop a reliable plan and urgent execution

Update on issues from previous briefing

1. Coal and coal quality
2. Diesel
3. Faster Procurement
4. People and skills
5. Restructuring
6. Unions, job losses and privatisation (security of jobs…)
7. Finance issues
8. New Build Status (Medupi and Kusile)

Eskom System Update

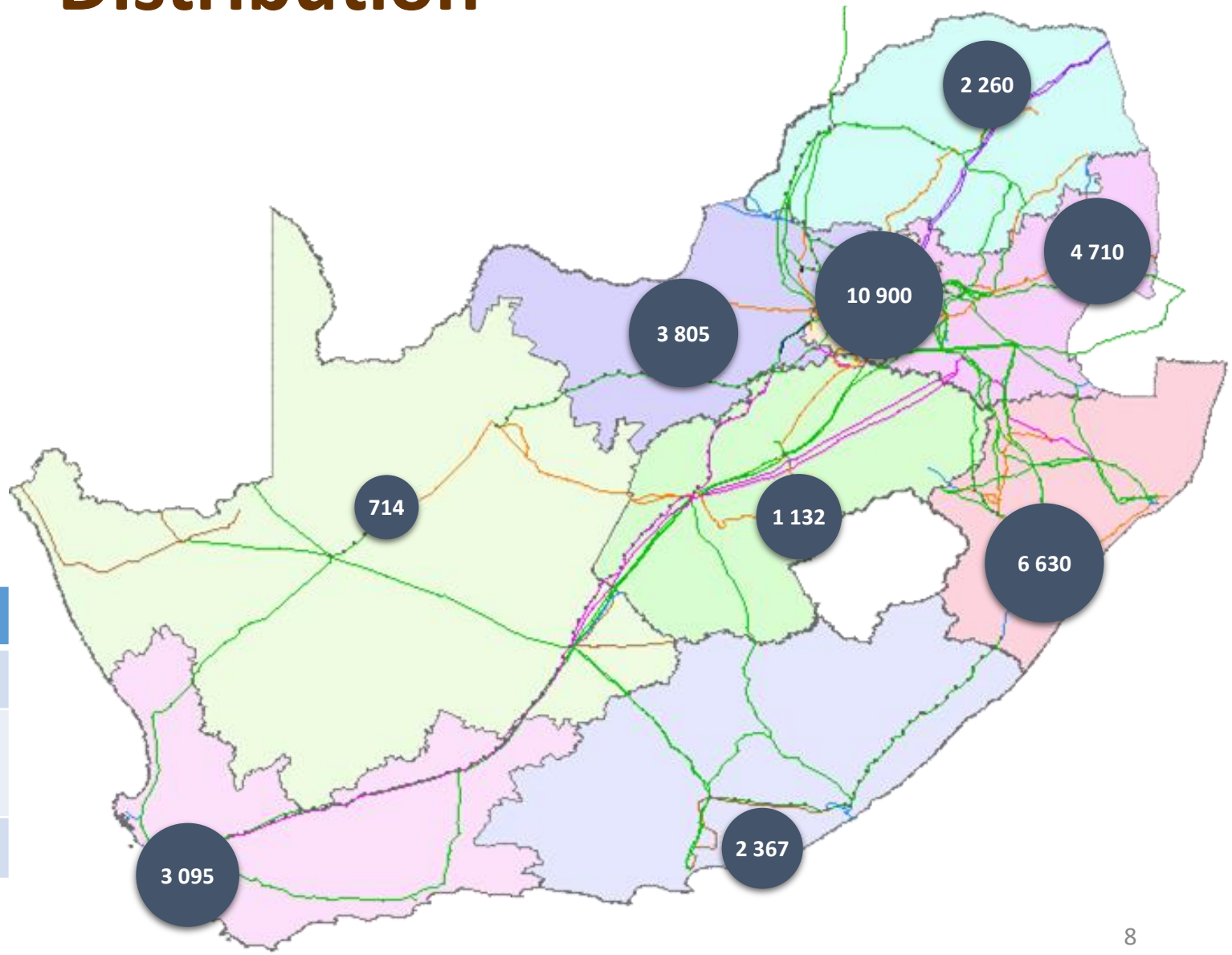
Eskom Generation Capacity

Installed Dispatchable Generation (MW)	
Eskom Coal	36 479 MW
Eskom Nuclear	1 860 MW
Eskom Hydro	3 324 MW
Eskom OCGT + GT	2 409 MW
International Imports	1 500 MW
IPP OCGT	1 005 MW
Total	46 577 MW

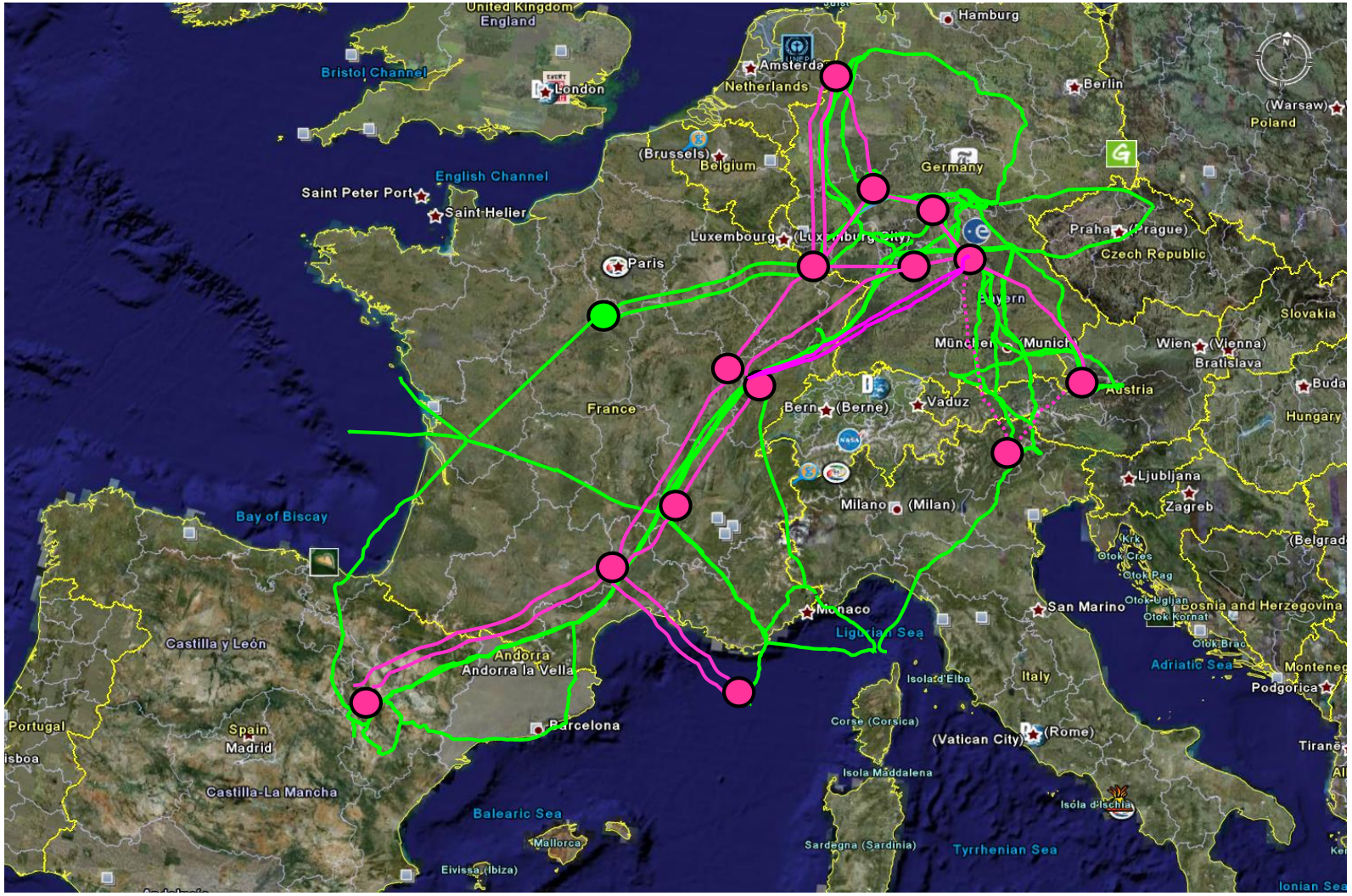
Eskom Transmission Grid and Demand Distribution

Transmission lines	km
765 kV	2 784 km
533 kV HVDC	1 035 km
400 kV	19 421 km
275 kV	7 218 km
220 kV	1 351 km
132 kV	889 km
Total	32 698 km

Substation assets	
Number of substations	167
Transformer capacity (≥ 30 MVA)	152 415 MVA
Number of transformers	444



Eskom grid superimposed on Europe shows that Eskom grid spans 5 European countries



What led to loadshedding: Thurs 14th to Sat 23rd March 2019

Loadshedding was implemented up to Stage 4 as a result of:

- High plant failures -UCLF (up to 13 000 MW) ~ normally under 10 000MW
- 16 boiler tube leaks in 10 days ~ normally 10 to 13 per month
- Depleted diesel levels and low water levels in Eskom hydro
- Loss of Cahora Bassa imports due to cyclone IDAI (1200MW lost)

Loadshedding stopped on Saturday 23 March 2019 when

- When UCLF was reduced to 11 000MW
- Diesel tanks and water levels were replenished
- 800MW of Cahora Bassa recovered

Protection of the system

- Loadshedding is a last resort lever to protect the Transmission system

Eskom’s Plan

Overall objective for Winter (next 5 months)

- Improve the Energy Availability factor
- Stop/Minimise loadshedding (limit to stage 1)
- Execute proper maintenance to reduce plant breakdowns
- Encourage public participation and energy saving initiatives
- Ensure effective and regular communication with all stakeholders

Scenarios for Winter 2019

- **Scenario 1 - No loadshedding**

Less than 9 500MW Unplanned Outages

And 3 000MW to 5 000MW planned Outages

- **Scenario 2**(Maxi of 26 Days of Stage 1 loadshedding)

Above 9 500 MW And 3000MW to 5000 MW planned Outages

Further briefing on Progress plan in September 2019

Initiatives to achieve scenario 1 (Max 9 500 MW)

1. **Increasing supply**
   - Kriel Unit 2 (475 MW), 18 Apr
   - Matla Unit 5 (575 MW), 13 May
   - Non-commercials: Medupi 2 and Kusile 2 (1200 MW)
   - Effort to bring Kusile 3
   - Diesel supply measures: Money approved and released on time

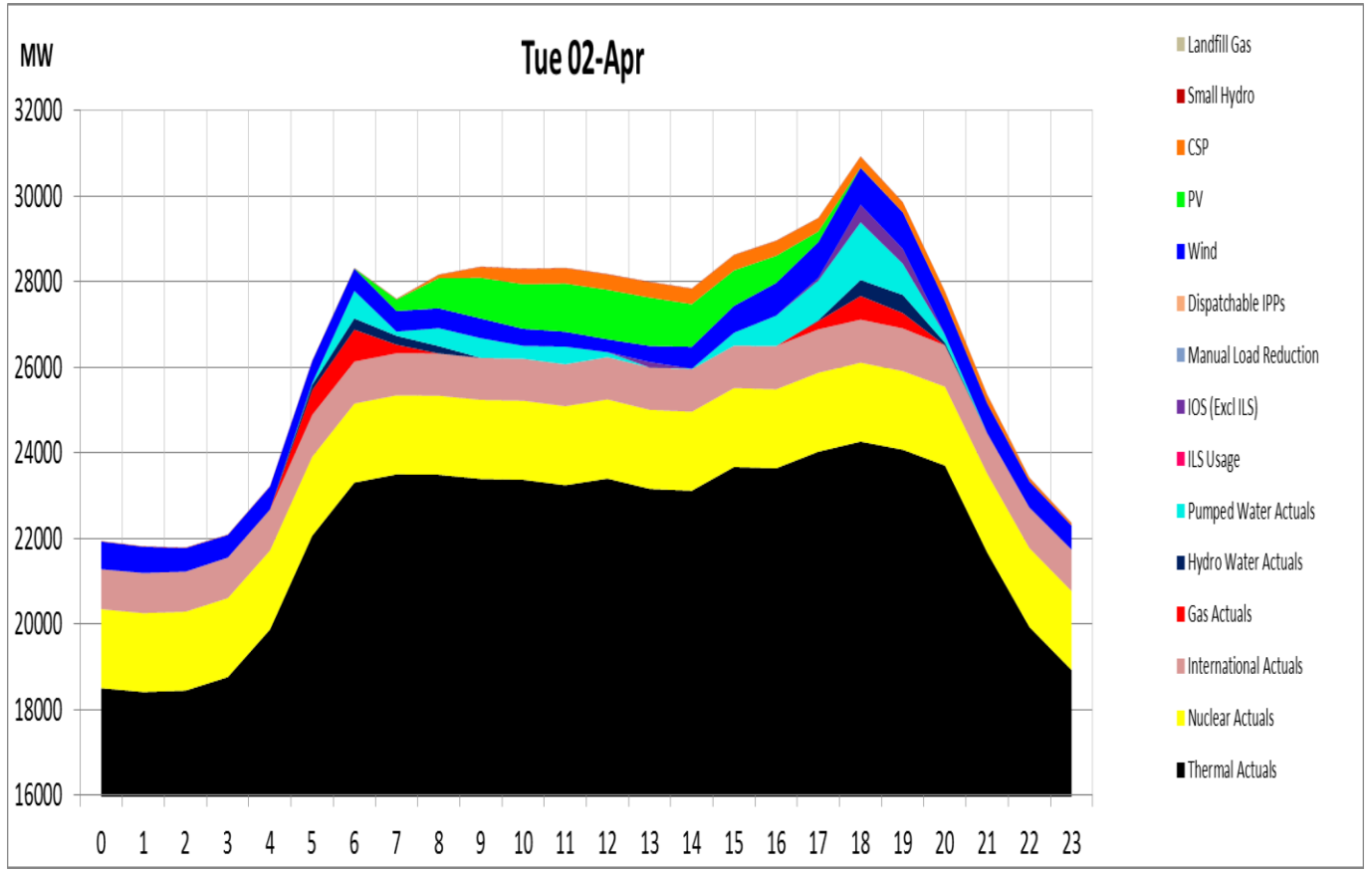
2. **Improved plant performance** as a result of cooler weather

3. **Cahora Bassa imports** back at full load (additional 300 MW)

Eskom was able to meet demand on 2 April with existing capacity

Installed Dispatchable Generation (MW)	
Eskom Coal	36 479 MW
Eskom Nuclear	1 860 MW
Eskom Hydro	3 324 MW
Eskom OCGT + GT	2 409 MW
International Imports	1 500 MW
IPP OCGT	1 005 MW
Total	46 577 MW

Residual Demand breakdown (MW) during evening peak on 02 Apr 2019	
Eskom Coal (1669 MW from non-commercial units)	24 273 MW
Eskom Nuclear	1 845 MW
Eskom Hydro	1 716 MW
Eskom OCGT + GT	546 MW
International Imports	1 009 MW
IPP OCGT	0 MW
Virtual Power Station	409 MW
Total	29 798 MW



8500 MW unplanned maintenance

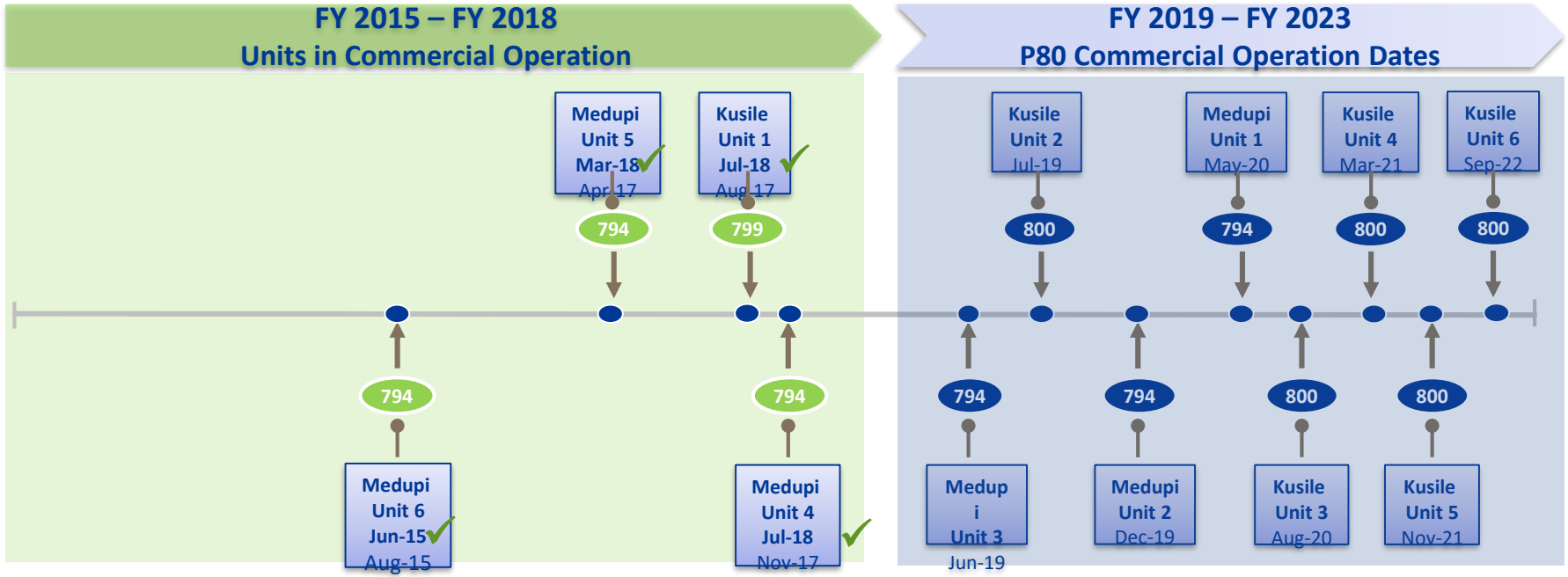
Overall objective up to December 2019

- Improve the Energy Availability factor
- Every effort to stop loadshedding
- In the event unanticipated events occur, limit to stage 1
- Continue with rigorous maintenance to reduce plant breakdowns
- Encourage public participation in energy saving initiatives
- Ensure effective and regular communication with all stakeholders

Initiatives to achieve scenario 1 (Max 9 500 MW) up to December 2019

- Lethabo Unit 5 (593 MW), 31 Dec
- 500 MW additional demand response from EIUG
- National energy savings drive (estimate ~100 to 500 MW depends on public participation)
- Continue execution of 9 Point Recovery Plan
  - 40% increase in planned maintenance compared to previous winter plan (preventative maintenance)
  - R49 billion spend on maintenance over the next 5 years
  - Set aside R4.5bn to address Medupi/ Kusile challenges
  - Increased usage of diesel and improved planning/ logistics

Kusile and Medupi: Eskom on track with the schedule
Progress as of Feb 2019



		Unit 6	Unit 5	Unit 4	Unit 3	Unit 2	Unit 1
		CO	CO	CO			
MEDUPI	Latest Progress	100%	100%	100%	99.83%	99.04%	88.54%

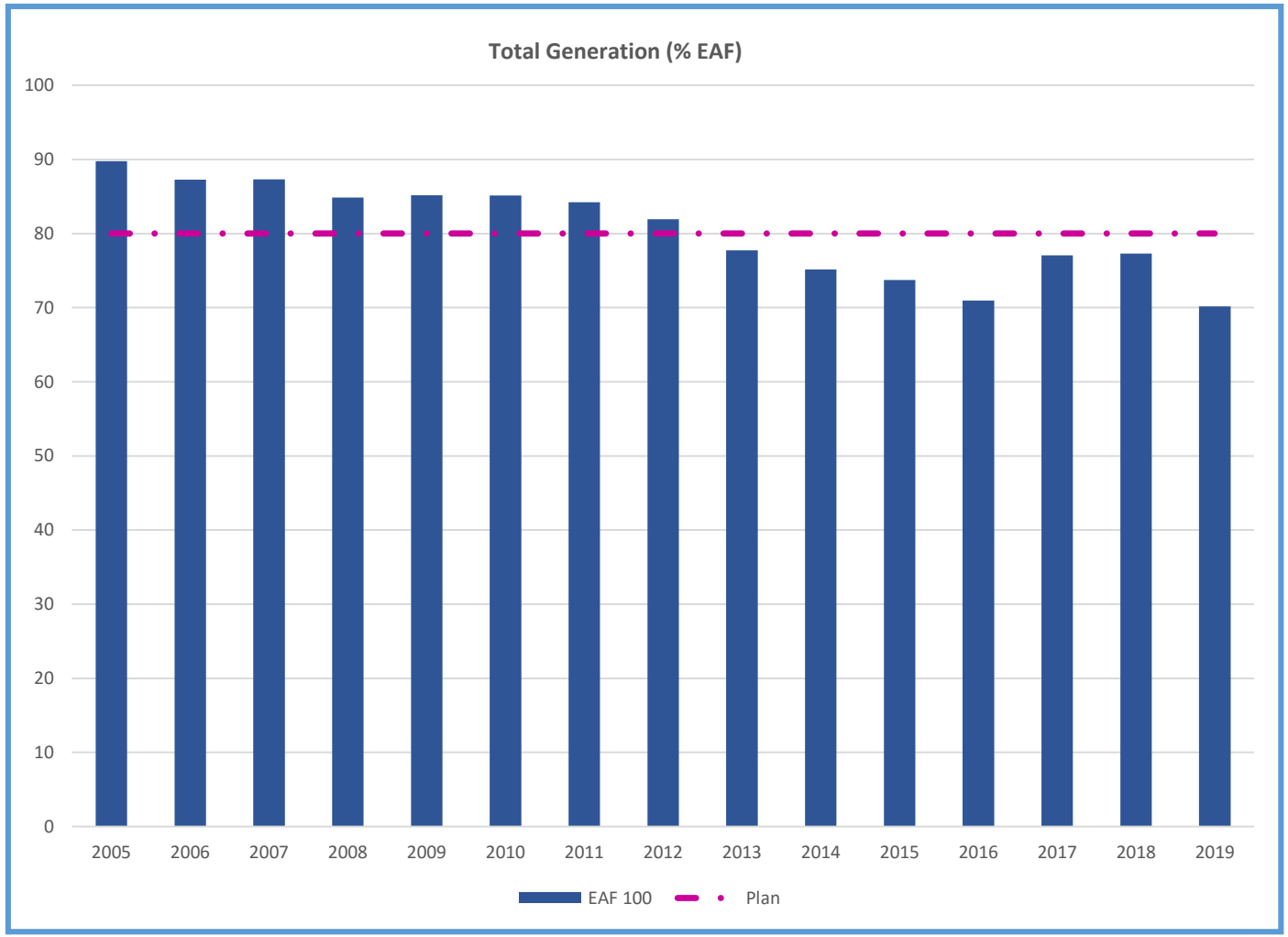
		Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
		CO					
KUSILE	Latest Progress	100%	99.50%	97.60%	83.80%	73.60%	65%

P80 schedule

✓ CO achieved on P80 or earlier date

Initial briefing from Eskom Technical Review Team

1. Generation Capability



- Place strong leadership at all key positions
- Appoint permanent Power Station Mangers with full authority
- Fill critical positions
- Improve the root cause analysis capabilities and execute promptly

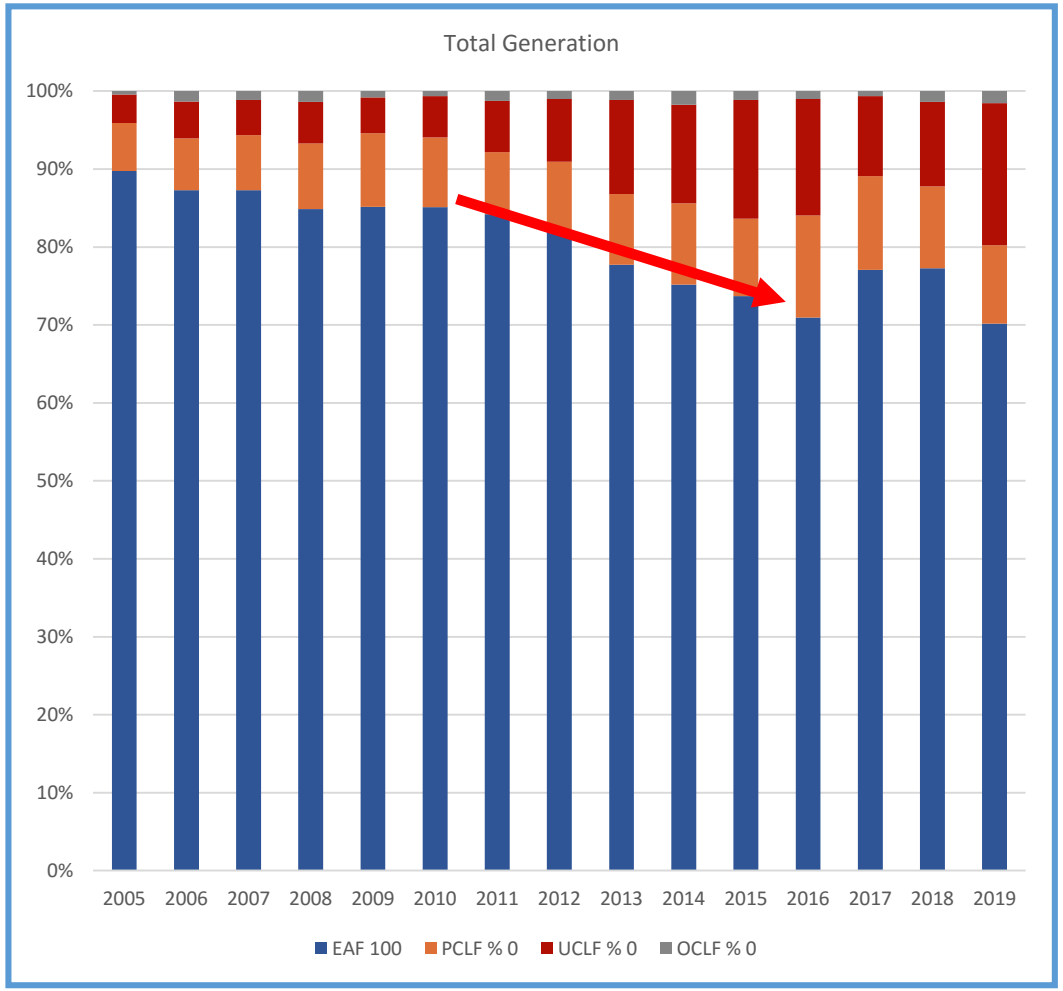
2. Plant Efficiencies

4.1. The Top three Contributing Factors to UCLF that resulted in load shedding (Direct Cause)

	Top three Contributors
Arnot Power Station	Unit trip: Direct cause not stated
	ID Fan vanes maximised
	Milling Plant PLL
Camden Power Station	ID Fan vanes maximised
	Ash dam capacity constraints
	Emissions high
Duvha Power Station	ID Fan vanes maximised
	Unit trip: ECO Flow low
	Unit Shutdown: Draught Group Trip
Hendrina	Unit Shutdown: Boiler Tube Leak
	Poor Vacuum Losses
	ID Fan Vanes Maximised
Kendal	ID Fan Vanes Maximised
	PA Fan Leakage
	Boiler Flame Failure
Komati	Unit Return to Service Slip
	Milling Plant Losses
	Draught Group Maximised
Kriel	ID Fan Vanes Maximised
	BFPT Gov Valve Maximised
	Unit Trip on Condenser Vacuum
Kusile	Milling Plant Losses
	Coal Quality Related
	FFP Differential Pressure High
Lethabo	Boiler Tube Leak Repairs
	Outage Slip
	SSC Standing
Majuba	Boiler Tube Leak Repairs
	FFP Differential Pressure High
	ACCCT Control Valve Stuck
Matimba	Secondary Air Out of Capacity
	-
	-
Matla	PA Fan Vanes Maximised
	Condenser Tube Leak Repairs
	Unit Trip, Low Boiler Drum Level
Medupi	HP Turbine Stress High
	Unit Trip, ID Suction Pressure Low
	Milling Plant Losses
Tutuka	Boiler Tube Leak Repairs
	ID Fan Vanes
	Turbine Bearing Temperature

- Strongly focus on overall process optimization
- Review the Duvha 3 recommendations on boiler oxygen levels without compromising safety
- Track partial load losses with daily targets based on each stations capabilities
- Create and manage daily leading indicators dashboard

3. Plant Reliability



- Adhere to outage planning guideline (unlock multi-year budget)
- Implement the plant care strategy,
- Manage and reduce OON conditions
- Implement a project to focus on reducing procurement backlog
- Re-engineer the procurement process for agility

4. New Build

System	Defect	Medupi	Kusile
High Flue Gas Exit Temperatures	Boiler design results in high temperatures at superheater and reheater tube sections. Cooling water system unable to cope in certain conditions. This situation can result in unit trips.	✓	✓
Boiler Erosion	Excessive erosion in the boiler, which manifests mainly in reheater 1	✓	✓
Gas Air Heater	High temperature gradients leading to fouling. Also problems with erosion and ash carry over to the clean air side	✓	✓
Milling Plant	Require more frequent servicing, sensitive to coal quality. This contributes to load losses and can also lead to unit trips in severe cases.	✓	✓
Pulsed Jet Fabric Filter system	Design causes excessive wear of filter bags and ash accumulation. This can lead to load losses (reduced generation) and trips.	✓	✓
Dust Handling Plant	Excessive leaks, lack of spares, premature failure of components, ash accumulation. This can also lead to unit trips	✓	✓
Distributed Control System (DCS)	Units 6,5 and 4 control system – hardware failures. Problems with the DCS system causes control difficulties and unit trip in certain cases.	✓	
Water Treatment Plant Laboratory (WTPL) and Demineralised Water Storage Tanks (DWST)	Excessive settlement of the WTPL and DWST foundations beyond allowable tolerances, resulting in observable cracking of the WTPL walls		✓

- Update maintenance strategies for the milling plant and fabric filter plant
- Put in place appropriate maintenance contracts for all plant
- Improve optimization of all boilers and turbines

We appeal to household to reduce electricity use – "Less is more – Live Lightly!"

- The power system **remains vulnerable** all day during summer

- **Use air conditioning efficiently**
  - Set air conditioning to 23ºC
  - Close windows and doors to optimise air conditioning
  - Switch off 30 minutes before leaving the office

1. **Switch off all geysers and pool pumps** (all day until 9pm), and invest in a timer
2. If you use the pool frequently, **limit pool filtering cycles** to two cycles daily, and not between 5pm & 9pm
3. **Switch off all non-essential lighting and appliances**

During Earth Hour 30 March 2019, South Africans achieved 554 MW Savings!!

Risks to Energy Availability

- Risk of new trips/ breakdowns remains (e.g. boiler tube leaks)
- Execution risks
- Unanticipated disruptive events
- Delay on the return of line 2 of Cahora Bassa

END