
ESKOM'S FINANCIAL CRISES AND CONTINUING TARIFF INCREASES

Strategies for containing costs and stabilising
its financial position.

NERSA Public hearing on Eskom's revenue application for 2018/19

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THIS STUDY

- Meridian Economics is currently finalising a study on the economics of:
 - decommissioning Eskom’s older power stations; and
 - curtailing Eskom’s capital expenditure programme.
- The results will be finalised and published by mid-November.
- Given the importance the matters under consideration at this series of NERSA public hearings we have decided to present the preliminary results here today.
- Findings are preliminary and might be revised.



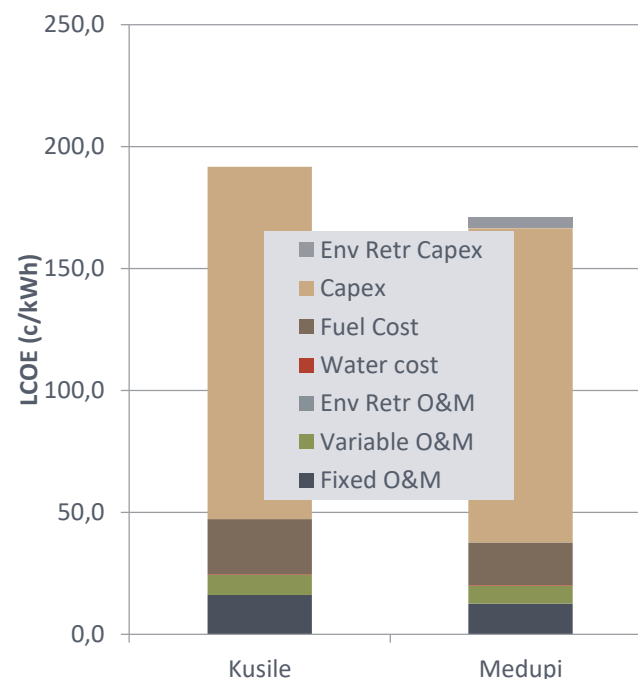
RATIONALE FOR THE STUDY

- Eskom is in a sustained financial crises which has led to:
 - the highest tariff increases in recorded history
 - credit rating downgrades to “junk status” with more to come; and
 - increased cost of and challenges to raise finance
- Primarily caused by:
 - Rapidly escalating costs
 - Enormous capital programme
 - Primary energy costs – especially coal
 - HR costs, etc.
 - Stagnant or declining demand: surplus capacity
 - Vicious circle of rapidly rising prices and stagnant or falling demand.
- What can be done to improve the situation?
- Our investigation looked at the options of:
 - curtailing Eskom’s capital programme; and
 - decommission expensive surplus capacity



ESKOM'S CONSTRUCTION PROGRAMME IS THE MAIN DRIVER OF ITS EXCESSIVE COST INCREASES

- Ingula, and esp. Medupi & Kusile are highly complex mega projects.
- Inevitably suffer from large cost and especially time overruns
- Has resulted in some of the most expensive coal power in the world
 - Medupi: LCOE approximately R1.7/kWh
 - Kusile: LCOE approximately R1.90/kWh
 - (2017 ZAR, Nat Treasury EOCC of 8.2% real, post-tax)
- *The build programme is the single largest reason why Eskom has required such large tariff increases.*
- *It is therefore import to consider whether it would make economic sense to curtail the programme.*



ESKOM'S SURPLUS CAPACITY: THE NEED FOR EARLIER DECOMMISSIONING

- “Due to the surplus capacity and the age of some of our coal-fired stations, some stations may have to be decommissioned earlier than originally anticipated” (Eskom, Integrated Report 2017)
- “it is not necessary to run all our existing plant to meet demand... We have identified Hendrina, Grootvlei and Komati as the stations with the biggest cash impact and they will be ramped down to zero production and placed in lean preservation” (Eskom, Integrated Report, 2017)
- Eskom’s Medium-term System Adequacy Outlook 2017-2021: Surplus capacity rises to 4-5GW in 2019/2020 even assuming higher demand growth than is being experienced currently (Eskom MTSAO, 31 July 2017: 13)
- Min Gigaba: Eskom has a surplus >5GW and governance/financial challenges pose an “enormous risk to the country
(<http://www.miningweekly.com/article/budget2-2017-10-25>)



STUDY DESIGN

- Focus
 - Older coal stations: Arnot, Camden, Grootvlei, Hendrina, Komati, GrHeKo
 - New build: Kusile Units 5 & 6.
- Methodology
 - The CSIR was contracted to calculate each option’s system alternative value (SAV) – the “system analysis”
 - I.e. the lowest system cost at which the system can replace the services provided by each power station (energy, capacity, etc.) from other resources, if it was to be retired earlier.
 - We then conducted a more detailed study of the incremental costs of running each of these stations according to the original plans – the “power station analysis”
 - We then compare the two costs: If it is cheaper for the system to provide the services from other resources, rather than the station under investigation, then the station should be closed.



WE CONSIDER ONLY INCREMENTAL OR AVOIDABLE COSTS

- Sunk costs should be ignored.
 - I.e. Capital costs already spent
- Unavoidable costs should be ignored.
 - I.e Capital costs already committed with high cancellation penalties – e.g Kusile Units 5 & 6.
- All that matters are the costs that the decision maker still has discretion over and which can in principle still be avoided.
- Incremental costs are thus similar to avoidable costs.

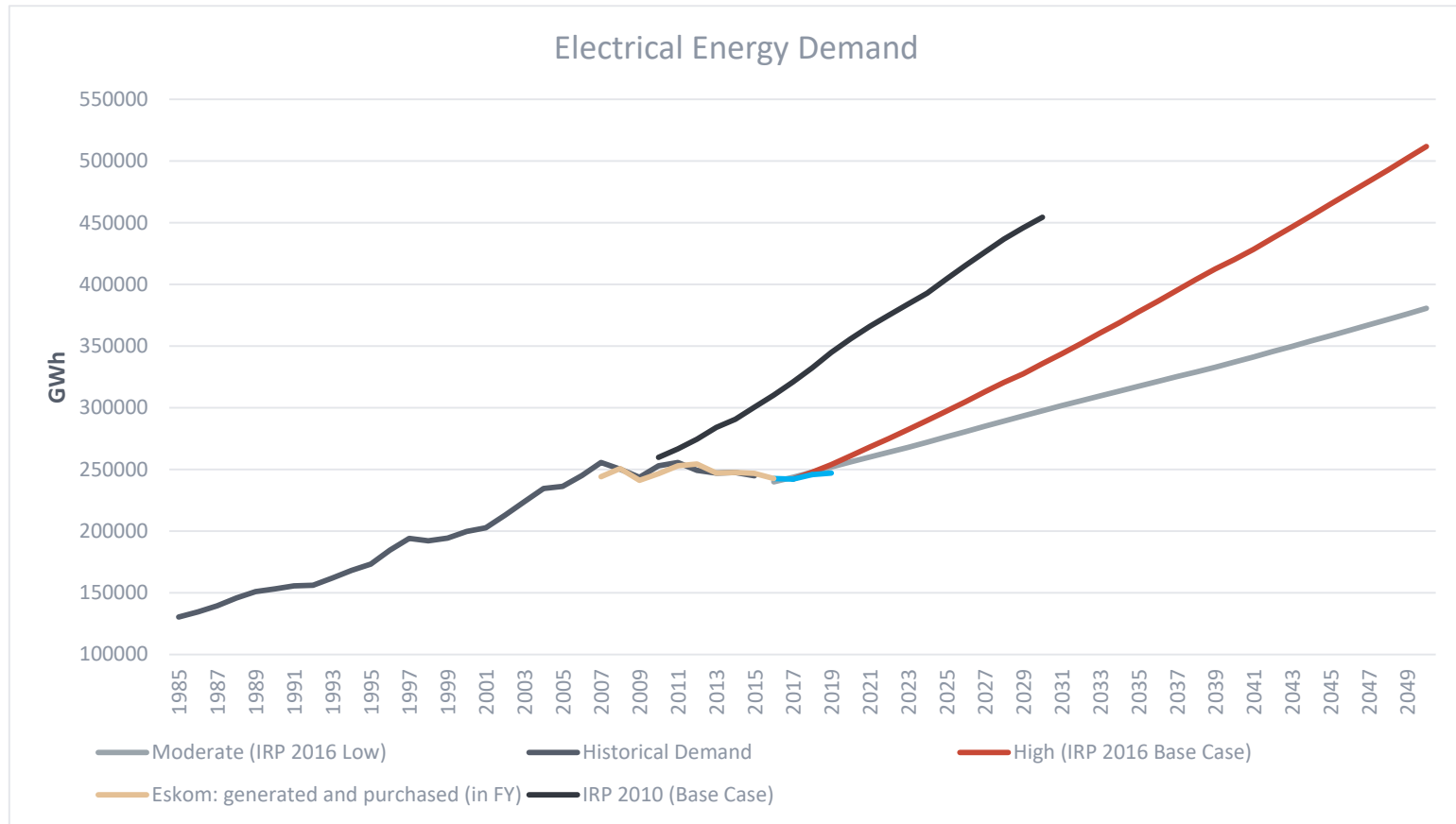


SYSTEM ANALYSIS ASSUMPTIONS: DECOMMISSIONING DATES FOR THE OLDER STATIONS

Power Station	IRP 2016 – Start Date	IRP 2016 – End Date	Early Decommissioning Date
Arnot	2021	2029	2020
Camden	2020	2023	2018
Grootvlei	2025	2028	2019
Hendrina	2020	2026	2019
Komati	2024	2028	2020



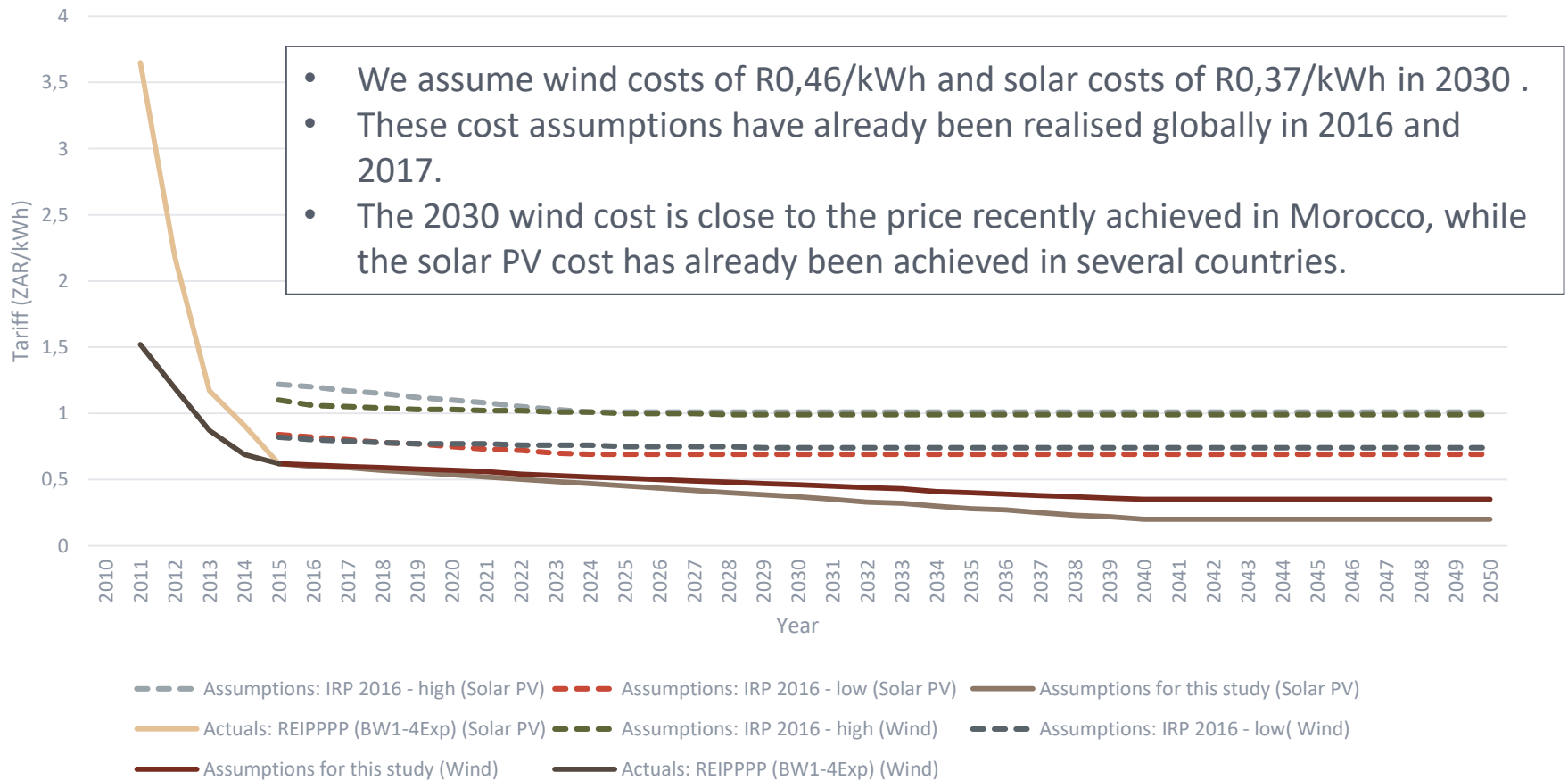
SYSTEM ANALYSIS ASSUMPTIONS: HISTORIC AND FORECAST DEMAND



Eskom Revenue Application 2018/19 figures in blue i.e. Total Gross Production, GWh



SYSTEM ANALYSIS ASSUMPTIONS: TECHNOLOGY LEARNING RATES



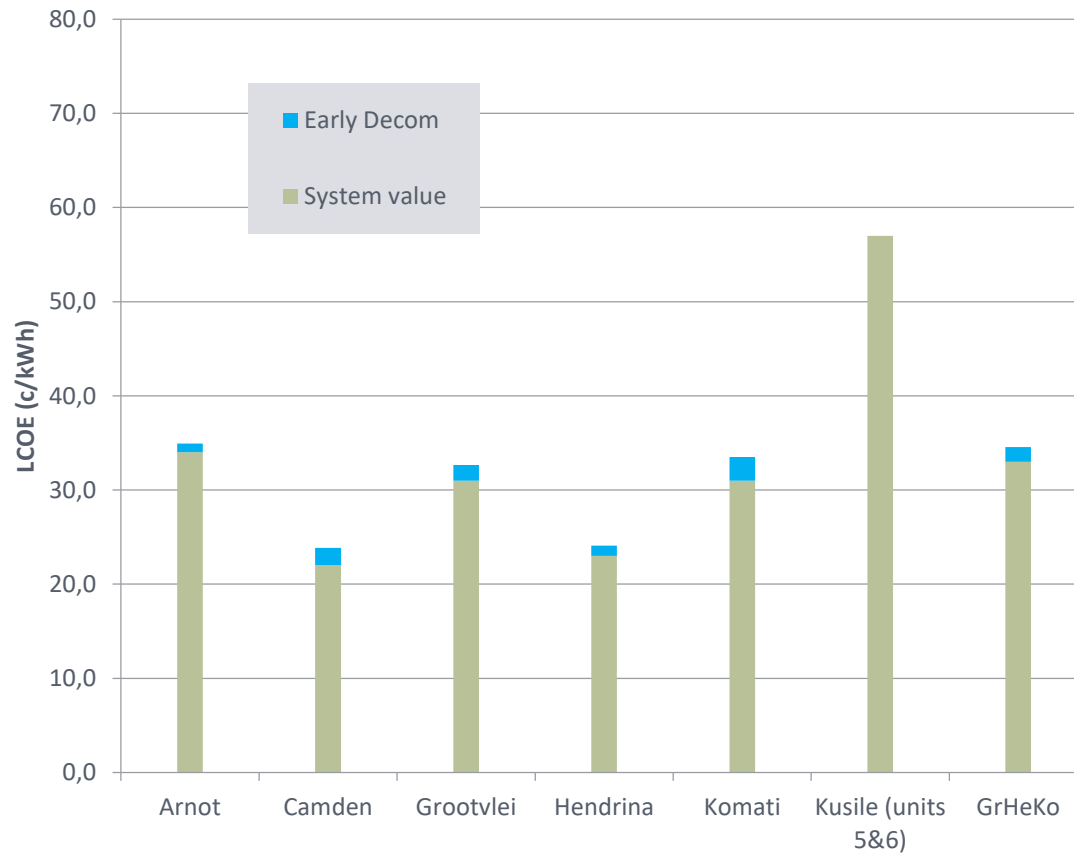
POWER STATION ANALYSIS ASSUMPTIONS: COST DRIVERS INVESTIGATED

- We had to investigate the circumstances of each station and gather best estimates of its present and future relevant cost drivers, including of factors such as:
 - Primary energy cost (coal supply arrangements and costs);
 - Power station efficiency;
 - Water costs;
 - Fixed and variable operating and maintenance costs (FOM and VOM);
 - Refurbishment costs;
 - Environmental compliance retrofits required and the costs thereof;
 - The increases in operating cost associated with environmental retrofits;
 - The environmental levy;
 - Decommissioning and the net present value of earlier decommissioning;
 - Energy production profile (from system modelling);
 - Operating capacity (from system modelling);



POWER STATION SYSTEM VALUES

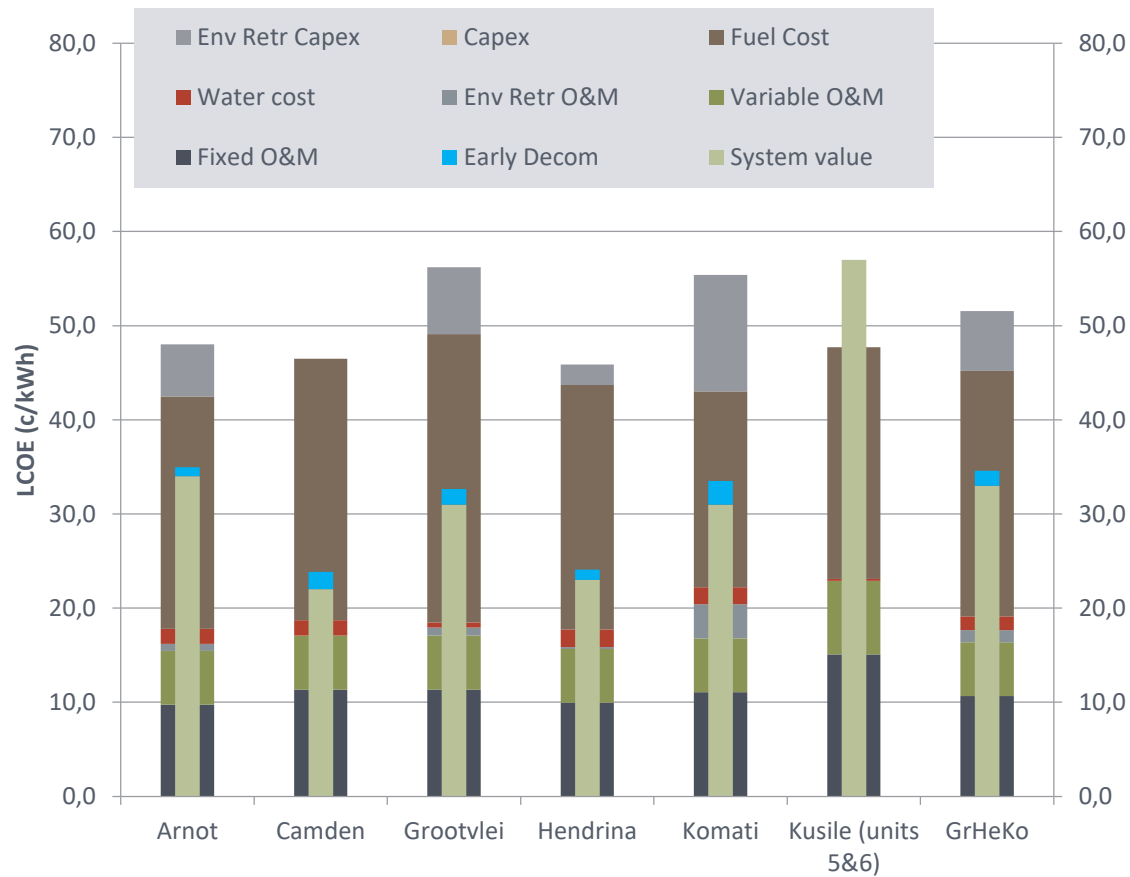
(The opportunity cost of closing each option separately)



Values in April 2016 ZAR and 2016 PV terms



POWER STATION COSTS AND SYSTEM VALUES



Values in April 2016 ZAR and 2016 PV terms



ESTIMATED PV OF THE POTENTIAL COST SAVINGS FROM DECOMMISSIONING THE OLDER STATIONS

	PV of cost saving (2017 Rbn)
Arnot	5 543
Camden	5 222
Grootvlei	6 086
Hendrina	7 977
Komati	3 735
GrHeKo	13 494

These numbers cannot be added to each other.



KUSILE UNITS 5&6 RESULTS

- Total station capital cost: approx. R250bn in 2017 PV terms (*April 2017, based actuals to date and Eskom's current cost to completion estimates*)
 - i.e. AFUDC included (in NERSA terms);
 - Nat Treasury EOCC (discount rate) of 8.2% real, after tax;
- If the capital cost saving of cancelling the completion of Units 5 & 6 is more than the capex savings threshold, then it should be cancelled.
- We have calculated the capex savings threshold to be:
 - Approximately 1.8% of the PV of the total capital cost; or
 - Approximately 9% of Eskom's budget for cost to completion for Kusile.
 - Based on consistent under estimates we expect the final cost to completion to be higher than Eskom's current figure



KUSILE UNITS 5&6 RESULTS: POTENTIAL COST SAVINGS

% of Eskom's Budget for cost to completion for Kusile*	PV of CAPEX saving (R'm)	Nett CAPEX Saving (R'm)
8.73%	4 667	0
15%	8 021	3 354
20%	10 695	6 028

*Assumed a 10% underestimate of remaining capital cost to completion



EMPLOYMENT AT ESKOM'S POWER STATIONS

- Ensuring a fair and “just transition” will be critical.
- However, the employment impact at power stations will be smaller than what most people expect.
 - Kusile and Medupi could absorb some personnel;
 - Some could be utilised elsewhere to make up for natural attrition; and
 - Some might have to be retrenched.

BU	Employment
GX Arnot	677
GX Camden	324
GX Grootvlei	427
GX Hendrina	644
GX Komati	331
GX Kusile	247
GrHeKo (Grootvlei, Hendrina, Komati)	1402

Source: Eskom station employment figures extract from SAP July 2017



FINAL REMARKS

- Our estimates show that it will be possible to decommission GrHeKo and avoid the completion of Kusile Units 5 & 6, giving rise to a financial saving in the region of R17bn.
- These savings do not reflect the substantial savings in the impact on human health and other externalities.
- The changes away from coal towards cheaper new technologies occurring in our power sector are not unique to South Africa, but are part of the global Energy Transition.
- South Africa – which is endowed with a “Saudi Arabia” of renewable energy resources – will lose out against its competitors if we do not pursue this opportunity.
- The sustained crises at Eskom will have a large negative systemic impact on the economy if not urgently addressed.
- The options we briefly presented today should form part of broader, comprehensive strategy to respond to these challenges.
- These are large and difficult decisions to make with many vested interests that will be affected.
- We have already seen that Government and Eskom are partially paralysed and could struggle to take the right decisions in the public interest.
- It is exactly for situations like this that countries create independent regulators (or independent public protectors, independent courts, etc.).
- It is therefore critical that NERSA ensures that these issues are investigated and addressed and that Eskom is only allowed to recover prudent and efficient costs in its tariffs.



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