Energy Water Food Climate Nexus Summit
Ridge Hotel, Musgrave, Durban, South Africa, 1-4 July 2024

Theme: We want what is possible

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2 July 2024

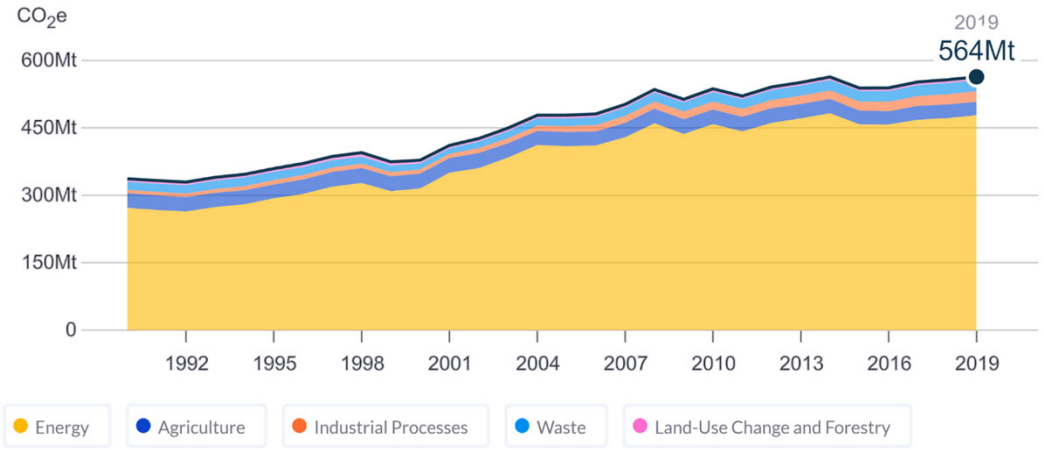
Achieving water, energy and food (WEF) security is a priority for southern Africa

Key issues impacting water, energy and food (WEF) security[1]:

- unfavourable climate changes
- increasing urbanisation
- population growth
- rapid ecosystem degradation

nexus

The energy sector remains the largest contributor to GHG emissions over any other sector contributing to ~ 84% of total emissions in SA[3].

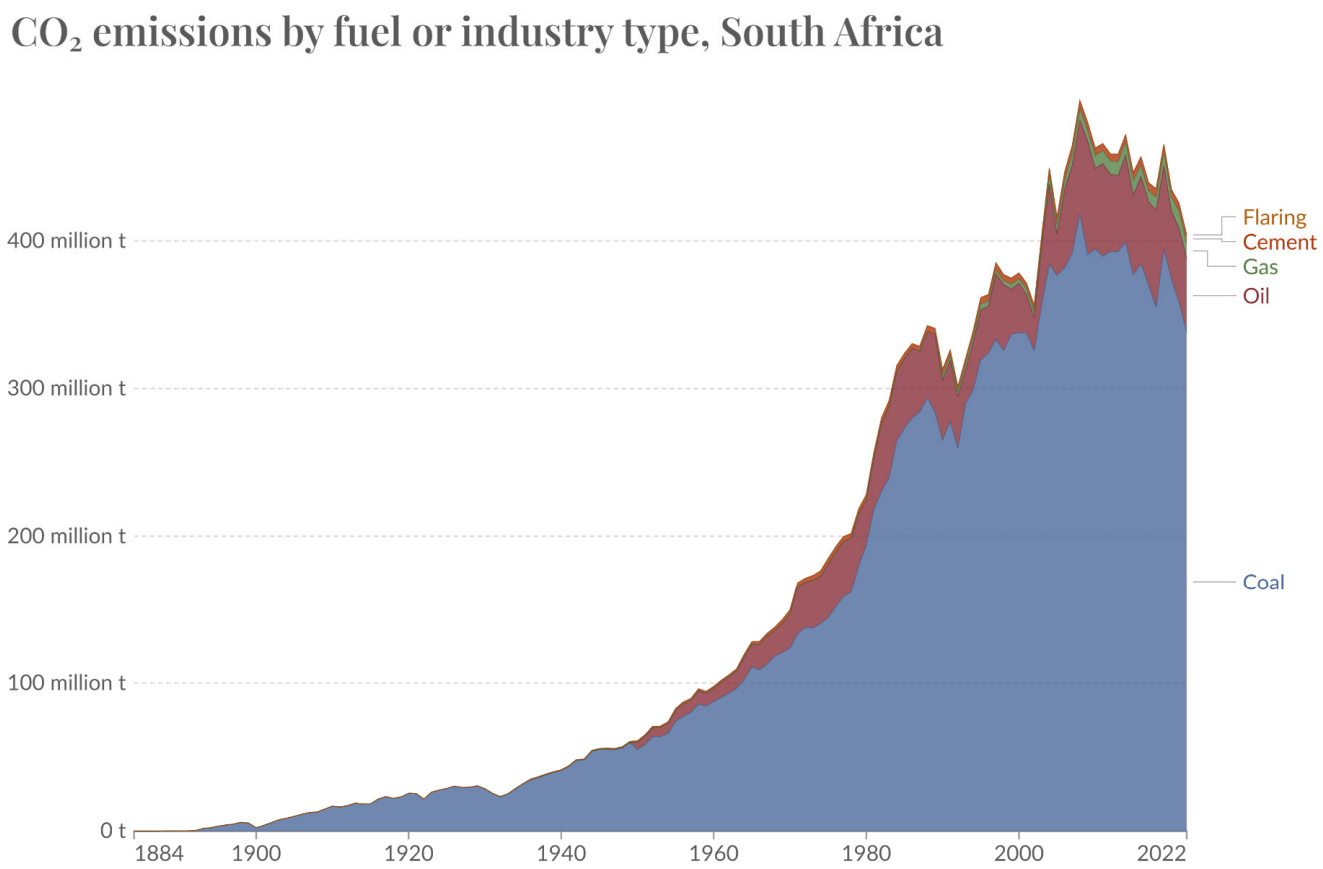


2019	CO_2e
Energy	478.06Mt
Agriculture	29.69Mt
Waste	25.24Mt
Industrial Processes	23.65Mt
Land-Use Change and Forestry	6.90Mt

Source:

1. Water-energy-food (WEF) Nexus;
2. www.water-energy-food.org
3. Climate Watch (2024) – Historical GHG emissions in SA by sector

~85% of SA's electricity is sourced from coal fired power stations – **Coal** contributes to **~338MT in carbon** emissions



Flaring	37,764.00 t
Cement	5.28 million t
Gas	11.02 million t
Oil	49.58 million t
Coal	338.13 million t
Total	404.05 million t

Source: Global Carbon Budget (2023)

Developments in the **policy** environment have **implications on Eskom's strategic direction** and **operations**

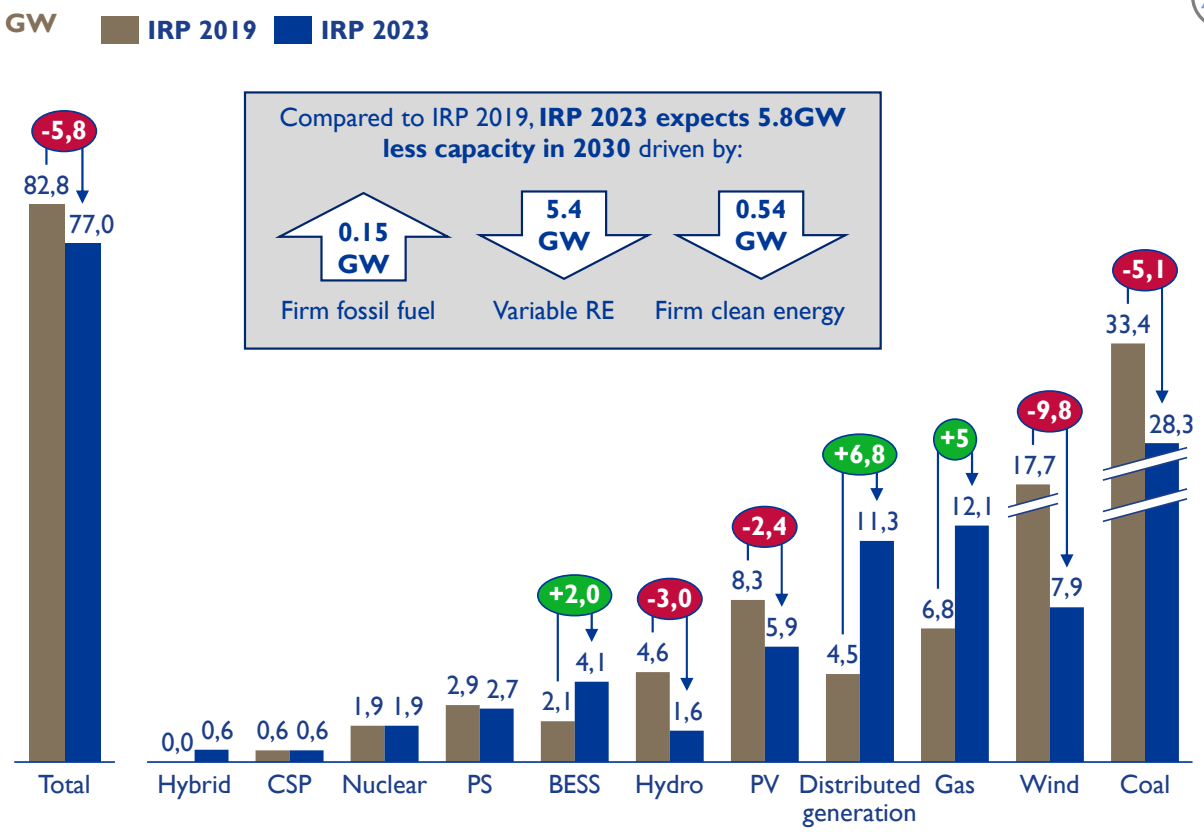
	Key developments	Implications for Eskom
Energy Policy	**Draft IRP2023 –** Emerging plan requires 29GW new generation capacity by 2030, 16.3GW is available for participation	• Generation and Distribution (distributed generation) to pursue share of capacity allocations
	ERA Amendment Bill – Reforms ESI to promote a competitive electricity market and provides market rules for various parties in the generation, transmission and distribution of electricity	• Operationalise NTCSA by April 2024 to facilitate competitive market • Generation and Distribution to review business models and explore market participation opportunities
Fiscal Policy	**Eskom Debt Relief Act 2023 –** Relief of R254 billion with conditions towards Eskom's debt servicing	• Deliver on debt relief conditions (i.e. EAF recovery, no new borrowing etc.) and investigate alternative funding mechanisms such as public-private partnerships (PPP)
	Public Finance Management Act – Changes under Section 54 significant transactions to extend scope of certain key players, NT Instruction Note 4 addresses approval of delegation of authority (DOA) for irregular expenditure contraventions	• Board now has oversight of all PFMA Section 54 significant transactions that go to DPE and NT • Eskom DOA and governance structures to be updated to align to the Instruction Note approval requirement
	Public Procurement Bill – Approved by National Assembly in Dec 23 and to be debated at the National Council of Provinces in 2024, the Bill replaces PPPFA and creates a single regulatory framework for public procurement	• Main changes include oversight and powers of new NT Public Procurement Office to direct procurement as well as provisions for set asides, subcontracting, local content, bidding in local currency and advancement of sustainable development • Eskom's operating model (governance, processes) to be amended to align with Procurement Bill
Environmental Policy	**Climate Change Bill –** Makes provisions for mandatory carbon budgets and includes a penalty (R5mil or up to 5 years imprisonment for first offence) for failing to submit a GHG mitigation plan	• Eskom has an existing (GHG) Pollution Prevention Plan that will automatically be converted into a GHG Mitigation Plan. Emissions that exceed the carbon budget are expected to attract a higher carbon tax
Trade and Industry Policy	**Reimagined Industrial Strategy Policy[1] –** Focuses on strategic value chains, localisation, sector masterplans, and legal measures to increase trade within Africa	• Eskom to develop a Socio-Economic Transformation Plan to leverage procurement capacity (capex and opex) to support socio-economic development

BESS – Battery Energy Storage Systems, Capex – Capital Expenditure, DPE – Department of Public Enterprises, EAF – Energy Availability Factor, ERA – Electricity Regulation Act, ESI – Electricity Supply Industry, GHG – Greenhouse Gas, IRP – Integrated Resources Plan, NT – National Treasury, NTCSA – National Transmission Company South Africa, Opex – Operating Expenditure, PFMA – Public Finance Management Act, PPPFA – Preferential Procurement Policy Framework Act, PV – Photovoltaic 1. Incorporates key aspects of national policy incl. National Development Plan, New Growth Path framework, Industrial Policy Action Plans Economic Reconstruction and Recovery Plan. Renewable energy is one of the ten prioritised sectors

Horizon One (2024-2030)

The most significant changes in the **IRP 2023** compared to **IRP 2019** is an **increase** in **distributed generation** and **Gas** along with a **decrease** in **Wind and Coal**

Comparison of total capacity per technology required by 2030 (IRP 2019 vs IRP 2023)



Insights

- Horizon One suggest **significant differences** in technology capacities by 2030 **compared to IRP 2019**, mainly driven by **demand reduction** (currently 19% lower than IRP 2019), **lower EAF assumptions**, **grid capacity constraints** and a significant increase of **Distributed generation**. This highlights the **evolving electricity supply industry** and **importance** of **agility** in Eskom's strategies and plans
- Horizon One expects additional **7GW Distributed generation**, **6GW Gas**, **2GW BESS** and **0.6GW Hybrid** technologies by 2030 **compared to the IRP 2019**
- Horizon One expects **10GW less Wind**, **5GW less Coal**, **3GW less Hydro** and **2.4GW less PV** by 2030 **compared to IRP 2019**
- The IRP 2023 **assumes ~12GW coal shutdown** by 2030 **compared to ~11GW in IRP 2019, although Eskom's current expectation is that shutdowns within the Horizon One timeframe will be delayed**
- **Lower PV capacity** expansion in the optimisation is likely **due to higher Distributed generation** (which is predominantly rooftop PV) while **lower Wind build** could be attributed to **grid capacity constraints.** Drivers behind reduced Hydro need to be clarified
- **Higher Gas** and **BESS** build is **driven by lower EAF** assumptions for the existing fleet which creates a need for **increased dispatchable capacity**

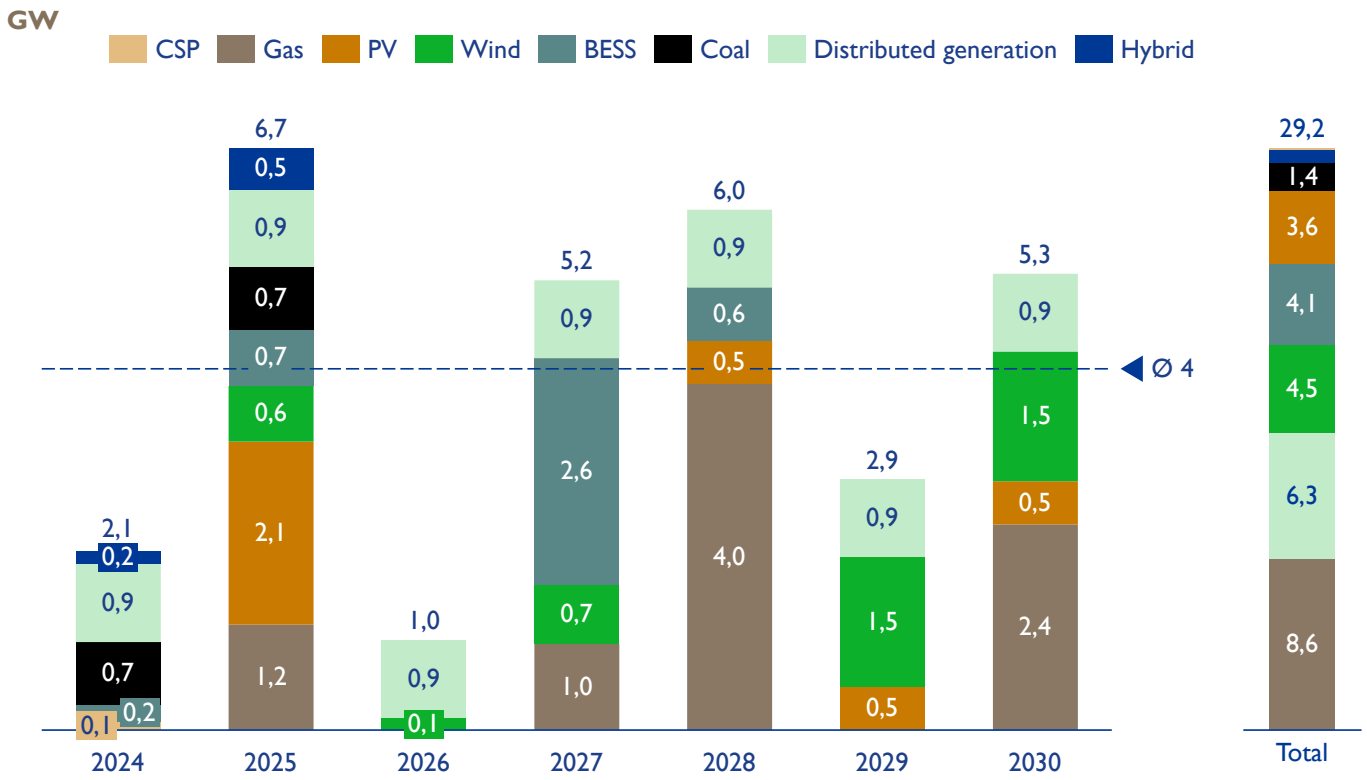
[1]Current indications are that Tutuka shutdown will be delayed

Although Coal decommissioning is not listed explicitly in the IRP 2023 draft emerging plan, shutdown dates for the reference case is listed and amounts to ~12GW of Coal being decommissioned by 2030; IRP 2023 Emerging Plan "Dispatchable capacity" assumed to be from Gas

Horizon One (2024-2030)

The **IRP 2023** Emerging Plan expects **~4GW** of new capacity annually between 2024 and 2030 with the highest annual build rate expected in 2025 (7GW)

Expected annual build rate of technologies from the IRP 2023 Emerging Plan for Horizon One



Insights

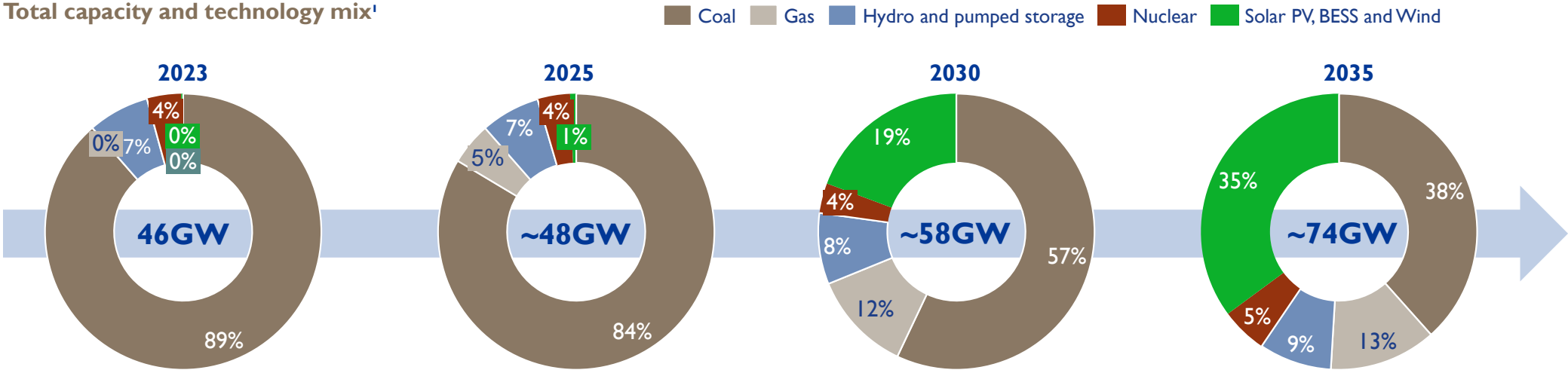
- The IRP 2023 Emerging Plan expects **~4GW of new capacity annually** between 2024 and 2030 with the **highest annual build rate expected in 2025 (7GW)** primarily driven by PV and Gas
- Total **Eskom allocation is 4.8GW** from Coal and BESS
- The IRP 2023 Emerging Plan expects **1220MW of Gas in 2025** which is **likely linked to RMIPPP** projects which have **failed to meet financial close** by the Dec 2023 deadline and are at risk of not materialising
- **No new coal except** for Kusile U5 and U6 completion is expected within Horizon One
- The **most significant increases** are from **Gas**, **Distributed generation**, **Wind** and **BESS** indicating as shift towards private sector generation and the **requirement for additional dispatchable generation**

IRP 2023 Emerging Plan "Dispatchable capacity" assumed to be from Gas

Eskom's Generation business remains **committed** to **transitioning** in line with industry trends to a diversified business that offers **cleaner energy**

Expected changes in Eskom's energy mix

Total capacity and technology mix[1]



Key insights

- Based on the current delayed shutdown and **expected new generation capacity** from the Clean Energy Roadmap, **total Gx generation capacity** can increase to ~74GW if all projects are realised
- **Generation's fleet technologies** are expected to **diversify** between 2023 and 2035, adding BESS, Wind, PV and Gas to a fleet which has been historically dominated by Coal, Diesel, Nuclear, Hydro and PS
- **Although additional clean generating technologies are expected, fossil fuel technologies** will still make up ~51% of the fleet (~38% Coal and ~13% Gas/Diesel)

Footnote: 1 New capacity projects are represented by installed capacity

Source: Project Funnel and Milestones dashboard, Clean Energy Unit, 22 December 2023; Eskom continued operations plan dates; Reports_Daily Reports Cluster, Generation Plant performance GPSS data, 11 December 2023

To **transition responsibly** the reality of balancing the **energy trilemma** of energy security, equity and environmental sustainability must be considered

'The global energy sector is facing unprecedented change as countries strive to decarbonise and shape a more inclusive energy transition as they seek to recover from the economic shocks generated by global events.'

Changes in the local energy environment

- Draft IRP2023 released
- RMIPPP capacity delayed
- Modelling by Tx(MTSAO), DMRE(IRP2023), Meridian Economics(NatJoints) show delays in new capacity in the next 5 years
- Declining plant performance, unplanned events/major plant breakdowns being addressed through the Recovery Plan
- Units were meant to shut down starting Jan 2023, have continued operation (Camden and Hendrina)
- Restructuring of ESI and unbundling of Eskom occurring at the same time
- Establishment of open energy market

Dimensions to balance to ensure prosperity and competitiveness for the country

ENERGY SECURITY

MEASURES

Ability to meet current and future energy demand

Withstand and respond to system shocks

ENERGY EQUITY

MEASURES

Ability to provide universa access to reliable, affordable, and abundant energy for domestic and commercial use

ENVIRONMENTAL SUSTAINABILITY

MEASURES

Ability to mitigate and avoid environmental degradation and climate change impacts

Generation strategic response

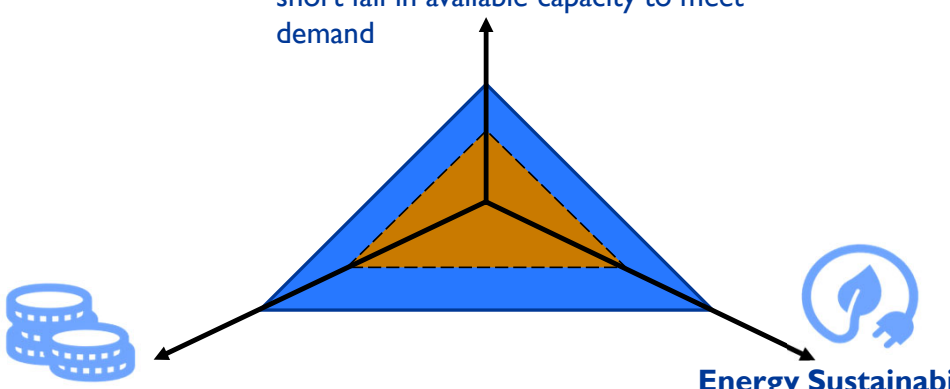
- **Continued Operations of Stations** (Energy Security, Energy Equity)
- Decoupled rollout of **Clean Energy Projects** from station shutdowns (Energy Security, Energy Equity, Environmental Sustainability)
- **Repurposing** (Energy Security, Energy Equity, Environmental Sustainability)
- **Market Participation** (Energy Equity)
- **Emission Reductions Upgrades and Retrofits** (Environmental Sustainability)
- **Air Quality Offset Projects** (Environmental Sustainability)

To ensure operational and business sustainability, Generation needs to balance the requirements of stopping loadshedding and provide security of supply to country, the shift towards a liberalised market and the **Just Energy Transition** and achieving net-zero emissions

Source: World Energy Council – *World Energy Trilemma (WEC 2021)10.*

South Africa, like many developing countries, is grappling with the energy trilemma

Energy trilemma in the South African context



Energy Security

- Unreliable performance from installed Eskom base leading to 4000 - 6000 MW short fall in available capacity to meet demand

Energy Affordability / Access

- SA's socio economic status and high levels of unemployment, inequality
- GDP growth negatively impacted by energy crisis

Energy Sustainability

- ~80% of electricity generation is fossil fuel based, ~47% contribution to SA's GHG[1] emissions
- Risk presented by non-compliance with air quality standards (MES[2]) 16GW

Impact of these interlinkages in decision-making

- Decisions that impact the energy sector must be viewed along the dimensions of energy security, affordability and sustainability
- Relative **priority** placed on each dimension **evolves over time based on the context**
- As a **developing country there are difficult trade-offs that need to be made to ensure security and affordability** in the short term
- Decision making during this dynamic context needs to **enable sufficient flexibility to respond** to changing context

Footnote: 1 GHG: Greenhouse Gas 2 MES: Minimum Emissions Standards

In the short-term Eskom is prioritising recovery - **security of supply** is key to prevent **loadshedding** which costs SA **~R204m - R899m daily**

Implementation complete | Implementation in progress

1 Set up for success

- **Set-up the enabling structures**
  - Turnaround plans
  - Generation recovery office
  - Key enablers
- **Guard performance** at current **flagship stations**
  - Medupi, Lethabo, Matimba and Peaking
- Focus on the **Priority stations**
  - Tutuka, Duvha, Majuba, Matla, Kendal, Arnot, Kriel
  - Kusile removed from priority list
- **Execution of Koeberg 1 Outage**
- **Source external specialized skills**

2 Execute excellence

65%[1] EAF

Actions for FY24

- **Successful execution of Koeberg 1**
- **Sustain Excellent Medupi performance**
- **Embed principles of Operational Excellence**
- **Address internal skills gaps**
- **Prevent outage slips**
- **Return of Kusile 1, 2 and 3**
- **Synchronisation of Kusile 5**
- **Review plant shutdown dates based on system requirements**

3 World class performance

70%[1] EAF

Actions for FY25 onwards

- **Return of Medupi 4** from long term forced outage (Sept 2024)
- **Commercial operation of Kusile 5** (Jun 2024)
- **Synchronisation of Kusile 6** (Oct 2024)
- **Continuous focus on current and future skills**
- **Ensure successful implementation of Koeberg 2 steam generator and long-term operating projects** (Sep 2024)

Continuous execution of Culture transformation and Strategic Levers as per the Generation recovery plan

Note: 1. MTD for March 2024 and March 2025

Despite global pressures, to support recovery efforts, Eskom has opted to continue operations of all coal fired power station until at least 2030

The **assumptions that informed the previous Eskom shutdown plan (Eskom 2035 strategy) have changed materially,** impacting the future outlook and necessitated the review of the Generation 2035 shutdown plan

- EAF deteriorated beyond 60% and the 2GW RMIPPP capacity intended to be online by 2022 has not materialised (only 150MW completed), resulting in additional dispatchable capacity requirements from Eskom
- The relaxation of licensing requirements has unlocked VRE capacity, although it has not assisted with dispatchable capacity ramp up
- SA's JET-IP programme and disbursement of funds delayed, while National Treasury debt relief requires focus on maintaining existing plant

Several considerations were incorporated in developing the **proposal to continue operations**:

- **Levelised costs of energy** of these plants is **comparable to alternative dispatchable technologies**. Least cost option for the country in the short term - (OCGT runs at ~R7500/MWh and load-shedding (~R10000/MWh). Country has spent ~R30bn on OCGTs in FY24 alone
- **Allows Eskom** and **South Africa** to **develop additional interventions** to mitigate the **negative socio-economic impact of plant shutdowns**
- **The estimated cost** (~R102, 9 bn) is inclusive of both Capex and Opex flows over the period up to 2030 and **will be subject to annual review to account for any changes in the market** and does not constitute a fixed contract which imposes an obligation to the spend
- Environmental implications considered include: Water Use License, ash disposal, MES compliance and coal supply requirements, however **continued operations will not put Eskom's contribution towards NDCs targets at risk**

Continued operations does not mean Eskom is not pursuing clean energy projects or enabling the connection of new generation capacity, instead this tactical approach to mitigate risks to security of supply while new capacity is being built. This will allow for:

- Development of clean energy projects on the ground and **avoid a repeat of Komati shut down** – enable implementation of repurposing and repowering initiatives before station shutdowns
- Acceleration of **TDP implementation to enable renewable generation capacity** to the grid
- **Development of dispatchable clean energy** (e.g. Gas) to enable increasing penetration of renewables while ramping down coal fleet

Continued Operations does not deprioritise Eskom's pursuit to diversify it's energy mix or support for the electricity sector transition

Continued Operations manages risks in a supply constrained environment…

- **Risk mitigation** in a volatile and transitioning sector
- Need approvals and alignment to **NERSA shutdown requirements**
- **Reduce financial burden of OCGT usage** (and economic impact of loadshedding)
- Ability to **continuously review requirements** as **sector evolves** and new projects come online

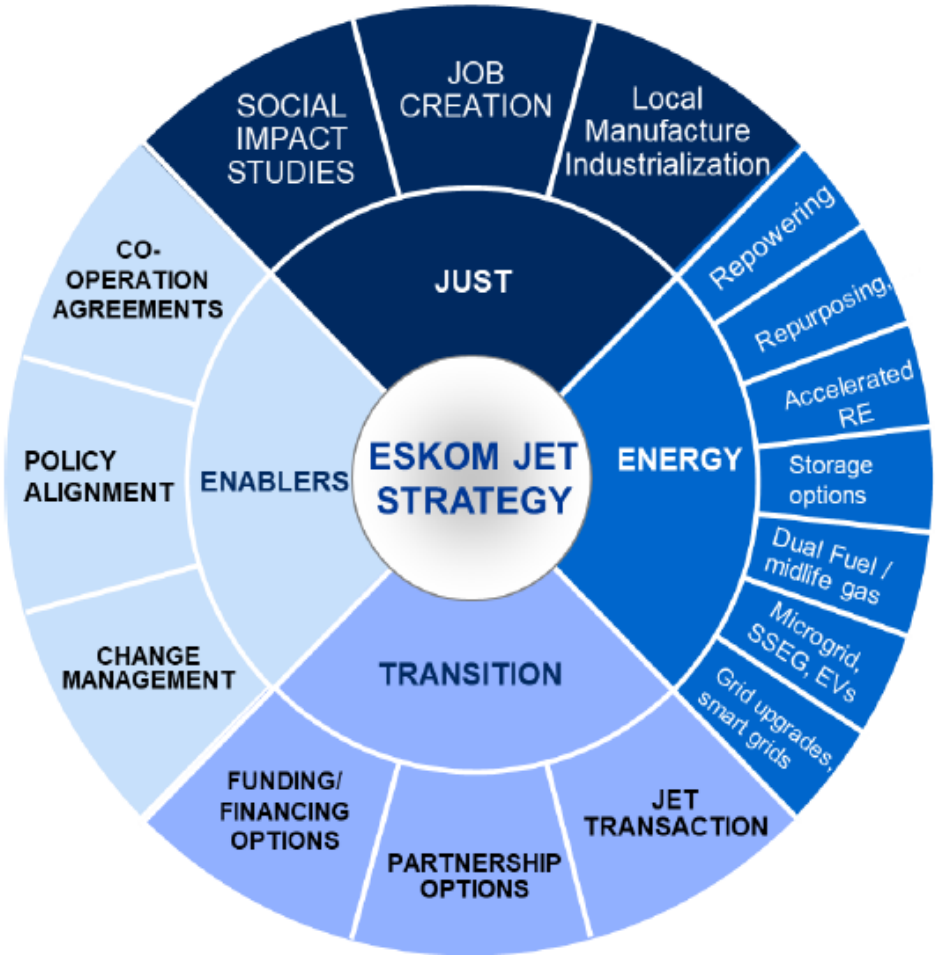
…while Eskom drives participation in the electricity sector transition

- **14000km** of **additional Tx lines pursued** to **add renewable generation** to the grid by ~2032
- Up to **10GW**[1] of **Wind, PV** and **BESS** projects **pursued** by **Gx** from greenfield and repowering projects by ~2030
- **Up to ~8GW**[1] of **Gas, Nuclear and Hydro and Hydro PS** projects **pursued** by **Gx** to accommodate the ramp up of variable renewable energy by ~2035

The intention of Continued Operations is **not to replace any alternative generating options**, but rather to **bridge the gap while other options are being pursued** – this decision is **not a long term or blanket commitment,** and the **commercial and technical viability will continually be monitored**

1: Primarily funded through Private Public Partnerships; Hedging will be utilised to manage Gas price volatility; Skills and resources required are already being pursued; projects still in early development phases and numbers subject to change

The **Eskom JET strategy** outlines the pathway to transitioning responsibly with due consideration to the elements of the energy trilemma



Just: *Doing better for people and the planet, Growing localisation and industrialisation*

Energy: *Cleaner, sustainable electricity provision*

Transition: *Transformational change of business models, attracting green financing*

Enablers: *Collaboration across constituencies*

Thank you.