Department of Mineral Resources and Energy

UNPACKING THE DRAFT IRP 2023

16 February 2024

mineral resources & energy
Department:
Mineral Resources and Energy
REPUBLIC OF SOUTH AFRICA

2030 NDP

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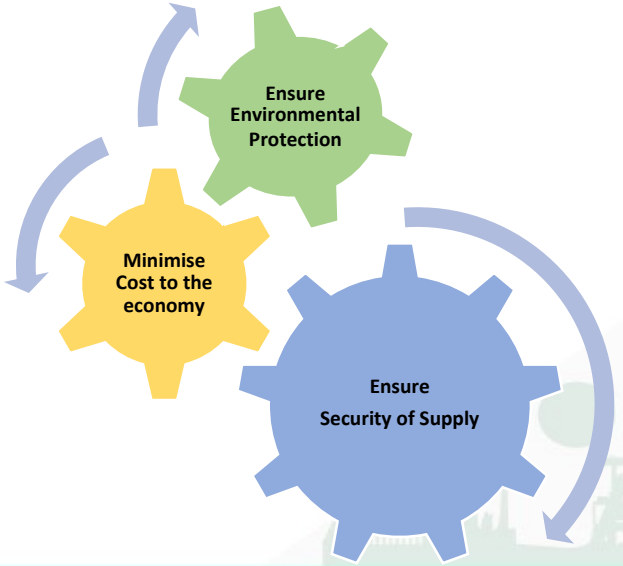
PURPOSE OF THIS ENGAGEMENT

- To provide context for the draft IRP Review Report
- Two additional public workshops planned that will focus on technical aspects of the report

WHAT IS THE INTEGRATED RESOURCE PLAN?

The IRP, as contemplated under the Electricity Regulation Act, is a legal instrument for an electricity generation plan that meets forecasted annual peak and energy demand, plus some established reserve margin, through a combination of supply-side and demand-side resources over a specified future period. The IRP is driven by a set of predetermined objectives

Objective of the IRP is to provide electricity generation plan that aims to:



KEY DRIVERS FOR IRP REVIEW: WHAT HAS CHANGED?

1		**Eskom Generation Plant (EAF)**	▪ Plant performance is currently trending below what was envisaged in IRP 2019 ▪ Changes to the shutdown plan of generating units in line with Eskom's strategy
2		**New Generation & Grid Capacity**	▪ Procurement and rolling-out of new generation capacity ▪ Transmission capacity constraints in high resource locations further inhibit new generation capacity rollout
3		**Demand**	▪ Lower demand due to low economic growth ▪ Lower demand due to loadshedding

…OTHER CHANGES

- The Just Energy Transition Investment Plan (JET IP) and the subsequent Implementation Roadmap for the period 2023-2027
- The Energy Action Plan designed to reduce load-shedding and achieve energy security as announced by President on July 25, 2022
- The removal of licensing requirements for the development of power generation by consumers (embedded generation) meant to enable and attract more investment necessary to address loadshedding

IRP REVIEW AND DEVELOPMENT PROCESS

ASSUMPTIONS
- Data gathering

TECHNICAL MODELLING
- Model development (Reference case)
- Technical Analysis

DRAFT REPORT
- Assumptions
- Technical Analysis
-Observations

PUBLIC INPUTS

ADDITIONAL TECHNICAL MODELLING

FINAL PLAN AND REPORT

IRP ASSUMPTIONS

- Assumptions into the IRP include the following amongst others:
  - Demand forecast
  - Existing power plants performance
  - Technology options including cost
  - Decommissioning plan
  - Commissioning of new capacity
  - Other input parameters

TECHNICAL ANALYSIS: THE TWO HORIZONS APPROACH

Horizon 1 of the IRP 2019 review seeks to establish the Power System Requirements up to year 2030

- Quantify the generation capacity and power system shortfall
- Assess the extent to which the proposed initiatives address the supply and demand deficit
- Identify initiatives or actions to be taken to address the supply and demand deficit

Horizon 2 seeks to evaluate energy mix pathways to inform the long-term power system policy choices

- Analyse a core set of energy pathways in the medium-to long-term taking into account the need for energy security, decarbonization and low cost of energy
- Inform policy to steer the development of South Africa's future energy mix

HORIZON ONE: SCENARIOS MODELLED AND ANALYSED

		EAF	Initiatives 2030 (MW)	New Gas (MW)	Comments
1	Firm Initiatives	49% – 51%	Business 2 842 RMIPPPP 150 REIPPPP 5 Wind 784	0	• Priority Projects as ranked by business and have grid capacity reserved as at June 2023 • Government projects in the RMIPPP + REIPPP programme under construction
2	Reference	49% – 51%	Business 5 304 RMIPPPP 626 REIPPPP 5 PV 975 REIPPPP 5 Wind 1 608 REIPPPP 6 PV 1 140 BESS BW 1-3 + Eskom 2 080	0	• Business initiatives with COD and location • Government projects in the pipeline
3	Firm Initiatives & All Initiatives	49% – 51%	Business 10 436 RMIPPPP 626 REIPPPP 5 PV 975 REIPPPP 5 Wind 1 608 REIPPPP 6 PV 1 140 REIPPPP 7 PV 2 000 REIPPPP 7 Wind 3 000	0	• All initiatives including those with no grid capacity reservation, COD and/or location • Includes REIPPPP 7 due for RFP
4	Firm Initiatives & Gas	49% – 51%	Same as 'Constrained New Build Development' Case	6 220	• Gas includes DMRE Gas, Eskom Richards Bay Gas and RMIPPPP dispatchable Gas
5	Firm Initiatives & Recovery	66% - 69%	Same as 'Constrained New Build Development' Case	0	• Eskom's EAF improvement as per its Generation Recovery plan

HORIZON TWO: PATHWAYS MODELLED AND ANALYSED

Pathway	Policy Guiding Principles	Energy Pathways	Comments
1	Establishing a reference for benchmarking	Reference Case	• Supply and demand balance based on least-cost. Optimisation model provided with an array of generation expansion options from which to select an optimum plan up to 2050
2	Power System Transition	Renewable Energy	• Optimize only green energy technologies and storage as candidate options; Wind (on-shore & off-shore); Solar PV; Hydro, Storage (BESS, CAES, WPS); and Bioenergy
3		Renewable Energy and Nuclear	• Optimize non-CO_2 emitting technologies as candidate options; Wind (on-shore & off-shore); Solar PV; Hydro, Storage (BESS, CAES, WPS); Bioenergy and Nuclear (PWR & SMR)
4	Shut down of existing coal fired station post 2030	Delayed Shutdown	• Delayed shutdown of coal-fired stations earmarked to shutdown post 2035 by 10 years
5	Clean Coal	Renewable Energy and Coal	• Assess impact of new cleaner coal technologies

OBSERVATIONS FOR HORIZON ONE

- The different electricity generation initiatives or projects currently being implemented will contribute to reducing unserved energy, but they must include dispatchable capacity. This is because of the inherent characteristics of the South African power system and the erratic performance of existing coal fired power plants.
- The system requires generation options that are of a similar characteristic to replace the lost dispatchable capacity as and when the failures occur.
- Improvement in EAF and deployment of gas to power provides these options to the system and hence low or no unserved energy is observed for Scenarios Four and Five.
- The emissions analysis for Horizon One indicate that carbon emissions are within the National Determined Contribution (NDC) until 2025 and thereafter begin to show a decline below the nationally determined threshold.

INTERVENTIONS FOR HORIZON ONE

- **Intervention 1**: Continue and intensify the efforts to improve of Eskom's plant performance (EAF)
- **Intervention 2**: Accelerate the deployment of dispatchable generation options such as gas to power (this is in addition to non-dispatchable supply initiatives by business and the State)
- **Intervention 3**: Where technically and commercially feasible, delay shutting down coal fired power plants to retain dispatchable capacity
- **Intervention 4**: Support and enable the development of the transmission grid as per the TDP 2023-2032 to enable connection of additional generation capacity initiatives
- **Intervention 5**: Manage the following emerging risks:
  - Completion of Extension of the design life of Koeberg Power Station
  - Resolve the challenges around compliance with the implementation of the Minimum Emissions Standards (MES) on coal fired power stations

OBSERVATIONS FOR HORIZON TWO

- Energy pathways based on renewable and clean energy technologies deliver the desired outcome for decarbonising the power system. However, these pathways do not provide security of supply while carrying the highest cost to implement.

- In the period between 2031 to 2050 the system will require a massive new build programme with significant capacity required in just over a decade from now. The implication of this is that implementation of generation capacity required for this horizon including associated transmission network will have to begin in earnest.

- Pathways comprising of dispatchable technologies with high utilisation factor provide security of supply. Other than delayed shutdown, these technologies include different combinations of nuclear, renewables, clean coal and gas. Notably these pathways support the carbon reduction commitments.

- To ensure security of supply in the long term while ensuring decarbonisation and least cost of supply will require a combination of technical analysis (power system modelling and simulation) and policy adjustment that considers practical implementation constraints and implications.

OUR ASK: PUBLIC INPUT

- Invitation for the public to comment on:
  - Assumptions and Input parameters
  - Scenarios analysed under Horizon One
  - Pathways considered under Horizon Two
  - Observations and Interventions for Horizon One
  - Observations for Horizon Two

NEXT STEPS

Public Comments

04 Jan - 23 Feb 2024

18 & 31 Jan 2024

Public Workshops: Unpacking the IRP.

Review and Consideration Public Comments

Feb – Mar 2024

Apr 2024

NEDLAC.

Final IRP

May 2024

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I THANK YOU
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QUERIES

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