SUBMISSION ON:

THE DRAFT INTEGRATED RESOURCE PLAN (IRP) 2018

January 2019

MINERALS COUNCIL
SOUTH AFRICA

WHAT IS THE IRP?

The IRP is an electricity capacity plan which aims to provide an indication of the country's electricity demand, how this demand will be supplied and what it will cost. The IRP 2010-2030 (IRP 2010) was released by the Department of Energy (DoE) in May 2011. The document outlined South Africa's forecast energy demand for the 20-year period between 2010 and 2030. The IRP was intended to be a 'living plan' that would be periodically revised by the DoE every two years.

The draft IRP 2018 document was published in 2018 for public comment.

The Minerals Council submitted its response to the draft document in October 2018.

CONTEXT OF THE IRP

The Integrated Resource Plan (IRP) should be seen in the context of the long-term economic goals laid out in the National Development Plan (NDP). In January 2018, the National Planning Commission of South Africa (NPC) released the Discussion Paper on Energy as part of the NPC Economy Series. The paper states that:

"South Africa will have an energy sector that promotes:

1. *Economic growth and development through adequate investment in energy infrastructure. The sector should provide reliable and efficient energy service at competitive rates, while supporting economic growth through job creation.*
2. *Social Equity through expanded access to energy at affordable tariffs and through targeted, sustainable subsidies for needy households.*
3. *Environmental sustainability through efforts to reduce pollution and mitigate the effects of climate change."*

The IRP is the embodiment of the infrastructure development plan aimed at achieving the long-term goals for the economy.

IMPLICATIONS OF THE IRP ON THE MINING SECTOR

The South African mining sector is an electricity-intensive industry. Access to reliable baseload electricity supply at competitive prices, from a more diversified supplier base, is a key condition for the sustainability and growth of the mining sector.

The mining industry is largely a price-taker. Around 80% of mining production is exported to global markets. The mining industry cannot simply pass on cost increases to its customers.

The IRP has important implications for the mining sector, and of course, Eskom in terms of its impact on production and employment.

In 2016, the Minerals Council provided the following comments in terms of the IRP Update released in November that year:

Comment in 2016:	Current status:
The assumption of a near 4% average economic growth over the period may prove highly ambitious and very costly to the economy if overcapacity is the result.	Economic growth has been disappointing, while the energy elasticity of growth has diminished substantially. Cost and time overruns on the Eskom build programme have resulted in substantial costs for the economy to such a degree that Eskom's debt situation (state guarantees) has become the single most serious threat to the fiscus and the economy.
Sufficient baseload capacity for the mining sector is critical. The stated industrial policy stance by government of beneficiation of mineral resources and support for basic ferrous and non-ferrous industries may alter the observed historical decline in electricity intensity of the economy and should be considered.	Unreliable electricity supply and exorbitant electricity tariff increases have deterred beneficiation, driven some facilities offshore and accelerated energy efficiency gains, with the result that energy demand from mining, and industry in general, declined over time.
The unexplained limitations put on additional wind and solar voltaic generation seemed to have had the objective of creating the scope for nuclear power generation and would potentially have a substantial impact on overall costs and therefore tariffs.	These limitations have all been lifted and combined with the objective of 'least cost' for the economy, have changed the scenarios completely.
The Minerals Council cautioned against the vilification of coal and the potential impact this could have on production and employment in coal mining. It stated that coal technology was not static and would contribute less to emissions over time.	Coal technology has indeed become more efficient and environmentally friendly, but this seems not to have been fully considered in the draft IRP 2018.

African Rainbow Minerals – Goedgevonden Mine

ELECTRICITY DEMAND FORECASTS 2017-2050 AND THE DECOUPLING OF ELECTRICITY CONSUMPTION FROM ECONOMIC GROWTH

The electricity intensity of the South African economy has declined over the past five years as consumers reacted to the escalating cost of electricity and Eskom's inability to supply the required demand.

The IRP Update 2018 Media Scenario suggests that:

GDP will grow by **4.26%**

Electricity demand will grow by **1.8%** by 2030 and 1.4% by 2050

The NERSA Electricity System Adequacy Outlook reports a decline in electricity sent out between 2011 and 2018.

In 2017 alone, electricity distributed declined by 0.55%. This highlights the risk of overestimation by the IRP as the proposed growth and demand forecast might not be achieved. In turn, this could lead to an oversupply which would further raise the cost of electricity given that idle electricity generation capacity has a real economic and opportunity cost.

The lower GDP forecast of **1.33%** which results in an annual electricity demand of **1.21%** by 2030 and 1.24% by 2050 is more feasible

Assuming different growth rates for different sectors in the economy is highly speculative and serves no purpose in long-term forecasting. GDP growth and electricity elasticity patterns are sufficient to determine future demand patterns.

Current statistics show a decoupling of electricity demand growth from GDP growth as more energy-efficient production methods are applied, lowering the electricity-intensity across the economy.

ACTUAL AND IMPLIED ELECTRICITY TARIFF TRAJECTORY

Unreliable electricity supply and unsustainable tariff increases will continue to lower the elasticity of electricity demand.

The impact of rising electricity prices on consumers will intensify further in 2019 given that NERSA ruled that **Eskom may recuperate R32.7 billion** of the MYPD3 allowable costs sustained between 2014 and 2017 through the regulatory clearing account (RCA). **While the 2018 RCA is still outstanding, it is estimated to be R20 billion**.

Starting April 2018, Eskom can raise electricity tariffs by at least 4.4% (excluding the 15% applied for by Eskom in the MYPD4) just to claw back the allowable revenue through the RCA. This, combined with the additional MYPD4 tariff increase, could result in electricity prices rising by much higher than inflation, and 10 percentage points higher than in recent years, over the next three years.

This poses an upside risk to the country's inflation profile. Electricity demand continues to decline to levels below what has been experienced over the past 10 years. This would have a significant impact on Eskom's income and its future sustainability. Moreover, this could very well be the death knell for several industries in the economy, including gold and platinum mining, given that electricity expenditure is a significant component of total intermediary costs (at around 15%-20%).

For South Africa to reindustrialise, electricity has to be available and affordable.

Even with the potential benefit of decreasing costs of renewable technologies and the price of electricity generated by these technologies, the prospect of breaking the unsustainable upward electricity price spiral is slim, mainly due to Eskom's rising debt and debt servicing spiral.

The draft IRP 2018 does not address the structure of the electricity market. Even though the IRP is an electricity infrastructure blueprint, the uncontrolled cost of infrastructure is one of the roots of the current cost problem.

Principles for developing energy policy and translation into infrastructure plans

The Energy White Paper of 1998 contained most of the principles for developing energy policy and translating that into infrastructure plans. These principles have to a large degree been echoed by the National Planning Commission's Energy update published in January 2018. Some of the key issues addressed in the White Paper were:

Regarding energy supply:

- The South African government will encourage competition within energy markets.
- Eskom will be restructured into separate generation and transmission companies.
- The entry of multiple players into the generation market will be encouraged.

Current status:

While competition has been introduced in most supply technologies, Eskom continues to dominate coal generation (+80% of capacity).

Regarding the distribution market:

- Government will consolidate the electricity distribution industry into the maximum number of financially viable independent regional electricity distributors (REDs).
- The distribution industry will accordingly be restructured into regional electricity distributors.
- Government will establish a transitional process that will lead up to the establishment of independent regional electricity distributors.

Current status:

The REDs failed, and municipalities struggle to maintain the distribution infrastructure for several reasons, including the lack of skilled personnel to maintain and service these facilities. Further, municipalities do not have economies of scale to drive down the cost of maintaining distribution networks. Outstanding municipal debt is one of the important reasons for Eskom's precarious financial situation.

Regarding the Transitional Structure:

- In the long-term Eskom will have to be restructured into separate generation and transmission companies.

Current status:

20 years after the 1998 Energy White Paper, no progress has been made.


Glencore – Tweefontein Colliery

Independent Power Producers (IPPs)

The single-buyer model prevails in the South African electricity sector.

IPPs are contracted by a vertically integrated, state-owned utility, which is supported by municipal distributors. No wholesale or retail competition exists in the supply of electricity. Competition would have a major impact on competitive pricing and improving efficiencies.

The draft IRP 2018 proposes a model of least-cost, which supports the use of IPPs and which would ultimately diminish Eskom's share of electricity production. The NDP is clear that the system operations, planning, power procurement, purchasing and contracting functions within Eskom should be separated into a separate and independent institution entirely.

The current environment in which the South African electricity sector operates provides for an increased incentive for this to be prioritised and undertaken in a phased approach in the short- to medium-term, while considering the long-term implications. An Independent Systems and Market Operator (ISMO) would be best placed to buy electricity from suppliers.

Least cost methodology vs levelised cost of electricity

The least cost methodology – which takes overnight capital costs into account – used in determining the three 'cheapest' technologies outlined in the IRP is commendable. However, making use of the levelised cost of electricity (LCEO) metric would be more comprehensive given that it not only includes overnight capital costs, but operating and maintenance costs as well.

IMPACT OF SUBSTITUTION OF COAL BY ALTERNATIVE ENERGY

Coal Mining Matters

South Africa has 30.8 billion tonnes of recoverable coal reserves and, in 2017, the South African coal mining industry:

- produced around 260 million tonnes of coal
- generated revenue of R130.3 billion (R69 billion from the local market and around R61 billion from exports)
- employed more than 82,000 people
- paid around R22 billion in wages

The weighted average growth rate of production over 10 years was 0.23%. The current level of production is 0.83% lower than it was 10 years ago.

The South African coal market is roughly split as follows:

Around 120 million tonnes of coal is allocated to Eskom

Around 45 million tonnes of coal is allocated to Sasol

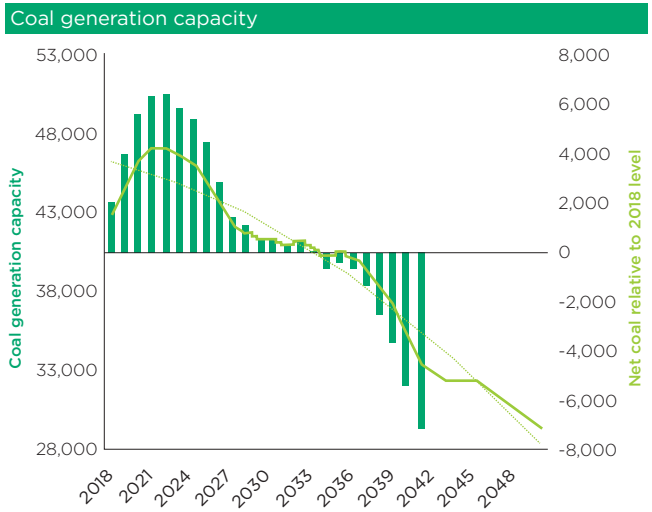
Around 70 million tonnes of coal is exported

Resgen – Boikarabelo Mine

Employment

Out of the total workforce complement within the coal sector, 37,834 employees (46% of the total workforce) are employed to produce coal for Eskom. Eskom employs around 47,000 employees of which 42,300 employees are employed as a result of coal. Jointly, the coal mining industry and Eskom directly employ 80,134 people to generate electricity from coal.

Eskom coal plants are meant to operate for 50 years. According to the IRP Update 2018, coal power stations with the capacity to produce 12,600MW of coal power will be decommissioned by 2030. However, the commissioning of other coal units, including Medupi and Kusile, will result in a 1,350MW reduction in the installed capacity of coal power stations between 2018 and 2030.



The least cost scenario IRP 1 was used for the coal calculations.

By 2050, coal fired power stations will have reduced capacity to 11,147MW from 37,754MW in 2017. It is estimated that by 2050, joint direct employment by the mining industry and Eskom for power generation from coal would have reduced by 53,658 (67% of the total joint workforce) from 80,134 employees in 2017 to 26,476 employees.

	Coal industry employment as per IRP 1					
	Coal consumed by Eskom (Mt)	Jobs in the mining sector as a result of coal power	Direct Eskom employment in the electricity industry as a result of coal	Total jobs coal mining sector and Eskom	Eskom installed coal capacity	Electricity sent out/ generated (TWh)
2015(actual)	119	37,318	43,771	81,089	37,754	204
2017(actual)	115	37,834	42,300	80,134	37,868	202
2030	116	34,162	42,667	76,829	33,847	205
2040	61	20,067	22,436	42,503	17,847	108
2050	38	12,500	13,976	26,476	11,147	67

Source: Eskom Annual Reports and the Minerals Council

Through its multiplier effect on the economy, the coal mining industry creates around 173,093 indirect jobs which includes truckers and manufacturing. These jobs too will be affected by the downscaling of coal power stations.

Primary industries	**1,953**
Agriculture, forestry and fisheries	181
Mining and quarrying	1,772
Secondary industries	**48,779**
Manufacturing	42,701
Petroleum, chemicals, rubber, plastics	16,881
Electricity	5,073
Tertiary industries	**154,064**
Transport and storage	119,558
Other	34,506
Total	**222,892**
Less imported element	49,799
Net jobs created	**173,093**

A full study on the impact of decommissioning coal power stations, which includes the full spectrum of adjustments in the coal mining and energy environment including a social impact assessment, is required.

Environment

Rehabilitation

The closure of old power stations and coal mines, primarily in Mpumalanga, has potential positive outcomes too. A number of pilot projects aimed at treating acid mine drainage water and rehabilitating land to a state to make agriculture possible are underway.

Geographically, the expanded photovoltaic farms will be positioned in Mpumalanga and the abandoned West Rand gold fields. An integral part of the adjustment is the impact this could have on the economy and employment in particular. South Africa must develop a plan that will ensure that maximum benefit will be derived from the development of renewable energy and that some of the job opportunities lost in coal mining and at power stations will be replaced.

CO_2 emissions

The draft IRP 2018 has not considered the use of technologies such as clean coal technologies, supercritical pulverised coal, circulating fluidised bed and integrated gasification combined cycle in South Africa.

These technologies increase the efficiency of power plants from the standard efficiency rate of 33% to at least 40%. An improvement of one percentage point in the efficiency of a standard pulverised coal power plant results in a decrease of between 2-3% in CO_2 emissions. South Africa is endowed with high quality coal, the use of which could reduce the amount of CO_2 emissions without the need for other policy instruments. However, Eskom's boilers are designed to use high-ash, low-quality coal. By installing boilers that could use high-quality coal, Eskom could lower CO_2 emission, ensuring that the resource is optimally exploited and additional jobs could be created.

Glencore – Goedgevonden Colliery

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Richards Bay Coal Terminal

The full utilisation and potential expansion of the Richards Bay Coal Terminal (RBTC) can add substantially to employment in the coal sector. Even though the RBCT has the capacity to export 91Mt of coal per annum, it is currently exporting less than 70Mt of coal. Plans are currently in place to increase export capacity to 120Mt.

The additional 50Mt could increase employment in the coal mining sector by around 16,000 employees, and could create additional jobs in the rail and transport industries.

In addition, market-related prices would not only increase revenue for the mining sector, but would mean that government would receive more taxes and royalties.

However, with many coal companies being forced to position themselves for larger coal exports to survive the consequences of the draft IRP, coal would become difficult to source locally at lower prices. This would have an impact on Eskom, which currently sources coal at a price of around R740 per tonne, compared to the export price of around R1,400 per tonne.

EXISTING ESKOM PLANT PERFORMANCE

Eskom's plant performance is critical to electricity security and planning. The IRP 2010-30 assumed that Eskom's plant availability would be 86%, while the actual availability at the time was 85%.

By 2015, Eskom's plant availability had declined to 70.79%, recovering to 75.66% in 2016. The reduction in availability caused capacity constraints between 2011-2015.

The NERSA Electricity System Adequacy Outlook reports a 2.2% decline in Eskom's Electricity Availability Factor (EAF) down from 75% in 2016, and to 72.8% in November 2018. In the past five years, Eskom has not achieved an EAF of 80%.

The draft IRP 2018 makes use of the medium plant performance which plans availability of between 80%-82%. Given that Eskom has not achieved the planned 80:10:10 availability over the past five years, this seems highly optimistic.

However, accepting the lower EAF equates to accepting mediocrity from Eskom. It is NERSA's duty to ensure that Eskom raises the bar and achieves an EAF of above 80%. Aging plants experience more plant outages. The logical assumption would be that Eskom's EAF should improve as older stations are closed. That said, Eskom's maintenance and early warning systems are a cause for concern as demonstrated by the recent boiler explosion at the Lethabo Power Station.

ESKOM – A DRAIN TO THE FISCUS

Contrary to the aspirations of the 1998 energy white paper, the IRP operates in an environment where Eskom has virtual monopolistic power in electricity generation and transmission. Eskom is both a player and a referee. This situation does not foster economic growth and is worsened by the fact that the utility is a state-owned entity. Eskom continues to be a drain to the state mainly because of the way the market is structured.

The cost of Eskom's monopoly is outlined below:

By early 2018, the South African government guaranteed **R350 billion** of Eskom's debt.

Mega-projects almost always overshoot their original budget and take longer to complete.

The average pay for an Eskom employee is **R700,000** – the highest across all nine productive sectors.

The original budget for the Medupi coal power station was **R69.1 billion**, but is now running at **R208 billion**.

The original budget for the Kusile coal power station was **R82 billion**, but it is now running at **R239 billion**.

The original budget for the Ingula Pumped Storage Scheme was **R9 billion**, but cost **R36 billion** to complete.

The cost of Eskom's monopoly has inevitably filtered through to electricity tariffs.

The major advantage of liberalising the electricity generation market is that new generation technologies will not depend on Eskom, but will instead be market driven.

MC Mining – Vele

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