NATIONAL ENERGY REGULATOR OF SOUTH AFRICA

Confronting South Africa's Electricity Crisis in the context of a Balanced Just Energy Transition



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PRESENTATION OUTLINE

1. Introduction
2. The balanced Just Energy Transition (BJET)
3. South Africa's Commitments (Goals)
4. Challenges towards achieving the BJET
5. Benefits of the green economy
6. Possible solutions towards achieving BJET
7. Confronting the electricity crisis in context of the jet
8. Risk mitigation in a multi supplier model
9. Conclusion

1. INTRODUCTION

INTRODUCTION

- South Africa can take advantage of the current Electricity crisis by embarking on a **balanced** energy transition that will ensure that the goals of:

    1. ***security of supply;***
    2. ***affordable prices of electricity for consumers; and***
    3. ***sustainability***

- Are met economically and with the least disruption to the economy.

- Affordable and secure electricity supply was once considered a third world issue now a global challenge.

- In the short to medium term, the threat of energy insecurity hangs

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INTRODUCTION *(cont. 2)*

- over many nations of the world as an albatross to economic growth and social cohesion, including nations in the global North, including parts of Europe as well as in North America.

- It is important that SA pursues a balance Just Energy Transition towards a net-zero future because of its unique circumstances.

- SA is a power island and cannot rely on its neighbors to supply baseload electricity like many countries in Europe and USA, who have inter-connected power pools.

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INTRODUCTION *(cont. 3)*

- The focus should be on developing a diversified energy mix including variable renewables, storage, gas, hydrogen, nuclear and investment in clean coal through technologies such as carbon capture.

- The design of an energy mix that considers security of supply, affordable electricity as well as climate considerations could be South Africa's primary strategy towards a net-zero future.

- This approach will realize the above goals without compromising security of supply as we have seen in many parts of the world.

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2. BALANCED JUST ENERGY TRANSITION (BJET)

The Balanced Just Energy Transition (BJET)

- The BJET transition seeks to balance the social and economic issues with environmental imperatives to decarbonize the energy industry.

- The challenges associated with achieving the above, while also ensuring security of supply are many, not least of which is the need to weigh livelihoods against a rapid transition to a green economy.

- Due to SA's reliance on coal, SA is the 14th largest emitter of greenhouse gases, with the energy and transport sectors accounting for 80% of gross emissions.

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3. SOUTH AFRICA'S COMMITMENTS (GOALS)

South Africa's Commitments (Goals)

- To mitigate the above, SA has set Nationally Determined Contributions (NDC) and mitigation goals for 2025 and 2030, with special focus on energy, waste, industrial processes, agriculture and forestry.

- The country has committed to achieving a reduction of between 350 $MtCO_2$ and 420 $MtCO_2$ by 2030.

- The higher end is consistent with the IRP2019 and the lower end (350 MtCO2) is based on rapid closure of coal fired power stations and the introduction of 6GW of RE per annum.

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4. CHALLENGES TOWARDS ACHIEVING THE BJET

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Challenges towards achieving the BJET

a. **Policy and regulatory challenges:** Clear and consistent policies and regulations are crucial for a smooth transition to a low-carbon economy, enabling long-term planning and investment.

b. **Skills and workforce transition**: Retraining and upskilling workers is vital to meet the demands of a just socio-economic transition.

c. **Social and equity considerations**: Protecting workers, supporting impacted communities, and promoting inclusive growth are crucial.

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4. Challenges towards achieving the BJET *(cont. 2)*

d. **Maintaining a Reliable & Resilient Grid**: Slowing down the shutting down of coal plants over the medium term is crucial to ensure security of supply. Post the transition, clean coal and nuclear will still be needed to ensure that the grid remains reliable and resilient.

e. **Financial barriers**: Limited access to affordable capital and high upfront costs hinder the adoption of just socio-economic transition energy projects.

- These challenges and possible solutions are discussed in the following slides:

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5. POSIBLE SOLUTIONS TOWARDS ACHIEVING THE BJET

a. Policy and regulatory challenges *(cont.3)*

- **Government** needs to provide clear policies and a stable framework that encourages long-term planning and investment, thereby enabling businesses and investors to actively participate in the just transition.

- **Regulation** must provide clear and consistent Rules for the industry to follow based on Government policy and regulations to facilitate a smooth transition to a low-carbon economy.

- Despite the steps taken by government towards energy planning, there remains fragmentation and inconsistency in integration.

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a. Policy and regulatory challenges *(cont.4)*

- This is partly because energy policy straddles over several different sections of government which are responsible for various aspects of energy policy and planning.

- This includes the National Planning Commission (overarching socio-economic planning), the DMRE (energy policy and regulation), Public Enterprises (managing Eskom), Office of the Minister of Electricity and Environmental Affairs (climate change and pollution).

- The solution could be the formation of a centralized forum dedicated to advising Government on policy towards meeting climate change goals such as NECOM or NATJOINTS.

b. Skills & Workforce challenges *(cont.5)*

- Educational institutions, industry, and government bodies need to bridge the skills gap and ensure a smooth workforce transition, thereby maximizing the potential for inclusive growth.

- According to a study done by Trialogue knowledge (2023), jobs in the coal mining industry may diminish by about 28,000 by 2050.

- These jobs could be saved by reskilling the staff in the coal sector to prepare them to work in new local Renewable Energy based industries.

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c. Social & Equity Considerations *(cont.6)*

- The transition to Renewable energy provides South Africa with the opportunity to develop new industries in the energy sector and associated economies, including multi-market opportunities.

- The manufacturing of components which go into wind and solar projects destined for both local and international markets.

- South Africa is also well positioned to be a global player in the green hydrogen economy, given our endowment with platinum group metals and increasing renewable energy capacity.

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c. Social & Equity Considerations*(cont.7)*

- Addressing social ownership impacts is essential to tackle inequality in South Africa. Access to capital and ownership of capital play a vital role in driving inequality.

- Wealth transfer to the poor is a necessary step in solving this problem.

- The just transition provides an opportunity to not only address climate change but also reduce inequality by ensuring that the private sector stimulates various sectors of the economy.

- If the transition is not implemented, the global shift in demand and changing trade dynamics in response to climate change could have a substantial impact on the country's economy, including trade balance, debt management and the cost of capital.

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c. Social & Equity Considerations*(cont.8)*

- South Africa's economy relies on industries such as gold, iron, steel, aluminum and platinum group metals which require supplies with high capacity Factor (up to 80%) to sustain.

- The shift to Renewables threatens the jobs in the above sectors since renewables provide low capacity factors (as low as 30%) due to their intermittency and variability, requiring flexible generation such as Gas and large expensive batteries to back them up.

- This situation highlights the opportunities as well as threats in transitioning to a climate-neutral economy.

- However with improvements in battery technology, the discovery of local gas in large quantities and other Hybrid Renewable solutions, the above problem can be surmounted.

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d. Maintaining a Reliable & Resilient Grid *(cont.9)*

- Slowing down the shutting down coal plants over the medium term is necessary until new capacity from other cleaner technologies is brought online to ensure that the grid remains reliable and resilient.

- The Energy White Paper of 1998 quotes that government will require the use of integrated resource planning methodologies in evaluating further electricity supply investments and the decommissioning of older power stations.

- This decision was reiterated in the NDP of 2012.

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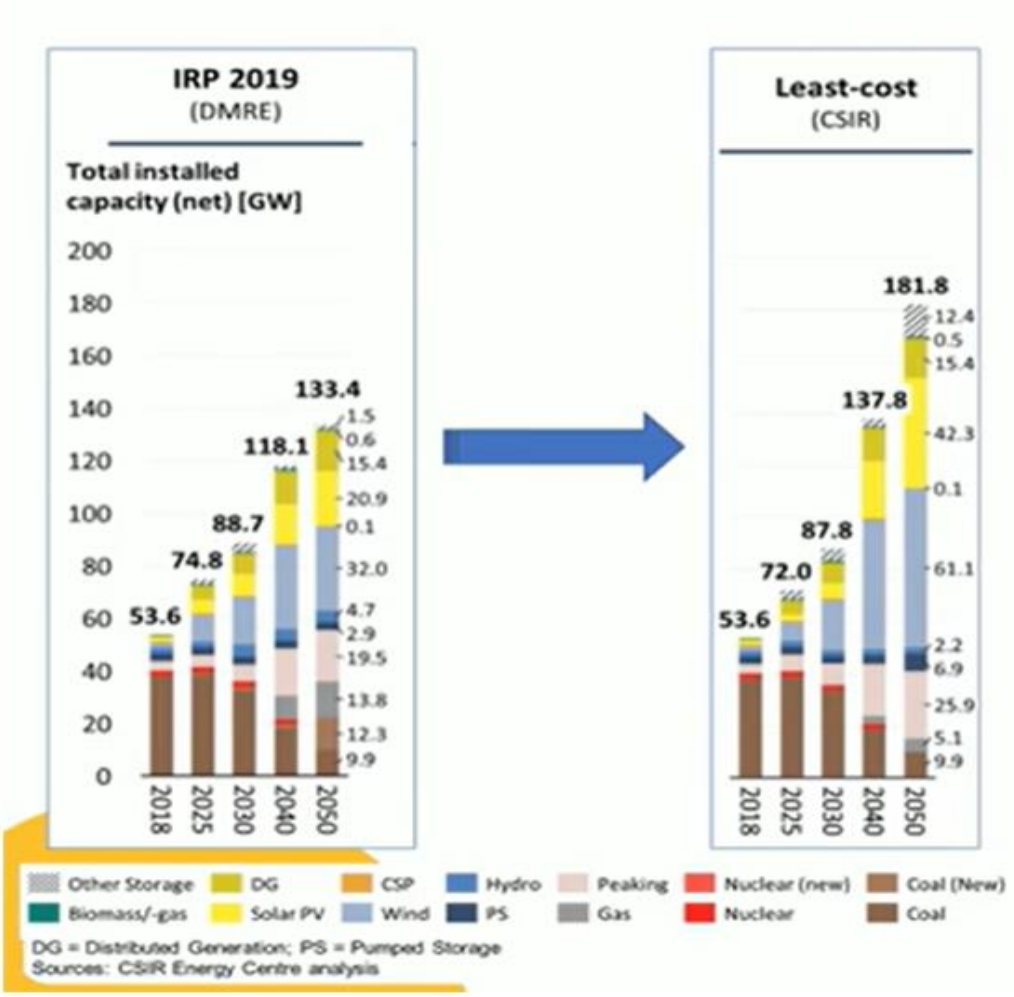
d. Maintaining a Reliable & Resilient Grid*(cont.10)*



- The Figure shows the IRP2019 in graphical form as well as the CSIR least cost benchmark for 2020.
- Coal currently accounts for about ¾ of the energy mix. By 2050 wind and Solar will account for about 70%.
- According to the Figure, the scale of coal diminishes notably after 2030. By 2040 coal fired power is about half of today and by 2050 it is about ¼ to 1/5th of what it is today.

d. Maintaining a Reliable & Resilient Grid *(cont.11)*

- The determination of the Energy mix in the IRP as shown above considers the following factors;

  - Energy Security and a reliable and resilient grid;
  - the evaluation of all candidate energy supply and demand in an unbiased manner;
  - the systematic consideration of a full range of economic, environmental, social, and technological factors;

d. Maintaining a Reliable & Resilient Grid *(cont.12)*

- the consideration of risks and uncertainties posed by different resource portfolios;
- external factors, such as fluctuations in fuel prices and economic conditions; and
- the facilitation of public consultation in the planning process.

- If the IRP is composed based on the above principles, with limited Policy Adjustments, then the mix will follow the least cost path with no concerns of a balanced and resilient grid.

d. Maintaining a Reliable & Resilient Grid *(cont.13)*

- It is also important to ensure that clean coal and nuclear is part of the energy mix post the transition to ensure that the grid is resilient as well as to ensure security of supply that supports a growing industrial sector.

- It is also important to include Gas in the future mix of technologies to assist the SO to balance the grid with a flexible technology to support Variable Renewable Energy.

- This will ensure continued growth and prosperity. Renewables alone cannot ensure continued growth of the economy.

e. Financial Barriers *(cont.14)*

- Considering the fact that the transition will involve a level of investment unprecedented in SA, an in-depth investigation into the financial viability of the JET is vital.

- South Africa needs a thorough investigation on the implications of transitioning from coal to renewable energy, including:

1. cost of the transition;
2. The opportunity cost of transitioning
3. financing options;
4. institutional arrangements;
5. costs and benefits;
6. cost of upgrading the grid; and
7. cost of backing up variable renewable energy.

e. Financial Barriers *(cont.15)*

- Innovative financing mechanisms, like public-private partnerships and risk-sharing initiatives, are needed to mobilize investments.

- Limited access to affordable capital and high upfront costs currently hinder the adoption of just socio-economic transition energy projects.

- SA needs to increase electricity supply to eliminate load shedding, which costs the country around R436 Billion in 2022, Morisset & Salto (2022).

- To connect renewables, the transmission system needs to be upgraded at a cost of about R250 Billion.

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e. Financial Barriers *(cont.16)*

- By simple extrapolation, the country could save about R3,5 Trillion by 2030 (R436 billion per year for eight years) by eliminating load shedding.

- At COP27, His Excellency President Cyril Matamela Ramaphosa presented an ambitious investment plan for a Just Energy Transition estimated at about $97 billion (R1.5 trillion) over the next five years.

- The World Bank estimates gains at least double that of the projected costs, as shown in the diagram below:

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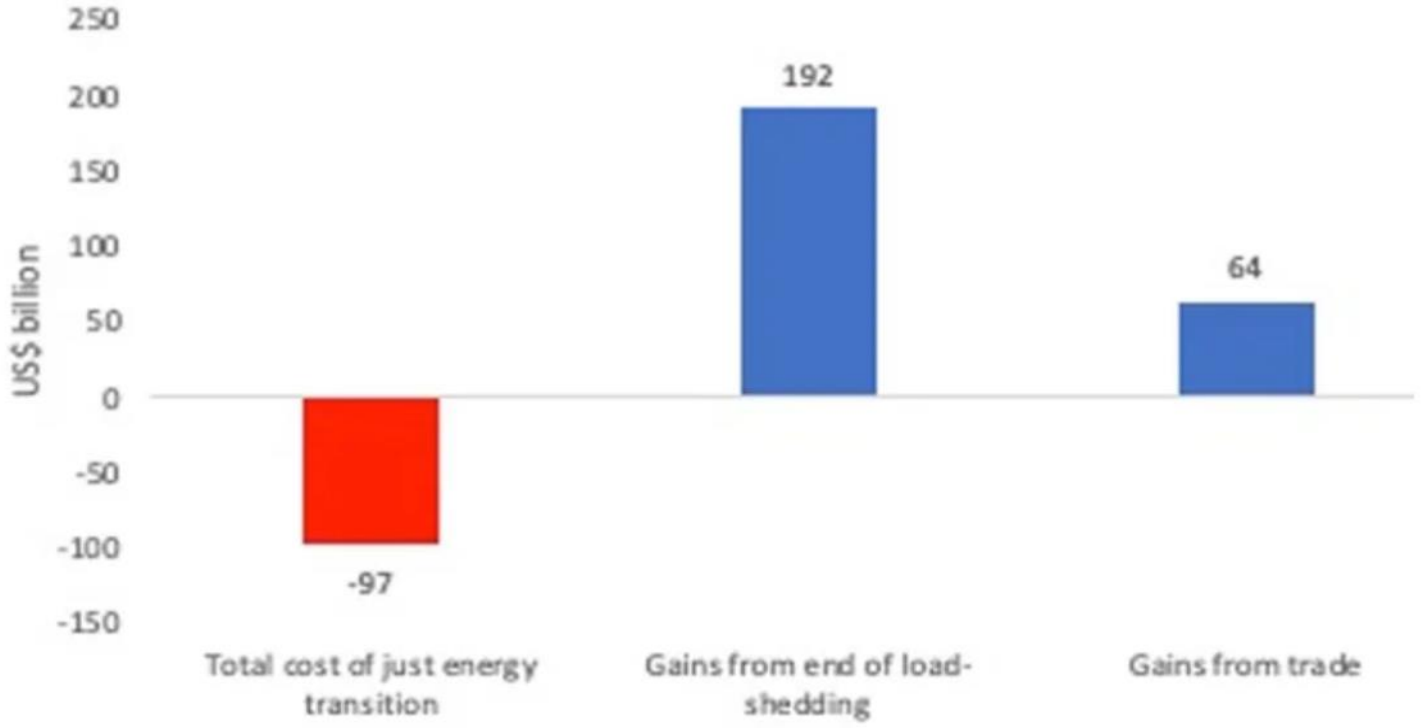
6. BENEFITS OF THE GREEN ECONOMY

Benefits of the green economy

- The world bank estimates gains at least double that of the projected costs, as shown below (R4,6 Trillion or $256 Billion)



Source: World Bank's calculations.

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Benefits of the green economy *(cont.2)*

- In addition, the just energy transition would improve the country's competitiveness on global markets by reducing the carbon intensity of its exports, Morisset & Salto (2022).

- Should the European Union introduce a carbon tax at the border, about one-third of South Africa's exports would be at risk—a potential loss of $8 billion per year, or $64 billion by 2030, Morisset & Salto (2022).

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5. Benefits of the green economy *(cont.3)*

- The third benefit would be lower air and water pollution, which would reduce the risk of early deaths and improve workers' health and productivity.

- The combination of these benefits could accelerate South Africa's economic growth and help create new jobs in several green and low-carbon sectors (such as renewables and batteries).

Benefits of the green economy *(cont.3)*

- According to the World Bank, *"although this cost (R1.5 Trillion Rand) is substantial, we argue that the JET should be implemented urgently, for two reasons: it would bring* ***considerable benefits to the country's economy*** *and its people, and the* ***required financing would become available with the right set of domestic policies*** *and external assistance."*

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7. CONFRONTING THE ELECTRICITY CRISIS IN CONTEXT OF THE JET

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Confronting the electricity crisis in context of the JET

- SA can dig itself out of the malaise of the electricity crises, while ensuring environmental sustainability through the following interventions (largely taken from the NECOM Plan):
  - I. Fix Eskom and improve the availability (EAF) of existing supply.
  - II. Enable and accelerated private investment in new generation capacity (in line with government policy)
  - III. Accelerate procurement of new capacity from renewables, gas and battery storage (enable BJET)
  - IV. Unleash businesses and households to invest in rooftop solar (Net-billing & feed-in tariffs)
  - V. Fundamentally transform the electricity sector to achieve long-term energy security (new Electricity market)
- These will be discussed in further sections.

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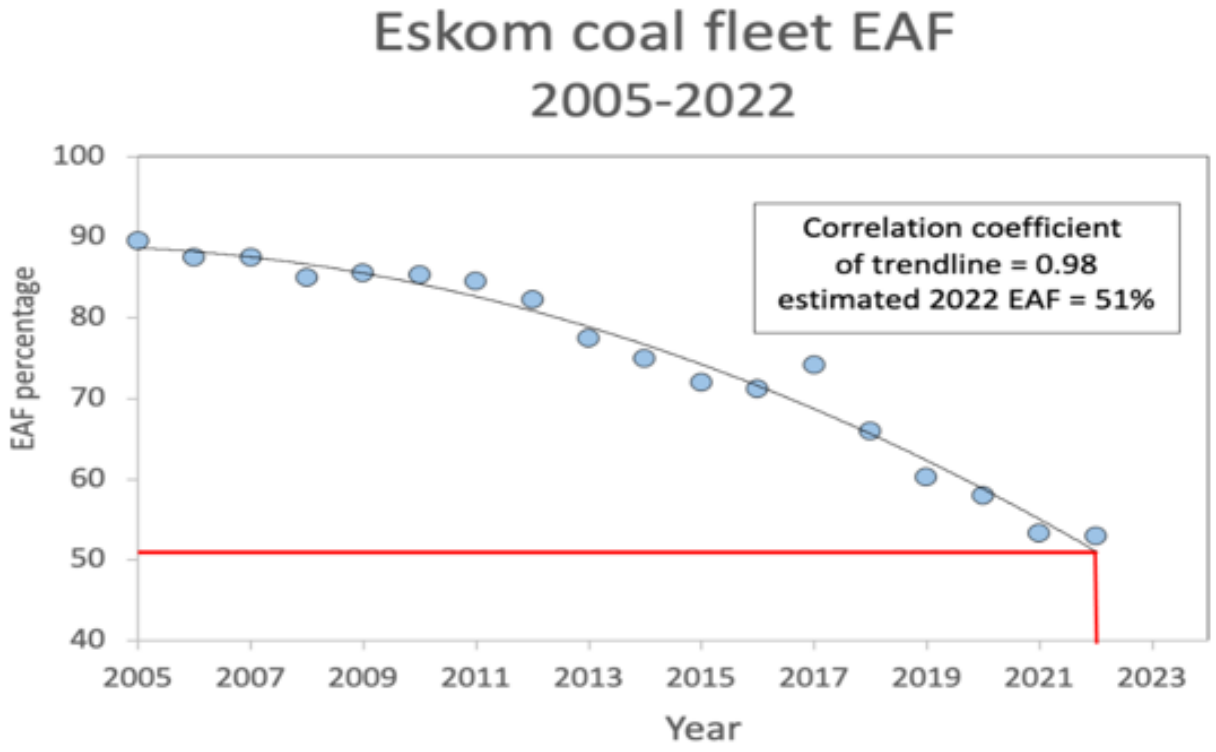
i. FIX ESKOM AND IMPROVING THE AVAILABILITY (EAF) OF EXISTING SUPPLY.

i. Fix Eskom and improve the availability (EAF) of existing supply.

- Eskom coal plant EAF has been declining steadily from nearly 90% in 2005 to just above 50% in 2022 as shown below:



i. Fix Eskom and improve the availability (EAF) of existing supply (*cont.2)*

- In the Budget speech of February 2023, Minister Godongwana announced an Eskom debt relief arrangement of R254 Billion.

- The conditions for the debt relief arrangement included that Eskom should prioritize capital expenditure in transmission and distribution during the debt-relief period.

- As far as Eskom coal power stations are concerned, the directive was to fix what can be fixed, sell what can be sold and close what needs to be closed.

- Judging by the above conditions, the policy position seems to hint that the future of Eskom is not in generation but transmission and distribution – hence the priority to set up the NTCSA

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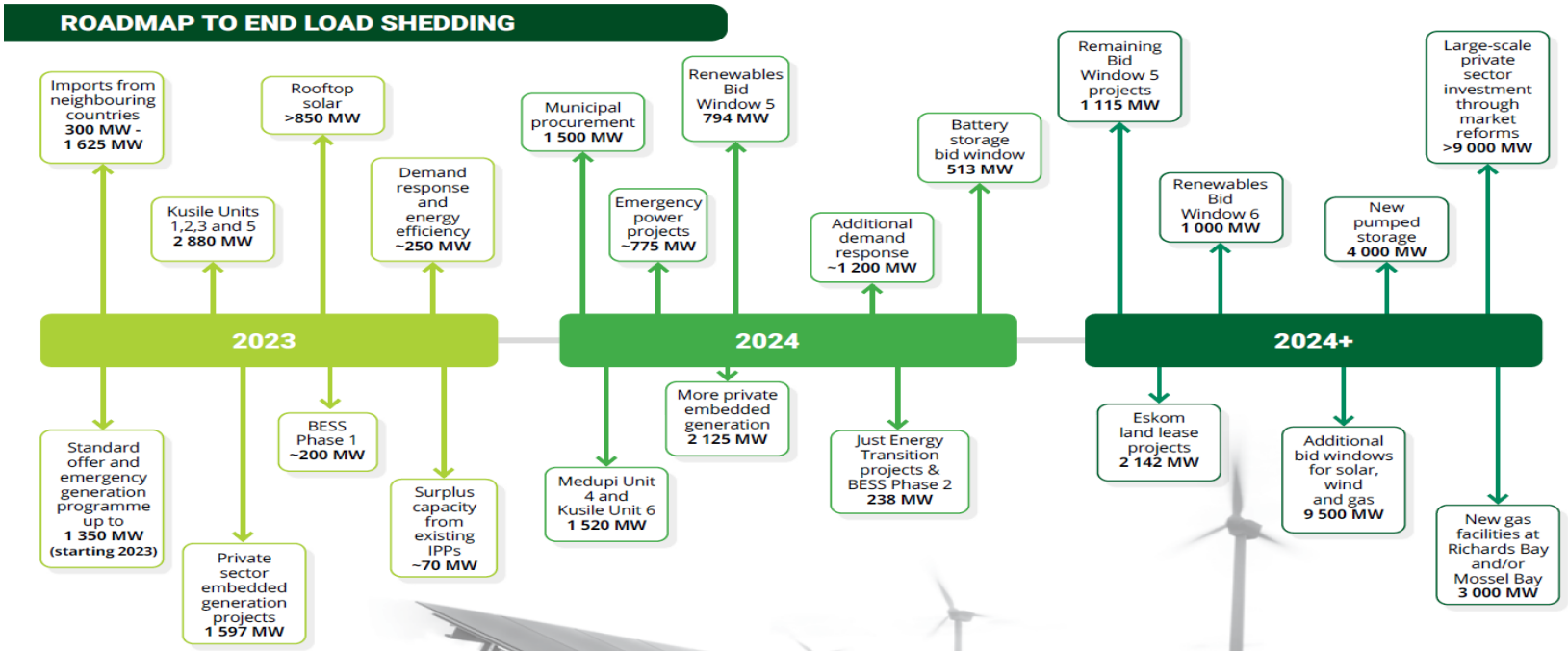
ii. ENABLE AND ACCELERATING PRIVATE INVESTMENT IN NEW GENERATION CAPACITY (IN LINE WITH GOVERNMENT POLICY) AND ACCELERATE PROCUREMENT OF NEW CAPACITY FROM RENEWABLES, GAS AND BATTERY STORAGE (ENABLE BJET)

ii & iii. Enable and accelerated private investment in new generation capacity (in line with government policy)

- Bid Windows 7 and 8 will each procure 5GW amounting to 10GW of private investment in the next 3 years as shown in NECOM plan



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iv. BUSINESSES AND HOUSEHOLDS TO INVEST IN ROOF-TOP SOLAR (NET-BILLING & FEED-IN TARIFFS)

IV. Businesses and households to invest in rooftop solar (Net-billing & feed-in tariffs)

- Wheeling and Net Billing requires unbundled tariffs.
- The methodology for a standardised approach for a countrywide wheeling and net billing is being developed.
- Eskom currently won't allow wheeling with municipalities that are indebted to Eskom. We need to find a way around this.
- The above intervention will reduce total demand, thus improve load shedding.

IV. Businesses and households to invest in rooftop solar (Net-billing & feed-in tariffs*(cont.2)*)

- How do we deal with issue of limited capacity of networks (distribution & transmission)?

- The wheeling methodology should address the issue of the presence of constraints in the network .

- Eskom is currently developing a proof of concept for virtual wheeling for South Africa.

IV. Businesses and households to invest in rooftop solar (Net-billing & feed-in tariffs) *(cont.3)*

- Net-billing and wheeling are crucial schemes to promote private energy trading as well as promoting roof-top solar uptake which will reduce demand in the short term thus reducing the risk of load shedding

v. FUNDAMENTAL TRANSFORMATION OF THE ELECTRICITY SECTOR TO ACHIEVE LONG-TERM ENERGY SECURITY (NEW ELECTRICITY MARKET)

V. Fundamentally transform the electricity sector to achieve long-term energy security (new Electricity market)

- NERSA is licensing the National Transmission company of SA (NTCSA), which is the first step towards unbundling Eskom, as well as the creation of the electricity market in South Africa.

- The pricing division is currently developing the new pricing methodology to cater for an unbundled electricity industry.

- In the court Judgement regarding the Municipal Tariff Guideline Increase,

V. Fundamentally transform the electricity sector to achieve long-term energy security (new Electricity market) (*cont.2)*

- The Court held that the Guideline and Benchmarking Method used by NERSA when approving Municipal electricity tariffs is unlawful and invalid.

- NERSA is developing new Cost of Supply Framework to be used by municipalities from FY2024.

- NERSA is also reviewing the grid codes to cater for registrants (new market entrants), net-billing rules as well as the development of wheeling rules.

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8. RISK MITIGATION IN A MULTI SUPPLIER MODEL

7. Risk mitigation in a multiple supplier model

- With the unbundling of Eskom, multiple suppliers will sell their energy and capacity to the NTCSA.

- The Risk associated with this is that Eskom will not be able to raise the same amount of revenues as when it was a monopoly.

- Eskom will need to become leaner and meaner to compete when the ESI is transformed to a fully-fledged market.

- This would put some jobs at risks which could be absorbed by IPPs that will emerge, noting that IPPs do not hire as many people as coal power stations.

7. Risk mitigation in a multiple supplier model (*cont.2)*

- Municipalities will however benefit from the market system in the future as they will have a choice to purchase from the cheapest supplier.

- This will lead to more sustainable and profitable municipalities which will enable better service delivery and financial sustainability.

- The multi-supplier model risks will also be mitigated by the Energy Regulator which will continue to ensure that all the industry participants are playing by the same rules and penalize those that break the rules.

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9. CONCLUSION

CONCLUSION

- **Based on the above, the following can be concluded:**
- The BJET programme is a promising initiative as it has potential to provide many benefits for the country and the economy.
- Implementing the BJET must not leave any stakeholder behind, especially workers and communities in the coal belt of the country in Mpumalanga.
- In the process of transitioning from a coal-dominated electricity industry to an energy mix that is dominated by renewable sources, energy security must be ensured by maintaining the coal fleet until the new market is mature.
- A proper mix of technologies including clean coal and nuclear should be considered to ensure that the grid is able to meet industrial growth in SA, while ensuring sustainability of the environment.

CONCLUSION (*cont.2)*

- An energy transition that will ensure that the goals of security of supply, affordable prices of electricity for consumers and ensure that the industry is sustainable is one that will:

✓ balance the urgent need for the country's security of supply and reduction of energy poverty, while also ensuring environmental sustainability and meeting NDC commitments.

✓ Ensure affordable prices for consumers through healthy competition in the generation and retail spaces.

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Thank you

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