Analysing South Africa's energy policy and regulatory reform: the case for promoting climate and competition considerations in policy formulation

7TH ANNUAL COMPETITION AND ECONOMIC REGULATION (ACER) WEEK

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OBJECTIVE OF THE STUDY

1. Reviews the historical context of South Africa's energy sector policy reform and the drivers.
2. Highlight the costs of neglecting climate and competition objectives in energy policy reform. These include:
    - Financial costs
    - Environmental failure
    - Energy system failure
3. Quantify the benefits of prioritising competition and climate considerations through increased renewable energy.

GLOBAL CONTEXT OF ENERGY POLICY REFORM

- The global consensus on the rationale for vertically integrated, state-owned monopolies was that these entities could efficiently supply markets.
    - This market structure can address three market failures: high capital costs; driving public service and social objectives; and coordination between generation and transmission.
- However, the 1980s and 1990s was characterised by the liberalisation of electricity markets worldwide.
    - Challenges: inadequate performance of state-owned utilities (both operational and financial); the need to expand investments and capacity; and the restructuring of utilities to ensure efficient operation and reduction of fiscal impact.
- Liberalisation and market reform can be categorised into: (i) system of independent regulation; (ii) promoting competition across the sector; (iii) vertically and/or horizontally unbundling into independent corporatised entities; and (iv) encouraging private sector investment in new infrastructure and privatisation of existing assets.

HISTORICAL CONTEXT OF SOUTH AFRICAN ENERGY POLICY

Drivers:

- Pre-1994, South Africa's public energy policy was largely aimed at achieving adequate supply of cheap electricity for industry and mid to high-income households.
- In the early 1990s was an increased focus on the electrification of previously excluded households
- In 1995, the National Energy Regulator was established.
- The need for reform of the South African electricity sector was (formally) recognised in the 1998 White Paper on Energy Policy.

Challenges:

- Despite previous interventions, the more radical market reforms outlined in the White Paper had not been implemented.
- Instead, several other White Paper-aligned reforms went through phases of proposal and resistance – in some cases going as far as the development of required legislation, ultimately failing to be adopted.
- Implementation of climate policies has been phased therefore minimising the policy impacts, e.g. flagship Renewable Energy Independent Power Producer Procurement (REIPPP) programme; Minimum Emissions Standards; and the Carbon Tax.

UPDATE ON RECENT POLICY DEVELOPMENTS

While recent developments are aligned to the White Paper proposals, the primary driver for policy reform was the electricity crisis with DPE noting: *Eskom's business model is outdated and Eskom's monopoly has prevented innovation and the ability of Eskom to embrace technology disruptions*.

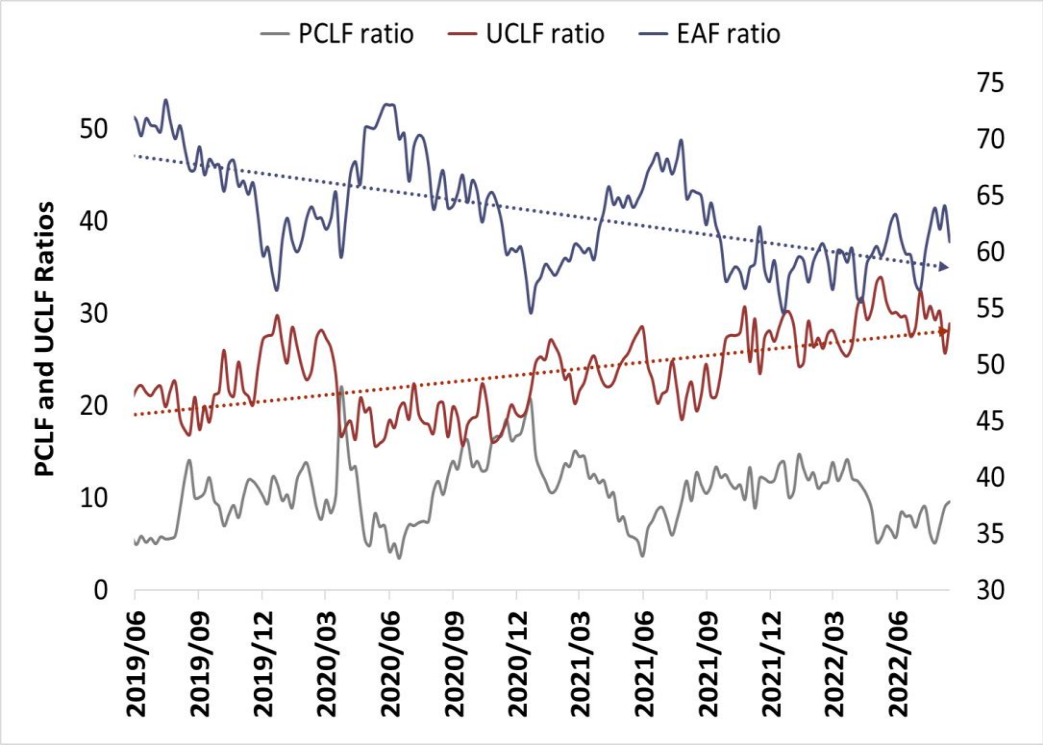
- 2019: Re-introduction of the policy of unbundling Eskom through the DPE roadmap.
  - Eskom has completed the divisionalisation and functional separation of the and opethe National Transmission.
- 2021: Revised the country's Nationally Determined Contribution (NDC).
  - Has implications for the update of the Integrated Resource Plan.
- 2022: Policy alignment: amendments to the Electricity Regulation Act (incl. Schedule 2) and Electricity Pricing Policy.
  - Transformation of the sector to facilitate competition and achieve long-term sustainability and energy security.

COSTS OF NEGLECTING CLIMATE AND COMPETITION OBJECTIVES IN ENERGY POLICY I

- Entities under the strucutre of a vertically integrated, state-owned monopoly are often prone to failure and South Africa is not an exception.
- Financial implications (Eskom)
  - Declining profitability since 2007/08 – with profit margins averaging 4% relative to highs of 15% in 1994/95.
  - Debt of ~R390 billion unsustainable and has necessitated fiscal support.
  - NB: Eskom's financial constraints interfere with Eskom's ability to meet other obligations such as MES compliance and undertaking of plant maintenance.
- Environmental implications
  - Coal generation remains a dominant source of electricity generation.
  - Eskom continues to be non-compliant with MES – full compliance will threaten energy security.

COSTS OF NEGLECTING CLIMATE AND COMPETITION OBJECTIVES IN ENERGY POLICY II

Planned and unplanned outages and energy availability factor

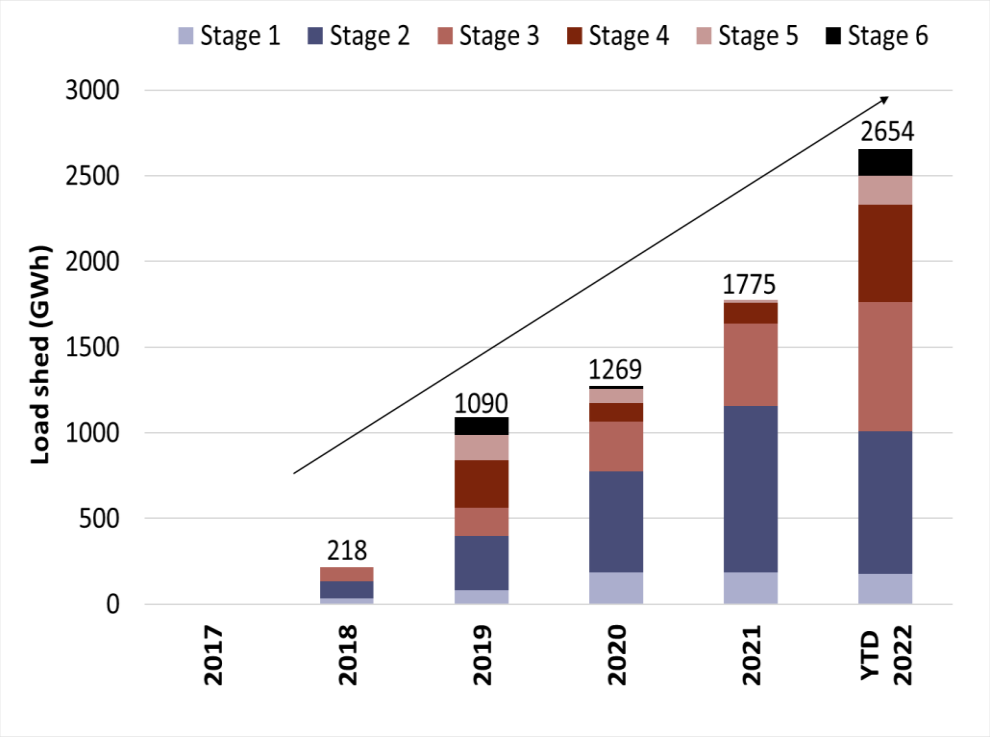


Source: Eskom data

- The market structure of a coal-dominated energy-mix, with a vertically integrated, state-owned monopoly has resulted not only in unsustainable energy but also inadequate and unreliable electricity supply.
- The average age of the coal fleet, excluding Medupi and Kusile, is 42 years across Eskom's 15 power stations of which many have become unreliable due to age and lack of maintenance.
- The electricity supply shortfall is at approximately 6 GW and is likely to persist over the next five years if action is not taken to add new capacity onto the grid.

COSTS OF NEGLECTING CLIMATE AND COMPETITION OBJECTIVES IN ENERGY POLICY II

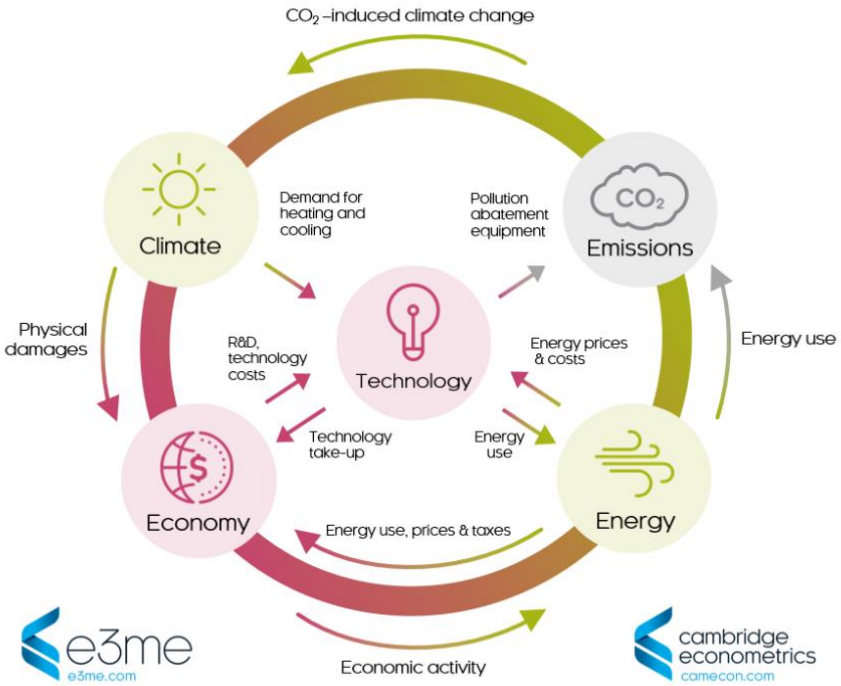
Loadshedding (blackouts) in GWh by stages



Source: Eskom data

- Failing to ramp up renewables in the energy mix and introducing competition in the market has led to an over reliance on ageing large-scale coal-fired power plants and ultimately reducing the energy security of South Africa at a significant cost.
- By August 2022, load shedding in 2022 was already 50% above 2021 level at 2654 GWh and will be the worst year on record.
- This translates into 1350 hours of load shedding in 2022 YTD ending August.
- Nova Economics (2020): cost of load shedding between 2007 and 2019 nearly R35 billion. The cost of load shedding for 2020 and 2021 estimated at R12 billion and R18 billion, respectively.

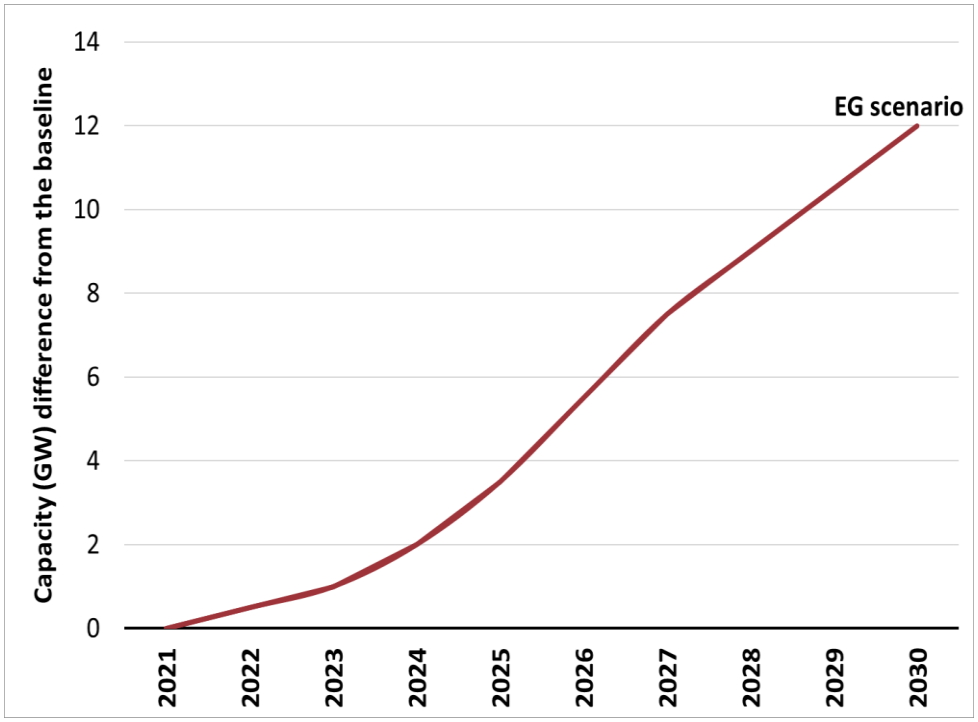
BENEFITS OF PRIORITISING COMPETITION AND CLIMATE CONSIDERATIONS: E3ME MODEL



- Rapid reform in the energy sector in the past 3 years- a response to the energy crisis. Although ex-ante climate and competition considerations are not the drivers of the reform, ex-post competition and climate benefits are expected.
- The embedded generation policy reform that supports climate and competition objectives, albeit after the fact, is expected to yield economic, social and environmental benefits.
- E3ME: Structural macroeconomic model suited for analysing impacts of Energy-Environment-Economy (E3) policies; allowing two-way linkages between the energy system, environment, and economy.
- The modelling approach based on the national accounting framework disaggregated to 43 industries and 29 stochastic equation sets by employing cointegration and error-correction methodology.

BENEFITS OF PRIORITISING COMPETITION AND CLIMATE CONSIDERATIONS: THE SCENARIO

Electricity capacity (Solar and Wind) GW

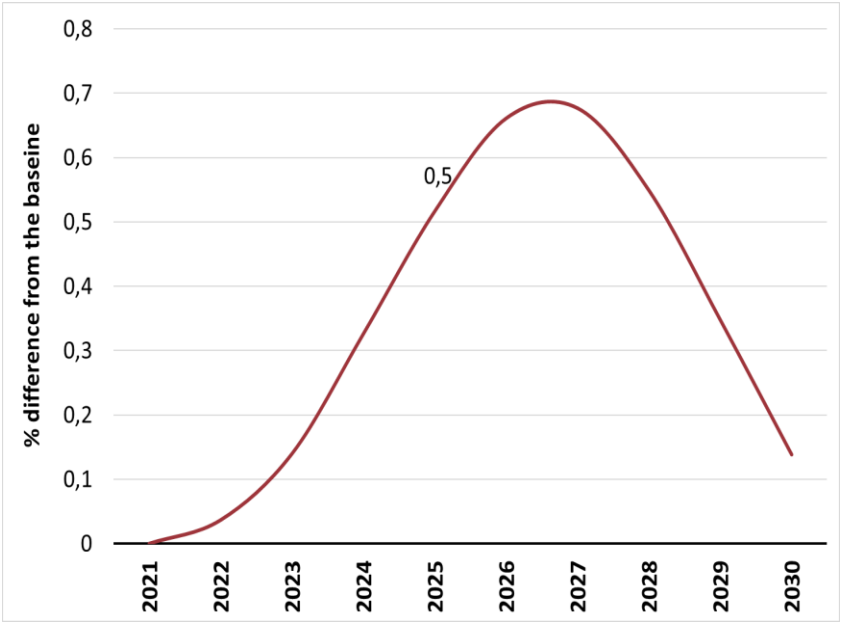


Source: E3ME modelling

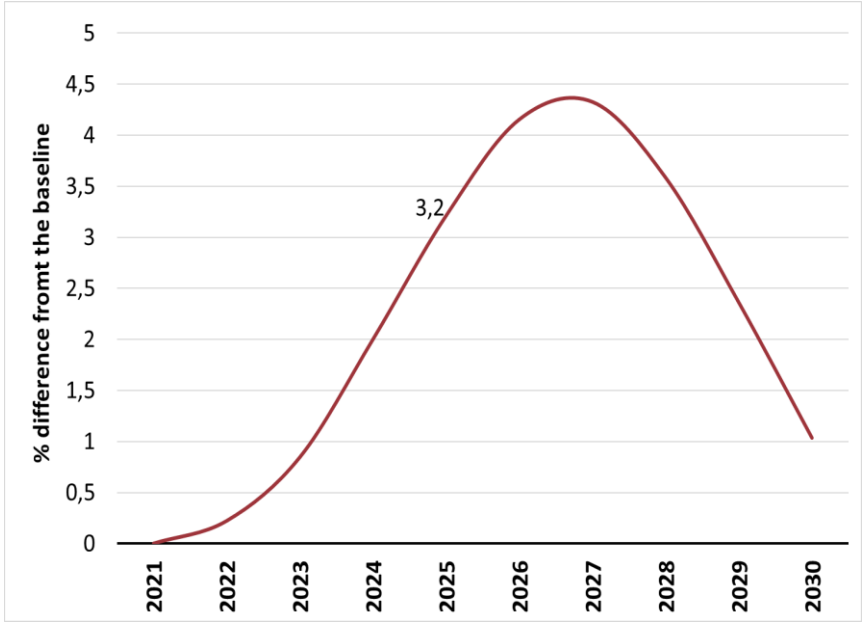
- To determine the impact of the energy policy change, a scenario was constructed that adds embedded generation renewable energy capacity to the baseline.
- The scenario assumes that embedded generation capacity is added incrementally over time reaching around 6 GW over the medium term in line with projections.
- In total, the scenario assumes 12 GW of renewable capacity over and above the level outlined in the IRP 2019 is added by 2030.
- Figure shows expected additional renewable- solar and wind- embedded generation capacity to the baseline as a result of the energy policy reform.

BENEFITS OF PRIORITISING COMPETITION AND CLIMATE CONSIDERATIONS: ECONOMIC ACTIVITY AND INVESTMENT

Economic Activity (GDP)



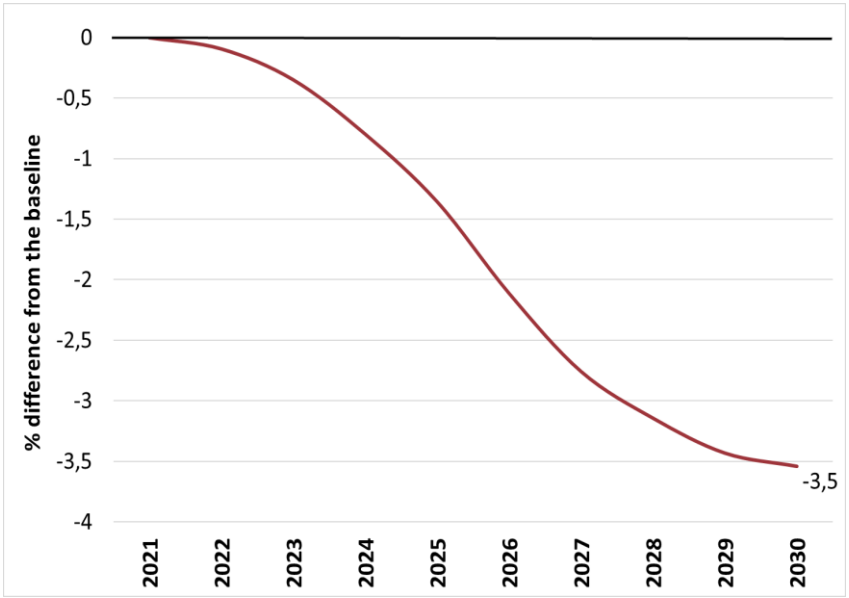
Investment (GFCF)



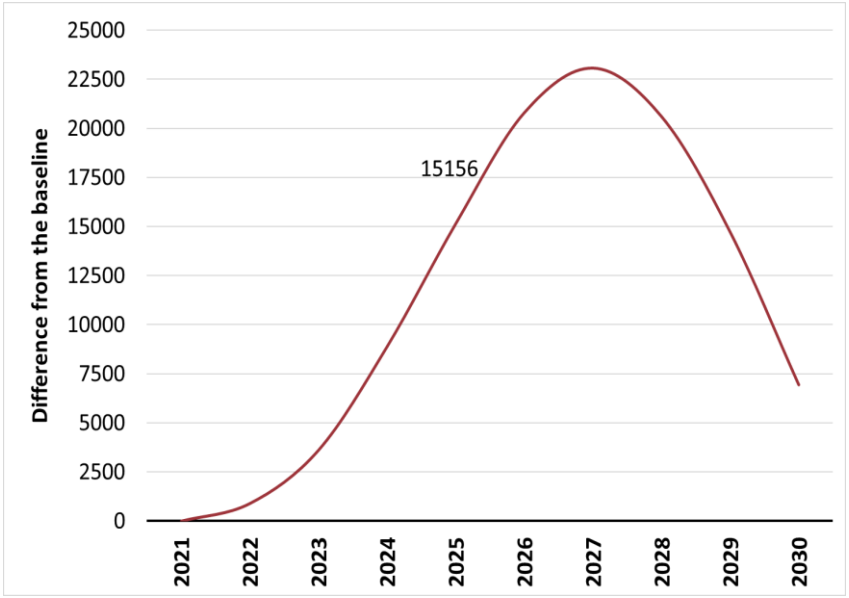
Source: E3ME modelling

BENEFITS OF PRIORITISING COMPETITION AND CLIMATE CONSIDERATIONS: EMISSIONS AND EMPLOYMENT

CO2 Emissions



Employment



Source: E3ME modelling

CONCLUSION

- Policy framework has lagged market's need for:
  i. competition to address increasing tariffs and the widening capacity shortfall and
  ii. the increased role of renewable energy to facilitate country's energy transition and climate objectives.
- Failing to ramp up renewables in the energy mix and introducing competition in the market has led to an over reliance on ageing large-scale coal-fired power plants; reducing the energy security of South Africa at a significant cost
- The energy sector has undergone rapid reform in the past couple of years, and although ex-ante climate and competition considerations do not seem to have been key drivers of energy policy reform, but rather a response to the energy crisis, ex-post competition and climate benefits are expected
- The empirical results demonstrate the benefits of climate and competition considerations, albeit de facto ex-post in this case, as illustrated through the lifting of the embedded generation threshold and support the case for ex-ante prioritising of climate and competition considerations in energy policy
- While energy security should remain the primary objective, considering and leveraging other government objectives, such as increased market participation and the energy transition, while formulating policy is crucial