PRESIDENTIAL CLIMATE COMMISSION
TOWARDS A JUST TRANSITION

JSE

# Report

## ROUNDTABLE DISCUSSION

# NEW BUSINESS MODELS TO ADDRESS SOUTH AFRICA'S GRID INFRASTRUCTURE REQUIREMENTS

**TUE 6 AUGUST 2024 | 09H00-13H00**

**This report is a high-level summary of the roundtable discussion on "*New business models to address South Africa's grid infrastructure requirements*". The full recording and presentations are available on the PCC website.**

# Executive Summary

On August 6, 2024, the Presidential Climate Commission (PCC) hosted a roundtable at the Johannesburg Stock Exchange (JSE) to address the pressing need for expanding and upgrading South Africa's electricity transmission infrastructure. This paper synthesizes the key conclusions from that event (noting that emergent recommendations are not recommendations of the PCC but rather outputs of a multistakeholder dialogue where agreement was extremely strong). This summary emphasizes the strategic priorities of increasing grid capacity, adopting innovative financing models, and addressing implementation challenges, all essential for securing South Africa's most desirable energy future. The paper also highlights the importance of supporting the Transmission Development Plan (TDP), the value of piloting new models, and the potential need for an Independent Power Transmission (IPT) Office. Recommendations from expert participants span two timelines. The first is actions needed immediately that strengthen the NTCSA and grid investment, using JET PMU support. The second is a medium-term (2 to 3 year) regulatory reform that allows for a more systemic increased investment in the grid.

**The main recommendations from the workshop are**:

1. Deploy a combination of state-backed and IPP-backed Independent Power Transmission models that focus the NTCSA on backbone grid operations and use the private sector to build out the collector grid.
2. Start immediately, in partnership with the JET-IP, to establish pilots of these business models as well as investigating IPP collective aggregation models.
3. Establish the financial independence of the NTCSA equipping them with a balance sheet that will enable it to make financial decisions and investments to support grid infrastructure growth and stability.
4. Redesign the tariff system (including Free Basic Electricity) to reflect the true costs of new transmission capacity, especially in regions with high renewable energy potential. Implementing unbundled cost reflective tariffs (and fiscal support) that allow efficient cost recovery for transmission and distribution, including provision of ancillary services, is essential.
5. Clarify and streamline the regulatory environment to support the deployment of the IPP-Backed IPT Model. For the State-Backed IPT Model, the requirement for a new "Electricity Regulation on New Transmission Capacity" was identified.
6. Ensuring that procurement and manufacturing capacity are in place to meet localisation goals will be essential for the successful implementation of the TDP.
7. Given the complexity and scale of the proposed infrastructure projects, establishing a dedicated IPT Office within NTCSA could be beneficial.

# Introduction

Electricity security is crucial for economic growth, productivity, and societal well-being. Alongside global efforts aimed to diversify energy sources, South Africa's push toward a low-carbon economy requires setting ambitious renewable energy targets and promoting investments in wind and solar. However, significant challenges remain in transitioning to a secure, competitive, and low-carbon electricity system. One key obstacle is the need to expand and modernize the country's transmission infrastructure. Much of the new renewable energy generation is located in the Western, Northern, and Eastern Cape regions, whereas the main demand centres are in the northeastern parts of the country.

To address this, the Transmission Development Plan (TDP) outlines the need for over 14,200 km of new high-voltage lines and 170 transformers by 2032. This infrastructure is essential for transporting power from renewable generation sites to demand centres. However, the current network, particularly the central grid backbone, is inadequate to manage the increased load, causing bottlenecks that threaten the reliability and efficiency of the national electricity system.

Substantial investment in transmission networks is critical for effectively integrating renewable energy sources into the grid. However, current build rates for transmission infrastructure lag behind the pace of new generation capacity, with long lead times further compounding the issue. To meet national targets, South Africa needs to secure funding and accelerate infrastructure roll-out by a factor of eight. The shortage of transmission capacity poses a severe risk to energy security and economic growth, making immediate action essential to prevent a future energy crisis.

In response to these challenges, the PCC/JSE roundtable was convened to explore innovative business and financing models to accelerate the development of transmission networks. Given the financial limitations of Eskom and the emerging NTCSA, the roundtable focused on identifying practical solutions to expedite network expansion at the necessary scale and speed. Additionally, the ERA amendment bill offers a clearer framework for enabling private sector participation in transmission. This paper presents actionable recommendations derived from the roundtable's findings, emphasizing the urgency of investing in transmission infrastructure to secure South Africa's energy future.

# KEY POINTS FROM THE ROUNDTABLE DISCUSSION

## Transmission and Distribution Expansion Needs

A critical issue identified in the Eskom TDP is the immediate need for significant and rapid expansion of South Africa’s transmission network and upgrading of the distribution networks (or collector networks), particularly at the 132 kV levels and below, to ensure effective evacuation of power from new renewable energy generation sites to the main grid.

Currently, IPPs bear the full cost of constructing 132 kV lines to connect their projects to substations on the 400 kV network, after which they transfer these assets to Eskom without any reimbursement. While this approach has been viable for projects participating in the REIPPP (where grid costs are included in the bid price and distributed across the entire Eskom customer base) it is not a sustainable model. As connection distances increase and costs escalate, this approach becomes increasingly unviable, and it won’t work for large private power off-taker projects where costs must be recovered

directly from private IPP customers, who cannot distribute these expenses across the national customer base.

Success has also been achieved with developers working together on the collection grid side to optimise infrastructure configuration and reduce costs. We need to stimulate collaborative design rather than individual developers trying to solve these problems on their own.

The discussion event emphasized the importance of the TDP to help with addressing these challenges, and simultaneously reduce the "hockey stick" effect, where most grid build-out is delayed until after 2030. Accelerating the TDP and increasing its ambition now, is crucial for preventing this impractical (even impossible) sudden ramping of capacity, and for sending steady market signals needed to develop capacity across all required institutions and entities.

## Financing Models Discussed

The roundtable highlighted the inadequacy of traditional financing models to meet the substantial capital requirements for transmission expansion. There is a general appreciation of the need for innovative approaches, particularly Independent Power Transmission (IPT) models that would enable private sector participation in the grid. Two complementary IPT models were proposed in the main presentation of the event, these models were based on a study conducted by Meridian and Krutham[1] to assess appropriate IPT models that suit South Africa's circumstances to be implemented in parallel with the NTCSA's grid build programme:

1. **State-Backed IPT Model:** This model is suited for large-scale backbone infrastructure projects (400kV and 765kV) where the state, through NTCSA, would facilitate the procurement and management of these projects. A Build-Own-Operate-Transfer (BOOT) approach was suggested, where private companies finance, construct, and operate the infrastructure for a set period before transferring ownership back to NTCSA. This model is ideal for projects with significant positive externalities, such as backbone expansions that benefit the entire grid.
2. **IPP-Backed IPT Model:** This model focuses on connecting new generation sites to the grid, particularly in areas where the state's capacity is limited. Private IPPs would take the lead in financing and constructing these connections, typically at the 132 kV to 220 kV levels, supported by a framework that allows them to recover costs through long-term agreements. This model is particularly effective for regions with concentrated renewable energy projects, such as the Northern and Eastern Cape, and is based on an IPT BOOT model in which the IPT counterparty is not a state entity but rather several closely located IPPs.

These models, if implemented, would mobilize significant private sector investment, reduce the burden on the state, and accelerate the expansion of critical transmission infrastructure at the pace and scale required, without compromising the ownership of the grid – a national asset.

## Implementation Challenges

Several challenges were identified that could hinder the implementation of the recommended strategies. The unbundling of vertically integrated Eskom has led to the NTCSA being founded as an independent subsidiary of Eskom Holdings; this is in line with core reforms in electricity systems

[1] Meridian, Kruthem, 2024, New Business and Funding Models to Resolve Grid Infrastructure constraints in South Africa, https://meridianeconomics.co.za/wp-content/uploads/2024/04/Meridian-Krutham-two-leg-IPT-strategy-Final.pdf

globally. However, the potential for capacity constraints within NTCSA and Eskom were noted. Concerns were raised about whether the organization possesses the capacity required for undertaking large-scale infrastructure projects at the increased pace and scale needed, especially if the 'hockey stick' effect is to be avoided. Furthermore, the independence of the transmission system operator needs to be supported by government (for example National Treasury) so that it can have financial independence and a balance sheet that will enable it to make financial decisions and investments to support grid infrastructure growth and stability.

## Regulatory and Policy Environment

Another significant challenge discussed was the existing regulatory framework, which is not fully supportive of the innovative financing models proposed. The current transmission tariff structure, for example, is not cost-reflective and disincentivizes appropriate grid investments. Participants called for a redesign of the tariff system to reflect the true costs of new transmission capacity, especially in regions with high renewable energy potential. The redesign of the tariff system will also require a review of the current Free Basic Electricity (FBE) programme to ensure that benefits are transferred to the beneficiaries.

Tariffs will need to enable project developers and state entities to earn reasonable returns on their investment capital. The Electricity Regulation Amendment (ERA) Act, signed into law by President Cyril Ramaphosa, will broadly support reforms in South Africa's electricity sector, including the establishment of a competitive electricity market. This is an important step towards ensuring that the transmission entity earns positive returns on its assets. The ERA Act also makes it clear that cost reflective tariffs are required, and that unbundled tariffs should result in efficient costs.

The regulatory environment also needs to be streamlined in some specific ways to support, for example, the deployment of the IPP-Backed IPT Model. This includes amending Eskom's self-build rules to cover 400kV infrastructure and expanding NERSA's license exemption for IPP distribution grids to all "IPP grid connector" infrastructure. For the State-Backed IPT Model, the requirement for a new "Electricity Regulation on New Transmission Capacity" was identified. Acceleration of Environmental Impact Assessments (EIAs) and licensing processes was also highlighted.

JET-IP is crucial for providing the financial means to accelerate grid expansion, particularly through the use of blended finance models that combine public and private investments, as well as concessional loans that offer favourable terms, both of which are aimed at addressing critical transmission bottlenecks and supporting the broader goals of South Africa's just energy transition, including the integration of renewable energy sources and the promotion of socio-economic equity.

Supporting the TDP will also require a thorough assessment of procurement and manufacturing capacity available. This includes evaluating Eskom's capabilities and the broader supply chain's ability to meet the demands of an accelerated infrastructure rollout. Ensuring that these capacities are in place will be essential for the successful implementation of the TDP.

# CONCLUSION

The participants from the roundtable discussion emphasized the urgency of implementing these recommendations. Any delay in expanding the network could have severe consequences for South

Africa's energy security, including the ability to access low-cost sources of energy as well as attract the associated investment, the potential to supply the economy with low-carbon emissions energy thereby also increasing international competitiveness, and the ability to meet international climate commitments. NTCSA associated government institutions (in particular, local government) should swiftly adopt the recommended financing models, engage private sector partners, and address capacity and regulatory challenges.

The PCC/JSE roundtable provided clear and actionable insights into the steps NTCSA could take to enhance South Africa's transmission infrastructure. By focusing on expanding the network, adopting innovative financing models, addressing capacity and regulatory challenges, assessing procurement and manufacturing capabilities, and considering pilot projects and the establishment of an IPT Office, NTCSA can play a pivotal role in securing the country's most desirable energy future. The NTCSA and supporting government departments were strongly encouraged to act on these recommendations with urgency, ensuring that South Africa can meet its energy and climate objectives in a timely and sustainable manner.