

**National Transmission
Company South Africa
Industrialisation Strategy
2024/25 – 2034/35**

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1 EXECUTIVE SUMMARY

Context

The National Transmission Company of South Africa SOC Ltd (NTCSA) was established in December 2021 as a state-owned company following the conclusion of the merger agreement between Eskom Holdings SOC Ltd and NTCSA. This was primarily implemented to enhance the reliability and efficiency of the country's electricity transmission network and drive economic growth. It is tasked with the pivotal role of transmitting electricity in South Africa from various energy generators (Eskom Generation and Independent Power Producers (IPPs)). It is further responsible for the sale of the electricity to distributors, and the Import and Export of electricity from and to utilities and IPPs connected to the SAPP network. The NTCSA has a great duty to contribute to the socio-economic objectives of South Africa, through the expansion of the transmission electricity network.

Rationale of the Strategy

To outline an industrialisation strategy for implementation by the NTCSA from 2025 to 2035, focusing on enhancing infrastructure, fostering innovation, and promoting sustainable practices. This strategy will guide the NTCSA to becoming a leader in sustainable energy transmission, driving economic growth and further industrialisation in South Africa through innovative technologies and strategic partnerships.

Strategic Objectives

Enhance Infrastructure: Upgrade and expand the transmission network to support increased demand and renewable energy integration.

Promote Local Manufacturing: Stimulate local industries by prioritising local procurement and manufacturing of transmission components.

Foster Innovation: Invest in research and development (R&D) for smart grid technologies and renewable energy integration.

Support Skills Development: Establish training programmes to upskill the workforce in new technologies and renewable energy.

Sustainability and Resilience: Implement strategies for climate resilience and environmental sustainability in operations.

Strategic Initiatives

Infrastructure Development

- **Network Expansion:** Identify key areas for expansion, especially in under-served regions.
- **Smart Grid Implementation:** Invest in smart grid technologies for better management of resources and real-time monitoring.
- **Renewable Integration:** Develop infrastructure that allows for seamless integration of renewable energy sources.

Local Manufacturing and Procurement

- **Supplier Development Programme:** Create a programme that encourages local businesses to manufacture transmission components.
- **Partnerships with Local Industries:** Collaborate with local manufacturers to enhance capabilities and reduce reliance on imports.
- **Incentives for Local Production:** Offer incentives for companies that invest in local manufacturing facilities.

Innovation and Technology

- **R&D Investment:** Increase investment in R&D for new technologies, such as energy storage and grid management systems.
- **Collaboration with Universities:** Partner with academic institutions for research initiatives focused on energy transmission innovations.
- **Pilot Projects:** Launch pilot projects for scalable cutting-edge technologies upon successful implementation.

Skills Development

- **Training Programmes:** Develop comprehensive training programmes for employees focused on new technologies and systems.
- **Apprenticeship Programmes:** Collaborate with technical colleges to create apprenticeship programmes in electrical engineering and renewable technologies.
- **Capacity Building:** Invest in community education initiatives to build a skilled workforce in the energy sector.

Sustainability Practices

- **Environmental Standards:** Implement and adhere to stringent environmental standards in all operations.
- **Climate Resilience Strategy:** Develop a strategy to enhance the resilience of the transmission network against climate change impacts.
- **Renewable Energy Goals:** Set ambitious targets for renewable energy usage within the transmission network.

Monitoring and Evaluation

- **Key Performance Indicators (KPIs):** Establish KPIs to measure progress in infrastructure development, local manufacturing, innovation, and skills development.
- **Annual Reviews:** Conduct annual reviews to assess the effectiveness of the strategy and make necessary adjustments.
- **Stakeholder Engagement:** Regularly engage stakeholders, including government, industry partners, and communities, to gather feedback and ensure alignment with national goals.

Conclusions and Recommendation

This industrialisation strategy for the NTCSA aims to strengthen the transmission network, support local economies, and promote sustainable energy practices. This will be achieved by focusing on innovation, local manufacturing, and workforce development. NTCSA can therefore play a pivotal role in South Africa's energy future while driving economic growth and local collaboration.

2 CONTEXT

2.1 Purpose of the Industrialisation Strategy

The purpose of NTCSA's industrialisation strategy is to drive economic growth and enhance the reliability and efficiency of the country's electricity transmission network. This is accomplished by bolstering local suppliers that operate in the sectors that have an impact on NTCSA's operations and empowering the localisation of procurement. The following are the key objectives:

Economic Growth: To promote economic growth and industrialisation in South Africa through the construction of a reliable and effective transmission network. This involves supporting regional industries and creating employment prospects.

Sustainable Energy: The strategy focuses on integrating new energy transmission capacities to ensure a sustainable and reliable electricity supply for the future.

Infrastructure Development: NTCSA is committed to building and modernising the electricity transmission infrastructure. This entails creative collaborations and project delivery strategies to expedite the Transmission Development Plan (TDP)'s implementation.

Market Efficiency: Through structural changes to the electrical industry, the strategy seeks to improve market efficiency and transparency. This includes designing a market code for a competitive power transmission industry.

Resilience and Reliability: One of the main objectives is to guarantee the transmission network's robust dependability. This comprises preserving and ensuring that infrastructure is adaptable and suited to the country's changing energy requirements.

Strategic Projects: Strategic infrastructure projects that are essential to the stability and effectiveness of the national grid are given top priority by NTCSA.

By accomplishing these goals, NTCSA aims to become the most reputable Transmission System Operator in Africa by 2035.

2.2 Industrialisation Context

NTCSA's industrialisation strategy is crafted at a time when there are many challenges in the electricity sector in South Africa. These challenges include lack of capacity by local suppliers to scale their operations to meet NTCSA's demands, and the pricing and quality of local supplies. This strategy seeks to address and align with several key frameworks and policies for industrialisation, economic empowerment and localisation in South Africa including the National Industrial Policy (NIP) and the Broad-Based Black Economic Empowerment Act (B-BBEE). Its efforts aim to enhance the local manufacturing and supply chain capabilities within the energy sector. This involves developing local industries to produce essential components like composite insulators, transformers, and steel structures, which are critical for the transmission network. Through the B-BBEE, government seeks to increase the economic participation of black South Africans. Therefore, NTCSA aligns its industrialisation efforts to these and other relevant policies. By focusing on these areas, NTCSA aims to create a sustainable and inclusive industrial base that supports South Africa's energy needs and economic growth.

3 KEY CONSIDERATIONS PERTAINING TO NTCSA'S INDUSTRIALISATION

To facilitate industrialisation, NTCSA must consider several factors which shape the industrialisation terrain, including business intelligence, internal and external analyses, and risk identification. The analysis of current and future trends in the energy sector, including demand for electricity, technological advancements, shifts towards renewable energy, and external markets which NTCSA targets is of utmost importance. This analysis covers local and international markets and customer needs. In doing so, NTCSA considers its strengths, weaknesses, opportunities, and threats for business engagement. This will inherently influence risk mapping and sustainable decision making. This requires coordination and alignment across a range of supporting policies and institutions, which are necessary for the NTCSA's industrialisation to run smoothly and for the explication of a successful industrial policy. Alongside more direct industrial strategies, four primary types of policies must be put into practice.

3.1 Environmental Shifts

To support industrialisation, a stable regulatory environment and macroeconomy is essential.

Regulatory and Legal Framework

NTCSA will ensure that it obtains the required regulatory approvals from various authorities, such as National Energy Regulator of South Africa (NERSA) for electricity licenses and other regulatory requirements. For example, the legal separation of NTCSA from Eskom into a distinct entity, as outlined in the Department of Public Enterprises' roadmap has been achieved. The company has taken some strides to confirm compliance with the Companies Act. These measures ensure the fulfilment of statutory requirements as per the Companies Act to comply with the necessary governance and operational functions. This is in line with NTCSA's intention of achieving exceptional governance and efficiency.

To ensure sustainable industrialisation, it is critical that monetary and industrial policies are closely aligned, reflecting a shared commitment across all levels of governance. In the context of improving the performance of non-traditional tradable goods and services, policies that influence currency stability and economic competitiveness must be carefully coordinated. A cohesive regulatory framework, spanning local, regional, and national authorities, plays a pivotal role in shaping investor confidence and driving economic growth.

The **District Development Model (DDM)** underscores the importance of intergovernmental cooperation by fostering integrated planning and execution at district, provincial, and national levels. This model enables collaborative efforts between government, industry, and local communities to align policies with regional development needs, ensuring that industrialisation initiatives address both local priorities and national goals.

Effective regulation across local, regional, and national governance structures is essential, particularly for small enterprises and major investments, to create an enabling environment for industrial growth. Coordination must also consider the potential unintended consequences of regulatory changes, ensuring they do not adversely impact economic activity or the competitiveness of non-traditional tradables.

Both government and industry are crucial in supporting industrialisation. Government entities provide platforms for local participation by investing in infrastructure, facilitating access to funding, and fostering opportunities for global competitiveness. Industry complements these efforts by driving innovation through intellectual property development, skills training, research, and adherence to high-quality standards.

By leveraging the DDM's integrated approach, the NTCSA can enhance the alignment of policies, streamline regulatory processes, and create synergies among stakeholders. This collaborative framework not only supports industrialisation but also ensures inclusive economic development that benefits local communities while advancing national objectives.

3.2 Critical issues and significant opportunities to leverage for industrialisation

The industrialisation of NTCSA relies on a robust skills and education framework, emphasising key technical fields like electrical engineering, IT, and project management. Specialised training is critical for maintaining and upgrading transmission infrastructure. Professional certifications, cybersecurity training, and expertise in data analytics help optimise system performance. Engaging TVET institutions, higher education, and industry partnerships (such as internships and research collaborations) is necessary, with government and institutional support playing a crucial role. Funding from Development Finance Institutions like the IDC and DBSA also supports capacity building. A comprehensive, multi-faceted approach is key to developing a skilled workforce for NTCSA's industrialisation.

The **Council for Scientific and Industrial Research (CSIR)** is one of several key institutions supporting NTCSA's strategy through various initiatives aimed at enhancing the country's energy infrastructure and technological capabilities. CSIR provides expertise in research and development, technological innovation, and capacity building, contributing significantly to the development and upgrading of South Africa's transmission infrastructure. In addition to CSIR, other entities and universities play pivotal roles in research, development, and commercialisation:

- **Technology Innovation Agency (TIA):** TIA bridges the gap between research and market-ready solutions by funding and supporting innovation initiatives, particularly in energy and green technologies.
- **Innovation Hub:** A premier science and technology park that fosters the incubation of start-ups and commercialization of technologies, including renewable energy and grid modernization solutions.
- **Mintek:** Known for its work in mineral processing and advanced materials, Mintek contributes to innovations in energy storage and other technologies critical for transmission systems.
- **South African National Energy Development Institute (SANEDI):** SANEDI leads in energy efficiency and renewable integration projects, supporting sustainable development and climate resilience in South Africa.

- **Universities:**

- **Stellenbosch University:** Renowned for its expertise in renewable energy systems and smart grid technologies, with programmes focusing on energy efficiency and solar power integration.
- **University of Pretoria:** Conducts cutting-edge research in electrical engineering, energy systems, and power grid modernisation.
- **Wits University:** A leader in energy research, focusing on sustainable energy solutions and advanced transmission technologies.
- **University of Cape Town:** Known for its work in energy policy, sustainable energy systems, and climate resilience.
- **Durban University of Technology:** Engages in applied research in energy technologies and training programs for renewable energy integration.

Traditional and modern infrastructure

NTCSA's industrialisation strategy effectively integrates traditional and modern infrastructure to build a robust and reliable transmission network. By combining established engineering practices with advanced technologies, NTCSA ensures the efficient delivery of electricity and supports South Africa's economic growth and development. Here is how both types of infrastructure are integrated:

Traditional Infrastructure

Traditional overhead transmission lines remain a cornerstone of NTCSA's infrastructure. These lines are essential for long-distance electricity transmission and are constructed using established engineering practices. Regular maintenance of existing transmission lines ensures reliability and reduces the risk of outages. Traditional substations play a critical role in stepping down high-voltage electricity for distribution. They are equipped with transformers, circuit breakers, and other essential components. Upgrading existing substations with modern equipment improves efficiency and capacity.

Modern Infrastructure

Smart grids incorporate advanced monitoring and control systems that provide real-time data on the performance of the transmission network. Automation technologies enable quick response to faults and optimise the flow of electricity, enhancing the reliability of the grid. Modern infrastructure supports the integration of renewable energy sources such as solar and wind into the transmission network. Technologies like battery storage systems help manage the intermittent nature of renewable energy and ensure a stable supply.

Digital Technologies capitalise on the Internet of Things (IoT) and sensor technologies are used to monitor the condition of transmission lines and substations, enabling predictive maintenance. Big data analytics help in optimizing the performance of the transmission network and making informed decisions.

NTCSA has established a hybrid approach using specialised engineering, procurement, and construction (EPC) panels for various aspects of transmission line construction, combining traditional engineering practices with modern project management techniques. This approach allows for flexibility in procurement and ensures inclusivity of all contractor capabilities.

Innovation and Technology

NTCSA's industrialisation strategy integrates innovation and technology to create a reliable transmission network, supporting South Africa's economic growth. It combines established engineering practices with advanced technologies. The industrialisation process involves three main approaches: importing and adapting foreign technology, utilising foreign direct investment (FDI) to access proprietary technologies, and fostering domestic research and development (R&D) to create homegrown technologies. While domestic innovation is the most challenging and risky, it offers the greatest long-term rewards for technological advancement and competitiveness.

Environmental, Social, and Governance (ESG) Principles

NTCSA incorporates Environmental, Social, and Governance (ESG) principles into its industrialisation strategy to ensure sustainable and responsible development. Here are some key aspects of how ESG is integrated:

Environmental

NTCSA aims for zero harm to the environment by implementing practices that minimise environmental impact. The strategy includes supporting the integration of renewable energy sources into the national grid, reducing reliance on fossil fuels with an emphasis on efficient use of resources and waste reduction.

Social

The social impact of this industrialisation agenda is to improve lives. NTCSA's industrialisation process is designed to create sustainable and skilled job opportunities. This includes community engagement wherever necessary. NTCSA engages with local communities to ensure that their needs and concerns are addressed, fostering positive relationships. Health and safety are central as the company seeks to ensure that it causes no harm through its operations. A safe, healthy, and high-performance culture is a priority.

Governance

In implementing this industrialisation strategy, NTCSA will maintain strong governance practices to ensure transparency and accountability in all operations. This will be done through adherence to all relevant legislation and regulatory requirements to maintain high standards of governance. Strong stakeholder collaboration involving government, private sector, and local communities to achieve common goals is essential.

ESG Scope 3 NTCSA

NTCSA is committed to comprehensive Environmental, Social, and Governance (ESG) reporting, which includes addressing Scope 3 emissions. Scope 3 emissions encompass all indirect greenhouse gas (GHG) emissions that occur in the value chain of a company, both upstream and downstream.

Key Aspects of NTCSA's Approach to Scope 3 Emissions:

Supplier Engagement: NTCSA collaborates closely with its suppliers to measure and reduce emissions associated with the production and transportation of goods and services. This includes encouraging suppliers to adopt sustainable practices and report their own Scope 3 emissions.

Employee Commuting and Business Travel: Efforts are made to minimise emissions from employee commuting and business travel. This includes promoting remote work options, optimising travel schedules, and encouraging the use of low-emission transportation.

Waste Management: NTCSA implements strategies to reduce waste generation and improve waste management practices. This includes recycling programmes and initiatives to minimize waste sent to landfills.

Product Use and End-of-Life: NTCSA considers the emissions associated with the use and disposal of its products. This involves designing products for longer life cycles, promoting recycling, and ensuring proper disposal methods.

Data Collection and Reporting: Accurate data collection is crucial for effective Scope 3 reporting. NTCSA uses advanced data management systems to track and report emissions across its value chain, ensuring transparency and accountability.

By focusing on these areas, NTCSA aims to reduce its overall carbon footprint and contribute to a more sustainable energy future for South Africa.

3.3 Existing strategic considerations

NTCSA will adopt lessons and best practices from organisations globally, with a particular focus on BRICS (Brazil, Russia, India, China, and South Africa) countries. This focus is due to the shared developmental challenges and aspirations within BRICS nations, such as industrialisation, economic growth, and energy security, which align closely with NTCSA's goals. As a result, NTCSA's industrialisation strategy is benchmarked against those of BRICS countries, offering valuable insights into successful practices and areas for improvement.

While benchmarking against other African countries or SADC members might seem a logical choice, these nations often face similar challenges to South Africa in terms of capacity, technology, and industrial development. Therefore, they are less likely to provide unique or advanced frameworks that can drive NTCSA's industrialisation forward. By contrast, BRICS countries, which have successfully implemented industrial policies and advanced their energy sectors, provide more diverse and scalable solutions that can be adapted to South Africa's

context. Added to that BRICS has a number of working committees and workstreams that can be easily accessed to gather additional information through existing platforms. The following are examples of areas where NTCSA leverages lessons for its industrialisation:

Brazil

- **Energy Sector:** Brazil has a strong focus on renewable energy, particularly hydroelectric power, which accounts for a sizeable portion of its electricity generation.
- **Industrial Policies:** The country has implemented policies to support local manufacturing and technology development, particularly in the energy sector.

Russia

- **Energy Infrastructure:** Russia's Industrialisation strategy heavily relies on its vast natural resources, particularly oil and gas.
- **Technological Advancements:** Investments in modernising its energy infrastructure and integrating advanced technologies are key components of its strategy.

India

- **Renewable Energy Integration:** India has made significant strides in integrating renewable energy sources into its grid, with ambitious targets for solar and wind energy.
- **Manufacturing Initiatives:** The "Make in India" initiative aims to boost local manufacturing and attract foreign investment in various sectors, including energy.

China

- **Technological Leadership:** China leads in the adoption of advanced technologies in its energy sector, including smart grids and renewable energy integration.
- **Infrastructure Development:** Massive investments in infrastructure development, including high-voltage transmission lines and renewable energy projects, are central to China's strategy.

Key Takeaways for NTCSA

By learning from the strategies of other BRICS countries, NTCSA can refine its industrialisation approach to better meet South Africa's energy needs and support economic growth. NTCSA may strengthen its strategy by supporting the integration of renewable energy into the national grid, developing local suppliers for the energy sector, and incorporating ESG principles to ensure sustainable and responsible development. This approach enhances local participation and promotes long-term sustainability.

- **Renewable Energy:** Like India and China, NTCSA can benefit from setting renewable energy targets and integrating these sources into the grid.
- **Local Manufacturing:** Drawing from Brazil and India's focus on local manufacturing, NTCSA can enhance its support for local suppliers and technology development.

- **Technological Advancements:** Emulating China's technological leadership, NTCSA can invest in advanced technologies to modernise its infrastructure and improve efficiency.

4 OBJECTIVES OF THE INDUSTRIALISATION STRATEGY

The objectives of NTCSAs industrialisation strategy are designed to enhance the country's energy infrastructure and support sustainable economic growth. The following are the specific objectives:

- **Reliable and Fair Access:** Ensure reliable, fair, and affordable access to the electricity grid and market.
- **Sustainable Economic Growth:** Enable sustainable, inclusive economic growth by providing stable and efficient electricity transmission.
- **Energy Security:** Contribute to South Africa's energy security by maintaining a robust and resilient transmission network.
- **Support for Local Industry:** Promote the development of local industries by providing them with reliable access to electricity, thereby fostering economic growth and job creation.
- **Competitive Market:** Foster a competitive electricity market that benefits consumers and encourages investment.
- **Non-Discriminatory Grid Access:** Promote non-discriminatory grid access to support a diverse range of energy producers and consumers.
- **Financial Stability:** Protect the financial stability of the organisation to ensure long-term operational sustainability.
- **Innovation and Modernisation:** Embrace innovation and modernisation in transmission technologies to improve efficiency and reliability.

5 STRATEGY

NTCSA's industrialisation strategy is crafted in line with the NIP programme and B-BBEE which refers to efforts by the state to shape the industrial sector of the economy and promote structural transformation by targeting specific industries, firms, or economic activities. The NIP framework recognises the inherent intra-governmental nature of industrial policy and demonstrates that four complementary sets of policies are necessary for the successful implementation of an industrial policy:

- a supportive macroeconomic regulatory environment.
- skills and education.
- traditional and modern infrastructure
- support for technological effort.

NTCSA's industrialisation policy focuses on strengthening the economy at a microeconomic level, building on strong macroeconomic fundamentals. Industrialisation requires long-term commitment, investment, and support led by industry, particularly through the Department of Trade, Industry and Competition (DTIC). Key components include ensuring access to markets and finance, as well as establishing systems for sustainable local participation and off-take agreements.

The policy highlights the roles of government, industry, NTCSA, Eskom, and its subsidiaries in promoting localisation, beneficiation, and innovation in technology and skills development. Strategic partnerships with suppliers, financiers, and technological players are crucial, while NTCSA plays a pivotal role in providing access to technology and fostering skills development.

5.1 Assumptions

5.1.1 Assumptions in areas that can be influenced by NTCSA

Supplier Engagement and Development

NTCSA is committed to localising supply systems and empowering potential local suppliers in line with the Broad-based Black Economic Empowerment Act. It has signed long-term agreements with 19 local companies for overhead line construction, covering Engineering, Procurement, and Construction (EPC). These agreements aim to foster local industry growth and stability. NTCSA's supplier development strategy includes training and upskilling local suppliers, particularly in critical sectors such as energy transmission and technological innovation. Additionally, NTCSA is modernising procurement processes under the Public Procurement Act of July 2024 to ensure transparency, efficiency, and value for money.

Access to Finance

Access to finance is crucial for NTCSA's industrialisation strategy. NTCSA leverages Public-Private Partnerships (PPPs) and Development Finance Institutions (DFIs), such as the Development Bank of Southern Africa (DBSA) and Industrial Development Corporation (IDC), to fund infrastructure projects. These partnerships bridge the financing gap and support local

suppliers with capital investments. NTCSA also benefits from Special Economic Zones (SEZs) and government grants, which offer tax incentives and subsidies, reducing project costs and attracting investment for sustainable development.

Support from the New Development Bank (NDB)/BRICS Bank is crucial for NTCSA's industrialisation strategy, providing financial backing, technical assistance, and a focus on sustainable development. In August 2024, the NDB approved a \$1 billion investment to enhance South Africa's water and sanitation infrastructure, reflecting its significant commitment to the country's economic growth and infrastructure development, including NTCSA's projects.

Localisation of Procurement

South Africa's localisation strategy promotes sourcing goods and services from local suppliers to boost the economy, create jobs, and reduce reliance on imports. A key part of this is the government's designation policy, requiring public institutions to procure locally produced items. The Department of Small Business Development (DSBD) supports Small, Medium, and Micro Enterprises (SMMEs) by enhancing manufacturing capacity, funding access, and export opportunities.

NTCSA is focusing on key sectors like steel manufacturing to revitalise infrastructure and promote innovation. It uses demand forecasting to identify localisation opportunities and establishes long-term contracts with suppliers to encourage investment. Incentives will reward elevated levels of local content, with support for financing and partnerships with international companies.

NTCSA's industrialisation efforts aim to strengthen the production of essential equipment for energy transmission. This is backed by reforms like the Electricity Regulation Amendment Act, which promotes competitive electricity markets. Through these initiatives, NTCSA seeks to develop infrastructure, foster economic growth, and ensure efficient delivery of critical projects.

Innovation and Technology Transfer

This industrialisation strategy supports technological innovation, especially ways to go green as a way of contributing towards mitigating climate change. This will be done by supporting the development of local R&D initiatives and facilitating technology transfers to ensure that local suppliers can meet international standards and NTCSA's specific operational needs. Innovation and technology are transforming electricity transmission in South Africa to address challenges like load shedding and grid reliability. Here are some key developments:

- **Renewable Energy Integration:** South Africa is integrating renewable energy sources like solar and wind into the national grid. This includes rooftop solar installations, battery storage systems, and smart meters. These technologies help balance supply and demand, reducing reliance on fossil fuels.
- **Grid Expansion and Modernisation:** Efforts are underway to expand and modernise the grid to accommodate new energy sources and improve reliability. This includes upgrading transmission lines and substations.

- **Smart Grid Technologies:** The adoption of smart grid technologies enhances the efficiency and reliability of electricity transmission. These technologies enable real-time monitoring and management of the grid, helping to prevent outages and optimize energy distribution.
- **Energy Storage Solutions:** Innovations in energy storage, such as advanced battery systems, are crucial for stabilising the grid. These solutions store excess energy generated from renewable sources and release it when needed, ensuring a consistent power supply.

Fostering innovation and encouraging R&D initiatives within NTCSA's supply chain is a key component in the industrialisation strategy.

Monitoring and Reporting

To monitor progress towards the achievement of the objectives of this strategy, NTCSA will establish Key Performance Indicators (KPIs) tracker systems. These will include on-time delivery systems to track project completion and supplier milestones, focusing on critical industries aligned with NTCSA's priorities. They will also monitor local content to ensure alignment with localisation goals and assess supplier performance against benchmarks in key sectors. Dashboard and reporting tools such as implementation dashboard, regular reporting, and reporting schedule to communicate progress to all stakeholders will also be established to ensure transparency and accountability, particularly in sectors critical to NTCSA's success.

Risk Management

Timeous and regular monitoring will allow identification of risks associated with supply chain disruptions, non-compliance with localisation targets, and financial challenges for suppliers, particularly in industries critical to NTCSA's operations. Mitigation strategies and contingency plans, including alternative sourcing options and financial support mechanisms, to address identified risks can be established to ensure continuity in NTCSA's critical supply chains.

5.2 Journey to achieving the strategic objectives



FIGURE 1 STRATEGIC OBJECTIVES ROADMAP

6 RISKS, TREATMENT PLANS, CONTINGENCY PLANS AND IMPLICATIONS OF ACTIVITIES FOR NTCSA

To ensure the successful implementation of NTCSA's industrialisation strategy, it is crucial to identify potential risks, develop treatment plans, contingency plans, and understand the implications of these activities.

Risks

- **Operational Risks:** NTCSA may face equipment failures, cyber-attacks, natural disasters, and maintenance issues.
- **Financial Risks:** A widespread problem in projects is funding shortages, currency fluctuations, cost overruns, and unsustainable debt levels.
- **Strategic Risks:** There might be changes in market demand, competitive pressures, and regulatory changes.
- **Compliance Risks:** Non-compliance with regulations, standards, and industry best practices.
- **Supply Chain Risks:** Delays in material supply, logistical challenges, and political instability.

Treatment Plans

- **Operational Risks:** NTCSA seeks to implement robust maintenance schedules, invest in cybersecurity measures, and develop disaster recovery plans.
- **Financial Risks:** NTCSA seeks to engage diverse funding sources, implement strict budget controls, and develop financial contingency plans.
- **Strategic Risks:** The organisation will conduct regular market analysis, develop competitive strategies, and stay updated on regulatory changes.
- **Compliance Risks:** NTCSA will establish compliance monitoring systems, provide regular training for staff, and ensure adherence to industry standards.
- **Supply Chain Risks:** Diversify suppliers, establish strong supplier relationships, and develop alternative supply chain routes.

Contingency Plans

- **Operational Contingencies:** Have backup equipment and systems in place, establish emergency response teams, and conduct regular drills.
- **Financial Contingencies:** Maintain a reserve fund, develop alternative funding strategies, and have access to credit facilities.
- **Strategic Contingencies:** Develop flexible business models, create strategic alliances, and have exit strategies for non-viable projects.
- **Compliance Contingencies:** Implement corrective action plans for non-compliance issues, conduct regular audits, and engage with regulatory bodies.
- **Supply Chain Contingencies:** Identify alternative suppliers, stockpile critical materials, and develop logistic contingency plans.

Implications of Activities

- Operational Implications: Improved reliability and efficiency of the transmission network reduced downtime, and enhanced customer satisfaction.
- Financial Implications: Enhanced financial stability, better cost management, and increased investor confidence.
- Strategic Implications: Stronger market position, improved adaptability to market changes, and enhanced competitive advantage.
- Compliance Implications: Reduced legal risks, improved reputation, and increased trust from stakeholders.
- Supply Chain Implications: More resilient supply chain, reduced dependency on single suppliers, and improved project timelines.

By addressing these risks and developing comprehensive treatment and contingency plans, NTCSA can ensure the successful implementation of its industrialisation strategy, leading to sustainable growth and development.

7 ISSUES TO BE ADDRESSED BY THE INDUSTRIALISATION STRATEGY

NTCSA Asset Management department conducted studies to guide this industrialisation strategy. The primary focus was mapping industrialisation potential, procurement needs, and the availability of the necessary materials, particularly transformers, in the local and worldwide market to inform procurement and development strategies. The research conclusions demonstrate that, with the right assistance, a sizable amount of procurement requirements can be met by local suppliers. Opportunities for industrialisation and local involvement in these industries can be found in the following key business areas for NTCSA:

7.1 Power Transformers

There are various challenges facing the demand and supply of power transformers. These vary with transformer type, supplier capacity, quality and pricing and supply chain disruptions, among others.

Class 1 & 2 Transformers

Class 1 and 2 current local suppliers have indicated sufficient supply capacity. However, recent transformer audits have revealed manufacturing defects for one of the suppliers which may affect their ability to meet Transmission's specifications. The supplier is currently being supported to meet the requirements as the alternative supplier may not have sufficient capacity to meet the total TDP demand.

Class 1 and Class 2 transformers are categorised based on their voltage levels and insulation requirements:

Class 1 Transformers

- These transformers have voltage windings of 69 kV and below.
- They are typically used in distribution networks and smaller power applications.
- They are designed to provide coordinated low-frequency and impulse insulation levels online terminals.

Class 2 Transformers

- These transformers have high-voltage windings ranging from 115 kV to 765 kV.
- They are used in larger power applications, such as transmission networks.
- They require higher insulation levels due to the higher voltage and exposure to overvoltage conditions.

These classifications help in distinguishing the diverse needs of insulation levels between smaller and larger power transformers, ensuring they meet the specific requirements of their applications. Audits performed indicate manufacturing defects poses a medium risk for the TDP. The audit showed the required class 1 and 2 transformers for NTCSA's expansion and repair plans from 2024 to 2032 as shown on table 1. Local industries have the capacity to produce these transformers meaning that there is an opportunity for local procurement. In South Africa, Class 1 and Class 2 transformers are essential for various applications in the power distribution and transmission networks. Here are some key points and notable manufacturers.

ACTOM Power Transformers: They produce a range of transformers suitable for distribution networks.

SGB-SMIT POWER MATLA: They manufacture power and distribution transformers in Pretoria and Cape Town.

Eskom: As the primary electricity supplier, Eskom procures large-scale transformers for enhancing the grid's capacity.

These transformers are crucial for maintaining the reliability and efficiency of South Africa's electrical infrastructure. This therefore requires NTCSA and other relevant systems to engage and support potential local suppliers in this regard and they can all be procured locally.

TABLE 1: REQUIRED CLASS 1 AND 2 TRANSFORMERS.

Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	Total
Required Class 1 Transformers	7	5	3	2	2	6	1	3	3	32
Required Class 2 Transformers	2	2	2	3	3	3	4	3	7	29

Class 3 Transformers

Findings from the TDP2022 analysis revealed a supply capacity shortage for Class 3 power transformers. The supplier indicated an annual manufacturing capacity of 12 units per annum however, poor performance of the supplier has revealed this is significantly over-stated. Furthermore, the supplier has been placed under business rescue, thus affecting their manufacturing abilities. Even if the supplier could achieve the stated production throughput, a maximum capacity deficit of 18 units is still forecasted from FY2027 onward.

Class 3 Power Transformers are typically used for various industrial and utility applications. There are several manufacturers and suppliers of Class 3 transformers in South Africa namely,

ACTOM Power Transformers: They manufacture a wide range of transformers, including those up to 315MVA with voltages up to 275kV. They cater to utilities, renewables, mining, industrial, and public works sectors.

Transfix Transformers South Africa: They specialise in oil-immersed, 3-phase, medium voltage/low voltage transformers up to 1MVA.

Instrument Transformer Technologies (ITT): They offer a range of voltage and current transformers, including resin encapsulated and oil-filled types.

Eskom Rotek Industries, Transformers and Switchgear (T&SS): They are the only local manufacture focusing on class 3B transformers.

These companies provide essential equipment for maintaining and expanding South Africa's electrical infrastructure. The projected required supply shows that local industries can only supply a maximum of 12 class 3 transformers per year, and the projected required transformers exceed the local capacity from 2027. The projected shortfall is highest in 2027, where there is shortfall of at least 18 class 3 transformers.

TABLE 2: PROJECTED REQUIRED SUPPLY FOR CLASS 3 TRANSFORMERS

Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	Total
Required class 3 power transformers	6	8	11	30	23	19	22	20	17	156
Local Capacity	6	8	11	12	12	12	12	12	12	
Supply Shortfall	0	0	0	18	11	7	10	8	5	59

Class 4 Transformers

There are no local suppliers in the production of Class 4 Transformers and the requirements in this category are met with imports. Table 3 lists the minimum supply that will be needed for Class 4 transformers beginning in 2027. Class 4 transformers are typically used for larger industrial premises or distribution substations and are characterised as follows,

Power Ratings: These transformers usually range from 4 MVA to 30 MVA.

Voltage Levels: The primary windings are rated up to 66 kV, while the secondary windings can go up to 36 kV.

Cooling Method: They are generally fluid cooled to manage the heat generated during operation. These transformers are essential for ensuring reliable power supply in large-scale industrial applications and distribution networks.

TABLE 3: REQUIRED CLASS 4 TRANSFORMERS.

Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	Total
Required of class 4 power transformers	-	-	-	1	4	4	4	5	1	19

Opportunity for Industrialisation of Power Transformers

It is evident that significant opportunities exist in South Africa for industrialisation of Class 3 and Class 4 Transformers by localising the production of transformers within the NTCSA framework. This aligns well with the country's B-BBEE policies, which aim to promote economic transformation and enhance the participation of Black people in the economy. However, there is need for capacity building, partnerships, and collaborations among different players to enhance production, efficiency, and quality of commodities. As local supply base is limited and constrained, opportunity exists for an additional local supply to successfully enter the market. NTCSA seeks to localise the industrialisation agenda in these sectors of electricity transmission ensuring participation of marginalised groups in line with the B-BBEE, localisation and beneficiation policies.

What needs to be done? Benchmarking with Eskom Rotek Industries Class 3B Transformers

Eskom Rotek Industries, Transformers and Switchgear Services (T&SS) have the facility and extensive experience in re-manufacturing large power transformers at 400kV levels. T&SS is desirous of extending its capability to the manufacturing of new 400kV power transformers (Class3B), to improve utilisation and sustainability of its large transformer business, and to deliver

on the skills development, job creation and industrialisation initiatives presented by Eskom and Government.

To realise industrialisation in this area, T&SS require the support and cooperation from others in the following ways:

Partnership with a recognised Original Equipment power transformer Manufacturer (OEM) to meet our need for the required intellectual property (IP) and transformer designs. T&SS does not have the capability to design transformers, and does not currently own any transformer design intellectual property,

Commitment from NTCSA to procure Class3B power transformers from ERI once such capability has been established.

This initiative will result in the following SDL&I outcomes over the duration of the Programme, namely:

Recruitment of winders, transformer assembly artisans, technicians, engineers, and supervisors,

Creation of new high-level permanent jobs for artisans, technicians, engineering and supervisory level positions through intake and development of learners from tertiary education institutions,

Training and skills transfer to local employees by international OEM (local training, as well as overseas training).

Local sourcing of materials and services such as copper conductor, core laminations, transformers tank, etc.

Critical success factors for this initiative are:

The **accreditation** of the T&SS transformer repair facility in Rosherville to supply new class 3B transformers,

Market related prices for transformers manufactured by T&SS,

Quality excellence for transformers manufactured by T&SS,

Delivery at comparable market delivery times,

Enabling contract with NTCSA for the supply of new Class 3B transformers for a period of 10 years.

The T&SS road map for establishing this capability:

Establishment of a Memorandum of Agreement (MOA) between NTCSA and T&SS that will establish cooperation and demonstrate commitment between the parties.

An MOA will assist T&SS during this time that we are trying to secure a partnership with an OEM for IP, as large companies are indicating reluctance to partner with T&SS without commitment that future work will flow from such a partnership.

More than one OEM have indicated failure of similar initiatives in other countries, where lack of commitment to work existed.

Establishment of partnership between T&SS and OEM.

Accreditation of T&SS factory as manufacturer of new Class3B transformers.

Upgrade of facility for cleaner conditions, to ensure that a quality product is manufactured.

Establishment of supply agreements with local and international suppliers for transformer components.

Purchase order (or enabling contract) with T&SS, possibly for a single “trial unit” or for a number of units over a longer period.

Delivery of first unit.

Ramping up production to full capacity.

The T&SS business case contains the following assumptions:

It is assumed that T&SS will produce approx. Twenty Class 3B units over a total 10-year period, starting with a single unit in year 1 and ramping up to full production at 4 units per annum. This initiative is estimated to add a total turnover of approx. R 1,0 billion to T&SS' revenue over the period.

T&SS are currently focusing exclusively on the manufacture of new Class 3B units, in addition to continuing with repairs of mostly Dx transformers in the workshop.

The reason for focusing on Class 3B is that:

NTCSA has indicated their need of this class of unit to T&SS.

T&SS is experiencing low volumes of repairs in the large transformer repair aisle and intend to supplement workload in this aisle with large new transformer manufacture. The medium transformer aisle does not suffer the same lack of work and will continue to focus on repairs alone for now.

T&SS have identified that there are currently sufficient local Class 1 transformer manufacturers in South Africa, sufficiently satisfying the local market. T&SS do not see the urgency for adding another Class 1 transformer manufacturer to the market currently.

T&SS is ideally geared towards manufacturing of large power transformers, having all the plant and equipment to start with new Class 3B transformers, almost immediately.

The sourcing of the primary material components is depicted in the table below and shows whether the item is outsourced locally or internationally. The total percentage of fully imported items is approximately 28% of the total cost of the transformer. Everything else is manufactured or procured locally.

TABLE 4: SOURCE OF PRIMARY MATERIAL COMPONENTS

Item	Description	Fully imported	Import raw material, local beneficiation	Local
1	Design and IP cost	X		
2	Windings copper conductor			X
3	Insulation materials		X	
4	Bushings HV, MV & LV	X		
5	Tapchanger	X		
6	Core		X	
7	Tank			X
8	Aux components (bucholz, PRV, fibre temp, WTI, OTI, etc.)	X		

7.2 Industrialisation in the Steel Value Chain

The TDP 2022 resource plan revealed a supplier capacity shortage for steel fabricators. The supplier capacity indicated refers to one supplier, with a manufacturing capacity of 28 000 tonnes per annum. The TDP steel demand includes requirements for overhead lines including towers, and for substations including bolts, rebar, steel members and fence mesh. A capacity shortage for lines and substation requirements is noted from FY2026 (without incubation) with a peak capacity deficit of 97 129 tons in FY2031 (without incubation). The risks associated with a single supplier also exist.

Challenges, Opportunities and Strategic Initiatives -

Technological Advancements: Embracing digitalization and circular economic systems is crucial for the industry's future.

Steel and Metal Fabrication Master Plan: This plan aims to revitalize the steel industry and ensure its sustainability and competitiveness.

BRICS Collaboration: Partnerships with BRICS countries are being explored to enhance infrastructure projects and promote sustainable development.

The steel industry remains a cornerstone of South Africa's Industrialisation path, supporting multiple sectors and driving economic growth.

Supply and Demand of Steel

Currently there is only one steel fabricator and manufacturer in this environment. Supply capability is approximately 28 000 tons of steel per annum. Steel requirements exist in the areas of overhead lines, towers, substations (rebar, bolts, steel members and mesh fences). Studies revealed a supply shortage in respect of the TDP from 2026 with a peak deficit of 97 129 tons in 2031.

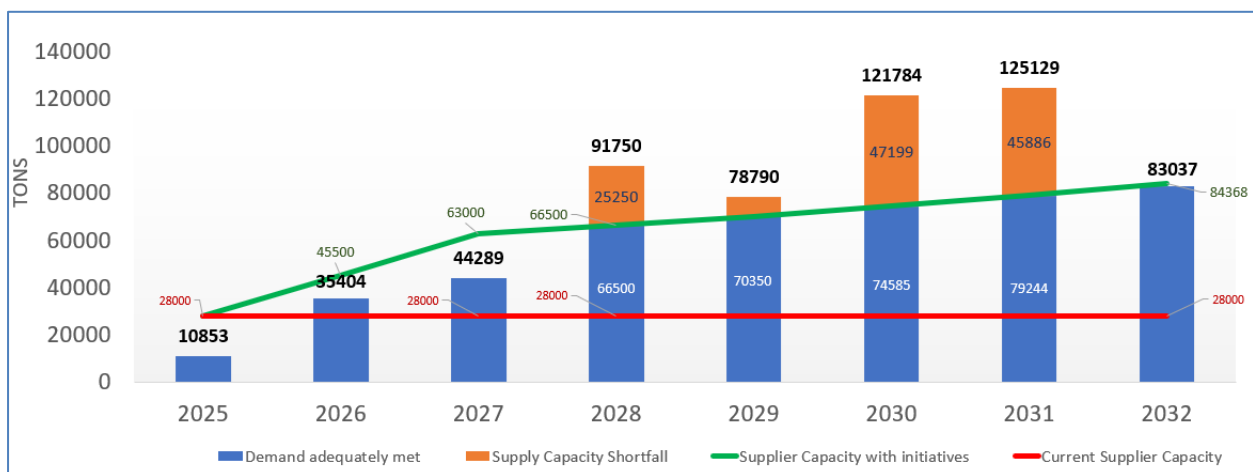


FIGURE 2: INDUSTRY CAPACITY FOR STEEL SUPPLY

Opportunity for Industrialisation of Steel

NTCSA is currently trying to address supply constraints in this environment through the identification of additional suppliers for steel commodities for its functioning. To determine the potential local industry capacity and competency of steel suppliers to supply tower steel for overhead lines, an RFI was issued to the market in July 2023. Suppliers are now in the prototyping phase. The expectation is that supply capacity will increase by 35000 tons in 2026 by adding 7 more steel fabricators and manufacturers through these initiatives.

Conductors

Local manufacturers have produced high-quality powerline conductors for many years. Aberdare Cables, CBI Electric, and M-TEC are some of the bigger manufacturers. Currently, local producers are able to fulfil demand. Overhead line conductor will become increasingly necessary as transmission and high-voltage distribution lines are built, allowing the system to integrate renewable energy sources. According to NTCSA's projection, the local sector may need to produce significantly more overhead conductor in the next ten years than it did in the previous ten.

At present only MTEC can produce OPGW, and there is reliance on imports. There is an opportunity to encourage localisation for this essential product, which both provide the communication fibre link and protects/shields the line from lightning strikes.

Hardware

Three major local suppliers of line hardware are McWade, Vexila, and Preformed Line Products (PLP). Most manufacturers are headquartered in and around Johannesburg, with PLP and Vexila having their headquarters in Pietermaritzburg. One of the biggest issues facing these manufacturers is consistent hardware volumes. Cullin Africa and Metpress are two more manufacturers that produce high-quality hardware and accessories for the distribution and specific gearbox hardware range.

Underground Cables

HV, MV and LV Copper cable is manufactured locally. Among the larger cable manufacturers are M-TEC, Aberdare Cables, and CBI Electric. There are companies like Versalec, Alvern, Unity, Tulisa Cables, SOEW making underground and LV cables. All suppliers can manufacture a broad range of XLPE and other cables in accordance with local standards. Theft of copper cable has been identified as one of the main risks from a utility viewpoint.

7.3 Protection and Control Schemes

Protection and control schemes are essential to ensure the reliability and safety of electrical power systems.

These are the key components and functions:

Protective Relays

- **Electromechanical Relays:** Traditional devices that use mechanical parts to detect faults.
- **Microprocessor-based Relays (IEDs):** Modern devices that use digital technology to perform multiple protection functions.
- **Circuit Breakers:** Automatically disconnect faulty sections of the network to prevent damage.
- **Current and Voltage Transformers:** Measure electrical parameters and provide inputs to protective relays.
- **Control Panels:** House the relays, meters, and other control devices.

Functions

- **Fault Detection:** Identifies abnormal conditions like overcurrent, overvoltage, and short circuits.
- **Isolation:** Disconnects the faulty section to prevent damage and maintain system stability.
- **Coordination:** Ensures that only the faulty section is isolated, minimizing disruption.
- **Monitoring and Control:** Provides real-time data and control capabilities through SCADA systems.

Design Considerations

- **Reliability:** Ensuring the system operates correctly under all conditions.
- **Redundancy:** Using backup relays and power supplies to enhance reliability.
- **Testing and Maintenance:** Regular testing to ensure all components function correctly.

These schemes are crucial for protecting large and expensive equipment like transformers, generators, and transmission lines.

Required Protection and Control Scheme

Currently there is only one supplier available to fully meet Protection Scheme demand. This poses a huge risk to the NTCSA business given its demand projections in the next 10 years. Regardless of the supplier having the capacity to supply the required protection schemes, an alternate supplier was reviewed but they were unable to meet the NTCSA requirements. In addition, the current supplier for Feeder Protection Scheme is also limited with capacity and unable to meet TDP demand. Commission resources for these Protection Schemes have also been identified as a risk.

TABLE 5: PROTECTION SCHEMES REQUIREMENT PER ANNUM FOR 10 YEARS.

Year	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	Total
Required Protection Schemes	35	141	214	256	249	275	315	257	201	51	1 994

TABLE 6: INDUSTRY CAPACITY DEMAND FOR FEEDER PROTECTION SCHEMES

Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	Total
Projected Demand	11	47	47	129	128	126	136	112	129	865
Local Industry Capacity	11	47	47	72	72	72	72	72	72	537
Shortfall	-	-	-	57	56	54	64	40	57	328

Opportunity for Industrialisation of Protection and Control Scheme

NTCSA is trying to address supply constraints in this environment currently, with identification of additional suppliers. RFI was issued into the markets and suppliers are currently being reviewed. However, with suppliers required to have capability to supply the volumes required of 1900 schemes over the next 10 years, it poses immense potential to drive industrialisation in the local supply market during this period. In-depth investigation will be required to drive the industrialisation process and remove reliance on imports in this space.

Opportunities for production of protection and control schemes can be enhanced by the following interventions:

Local Expertise Development: The establishment of production facilities for control and protection schemes can stimulate innovation and local knowledge. This may encourage technological developments in the energy sector and result in the creation of a skilled labour force.

Supply Chain Development: Creating a local supply chain for parts and materials can cut expenses, increase supply chain dependability, and lessen reliance on imports.

Alignment with B-BBEE: By encouraging Black ownership and participation in the economy, localising production can promote B-BBEE (Broad-Based Black Economic Empowerment) activities.

Through the effective management of the available opportunities, South Africa may improve its control and protection systems, so making its electrical grid more robust and efficient.

7.4 Composite Insulators

Composite insulators are essential components in electrical transmission and distribution systems. They are designed to support and insulate high-voltage conductors, ensuring the safe and efficient flow of electricity. South Africa has a notable capacity for manufacturing composite insulators, with companies like Vexila leading the way. Vexila, based in Pietermaritzburg, is a significant player in this field. They design, manufacture, and supply a wide range of composite insulators for electrical rail, transmission, and distribution overhead power line infrastructure.

Vexila's products are known for their high quality and durability, especially in high pollution and vandal-resistant environments. They offer insulators for various voltage levels, including up to 765kV, and have a strong presence both locally and internationally. Their composite insulators are lightweight, making them easier and cheaper to store, transport, handle, and install. Another company, Afritek, also contributes to the local industry by producing polymer long rod insulators and other related products.

These companies demonstrate South Africa's capability to meet both local and international demands for composite insulators, supporting the country's Industrialisation and infrastructure development goals.

Composition and Design of composite insulators

- **Materials:** Composite insulators are typically made from a combination of fiberglass or other reinforcing fibres with a polymer or resin matrix.
- **Core and Housing:** They usually have an insulating core made of fiberglass and a protective covering of silicone or another weather-resistant material.

Applications

- **Transmission Lines:** Used extensively in high-voltage transmission lines to prevent electrical arcing and flashovers.
- **Substations:** Serve as isolators, bushings, and surge arresters within substations.
- **Electrical Equipment:** Used in circuit breakers, transformers, and switchgear to maintain electrical isolation and ensure safe operation.

Composite insulators are integral to modern power systems, providing reliable performance and reducing maintenance costs.

Supply and Demand of Composite Insulators

The local supplier capacity challenges have been identified for the 765kV 300kN demand. The supplier's manufacturing capacity is approximately 5400 units per annum. The data reveals that there is a capacity shortage from FY2031, with a maximum capacity deficit of 3684 units in FY2031. The supplier cannot produce the 400kN type insulator, for both 400kV and 765kV. The single current local supplier indicated that it is not financially viable to develop the capacity to produce the 400kN type.

TABLE 7: LOCAL INDUSTRY'S CAPACITY VS DEMAND FOR 765kV - 300kN COMPOSITE INSULATORS.

Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	Total
Projected demand			3762	3738	1050		1126	9084	8802	27562
Local capacity			3762	3738	1050		1126	5400	5400	20476
Shortfall								3684	3402	7086

TABLE 8: REQUIRED SUPPLY OF COMP INSULATOR 765kV - 400kN

Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	Total
Required supply of comp insulator 765kV – 400 kN	-	-	1920	1896	552	-	588	4666	15816	25438

Opportunity for Industrialisation of Composite Insulators

The supplier's capacity for the 765kV 300kN type will be insufficient towards the end of the 10-year TDP (FY31–FY32), creating an opportunity to onboard another supplier. A potential

alternative (PLP) has been identified but must complete product testing to become an approved NTCSA supplier. There is also scope for local manufacturers to produce the 400kN type, though a feasibility study is needed to assess sustainability.

As part of the industrialisation push for composite insulators, NTCSA issued a five-year tender for the design, manufacture, testing, and supply of composite insulators on an "as and when" required basis. The tender includes designated products (132kV–400kV 300kN Long Rods and Line Posts) with subcontracting thresholds to encourage local supplier development. A budget of R572m has been allocated, aiming to support new market entrants and sustain existing manufacturers.

7.5 Initiatives to Support Industrialisation - Development Financial Institutions

NTCSA is actively involved in initiatives to support Industrialisation, leveraging partnerships with Development Financial Institutions (DFIs) to drive these efforts. NTCSA seeks to collaborate with DFIs to finance and develop critical infrastructure projects, such as expanding the transmission grid. This is essential for supporting industrial activities and ensuring a reliable power supply. NTCSA also engages in Public-Private Partnerships (PPPs) to leverage private sector expertise and resources to accelerate the implementation of the Transmission Development Plan (TDP). In collaboration with DFIs, NTCSA focuses on building the capacity of local industries and workforce. This includes training Programmes and knowledge transfer initiatives to enhance skills and competencies.

MOA with the IDC

A MOA between NTCSA and the Industrial Development Corporation (IDC) is in place and aims to bolster support for SMMEs in South Africa. The MOA seeks to provide support for SMMEs to navigate a capital-intense business landscape. It also aims to provide an opportunity for growth of local supply base by fostering an environment which promotes development. This collaboration is designed to enhance the growth and sustainability of SMMEs, which are vital for economic development and job creation. Through the MOA, the IDC has made a commitment to prioritise funding of local companies from the NTCSA Supplier Development Programme and those who have contracts with the NTCSA. Additionally, the IDC has committed to accelerate the turnaround times for funding applications from local companies for the next 72 months.

The MOA ensures NTCSA and IDC will collaborate in the process of financing or funding using means available in their respective Programmes in respect of the winning NTCSA bidders and verified suppliers that are involved the following projects:

- Transformers.
- Insulators and hardware.
- Transmission steel.
- Conductors.
- Line construction; and
- Grid infrastructure development support through approved model.

The Scope of the MOA covers the following

- Participation in the commodity working groups with Eskom, DITC, DPE and IDC.
- Circulate Eskom approved RFIs and RFPs to the IDC and widely to industry.
- Verification and development of potential suppliers before engaging in contracts.
- Engage companies on potential Capex and working capital funding support for manufacturing, technical upgrades and to develop industrial capacity.
- Provide funding support for Verified Suppliers with purchase order agreements that require IDC funding and agree to IDC terms and conditions of funding.
- Engage foreign manufacturers on localisation.
- Promote and support energy efficiency initiatives.

Key Objectives of the MOA

- **Financial Support:** Providing access to funding and financial resources to help SMMEs scale their operations.
- **Technical Assistance:** Offering technical support and expertise to improve the operational efficiency of SMMEs.
- **Market Access:** Facilitating access to new markets and business opportunities for SMMEs.
- **Capacity Building:** Enhancing the skills and capabilities of SMME owners and employees through training and development Programmes.

Expected Impact on SMMEs

- **Job Creation:** By supporting SMMEs, the MOA aims to create more employment opportunities.
- **Economic Growth:** Strengthening SMMEs contributes to overall economic growth and development.
- **Innovation:** Encouraging innovation and competitiveness within the SMME sector.

This partnership is a significant step towards addressing the challenges faced by SMMEs in South Africa, such as access to finance, market entry barriers, and skills shortages.

8 KEY PERFORMANCE AREAS (MEASUREMENT AND TRACKING)

Effective monitoring and evaluation are essential for the successful implementation and sustainability of NTCSA's industrialisation strategy. These activities will ensure alignment with strategic goals, regulatory compliance, and continuous improvement.

Industrialisation Tracking

Responsibility: Industrialisation Advisors and Commodity Managers

Objective:

- Monitor progress against industrialisation goals, ensuring compliance and achievement of targets.

Data Collection

Responsibility: Departmental Heads and SDL&I Team

Objective:

- Establish regular data inputs across departments for real-time updates.
- Develop a checklist aligned with the strategy to ensure comprehensive data collection.
- Cross-reference indicators with supporting documentation for accuracy.

Quarterly Audits and Reviews

Responsibility: Industrialisation Advisors and Commodity Managers

Objective:

- Identify gaps, track progress, and recommend improvements to remain on course.
- Use audit findings to create action plans for identified gaps.
- Present audit outcomes and action plans to senior management and relevant committees.

Stakeholder Communication

Responsibility: Industrialisation Advisors and Commodity Managers

Objective:

- Maintain transparent communication with stakeholders to build trust and accountability.
- Provide quarterly progress updates to internal stakeholders for strategic alignment.

Compliance Reporting to Commissioner

Responsibility: SDL & I Unit

Objective:

- Ensure compliance with the B-BBEE Act and the Public Finance Management Act (PFMA).
- Submit annual reports to the B-BBEE Commission detailing performance across key pillars, including ownership, management, skills development, and socio-economic contributions.
- Report sector-specific contributions toward the B-BBEE scorecard.

Critical success factors

- **Leadership Commitment:** Executive leadership must actively support initiatives to drive success.
- **Resource Allocation:** Allocate adequate financial and human resources to sustain momentum.
- **Continuous Monitoring:** Implement robust systems for tracking progress, with periodic reviews and adjustments.
- **Change Management:** Develop a framework that promotes inclusivity and embeds B-BBEE principles into the company culture.

Stakeholder engagement and advocacy plan

The success of NTCSA's industrialisation strategy hinges on securing buy-in and adoption from a wide range of stakeholders, each with their own interests and levels of influence. This engagement will ensure that all parties understand their roles in advancing the strategy and contribute to its long-term success. The table below outlines each stakeholder's interest, level of influence, and key points of engagement.

TABLE 9: NTCSA'S INDUSTRIALISATION STRATEGY KPAs AND KPIS FOR THE PERIOD 2025 TO 2029

Key Performance Area	Key Performance Indicator	Target 2025	Target 2026	Target 2027	Target 2028	Target 2029
Stakeholder and Supplier Engagement	List of stakeholders					
	List of suppliers and engagement plan per supplier					
Development of Management Systems	Monitoring and Management Systems for all commodities					
Needs Analysis and Mapping	A Needs Analysis Report					
	A strategy per commodity					
Engagement with DTIC for Import Exemptions	Protocol for Import Exemptions					
Incubation of Local Suppliers	List of incubation Programmes					
	Partnerships with Educational Institutions					
Supplier Diversification and Local Capacity Building	Diversification Strategy					
	Local Capacity Building					

Note: These KPAs and KPIs are for the period 2025 to 2029 and will be updated after 5 years identifying other areas that will be emerging.

9 NTCSA PLANNED INDUSTRIALISATION PROCESS

The Industrialisation process of NTCSA is a significant step in restructuring South Africa's electricity supply industry. Here are some key aspects of this process:

9.1 Objectives

Unbundling from Eskom: The NTCSA is being established as an independent entity, separate from Eskom's generation and distribution divisions.

Enhanced Efficiency: Aims to improve the efficiency and reliability of the national grid by focusing solely on transmission.

Facilitating Renewable Energy: Supports the integration of renewable energy sources into the grid, promoting a more sustainable energy mix.

9.2 Key Industrialisation Steps

Regulatory Approvals: The National Energy Regulator of South Africa (NERSA) has approved the necessary licences for NTCSA's operation, including trading, import, and export licences.

Operationalisation: The transfer of powers and duties from Eskom to NTCSA, including power purchase agreements with independent power producers (IPPs).

Infrastructure Development: Investment in upgrading and expanding transmission infrastructure to meet future energy demands.

9.3 Expected Impact

Economic Growth: By improving the reliability of the electricity supply, NTCSA supports industrial growth and economic development.

Job Creation: The restructuring and expansion of the transmission network create job opportunities in various sectors.

Energy Security: Enhances South Africa's energy security by ensuring a stable and efficient transmission network.

This process is crucial for modernising South Africa's electricity supply industry and supporting the country's broader Industrialisation goals.

The NTCSA operationalisation is divided into three key stages as listed below

Stage 1: Investigation

- **Review Capabilities:** Assess the potential of local suppliers to enter the industry.
- **Identify Technology Needs:** Determine the technological advancements required.
- **Legislation Review:** Examine supportive industry legislation.
- **Stakeholder Engagement:** Collaborate with relevant stakeholders to set objectives and timelines.

Stage 2: Execution

- **Infrastructure Implementation:** Establish necessary infrastructure, including funding, legislation, and technology, to support Industrialisation.
- **Economic Active Zone:** Develop zones that encourage economic activity.
- **Manufacturing Plant Set-up:** Establish manufacturing facilities.

Stage 3: Contracting

- **Prototyping:** Develop prototypes to test and refine products.
- **Competitiveness:** Ensure local and global competitiveness.
- **Contracting:** Finalise contracts for production and supply.

This structured approach ensures a comprehensive and systematic process for industrial development.

10 ROADMAP FOR NTCSA INDUSTRIALISATION

The industrialisation roadmap for NTCSA involves several key steps and considerations. By following this structured approach, NTCSA can effectively manage its industrialisation strategy, mitigate risks, and capitalise on opportunities. This plan ensures that NTCSA and board have a clear view of progress and potential challenges, enabling informed decision-making.

TABLE 10: INDUSTRIALISATION ROADMAP

Focus Area	Activities	Timeline
Stakeholder Engagement	Identify Key Stakeholders: Government bodies (e.g., DTIC), industry partners, local communities, and suppliers. Engagement Plan: Regular meetings, workshops, and feedback sessions	Initial engagement in Q1 2024/25, followed by quarterly updates
Needs Analysis and Mapping	Market Analysis: Assess current and future demand for transmission infrastructure. Supplier Capability Assessment: Evaluate the capacity and capabilities of existing and potential suppliers. Policy Positioning: Align with national industrial policies and incentives.	Complete by Q2 2024/25.
Incubation of Local Suppliers	Supplier Development Programmes: Training, funding, and technical support. Partnerships with Educational Institutions: Develop specialized training Programmes.	Ongoing, with major milestones every 2 years.
Risk Management and Early Warning Systems	Case Study: Transformers Supply Chain Risk Identification: Single supplier dependency, delivery delays. Learnings: Diversify suppliers, build local capacity. Early Warning System: Regular monitoring and reporting mechanisms. Engagement with DTIC: Establish protocols for import exemptions.	Implement by Q4 2024/25, with annual reviews.
Dashboard for NTCSA and EXCO and Board	Key Metrics: Supplier performance, project timelines, risk indicators. Visualization Tools: Interactive dashboards with real-time data. Reporting Frequency: Monthly reports with quarterly deep dives.	Develop and deploy by Q3 2024/25.
Focus Areas and Initial Steps	Market Analysis and Information Gathering: Start with a comprehensive market study. Supplier Ability and Policy Position: Assess and align with national policies. Frequency of Reporting: Establish a regular reporting cadence to keep stakeholders informed.	
Supplier Diversification and Local Capacity Building	Diversification Strategy: Identify and onboard multiple suppliers. Local Capacity Building: Collaborate with industry to enhance local manufacturing capabilities.	Initiate by Q1 2025/26, with continuous progress tracking.
Engagement with DTIC for Import Exemptions	Protocol Development: Create a clear process for applying for exemptions. Regular Communication: Maintain open lines of communication with DTIC.	Establish by Q2 2025/26.

Case Study - Transformers

Background

Transformers are essential components in the transmission network and having a reliable supply chain is crucial for maintaining the stability and efficiency of the power grid. Historically, NTCSA has relied on a single supplier for transformers, which has led to several challenges.

Challenges Faced

Single Supplier Dependency:

Risk: Relying on one supplier increases vulnerability to supply disruptions.

Impact: Delays in delivery can lead to project delays and increased costs.

Supply Chain Disruptions:

Risk: Any issues at the supplier's end (e.g., production delays, quality issues) directly impact NTCSA's operations.

Impact: Potential for power outages and reduced reliability of the transmission network.

Quality and Performance Issues:

Risk: Inconsistent quality can lead to higher maintenance costs and reduced lifespan of transformers.

Impact: Increased operational costs and potential safety hazards.

Learnings and Mitigation Strategies

Supplier Diversification:

Action: Identify and onboard multiple suppliers to reduce dependency on a sole source.

Benefit: Enhances supply chain resilience and reduces risk of disruptions.

Local Capacity Building:

Action: Collaborate with local manufacturers to build their capacity to produce transformers.

Benefit: Supports local industry, creates jobs, and reduces reliance on imports.

Early Warning Systems:

Action: Implement monitoring systems to detect potential supply chain issues early.

Benefit: Allows for proactive management and mitigation of risks.

Engagement with DTIC:

Action: Establish protocols for applying for import exemptions when necessary.

Benefit: Ensures continuity of supply in case of local production shortfalls.

Implementation Steps

Supplier Assessment and Onboarding:

Conduct a thorough assessment of potential suppliers.

Onboard multiple suppliers to diversify the supply chain.

Capacity Building Programmes:

Partner with local manufacturers and provide technical and financial support.
Develop training Programmes in collaboration with educational institutions.

Monitoring and Reporting:

Set up real-time monitoring systems for supply chain performance.
Regularly report to EXCO and the board on supply chain status and risks.

Policy and Regulatory Engagement:

Work closely with DTIC to streamline the process for import exemptions.
Advocate for policies that support local manufacturing and supply chain resilience.

Conclusion

The Transformers case study highlights the importance of a diversified and resilient supply chain. By learning from past challenges and implementing strategic measures, NTCSA can ensure a stable and efficient transmission network. This approach not only mitigates risks but also supports local economic development and Industrialisation.

11 SUSTAINABILITY OF NTCSA INDUSTRIALISATION STRATEGY

To ensure the sustainability of Industrialisation and local supplier engagement, NTCSA can leverage several strategies and agreements:

- **Bilateral Agreements:** South Africa has numerous bilateral agreements that can be utilised to foster economic growth and strategic partnerships. These agreements often include provisions for mutual benefits such as tariff reductions and defence cooperation, which can help local suppliers sustain themselves.
- **African Continental Free Trade Area (ACFTA)** Participation in the ACFTA can significantly boost intra-Africa trade by eliminating barriers and promoting trade in value-added production. This can provide local suppliers with access to a larger market, enhancing their sustainability.
- **Southern African Development Community (SADC) and Southern African Customs Union (SACU) Agreements:** These regional agreements aim to enhance regional integration and economic development. By participating in these agreements, local suppliers can benefit from market access opportunities and reduced tariffs, which can help them sustain their operations.
- **Business Development Initiatives:** As part of the incubation process, NTCSA can implement business development initiatives that leverage these agreements. This can include providing training, financial support, and access to new markets, helping local suppliers build their capacity and sustain their businesses.
- **Learning from PRASA among other success stories:** PRASA has implemented several sustainability practices, such as improving operational safety, security, and financial performance. By studying PRASA's approach, NTCSA can adopt similar strategies to ensure the sustainability of industrialisation and local supplier engagement.
- **Diversification of Markets:** Encouraging local suppliers to diversify their markets can reduce dependency on a single market and increase resilience.
- **International Trade Agreements:** Taking advantage of South Africa's participation in various international trade agreements can open new markets for local suppliers.
- **Capacity Building and Skills Development:** Implementing continuous training programmes to upskill the workforce and keep them abreast of the latest industry standards and technologies.
- **Knowledge Exchange:** Facilitating exchange programmes with other countries to learn best practices and innovative approaches.
- **Innovation and Technology Adoption:** Investing in R&D to drive innovation in products and processes.
- **Digital Transformation:** Encouraging local suppliers to adopt digital tools and technologies to improve efficiency and competitiveness.
- **Financial Support and Incentives:** Providing access to financial support through grants, loans, or subsidies to help local suppliers invest in growth and development.

- **Tax Incentives:** Implementing tax incentives to encourage investment in industrial activities and innovation.
- **Sustainability Practices:** Promoting adherence to environmental standards to ensure sustainable industrial practices.
- **Corporate Social Responsibility (CSR):** Encouraging suppliers to engage in CSR activities that benefit the community and environment.
- **Collaborative Networks:** Forming industry clusters where companies in related fields can collaborate, share resources, and drive innovation
- **Public-Private Partnerships (PPPs):** Leveraging PPPs to fund large-scale industrial projects and infrastructure development.
- **Monitoring and Evaluation:** Establishing clear metrics for monitoring the performance and sustainability of local suppliers.
- **Feedback Mechanisms:** Implementing feedback mechanisms to continuously improve supplier development Programmes.

12 ABBREVIATIONS, GLOSSARY AND TERMS

Abbreviations

ACFTA	African Continental Free Trade Area
B-BBEE	Broad-Based Black Economic Empowerment, legislated in South Africa under the Preferential Procurement Policy Framework Act (No 5 of 2000) and the Broad-based Black Economic Empowerment Act (No 53 of 2003)
BRICS	Emerging national economies of Brazil, Russia, India, China, and South Africa
CSR	Corporate Social Responsibility
DPE	Department of Public Enterprises
EAL	NTCSA Academy of Learning
EXCO	Executive Committee
IRM	Integrated risk management
IT	Information Technology
KPI	Key Performance Indicator
LTIR	Lost-time incidence rate
MOA	Memorandum of Agreement
MW	Megawatt
NERSA	National Energy Regulator of South Africa
NIP	National Industrialisation Policy
NTCSA	National Transmission Company of South Africa
OHS	Occupational Health and Safety
PESTEL	Political, Economic, Social, Technological, Environmental and Legal (Sphere)
PFMA	Public Finance Management Act
PPP	Public-Private Partnership
R&D	Research and Development
SACU	Southern African Customs Union Agreements
SADC	Southern African Development Community
SAPP	Southern African Power Pool
SHEQ	Safety, Health, Environment and Quality
SLA	Service Level Agreement
SMME	Small, Medium, and Micro Enterprises
SOC	State-owned company

SOP	Standard Operational Procedure
t.b.d.	to be determined
VAT	Value-added tax (RSA)

Glossary

NTCSA Sustainability Performance Index (SPI)	Index covering technical, economic, environmental, and social measures to score sustainable performance.
Forced outage	Shutdown of a generating unit, transmission line or other facility for emergency reasons or a condition in which generating equipment is unavailable for load due to unanticipated breakdown.
Human Resources Sustainability Index (HRSI)	A measure of NTCSA's ability to achieve its human resources objectives.
Independent Power Producer (IPP)	Any entity, other than NTCSA, that owns or operates, in whole or in part, one or more independent power production facilities.
Kilowatt-hour (kWh)	Basic unit of electric energy equal to one kilowatt of power supplied to or taken from an electric circuit steadily for one hour; one kilowatt-hour equals 1 000 watt-hours.
Lost-time incident rate	A proportional representation of the occurrence of lost-time injuries over 12 months.
Megawatt	One million watts
Megawatt-hour (MWh)	One thousand kilowatt-hours or one million watt-hours
Mothballed	Plant (i.e., power stations) placed in long-term storage.
Outage	The period in which a generating unit, transmission line, or other facility is out of service.

Energy terms

Units of power	Units of energy
Power is generated per unit of time	Energy is power multiplied by time
Power is expressed in watts (W)	
1 kW (kilowatt) = 1 000 W	1 kWh (kilowatt-hour) = 1 kW expended over one hour
1 MW (megawatt) = 1 000 kW	1 MWh (megawatt-hour) = 1 000 kWh
1 GW (gigawatt) = 1 000 000 kW or 1 000 MW	1 GWh (gigawatt-hour) = 1 000 000 kWh or 1 000 MWh
Voltage	
1 kV (kilovolt) = 1 000 V	
Presentation currency	
R1 million = R1 000 000	
R1 billion = R1 000 000 000	