



TIPS FORUM 2023

INDUSTRIAL POLICY IN AN ERA OF GLOBAL STRUCTURAL CHANGE: IMPLICATIONS FOR SOUTHERN AFRICA

TITLE: NIPPING ECONOMIC STAGNATION IN THE BUD – THE ROLE OF TRANSMISSION INFRASTRUCTURE IN SOUTH AFRICA’S GREEN ECONOMY INDUSTRIALISATION

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Abstract

The power transmission grid plays an undeniably critical role in South Africa's economy by delivering the electricity that households and industry need to be productive. At present, the grid infrastructure is not expansive enough to accommodate new generation. With only a reported 17GW of spare capacity, the transmission grid has in fact, become one of the biggest barriers for deploying much needed new generation. The reality of this constraint was clearly demonstrated when in December of 2022, the renewable energy independent producer power procurement program (REIPPPP) selected only five preferred bidders in bid window 6 (BW6) due to inadequate grid capacity. There is therefore a need for South Africa to embark on an accelerated build out of the transmission infrastructure. The augmentation of the transmission infrastructure in regions targeted for renewable energy development is also acknowledged in Eskom's latest Transmission Development Plan (TDP).

However, within the grid expansion imperative is also an opportunity for industrialisation. According to the Better finance, better grid consultation paper launched by the Centre for Sustainability Transitions and Blended Finance Taskforce in March 2023, the national grid infrastructure requires a build-rate of over 2000km per annum. Currently, domestic contracting firms are only capable of building at a rate of 300km per annum. Moreover, wind and solar resources require a greater quantity of grid infrastructure as the general output of one renewables power station is less than that of fossil fuels. Therefore, a decarbonized grid holds less capacity per grid connection, which creates an even bigger requirement for a more spread out (or decentralised) grid infrastructure. This characteristic of the decarbonized grid, coupled with the difference in South Africa's current building capacity in relation to the build-rate required, is an industrialisation opportunity where the capacity building of existing firms, coupled with industry expansion and industrial policy can be used to best position South African firms to absorb as much of this opportunity as possible.

This paper plans to examine how the need to accelerate the transmission build rate creates an opportunity to increase the industrial productivity of local electrical, civil and manufacturing companies. It delves into the state of play and calls for an industrial strategy that evaluates the impact (whether positive or negative) of applicable existing industrial policy and promotes the active facilitation of capacity building in local industries that could participate in the grid expansion process.

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Abbreviations

BFT	Blended Finance Taskforce
BW	Bid window
CST	Centre for Sustainability Transitions
DBSA	Development Bank of South Africa
DTIC	Department of Trade, Industry, and Competition
HV	High voltage
IPAP	Industrial Policy Action Plan
IRP	Integrated Resource Plan
JET IP	Just Energy Transition Investment Plan
MW	Megawatt
NDP	National Development Plan
NIP	National Infrastructure Plan
NTC	National Transmission Company
PCC	Presidential Climate Commission
RE	Renewable Energy
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
RFI	Request for Information
SIP	Strategic Integrated Project
SOE	State-owned enterprise
TDP	Transmission Development Plan
TIPS	Trade & Industrial Policy Strategies
Tx	Transmission
UNEP	United Nations Environment Programme,

1. Introduction

South Africa requires reliable access to electrical power in order to achieve the structural transformation that is needed to promote economic growth and social progress. A key component of enabling this access to electricity is the infrastructure that transports electrons from power stations across long distances to the various substations, from which it is subsequently distributed to households and businesses that rely on it in their daily operations. At present however, the grid infrastructure in South Africa is not expansive enough to accommodate the new power generation for short- and long-term energy security.

There is therefore a need for South Africa to embark on an accelerated build out of the transmission infrastructure. The augmentation of the transmission infrastructure in regions targeted for renewable energy development is also acknowledged in Eskom's latest Transmission Development Plan (TDP). However, within the grid expansion imperative is also an opportunity for industrialisation. A nationwide strategic transmission initiative for expanding the grid has the potential to promote economic growth and create jobs while fostering a low-carbon environment (BFT & CST, 2023).

2. Expanding the division in the middle – the power grid

2.1 Situating the power transmission grid in South Africa's economy

The state-owned power utility, Eskom, is comprised of three divisions, namely Generation, Transmission and Distribution. The Transmission (Tx) division operates, maintains and manages the power transmission infrastructure, which is an interconnected network of high-voltage (HV) powerlines and accompanying electrical equipment that transmits electricity.

Insufficient power supply is currently undermining this system, which has made it necessary for Eskom's System's Operator to implement load shedding (or scheduled blackouts on a rolling timetable) in order to balance power supply and demand and thereby protect the technical integrity of the grid. An additional generation capacity of 4000 – 6000MW is required to close the supply gap that is causing loadshedding (BFT & CST, 2023). According to the South African Reserve Bank, load shedding – which is necessary to protect the technical integrity of the grid when there's insufficient power supply for the load demand – causes the country to lose approximately ZAR204 million to ZAR899 million per day during Stage 3 and Stage 6 respectively (News24, 2023). The loss of productivity can reduce the GDP by as much as 5% (BFT & CST, 2023).

Achieving energy security requires more power to be generated to match the electricity demand in the country. Renewable energy (RE) is the easiest and fastest method of obtaining new generation for the grid as evidenced by the success of the various bidding rounds of South Africa's Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) which has succeeded in supplementing the grid with 6200MW of power in the past decade (Eberhard & Naude, 2018; BFT & CST, 2022). A recommendations report by the Presidential Climate Commission (PCC) also found that

the combination of renewables (solar and wind), storage technologies and peaking support is the pathway of least cost.

The deployment of RE through the REIPPPP, however, was brought to an abrupt halt when in 2022 under bid window 6 (BW6), 3000MW of the original bid round allocation was rejected due to grid capacity constraints. According to Eskom's 2023 – 2032 Transmission Development Plan (TDP), 4000 – 5000MW of power generation needs to be added per year in order to supplement the current installed supply of 56000MW with an additional 53000MW needed to achieve energy security in the next decade (Eskom, 2023a). However, in order for this electricity to reach the countless businesses and households in need of it, a functional grid is required to transport it. As a result, there's increasingly greater consensus amongst stakeholders that expanding the power transmission infrastructure or grid should be at the centre of energy planning (Infrastructure South Africa, 2022; The Presidency, 2022; The Presidential Climate Commission, 2023; BFT & CST, 2023; Montmasson-Clair, 2023). Hence the grid has received a lot more focused attention in recent years.

The National Infrastructure Plan 2050 (NIP 2050) is a cabinet approved infrastructure blueprint for South Africa that aims to guide the foundational steps necessary for accomplishing the objectives outlined in the National Development Plan (NDP) (Infrastructure South Africa, 2022). NIP 2050 considers public infrastructure as a non-negotiable pre-requisite to structural transformation and inclusive growth. Infrastructure is critical to reducing spatial inequality, achieving greater productivity and competitiveness and supporting emerging job-creating sectors. The improvement and expansion of energy infrastructure, including the transmission grid network, is one of the four pivotal infrastructure sectors in NIP 2050 and is also designated as one of the government's Strategic Integrated Projects (SIPs) (Republic of South Africa, 2023).

2.2 The industrialisation opportunity in the grid expansion challenge

Expanding the grid is a massive undertaking. And while Eskom owns, operates and funds the construction and upkeep of the transmission network, they do not construct the physical infrastructure. This is fulfilled by the private sector. Eskom's Strategic Grid Planning Manager, Ronald Marais, echoed this during a live event when he said "the reality is that Eskom doesn't build any transmission, or any substations or supply any equipment. The private sector does." He went on to explain that the grid demanded a significant increase in productive capacity from the private sector to address the forthcoming construction challenge effectively (Centre for Sustainability Transitions & Daily Maverick, 2023).

The target of 4000 – 5000MW of renewables per year requires the construction of approximately 14 218km of transmission lines and the installation of 106GVA of transformer capacity in the next decade. A significant portion of this will happen in the second part of the decade due to significant scaling up that's required for project planning, permitting, financing and industry capacity in the next few years (BFT & CST, 2023). If implemented locally, this would require the domestic sector to ramp up productive output by from approximately 300km per year of transmission lines to over 2000km per annum – over six times as the sector's current build rate (BFT & CST, 2023). This scale and speed of constructing the power grid has never been done in South Africa.

In June 2023, Segomoco Scheppers, the managing director of the Tx division, announced that Eskom would adopt the Engineer, Procure, and Construct (EPC) contracting model for grid expansion projects (Creamer, 2023). The process would, for example, entail that a selected primary EPC

contractor take charge of the build project and design, procure, build and commission the piece of infrastructure before handing it over to the Tx division (or NTC South Africa if the SOE is unbundled). This departure from Eskom's usual bureaucratic procedures aims to expedite the infrastructure development process (Creamer, 2023). However, the question that lingers is whether domestic electrical and construction companies can genuinely capitalize on this opportunity and effectively ramp up their production capacity to meet the demands of grid expansion projects. This pertains specifically to locally owned and operated EPC contractors such as Adenco Construction, AMP Property Management and Land Acquisition, ARB Electrical Wholesalers, Babcock, Conco Group, and Konupi Contractors (Swilling, 2023).

The sheer magnitude of the construction that needs to take place in the next decade alone signals a strong need for a strategic approach in helping local private sector EPCs, like the ones listed above, to increase their operations and workforce. The expansion of the grid could provide an additional boost to the already promising local construction sector. Its performance has been on the rise since the last quarter of 2022, leading to a notable increase in job opportunities (Trade & Industrial Policy Strategies, 2023). Despite the potential for significant market opportunities arising from the grid expansion project, South African companies face a tangible risk of missing out if the necessary enablers are not implemented to prepare the local industries for this opportunity. In light of the acknowledged importance of a functional grid for the current and future economy, waiting for local companies to build capacity for the construction process seems highly improbable. This notion is already evident, as evidenced by Eskom's recent actions on 15 June 2023, when its tender office issued a request for information (RFI) with Prequalification from "manufacturers with the potential to supply fabricated steelwork to construction companies for Transmission lines and substations, for various projects in support of the Eskom Transmission Development Plan" (Eskom, 2023b). While this is not an official request for proposals for actual construction projects, it signals that Eskom is actively seeking potential suppliers and is already taking steps towards the implementation of the TDP (Rodseth, 2023). This indicates a sense of urgency and a commitment to moving forward with the grid expansion projects, making it evident that local companies must act promptly to gear up for the upcoming opportunities to avoid losing out on the market.

NIP 2050 also emphasizes on capacity building, which includes furthering industrial development and localization in how the infrastructure projects are carried out, such as the localization of supply chains to stimulate and grow the civil construction and supplier industries (Infrastructure South Africa, 2022). However, it remains to be seen how South Africa can achieve this, and whether industrial policy has an effective role to play in boosting the positionalities of local firms in a way that enables them to scale up appropriately. Failing to seize the reindustrialization opportunity through these grid expansion projects also translates to a missed chance to generate potential jobs that could have otherwise been created.

3. A role for industrial policy in grid expansion?

The transmission infrastructure expansion project is a massive, national construction project. Building out the grid is not a once off project. In addition to the 14,000km of new power transmission lines needed, more RE generation will need to come online to offset the phase out of coal power plants and meet the rising peak electricity demand (BFT & CST, 2023). Moreover, wind and solar resources require a greater quantity of grid infrastructure as the general output of one

renewables power station is less than that of fossil fuels. Therefore, a decarbonized grid holds less capacity per grid connection, which creates an even bigger requirement for a more spread out (or decentralised) grid infrastructure. This characteristic of the decarbonized grid means the infrastructure will likely need to be expanded beyond current projections for 2050.

Currently, constructing the grid at the necessary scale and speed surpasses the capacity of locally owned industrial firms. However, this situation presents a significant opportunity for these firms to expand their capacity and capabilities. Amid the presence of major international corporations such as Siemens and Murray and Roberts, smaller local players will need support to not only participate in the grid expansion but also to take on more of the value chain and project scale. This would lead to expansions in production and workforce at the firm level and potentially foster the growth and vitality of vibrant supply chains. The various opportunities range from fabricating steel towers and the providing and installing electrical equipment and powerlines. The grid expansion is a multi-sectoral endeavour, necessitating both construction and manufacturing firms to ramp up their operation. The task that now remains is to identify what these local firms need to bolster their operations, and what industrial policy strategies can be employed to position them optimally to seize this reindustrialization opportunity.

The primary objective of industrial policy in South Africa, entrusted to the Department of Trade, Industry, and Competition (DTIC), is to stimulate and bolster industrial development to foster broader economic development by enhancing the productive capabilities of the economy. Since the end of apartheid, South Africa has adopted several industrial strategies aimed at transitioning from its historically dominant commodity market to a more industrialized, knowledge-based economy. At its core industrial policy in South Africa seeks to transform the racially skewed employment, management and ownership that characterizes the economy, and has applied various industrial policy approaches to accomplish this (Department of Trade Industry & Competition, 2018).

There's the National Industrial Policy Framework (NIPF) and Industrial Policy Action Plan (IPAP) which were endorsed in 2007 and exemplify the efforts made to facilitate transformation through industrialization. The NIPF aimed to encourage labour-intensive industries to transition into more knowledge-intensive sectors, while the IPAP called for strategic interventions to actualize this transformation (Trade & Industrial Policy Strategies, 2016). The latter published its last iteration in 2018 and gave way to the masterplan strategy, which relaunched industrial policy in 2019. Masterplans generate a short list of critical interventions aimed at achieving an agreed upon goal and create platforms of engagement between various stakeholders to address problems within the industry as they arise (Levin & Makgetla, 2019). A promising feature of the Masterplan model is its integration of constructive engagement and implementation that respond to emerging evidence and changing contexts.

This is critical in a world that is trying to transform toward global sustainability (Westley et al., 2011; Chang & Andreoni, 2020; Mondliwa & Roberts, 2021). In this era, more than ever before, industrial policy is obligated to focus beyond the economic returns and consider social and environmental outcomes of the economies are shaping. South Africa's transformation journey delves deeper into these dimensions than most countries. It is one of the most carbon intensive economy in the world (Swilling, 2013; Parr, Swilling & Henry, 2018; Makgetla & Patel, 2021; Sovacool et al., 2021). This is further compounded by the highest social inequality (World Bank, 2022) and unemployment rates worldwide (StatsSA, 2023; World Population Review, 2023). These are the realities that all policies,

and especially industrial policy which is closely linked to a country's capacity to achieve structural transformation (Aryeetey & Moyo, 2012), cannot afford to ignore. Green industrial policy exemplifies this coupling of multiple objectives, striving to shift industrial policy from the business-as-usual (BAU) approach to one that interlinks economic growth, social progress and environmental preservation (UNEP, 2020). Nevertheless, despite South Africa embracing this approach, its real-world impact has been minimal. Rather than transforming industrial policy, the United Nations Environment Programme's green economy policy review characterized South Africa's integration of green industrial policy as appearing to be an "add-on" to other developmental BAU initiatives within the country (UNEP, 2020).

Rather than trying to perform a balancing act of competing interests, Mazzucato proposes a new way of tackling "the grand challenges of our time" using industrial policy (Mazzucato & Kattel, 2020, 2023; Mazzucato, Kattel & Ryan-Collins, 2020). The framework emphasizes the importance of specific and targeted goals that mobilize the private and public sectors to work together in order to accomplish mission-oriented objectives. At the core of this approach is the specific and ambitious challenge-driven missions aimed at challenging the grand challenges (such as unemployment). The missions are meant to guide innovation and catalyse investment toward complex, multi-sectoral problems. In this framework, industrial policy does not "fix market failures." Rather, industrial policy is used to shape the market through missions such that the grand challenges are addressed. This involves the state (or state entities like the Infrastructure Fund for example) taking the lead in making the necessary investments and bearing the frontline risk that private firms may shy away from. The framework calls for a more active engagement and partnership between the government and the private sector, in dynamics that allow both sides to adapt and adjust to changing conditions as the missions progress. While there's significant criticism that this approach would lead to excessive intervention from the state side, Mazzucato argues that micromanaging the process and running the risk of stifling innovation, the government should set a clear direction for the market by creating demand and shaping how it develops, as well as making the initial bold, high-risk investments which crowd in more private investors in a way that rewards the frontliners that are willing to invest and innovate (Andreoni et al., 2022).

But what are the missions that need to be undertaken in order to empower South African EPC firms and contractors to scale up? During the live debate about expanding the grid, Adenco Construction CEO, Kashif Wicomb, listed some of the primary barriers (Centre for Sustainability Transitions & Daily Maverick, 2023):

- *Insufficient technical capacity and workforce.* South Africa faces a shortage of accredited engineers capable of undertaking the required work. Many engineers are employed by engineering consultancies or international renewable energy companies that offer higher salaries compared to those in South Africa.
- *Insufficient guarantee facilities.* Local contractors are unable to provide the guarantees that project developers require, which will massively affect big projects that the grid extension requires. There is therefore a need for developmental financial institutions to step in more aggressively to provide guaranteed facilities that contractors need. The alternative is that international contractors, who have sufficient resources, come in and build, but this will likely result in limited economic development.

- *Lack of market certainty.* Contractors need certainty regarding upcoming projects for at least a two-year period to justify investing in the costly materials, equipment, and expertise necessary for these projects.
- *Lack of technical skills development in the country.* Less than 1% of the high schools in South Africa are technical high schools. To build long-term capacity, there is a need for more technical high schools. In the short term, experienced engineers should be called to mentor younger engineers to increase capacity to tackle the challenge ahead.

The lingering question is whether industrial policy can play a role in addressing these real-life obstacles that local industries are currently grappling with. If it is through a masterplan which is the current industrial strategy of choice, then which masterplan? Is it the Steel Masterplan or the Renewable Energy Masterplan? Is it the Construction Masterplan which is yet to be developed? Or since this is clearly a cross-sectoral project that requires multiple engaging stakeholders, should the grid expansion project have a Masterplan of its own?

While it's not yet clear what industrial strategy should be used to tackle the grid expansion challenge in a manner that facilitates the most local economic growth, it is evident that a well-defined plan involving active participation from both the public and private sectors is essential and urgent.

4. Conclusion

South Africa needs to expand the power transmission grid in order to accommodate the new generation that is urgently needed for energy security. A functioning grid serves as a vital precondition for stabilizing the economy, addressing unemployment, and unlocking new opportunities associated with a low-carbon economy. Beyond these factors however, the construction of this crucial infrastructure presents a valuable industrialization opportunity for local industries in EPC, manufacturing, and construction to expand operations and flourish, which aligns to the The National Infrastructure Plan 2050 (NIP 2050) and National Development Plan (NDP).

The scale and build rate that is required for the grid expansion is far beyond what local industries can currently handle. Industrial policy can play a role by boosting the positionalities of local firms in a way that enables them to scale up appropriately. The paper highlights the need for capacity building, which includes furthering industrial development and localization in how the infrastructure projects are carried out. The challenges that local firms need to overcome in order to ramp up production are complex and include insufficient technical capacity and workforce in South Africa, which creates a shortage of accredited engineers capable of undertaking the required work; insufficient guarantee facilities that prohibit local contractors from taking on big projects; market uncertainty in the long term and a lack of technical skills in South Africa's schooling system.

The paper calls for well-defined industrial strategy involving the active participation of both the public and private sectors that makes it possible to build the grid while creating industrialization opportunities for the local economy. This aligns to Mazzucato's challenge-driven mission economy, which advocates for the active collaboration of public and private sectors and a "market shaping" approach to industrial policy instead of a market fixing one.

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