ACER 2023 conference paper

ACHIEVING COMPETITIVE OUTCOMES IN THE SOUTH AFRICAN ELECTRICITY MARKET[1]

Anthony Felet and Faarez Gamieldien[2]

Introduction

1. The South African Electricity Supply Industry (ESI) continues to be dominated by the state-owned utility Eskom, which is responsible for nearly all generation output. It performs the transmission function solely and shares the distribution function with municipalities. In response to the ongoing electricity supply crisis, the South African Government is focused on improving the reliability of Eskom's coal-fired plants and procuring more energy capacity from Independent Power Producers (IPPs). In this paper, we argue that measures that promote competition in the contestable segments of the ESI, namely generation and retail, would be of greater importance.

2. Competition has the potential to improve the supply of electricity, as well as promote efficiency and service offerings to consumers. We highlight the importance of competition in this market and the type of market structure that facilitates competitive outcomes. We propose specific interventions to transition the South African electricity market from its current monopolistic single buyer structure to one where there is active participation of IPPs, large customers with embedded generation facilities and independent electricity traders.

Current structure of the ESI

3. The South African ESI currently operates under a single buyer model under which Eskom acts as the primary purchaser of electricity from its own generation division, IPPs and from the Southern African Power Pool (SAPP). Eskom is responsible for the supply of over 90% of local electricity demand with its power plants having a nameplate capacity of 47 GW of electricity in 2022. However, only 62% of the capacity was available during FY2022 due to the unreliability of plants and planned maintenance (Eskom Integrated Report 2022). This low availability (expressed as EAF[3]), is the primary cause of the extensive load shedding experienced by South African electricity users in recent years.

4. Eskom is also responsible for the balancing of the electricity system through the Eskom System Operator (SO). The SO provides real-time balancing of the supply and demand of electricity by forecasting the future demand for electricity on an hourly basis and ensuring that enough generation capacity is made available to meet that demand. The SO constantly monitors parameters such as voltage levels and frequency to maintain the balance of the national electricity grid. When the demand for electricity outstrips generation, the SO employs diesel powered generators to increase supply. As a last resort, when electricity demand cannot be met through supply, the SO implements load shedding to decrease the electricity demand (Eskom, n.d.).

[1] *This paper draws on the main findings of a report prepared in 2023 by a consortium of experts (including one of the authors of this paper – Anthony Felet) on behalf the National Treasury. The consortium was headed by Gopa-International Energy Consultants.*

[2] *The authors of this paper are employees at Genesis Analytics. The views expressed in this paper are those of the authors and do not necessarily represent the views of Genesis Analytics.*

[3] *Energy Availability Factor*

5. Other key players in the ESI include municipalities, IPPs and energy traders:

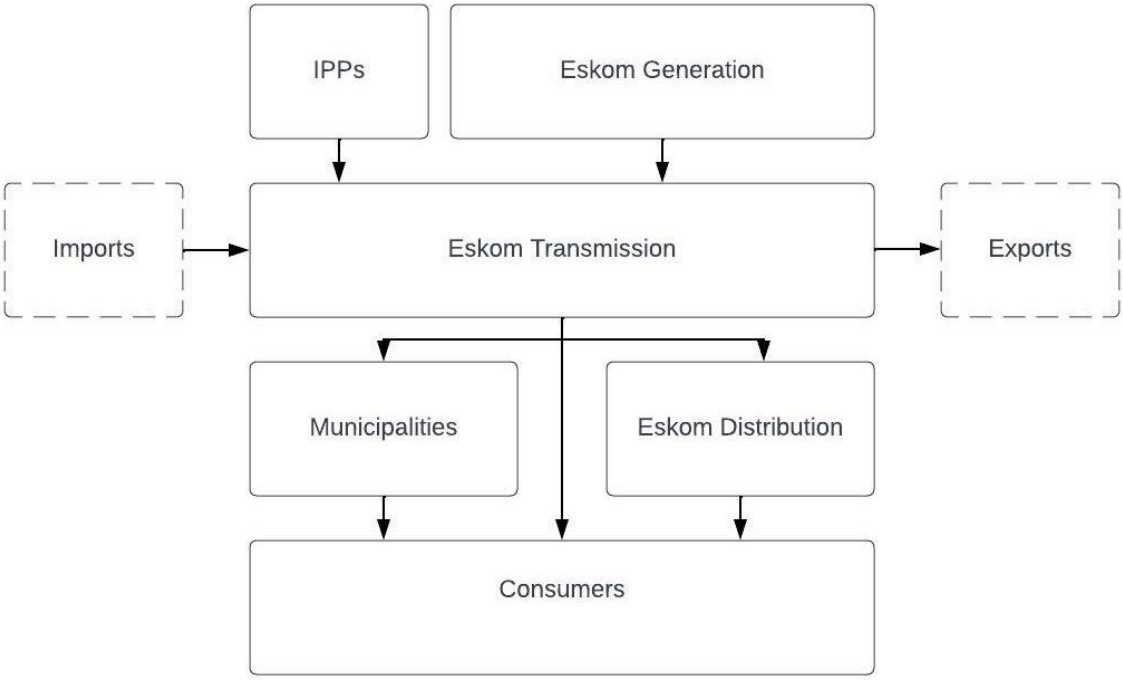
    a. Municipalities are mainly concerned with the distribution of electricity that it procures from Eskom or IPPs to end users and are responsible for the management and maintenance of the distribution networks as well as customer-facing processes such as metering and billing of electricity use. Municipalities' tariffs are monitored and approved annually by the national regulator NERSA.

    b. IPPs account for most of the renewable energy produced in South Africa, which is supplied almost exclusively to Eskom through the REIPPPP.[4] The REIPPPP is a competitive tender process designed to increase the participation of private renewable energy suppliers in South Africa. In recent years, IPPs have entered into Power Purchase Agreements (PPAs) with municipalities and large industrial customers.

    c. Energy traders purchase electricity from IPPs and resell this to commercial customers in the form of PPAs. They are required to have a trading licence from NERSA to be allowed to trade electricity.

6. The Southern African Power Pool (SAPP) is a regional coordination of electricity utilities across the SADC region. It coordinates the generation, transmission, and trade of electricity between member countries through a day-ahead market – a market for selling and procuring electricity prior to its physical delivery. Participants (electricity generators such as Eskom) submit their offers to buy or sell specific quantities of electricity the next day at specific prices. SAPP matches these bids and offers to determine the market clearing price (Southern African Power Pool, 2023). Figure 1 shows the current structure of the South African ESI.

Figure 1: South African electricity supply industry



Source: Own construction

7. Despite the introduction of the REIPPPP, which has brought a significant amount of renewable energy capacity, the South African ESI remains in a state of crisis, exhibiting higher levels of

[4] Renewable Energy Independent Power Producer Procurement Programme.

load shedding than ever before. South Africa's aging power stations, inadequate transmission infrastructure, mounting utility debt and the failing distribution networks means that new industry players are required for a sustainable ESI capable of meeting the needs of electricity users. This requires significant changes to the current market structure.

The need for competition

8. The South African ESI is characterised by a near complete absence of competition in all segments of the value chain. Even in generation, nearly all renewable energy provided by IPPs is procured centrally by government (DMRE) on behalf of Eskom. South African consumers have historically benefited from relatively cheap electricity, particularly in the 1990s and early 2000s, when a dysfunctional tariff-setting regime resulted in real reductions in electricity tariffs. However, poor centralized decision making resulted in periods of significant over-capacity and stranded assets (late 1980s and early 1990s) followed by periods of extensive load-shedding and tariff spikes (late 2000s to present) (Meridian Economics, 2018).

9. Given its dire predicament, the ESI requires a move towards a more competitive market structure. Competitive markets generally produce more efficient outcomes resulting in the lowest costs to customers (and the fiscus) in the long run. This applies to the power sector as well. The pricing mechanism in competitive power markets encourages more efficient use of electricity and stronger demand responses. In recent decades, economists and economic regulators have argued for liberalised and competitive electricity markets when competition is feasible (i.e., in generation and retail) (NERA Economic Consulting , 2008). The benefits of competitive power markets include:

    a. Pricing signals derived from competitive markets create incentives to add generation capacity and elicit demand responses from large customers.

    b. Competition provides choices to customers with respect to suppliers and generation sources.

    c. Suppliers of electricity are incentivized to operate more efficiently and lower their operational costs. When combined with carbon taxes, competitive markets encourage generators to invest in cleaner generation technologies.

    d. Under competitive markets, investors, not the ratepayer, assumes investment risk.

    e. Suppliers are incentivized to maximise service levels when competing for customers.

Recent government measures

10. The South African government has, in recent years, implemented measures and policies aimed at enhancing private sector participation in the ESI. In 2021, the Electricity Regulation Act was amended to increase the NERSA licencing threshold for embedded generation from 1MW to 100MW; this aimed to reduce the time associated with onboarding private generation capacity. In 2022, addressing the nation on the energy crisis, the President announced that the licencing requirements for new generation projects would be done away with completely.[5] This aimed to further streamline the regulatory process and increase the participation of private generation.

11. In 2019, the Department of Public Enterprises (DPE) announced plans to restructure Eskom into three separate subsidiaries under a holding company (Eskom Holdings). It proposed the

[5] https://www.gov.za/speeches/president-cyril-ramaphosa-address-nation-energy-crisis-25-jul-2022-0000

functional separation of Eskom's generation, transmission, and distribution roles to occur in 2020 and the legal separation of these three entities was proposed to take place in 2021 (Department of Public Enterprises of the Republic of South Africa, 2019).

12. From an economic perspective, the unbundling of Eskom into these entities is a step towards an independent transmission operator, which would provide IPPs non-discriminatory access to the transmission network. From an operational perspective, the unbundling is aimed at streamlining the management of Eskom's functions, providing clarity on performance, improving efficiency, and allowing providers of capital with greater clarity on the allocation of their contributions within Eskom. The functional separation of the three entities was achieved by April 2021, with the legal separation still underway (Eskom, 2022).

13. In 2023, NERSA approved the licence for one of the unbundled entities - the National Transmission Company of South Africa (NTCSA) - to operate a transmission system in South Africa. In issuing its approval, NERSA stated that the entity will operate the transmission system and perform the following key integrated roles for the interconnected power system (IPS):

    a. Transmission Network Service Provider (TNSP)

    b. System Operator (SO)

    c. Transmission System Planner (TSP)

    d. Grid Code Secretariat

14. The NTCSA will be responsible for ensuring grid stability, to which end, it is allowed to buy and sell power, but not for profit. NERSA added that the entity's independence was an important signal to IPP investors that they will have non-discriminatory access to the transmission system.

    "*[I]n terms of section 15(1) of the Act, the NTC will be afforded the opportunity to recover its efficiently incurred costs and a reasonable return on its assets. The Energy Regulator understands that the aforementioned provisions are both within the ambit of the Act and enable the NTC to be operationalised as an independent and reliable transmission system operator"*[6]

15. A measure gradually being rolled out by Eskom to facilitate private sector participation in the ESI is the facilitation of electricity wheeling. The buying and selling of electricity between private generators and end users through bilateral agreements facilitated over the existing transmission and distribution network, has been approved by Eskom since 2008 (Eskom, 2022). Wheeling does not necessarily entail the transport of electrons from a private generator to an end user but is rather a financial transaction which matches the electricity consumed by the end user with the energy made available by the generator through a credit on the customer bill for electricity delivered but not supplied by Eskom, subject to time-of-use (TOU) pricing structures.

16. The current wheeling framework allows for the third-party wheeling of electricity over medium and high-voltage networks (above 1kV), and requires customers to be on TOU tariffs, with generators required to apply to Eskom for grid connection, and end users required to sign amendments to their electricity supply agreements to account for adjustments for wheeled electricity. Where these transactions take place within a municipality (where customers are not

[6] https://www.sanews.gov.za/south-africa/independent-transmission-system-operator-issued-licence-operate

directly connected to Eskom), wheeling involves additional amendments to electricity supply agreements between municipalities and Eskom (Eskom, 2022).

17. Eskom is currently developing a "virtual wheeling" framework that allows energy to be wheeled at low voltages in one-to-many arrangements. Virtual wheeling is expected to enable industrial and commercial customers embedded within both Eskom and municipal networks to become customers of licenced third- party traders. Customers will benefit from shorter off-take terms than the trader's PPA terms with the IPPs.[7]

18. The benefits of the above interventions will take time to eventuate, evidenced by the relatively low uptake of private generation thus far. One of the causes of the low uptake is the current constraints on the transmission network.[8] In addition, the absence of a competitive wholesale electricity market is a significant obstacle to the rapid expansion of competition in the South African ESI.

The need for a wholesale energy market

19. Private sector participation in the ESI can be enhanced with a market orientated ESI. In recent years, activity in private sector energy provision has grown, with signed PPAs between IPPs and commercial enterprises, indicating a pipeline of much needed generation capacity.[9] However, a wholesale energy market would further enhance the commercial viability of IPPs (particularly renewable energy IPPs) and reduce the burden on Eskom as the supplier of last resort.

20. Commercial customers generally prefer to procure all its electricity requirements from a single supplier. However, a renewable energy IPP cannot provide all the customer's electricity requirement when generation is unavailable and/or not dispatched; this can happen if the generation profile of the IPP does not match the customer consumption profile. In the absence of a wholesale energy market (or an associated balancing mechanism), IPPs cannot make up for the energy it cannot produce and, hence, cannot achieve the status as the sole provider of electricity for its customer.

21. IPPs seek to sell all their total available output to prevent wastage and minimise the per kwh cost of generation. This means that IPPs would want to contract with commercial customer(s), or other guaranteed off-takers, for all output (i.e., under a take or pay arrangement). For this to occur, individual customer demand would need to be large enough to absorb all the generated energy produced. Relatively few customers meet this criterion. Even where such customers were able to absorb all the IPP's output, they would need to procure their remaining electricity requirements elsewhere, usually the supplier of last resort. In the absence of a wholesale energy market, customers would procure the balance from Eskom or the municipality at NERSA's determined average tariff. This is economically unfeasible (and unfair) for Eskom and the municipality, as they must provide the balance of electricity requirements of the customer at a high marginal cost; such costs are not reflected in the calculated tariff, which is set by NERSA at the average cost of production. For example, if a customer is procuring most of its electricity from an IPP during the day, when the marginal cost of Solar PV is low, and the balance is procured from Eskom or the municipality in the late afternoon or evening when the

[7] Read more at https://www.news24.com/fin24/opinion/analysis-how-eskoms-new-virtual-wheeling-is-a-game-changer-20230821

[8] Eskom's 2024 Transmission Generation Connection Capacity Assessment of the 2024 Transmission Network (GCCA – 2024) shows that the Northern Cape province has 0MW of generation connection capacity – see https://www.eskom.co.za/wp-content/uploads/2022/04/Generation-Connection-Capacity-Assessment-GCCA-2024-rev15-Final.pdf

[9] See for example, the agreement between EGP and Air Liquide and Sasol (2023) providing 900MW of wind power in the Eastern Cape – see https://www.power-technology.com/news/enel-green-power-south-africa-2/?cf-view

marginal cost is higher, this would result in economic losses for the utility(s). While Eskom levies peak time tariffs, these do not reflect the full marginal cost of operating Open Cycle Gas Turbine (OCGT) generators dispatched at peak times.

22. In scenarios where the customers' energy requirements do not account for the total energy generated by the IPP, the existence of a wholesale energy market allows the sale of excess generation to other potential market participants, such as traders or municipalities. A wholesale market allows differences between generation and contracted sales to be settled so that IPPs have the potential to derive revenues for all output. This, in turn, incentivises IPPs to invest in larger generation facilities and realise economies of scale for the benefit of customers, and enhance security of supply. In the absence of a wholesale energy market, IPPs would favour smaller generation facilities to avoid unrecoverable generation costs.

23. A competitive wholesale electricity market requires an independent systems market operator (ISMO), responsible for the following functions:

    a. Market Operations**:** Facilitating the buying and selling of energy among market participants and processing the associated settlement.

    b. System Operations**:** Ensuring that the energy fed into the network by generators, including imports, and the energy consumed by customers, including exports, are balanced securely and reliably. This involves sending instructions to the transmission network operator and the generators.

24. The wholesale electricity market will typically comprise a day-ahead market, where electricity can be bought and sold prior to its physical delivery, as well as an intra-day market to account for any unforeseen fluctuations in demand for electricity in real-time. In the day-ahead market, the wholesale electricity price is determined through a structured bidding process. Generators submit bids to the market operator, detailing the quantities of electricity they can supply and the prices at which they can supply this electricity for every hour of the following day. Retailers and electricity traders submit their forecasted consumption of electricity for every hour of the following day to the market operator. These submissions inform the ISMO of the quantity of electricity available and the prices the electricity is available at, as well as the quantity of electricity demanded.

25. Given these parameters, the market operator will sort offers made by electricity generators from the lowest price to the highest and accept bids until the total quantity of electricity demanded is matched with electricity supplied. The market clearing price is determined at the point where electricity supplied is equal to electricity demanded and represents the price of the last accepted offer made by generators. This is the price that electricity is sold to all parties, and in turn, the price at which generators whose offers were accepted will be compensated for the provision of electricity.

26. To illustrate the mechanics of price determination in the competitive day-ahead wholesale electricity market, consider the following simplified hypothetical scenario involving bids and offers for a single hour (for example 12:00 PM to 1:00 PM) for the following day in South Africa. Electricity generators (Eskom and IPPs) will submit their bids to supply electricity in this hour to the ISMO, and retailers of electricity, such as municipalities, and large electricity customers will submit their expected consumption of electricity for this hour.

27. The following represents the electricity supply offers received by the ISMO:

    a. Generator A offers to supply 100MW of electricity at R600 per MWh

b. Generator B offers to supply 150MW of electricity at R700 per MWh

c. Generator C offers to supply 200MW of electricity at R800 per MWh

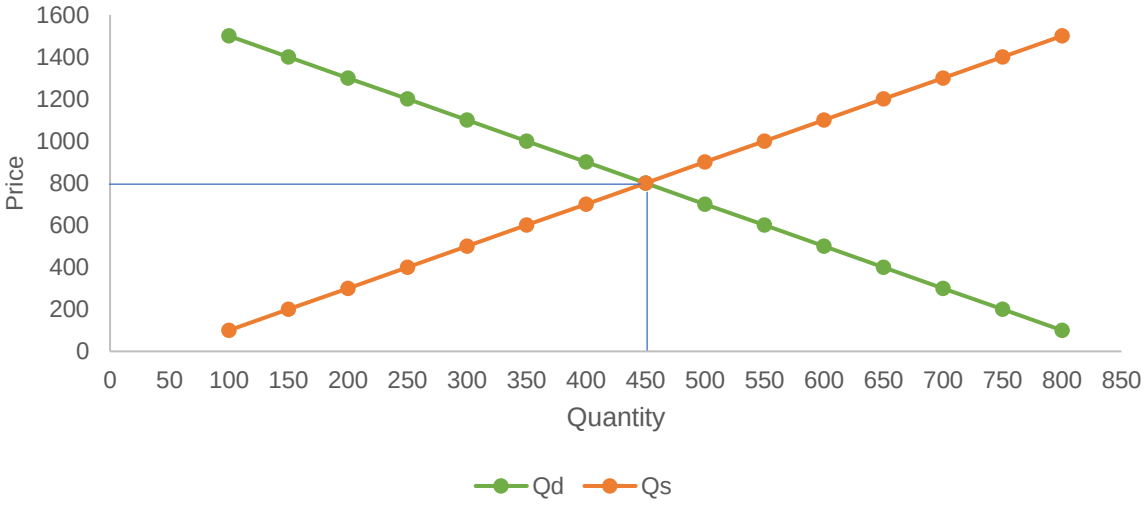
d. Generator D offers to supply 150MW of electricity at R900 per MWh

e. Generator E offers to supply 100MW of electricity at R1000 per MWh

28. Assume that the expected demand for electricity between 12:00 PM and 1:00 PM in the following day (as submitted by electricity retailers and large electricity customers) is 450MW. If the supply offers meet the minimum regulatory and technical requirements, the ISMO will sort supply offers in ascending order by price and accept these offers until the expected electricity demand is supplied. The price of the last accepted bid will determine the market clearing price.

29. In this example, the supply offers for Generators A, B and C will be accepted. The offers submitted by Generators D and E are rejected. The price of electricity offered by Generator C will then become the market clearing price, the price for which electricity is sold, and the price at which Generators A, B and C will be compensated for their generation capacity supplied. The market clearing price for this hour is R800 per MWh, and at this price, total electricity supplied is equal to total expected electricity demanded. This outcome is shown in the simplified demand and supply graph as shown in Figure 2.

Figure 2: Market clearing electricity price and quantity



Source: Own construction

30. The competitive bidding process of the day-ahead market serves several purposes. It enhances transparency and signals the true value of electricity at different times of the day, and reveals anticipated electricity demanded prior to its consumption. Knowledge of estimated electricity demand ahead of time contributes towards grid stability. In the case of unforeseen fluctuations in electricity, the intra-day market or the day-ahead reserve market can provide reserves of electricity upon which the systems operator can draw to balance electricity supply and demand in real time. Moreover, the determination of the market clearing price by the market operator incentivises generators who produce electricity inefficiently to streamline their operations to reap larger profits and rewards those who generate electricity efficiently.

Changes required for a more competitive ESI

31. The Electricity Act 4 of 2006 is being amended to liberalise the current ESI structure, with the main feature being the establishment of the Transmission System Operator (TSO) and the Central Purchasing Agency (CPA), which will be housed within the TSO. In addition to being responsible for transmission operations and planning, the TSO will be responsible for SO functions (act as the System Operator and operate the integrated power system in a safe, secure, efficient, and sustainable way) and the market operations (provide for a transparent, non-discriminatory trading platform for market participants, allowing willing buyers and willing sellers to trade). According to the draft Act, the CPA will be responsible for being the single buyer during the transition to a competitive market, specifically, the buyer of legacy power purchase contracts. It can purchase additional capacity and energy as required to maintain system integrity in a competitive environment. (DMRE, 2022)

32. As explained above, the establishment of the TSO (NTCSA) is ongoing with NERSA recently approving a transmission licence for the entity. However, there are two problematic aspects of the proposed structure of this entity:

    a. The TSO will house the CPA, an entity that will be responsible for signing contracts with Eskom generation plants and legacy IPPs and trading the generated energy with large contestable customers. These customers are also being targeted by competing IPPs. Combining the CPA and its trading activities with the core activities performed by the TSO (transmission, market, and system operation) will undermine the required independency and transparency of the TSO. Accordingly, to achieve full independence in the market and promote a level playing field for all market participants, the CPA, along with all its energy trading activities, should be separated from the TSO.

    b. The intention is to house the TSO as a wholly owned subsidiary of Eskom Holdings, the same parent company that owns Eskom Generation. Although this could suffice as an interim step before the TSO is fully separated from all Eskom's activities, the inclusion of this entity within the Eskom group structure creates a conflict of interest between TSO's independent market and systems operations and Eskom's own generation facilities that will compete with IPPs (key customers of the TSO). This would undermine the objective of establishing a competitive market for the ESI**.** Full legal separation of the TSO from Eskom, along with removing all trading activities within the TSO (see a. above) is necessary for ensuring long-term sustainability for the ESI, as it would create confidence among IPPs that the market and systems operator is fully independent and transparent.

33. In addition to establishing a wholly independent market and systems operator, the regulatory regime should be configured to maximizing the number of participants in the ESI, both from a supplier and customer perspective:

    a. IPPs**:** Competitive markets are characterized by many suppliers/sellers. Given that most of the current generation capacity will be controlled by a single entity (CPA) in the short term at least, the regulatory regime should be configured to encourage as many new IPPs as possible under a contestable market structure, Accordingly, IPPs should be subject to a streamlined and straightforward compliance process, including all relevant social, environmental and land use requirements. Under the proposed amendments to the ERA, all new generation capacity will be exempt from holding a generation licence but will be required to be registered with NERSA (Norton Rose Fulbright, 2023). Although the process to register with NERSA is intended to be less

onerous than obtaining a generation licence (for example, there is no requirement to have a signed PPA in place), the registration procedures need to be transparent and predictable to avoid unnecessary delays. IPPs should be free to enter contracts with eligible customers, on a bilateral basis, or sell to other suppliers such as traders. In selling to the wholesale market, these IPPs should operate under the same rules as other balance responsible parties.

b. Traders: These participants play an important function in a competitive energy market by buying energy and capacity from IPPs, through bilateral contracts, and aggregating generation from multiple sources. Importantly, traders can aggregate demand by selling to multiple eligible customers, also on a bilateral basis. They can make use of the transmission network by paying UoS charges to the TSO and municipalities. Traders currently require a trading licence from NERSA, and up to recently, there were only two licenced traders (Enpower and PowerX). Simplifying and expediating the licencing/registration process for applicant traders would go a long way to facilitating the expansion of this important activity and boost competition in the ESI.

c. Eligible Customers**:** Currently, there exists no restriction in South Africa in terms of which customers can contract directly with suppliers or traders for the procurement of electricity. In practice, the current wheeling framework only allows customers on ToU tariffs, which includes large industrial customers. To maximise the number of eligible customers that can participate in a competitive ESI (i.e., being able to enter bilateral agreements with IPPs and suppliers), restrictions should be limited to the obligation to have smart meters that can measure consumption on an hourly basis.

34. Competition in the ESI can be enhanced by further structural changes to Eskom over and above the vertical unbundling currently being implemented. For example, Eskom Generation can be unbundled horizontally into several separate generation companies, each being a stand-alone SOE and/or sold to the private sector. In this scenario, each of these companies will comprise five or six power plants with its own oversight and management teams. In addition to increasing the number of participants in the ESI, horizontal unbundling can help improve maintenance and refurbishment of plants and allow these companies to compete more effectively in the market. These companies can agree vesting contracts with the CPA for the sale of capacity and energy at tariffs determined by NERSA. If these unbundled generation companies can improve its efficiency and increase its energy output beyond the amounts agreed under the vesting contracts, the surplus can be sold to traders and eligible customers in the wholesale market.

35. Under the single buyer model, Eskom is the procurer of all energy output produced by IPPs. One of the main shortcomings of this market structure is that IPPs have no responsibility to contribute to the capacity requirements at peak times. If this lack of responsibility were to continue under the new structure, the cost of the capacity required to cover the system peak would be borne by Eskom generation alone, and then be passed on to captive customers only. This creates an inappropriate asymmetry of costs to the detriment of captive customers.

36. Eskom has failed in its role as the sole participant of the ESI with the responsibility of maintaining sufficient capacity to meet all the electricity demand. Keeping this arrangement will only prolong the electricity crisis and undermine Eskom's financial viability. Accordingly, under a competitive market structure, the responsibility for ensuring sufficient capacity to meet future demand should be shared among all suppliers of captive customers, including municipalities. This requires financially capable municipalities and traders to procure energy from the market and ensuring that customer demand is covered by its procured capacity. This, in essence, requires all suppliers to be "balance responsible," meaning that they can remedy any

imbalances in production and consumption of electricity by trading in the wholesale energy market. This removes the financial burden on the established incumbent utility.

37. Making municipalities and traders fully responsible for the supply of energy to their customers, including the procurement of the required energy and capacity, will also ensure that payments to suppliers are processed in a timely manner (which will improve the payment discipline of municipalities) and reduce the financial exposure of Eskom. It will also contribute to rapid development of new IPPs and generation projects.

38. Security of supply, or system adequacy, can be obtained through capacity auctions or a separate capacity market. A capacity market is an important part of the wholesale energy market, and its function is to procure capacity rather than energy. The capacity market comprises of both existing and new-build generators competing for capacity contracts. This market helps ensure that there is sufficient electricity supply to meet expected demand in future years and is especially important when the ESI becomes more reliant on intermittent technologies such as Onshore Wind and Solar PV.[10] Typically, the systems or market operator conducts an auction for generators to commit to providing a certain amount of capacity at pre-specified periods some years in advance (usually between 3 to 5 years). The amount of capacity to be procured is determined by long-term forecasts performed by the systems operator.

39. The wholesale energy market prices currently being derived by the market operator (i.e., Eskom) is based on the Standard Offer Programme, developed to procure power from existing generators for a period of three years. This programe allows Eskom to purchase energy at a static price calculated at the avoided cost of Eskom's own generation (including purchases under the REIPPP). This program includes a dynamic price option whereby the offer price is set on a day-ahead basis each hour, using the avoided cost of generation based on internal scheduling of generators (Eskom , 2022). The "market prices" are hedged back to NERSA's regulated revenue determination, meaning that the participants are not subjected to the financial impact of market-clearing prices, but are able to learn how the future wholesale market processes will work. (GIZ, SAGEN et al. , 2022).

40. It is important that the wholesale energy market move towards a system that produces market-clearing energy prices, particularly on the Day-Ahead and Intraday markets. Prices in such markets tend to reflect the marginal costs, the most appropriate proxy for opportunity costs, whereas regulatory determined prices can become distorted from marginal costs from an ineffectual ratemaking process. We accept that Eskom generation, being the dominant supplier of energy can unilaterally determine the wholesale prices in these markets. Accordingly, as an interim measure until there are enough participants in the generation segment, it will be necessary to cap market prices at the marginal cost of Eskom's base load generation fleet (coal and nuclear) at non-peak times and at the marginal cost of Eskom's peaking plants (OCGT) at peak times.

Conclusion

41. The establishment of a competitive wholesale electricity market run by an ISMO will provide greater transparency in electricity trading. The open and unbiased access to the transmission grid, along with a stable regulatory environment, will stimulate private investment in the ESI,

[10] See Section 34B (3) (c) (i) of the Act, which allows the market operator (TSO) develop a market code and rules to include, but is not limited to, provisions related to the *different types of markets* necessary to ensure effective and secure operation of the industry.

and foster competitive outcomes. The Electricity Regulation Amendment Bill provides sound interim measures towards a competitive energy market, including the functional seperation of Eskom's transmission operations into the TSO and the removal of all licencing requirements for new generation facilities. However, as explained in this paper, further measures are required over time to realise the full benefits of competition. These measures include the removal of the proposed CPA and other trading activities from the TSO, the full legal separation of the TSO from Eskom Holdings, simplifying and expediating the licencing/registration process for new generators and traders, horizontal unbundling of Eskom Generation, requiring all suppliers (including municipalities) to be "balance responsible" parties and gradually moving towards market-clearing energy prices. In addition, the development of a capacity market will help ensure long-term security of supply and system adequacy.

References

Department of Public Enterprises of the Republic of South Africa. (2019). *Roadmap for Eskom in a Reformed Electricity Supply Industry.* Pretoria: Department of Public Enterprises.

DMRE. (2022). *Electricity Regulation Amendment Bill.*

Eskom . (2022). *Short Term Energy Purchases Programme*. Retrieved from Eskom : https://www.eskom.co.za/eskom-divisions/tx/energy-market-services/market-operator/short-term-ennergy-purchase-programme/

Eskom. (2022). *Eskom Integrated Report 2022.* Eskom.

Eskom. (2022). *Transmission Generation Connection Capacity Assessment of the 2024 Transmission Network (GCCA -2024).* Johannesburg: Eskom Transmission Division.

Eskom. (2022). *What you need to know about wheeling of electricity*. Retrieved from Eskom: https://www.eskom.co.za/distribution/tariffs-and-charges/wheeling/

Eskom. (2022, July 21). *What you need to know about wheeling of electricity: Factsheet.* Retrieved from Eskom: https://www.eskom.co.za/distribution/wp-content/uploads/2022/07/20220721-Wheeling-concept_Introduction.final_.pdf

Eskom. (n.d.). *Data Portal*. Retrieved from Eskom: https://www.eskom.co.za/dataportal/

GIZ, SAGEN et al. . (2022). *Research Paper on The South African Electricity Market; Capacities for an Energy Transition.*

IPP Office. (n.d.). *About*. Retrieved from IPP Projects: https://www.ipp-projects.co.za/Home/About

Meridian Economics. (2018). *EE Publishers debate: Should Eskom be restructured, and if so how and when?*

NERA Economic Consulting . (2008). *Competitive Electricity Markets: The Benefits for Customers and the Environment.*

Norton Rose Fulbright. (2023). *Energy Laws and Regulations 2023 | South Africa.*

Ramaphosa, P. C. (2022, July 25). *Address to the nation on energy crisis*. Retrieved from South African Government: https://www.gov.za/speeches/president-cyril-ramaphosa-address-nation-energy-crisis-25-jul-2022-0000

South African Government . (2023, July 30). *Independent transmission system operator issued with licence to operate*. Retrieved from SA news: https://www.sanews.gov.za/south-africa/independent-transmission-system-operator-issued-licence-operate

Southern African Power Pool. (2023). *Home*. Retrieved from SAPP: https://www.sapp.co.zw/