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**THE EVOLUTION OF ECONOMIC REGULATION IN SOUTH AFRICA:
A REVIEW OF INSTITUTIONAL DESIGN, REGULATORY GOVERNANCE, POLICY
AND TOOLS WITHIN THE ENERGY SECTOR**

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This paper charts the evolution of energy regulation in South Africa with a specific focus on the National Energy Regulator of South Africa. The paper will outline the journey that has been undertaken since the establishment of the energy regulator that changed the paradigm of the economic regulatory regime on energy in South Africa. The paper discusses the execution of NERSA's mandate for regulation of the electricity, petroleum pipelines and piped-gas industries. While the electricity industry had been regulated since 1995, the piped-gas and petroleum pipeline industries had never been regulated before, and this posed additional challenges for the newly created Energy Regulator. In anticipation of the future development of these industries, the Gas Act of 2001 (Act No. 48 of 2001) and the Petroleum Pipelines Act of 2003 (Act No.60 of 2003) were passed to promote the orderly development of the said industries. In November 2005, NERSA started regulating the two industries and the regulation of the electricity industry was incorporated formally into NERSA in July 2006. The incorporation of the regulation of the three industries into one regulatory entity raises issues of institutional design. These issues are linked to, but not limited to, the kind of institutional design and knowledge needed to properly regulate the energy sector; the principles and values that are required in order to ensure institutional effectiveness; and the effective measurement of the performance of the institution given the diverse nature of the regulated industries. This paper also highlights some of the regulatory policies and tools that are in place for the effective execution of the regulatory mandate of NERSA; and the achievements to date as an economic regulator for the energy industry as well as the lessons learned thus far in regulating the three energy industries.

KEY WORDS: Legislation, Regulation, Institutional Design, Electricity, Piped-Gas, Petroleum Pipelines, Economic Regulation

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1. INTRODUCTION

- 1.1 Following a feasibility study on the rationalisation of regulators within the energy industry, commissioned by the Department of Minerals and Energy, Cabinet approved in 2002 the recommendation that the National Electricity Regulator (NER), established in terms of the Electricity Act, 1987 (Act No. 41 of 1987) to regulate the electricity industry, be used as the basis to create the envisaged national energy regulator. This would include the regulation of the gas industry in terms of the Gas Act, 2001 (Act No. 48 of 2001), and the petroleum pipelines industry in terms of the Petroleum Pipelines Act, 2003 (Act No. 60 of 2003). The three forms of energy (electricity, piped-gas and petroleum pipelines) were grouped together to form the National Energy Regulator of South Africa (NERSA)². NERSA was established in terms of the National Energy Regulator Act, 2004 (Act No. 40 of 2004) ('the Act'). In November 2005, NERSA started regulating the piped-gas and petroleum pipelines industries and the regulation of the electricity industry was formally incorporated into NERSA's mandate in July 2006. (This meant that two regulators were operating parallel to each other until July 2006.)
- 1.2 While the electricity industry had been regulated since 1995, the piped-gas and petroleum pipeline industries in South Africa had never been regulated before, which posed additional challenges that the newly created National Energy Regulator had to face. With regard to the governing legislation, the National Energy Regulator Act makes provision for the governance structure of the regulator as an institution. The three industries are regulated in terms of their relevant industry legislation, namely the Gas Act, 2001 (Act No. 48 of 2001) for the piped-gas industry, the Petroleum Pipelines Act, 2003 (Act No. 60 of 2003) for the petroleum pipelines industry and the Electricity Regulation Act, 2006 (Act No. 4 of 2006) for the electricity industry³.
- 1.3 This paper aims to provide a review of the institutional design of NERSA, and highlight some of the regulatory policies and tools within the energy sectors that fall within its mandate, namely the electricity, the piped-gas and the petroleum pipelines industries.

2. PROBLEM STATEMENT

- 2.1 One of the critical challenges faced by the newly created Energy Regulator was the issue of the institutional design, which had to be appropriate and effective for NERSA to effectively execute its regulatory mandate. The other major challenges were in relation to gaps that existed where the three industries' governing legislation was either not clear or did not address certain regulatory issues. NERSA therefore had to develop tools to bridge these gaps in the governing legislation and address the lack of clarity in the legislation.

² The acronym 'NERSA' was used for the National Energy Regulator to differentiate it from the NER, which was the acronym for the National Electricity Regulator.

³ The Electricity Regulation Act, 2006 (Act No.4 of 2006) repealed the Electricity Act, 1987 (Act No. 41 of 1987) with the exception of section 5B, which deals with the funding of the electricity industry.

- 2.2 In accordance with the Act, the Energy Regulator comprises nine members: four are Full-Time Regulator Members (FTRM) and five are Part-Time Regulator Members (PTRM). The Act provides that the FTRMs are 'primarily responsible' for the industries they have been appointed to respectively, but it is not clear whether their responsibility/roles are related to strategic or operational activities, or to both. Furthermore, there is no clarity in relation to their reporting structure considering that their appointment is made by the Minister of Energy. In other jurisdictions, the FTRMs are referred to as Commissioners and their responsibilities are limited to strategic activities⁴.
- 2.3 In the absence of clarity on both issues, NERSA has allowed FTRMs' responsibilities to include both strategic and operational activities. This has worked to a certain extent, but it has also caused grey areas and distorted the reporting lines of management and staff in the regulatory areas in terms of FTRMs and the Chief Executive Officer (CEO).
- 2.4 The question then is, what is the best structure that can address this distortion? In other regulatory environments, the Commissioners (similar to FTRMs) have advisors and other resources that may be required in the execution of their responsibilities. Some of the best examples include the Federal Energy Regulatory Commission (FERC) and the Florida Public Service Commission (FPSC), where the Commissioners, who are employed full time, have their own resources⁵ that are separate from those of the secretariat or general staff of the organisation.
- 2.5 In accordance with this precedent, the role of the FTRMs should only be strategic (as opposed to being both strategic and operational), which would address the grey area/distorted reporting lines. The CEO is on the same level as the FTRMs and is primarily responsible for both strategic and operational issues of NERSA.
- 2.6 The following are some of the options that were considered for NERSA's institutional/structural design:
- **Industry/sector design** – this refers to a structure that is based on each of the industries regulated by a regulator. This type of design may work well for a very small regulator. The disadvantages thereof are, among others, a lack of information sharing and comparison of best practices within the regulated industries.
 - **Functional structure** – with this type of structure, the organisation groups employees according to a specialised or similar set of roles or tasks. A functional structure is said, among others, to foster cross-pollination and encourages efficiency and/or consistency across the regulated industries. At the same time it allows and builds deep knowledge and applies best practices across the regulated industries. However, one of the drawbacks to a functional structure is that the coordination and communication between departments can be restricted by the organisational boundaries of having the various departments working separately.

⁴ Commissioners in the Federal Energy Regulatory Commission (FERC); Florida Public Service Commission (FPSC); Public Utilities Commission (PUC) (Latvia), Hungary;

⁵ The Commissioners have at least three staff members who have technical and/or legal qualifications.

- **Discipline structure** – this refers to an organisational structure that is based on the professional field of study or knowledge of its employees. This structure has the potential to increase the individual employees' skills within the areas of their professions, but can lead an organisation to work in silos.
- **Hybrid/Matrix structure** – this structure is a combination of the industry and functional structures. The matrix structure allows for the benefits of functional and industry structures to exist in one organisation. However, this can create power struggles because most areas of the organisation will have dual management or a manager with capabilities at both a functional and industry level.

2.7 Based on the above, NERSA has followed a functional structure (as was the case with its predecessor, the NER). This structure has worked well for NERSA so far in that it has resulted in, among others:

- consistencies in the regulated industries through regulated methodologies developed for similar regulatory activities;
- the promotion of functional excellence in executing NERSA's mandate; and
- the creation of growth opportunities for employees.

3. ELECTRICITY INDUSTRY

3.1 Overview

3.1.1 The South African Electricity Supply Industry (ESI) is a vertically integrated electricity supply system, with Eskom contributing nearly 96% of generation capacity (including 5% imports), while municipalities generate 1% and the other major industry players such as Independent Power Producers (IPPs) add approximately 3% of generation capacity. Eskom not only plays a major role in electricity generation capacity, it is also the only licensee that owns and operates the transmission network of the country. In terms of the distribution network, Eskom shares the ownership and responsibility with the municipalities, whose share is currently about 40% of the total distribution network. Figure 1 below presents a graphical representation of the ESI.

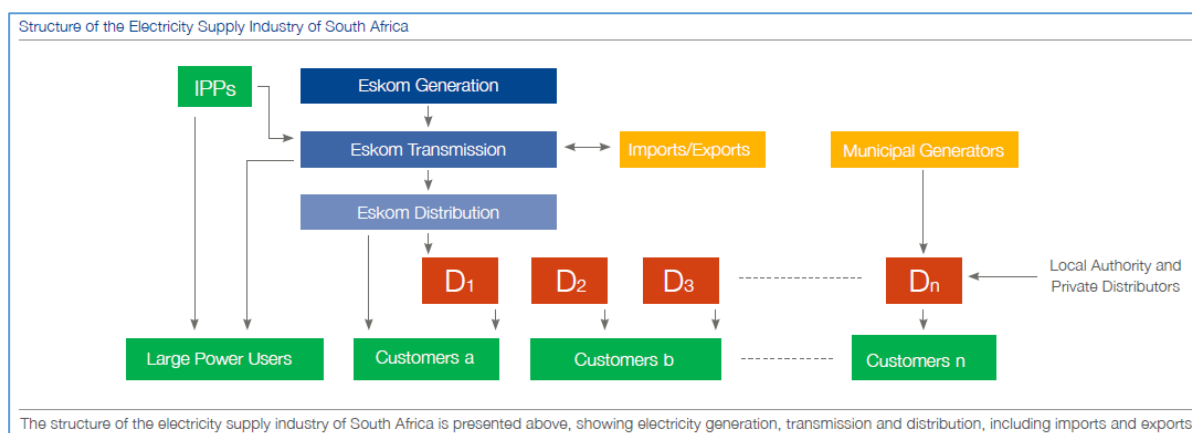


Figure 1: Structure of the Electricity Supply Industry of South Africa, referenced from Electricity Supply Statistics for South Africa 2012 NERSA report

3.2 Regulatory Legislation

3.2.1 A number of policies have been adopted in South Africa in order to ensure that the electricity industry develops in an orderly and sustainable manner. The following are some of the key legislation and policies that have an impact on the ESI:

- Electricity Regulation Act, No 4 of 2006.
- White Paper on the Energy Policy of the Republic of South Africa (1998) GN 3007 in Government Gazette 19606 of 17 December 1998 ('Energy White Paper').
- White Paper on the Renewable Energy Policy of the Republic of South Africa GN 513 in Government Gazette 26169 of 14 May 2004, 43 ('Renewables White Paper').
- Integrated Resource Plan for Electricity 2010–2030 (IRP 2010) (currently being amended).
- National Climate Change Response White Paper GN 757 in Government Gazette 34695 of 19 October 2011 ('Climate Change White Paper').

3.3 Important Regulatory Developments

3.3.1 There is no doubt that the ESI in South Africa has evolved significantly in the past decade, beginning with times of intensive load-shedding caused by a lack of security of supply, until the time when the first units of the new-build programme reached commercial operation.

3.3.2 South Africa experienced unprecedented load-shedding across the country from November 2007 to January 2008 due to generating capacity and energy constraints. It has been argued that the cause of the load-shedding was policy and regulatory uncertainty over the previous decade (Chettiar et. al, 2009). Subsequent to the load-shedding events, NERSA commissioned an investigation into the causes of the capacity shortages and the resultant load-shedding. The findings of the 'Inquiry into the National Electricity Supply Shortage and Load-Shedding' was concluded and published on 12 May 2008. The load-shedding events had a major negative impact on the South African economy. The mining sector – the backbone of the South African economy – was forced to reduce production as an energy saving measure. The reduction in production in turn placed thousands of jobs at risk. Other major commercial activities in the country almost came to a halt.

3.3.3 South Africa has an installed generation capacity of approximately 46 407 MW (Eskom, 2017:105). Most of this capacity is sourced from coal-fired power stations, with the remainder coming from nuclear, hydro and diesel. South Africa's capacity reserve margin is currently about 30%. This reserve margin is considered to be high. A reserve margin of 13% is recommended by the European Network of Systems Operators for Electricity (ENTSO-E). The reserve margin is the estimated margin between the amount of electricity needed at peak times and the electricity that can be produced with the available generation capacity. The high reserve margin for the South African power system has not spared the industry from experiencing supply–demand imbalances, resulting in power shortages, which have led to load-shedding.

3.3.4 Due to the abovementioned challenge in the supply of and demand for electricity, the Energy Regulator, through the Grid Code, established a requirement that the System Operator publish the Medium Term System Adequacy Outlook (MTSAO) on an annual basis. The MTSAO is a medium-term generation system security and adequacy assessment study that highlights possible capacity or energy shortages in the medium term. The MTSAO informs the system security in the medium term and outlines proactive measures ('Levers') for acquiring additional capacity/energy where shortfalls are identified.

3.4 Regulatory Mechanism/Tools

3.4.1 NERSA developed the first Multi-Year Price Determination Methodology for 1 April 2006 to 31 March 2009 (MYPD1) as a regulatory tool aimed at creating certainty and predictability on prices within the ESI.

3.4.2 On 30 April 2007, Eskom applied to NERSA for a change to the Multi-Year Price Determination (MYPD) rules. Eskom's request focused on the following areas:

- primary energy cost variances;
- variances on capital expenditure; and
- rules on triggers for re-opening the MYPD.

3.4.3 On 20 December 2007, the Energy Regulator decided that the rule changes applied for by Eskom should be treated entirely in the second Multi-Year Price Determination (MYPD 2) rules review process. On 2 September 2008, Eskom submitted a proposal for the review of capital expenditure variance rules that differed from the application submitted on 30 April 2007. In addition to Eskom's initial request, it was proposed to include a rule change on the evaluation of the Regulatory Asset Base (RAB).

3.4.4 NERSA published a consultation paper on the abovementioned proposed rule changes on 20 October 2008 and written comments were received from various stakeholders. On 26 November 2008, NERSA convened a stakeholder workshop to deliberate on the key issues raised by stakeholders in their written comments. This was followed by a NERSA public hearing, held on 5 February 2009. All comments received were then taken into account in the formulation of the rule changes. The Energy Regulator approved the MYPD rule changes on 26 March 2009.

3.4.5 In June 2007, NERSA commissioned a study to set out the regulatory framework to initiate tariffs and licensing conditions for a self-sustaining grid-connected market for renewable energy in South Africa.

3.4.6 The development of the renewable energy framework was completed in December 2008 as a guideline. The consultation paper on the proposed Renewable Energy Feed-In Tariff (REFIT) guidelines was published on 12 December 2008 and after receipt of public comments, a public hearing was held on 5 and 6 February 2009. On 26 March 2009, based on the available information and analyses performed, the Energy Regulator approved the REFIT (NERSA REFIT; 2009) and the associated technologies as shown in Table 1.

Table 1: REFIT approved technologies and tariffs (phase 1)

Technology	R/kWh
Wind R/kWh	1.25
Small hydro	0.94
Landfill gas	0.90
Concentrated solar	2.10

3.4.7 In the guidelines, the following key principles were included to ensure the success of the programme:

- The term of the REFIT Power Purchase Agreement is 20 years.
- The REFIT is to be reviewed every year for the first five-year period of implementation and every three years thereafter and the resulting tariffs will apply only to new projects.
- A Reduction Rate is to be excluded from the REFIT.
- Carbon revenue from the Clean Development Mechanism (CDM) is to be excluded from the REFIT.

3.4.8 Due to various stakeholder requests for the inclusion of other types of Renewable Energy (RE) technologies, in June 2009, NERSA undertook another public consultation process for phase 2 of the REFIT. On 31 October 2010, NERSA approved five technologies as shown in Table 2.

Table 2: REFIT approved technologies and tariffs (phase 2)

Technology	Unit	REFIT
Concentrated Solar Power (CSP) trough without storage	R/kWh	3.14
Large scale grid connected PV systems (≥ 1 MW)	R/kWh	3.94
Biomass solid	R/kWh	1.18
Biogas	R/kWh	0.96
CSP Tower with storage of 6 hrs per day	R/kWh	2.31

3.4.9 The two phases of REFIT were instrumental in ensuring that the industry market for IPPs is recognised in South Africa. For Eskom, there was a challenge in relation to meeting the requirements of the Public Finance Management Act, 1991 (Act No.1 of 1991) ('PFMA') as a state entity buying power from RE IPPs. The PFMA requires that a competitive process be followed when government entities are procuring services from private companies. A detailed analysis on the challenges for the REFIT are discussed by Eberhard, 2010.

3.4.10 In May 2011, the Department of Energy (DoE) gazetted the Electricity Regulations on New Generation Capacity (DoE, 2011) under the Electricity Regulation Act. In terms of the Regulations, the roles of various institutions are outlined. The Minister, in consultation with NERSA, makes Determinations on the capacity to be procured and types of energy sources. The Determinations are informed by capacity and the schedule of technologies in the Integrated Resources Plan 2010–2030. NERSA's role has been to assess and concur with the Minister's Determinations. To date, NERSA has concurred with five Ministerial Determinations, as listed in Table 3.

Table 3: Ministerial Determinations NERSA concurred with

Ministerial Determination	Total MW
Renewable Energy IPP Procurement Programme 2011	3 725
Renewable Energy IPP Procurement Programme 2012	3 455
Renewable Energy IPP Procurement Programme 2015	6 300
IPP Baseload 2012	7 761
Ministerial Determination for Medium Term Risk Mitigation (MTRM), 2012	1 274
Total Determination Capacity (MW)	22 515

- 3.4.11 There are currently 112 RE IPP projects that have been selected through seven bidding windows since 2011. NERSA has licensed all of these projects from the DoE's IPP Programme.
- 3.4.12 In order to address the need for compliance of new technologies in the form of RE, NERSA has developed and approved, through its Grid Code Advisory Committee (GCAC), the renewable energy grid code [currently on version 9 (NERSA, 2016)]. Although this code has allowed the RE IPPs to be connected to the grid, further improvements are still required to reduce the number of non-compliances.

3.5 Some of the Challenges in the Regulation of the Electricity Sector

- 3.5.1 Renewable energy technologies have experienced a remarkable evolution over the past decade. Indisputably, they – in combination with energy efficiency – now form the leading edge of a far-reaching global energy transition. Spurred by innovation, increased competition and policy support in a growing number of countries, renewable energy technologies have achieved massive technological advances and cost reductions in recent years. Consequently, the growth in their deployment has come to outpace that of any other energy source. NERSA had to draft and initiate regulations to deal with management of IPPs.
- 3.5.2 As renewable energy technologies mature, policy makers are confronted with new challenges. The rapid expansion of variable renewables, such as solar photovoltaics and wind power, requires more flexible energy systems to ensure reliable and cost-effective system integration. In future, renewable energy policy approaches will have to be more holistic and sophisticated to reflect the transformative changes induced by the energy transition on the energy sector, society and economy. NERSA is confronted with these challenges as the electricity industry now relies more on renewables than on fossil fuels.
- 3.5.3 The challenge today is that there is no electricity market for buying and selling of power generated from the private renewable generators. The Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) was introduced by the Department of Energy, where Eskom was designated to be the buyer of the energy from IPPs. However, this has created a new challenge for the IPPs who are not part of the REIPPPP. NERSA could not license them as most of them were not selected to bid as part of the REIPPPP and are not within the capacity of the Ministerial Determination.

- 3.5.5 Small-scale embedded generation refers to power generation under 1MW/1000kW, which are located on residential, commercial or industrial sites where electricity is also consumed. Increasing environmental awareness and high electricity prices are driving people to invest in a more sustainable future by installing solar photovoltaic (PV) rooftop panels. The combination of solar PV and more economical battery-storage options, as well as demand response and energy efficiency, provide consumers with more buying power, which forces distribution utilities to provide more flexibility and different types of services. A balanced approach by the regulator is required to successfully integrate embedded generation while enabling the utilities to benefit.
- 3.5.7 Despite the challenges that the integration of these new technologies at a large scale bring, it is essential for the Energy Regulator to meet the growing expectations of consumers. NERSA has to develop tools to deal with:
- the registration of these technologies with NERSA and how it should be done;
 - application and connection;
 - tariff design and principles; and
 - the reporting requirements Small-Scale Embedded Generation (SSEG) installations.
- 3.5.8 The resale of electricity in the South African ESI is a growing business. With section 7 of the Electricity Regulation Act, 2006 making provision for the licensing of Generation, Transmission, Distribution, export or import and trading activities by the Energy Regulator, electricity resale by default falls under trading, where the buying and/or selling actually takes place. However, it remains 'unlicensed' or 'unregistered', implying that it remains an 'unregulated' and/or 'uncontrolled' business activity from a regulatory point of view.
- 3.5.9 The electricity resale business continues to thrive in South Africa, and it has become a huge part of total gross sales to end customers, accompanied by numerous customer complaints relating to the rights and responsibilities of both affected parties. Issues related to dispute resolution, quality of service, tariffs and pricing principles as well as billing are also widespread.
- 3.5.10 The advantage of licensing or registering small-scale activities such as electricity resellers is that they can be subjected to the enforcement arrangements that currently apply to licensed utilities or operators. It would then lead to customers being afforded a similar level of customer protection and choice as those currently enjoyed by customers in the wider market. In terms of the current regulatory requirements, any person involved in 'trading' must either be licensed by the Energy Regulator or, in certain circumstances, registered with the Energy Regulator.
- 3.5.11 NERSA's existing practice for setting municipal tariffs is that NERSA publishes a percentage guideline increase each year for municipalities. NERSA undertakes regular reviews of its tariff benchmarks or guidelines and recommends new benchmarks that are used to evaluate subsequent municipal tariff applications. The review or benchmarking process takes into account the proposed Eskom bulk price of electricity to municipalities and the increase in municipalities' own cost structures. NERSA also provides financial benchmarks which, if the municipalities concerned operate within them, are considered to run an efficient electricity business.

3.5.12 National Treasury suggests that even the tariffs that are applied for by municipalities are grossly understated, as they do not take into account many so-called 'indirect costs' of operating the municipality. According to National Treasury, common costs for providing the full range of municipal services such as human resources, legal costs, audit fees, personnel costs etc. are not incorporated in the costs provided to NERSA to determine (on a pro rata basis) the guideline tariff or above-guideline tariff for electricity. Only the 'direct costs' of electricity provision are provided for, and even these costs are not reported in a standard fashion across the municipalities.

4. PIPED-GAS INDUSTRY

4.1 Overview

4.1.1 The South African gas industry has been in existence prior to the gas legislation being developed. In order to promote the orderly development of the piped-gas industry, an agreement⁶ was reached between the Government of South Africa and Sasol Limited. The industry was regulated using this agreement. Schedule One to this Agreement set out the regulatory dispensation, which is applicable to Sasol Limited's piped-gas business to supply gas from Mozambique and the sale of that gas into markets within South Africa.

4.1.2 The Special Dispensation Period was valid for a period of ten years after First Gas. Furthermore, Sasol undertook to supply 120 million Gigajoules per annum of natural gas from Mozambique to South African markets for a period of 25 years after First Gas (i.e. until 2029). Before the end of the dispensation period (March 2014), Sasol charged its customers using the Market Value Pricing mechanism. The mechanism allowed Sasol to use the customer's alternative fuel to determine the gas price that was to be charged to a specific customer.

4.2 Regulatory Legislation

4.2.1 The Regulatory Agreement was binding to the Gas Regulator. The Gas Act, 2001 (Act No. 48 of 2001) was promulgated in 2001 and came into effect in 2004. The Gas Act, 2001 provided for the orderly development of the piped-gas industry and adopted a light-handed approach in its regulation of the piped-gas industry. Furthermore, the Gas Regulator Levies Act, 2002 (Act No. 75 of 2002) was developed to provide for the imposition of the levies by the Gas Regulator and to provide for matters connected therewith.

4.3 Regulatory Policies and Tools

4.3.1 Tariffs prior to the Gas Act, 2001 were monitored using the Agreement Concerning the Mozambican Gas Pipeline between the Government of the Republic of South Africa and Sasol Limited ('the Agreement'). This Agreement sets the tariff for the gas transportation

⁶ The Agreement Concerning the Mozambican Gas Pipeline between the Government of South Africa and Sasol Ltd of 2001.

between the owner of the Mozambique-to-South-Africa pipeline, the Republic of Mozambique Pipeline Investments Company (Pty) Ltd (ROMPCO), and Sasol Gas at R4.64 per Gigajoule as at January 2000. It is adjusted quarterly with the South African Producer Price Index (PPI), excluding any expansion-related charges, based on a ship-or-pay for 80% of the contracted 120 million Gigajoules per annum. The Agreement was for the 120 million Gigajoules that Sasol needed to bring to South Africa. For any amount above this, the Energy Regulator had to use a methodology to monitor and approve the tariffs.

- 4.3.2 The Energy Regulatory then developed the 'Guidelines for Monitoring and Approving Piped-Gas Transmission and Storage Tariffs in South Africa' in 2009. In anticipation of the expiration of the pricing provisions of the Agreement in March 2014, the Energy Regulator developed the Methodology to Approve Maximum Prices for Piped-Gas in 2011. This was developed after determining that there was inadequate competition in the gas industry.

4.4 Important Regulatory Developments

- 4.4.1 The end of the dispensation period also saw the emergence of other players in the gas industry. The gas industry in South Africa is currently dominated by a monopoly in terms of the importation of gas, which operates across the value chain of gas in South Africa⁷. There are three transmission licensees, but one supplier of gas. Sasol Gas is the main player in the distribution of gas and also participates in the trading environment. The players that have come into the industry concentrate on the trading business of gas, where they buy gas from Sasol Gas but still compete with it.
- 4.4.2 There has been a rise in interest in Compressed Natural Gas (CNG). CNG has gained momentum in the car industry where it is now being used as fuel, as can be seen in the Taxi industry, especially in the Benoni area, as well as in the bus industry (e.g. the BRT system in Pretoria). The Department of Energy has proposed the use of Liquefied Natural Gas (LNG) in the production of electricity through the IPP programme. The programme will see the importation of LNG through South African ports for the production of electricity.
- 4.4.3 Another development is the discovery of large gas reserves at the Rovuma Basin in the Republic of Mozambique. Mozambique is currently building an LNG terminal facility that will be exporting gas internationally and South Africa is in a good position to utilise such gas finds.

4.5 Challenges in the Regulation of the Gas Sector

- 4.5.1 One of the biggest challenges was encountered towards the end of the Dispensation period as the Energy Regulator had to decide on a consistent manner that will be used to determine the tariffs and prices, as the Market Value Pricing (MVP) was going to be abolished. The Act and Regulations did not specify any guidelines or methodologies to be used.

⁷ The incumbent operates in transmission, distribution and trading of gas

- 4.5.2 Another important challenge has been rapid development in terms of technology in the gas industry, which has resulted in some of the legislative provisions becoming outdated. When the Gas Act, 2001 was developed, it was not envisaged that many new technologies would be available in the market within ten years of the promulgation of the Gas Act, 2001. There is a draft gas amendment bill, but the promulgation thereof has been delayed. This has exacerbated the challenge in that the rapid development in the gas industry was not anticipated in the current Act.
- 4.5.3 There is no proxy gas market close to South Africa that can be used to determine the price of gas. All the gas hubs are remote and mostly deal with LNG prices instead of piped-gas prices. The Energy Regulator therefore has to look elsewhere to benchmark piped-gas prices.
- 4.5.4 In terms of legislation, the regulation of Liquefied Petroleum Gas (LPG) is included in both the Gas Act, 2001 and the Petroleum Pipelines Act, 2003, resulting in a challenge as it is unclear what needs to be regulated by each Act.
- 4.5.5 The South African gas industry is still dominated by a bungled monopoly, while gas remains a scarce commodity in South Africa and progress is slow in exploring the shale gas in the Karoo.
- 4.5.6 The Energy Regulator has also recently been challenged on the maximum price methodology that it has developed and used to monitor and approve prices for the licensees. The legal process on this matter is still ongoing.

4.6 Mechanisms/Tools Developed to Address the Challenges

- 4.6.1 Regulatory advocacy is a tool that has mostly been used to communicate with the Department of Energy on the challenges faced by the Energy Regulator with regard to the administration of the Gas Act, 2001.
- 4.6.2 The regulatory tools developed by the Energy Regulator are the Guidelines on Approving Piped-Gas Transmission and Storage Tariffs in South Africa and the Methodology to Approve Maximum Prices for Piped-Gas in South Africa in order to regulate the tariffs and prices after the expiration of the Dispensation period. To mitigate the challenge of separation of costs between regulated and unregulated business, the Energy Regulator developed the Regulatory Reporting Manuals.

4.7 Effectiveness of the Developed Mechanisms/Tools

- 4.7.1 The developed guidelines and methodology have been sufficient to regulate the tariffs and prices of the gas market, but certain gaps have been identified.
- 4.7.2 The Regulatory Reporting Manuals (RRM) have resulted in companies reporting regulatory activities separately from other unregulated business. They have also assisted with the approval of tariffs, as costs incurred by businesses are now identified and verified as the reports are audited.

- 4.7.3 The pricing methodology has recently been challenged in court by some of the users, who indicated that it has prejudiced them in that it resulted in higher prices than what they used to pay.
- 4.7.4 The legal process on this matter is pending and the Energy Regulator awaits the decision of the court on the way forward.

5. PETROLEUM PIPELINES INDUSTRY

5.1 Overview

- 5.1.1 To regulate the petroleum pipelines industry, the Energy Regulator derives its powers from various legislation, including the National Energy Regulator Act, 2004 (Act No. 40 of 2004), the Petroleum Pipelines Act, 2003 (Act No. 60 of 2003), the Regulations made in terms of the Petroleum Pipelines Act, 2003 (Act No. 60 of 2003) and the Rules made by the Energy Regulator, gazetted in November 2008 and revised in December 2014. Some of the functions of the Energy Regulator as stated in the Petroleum Pipelines Act, 2003 are to:
- issue licences for the construction and conversion of petroleum pipelines, loading facilities and storage facilities;
 - issue licences for the operation of petroleum pipelines, loading facilities and storage facilities; and
 - set or approve tariffs and charges in the manner prescribed by regulation.
- 5.1.2 The functions of the Energy Regulator regarding the petroleum pipelines industry are not limited to the list mentioned above; however, for the sake of this paper, only the three points are mentioned to limit the discussion. In any regulatory environment, applicable legislation is in place to support the regulatory functions; however, challenges are bound to be experienced in executing the duties or realising the intended objectives. Ford, Steen and Verreynne (2014:5) argue that policing and implementing regulations tend to be inefficient and expensive, and affect competitive advantage, where the cost of doing business increases, reducing opportunities for improved performance and giving leverage to less regulated firms. Asiago (2017:2) states that regulatory frameworks developed from rule-based regulations or command and control systems are prescriptive in nature and tend to centre on compliance or prevention mechanisms to influence market forces, without any success in realising the policy objective or to mitigate legal and political concerns. However, Short and Toffel (2010:363) note that strict and complex regulatory demands have influenced organisations to opt for self-regulatory structures both to signify and to facilitate compliance.
- 5.1.3 The regulatory arguments posed by various scholars on regulated industry point to the need to assess the work done by the Energy Regulator since its existence pertaining to the petroleum pipelines industry. A select few interventions are introduced and discussed in alignment with the three functions of the Energy Regulator mentioned above.

- 5.1.4 The development of systems and regulatory mechanisms are not only motivated by challenges, since some exist in compliance with legislation, or in ensuring that stakeholders have a common understanding of regulatory functions.
- 5.1.5 After instituting a certain process or implementing a regulatory tool, challenges are often experienced, which necessitates a review of the process or the introduction of some corrective measures. Trollip, Butler, Burton, Caetano and Godinho (2014:3) emphasise the need for an informed, decisive and timely action, should there be an energy security crisis, considering the centrality of the energy system to the development and survival of the modern state. Such an approach is not restricted to an energy security crisis, but cuts across. Various factors have led to the introduction of the regulatory tools or instruments that assist in the effective and efficient regulation of the dynamic sectors and environment within which NERSA operates.

5.2 Regulatory Policies and Tools

- 5.2.1 There are three rationales for economic regulation. Among these is the regulation of access, which is intended to place requirements on participants through licensing (Mondliwa & Roberts, 2014:548). The work done by Nobel Prize-winner Professor Ronald H Coase of the University of Chicago Law School about communication matters regarding the allocation of frequency licences in the 1960s, is perceived by Gaille (2010:112) to be suitable in the petroleum licence market.
- 5.2.2 According to Gaille (2010:112), Professor Coase tried to address the following problem and provided the following solution:

What happens if the government's regulatory process initially gives the licenses to companies who are unable to exploit their maximum value? Coase argued that "whatever the initial distribution of the legal right to use these frequencies, the competitive system would, in the absence of transaction costs, bring about an optimal distribution of these rights – provided the rights were well defined and transferable." Stated another way, where the value of the government license is high enough – which is often the case with communications spectrum and petroleum rights – the value achieved from transferring a license to a new, more efficient owner is more likely to exceed the transactions costs of the transfer and thereby enable the secondary market to overcome regulatory failures in the initial allocation.

- 5.2.3 This is also applicable to the petroleum industry, particularly regarding the delayed implementation of what the licences were issued for, which might appear to some as a failure in bringing the economic value of the licence within what was initially stipulated, as well as on the transferability aspect of the licence. In terms of petroleum matters, the licences issued by NERSA are for the construction and conversion of the infrastructure (pipeline, storage and loading), and the operation of such infrastructure.

- 5.2.4 Such licences can be revoked by NERSA, provided that a licensee submits an application for revocation stipulating one of the following reasons stated in the Petroleum Pipelines Act, 2003 (Act No. 60 of 2003), section 24(1)(a)-(c):
- the licensed facility or activity is no longer required;
 - the licensed facility or activity is not economically justifiable; or
 - another person is willing and able to assume the rights and obligations of the licensee concerned in accordance with the requirements and objectives of the Act, and a new licence is issued to such person.
- 5.2.5 A licence application must be submitted to NERSA for consideration before a licence is issued. The Rules assist potential licensees to prepare their applications. Despite the existence of the Rules, NERSA saw a need to develop a Licensing Guideline. The Guideline ensures that the processing of the applications are not delayed due to insufficient information being provided.
- 5.2.6 The licences (construction and operation) issued by NERSA are valid for a period of 25 years from the commencement date and come with conditions that must be adhered to. For the construction licence, the construction of the facility must commence within 12 calendar months from the date of issue of the licence and the construction of the facility must be completed and ready for operation within the period indicated by the applicant on the schedule for the project. Should the licensee fail to commence with the construction within the stipulated period, the licensee must, within 15 calendar days of the elapse of that time period, apply to the Energy Regulator for the revocation of the licence. The validity period of 25 years for a construction licence causes confusion, with some thinking that the construction can drag as long as the expiry period has not been reached. Ideally, the 25 years was intended for very complex projects, but it appears that the Legislation did not want to distinguish between the complexities of the projects. It is for that reason that the schedule of the project is considered by NERSA.
- 5.2.7 Although the applicable legislation exists, together with supporting regulatory instruments such as the Licensing Guidelines, certain circumstances can lead to a deviation from the intended objectives, which requires the Energy Regulator to evaluate such deviations on a case-by-case basis. Among some of the reasons for the construction delays are funding problems or final investment decisions by licensees based on NERSA approved tariffs; and other regulatory approvals which have not yet been finalised, such as environmental impact assessments, re-zoning of land and permits. Such delays result in incomplete projects on NERSA's books and the commitment of human resources for extended periods.
- 5.2.8 There seems to be a demand from potential investors to acquire or build facilities; however, the demand varies from place to place, influenced by the potential market per area, with densely populated and industrialised areas in high demand and rural and remote areas in low demand. Barnes and Floor (1996:498-499) argue that the rural population do not get access to affordable 'modern' energy sources, such as electricity, liquid fuels, and modern biomass, resulting in highly uneven distribution and use of modern energy sources. NERSA has no direct control of where and how people should invest, other than considering the submitted applications. However, it plays an important role in evaluating the capability of the infrastructure to meet the demand for security of supply purposes, particularly in the inland market.

- 5.2.9 Another function of the Energy Regulator, in terms of section 28 of the Petroleum Pipelines Act, 2003, is to set tariffs for the operation of a petroleum pipeline and approve tariffs for storage and loading facilities. The Act requires that the tariff charged should be based on a systematic methodology applicable on a consistent and comparable basis; as well as be fair; non-discriminatory; simple and transparent; and predictable and stable.
- 5.2.10 Ideally, to make competition effective, users must be willing to switch suppliers instead of sticking with a monopoly operator in their area. However, the situation is slightly different in the petroleum pipelines industry in South Africa in that there is only one operator that transports petroleum products from the coastal area to the inland market, therefore the users cannot switch operators. Users do, however, have the option to use road or rail haulage.
- 5.2.11 In terms of storage, the owner of the storage infrastructure is often also involved in trading of the petroleum products. This can give an impression that there is less appetite to give access to petroleum storage, considering that third-party access to petroleum storage is rare based on the analysis of volume reports submitted to the Energy Regulator. A handful of multinational oil companies in the fuel sector value chain are controlling the sector, as they are involved in the vertical integration activities covering the entire value chain, including importing, refining and production, distribution and retail (Paelo, Robb & Vilakazi, 2014:3).
- 5.2.12 NERSA publishes the tariffs set or approved for the petroleum pipelines, storage and loading facilities on its website. With regard to the setting and approval of these tariffs for the petroleum pipelines sector, NERSA has developed guidelines and procedures for the approval of tariffs, which detail the process to be followed for tariff applications. The Guidelines for the Annual Assessment of Storage and Loading Facilities Tariff Applications ('the Guidelines') assist the applicants to prepare tariff applications. The Guidelines focus primarily on the Regulatory Asset Base (RAB) and Weighted Average Cost of Capital (WACC), particularly the Cost of Debt and Cost of Equity (Beta). The Guidelines assist licensees by:
- simplifying the tariff applications;
 - fast-tracking the processing of tariff applications;
 - simplifying the confidentiality of application;
 - reducing the regulatory burden on the licensees;
 - ensuring greater certainty of tariff outcome; and
 - giving surety on the industry-wide treatment of the WACC.
- 5.2.13 In 2016, according to the Reasons for Decision of the Energy Regulator, following the amendment of the Regulations by the DoE, the Energy Regulator amended its Tariff Methodology (version 2) to align it to the DoE's Methodologies and also to find a 'light-handed' format in which licensees can submit their tariff applications (National Energy Regulator of South Africa, 2017:2). The new Tariff Methodology (version 3), which replaced version 2, was 'based on the Indexed Original Cost (IOC)/Replacement Value (RV) method that is similar to the Replacement Cost no Depreciation (RnD), in order to converge with the DoE practice of fuel price regulation' (National Energy Regulator of South Africa, 2017:2). Furthermore, the Reasons for Decision state that 'the new Tariff

Methodology incorporated the standard costing options, which were aimed at lightening the process of calculating tariffs and shortening the application process for both the applicants and the Energy Regulator' (National Energy Regulator of South Africa, 2017:3). NERSA monitored the tariffs over a period and noticed that the tariffs were higher than normal. Despite the good intentions of the Energy Regulator in instituting this light-handed form of tariff application, it was faced with a number of challenges.

5.2.14 Some of the challenges mentioned in the Reasons for Decision are as follows:

- For the Standard Costing Options, the RAB values used are based on the Department of Energy's Engineering Procurement Construction Management (EPCM) study. It is the Energy Regulator's view that this study overstates the actual values of the storage facilities.
- There is no criteria for eligibility and efficiency, therefore the Energy Regulator cannot verify the eligibility, efficiency and correctness of the asset values.
- Version 3 of the Tariff Methodology does not allow for clawbacks, and therefore no adjustments can be made in instances where projections are significantly inaccurate.
- Version 3 of the Tariff Methodology allows for no depreciation of assets and clawback.

5.2.15 The Energy Regulator has reverted to its previous tariff methodology (version 2) while embarking on the process of reviewing its Tariff Methodology in order to address the challenges identified in version 3.

5.3 Assessment/Review of the Developed Regulatory Mechanisms/Tools

5.3.1 Regulation is intended to make improvements by changing individual or organisational behaviour, which should result in positive impacts in terms of solving societal and economic problems (Coglianese, 2012:8). Therefore, evaluating regulation after it has been put in place requires an inquiry into how it has changed behaviour, as well as, ultimately, its impacts on conditions in the world (Coglianese, 2012:8). In an attempt to unpack regulatory failure, the Economic Insight Ltd (2012:12-13) identifies three factors that could lead to regulatory failure:

- relevant existing factors are not identified;
- relevant factors emerge over time, leading to unanticipated economic costs; and
- the economic costs of relevant factors are under-estimated.

5.3.2 According to Kurniawan, Muslim and Sakapurnama (2018:105), Kirkpatrick and Parker's (2004) work has led to the realisation that the 'Regulatory Impact Assessment (RIA) is a term used to describe the process of systematically assessing the benefits and costs of a new regulation or an existing regulation, with the aim of improving the quality of regulatory policy'. All of the above shows the complexity involved in assessing the tools, therefore it should be based on a systematic process of assessment.

5.3.3 The regulation of the electricity industry has evolved and there is an urgent need to review related policies and legislation by the policy makers to enable NERSA to effectively regulate the said industry. The need for this is evident from the new

technologies that have been developed in this industry, as well as the need to protect customers, particularly those supplied by resellers of electricity.

- 5.3.4 In regulating the Piped-Gas industry, NERSA has been effective in executing its mandate in terms of the Gas Act, as well as with the developed guidelines and methodology to regulate the tariffs and prices of the gas market. Gaps have been identified through the regulatory processes and through legal challenges. The Energy Regulator will have to review these and come up with strategies to address the identified gaps and legal issues.
- 5.3.5 With regard to the petroleum pipelines matters, the assessment can be summarised by acknowledging the challenges experienced as detailed in the paper, and the mitigation measures put in place to deal with those challenges. There is usually a temptation by people to focus on the end results in the assessment and forget about the process followed before implementing something, which led to those results. Therefore, judging a tool without a systematic process of assessment will be unjustifiable, hence challenges are only acknowledged. It is for that reason that the three points mentioned above by the Economic Insight Ltd were mentioned.
- 5.3.6 It is worth noting that some processes are not within the total control of the Energy Regulator, although it can make recommendations to the policy maker for possible amendments. Where the Energy Regulator is in control, it will continue to assess the implemented tools and make the necessary changes, as done with the tariff methodology, from time to time.
- 5.3.7 Additionally, with regard to the institutional design, there is a need for the governing legislation to explicitly establish the roles of the FTRMs in terms of whether it should only be strategic, or both strategic and operational. On the actual operational structural design, NERSA has been able to excel in executing its mandate based on a functional structure, and it is our view that it will be able to continue do so with any of the options highlighted in this paper.

6. CONCLUSION

- 6.1 It is an undisputed fact that there has been a multitude of changes and challenges in the regulation of the energy sector since NERSA came into existence. NERSA's journey takes place within a dynamic operating environment, requiring constant monitoring and improvement. Our success in delivering the mandate of the Energy Regulator relies on a team effort from all interested and affected parties in working towards the goal of becoming a recognised world-class leader in energy regulation.
- 6.2 In achieving this goal, some roads will be smooth and others paved with challenges, which will require a constant review process. Although NERSA has the opportunity to learn from other regulators, it has to be acknowledged that in certain instances, the operating environment is not the same. Therefore, NERSA will have to rely on its core values of passion, partnership, excellence, innovation, integrity, responsibility, professionalism and pride to guide it on its journey.

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