

Who pushes the buttons?

Investigating the regulatory governance of retail electricity tariff setting in South Africa through Institutional analysis and development.

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Abstract

The rapid increase in South African electricity prices in the past eight years has been overseen by a proactive, policy-oriented regulator, NERSA. Regulatory governance theory proposes that regulation is most effective when the roles of different organisations are clearly defined. While the laws establishing the regulator comply with this requirement, effectiveness of regulation is challenged by a weak ministry, overlapping spheres of regulatory influence and competing goals amongst the parties involved. It is hypothesised that this impacts the outcomes of the regulatory institution. Using Institutional analysis and development as a framework, the interactions between the regulator, the energy ministry, municipal electricity distributors and National Treasury are investigated. Attempts to change the institutional rules have generally failed because of the threat they posed to the constitutional and financial interests of municipalities. The regulator, with support from National Treasury, has achieved success in ensuring compliance by municipalities to its administrative processes and its prescribed tariff escalation rates. It has been less successful at ensuring standardisation of business tariffs across electricity distributors. The regulator's tariff objectives have prioritised protection of the poor rather than economic development. The major pro-poor initiative of the regulator is the inclining block tariff which has effectively subsidised electricity consumption of low usage households. This is primarily at the expense of municipalities, rather than other consumers.

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1 INTRODUCTION

In 2007 and 2008 South African electricity users were hit by dual shocks of intermittent electricity blackouts and price increases of between 27.5% and 32.7% (Mail & Guardian 2008a; 2008b). The production price of electricity increased by almost four times in the ten year period starting in 2005 (Stats SA 2016). Since then, the electricity sector has been in a crisis with the inadequate generation capacity of aging infrastructure struggling to meet demand.

Since 2006 the South African electricity sector has been overseen by a powerful and independent regulatory agency with all electricity generation, transmission and distribution activities in its purview (Marquard 2006). Although some improvements have been seen in the regulatory process over time, Steyn (2012) proposes that the weak state of the industry is largely the result of weak regulatory governance.

Regulatory theory maintains that the governance of regulatory systems should produce outcomes that are efficient, transparent and have integrity (Stern & Holder 1999). This usually occurs when the roles and authority of different stakeholders and the rules of the institutional processes are clearly delineated. Similarly, the starting point of principal-agent theory is that the regulator is assigned a certain mandate by law and policy which it should rationally implement to oversee the industry as agent (Kay & Vickers 1990).

The effective regulation of South Africa's electricity distribution system, however, is challenged by a weak ministry, a strong proactive regulator, unclear terms of delegation, overlapping spheres of regulatory influence, competing goals and differing regulatory mechanisms. The interactions between the role-players result in outcomes that reflect conflicting power relations, rather than deliberate translation of policy within formal roles.

Local scholarship on electricity regulation is relatively sparse and it is possible to identify at least four relatively unexplored areas in the literature. Firstly, there is limited treatment of any issues at a sub-national level, with only brief and generalised reflections on municipal distribution. Second, there are no studies providing detailed analysis of specific pricing structures and how these are determined. Thirdly, no study specifically examines the regulatory system from the perspective of businesses, which

are the largest consumers of electricity. Finally, aside from Steyn's (2001; 2006) use of principal-agent analysis to explore investment decisions in the electricity sector, no attempt has been made to use a specific theoretical approach to analysis.

This research addresses these limitations through focusing on the legal, policy and procedural elements of municipal tariff determination and the associated roles of key players. The aim is to understand the extent to which trade-offs made in the regulatory process are a result of the interests and power relations of different stakeholders. A detailed analysis of industrial and domestic pricing structures, levels and changes provides a quantitative perspective on the outcomes of the regulatory process over time. Institutional analysis and development (IAD) (Ostrom 2011a) is used as a conceptual framework to understand the institutional factors that shape tariff setting.

The paper starts with an overview of changing international approaches to regulating monopolies over the past 30 years and the emergence of regulatory governance as a paradigm for both the design and evaluation of regulatory systems. The history of South African electricity regulation is sketched. The IAD framework is presented as a structure to systematically analyse interactions between key actors. Key institutional actors, together with the rules that regulate their interactions, are identified. Retail electricity tariff determination is investigated as the focal area of interaction between role-players. The analysis is then completed with a quantitative assessment of key outcomes highlighting institutional performance.

2 CHANGING FORMS OF REGULATION

Electricity was one of a number of South African economic sectors in which new regulatory agencies were established following the introduction of democracy in 1994 (Steyn 2012). This aligned with a global trend in which governments established a large number of regulatory bodies with wider powers than had previously been the norm (Jordana et al. 2011).

2.1 History of South African electricity regulation

In many countries electricity generation and distribution were traditionally provided by utility monopolies. These tended to be natural monopolies due to the large capital costs in developing infrastructure in comparison to the relatively low marginal costs of supplying electricity. Economies of scale and the highly specialised and vertically integrated nature of the technology favoured centralised control and coordination (Spiller & Tommasi 2005; Finger & Künneke 2009). This logic underpinned the creation of a central state-owned electricity utility in South Africa in the 1920s which consolidated existing private and municipal generation activities into a vertically-integrated electricity utility, the Electricity Supply Commission (Eskom) (Steyn 2001; Marquard 2006).

Eskom was originally established with the specific aim of providing cheap energy for industrialisation and mining expansion. Electricity in South Africa was directly supplied to large industrial and rural consumers by Eskom, and indirectly to urban residential and other business consumers through local authorities (Marquard 2006). Racially differentiated municipalities resulted in almost complete electrification of white residential areas and uneven provision in areas reserved for other races. This arrangement continues to this day in the form of vertically-integrated Eskom with an electricity generation and transmission monopoly, and distribution rights shared between Eskom and municipalities (Eskom 2014).

From the formation of Eskom in the 1920's to the mid-1980's, regulatory control was exercised by a nominally independent Electricity Control Board (ECB) which consisted of representatives of government and large business consumers. It had little real

capacity and primarily mediated the interests of the generator, government and consumers. The ECB approved Eskom's prices, but only reviewed and commented on municipal tariffs (Steyn 2001; Eberhard 2006; Marquard 2006).

The 1987 Electricity Act (RSA 1987) removed Eskom from external regulatory control. Instead, the Electricity Council, still comprising government officials and major consumers, regulated Eskom and had the power to veto its price increases. However, this body had little influence over the utility, nor did it have any authority over municipal tariffs (Marquard 2006; Steyn 2006).

The current phase of regulation started in 1995 with a major overhaul of institutional arrangements driven by the transformative agenda of the newly-elected democratic government. A new energy policy, the extension of electricity provision to poorer households, the consolidation of electricity distribution entities and the establishment of the National Electricity Regulator (NER) were the key reform initiatives of the new government.

An institutional framework for the regulation of state electricity provision evolved from several policies and laws issued between 1998 and 2008 with the independent National Energy Regulator of South Africa (NERSA) at its centre. Established through two amendments to the 1987 Electricity Act (RSA 1994; 1995), the NER was both more independent and powerful than before (Marquard 2006), along the lines of new regulators established in other countries. The NER had stronger organisational capacity as well as purview over all generation and distribution. It further had the authority to regulate all tariffs and was intended to moderate the diverse interests in the electricity sector (Teljeur et al. 2003). Following the adoption of a new energy policy (RSA 1998a) and subsequent legislation the NER morphed into its current form as the National Energy Regulator of South Africa (NERSA).

2.2 New style regulation

Two models of regulating natural monopolies existed prior to the 1980's. In the USA utilities were usually privately owned and authorities consequently established regulatory agencies with specific executive functions aimed at enforcing regulations to correct market failures and constrain monopoly power (Crew & Kleindorfer 1986). Regulation in this model is intended to improve efficiency by ensuring the monopoly

produces at the lowest possible marginal cost and receives a return on its investment that enables its sustainability (Joskow & Rose 1989).

European and developing countries employed a model in which regulatory power and policy-making was vested in the central state in order to achieve welfare-orientated political and social goals (Cook et al. 2004; Majone 1990). These institutions most commonly targeted equity objectives aimed at reducing poverty and income inequalities between different groups (Crew & Kleindorfer 1986).

Over the past 30 years, many countries in the developed world privatised the ownership of utilities, and simultaneously established a range of regulatory agencies to protect public interests (Levi-faur 2012). These independent regulatory agencies are often delegated additional policy-making functions, traditionally the responsibility of the legislative or executive arms of government (Thatcher 2002). The proliferation of these new-style regulators has been viewed as a new form of governance, labelled the 'regulatory state' (Majone 1999).

Kay & Vickers (1990: 230) state unequivocally that the "general economic framework for the analysis of regulation is the class of principal-agent problems". The delegation of policy making powers raises complex principal-agent problems because of information asymmetries and non-alignment of objectives. Over time regulators may develop greater knowledge and expertise and thus may become detached from the accountability of elected government. This shift in roles represents a delegation by elected government of several of its responsibilities to independent or semi-independent bodies. Delegation to what are called non-majoritarian institutions raises significant concerns of legitimacy and accountability of regulatory agencies due to their insulation from the electoral cycle and political direction (Majone 1999; Thatcher 2002). However, these organisations can have a positive impact through mechanisms such as public consultations, which can make the process of policy formulation transparent and enable the participation of a broader range of stakeholders without the need to access ministers and line departments (Thatcher 2002).

In developing countries new-style regulators were established while the utilities remained in state ownership (Minogue & Carino 2006; Dubash & Rao 2008). Public ownership does not remove the principal-agent problem but rather re-contextualises it in a different institutional environment (Kay & Vickers 1990). Public corporations are

usually managed by boards which have operational imperatives and may be influenced by a variety of stakeholders resulting in their objectives differing from those of the government executive. Consequently, independent regulatory agencies can assist governments in managing the technical aspects of the industry as well as depoliticising unpopular but necessary decisions (Gilardi 2001).

Effective regulation usually requires the regulator to manage a set of trade-offs between efficiency and equity objectives. Because of the economic and social importance of the service provided by the utility, these trade-offs often derive from the influence of specific interest groups or political priorities (Spiller & Tommasi 2005). Trade-offs are commonly resolved through transfers by means of cross-subsidisation between consumers, commonly benefiting residential users at the expense of industrial customers (Joskow & Rose 1989). In some countries the trade-offs are clearly defined in legislation while in others the regulatory agency has more discretion (Smith 1997).

Important conceptual insights into the operation of regulatory systems have been provided by New Institutional Economics (NIE) (Crew & Kleindorfer 1986). An institution can be defined as a system of interrelated formal and informal rules according to which organisational actors interact to pursue their interests. NIE provides a conceptual basis for regulatory governance theory as well as the institutional analysis and development framework. Regulatory governance provides a normative approach to the design and evaluation of regulatory institutions encompassing all laws, policies and other means of control impacting the industry, not only those concerning the regulatory agency (Majone 1990). Effective regulatory institutions should reflect principles of independence; accountability; transparency and public participation; predictability; completeness and clarity in rules; proportionality; requisite powers; appropriate institutional characteristics; and integrity (Stern & Holder 1999; Brown et al. 2006).

It is common, however, for there to be several laws, authorities and regulatory organisations with overlapping spans of responsibility, resulting in more complex principal-agent problems (Gilardi 2001). The concept of polycentric regulation has been used to describe multiple interlinking agents of regulation at different levels and the ways they may compete or cooperate to enhance their legitimacy (Black 2008).

This concept is contrasted to the common hierarchical structure evident in a strong centralised state or a decentralised apparatus where authority is vested in lower levels (Ostrom et al. 1993; Aligica & Boettke 2011). The interaction of political institutions through regulatory processes within specific economic conditions can substantially determine the economic performance of the industry (Levy and Spiller 1994).

2.3 Methodology

Analyses of policy institutions and regulatory governance generally employ qualitative research methodologies because they give deeper relevance to the characteristics and decisions of regulatory systems than quantitative methodologies (Mouton 2001; Brown et al. 2006). IAD is a qualitative research methodology providing an analytical framework for evaluating institutional players, rules, interactions and outcomes. IAD is aimed at understanding the operation of public policy institutions. Its intellectual foundations are in NIE, game theory and psychology (Ostrom 2011b).

While IAD has most commonly been applied to the examination of common pool resources such as water and grazing land, it has increasingly been recognised as a framework for the analysis of a wide range of policy topics including utility regulation. (Ostrom 2011a; Nowlin 2011). IAD was used as a comparative tool to match the institutional form of regulators with varying performance of Italian public utilities (Asquer 2011) and to track the influence of stakeholder groups and rules in shaping institutional forms and policy outcomes of electricity regulation in the United States (Baldwin 2013) and Brazil (Amorim 2013). The benefit that IAD brings to the study of complex policy situations is as an aid to analysing how formal and informal rules shape the behaviour of institutional actors. It emphasises the critical variables in the policy environment, rather than a particular policy outcome or theoretical outcome (Baldwin 2013). IAD has shown a high level of flexibility, and in each of the cases mentioned, the researchers adapted the framework to their specific research questions and selected those elements of the framework most applicable.

This study explores the hypothesis that the electricity regulation institution in South Africa is comprised of a number of overlapping centres of power and that regulatory outcomes reflect the product of interactions between industry actors. IAD is ideally

suitable to this analysis given that it was developed to analyse institutional arrangements for the distribution of limited resources.

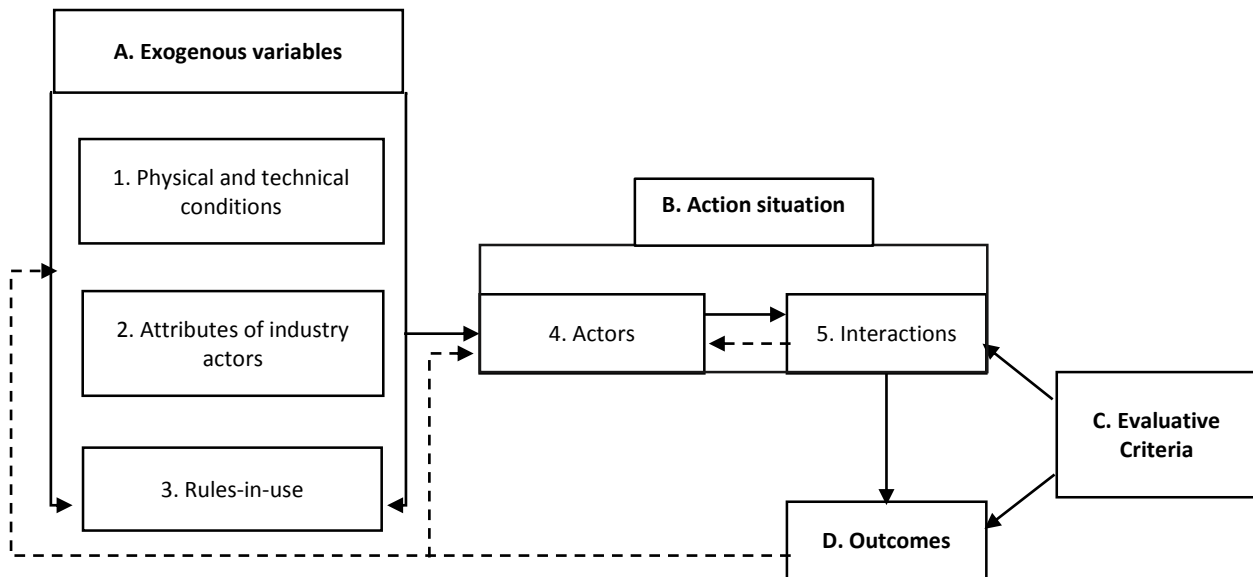


Figure 1 Adapted framework for institutional analysis (Asquer 2011; Ostrom 2011a; Baldwin 2013)

Figure 1 shows the main components of the IAD framework as they are to be used in this study. Policy outcomes (D) are a result of interactions (5) between organisational actors (4). These interactions are framed by the exogenous variables (A) which describe the context in which the policy is implemented. The physical and technical conditions (1) describe the tangible realities of the subject. Attributes of industry actors (2) describe the main role-players, their positions in relation to the policy situation and in relation to each other. The rules-in-use (3) describe the powers and authority allocated to each role-player. These consist of both formal rules allocated through legislation, policy or regulations as well as informal rules governing accepted modes of behaviour. The exogenous variables can change as a result of the interactions and their outcomes. The action situation (B) describes the ways in which the actors engage with each other, using the rules to advance their positions in the course of policy processes. The policy outcomes can be evaluated (C) by the role-players against their objectives, but also against independent criteria posed by the original goals of the policy, a particular theory or some best practice. Based on these experiences, the actors may adjust their positions or try to change the rules (Polski & Ostrom 1999; McGinnis 2011; Ostrom 2011a).

This research primarily focuses on the twelve South African municipalities with revenue from electricity sales of over R1 billion in the 2013/14 financial year based on official statistical information (Stats SA 2015a). Both textual analysis and numerical data have been used including over 330 published and unpublished documents compiled by role-players in the institution. These include laws and regulations, official circulars, regulatory decisions, planning and reporting documents, as well as position papers and presentations. Documents were analysed using Atlas.ti, a Computer Aided Qualitative Data Analysis Software (CAQDAS) programme which enables the coding and thematic review of document excerpts. The document analysis was supplemented by personal semi-structured interviews with experts in relevant organisations. Seven of these were with municipal managers responsible for electricity tariffs while others included senior officials at Eskom, NERSA, the Department of Energy and organisations representing businesses. Price data was sourced from NERSA and electricity distributors directly and information on local government finances from Statistics South Africa.

3 INSTITUTIONAL ANALYSIS OF ELECTRICITY REGULATION

A disaggregation of the exogenous variables comprises the first part of the analysis, followed by a discussion of the interactions of the role-players, especially with regard to tariff setting processes. The outcomes of the interactions are then evaluated.

3.1 Physical and technical conditions

The South African electricity industry is dominated by the state-owned vertically-integrated utility Eskom and municipal electricity distributors. The entire value chain of generation, transmission and distribution is therefore state controlled. Eskom generates 95% of all power in South Africa – some 231 000 Gigawatts hours in 2013/2014 (Eskom 2014). It owns and operates all electricity transmission infrastructure and thereby provides the control centre for the entire electricity grid (das Nair et al. 2014).

The 1980's saw a period of over-investment in power plants, which allowed cheap power provision during the 1990's as the capital costs of power stations were already amortised. Surplus capacity declined during the late 1990s and first years of the last decade because of accelerating economic growth and an extensive residential electricity rollout amongst previously disadvantaged households (Eberhard 2006). Currently, approximately 86% of South African households have access to electricity (Stats SA 2015b). However, no new generation capacity was developed during this period and as a consequence, demand exceeded supply in 2007 resulting in a series of national power failures (Mail and Guardian 2008a).

Eskom directly distributes about 60% of generated power to approximately 4000 energy-intensive large businesses and mines as well as about 4,9 million households mainly in rural areas and formerly black-only municipalities (Eskom 2012; 2014). The remaining 40% of Eskom's generated power is sold to municipalities for distribution to consumers within their geographic boundaries.

Municipalities have a higher proportion of residential and small business consumers. Of the 280 municipalities in the country, 177 distribute electricity (Eberhard 2006; Das Nair et al. 2014). Electricity sales contribute approximately 30% of total municipal revenues (Stats SA 2015a) and net surpluses from these are used by municipalities

to cross-subsidise other services. Maintenance of infrastructure such as water, electricity and roads by municipalities is uneven and often inadequate (Steyn 2012). One reason for this is poor financial management in municipalities. Municipal revenue is comprised of a mixture of service fees, local taxes and grants from national government (Stats SA 2015b). Certain grants are earmarked but overall municipalities have a high degree of autonomy regarding their financial priorities. The surplus on electricity sales is important revenue for funding other municipal priorities.

3.2 Policy and legal context

Existing institutional arrangements for electricity regulation are grounded upon the Energy White Paper (RSA 1998a) which sets out the short, medium and long term objectives for the electricity sector. While the policy was officially adopted in 1998 and is considered by many institutional actors to be outdated, it is useful to understand the policy framework in which the regulator operates, specifically the two laws which establish the rules of the regulatory system – the National Energy Regulation Act [NERA] (RSA 2004) and the Electricity Regulation Act [ERA] (RSA 2006a).

In contrast to the secretive nature of regulatory decision-making during the apartheid era, the White Paper promulgates a transparent process, with a broader inclusion of previously excluded constituencies, the sharper delineation of roles of different industry actors and includes mechanisms to reduce information asymmetries. These are elaborated in NERSA's 2012/13-2016/17 strategic plan (NERSA, nd), requiring the regulator to be neutral and independent, consistent and predictable in its decisions, and to operate with integrity and efficiency. These are consistent with the established principles for effective regulatory governance (Brown et al. 2006).

The White Paper and subsequent legislation establish five high-level objectives for the institution:

- a. Ensure universal and affordable access to electricity;
- b. Promote investment in the sector by ensuring adequate returns to underpin the financial viability of operators and long term sustainability of the industry;
- c. Balance the needs of different stakeholders such as generators, distributors, customers and the general public;
- d. Promote energy efficiency and the use of diverse energy sources; and
- e. Promote competition in the sector, especially to promote customer choice.

These goals are not necessarily in harmony with each other. Rather, different aims are favoured by different actors and thereby compete with each other for dominance. It is not the aim of the study to systematically evaluate achievement against each of these objectives. However, it is clear that the most important success of the new policy and governance environment was the massive electrification of homes in black residential areas (Bekker et al. 2008).

In order to promote competition in the industry, the White Paper envisaged that Eskom's vertical integration would be decentralised and regional distribution utilities (REDs) would be established encompassing both municipal and Eskom's distribution infrastructure. However, despite significant resources and time dedicated to this project, it ultimately failed due to the reluctance of municipalities to sacrifice the additional revenue derived from electricity sales (Keswell-Burns 1998; Eberhard 2013).

Good regulatory governance is gauged by the extent to which the roles and powers of organisations are discretely defined (Stern & Cubbin 2005). While the laws establishing the regulator may be well defined, these represent only two of the fifty eight acts governing the regulation of the electricity sector listed by Klees (2014). Primary among these are laws regulating local government and inter-governmental finance, municipal bylaws, and laws concerning the transparency and fairness of administrative decisions. Company law and the Eskom Conversion Act (RSA 2001) provide the governance framework for Eskom. Environmental protection laws, public procurement law and contract law play a role in new generation projects. Indeed NERSA is not the only regulator active in the industry. The nuclear regulator, the departments of Public Enterprises, Energy and National Treasury as well as private sector corporate governance requirements have an influence in the regulation of the industry (Eskom 2014; Das Nair et al. 2014). The White Paper (RSA 1998a: 106) acknowledged that "the range of stakeholders and their interrelationships makes the energy sector difficult to manage". This challenge is underpinned by often conflicting legal, economic and political interests which are represented in the various policies governing the regulation of the electricity sector and which are seen to reduce overall industry performance (Steyn 2012; Das Nair et al. 2014, Klees 2014).

Amongst these systems, one which is of primary importance to this analysis is the regulation of public, and specifically municipal, finances. The White Paper on Local Government (RSA 1998b) provides a policy framework which sets a developmental role for local government which places municipalities at the centre of ensuring the provision of household infrastructure, services and local economic development. The policy envisages a high degree of autonomy for local authorities, with national and provincial government limited to establishing legislative frameworks; and enabling and monitoring municipalities. Local authorities are responsible for their own financial administration and budgeting to fulfil this role. Municipal finances are, however, subject to national macro-economic discipline by National Treasury (Powell 2012). This policy forms the basis of much of the legislation regulating municipalities passed in the early 2000's.

3.3 Institutional actors and rules in use

While the roles of certain actors are strictly defined by legislation, others exert influence through political or economic pressure. IAD views the formal authority and scope rules as a primary exogenous variable informing institutional interactions. The multiple formal laws and policies provide the basis by which the different decision makers exercise their authority, resulting in a characteristically polycentric institutional environment (Aligica & Tarko 2012).

Electricity regulation operates as a component of the broader system of public financial management as represented in Figure 2. Red shapes represent the public finance regulatory system and blue the electricity regulation system. NERSA reports to the Department of Energy, and in turn has regulatory authority over Eskom. Eskom is accountable to the Department of Public Enterprises representing the government as shareholder. National Treasury has regulatory authority over the financial affairs of all government institutions, including municipalities. As all the role-players in the electricity sector are organs of state, Treasury's authority incorporates them all. NERSA has regulatory authority over the electricity tariffs and revenue of municipalities which comprise part of their financial affairs. Importantly, municipalities have a high degree of autonomy in managing their own affairs.

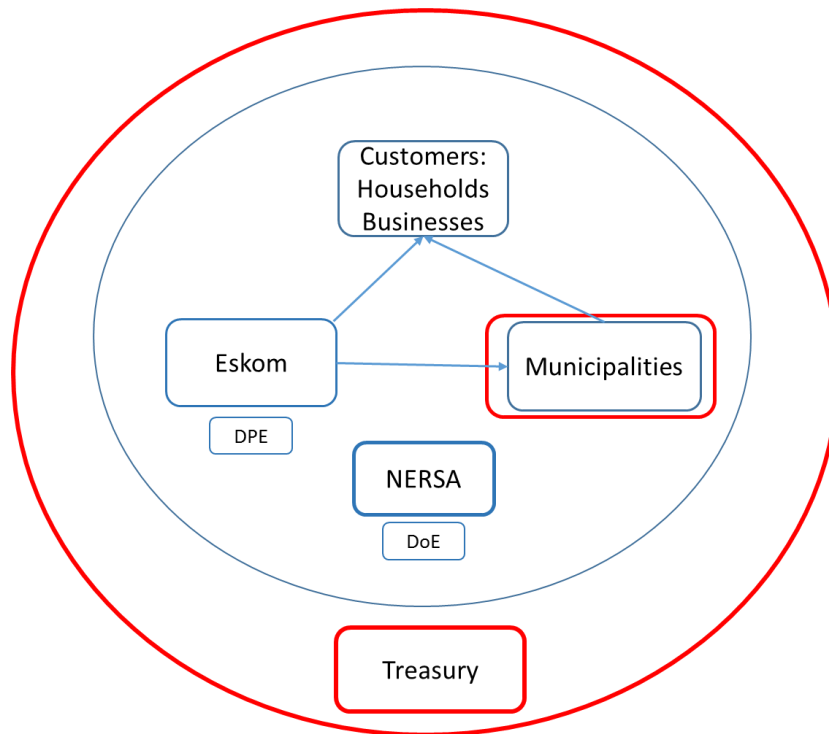


Figure 2. Schematic of institutional actors and relationships

Blue outline = electricity regulation institution

Red outline = government finance regulation institution

3.3.1 NERSA

Legally, NERSA is the custodian and policy enforcer in the electricity regulatory framework (RSA 2006a). NERSA is a new style regulator which is delegated specific responsibilities through policy but is ultimately held accountable to the Minister of Energy. The agency is granted substantial independence in its legal establishment.

NERSA is assigned seven key responsibilities in section 4 of the ERA. The first three of these are substantive responsibilities. These include the licensing of operators in all aspects of the electricity industry, the regulation of prices and tariffs and the issuing of rules to implement government's policies. To achieve these responsibilities, the regulator is granted further powers to establish monitoring and information systems, initiate investigations, mediate disputes between actors and enforce compliance by levying fines.

The regulator consists of four full time and five part time members appointed for a fixed but renewable period by the Minister of Energy. Competence and ethical criteria

(which include not being a member of a political party) are specified and a member may only be dismissed by the Minister if they breach ethical standards. The NERA requires members to act impartially, transparently and independently of any undue influence. NERSA is subject to the Promotion of Administrative Justice Act (PAJA) (RSA 2000a) which requires fairness and transparency in administrative decisions and justified decision making.

NERSA may be funded by the national fiscus, levies on the sale of (generated) electricity and donations. However, NERSA is not currently dependant on national government for any of its funding as all income is provided through electricity levies and interest on surpluses (NERSA 2015), thus strengthening its independence.

NERSA's annual reports show that income for electricity regulation functions has increased by 183% between 2006 and 2015, while its total staff complement increased by 64%.

NERSA's independence is strengthened by the fact that the ERA does not allow any recourse for appeal with regard to its decisions, save through the courts. In such a case, a complainant is required to prove that NERSA acted outside of its legal mandate, and plaintiffs can only challenge the rationality of decisions, not their substance.

NERSA has embraced its role as a new style regulator by involving itself in policy matters from its inception as the NER by supporting the Department of Energy in designing and implementing the REDs-based industry restructuring initiatives as well as the electrification programme (Teljeur et al. 2003). A review of NERSA's planning and reporting documents shows that it has continued to actively position itself as a key policy agent in the sector. This is in the context of a policy vacuum created by the Department of Energy and the shift of emphasis in government towards a more interventionist developmental state. Its goals are increasingly framed by self-selected developmental objectives of government (NERSA 2015).

A key achievement of NERSA was the implementation of the Inclining Block Tariff (IBT), a major cross-subsidisation mechanism (Teljeur et al. 2003). This is an example of NERSA using its specific tariff regulatory power to achieve political goals outside its direct mandate. A recent strategic plan states that NERSA aims to further strengthen

its powers, although it does not mention what those additional powers might be (NERSA 2015).

Most institutional actors interviewed for this study agree on the importance of a regulator to curb the power of Eskom (as a monopoly) as well as local politicians (who may wish to manipulate tariffs for political purposes). However, municipal officials regard NERSA as ineffective at ensuring a level playing field between Eskom and municipalities. This is particularly in cases where consumers have adjacent distributors and where the expanding urban edge encroaches on rural areas supplied by Eskom. Municipal officials consider that NERSA has failed to properly understand the diversity of municipal electricity operations and financial structures which results in incorrect benchmark tariffs (Fowles 2010). NERSA has a high staff turnover which results in loss of memory, knowledge and skills, impacting on its technical competence in a highly specialised field. NERSA is also considered impotent as a mediator as it does not employ the sanctions provided for in legislation.

Business organisations commonly make use of NERSA's public hearings to voice their views on impending decisions. They provide technical experts to participate in industry working groups to nudge the institution to a more business-friendly position. However, there is substantial frustration amongst businesses, as reflected in presentations to the regulator, concerning the general state of the electricity industry including lack of capacity and supply interruptions.

3.3.2 Minister of Energy

The Energy White Paper identifies the Minister of Energy as responsible for the development and implementation of energy policy. The Department of Energy, which is accountable to the Minister, is allocated responsibility for the general governance of the energy sector, the formulation of long-term integrated energy plans, and ensuring that appropriate institutions are established to achieve energy policy objectives. The Minister has issued the Electricity Pricing Policy [EPP] (RSA 2008a) which underpins many of the principles currently applied in tariff determination.

The Minister is allocated substantial powers and responsibilities by the ERA and the NERA. The Minister directly appoints members of NERSA and has extensive authority to determine the rules and procedures related to critical regulatory functions. Among

these are the power to determine the criteria for the regulator to issue a licence as well as exemptions from licensing, thus insulating such a party or activity from the regulatory process. The department has not updated its industry-wide policy position since the Energy White Paper, rather focussing on energy supply planning, specifically nuclear, gas and hydro options, as well as the promotion of clean energy sources (DoE 2014; 2015).

3.3.3 Municipalities

The South African Constitution (RSA 1996) specifically empowers local government to distribute electricity subject to national or provincial legislation. This concretised the historical independence of municipalities in formulating local electricity policy. The balance of municipal and national rights are highly contested between NERSA and municipalities. This divergence of powers creates a polycentric relationship between the electricity and public finance regulation institutions.

The financial decisions of local authorities are regulated by three main national laws which emanate from the Local Government White Paper (RSA 1998b). These are the Local Government Municipal Systems Act [LGMSA] (RSA 2000b), the Municipal Finance Management Act [MFMA] (RSA 2003) and the Municipal Fiscal Powers and Functions Act [MFPFA] (RSA 2007). Collectively, these establish a framework for the functioning of municipalities including the proper management of their financial affairs. Municipalities are therefore responsible for their own financial management subject to national legislation including the power to raise their own revenue by levying local taxes and service charges such as electricity tariffs.

Municipalities formed two associations to collectively represent their interests in national government. The South African Local Government Association (SALGA) directly intervenes on behalf of municipalities on a range of topics including those relating to electricity. The Association of Municipal Electricity Undertakings (AMEU) periodically discusses policy, technical and regulatory issues with national government.

Municipalities are generally viewed negatively by other institutional actors. NERSA and businesses believe that municipalities deliberately hide their cost structures and make every attempt to optimise their revenue while appearing to comply with NERSA

decisions. Many municipalities – especially smaller ones - do not have the necessary number of skilled staff to adequately maintain their electricity networks resulting in service deterioration (Maphumulo & Fowles 2008).

3.3.4 National Treasury

The National Treasury is the regulatory control centre of the state's financial management system. It has three responsibilities related to the electricity sector. Firstly, approval of Eskom's debt levels and its possible impact on the nation's overall borrowings and credit rating; secondly, monitoring the effect of tariff increases and power shortages on inflation and GDP; and thirdly, monitoring the health of local government finances and allocating fiscal transfers (Das Nair et al. 2014). The MFMA assigns National Treasury powers of monitoring, investigating, supporting and taking action with respect to local authorities, specifically in relation to compliance with national legislation, but it has no power to make decisions.

In total local authorities receive approximately 32% of their total revenue in grants from the national fiscus (Stats SA 2015b). The MFMA (s5) creates significant leverage for the Minister of Finance by empowering him to stop funds to a municipality if it is in serious material contravention of relevant laws.

Additionally, section 20 of the MFMA specifically empowers the Minister of Finance to take steps to ensure that municipalities do not prejudice national economic policies. In pursuit of this, Treasury requires municipalities to submit motivations for any electricity tariff increase higher than the central bank's inflation target ceiling of 6%. National Treasury is also authorised to issue regulations and guidelines to municipalities on finances, including regulating municipal fiscal and tariff-fixing powers and surpluses.

3.3.5 Eskom

Through the Eskom Conversion Act (RSA 2001), Eskom is a state-owned public company subject to the governance provisions of the Companies Act (RSA 2008b). The Eskom Conversion Act is silent on the role expected of Eskom except for the promotion of cheap access to electricity for households and the need to play a developmental role. Government, as its only shareholder, establishes a set of specific focus areas and targets for the utility. Most of these relate to governance and the management of its generation and transmission operations (Eskom 2014). Eskom's strong influence in the institution stems from its control over these functions and its technical competencies, rather than its distribution activities or specific legislation.

3.3.6 Consumers of Electricity

Households and businesses are the main purchasers and consumers of electricity in the country and thus are the net winners or losers of regulatory decisions. While formerly white suburbs have been typically supplied with electricity since their establishment, poorer households benefited from government's massive electrification drive with almost 3,3 million new connections made between 1991 and 1999 alone (Gaunt 2005; Bekker et al. 2008). Poor households also obtained low priced electricity and substantial electricity subsidies. The poor mainly influence institutions through political power and government policy to improve their access to basic services.

Business organisations consume approximately 70% of all electricity in the country (EGI 2013), with over half used by 32 extremely energy intensive companies (EIUG 2014). Prior to the 1990's, business consumers were formally represented on regulatory bodies (Steyn 2001; Gaunt 2005), but following the establishment of the NER, businesses resorted to using public consultation opportunities and political lobbying to advance their interests.

3.3.7 Conclusion

The electricity regulation institution is centred on NERSA, the Minister of Energy and National Treasury as the key regulatory entities. Eskom and municipalities are the main electricity distributors and households and businesses the main consumers of electricity from which municipalities generate a substantial portion of their revenue. Municipalities are subject to regulation by both NERSA and Treasury, but also constitutionally and historically enjoy substantial autonomy in setting tariffs.

Given the importance of electricity revenues, local authorities are reluctant to cede their tariff determination powers to an organ of national government. This tension underpins much of the interaction between these institutional actors. NERSA has fully embraced its role as a proactive regulator in a policy vacuum left by the Minister and Department of Energy, leaving it with much discretion on the alignment of its mandate with government policy and the interests of competing consumer groups.

3.4 Institutional interactions

The exogenous variables discussed above provide the context and basis on which the institutional actors engage each other. Five arenas of interaction (action situations in IAD terminology) are examined here. The first two are attempts to change the rules of the game and show the shifting positions of NERSA and the Department of Energy. The third arena concerns the actual process of tariff determination and the way in which actors use or abstain from different processes according to their interest and opportunity. The fourth shows the use by the regulator of tariff instruments to pursue its social policy goals. The fifth action arena is currently in play and illustrates an attempt by the Department of Energy to reclaim institutional power.

3.4.1 The struggle for regulatory authority

The period between 2006 and 2010 saw a tussle between NERSA and municipalities to assert their authority. This contest first played out in formulation of the NERA, resulting in its 2007 amendment and continued through the failed efforts of the regulator and Department of Energy to change the constitution and establish the REDs.

Prior to 2006, municipal electricity operations were insulated from national regulation and the original version of the ERA maintained this arrangement (Eberhard 2006; NER 2006). However, NERSA actively lobbied for this to be changed (NERSA 2007a), causing an entire chapter to be omitted from the ERA. The first attempt to resolve this was the 2007 ERA Amendment Bill (RSA 2006b) which tried to restrict municipalities from supplying industrial customers. This raised specific logistical and financial problems for municipalities, undermining the cross-subsidisation of poorer users by industrial customers. Levying a surcharge on the sale of electricity was also banned, threatening the revenue of municipalities (AMEU 2006). However, the draft amendment bill still restricted the tariff setting authority of NERSA over municipalities and proposed that the Minister of Energy set norms and standards for municipal tariffs. This would create a dual regulation system which was problematic for NERSA (NERSA 2006).

The final 2007 ERA amendment (RSA 2008c) affirmed the right of NERSA to regulate the tariffs of municipalities, but also the right of municipalities to distribute to all classes of consumers. Although this represented a compromise from the initial proposal, it ultimately provided the basis for NERSA to incrementally exert greater influence over municipal tariffs. Subsequently, NERSA and the Department of Energy unsuccessfully petitioned Parliament to change the constitution. They proposed that the function of electricity distribution be made a national competence and that the term 'excluding regulation' be inserted as a condition to municipal electricity functions (NERSA 2008; DOE 2010).

Despite these provisions, municipalities openly stated that they did not regard themselves as bound by NERSA rulings (Fowles 2010). However, the South African Local Government Association (SALGA) obtained legal opinion confirming NERSA's right to regulate municipal electricity distribution (Kolisa 2010). This matter is still cited as an issue by municipal officials interviewed.

The Department of Energy has twice unsuccessfully attempted to restructure the industry in line with the Energy White Paper. These are not discussed in any detail here. Firstly the establishment of six geographically-based distribution agencies (REDs) would have removed the distribution roles of both Eskom and municipalities and opened the possibility of competition. Second is the current proposed removal of

Eskom's grid management role into an independent system and market operator (ISMO). Both of these projects ultimately failed because of resistance from municipalities and Eskom (Eskom 2012; Eberhard 2013; Das Nair et al. 2014).

3.4.2 Contestation over the powers of NERSA by the Department of Energy

Authority rules continue to adjust based on the feedback loops from institutional interactions. The DoE has identified a number of problems with the current governance arrangements in the industry which have given rise to proposed amendments to the NERA (RSA 2011a) and the ERA (RSA 2011b). These proposals are tangible examples of attempts to alter the rules of the institution with the aim of undermining the current power of the regulator.

One of the aims of the NERA amendment is the establishment of an appeal board which would have wide powers to nullify or amend any decision of the regulator and whose decisions would have the same force as High Court judgements. The appeal board would provide industry participants with a means to have their case heard by a new panel when dissatisfied by the decisions of NERSA. The only difference in the appointment criteria of the members of the regulator and the appeal board is that the bar on political party membership for regulators does not apply to members of the appeal board. In August 2015 the bill was approved by Cabinet for tabling in Parliament (Paton 2015).

The proposed changes to the ERA further aim to increase the power of the Minister at the expense of NERSA. The role of NERSA as the custodian and enforcer of the regulatory system is removed, as is the power of NERSA to issue regulations to implement government's policy framework. These amendments allow the Minister to determine a tariff for independent generation capacity and set conditions according to which NERSA may exercise its functions in relation to these new activities. This bill has not yet been approved by Cabinet for submission to Parliament.

It is unlikely that these amendments would strengthen the regulatory system. The creation of an appeal board opens the door to unlimited challenges to NERSA's rulings which may be judged on political criteria, rather than those of efficiency or equity. There is no evidence that the DoE ever resisted NERSA's proactive policy role. Rather they initially worked together and NERSA then filled the policy formulation space

vacated by the DoE. Taken together, the proposed amendments will further fragment the institution by adding a new centre of power and strengthen political considerations in regulatory processes, rather than a more balanced approach.

3.4.3 Tariff regulation

The key arena in which interactions take place between all role players is in the process of determining tariff levels. Differences in legislation and policies regarding the definition of a tariff and the criteria for determining tariffs, together with the competing interests of the electricity and public finance regulatory systems underlie the contestations between institutional actors. The analysis shows how the regulator, with enough support from National Treasury, has muscled itself up to assert its pricing priorities in support of the poor and tariff standardisation. This has been to the detriment of municipal electricity distributors and their business customers.

3.4.3.1 Defining a tariff

The policy and laws within which electricity regulation operates have varying definitions of a tariff. These differences, and the principles which underpin them, reflect competing views on tariff policy. The critical issue is the extent to which municipalities may charge a levy or surcharge on electricity above the full cost of supplying electricity.

Although the ERA defines a tariff simply as a charge for electricity, the EPP broadens this as a combination of charges covering different aspects of supply. The EPP recognises that municipalities may charge a surplus, but does not consider this to be part of the electricity tariff. The approach taken by NERSA is to consider the scope of an electricity tariff to exclude any surcharge not related to the cost of supplying electricity. According to the EPP, tariffs should reflect usage, be equitable between classes of consumer, be affordable, should increase in a stable and predictable fashion and should be transparent with all costs fully reflected. However, the EPP provides that a reasonable margin of cross-subsidisation may be included to protect poor households. Tariffs may also vary according to cost factors such as geographical differences and local service standards and can be used to promote economic development and technical and economic efficiency.

The MFMA on the other hand, defines municipal tariffs to include a surcharge. The MFPFA introduces the concept of a base tariff and defines a municipal surcharge as being in addition to this. This Act also explicitly provides for the regulation of municipal surcharges by the Minister of Finance. To date no regulations in this regard have been promulgated, suggesting that Treasury is happy to allow NERSA to take the lead on electricity tariffs.

3.4.3.2 Rules of engagement in tariff determination

The base cost of retail tariff escalations is Eskom's revenue increase in respect of meeting the changing costs of electricity generation approved by NERSA through a multi-year price determination (MYPD). However the process and methodology of retail tariff setting for Eskom and municipalities follow different regulatory paths.

On the basis of the MYPD or subsequent determinations, Eskom submits an annual retail tariff adjustment (ERTSA) application to NERSA for approval. This process precedes the municipal adjustment and is finalised for the start of Eskom's new financial year. In contrast to the municipal process, the Eskom application is not open to public scrutiny, but these decisions have not attracted controversy.

NERSA uses a benchmarking methodology to determine the tariff increases for municipalities. The cost structures of Eskom and the cost categories of municipalities are combined by NERSA to determine the weighting these should have in the price structure. The municipal cost categories include electricity purchase costs (the portion due to Eskom), staffing, repairs, capital costs, and other costs including back office functions, general overheads and municipal surcharges, although these are not usually specified. In most years, the other costs are given a 10% weight although NERSA proposed to reduce them to 8% in the 2012/13 year and 7% in 2015/16 (NERSA 2011; 2014). These costs are usually escalated according to the consumer inflation rate. NERSA then calculates bands in which the c/kWh charge for different tariff categories should fall. The outcome of this methodology is that municipalities are awarded lower overall increases than Eskom.

The primary channel used by NERSA to communicate its proposed and final tariff increases through public documents. Municipalities are required to obtain approval on their specific tariffs before they can be implemented. Any proposed tariffs that fall

outside of the NERSA guideline require a specific motivation which is usually presented at a public hearing. Finalising approval for electricity tariffs intersects with the municipal budgeting process, of which National Treasury is the key regulator. It is in this process that the intersection of the two institutions comes most sharply into focus.

Municipal electricity tariffs must legally conform to specific requirements of the municipal budgetary process, which includes public participation periods, dates for tabling at a Council meeting and the start of the new financial year. Importantly, municipalities are not permitted to change tariffs during the course of a financial year. NERSA must also conform to the timing of different phases of the budget preparation process to allow municipalities to approve their tariffs and budgets (NERSA 2011; 2013). National Treasury issues an annual budget circular to municipalities (NT 2015). These documents have increasingly affirmed the authority of NERSA over municipalities by restating NERSA guidelines and emphasising their legal status. NERSA consults Treasury on potential percentage increases, as well as the relative weightings of the different cost components comprising the tariffs (NERSA 2011).

However, the timing of NERSA's approval process undermines the integrity of the tariff approval process. Because municipalities are bound by clear timeframes by the public finance regulatory system, delays on the part of NERSA compromise their entire budgeting process. SALGA has, on a number of occasions, written to NERSA to express its frustration with the situation (Masondo 2011; Louw 2014).

3.4.3.3 Public hearings as a physical space of interaction

The most visible forum of interaction between actors is NERSA's public hearings. Hearings are not required by law but do enhance transparency, and those on Eskom's MYPD applications typically yield a large number of submissions from a broad cross-section of interest groups.

Government departments do not participate in the public hearings but instead meetings between key national departments are convened on important regulatory issues which are not reported on in public. These are typically arranged on an *ad hoc* basis, in contrast to prescriptions providing for formal advisory forums in the ERA.

NERSA uses the public hearings to dissuade municipalities from deviating from its tariff guidelines. From 2007 to 2012, NERSA held public hearings on the municipal tariff guideline (NERSA 2007b). Changes seldom resulted from these and in 2013 NERSA ceased the practice because of a lack of participation (NERSA 2014).

Municipalities who wish to increase their tariffs by more than the NERSA guideline are required to motivate this at a public hearing which takes place at the NERSA head office in Pretoria rather than in the location of the municipality. NERSA uses the public spotlight of hearings as an informal disincentive to municipal requests for above-benchmark tariffs, especially those which may be motivated by rent seeking by local politicians.

3.4.4 Priorities in tariff setting

Following from its strategy, NERSA has focussed its tariff setting strategies in two main areas. The first is that of protecting the poor through cross subsidisation, to the neglect of businesses interests. The second is standardising tariffs and improving their cost reflectivity. Both of these policies have had a negative financial impact on municipalities.

3.4.4.1 Protecting the poor vs stimulating the economy

Protecting the poor from steep electricity price increases has been a common priority of the Department of Energy, NERSA and municipalities. This is consistent with overall government policy to increase access to services for the poor (Presidency 2009).

The key tool promoted by the regulator to protect the poor from price increases is the domestic inclining block tariff (IBT). The IBT structures the tariff into a number of bands, incrementally increasing the electricity price per usage. As the rate for the first blocks is lower than that for higher usage blocks, it directly cross-subsidises low consumption users who tend to be poorer. The IBT was formally implemented in 2012, but was preceded for many years by policy interventions aimed at ensuring low cost electricity for the poor. NERSA has spent substantial effort ensuring that the IBTs are implemented by Eskom and municipalities (NERSA 2010a; 2011).

However, national government's economic development goals also include the growth of the manufacturing sector (DTI 2007; Presidency 2009) though there is generally a

weak and antagonistic relationship between business and the government (Seekings & Natrass 2011). Despite businesses consuming the bulk of electricity in the country, their interests seldom feature in plans or reports on electricity pricing. NERSA seldom shows any specific concern for business interests in its actual decisions and only once in its municipal tariff consultation documents (between 2007 and 2015) does NERSA request feedback on whether businesses should be considered for protection from very high tariff increases in the same way that the poor are (NERSA 2011). There is no indication that any action came of this. While business issues do not feature in the annual planning or reporting documents of municipalities most large municipalities have formal structures for engaging with businesses on tariffs and issues of concerns such as the quality of electricity supply.

The main anxiety of business is the negative impact of high electricity prices on their cost structure and competitiveness. Electricity costs comprise 10%-20% of the input costs of manufacturers, especially those in the metals sector. Many of these businesses form part of export-oriented value chains which are highly cost competitive (BDO 2014; Deloitte nd). Business organisations highlight their unhappiness with the significant price differentials between municipalities and Eskom, and among the municipalities themselves. One local chamber of business called the difference in tariffs for the same service as unfair, irrational and unconstitutional (Clarke 2014).

3.4.4.2 Cost reflectivity and tariff standardisation

Another important tariff principle of the EPP is that electricity prices should be related to the cost of supplying the service. In the municipal tariff-setting process this concern is often interpreted as the desire to standardise municipal tariffs, resulting in NERSA's use of benchmark tariffs (NERSA 2010b).

One of the objectives of the REDs was the rationalisation of tariff structures and prices across municipalities by grouping municipalities according to the expected RED boundaries and determining tariff benchmarks for each area (NERSA 2010b). Teljeur et al. (2003: 58) termed this "regulation by comparison". NERSA identifies five customer segments by which municipalities should organise their tariff structures, and provides a guideline percentage increase and a benchmark for the actual energy (c/kWh) price. However, it provides no benchmarks for associated charges such as

service fees, nor charges applicable to industrial customers such as demand charges, network access charges or seasonal and time of use tariffs.

In order to determine municipal costs, NERSA requires municipalities to complete an extensive questionnaire which is used to calculate benchmarks. Municipalities are also encouraged to conduct cost of supply studies for each customer class. Because of the lack of cost of supply studies, it is difficult in many municipalities to clearly distinguish between actual overhead costs, cross subsidisation and surpluses dedicated to other activities. To date, only large municipalities with the capacity and resources to commission such studies have done so. NERSA therefore relies heavily on Eskom's cost base when determining municipal tariffs.

National Treasury also communicates its views on tariffs to municipalities through MFMA circulars. However, the factors considered by Treasury are broader than those in the EPP and NERSA determinations and have a higher degree of sensitivity to local differences (NT 2011).

Municipalities argue that the use of standardised tariffs ignores the differences between the cost base of local authorities (Fowles 2010; Kolisa 2010). Revenue, which is a principal factor in calculating tariffs, depends both on the price and the quantity of electricity sold. Consequently, the mix of customers eligible for different tariffs is a critical component of the equation. Equally, the proportional cost to supply a community of low use customers is higher per unit than supplying an industrial area due to the larger number physical connections required to provide the service.

Municipal sales also provide additional revenue to the municipality over and above the cost of supplying power to customers. As Eskom has no additional activities to support, Eskom tariffs do not contain any surcharge and are lower than those of municipalities. This creates competitive problems for businesses in areas where municipal and Eskom supply areas are in close proximity (BDO 2014).

3.5 Conclusion

The changing relationships borne out through interactions in the different arenas show how NERSA, in alliance with the Department of Energy, initially tried to limit the powers of local authorities with regard to electricity distribution, both through constitutional and

legal means, as well as through the establishment of the REDs. The fact that these initiatives failed, illustrates that achievement of specific goals of the electricity regulation institution are subordinate to the broader balance of power among other state institutions. NERSA won the right to regulate municipal electricity tariffs and has developed an alliance with National Treasury, as the regulator of state financial management, to ensure municipalities comply with its processes. NERSA has further used opportunities such as public hearings to enforce compliance with its regulatory decisions. While Treasury has supported NERSA, it has equally made it clear that NERSA is required to fit into its own regulatory processes – which on the whole NERSA has done. This can be seen as a mutually beneficial relationship.

As a proactive regulatory agency, NERSA has used its strong independence to pursue its own policy priorities. It increasingly references general government policy goals rather than those of the energy department. As principal-agent theory predicts, the regulator has reduced its dependence on the department as its principal and has pursued its own objectives. The proposed legislative changes show how the department is attempting to reassert its authority.

The pro-poor policy perspective and emergent power of the regulator have resulted in the adoption of a specific IBT methodology aimed at engineering cross subsidies from business and high-use domestic customers to poor households. This is politically popular and in line with formal policy. However, it ignores the interests of the largest distributors of electricity – municipalities, and the largest customers – businesses, reflecting the limited influence of these groupings in the institution.

NERSA was established as a ‘new style’ regulator and has affirmed this role by assuming a more proactive policy role over the years. This has promoted transparency and predictableness of the regulatory process. However, it has also shifted regulatory power away from the traditional organs of government – such as National Treasury and Department of Energy – towards the regulator which has less accountability to the democratic process. One impact is that decisions on electricity tariffs do not take account of the totality of municipal activities, income and expenditure and local authorities have become the worse off for it.

4 INTERACTION OUTCOMES

The interactions between institutional role-players in the different action situations produce outcomes for the industry that illustrate the winners or losers of these interactions. The extent to which NERSA has succeeded in imposing its goals on municipalities is examined here and illustrates that this has been achieved in the areas in which the regulator has placed its greatest emphasis – administrative compliance, protection of the poor and overall tariff escalation rates.

4.1 Compliance to NERSA’s administrative processes

The relationship between NERSA and National Treasury represents an alliance aimed at ensuring that municipalities comply with the legal and administrative requirements of the regulator. In this regard there has been substantial success. In 2007, only 35 of the 177 distributing municipalities had submitted their application for tariff approval on time (NERSA 2007a). In this (2006/07) annual report NERSA also comments on the “critical challenge of municipalities not complying with the NERSA tariffs” (2007a: 10). By the 2009/10 financial year, compliance had already improved with 125 applications being received and approved before the start of the municipal financial year (NERSA 2011). In the 2011/12 period NERSA (2012) reports that all 177 municipalities submitted their tariff applications on time and had these approved.

4.2 Impact of the Inclining block tariff for municipalities

The introduction of the IBT represents NERSA’s major contribution to government’s social policy. The IBT is politically attractive but is unpopular with municipal officials who are responsible for electricity revenue. NERSA introduced the specific structure for the IBT without consulting municipalities with the result that its implications were poorly thought through (Kolisa 2010). Over time, NERSA has increased the tariffs for the lower bands of the IBT at a lower rate than the higher bands. This increases the cross-subsidy for poorer households who consume proportionally less energy but have a higher cost to supply. This has led to significant distortions in the tariff structures in contradiction to the principle of cost reflectivity (Auret & Carstens 2010; Govender 2010). As the IBT applies to all households irrespective of whether they qualify for a subsidy, it results in a larger number of households being subsidised from a much smaller pool of high usage residential and business customers, with adverse

outcomes for municipalities, especially those where the pool of high usage consumers is relatively small (Fowles 2010).

The net result is a significant revenue reduction in many municipalities. EtheKwini metropolitan municipality estimated that the introduction of IBT would result in a revenue drop of R400 million in the 2011/12 financial year (Govender 2010). CENTLEC (2010) estimated the implementation of IBT would cost it R33.4 million and R47.4 million in the 2010/11 and 2011/12 financial years respectively for its operations in the Mangaung local municipality. Large losses in revenue continue to be experienced by municipalities due to the implementation of the IBT (Barnard 2014). This threatens the financial health of municipalities with the risk of reduced capital expenditure and provision of other basic services.

4.3 Municipal surplus

While a detailed examination of the claims of municipal revenue loss are beyond the scope of this study, it is possible to examine the extent of the reduction in the financial surplus of municipal electricity operations.

The percentage difference between the costs and revenue of electricity operations for the largest municipal distributors in 1992 (before democracy) and between 2006 and 2014 (current period of regulation), as sourced from municipal financial reports (Stats SA 2015a) is shown in table 3. In the period between 1992 and 2006, electricity surpluses had already declined by some three percentage points. Post-2006 there is a high degree of variation both between municipalities, and for each municipality between different years. This reflected in the colour coding highlighting variation according to standard deviation. Most municipalities implemented the IBT in the 2011/2 and 2012/3 financial years. The average surplus for the four years prior to this (2007-2010) is 13.1%. This drops in the four years during which IBT has been in effect (2011-2014) to 11.5%. This is equivalent to a revenue reduction for these municipalities of R1.06 billion in the 2014 year alone.

Table 3. Percentage difference between cost and revenue from municipal electricity sales

%	Jo'burg	Ts'ane	Ekur'leni	Emfuleni	Rust'brg	Mang'ng	eThek'ni	Msun'zi	Um'tuze	Buffalo	NMB	CoCT	Ave
1992	23.0%	21.0%	14.7%	20.0%	n/a	16.0%	12.0%	19.0%	n/a	15.0%	11.0%	16.0%	16.8%

2006	8.2%	11.1%	13.1%	10.4%	13.4%	n/a	16.8%	22.8%	21.3%	11.2%	9.3%	13.3%	13.7%
2007	13.6%	11.9%	16.3%	15.2%	12.0%	n/a	17.8%	21.9%	16.9%	-4.7%	21.5%	5.2%	13.4%
2008	-0.3%	15.1%	11.2%	16.0%	10.6%	40.9%	19.2%	16.1%	-4.6%	10.8%	14.5%	3.7%	12.8%
2009	3.6%	10.2%	-6.9%	19.6%	15.0%	25.6%	16.2%	11.2%	6.0%	16.1%	19.3%	9.9%	12.1%
2010	6.3%	15.7%	6.1%	24.6%	19.9%	21.2%	13.9%	-3.6%	26.6%	6.5%	23.4%	9.3%	14.2%
2011	8.3%	21.9%	7.8%	16.0%	14.3%	12.7%	16.3%	15.4%	-3.3%	2.8%	12.4%	13.2%	11.5%
2012	9.5%	8.8%	7.4%	14.4%	22.0%	15.8%	14.1%	14.3%	15.8%	5.2%	14.7%	4.9%	12.3%
2013	8.1%	8.8%	7.4%	15.5%	15.4%	9.8%	13.8%	18.1%	19.0%	8.1%	5.2%	4.7%	11.1%
2014	7.9%	3.8%	6.8%	15.5%	15.7%	7.3%	14.4%	13.0%	18.9%	12.5%	12.4%	6.4%	11.2%

+2 std dev	+1 std dev	>1 std dev<	-1 std dev	- 2 std dev
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Source: Mountain 1994; Statistics SA

4.4 Tariff standardisation

There is substantial variation in the composition of tariffs charged by municipalities. To examine this, commercial and industrial business tariffs for all municipalities across the country for 2014/15 were captured and synthesised to identify unique tariff types.

Table 4 summarises the number of unique tariff types according to NERSA's categories. In total there are 322 different tariff structures available to businesses. Structures vary by the specific set of charges levied, the voltage or amperes available, and whether there are seasonal or time variations in tariffs. Within these structures there are 79 unique charge descriptions.

NERSA stipulates benchmark tariffs for only one tariff type per its five categories – the basic energy charge. The diversity of tariffs suggests that municipalities structure their tariffs according to their own requirements, rather than the guidelines of the regulator, showing the relative impotence of the regulator to influence pricing structures.

Table 4 Number of unique business tariff structures

Tariff category	Commercial prepaid	Commercial conventional	Industrial low voltage	Industrial high voltage	Industrial time of use
Number of tariff structures	52	111	49	37	69

Source: NERSA price data

4.5 Impact of not regulating non-energy charges

The time of use (TOU) tariff is a favoured tariff structure for industrial consumers as the charges are most closely related to the municipal purchase cost of electricity and

can most effectively utilise Eskom electricity surpluses generated in off-peak hours. Businesses can adjust their production schedules to take advantage of the cheaper tariff options, smoothing their usage across times of peak and low demand. To this end, higher fixed fees such as demand tariffs are not preferred as they do not incentivise energy efficiency and increase costs for industrial consumers (Cousins nd). The typical TOU tariff consists of six different energy charges and additional charges including a basic service charge, demand (kVa) charge and network access charge. In many cases there are a range of further charges which have been grouped in these calculations on the basis on which they are charged. As NERSA only specifies an increase for the total consumption of energy, opportunities exist for municipalities to optimise revenue through the non-energy charges. One business-funded study reported that municipal demand charges can be anything between 100% and 277% on top of the Eskom rate (Clarke 2014). In certain municipalities, these fixed fees can comprise almost one-third of the users' electricity bill (BDO 2014).

In order to test these claims, the costs for two indicative industrial TOU customers in the 2014/15 financial year were calculated. NERSA's standard IBT profile (NERSA 2014) and the TOU profile from Delport (2010) were used to create a medium voltage (MV) profile. A high voltage (HV) tariff comparison with a higher use profile drawn from Delport (2010) was also created. The diversity of total cost across providers, as well as the difference in cost composition is striking. The median municipal cost for both profiles is almost 60% higher than that of Eskom's. The highest MV cost (Johannesburg) is 130% higher than that of Eskom and the highest HV cost (Mangaung) is almost double the Eskom cost. The advantage of a business being supplied by Eskom rather than a municipality is clear.

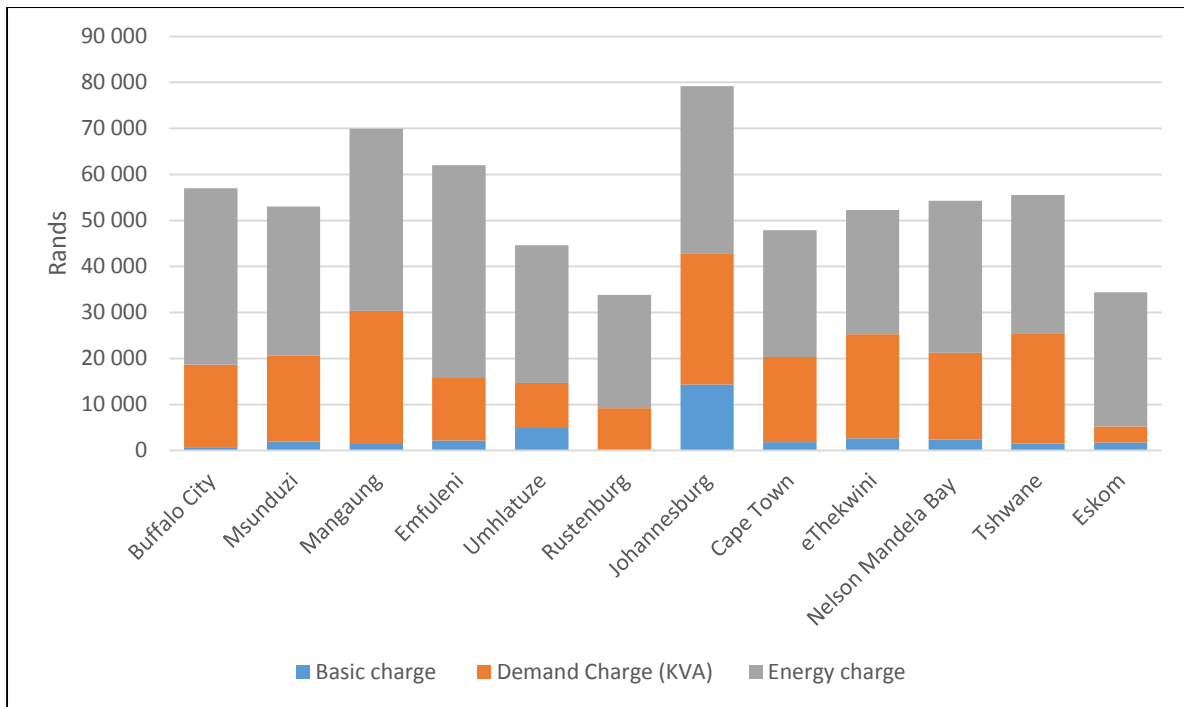


Figure 3. Cost profile for medium voltage industrial users 2014/15

Source: Municipal budgets; Eskom tariff tables

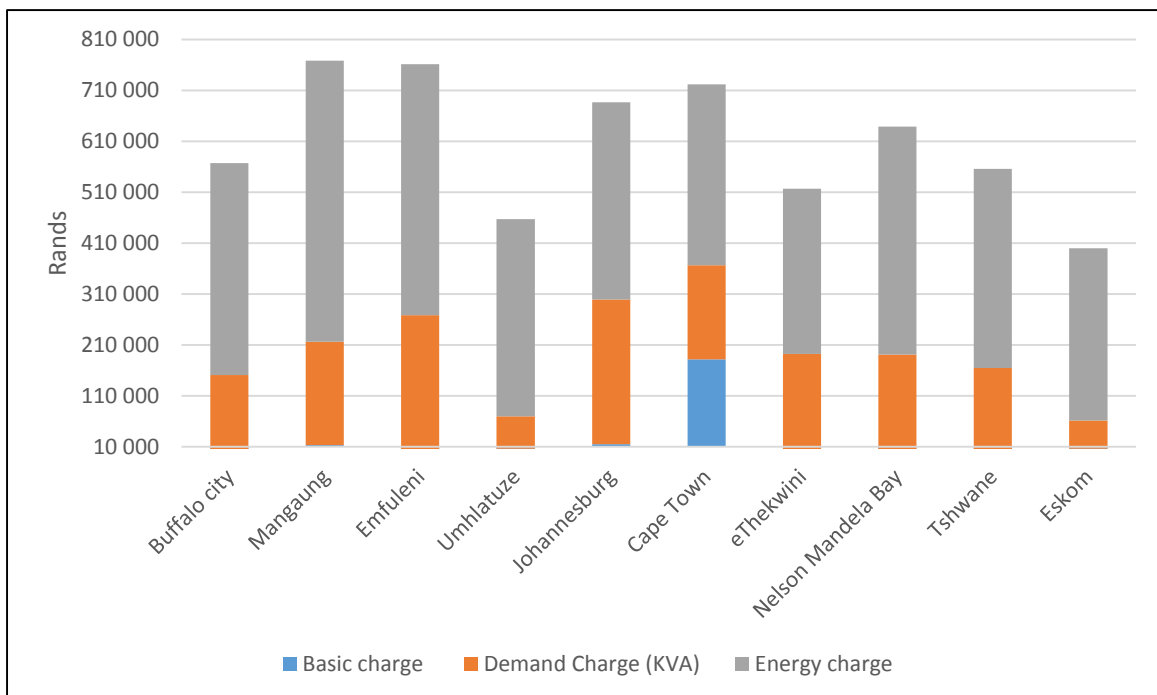


Figure 4 Cost profile for high voltage industrial users 2014/15

Source: Municipal budgets; Eskom tariff tables

Within the TOU structure for the selected municipalities, energy charges comprise the largest proportion of the cost for all suppliers, however, this proportion varies considerably. Eskom's proportion of energy charges for MV and HV customers is 85%

and the average for municipalities is 60% and 67% respectively. Johannesburg is the worst offender with 54% of its MV tariff and 44% of its HV tariff being comprised on non-energy charges. Cape Town's HV non-energy charges represent 51% of the cost for the HV user and 42.5% for MV enterprises.

4.6 Electricity escalation rates for different tariff structures

Indices were calculated to compare the difference in price increases between four electricity tariffs. The municipal TOU tariff and Eskom rates are calculated on the same basis as figure 3 and 4. Domestic electricity indices are based on the kWh rates and proportional basic charge where applicable as approved in municipal budgets. The low use domestic tariff reflects tariff types mainly aimed at poorer households with low ampage supply (20-40A) and low use IBT bands. The high use index reflects a 60-80 amp supply and high-use IBT bands of wealthier households. The NERSA index is compiled based on the announced increase applicable to municipalities.

Figure 5 shows the nine year increase in electricity prices. Low-use domestic tariffs show the lowest increases at 246% over the period, shielding poorer customers from overall high tariff rises. This occurred both before and after the implementation of IBT, suggesting that the formal introduction of the IBT was an intensification and codification of a *de facto* practice.

Eskom's megaflex tariff (which is similar to the bulk tariff paid by municipalities) has increased by 384%. The increase in the NERSA index of 381% is lower than all tariff categories aside from the low-use domestic. This means that the NERSA benchmark increase is lower over the period than the change in the actual cost of power paid by municipalities. High-use residential customers and MV industrial customers using the Eskom minflex tariff have experienced the highest increases, both 441% by 2014 – some 16% higher than the NERSA increase and 80% higher than the increase in the low use domestic tariff. Municipal industrial tariffs (both HV and MV) are a more modest 5% higher than the NERSA increases.

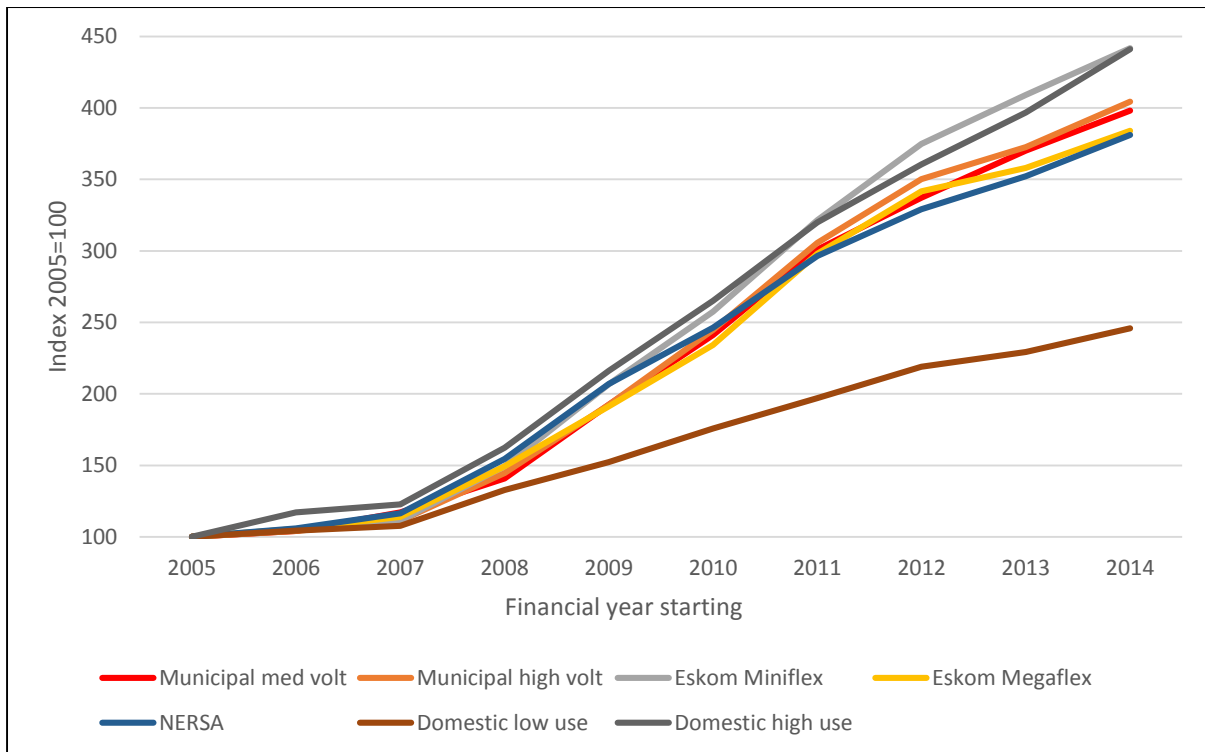


Figure 5 Electricity price indices

Source: Municipal budgets, Eskom tariff tables

4.7 Conclusion

It is evident from this analysis that NERSA has been successful in three areas. Firstly, it has obtained a very high level of compliance to its administrative processes. Secondly, it has successfully insulated the poor from the effects of the steep overall tariff increases of the post-2007 period. Thirdly, the rate of increase in different tariff structures (aside from low-usage domestic) broadly follows a similar pattern. However, by using escalation rates as its primary tariff determination tool, NERSA has not adequately addressed the diversity of tariff levels and composition. Municipalities lost revenue through the reduction of their surplus from electricity distribution sales. This cannot only be blamed on the introduction of the IBT as the surplus had also fallen between 1992 and 2006, well before the introduction of IBT. However there is a noticeable drop in the surplus in certain municipalities and in the average of all of those surveyed after the introduction of IBT.

5 CONCLUSION

The existence of an independent regulatory agency, transparent processes, reasons for decisions and clearly defined roles and rules of operation are necessary but not sufficient conditions for effective regulatory governance (Brown et al. 2006). The electricity policy and legislation established between 1998 and 2008 went a long way to achieving this in South Africa. However, the outcomes of the regulatory system depend perhaps more on the informal rules governing interactions between organisations. NERSA has proven to be an archetypal new style regulator, and its actions show both the problems and advantages of an independent and powerful policy actor.

The electricity regulation institution has seen shifting positions and alliances between actors over time. In the years immediately following the establishment of the regulator, the Department of Energy – playing the role of the principal and tasked with policy responsibility – collaborated with the regulator as its agent in attempting to curb the power of municipalities. Both constitutional and industry restructuring initiatives failed and the department withdrew from this policy space. As a consequence, the regulator assumed a more dominant role in the sector than its principal and aligned itself primarily to general government's pro-poor policy, than to specific objectives of the department. This move is positive when seen from the perspective of driving national government policy. It is unlikely that a pro-poor pricing strategy would have emerged were it not for the initiative of the regulator.

However, the regulator has increasingly attempted to exert influence over elected local government. In response, municipalities have used their constitutional independence to limit the potential damage that NERSA's directives may have done to their finances. NERSA's policy-infused tariff direction and administrative compliance promotion has been supported by National Treasury – an alliance that acknowledges that the electricity regulation institution is a component of the wider institution of public financial regulation.

On the surface, municipalities comply with regulatory decisions by introducing required tariff structures such as IBT and increasing their tariffs at the general rate specified by NERSA. However, substantial variation is seen in the number of unique tariff

structures and the relative proportion of different charges in the cost of industrial electricity. Variation is especially marked when comparing the overall cost of industrial electricity among municipalities and Eskom. These differences are rooted in historical cost structures and reflect the ambition of municipalities to retain as much autonomy as possible. Viewed together with the failed attempts to change the constitution and restructure the industry, it demonstrates the robustness of history in impeding changes to the rules of the game.

The implementation of the IBT represents NERSA's biggest retail tariff regulation achievement. Although business and high usage residential customers certainly cross-subsidise the electricity consumption of the poor, the analysis of escalation rates shows that these groups have not been substantially disadvantaged. Rather the additional revenue earned by municipalities has diminished, showing local authorities to be worst affected financially. This negative impact, which was surely unintended, illustrates the danger of regulating one element of a complex system without cognisance of possible broader consequences.

The strength of IAD is the analysis of organisational behaviour within an institutional context. Overlapping and nested institutions create opportunities for organisations to develop alliances and adopt policy positions beyond the scope of their formal mandate. The case of regulating electricity distribution in South Africa shows how this happens in reality.

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