Journal of Economics and Behavioral Studies (ISSN: 2220-6140)
Vol. 8, No. 6, pp. 206-215, December 2016

The Trade-Offs Between Pro-Poor and Cost-Reflective Tariffs in South Africa: A Regulatory Perspective

Michael Maphosa, Patrick Mabuza
National Energy Regulator of South Africa
michael.maphosa@nersa.org.za, patrick.mabuza@nersa.org.za

Abstract: This paper presents arguments for and against cost reflectivity and pro-poor tariff policy in South African electricity supply from a regulatory perspective. This debate has been ongoing for decades in developing countries; however, there is still no clear direction on how countries should approach these two important competing policy positions. There are those that argue that achieving cost-reflective tariffs will attract private sector investment into the electricity supply industry (ESI) that will lead to much needed competition and reduced electricity tariffs. However, there are also those who argue that cost-reflective tariffs will make it difficult to achieve government social objectives of universal access through pro-poor tariffs, as cost-reflective tariffs will be unaffordable to the majority of the population. The fundamental question is what should come first, between cost-reflective tariffs and pro-poor tariffs in a developing country context, specifically in South Africa. This paper therefore attempts to examine the real trade-offs between pro-poor tariff policies and cost-reflective tariffs. The study attempts to answer one critical question: How can the electricity sector attract local and foreign investors, without necessarily affecting government social objectives such as universal access to electricity? The study finds that electricity consumers, and in particular poor households, have historically benefited from relatively cheap electricity and that tariffs have not been cost reflective. In other words, there is a mismatch between tariffs and the underlying costs of supplying electricity in South Africa. It also finds competing expectations between poor consumers and utilities. Consumers expect to receive electricity at an affordable price, while utilities argue that a good, reliable electricity supply's tariffs must be matched with costs. Lastly, the study finds that it is difficult to achieve cost reflective tariffs in the short run, in an environment characterised by a high number of consumers dependent on government social grants and cross-subsidies. The study therefore recommends a gradual movement towards cost-reflective tariffs, together with the introduction of competition and energy efficiency and demand side management (EEDSM), in order to minimise the impact on the poor.

Keywords: *Tariffs, pro-poor, cost reflectivity, electricity, consumers*

1. Introduction

The trade-offs between cost-reflective and pro-poor tariff policy has received emphasis from a number of policy makers and regulatory authorities around the world. The debate over the past three decades in developing countries has been on what comes first, between cost-reflective tariffs and pro-poor tariff policies. In other words, how can policy makers balance cost-reflective tariffs and pro-poor tariff policies, without affecting the sustainability of the Electricity Supply Industry (ESI)? Furthermore, how can government balance pro-poor tariffs, to achieve government social programmes of universal access to safe affordable electricity, and cost-reflective tariffs, to attract private sector investment into the ESI? The balancing act has left many policy makers and regulatory authorities confused. To date, there is still no clear direction on how developing countries should approach these two important competing policy positions.

Those in support of cost-reflective tariffs argue that implementing cost-reflective tariffs in the electricity supply industry (ESI) will assist government achieve universal access through increased generation capacity, which will result in lower costs in the long run. Therefore, in the long run, government programmes of universal access to affordable electricity will become a possibility. On the other hand, pro-poor tariff policy advocates assert that achieving cost-reflective tariffs first may delay the achievement of universal access to affordable electricity, especially in a developing country context characterised by high unemployment, low growth and high dependence on government social grants. They further argue that cost-reflective tariffs will be beyond the reach of poor households, and this will hinder or delay the achievement of universal access, as struggling consumers may switch to unsafe and inefficient sources of energy. There are currently strong signs that South African electricity utilities are facing serious challenges, as falling energy consumption has resulted in declining revenues, and this hinders the achievement of pro-poor tariffs/universal access, as utilities have to increase tariffs and introduce innovative tariff structures that will align tariffs with the actual costs of rendering electricity to end-users, in order to match the increasing production costs. Literature suggests that the priority between cost-reflective tariffs and pro-poor tariff policies differs from one country to another. For a country with a large social welfare base, like South Africa, the priorities between pro-poor and cost-reflective tariffs are different from that of a developed country.

There has been an accelerated increase in the number of people dependent on government social grants and other relief packages. In 2015, approximately 16.9million (30 percent of the total population) received government social grants (South African Social Services Agency, 2015). It is clear that, for these consumers to have access to electricity, they will need to be assisted by government one way or the other or through cross-subsidisation by other electricity consumers. According to the South African Department of Energy, 2025 has been set as a target for achieving universal access to electricity, while 2013 was previously set as a target for cost-reflective tariffs. However, this target was not achieved, and tariffs are still not cost reflective. This shows how difficult it is to achieve cost-reflective tariffs in a developing country context. The paper therefore discusses the trade-offs between cost-reflective tariffs vs pro-poor tariffs, with the aim of making implementable recommendations. The remainder of the paper is organised as follows: Section 2 looks at the South African Electricity Supply Industry; Section 3 presents the arguments for and against pro-poor and cost-reflective tariffs; while section 4 looks at the role of the regulator in relation to tariffs; Section 5 discusses the possible ways of protecting low-income households; and Sections 6 and 7 provide the recommendations and conclusions respectively.

2. The South African Electricity Supply Industry

Unlike developed economies, South Africa does not have a market for wholesale or retail electricity trading; instead the ESI is predominantly owned by the state-owned utility Eskom, which generates approximately 94 percent of all electricity consumed. Eskom also wholly owns the power transmission network through the national transmission company. The National Energy Regulator (NERSA), established through an act of parliament, regulates the electricity industry, rather than the market, covering licensing of new plants and electricity tariffs. The main objectives of the electricity sector, as set out in the energy White Paper of 1998 and the Electricity Pricing Policy of 2008 (EPP), are to:

a) improve social equity by addressing the requirements of the low-income households;
b) enhance efficiency and competitiveness to provide low-cost and high-quality inputs to all sectors;
c) provide competition, especially in the generation sector; and
d) increase private sector participation in the industry.

Furthermore, specific objectives addressed in the abovementioned policies refer to ensuring that electrification targets are met; the provision of low-cost electricity; better price equality; financial viability; improved quality of service and supply (including security of supply); proper co-ordination of operation and investments; and the attraction and the retention of a competent work force. During the past two decades, the government has developed energy policies that support universal access to energy sources. Policies such as rural electrification aim to electrify poor households around rural and peri-urban areas (Gaunt, 2005). The design of energy strategies that contribute to reducing poverty has been a topic of great importance within the South African political discourse (Howells et al., 2006). In 2008, government had set a target of achieving cost-reflective tariffs by 2013 in order to reform tariffs to reflect their underlying costs, and attract and retain public and private sector investment. However, to achieve cost-reflective tariffs meant that tariffs had to increase significantly over a short period. A steep increase in tariffs to achieve cost reflectivity could potentially cause low-income consumers to 'either increase their expenditure to maintain consumption; change their behaviour through energy savings; or compromise their health and safety by switching back to unsafe and inefficient fuels such as paraffin or wood' (Franks, 2014:16).

Historically, South Africa's electricity pricing regime has been pro-poor in nature. These pro-poor tariffs are concerned with relieving some of the burden on the poor by introducing tariff structures that benefit the poor more than the rich. More specifically, pro-poor electricity tariffs were designed to provide discounted electricity to those most vulnerable to falling into, or already in, energy poverty. For example, pro-poor tariffs make electricity affordable to the poor via a zero charge for the first block of the Inclining Block Tariff (IBT), usually 50kWh a month. This also promotes energy conservation by applying high tariffs in the upper consumption brackets. Eskom, through the Energy Regulator, is allowed to protect the poor, through a tariff structure with transparent cross-subsidies and a single digit, or lower than average, tariff (rural and residential) increase at a time (Eskom, 2012). The principal challenge currently dominating the ESI is the issue of pro-poor tariffs (including subsidies) and cost-reflectivity of tariffs. However, there is a commonly accepted notion among industry participants that electricity tariffs need to be cost-reflective to ensure financial stability of the power system and the sustainable provision of electricity services. In the case of South Africa, these prices are often beyond the reach of low-income households. Compounding the problem is that for low-income consumers pay less than the cost-reflective tariff, then they will need to be subsidised, either by other electricity consumers or from other financial sources such as government grants. Therefore, questions have emerged regarding whether these pro-poor tariffs consider other benefits, such as social grants provided by government to low-income households. If not, are these pro-poor tariffs set at the right level? Are poor households over-subsidised?

Pro-Poor vs Cost-Reflective Tariffs in South Africa: Electricity consumers and utilities are very important stakeholders in the ESI; however, they have competing and different expectations, which at times regulatory authorities find difficult to balance. Pro-poor policies strive to ensure that all consumers have access to affordable electricity services. On the other hand, achieving 100% access to electricity comes at a price, especially for the poor, mainly in rural areas. Rural connections are costly compared to connecting a poor household in an urban area, and this makes the average cost of providing the services to these areas high, which goes against pro-poor policy's objective of providing affordable services to all. There seems to be an inverse relationship between providing services to all, and affordability, at least in the short term. One way of providing affordable services to the poor is through subsidies. This means that high-income households pay more than the cost of providing the service they consume, while the poor pay less than what the actual cost of providing the service is. Although subsidies are an acceptable solution to dealing with affordability issues, it has its own challenges, especially when the segment of the population to be subsidised is larger than the subsidising population. This overburdens the subsidising population, which may lead to questions as to why they have to carry the burden alone. Currently, subsidising electricity customers are questioning the appropriateness of this subsidy amount paid to poor customers. The argument is that these subsidies encourage inefficiency in the use of this limited resource. Are the poor households not over-subsidised, if one takes into account all other government subsidies/benefits that the poor get, such as social grants and other social relief aids? Over-subsidisation of the poor could potentially lead to inefficient use of electricity.

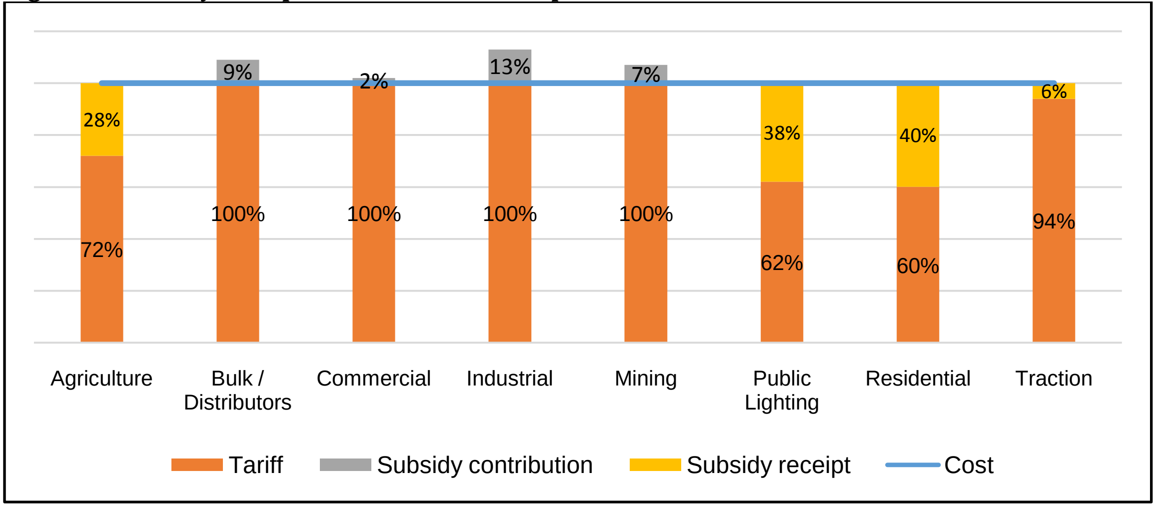
This leads to the next questions that regulators and policy makers need to answer: What is the appropriate grade of service that a subsidy to the poor seeks to achieve? Is it permissible to allow utilities to offer a lower-grade service at a lower price, so that the poor can receive at least some service, thus giving the poor options that make services more affordable, while at the same time reducing the subsidy burden to the subsidising group? Some countries reject the idea of allowing the poor to be provided with lower-grade service, as they see this as discrimination. If the acceptable grade of service that the poor should receive is unaffordable at a particular point in time, does it mean that the poor should not be allowed access to at least some form of service until the acceptable service grade becomes affordable? Is this not justifiable discrimination? Regulators and policy makers are still grappling with these issues. Those who support providing a lower grade level of service to the poor argue that providing a high-grade level of service is not what the poor need – what they need is a level of service that they can afford and that meets their needs. Providing the poor with more than what they need may result in inefficient use of resources.

The Low Income Pro-Poor Tariffs for Electricity in South Africa: As discussed above, the ESI has a host of cross-subsidies, where certain customer tariff categories subsidise other customers connected to the network. These subsidies include the following:

a) Electrification and rural subsidies meant to cover the cost of connecting a house to a 20A (low consumption) electricity supply.
b) Affordability subsidies to residential customers i.e. Inclining Block Tariffs (IBTs) and Free Basic Electricity (FBE). IBTs, together with lower-than-average tariff increases, have resulted in subsidies of up to 42% of the total residential customers. The FBE programme, on the other hand, provides 50kWh (more in some local authorities) of free electricity per month to identified indigent customers.
c) Subsidies to low-voltage customers (large power users and commercial customers).

The subsidies are currently borne by industrial and commercial customers.

Figure 1: Subsidy receipts and contributions per sector



Source: Eskom cost allocation based on MYPD3 2014/15 tariff application

Table 1: Subsidy receipts and contributions per sector

Subsidised Customers	Subsidised Customers %	Subsidising Customers	Subsidising %
Agriculture	28	Bulk/ Distributors	9
Public Lighting	38	Commercial	2
Residential	40	Industrial	13
Traction	6	Mining	7

Source: Eskom (2012)

Table 1 and Figure1 above show the extent of cross-subsidisation in the ESI. The biggest beneficiary of subsidies is residential customers (40%), and the biggest contributor is industrial customers (13%). These customers contribute more subsidies than other customers supplied by Eskom and the municipalities. However, these subsidies sometimes result in large annual unaffordable tariff increases and negatively affect the sustainability of these customers' businesses. A breakdown of residential customer subsidies shows a worrying trend. Residential customers on 20A and 60A connections are the highest recipients of subsidies in the country. Furthermore, the majority of these customers receive free basic electricity of 50kWh per month. Table 2 below gives a breakdown of residential subsidies.

Table 2: Subsidies 2012/2013 FY (billion)

	Allocated allowed costs	Current tariffs	Current subsidy	Current subsidy (% of revenues)
Total	R12.2	R7.6	-R4.5	-59%
Homepower	R 2.4	R 2.1	-R 0.3	-15%
Homelight 20A	R 5.3	R 2.6	-R 2.7	-107%
Homelight 60A	R 4.5	R 2.9	-R 1.5	-49%

Source: Eskom (2012)

Cross-subsidies represent an important principle for electricity pricing and a critical element of the effective functioning of the electricity pricing system. The cross-subsidisation principle as reflected in the EPP is meant to promote equality in electricity pricing and contributes to the advancement of government's electrification programme. According to Eskom (2012), cross-subsidies increased from R9 billion in 2012/13, to 11.3 billion in 2013/14. However, with the rate of electricity hikes over the past 8 years, the issue of pro-poor tariffs and the accompanying subsidies have received great attention among utilities, end-users and the regulator. Subsidising customers are questioning the fairness and equitability of these subsidies, and why they should be the ones carrying the burden of advancing the government programme of universal access and affordable electricity.

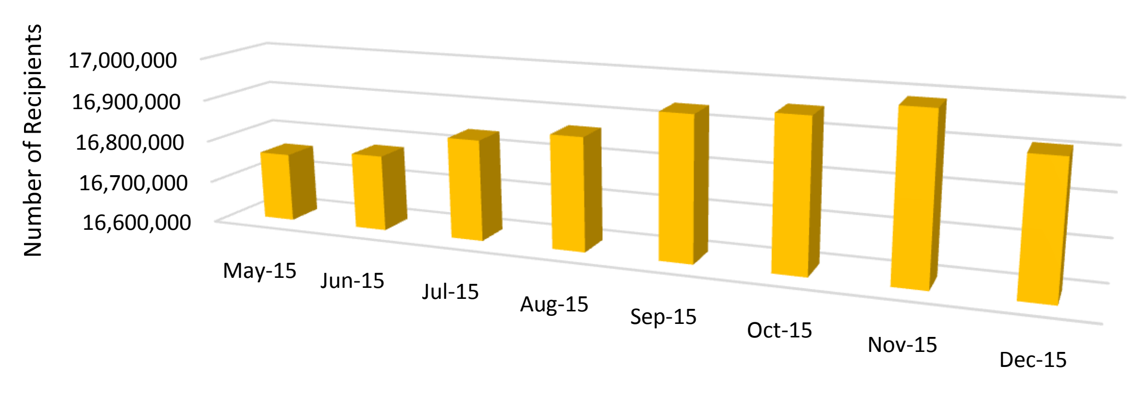
In section 3 above, the question was raised regarding whether poor households are over-subsidised or not, when taking into account all other benefits that they currently received from the South African Social Services Agency (SASSA). Statistics suggest a growing number of SASSA beneficiaries between 2014 and 2015. Table 3 below shows the distribution of government grants between different population groups. It also shows that South Africa has a social welfare base of 19.9 million people (SASSA, 2015), which translates to approximately R122.6 billion and R127 billion in 2014/15 and 2015/16 respectively (South African Social Services Agency, 2015). Social welfare expenditure has increased from R122.6 billion in 2014/15 to R127 billion in 2015/16. This represents a 3.5% increase in social welfare expenditure.

Table 3: Current Structure of Social Grants in South Africa

Grant Name/Type	Number of recipients	Total Expenditure by Government 2015/16	2014/15
Grant for Old Persons	1580892	R 26748692640	R 25610450400
	1580892	R 27128106720	R 27128106720
Disability Grant	1099867	R 18609749640	R 17817845400
War Veteran's Grant	261	R 4478760	R 4290840
Foster Child Grant	427928	R 4416216960	R 4262162880
Care Dependency Grant	131296	R 2221528320	R 2126995200
Child Support Grant	11956549	R 47347934040	R 45195755220
Grant-in-Aid	132620	R 525175200	R 501303600
TOTALS	16 910 305	R127 001 882 280	R122 646 910 260

Source: South African Social Services Agency (2015) and Authors' calculations.

Figure 2: Monthly Increases in Number of Recipients



	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15
Totals	16,762,822	16,780,488	16,839,478	16,867,894	16,938,608	16,954,459	16,988,598	16,910,305

Source: South African Social Services Agency (SASSA), 2015.

3. Rationale for Cost-Reflective Tariffs and the Implications

The ambition of moving to cost reflectivity goes as far back as 2004. It is a goal that is seen by government as a critical tool to improve the sustainability of utilities, reducing costly subsidies and a prerequisite for attracting private capital. Achieving this goal would show a high impact on increasing electrification and improving reliability in the ESI. According to the PwC (no date) study, the inability to recover the cost of new generation via current electricity tariffs is a major barrier to investing in new large-scale generation and transmission projects. This is a recurrent theme in surveys and heads the list of energy policy measures needed to address the key challenges of expanding power provision and making existing assets more reliable (PwC, no date). The fundamental issue regarding the move to cost-reflective tariffs is a complicated one, but utilities and the regulator have a duty to consult constantly with consumers and consumer groups in order to reflect their interest and concerns. Understanding the psychology of consumers, and the effects such tariffs have on different consumer groups, is crucial to getting the best from electricity tariffs (CUAC, 2015).

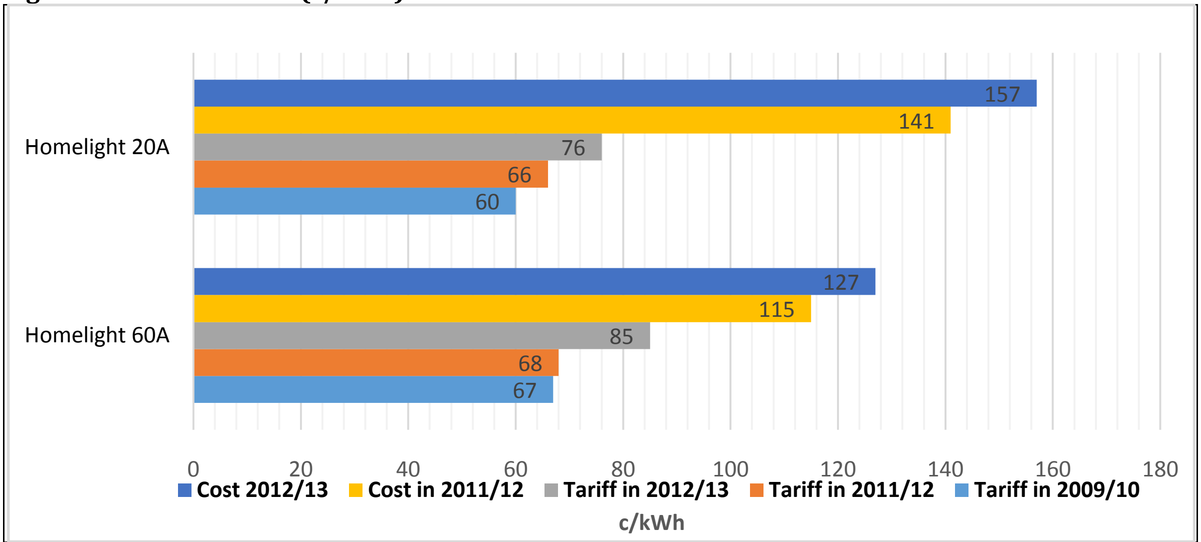
A substantial body of literature on electricity pricing highlights three important issues as to why linking tariffs to actual cost drivers is important. Firstly, it promotes efficient use of electricity infrastructure by ensuring that only those consumers that most value the service during high cost time use the system, while encouraging use of the network during low cost periods. Secondly, it promotes efficient investment in electricity infrastructure and innovative technology, as usage corresponds to the willingness of consumers to pay the true costs of providing services when required. Thirdly, it is viewed as a fair pricing system, as consumers directly contribute to the costs that they impose on the system because of their usage (Gerlach and Franceys, 2010; Tait, 2011; Franks, 2014; Schreiber et al., 2015). Cost-reflective tariffs typically recover the following key costs:

- Time and seasonal variance of the cost of energy (Generation).
- The price paid will depend on the usage pattern of customers represented by the load profile. It will include environmental levy costs.
- It could include signals to incentivise behaviour.
- Network costs (distribution and transmission wires) based on the voltage of supply, the density of the network to which customers are connected, geographic location (transmission), electrical (technical) losses for both distribution and transmission, and the reactive energy support.
- Retail costs that typically cover customer services, based on the size of the supply and usage. This reflects the type of the service provided to the customer.

The overarching argument of cost reflectivity is that where end consumers are faced with the actual costs of their consumption and decide to change their behaviour, network investment can be avoided and costs substantially reduced. Over time, this should result in lower network costs for all consumers, than when continuing with non-cost-reflective tariffs (CUAC, 2015). Furthermore, industry participants highlight that matching tariffs with actual costs will potentially eliminate problems of capacity shortages, investment, and maintenance backlogs, which lead to high interruption costs and inequitable treatment of consumers.

The biggest factor driving electricity infrastructure investment is peak demand. These levels are only reached for short periods each day in South Africa. However, network costs are recovered from most end users, particularly domestic consumers, through charges on their consumption over the course of the day, rather than on their peak demand. Current ESI prices do not reflect the true underlying costs of using electricity during demand peaks, nor are the costs distributed fairly among end users. Low-income domestic consumers with high demand and low consumption receive implicit subsidies from households with low demand and high consumption (see Figure 3 below).

Figure 3: Costs vs tariffs (c/kWh)



Source: Eskom, 2012

Good ESI tariffs must be efficient, equitable, provide stable billing for end users and revenue for utilities, and be acceptable to consumers. However, as it stands, the current electricity structure appears inequitable, as most costs incurred by the majority of residential and agricultural users are borne by commercial and industrial consumers, as shown in Figures 1 and 3 above. Therefore, it is obvious that without cost-reflective tariffs, private and public utilities would find it difficult to raise capital to expand their generation, transmission and distribution infrastructure networks. Furthermore, it would be nearly impossible to attract new private sector investment, to increase competition and lower costs in the electricity industry. Infrastructure expansion in the ESI is critical for economic growth, as utilities struggle to meet electricity demand, and as the country is short of generating capacity. Although cost-reflective tariffs are imperative for the ESI, achieving cost-reflective tariffs in a heavily subsidised environment may negatively affect government's effort towards universal access. The transition towards cost reflectivity must be gradual and accompanied by greater emphasis on stakeholder participation. A quick move to cost reflectivity may affect the proper functioning of the sector as well as the economy in general.

4. The Role of the Regulator

The National Energy Regulator is putting more emphasis on moving towards self-sustainability for the electricity sector, while addressing the issue of affordability. Appropriate low-cost options that give poor households access to formal services have been matched with appropriate tariff structures, which allow both public and private utilities to recover their prudently incurred costs of operations and ongoing maintenance, as well as ideally generating revenues that enable debt servicing of capital investments.

In terms of tariff decisions, the Energy Regulator always tries to strike a balance between affordability and sustainability of the electricity industry. The Energy Regulator takes into account tariff principles such as cost recovery, signals for investors, efficient use of the network, simplicity and cost-effectiveness, transparency, and social and political objectives, among others. For example, in balancing between cost recovery and social and political objectives, the Energy Regulator only approved an average Multi-Year Price Determination (MYPD) tariff increase of 8%, instead of the 16% applied for by Eskom. In arriving at its decision, the Energy Regulator endeavours to set tariff levels not only to ensure that licensees collect enough revenue to recover full costs, but also to allow them to obtain reasonable funding in the future. Various ratios, such as earnings before interest, taxes, depreciation and amortisation (EBITDA), interest cover, and debt service cover, are used to test for reasonableness and the financial impact of every decision made. However, the utility has raised concerns regarding its sustainability and the impact the current five-year determination will have on its infrastructure expansion programme. On the other hand, consumers have argued that the 8% increase over the five-year period was exorbitant. They list affordability and timing as their biggest concerns. It is clear that the expectations of consumers and utilities are always at variance. On one hand, consumers expect to receive services at an affordable price and of high quality, while utilities argue that to provide a good quality service means increasing tariffs. The pursuit of higher tariffs is in conflict with consumer expectations and pro-poor policies. Table 4 below lists some of the different and conflicting expectations that the two parties may have.

Table 4: Competing expectations: utilities vs poor customers

Utilities	Poor customers
Risk mitigation	Availability of affordable supply of electricity
All costs recovery	Reliable and safe supply of electricity
Reasonable return on investment	Protection from exploitation by operators
Financial balance: Costs and Tariffs	Participation, consultation, and transparent decisions of the regulator and utilities.
Bankable contracts	Prompt response to customer complaints and disputes
Regulatory certainty	Value for money
Customer buy-in	Simplicity, convenience of payment and understand ability

Source: Authors

Table 4, above, highlights that affordable and reliable electricity is the main concern for poor households, while utilities put more emphasis on mitigating all risk and earning a reasonable return on investment.

From a regulatory point of view, reasonable return and affordability are two of the most difficult issues to balance in the ESI without one necessarily compromising the other.

Possible Ways of Protecting Low-Income Households: Costs vary between customer categories. These customer categories impose different costs on the power system. There are higher costs associated with supplying low-voltage, low usage consumers in remote rural areas in South Africa than high voltage and high usage customers close to generation stations, especially around Mpumalanga and Gauteng provinces. In order to develop an effective cross-subsidy framework, one needs to understand the main cost drivers of supplying electricity to different consumers. These costs consist of the energy costs (cost of generating electricity); the transmission and distribution network costs (cost of moving electricity from where it is generated to where it is supplied); and the customer service costs (providing necessary and optional support services to consumers).

Possible approaches: Local and international literature lists various ways of promoting affordability of electricity usage by low-income households (see Dubach, 2003; Lago, 2010; ACOSS, 2013; Banerjee et al., 2014; Maxwell, 2015). These studies highlight the importance of committing to universal access to electricity without affecting the sustainability of the electricity sector. For example, Banerjee et al. (2014) found that the overarching goal of access in India has overshadowed the need to provide safe, reliable electricity. Below is a list of possible approaches to cushion poor households from high electricity costs in South Africa.

- Providing a partial or full subsidy for the connection fee. This once-off capital subsidy promotes access to the grid. In other words, affordability is not a constraint for connecting to the electricity grid (where a grid is available to be connected to).
- Reducing or eliminating the fixed charge component of the tariff. This has the effect of eliminating any 'lump sum' payments required on the part of the poor household. That means, for example, the poor household does not need to find R300 per month (or whatever the monthly fixed charge may be) to maintain a connection to the electricity grid. Access to electricity by the poor households can be promoted through subsidising fixed charges (including the connection charge).
- Eliminating the energy charge for a defined maximum consumption per month. Currently electricity distributors give between 50-100KWh of FBE per month.
- Reducing the energy charge for a defined maximum consumption per month; that is, a partial energy charge subsidy with a limit.

Recommendations: The study makes the following recommendations:

a. There should be a gradual movement towards cost-reflective tariffs in order to minimise the short term impact of price increases on poor households which must be accompanied by the following key strategies:
    - Customer education programmes focusing on the importance of gradually moving towards cost-reflective tariffs for the sustainability of the ESI in South Africa. These gradual price increases over a longer period will provide certainty and give households time to adjust and acquire energy-efficient appliances.
    - Robust energy efficiency and demand side management (EEDSM) programmes aimed at reducing energy costs and demand. Energy efficiency and EEDSM programme will help reduce the need for new generation capacity and still be able to meet existing demand (the costs of new generation capacity outweigh the cost of energy efficiency and EEDSM).

b. There should be an understanding of other subsidies that accrue to the poor, regarding whether the subsidies given are enough to achieve government social objectives or not. Over-subsidisation of the poor can delay the achievement of cost-reflective tariffs. Furthermore, targeted subsidies should be introduced that are efficient, sound, transparent, practical, and limited in time. Subsidies must be for a limited time only. Utilities' consumption data should be used to determine whether households still qualify for electricity subsidies. For example, once a poor household has achieved a set minimum annual income, they should gradually move towards paying a full, cost-reflective tariff for their consumption. This should be done to eliminate high-income household access to subsidised electricity.

c. A national study on the minimum level of service grade required by poor households, based on their economic circumstances, is required.
    - This study will help determine the minimum electricity service required by households and avoid over-supply of services, which could lead to inefficient use of service.

- Those who need to consume more than the minimum services should pay for the extra consumption. Inclining block tariffs must be introduced to avoid electricity wastages where higher consumption will attract a higher tariff that mirrors the actual costs of electricity supply.

d. Introduce legislation or policies that promote competition in the electricity industry. Introduction of renewable energy-independent power producers will promote efficiency and reduce costs. Available literature shows that competition in the ESI improves efficiency (Goldstein, 2009) and service delivery.
e. The regulator must be involved in the procurement of all regulatory assets to be included in the regulatory asset base. The efficient and timely procurement of assets will limit the costs to consumers. The regulator should supervise and enforce the time utilities take to complete the construction of generation assets.

5. Conclusion

This study sought to assess the trade-offs between pro-poor and cost-reflective tariffs in the context of South Africa. This study further highlighted the need to adequately attract and reward local and foreign investors without necessarily affecting government's social objective of universal access to electricity. The study also highlighted that the structure of the electricity supply industry in South Africa focuses more on electricity and its impact on poor households and investment. The study further stated that the existing tariffs for residential users do not reflect the underlying costs of supplying electricity to them. From a regulatory perspective, it can be argued that there is evidence that low-income households will not be reached if utilities were to decide whom to supply without tariff subsidies. Poor households in low-income areas would be excluded permanently from the network. Furthermore, the regulator at all times should consider the socio-economic implications of costs-reflective tariffs within the broader context. It is also equally most important to shield the most vulnerable customers in South Africa. Furthermore, the point is made that the protection of poor households and low-income areas goes beyond issues of affordability of services. Moving them from informal to formal services is a fundamental starting point, even without necessarily establishing pro-poor tariffs. In conclusion, it is important that electricity tariffs be balanced, to enable private and public investors to recover efficiently incurred costs plus a reasonable profit, while also attempting to supply poor households and low-income areas with affordable electricity.

References

Australian Council of Social Services (ACOSS). (2013). Energy efficiency and people on low incomes. Available online at: http://www.acoss.org.au/images/uploads/ACOSS_ENERGY_EFFICIENCY_PAPER_FINAL.pdf. Accessed 10 November 2016.

Banerjee, S. G., Barnes, D., Singh, B., Mayer, K. & Samad, H. (2014). Power for all: Electricity access challenge in India. World Bank Publications.

Consumer Utilities Advocacy Centre (CUAC). (2015). Cost reflective pricing: Engaging with the network tariff reform in Victoria. Available online at: https://www.cuac.org.au/research/cuac-research/400-cost-reflective-pricing-engaging-with-network-tariff-reform-in-victoria/file. Accessed 10 June 2016.

Department for International Development (DFID). (2002). Energy for the poor: Underpinning the millennium development goals. Available online at: https://www.ecn.nl/fileadmin/ecn/units/bs/JEPP/energyforthepoor.pdf. Accessed on 1 February 2016.

Department of Energy. (2014). Overview of Universal Energy Access Strategy. IEP Planning Report Workshop. Available online at http://www.energy.gov.za/files/IEP/Polokwane/Overview-of-Universal-Energy-Access-Strategy.pdf. Accessed on 1 February 2016.

Department of Minerals and Energy. (2008). Electricity Pricing Policy (EPP) of the South African Electricity Supply Industry. South African Government Gazette No. 31741.

Dubach, N. K. (2003). Revisiting electricity reform: The case for a sustainable development approach. *Utilities Policy*, 11(3), 143-154.

Eskom. (2012). Revenue application: multi-year price determination 2013/14 to 2017/18 (MYPD 3). http://www.eskom.co.za/CustomerCare/MYPD3/Documents/Economic_Impact_of_Electrcity_Price_Increases_Document1.pdf. Accessed on 1 February 2016.

Franks, L. (2014). The impact of rising electricity tariffs on urban poor. A South African case study. Energy Research Centre. Available online at https://open.uct.ac.za/bitstream/handle/11427/9136/thesis_ebe_2014_franks_l.pdf?sequence=1. Accessed on 02 February 2016.

Gaunt, T. (2005). Meeting electrification's social objectives in South Africa, and implications for developing countries. *Energy Policy*, 33, 1309–1317.

Gerlach, E. & Franceys, R. (2010). Regulating water services for all in developing economics. *World Development*, 38(9), 1229–1240.

Goldstein, M. (2009). An Argument for the Introduction of IPPs in the South African Electricity Industry. Frost and Sullivan.

Howells, M., Victor, D. G., Gaunt, T. Elias, R. J. & Alfstad, T. (2006). Beyond free electricity: The costs of electric cooking in poor households and a market-friendly alternative. *Energy Policy*, 34, 3351–3358.

Lago, J. N. (2010). The changes in the social tariff of electricity in Brazil. Available online at http://www.gwu.edu/~ibi/minerva/Spring2010/Juliana.pdf. Accessed on 20 January 2016.

Maxwell, M. J. (2015). Can low-income households afford alternative energy? Institute for Economic Inquiry. Creighton University. Available online at https://www.creighton.edu/fileadmin/user/EconomicInstitute/Research_Scholars/Alternative_Energy_White_Paper_-_4-6-15.pdf. Accessed 10 November 2016.

PriceWaterhouse Coopers (PwC). (2015). Africa Power & Utilities Sector Survey. A New Africa Energy World: A More Positive Power Utilities Outlook. Available online at: http://www.pwc.com/gx/en/utilities/publications/assets/pwc-africa-power-utilities-survey.pdf. Accessed on 13 January 2016.

Schreiber, M., Wainstein, M. E., Hochloff, P. & Dargaville, R. (2015). Flexible electricity tariffs: Power and energy price signals designed for a smarter grid. *Energy*, 93, 2568–2581.

South African Government News Agency. (2015). SADC Energy Ministers approve establishment of renewable energy centre. Available online at: http://www.sanews.gov.za/south-africa/sadc-energy-ministers-approve-establishment-renewable-energy-centre. Accessed on 13 January 2016.

South African Social Services Agency. (2015). A statistical summary of social grants in South Africa. Fact sheet: Issue no. 12 of 2015. Available online at www.sassa.gov.za/index.php/.../statistical-reports? Accessed on 15 February 2016.

Southern African Development Community (SADC). (2015). Energy Ministers target 2019 for electricity surplus, cost-reflective tariffs. Available online at http://www.polity.org.za/article/sadc-ministers-target-2019-for-cost-reflective-electricity-2015-07-24. Accessed on 13 January 2016.

Tait, L. (2011). The potential for local community benefits from wind farms in South Africa. Cape Town: University of Cape Town, Energy Research Centre.

Trade and Industry Chamber. (2010). A study into approaches to minimise the impact of electricity price increases on the poor. Available online at https://www.thedti.gov.za/industrial_development/docs/fridge/NEDLAC_final_report.pdf. Accessed 20 January 2016.

Trade and Industry Chamber. (2011). Fund for Research into Industrial Development, Growth and Equity (FRIDGE): Study to collect all research work done on Administered Prices.