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Article

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Reference: Nkosi, N. S./Govender, Krishna K. (2022). Electricity price increases and energy demand : the case of an electricity supplier in South Africa. In: International Journal of Energy Economics and Policy 12 (5), S. 138 - 145. https://econjournals.com/index.php/ijeep/article/download/13045/6950/31277. doi:10.32479/ijeep.13045.

International Journal of Energy Economics and Policy

ISSN: 2146-4553

available at http: www.econjournals.com

International Journal of Energy Economics and Policy, 2022, 12(5), 138-145.

Electricity Price Increases and Energy Demand: The Case of an Electricity Supplier in South Africa

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Received: 26 March 2022 **Accepted:** 28 July 2022 **DOI:** https://doi.org/10.32479/ijeep.13045

ABSTRACT

South Africa (SA) experienced electricity supply and demand challenges since the first load shedding crisis in 2008, which also resulted in drastic price increases during the period 2009-2018. This study aimed to investigate the impact of price increases on the demand for electricity supplied by one of South Africa's largest electricity supplier in Johannesburg, South Africa, namely, City Power. An on-line survey was conducted using QuestionPro, to collect data from a random sample of 107 respondents stratified as residential, commercial and industrial customers. Although the impact of the electricity price increases differed across customer segments, all customers were that energy conservation is necessary to protect the national grid from total collapse. A key finding was the interest shown by the different customer segments in investing on renewable and alternate energy sources to counter the electricity price increases. Thus, City Power should invest in generating its own electricity to reduce over-reliance on Eskom which is the national state-owned electricity generator and supplier. City Power should also consider investing in renewable energy sources, but this will require the SA government to change current energy policies and guidelines.

Keywords: Energy, Electricity, Load-shedding, Pricing, Supply and Demand, South Africa
JEL Classifications: Q4, Q41

1. INTRODUCTION

In South Africa (SA) prior to 1994, the minority white population were the main beneficiaries of the government's energy investments in the residential sector. Post 1994, the democratic government's vision was to ensure that South Africans have universal access to electricity. From 1994 to 2012, the government successfully increased the proportion of households that have access to energy from 30% to 87%.

Electricity generation in SA is still heavily reliant on coal, and in 2013, coal generated 88.3% of the national electricity, which is about 215,691 gigawatts, and in 2016, coal was responsible for 1.8% of the total energy generated. Several researchers inter-alia, Amusa et al. (2009) Argus that owing to the utilisation of its vast coal resources and extensive public sector investment in generation and transmission, electricity prices in South Africa (SA) are ranked as one of the lowest in the world. Since 1994, the SA government's desire to ensure universal access to electricity and buoyant economic growth has seen South Africa's aggregate electricity demand grow at a rate of 4% per annum. However, the scaling down of investments in new generation and transmission infrastructure between the late 1990s and 2004 has resulted in a shortfall in available electricity capacity and a drastic reduction in the gap between electricity supply and demand. By 2007, South Africa's electricity reserve margin, which is the difference between generation and demand, had declined from 25% in 2001 to between 8% and 10% (Amusa et al., 2009). The net effect of demand outstripping supply is a growing power crisis that threatens to negatively affect South Africa's stated objective of growing the economy at 6% per annum between 2010 and 2014.

Electricity generation and supply in SA is dominated by a state-owned utility, namely, Eskom, which ranks among the five largest in the world, (UCT Graduate School of Business, 2019). Eskom generates up to 95% of the country's electricity supply and it owns and controls all the high voltage transmission grid in South Africa. The utility supplies about 40% of electricity directly to consumers and the remainder is serviced via 368 municipal entities who purchase bulk electricity. The municipalities also generate small amounts of electricity, but the bulk of their distribution is from Eskom. The municipal departments account for about 40% of the national electricity consumption, of which eight cities are responsible for 34% of the national electricity demand. The vast majority (92%) of electricity is generated from coal, nuclear energy accounts for about 6% and hydro and emergency gas turbines contribute to the remaining 2% (Eskom, 2020).

City Power Johannesburg supplies electricity across ten depots in the City of Johannesburg. The reduction in electricity demand from City Power over the last 12 years raised serious concerns. A significant decrease in demand was reported during 2016-18, where the volume growth percentage was –0.1 and –2.8 respectively, which is the lowest since 2006-07 (City Power, 2019).

In 2007/2008, the South African energy sector has experienced a severe crisis that had resulted in numerous power cuts with negative consequences both for the specific sector and for the economy in its entirety (Inglesi-Lotz and Pouris, 2016). According to Rustomjee, (2019), between 2007 and 2016, 100 of South Africa's 265 foundries were closed, and in 2018 the power cost increases impacted jobs and economic production. In early 2008, South Africa experienced the first of a series of highly disruptive outages know as "load-shedding" which was introduced at an enormous cost to the economy. Furthermore, in the 5 years between 2008 and 2013, electricity prices more than doubled in real terms, rising by a cumulative 114%, since the National Energy Regulator of South Africa (NERSA) granted Eskom major tariff increases to help it raise debt to build a new powerplant.

Although much has changed since 2008, South Africa's power system remains constrained and will be for some years, until Eskom's large new power stations, namely, Medupi and Kusile, deliver the capacity needed to relieve the shortage of supply. The economic recession in 2008 which plagued SA, helped initially to provide space for recovery, and Eskom has since made significant progress towards stabilizing the power system. It built coal stockpiles, added new capacity to the grid and implemented a Demand Side Management programme, which has achieved savings in electricity usage. It also added some capacity from the Independent Power Producers (IPPs) into the grid. Eskom's power stations require an ever-increasing amount of routine maintenance, because most of them are in their mid-life, and because they have been "run hard" over the past few years to compensate for the shortage of capacity. However, doing planned maintenance requires that units be taken out of service for shorter or longer periods. In a situation of constrained supply, there often has not been the space to switch units off, while also meeting demand and keeping some capacity in reserve to cater for any unplanned events. Thus, in recent years, Eskom has kept the lights on, in part by deferring non-essential or non-priority maintenance with the Systems Operator and the Generation divisions working closely together to juggle requirements (Mokoena, 2018:20).

In 2012, Eskom implemented a recovery plan to alleviate the electricity shortages (NERSA, 2008:12), by roping in the private sector Independent Power Producers (IPPs) to play a role in addressing the challenges. This was intended to not only reduce the funding burden on Government by relieving the borrowing requirements of Eskom, but to also introduce generation technologies that Eskom may not consider as part of its core function, which may play a pivotal role in the future electricity supply options, in particular off-grid, distributed generation, co-generation and small-scale renewable projects.

It is against the above background that this study aims to understand the impact of electricity price increases on electricity consumption per customer type, in the Gauteng province of South Africa. More specifically, the objectives of the study are to determine the impact of the electricity price hikes on different customer types, to ascertain if customers are using multiple energy sources to alleviate the tariff hikes and to investigate customers' willingness to invest on renewable energy as a result of the electricity tariff hikes.

2. LITERATURE REVIEW

Eskom's 2018 medium-term system adequacy outlook (MTSAO) revealed that the system would be adequate for two demand scenarios studied with an Energy Availability Factor (EAF) at 75% and above (Eskom, 2020:18). A deteriorating EAF or increase in demand would have an impact on the 'adequacy' and this could be further exacerbated if one or more of the identified risks were to materialize. The above report further indicated that capacity can be increased either through increasing the EAF or delaying the shutdown of units. If the risk of a shortage of coal and the potential impact of available capacity on the system are not mitigated, this would have severe negative implications for the adequacy of the system.

The 2019 MTSAO report indicates an adequate EAF above 72% and this is due to the lower energy used, compared to the 2018 forecast (Eskom, 2019). Although the 2019 study considers a zone of uncertainty with regard to plant performance and demand, excessive unplanned plant failures and or increases in electricity growth would affect the adequacy outlook of the system (Eskom, 2019:19).

According to Amusa et al. (2009), electricity demand in South Africa has grown at a very rapid rate over the past decade. As part of reform initiatives to enhance long-term sustainability of the country's electricity industry, the South Africans authorities have in recent years sought to develop an electricity pricing framework that is cost reflective and forms the cornerstone of demand management schemes meant to foster changes in consumption behaviour and enhance efficiency in resource use. The effects of any pricing policy on aggregate electricity consumption will depend on a useful understanding of the factors that influence

electricity demand, and the magnitude to which electricity demand responds to changes in such factors (Amusa et al., 2009).

2.1. Electricity Pricing in South Africa

Due to the attention being focused on the negative impact of load shedding on the growth of the economy, the impact of rapidly rising electricity tariffs on electricity consumers has been given less focus. Considering the poor financial status of Eskom currently, for the electricity distributor to remain sustainable, real tariffs will have to rise further to ensure that other energy sources are explored to assist in meeting the current energy demand. Electricity prices in South Africa have dramatically outpaced inflation ever since the 2008. During the period 1987-2007, electricity tariff increases were not aligned to inflation, due to government policy of keeping the electricity tariffs as low as possible and affordable by poor communities (Poweroptimal, 2020).

Economic growth has proven to be one of the main drivers in South Africa and by contrast electricity prices from 1987-2005 had almost no effect (Inglesi-Lots, 2016). The electricity price elasticity had not been constant over time and with the approval of increases for 2020 and 2021, the total electricity tariffs would have increased more than 5-times in 14 years. On 07 March 2019, the National Electricity Regulator (NERSA) approved standard tariff increases of 9.41%, 8.10% and 5.22% for the Multi Year Determination Process (MYPD4) for the three periods (2019/20, 2020/21 and 2021/22 financial year), which was lower than the 15% applied for by Eskom. This indicates that there is a misalignment in the implementation of the MYPD methodology (SA Government, 2020). According to Deloitte (2017), electricity price adjustments in South Africa are currently determined by NERSA through the MYPD methodology, which is based on rate of return principles and was developed for the regulation of Eskom's tariffs via "allowable revenue."

Eskom's standard tariffs cover the average costs of providing electricity and these include the costs of generation, transmission and distribution, a certain amount of capital expenditure on local reticulation networks and administration (Eskom, 2020). Eskom's tariffs are adjusted annually on 1 April. In comparison with the Consumer Price Index (CPI), the increases for the past 15 years far exceeded the CPI (Eskom, 2020). However, the "real" electricity prices have increased sharply from 2008, following a progressive decline between 1978 and 2008.

There are currently 11 tariff options available from municipalities which are distributors of Eskom generated electricity to their customer base within their licensed area of supply. Municipal tariffs are typically divided according to the following categories: Residential, Residential TOU, Business and General, Commercial TOU and Industrial TOU.

According Mokoena (2018), NERSA's authority to regulate the tariffs charged by municipalities is not clear. While the Electricity Regulation Act of 2006 gives NERSA the authority to regulate electricity prices and tariffs, the current South African Constitution gives local government exclusive jurisdiction over electricity reticulation. Figure 1 provides an overview of the standard residential tariff variation across selected municipalities.

A comparison of the standard residential electricity tariff charges imposed by seven (7) of the 187 municipalities highlights that there are large discrepancies in the tariff charged by municipalities (Deloitte, 2017).

2.2. Electricity Price Increase and Consumer Behaviour

According to Yizhang (2013), customers adjust their electricity consumption as a response to the price signal of a demand-based time of use electricity distribution tariff. Customers reduce their electricity consumption as well as shift demand from peak to off-peak hours. Based on the sectoral electricity elasticities in South Africa before and after the supply crisis of 2008, the study of electricity elasticities indicated that the estimates for price elasticity were statistically insignificant for the majority of the sectors during the period 2002-2007. However, after 2008, the sectors showed significantly higher sensitivity to price changes. Inglesi-Lotz, (2011) argued that that some consumers will aim to consume energy more efficiently while other consumers will turn to alternative and renewable forms of energy. However, with higher prices of electricity, the variable costs for many small – and medium- sized enterprises will in some cases, be unbearable and cause them to close down, thus putting severe constraints on the economic production of the country. The sensitivity of consumers to changes in electricity prices appears to vary significantly over time and depends on the direction and magnitude of price increases and the prevailing price level. Inglesi-Lotz (2015) also indicated that the income elasticity demand is positive and negative stability over time seems to be likely due to large variations in the sensitivity of consumers to price. According to the report by Deloitte, (2017), when real electricity price increases, the implication for Eskom sales forecasters and policy makers is that large consumers are likely to respond to price by reducing consumption.

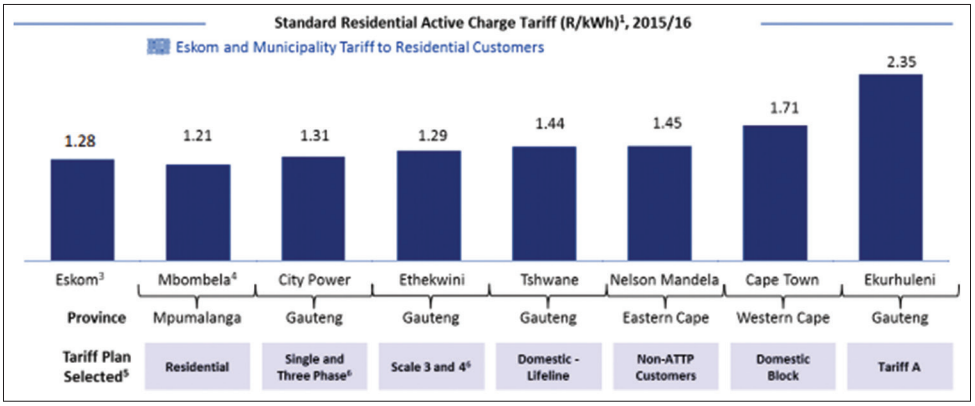
In the past 12 years, Eskom has seen electricity demand reduction and significant decrease in demand was reported in the 2016-17 and 2017-18 financial year (Eskom, 2019), where the volume growth percentage was –0.1 and –2.8 respectively, the lowest since 2006-07. With the electricity shortages in South Africa, some of the utility's customers resort to using other types of energy such as solar power and generators to address the shortage. However, these types of energy remain expensive to maintain, since the utility's customers will revert to electricity supply by the City of Johannesburg's power utility.

2.3. Energy Demand and Economic Growth

According to Kahsai et al. (2012), the question of whether a relationship between energy (electricity) demand and economic growth exists has attracted massive attention in the international literature. The existence of this relationship is of great importance especially for the energy policy makers. In a global environment where energy conservation is a target for many governments but at the same time growth, development, and sustainability are also high on the political and economic agenda, energy conservation policies should not become obstacles to the country's growth.

In South Africa, several studies have explored have examined the country's energy or electricity consumption–economic growth relationship either individually in a time-series context Odhiambo

Figure 1: Residential electricity tariffs



Source: Adapted from Deloitte, 2017

(2010) or in a panel data framework among other countries, usually from the African continent (Al-mulali and Sab, 2012). In line with what has been reported in the international literature, the results are inconclusive and is not surprising (Al-mulali and Sab, 2012; Eggoh et al., 2011; Esso, 2010) as reported by Inglesi-Lotz and Pouris (2016).

The literature review served to provide a contextual understanding of the research problem. This albeit somewhat brief discussion was necessary to ground the study, and it is against the above background that the primary aim of this study, namely to examine the impact of electricity tariffs on electricity demand reduction at City Power Johannesburg. This was addressed using the methodology discussed below.

3. RESEARCH METHODOLOGY

3.1. Research Context

The City of Johannesburg Metropolitan Municipality which is located in the Gauteng Province in South Africa is the economic engine of South Africa (Municipalities, 2020). The City of Joburg is the largest city in South Africa, and the provincial capital of Gauteng, the wealthiest province in South Africa. The City's primary economic sectors are finance and business services, community services, manufacturing and trade and 88.12% of the 1.41 million households have electricity. According to StatsSA (2020), in the past couple of years, growth in crucial job creating industries such as manufacturing and mining has declined significantly.

City Power was established in 2000 as an independent municipal entity, wholly owned by the City of Johannesburg (City Power, 2020). City Power has approximately 385 567 consumers and currently purchases about 80% of its electricity from Eskom and the rest from Kelvin Power Station (City Power, 2020). The over-reliance by City Power on Eskom and Kelvin power stations, results in load shedding causing a loss of revenue during the downtime.

City Power is experiencing certain distribution challenges, namely the aging distribution infrastructure, unplanned outages and its costing structure. On an annual basis, the National Electricity Regulator of South Africa (NERSA) approves the percentage increase guidelines and reviews the municipal tariff benchmarks (NERSA, 2020). The cost of generating electricity is increasing as a result of the need to develop new generation capacity and the cost of distributing electricity needs to increase to provide adequately for maintenance and rehabilitation of the network. Sharply rising electricity costs have a significant impact on the welfare of poor households and effective ways need to be found to target affordable subsidies that till mitigate these impacts (DTI, 2020).

3.2. Research Design

A cross-sectional design was used to assess the impact of high electricity tariffs which Eskom imposed on different municipalities and which consequently resulted in energy consumption reduction in the last 12 years. A quantitative research approach was used to collect data using an on-line data survey (QuestionPro, 2020). The questionnaire comprised a total of 13 questions, 12 of which were closed-ended and one open-ended. The online questionnaire requested information about the customer type, the age of supply, season category of consumption, views on electricity tariff increase, the impact of the electricity tariffs on consumption levels, impact on business operations, and addition of new forms of energy such as renewables, to alleviate the electricity shortages.

3.3. Sample

The researcher followed an efficient and effective way to select the sample from the population through simple random sampling method. Since changes in electricity prices affect all members of the population, all the electricity customers of City Power Johannesburg were included in the sampling process. The first category was the residential customers, then the commercial customers which included business and shopping malls and lastly industrial customers.

3.4. Data Collection and Analysis

The survey was conducted over a three-month period from October 2019-December 2020. The survey link was sent to over 400 respondents via their email address and 164 questionnaires were fully completed and accepted for data analysis. Both descriptive and inferential statistics techniques were used to analyse the data.

3.5. Pilot Study

The questionnaire was pre-tested among a pilot sample of three respondents to verify that the completion time did not

exceed 10 min and to identify any potential threats to the instrument's internal validity resulting from ambiguity of wording, misinterpretation of questions, inability to answer a question, sensitive questions, and many other problems associated with the questionnaire, as well as the process of administering the survey (Cooper, 2017). The purpose of the pilot study was also to evaluate the survey questionnaire and detect any problems with the data collection procedures and survey software. Three questions were found to be ambiguous and four were deemed sensitive, which resulted in the final questionnaire being modified.

4. RESEARCH FINDINGS

4.1. Demographics

The vast majority (98.13%) of the research participants confirmed that they were City Power customers. All customer segments were fairly represented in the survey as follows: Residential (81.13%), Commercial (17.92%) and Industrial (0.94%). The higher participation rate by residential customers was expected because the customer statistics for City Power Johannesburg indicates over 63% are prepaid (residential), 36% conventional business and 1% large power users.

The vast majority (89.22%) of the respondents indicated that they are being supplied with electricity by City Power for over 11 years. The high percentage of the respondents with over 11 years of supply was also obvious due to the high number of Residential customers who participated in the study.

4.2. Inferential Statistical Analysis

Anova tests were conducted on the customer type, the consumption behaviour, impact of electricity price increases on the consumer type and the impact of electricity shortages against these customers. Table 1 reflects the outcome with respect to customer types.

The p-value equals 0.911703, [$p(x \leq F) = 0.0882966$], which means that if H0 is rejected, the chance of type1 error (rejecting a correct H0) would be too high: 0.9117 or 91.17%. The F test statistic equals 0.0941708, which is in the 95% critical value accepted range: [$-\infty$: 5.7861].

The second category test results, namely, consumption behaviour of the customer as a result for price increases are reflected in Table 2.

The second category test results also accept the null hypothesis, since p-value equals 0.928995808, [$p(x \leq F) = 0.076431123$].

The third test looks at the impact on customers of electricity price increases. The test statistic p-value is 0.928995808 and p-value > α, H0 is accepted.

The last category was based on the impact caused by electricity shortages to business and residential customers. The ANOVA test is presented in Table 3.

The test statistics F equals 0.047363, is in the 95% critical value accepted range, which implies that Ho is accepted.

In order to determine the relationship between electricity consumption and electricity price increases, two questions were asked, the first intended to establish the consumption of electricity as a result of electricity price increases. The overwhelming majority (81.31%) of the 107 primarily household customer participants indicated that they will reduce electricity consumption if the price increases. However, the participants from the commercial and industrial sectors indicated that they will maintain their consumption levels irrespective of any price increases. This is expected from a business, since businesses have to maintain production levels.

The second question concerned reducing consumption levels, the respondents were asked if the reduction will be short-term, medium-term or long-term and the majority (72.90%) indicated that they will only reduce consumption in the long-term.

The vast majority (85.85%) of household participants also indicated that the increase in electricity prices had resulted in a lifestyle change. In addition, 85.05% of the participants confirmed that electricity price increases also affected inflation, resulting in an increase in food prices. The lifestyle changes and food price increase presented a dilemma for poor households in South Africa. Inglesis-Lotz (2016), argued that the poor are particularly vulnerable to the effects of rising food prices and the rise on food prices generally result to reduction in demand for electricity. To ensure the poor communities continue to maintain their electricity consumption, some may decide to implement illegal electricity connections. Illegal connection is made when a person attaches their home's electrical circuit to the national grid without a meter (Siyavula, 2020). The vast majority (92.38%) of participants indicated that they did not support illegal connection activities.

The business customer respondents indicated that the electricity price increase had impacted their staff levels and 10.28% had

Table 1: ANOVA - The information about city power customers

Source of variation	SS	Df	MS	F	P-value	F crit
Between groups	534.7083	2	267.3542	0.094171	0.911703	5.786135
Within groups	14195.17	5	2839.033			
Total	14729.88	7				

Table 2: Consumption behaviour if electricity price increases

Source of variation	SS	2f	MS	F	P-value	F crit
Between groups	381.6333333	2	190.8166667	0.076431123	0.928995808	19
Within groups	4993.166667	2	2496.583333			
Total	5374.8	4				

Table 3: ANOVA – impact of electricity shortages

ANOVA						
Source of variation	**SS**	**Df**	**MS**	**F**	**p-value**	**F crit**
Between groups	867.0667	6	144.5111	0.047363	0.99863	8.940645
Within groups	9153.333	3	3051.111			
Total	10020.4	9				

retrenched staff since the last tariff increase. According to Ceicdata (2020), since the last electricity price increase (01 March 2018-01 September 2019), the unemployment rate had also moved up from 26.7% to 29.10% in September 2019.

Figure 2 illustrates the responses of actions taken by participants when there are continuous electricity price increases.

It was ascertained that only a minority (35.85%) of household participants had begun using a combination of traditional and renewable energy sources. This may be due to limited traditional biomass and off-grid applications and the higher installation cost to consumers. This was deduced since 68.32% of participants indicated that the cost of using both energy sources is expensive.

Over 50% (56.31%) of the household (customers) respondents indicated that they will be able to run their businesses or households with renewable energy only, while 36 respondents were not sure if it could sustain their day-to-day operations.

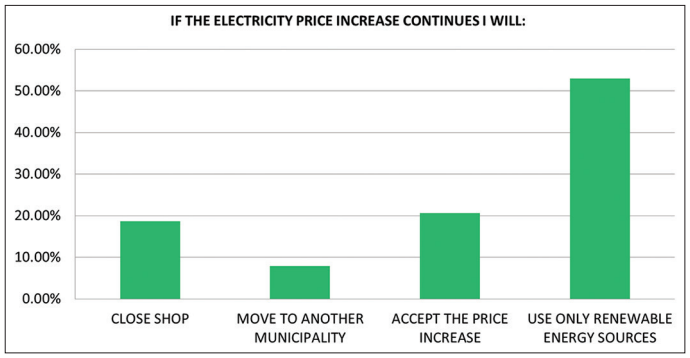
Given the electricity shortages in South Africa, it becomes very important for customers to save on electricity. Eskom, the electricity generator issues power alerts daily on the grid challenges and advises consumers to use electricity efficiently in order to reduce load shedding (Eskom, 2020). All 100.00% of the respondents indicated that they indeed do their best to save electricity.

The overwhelming majority (94.34%) of all the customer type participants had a negative perception about price increases. According to a report in Energy, (2020), customer's perception about the price they pay for electricity is skewed towards the feeling that they are paying too much for electricity.

A significant (52.94%) of the business respondents replied that they will turn to renewable energy sources and disconnect from the current electricity grid if the prices continue to increase. The minority (18.63%) replied that they will close the businesses and 7.84% responded that they will relocate their business to another municipality where the electricity tariffs are lower.

The primary driver of electricity price movements has historically been Eskom's investment decisions such as the type of technology selected, and the timing and scale of new generation capacity building (Tips, 2020). The energy security concerns, presented by electricity shortages and load shedding since 2008, and the trebling of the average electricity price from 2009/2010 to 2017/2018 have drastically changed the environment in which businesses operate in South Africa (Tips, 2020). Based on the assumptions that current rapid electricity price increases, coupled with protracted supply interruptions challenges, present an incentive for companies to invest in appropriate mitigation strategies such as investing on renewable energy sources to counter the electricity shortages.

Figure 2: Action taken when electricity prices increase



Source: Developed from survey data

In order to investigate if business customers are investing in mitigation strategies, three questions were asked to the participants. The first question concerned whether the customer is currently utilising a combination of renewable energy sources and the electricity grid and the response was as follows: 35.85% responded in the affirmative and 64.15% responded that they are only using the traditional supply grid. The higher response of traditional supply was expected since the residential customers make up 80% of the sample. Similarly, the cost of using a combination energy-mix (renewable and traditional supply), was perceived to be expensive by 68.32% of the respondents, Affordable (17.82%) and 13.86% of respondents saw no difference in the cost.

According to Tips (2020), businesses are progressively turning their focus towards energy efficiency improvements and the use of renewable energy to improve their energy profile and their energy security.

5. CONCLUSION AND RECOMMENDATIONS

The results of the survey seem to concur with Ezzard's (2016) arguments, since the overwhelming majority (81.31%) of the respondents agreed to have reduced the consumption of electricity as a result of electricity tariffs increases. However, Business customers need to maintain their consumption levels to ensure consistent output levels. The residential respondents indicated that they will adjust their behaviour or lifestyle as prices rise. Ezzard, (2016) argued that short-run price elasticities (<2 years), cover input costs which one does not have control over, but in the long-run (normally over 5 years), consumers have sufficient time to adjust to the change in pricing level.

Municipalities are constitutionally mandated to deliver basic services, including electricity (Eskom, 2020). Furthermore, in South Africa, the government utility Eskom has a monopoly on the generation and transmission of electricity. Municipalities purchase bulk electricity from Eskom in order to fulfil their constitutional mandate of electricity distribution. As the constitution allows municipalities the right to apply surcharges over and above the electricity prices determined by NERSA, municipalities have tended to increase tariffs in order to maximise revenues and subsidise other expenses.

The vast majority (85.85%) of residential customers responded that they have changed their lifestyle as a result of electricity price increases. Residential customers also confirmed that food prices increased since the last electricity price increases which contributed to a change in lifestyle.

The overwhelming majority (92.38%) of residential customers were against illegal connections which results in power outages and injuries to communities.

Business customers (Commercial and Industrial users) indicated that their business was negatively affected due to the electricity price increases. Only an insignificant minority (3.77%) of respondents indicated that the electricity price increases had not affected their sales output. Some (15.89%) of the respondents indicated that they have had to retrench staff, since their income levels were reduced.

Based on the different pricing models employed by different municipalities, the business customers (52.94%) responded that they will turn to renewable energy sources and disconnect from the national electricity grid, should this be a better option. Some indicated that they would even consider relocating their businesses to a different municipal district where the tariffs are lower. This would have a negative impact on employment in the municipality.

The primary driver of electricity price movements has historically been Eskom's investment decisions such as the type of technology selected, and the timing and scale of new generation capacity building. The energy security concerns, presented by electricity shortages and load shedding since 2008, and the trebling of the average electricity price from 2009/2010 to 2017/2018 have drastically changed the environment in which businesses operate in South Africa.

The current rapid electricity price increases, coupled with protracted supply interruption challenges, present a motivation for companies to consider appropriate mitigation strategies such as investing in renewable energy sources to counter the electricity shortages. With changes in the legislation, the positive impact of alternate energy sources will also be felt by households. Business and household consumers should seriously and progressively turn their focus towards energy efficiency improvements and the use of renewable energy to improve their energy security.

The large discrepancies in municipal electricity tariffs in South Africa are a cause for concern and also complicate any analysis of the impact of rising tariffs on the end – consumer. The variance presents a gap where Eskom's end-user tariffs are regulated, while municipalities enjoy a large amount of discretion with respect to how they structure tariffs and how much they charge for electricity distribution services. This matter should be looked into by the relevant authorities.

It is also recommended that City Power should invest in generating its own electricity to reduce over-reliance on Eskom, which is the national state-owned electricity generator and supplier. City Power should also consider investing in renewable energy sources, however this will require the South African government to change current energy policies and guidelines to allow for such changes in the industry.

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