In pursuit of Vision 2030: Reforming South Africa's electricity sector

[3853 words]

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Introduction

1.1 Historical Context

The development of a viable and efficient power sector is pivotal in promoting strong economic growth in a country. Indeed most industries and households rely extensively on power supply to be able to fuel economic growth, provide employment and to be able to enhance the quality of life for the citizens of a country. For many years, governments have thought that the function of providing this electricity should be the domain of a state owned utility like Eskom in the South African case (Hertzmark, 2012). This has led to having state utilities in many countries including Brazil and India having substantial power in the three main domains of electricity provision: Electricity generation, transmission and distribution (von der Fehr & Wolak, 2003). The economic fates of many a country have been tied thus to the efficient operation of these and their ability to be one of the key enablers of economic prosperity.

The provision of electricity has long been thought of as a natural monopoly (Hertzmark, 2012) . This has been influenced by the high infrastructure investment that is needed as well as an understanding that there are significant economies of scale that can be gained that would make it economically undesirable to have a competitive market with many providers of electricity. The state run utilities in many countries including BRICS member states India and Brazil have thus been vertically integrated covering all three domains of electricity provision (Hertzmark, 2012). South Africa's Eskom has thus followed a similar path with providing most of the electricity generation from predominantly coal based sources, a transmission grid that spans the country with the electricity distribution provided by the utility and municipalities. The mainly heavy industry industrial clients like mining houses have purchased their electricity from Eskom, while residential consumers and other commercial enterprises access through the municipalities as the distribution agents (Steyn, 2003).

From the 1970s through to the 1980s, Eskom pursued an ambitious build programme that aimed to boost the generation capacity of the utility (Steyn, 2003). The utility was able to add significant coal based power stations as well as Koeberg in the Western Cape that was nuclear based. The result of this expansion was excess capacity with demand not increasing as fast as was anticipated. The utility had to fund this programme with increased tariffs that were approved by the National Electricity Regulator of South Africa (NERSA) (Steyn, 2003) . A tradeoff was reached that there would be gradual price increases from the 1990s as there was no foreseen need for new capital projects and the result of this was real electricity price declines that the country faced from the 1990s to the early 2000s (Steyn, 2003). Indeed, South Africa enjoyed low electricity prices, the lowest in the world up to 2004 that was backed by a reliable electricity supply that had positive effects on the economy.

As a result of the low prices and government policy that favoured capital and energy intensive industries, heavy industry was able to flourish in the South African case and residential consumers were able to increase their reliance on electricity at relatively low costs. The heavy industrial clients like mining houses were able to choose technology mixes that were capital and electricity intensive. In addition to this (Steyn, 2003), after 1994 the country increased substantially the number of households with electricity access to include many areas that were previously excluded in the Apartheid state. This

coupled with strong GDP growth led to a large increase in the demand for electricity, in a market dominated by one supplier that was providing it at very low costs.

Despite this increase in demand, Eskom under invested in the capacity of the country to generate electricity. There were no major power station build programmes since the 1980s and there was even a backlog in the maintenance of the power plants, transmission grids as well as the distribution power lines for the municipalities (Steyn, 2003). In addition to this, the pricing structure of the utility was characterized by high price discrimination and revenues that were inadequate to meet future demand needs (Hertzmark, 2012). The high price discrimination was a result of the very low, non-cost reflective prices that the small group of large industrial consumers including the mining houses were able to negotiate versus the higher fees paid by household and other commercial enterprises that received electricity from municipalities (Steyn, 2003). In addition to this, the prices were not variable in terms of inducing consumers of electricity to investigate the most efficient means to conserve electricity or to investigate additional energy sources like gas to supplement the electricity supply. Hertzmark notes though, that this is a challenge similarly faced by vertically integrated state utilities from his study of the Asian Pacific countries with countries like India also having similar challenges (Hertzmark, 2012).

1.2 Key Challenges

It is this combination of demand side and supply structural challenges that have led the current crisis in the power sector in South Africa. In addition to these there has been a huge realization of the negative impact of carbon based sources in global warming and an increased effort to move towards more renewable energy sources (National Planning Commisision, 2011). There have also been concerns of the efficiency of having a state utility dominating electricity provision with models that have been proven successful in countries like Brazil of having a more competitive environment in the generation, transmission and distribution of power (von der Fehr & Wolak, 2003). The need to reform the electricity provision sector in South Africa has never been more acutely felt.

In an attempt to reform the sector, the South African government has responded with a number of Policy interventions including the Integrated Resource Plan (IRP). There has been a plan to introduce private electricity providers to supplement the generation capacity of Eskom. An insistence of increasing the share of renewable energy that is used in generating electricity in South Africa and move to increase the current generation capacity of Eskom albeit this is still largely from coal based sources (Department of Energy, 2010). The result of this have been the inevitable price increases that have been approved by NERSA and can enable Eskom to be able to finance the huge capital expansion projects that it is currently pursuing.

The key challenge has been to balance these long term objectives with the short term tradeoffs that the country will have to ensure to be able to reach this desired point. How can the structural efficiency of the electricity provision sector be improved and what are the implications of this? What should the country do about the negative impact of these price increases on poor households, and who should finance this? How can the price increases be smoothed in order to minimize the impact on industry and employment while still financing the supply side expansion? Finally how do we align the solution to this

energy challenge to the long term objective of building a more equitable and just South African economy that can improve the lives of all its citizens?

1.3 Hypothesis

In order to address these challenges this essay will propose that to improve the efficiency of the energy sector there needs to be structural reforms in especially electricity generation and distribution. The main structural reform will be more competitive markets, with treating each function separately. There also needs to be support of poor households in the form of preferential tariffs. There also needs to be a focus on supporting labour intensive industries to ensure that the vision outlined in the National Development Plan is realized and South Africa is closer to a more just, equitable society with better lives for more people.

Improving the efficiency of the electricity market

In order to assess the efficiency of the existing electricity provision sector, this report will separately analyze the generation, transmission and distribution of electricity in the country and propose possible policy improvements. There will be particular emphasis on the efficiency gains that can be made in generation as well as the key reforms needed in distribution. In addition to this a key focus will be placed on the operation of the current regulator NERSA and what can be done to improve its effectiveness.

2.1 Increasing generation capacity

Electricity generation can be depicted by the process of transferring a renewable or non-renewable source to electricity that can subsequently be fed through the transmission network to be delivered in the required voltage to end users. In South Africa, 98% of electricity is generated by Eskom with the balance being provided by independent power producers (IPPs) as well as sources from renewable sources in other SADC countries (Eskom , 2012). There have been key challenges the electricity generation capacity as a result of the underinvestment in Eskom, even at levels that could not keep track of maintenance requirements.

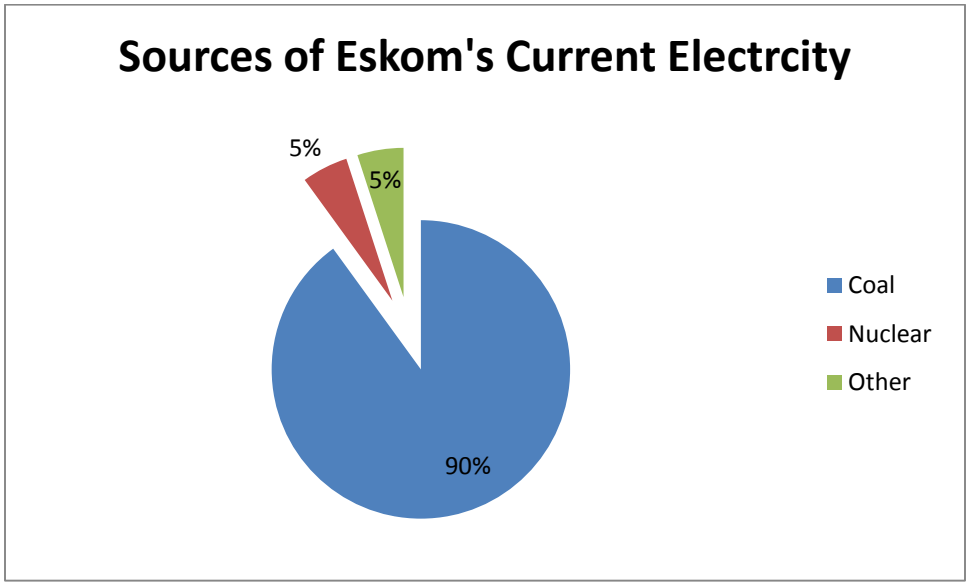

Figure 1

Source: Eskom

Eskom's large infrastructure programme has focused on the building of two mega power stations, Medupi and Kusile which are both coal based power stations that collectively cost over R 200 billion and have significant potential to ease the supply constraints in the medium term (National Treasury, 2013). There has also been a substantial investment outlined in the budget for investing in IPPs with most of this generation power earmarked to come from renewable sources of wind and solar energy

(Department of Energy, 2010). The NDP has also made provisions for a closer investigation of using more nuclear energy as well as introducing natural gas into the energy mix (National Treasury, 2013). Cabinet has also been in negotiations to have a R 200 billion hydroelectricity project, The Grand Inge in partnership with the Democratic Republic of Congo (National Treasury, 2013). It is hoped that these initiatives will be able to deliver South Africa to the more diversified energy mix that the Integrated Resource Plan envisages.

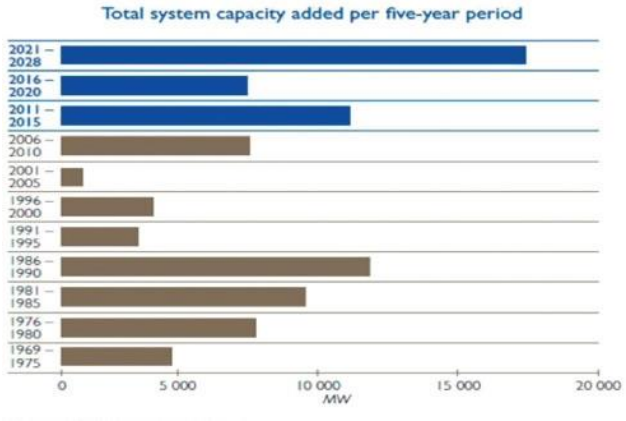

Figure 2

Source: Eskom Annual Report

There have been numerous challenges to making the electricity market more competitive by introducing more IPPs. The key challenge in attracting more IPPs has been the low return on assets that is achieved on electricity production as a result if the electricity tariffs that are not truly cost-reflective. Steyn argues that a return on assets of at least 8% is required while the current return to Eskom is less than 4% (Steyn, 2003). It is thus imperative that Eskom be able to have higher tariffs approved that will enable not only it to improve its financial position but attract more private investment as this would make it economically feasible to enter this market. The entry of more IPPs will allow for the to be a more competitive market in the purchase of generated electricity, and the country can follow an open auction for electricity generated that is similar to that used in The United States of America (von der Fehr & Wolak, 2003). Hertzberg has also noted the advantage of creating more regional based electricity generation that can help lower the final costs paid by the end user. This can be particularly important in the South African case to support the special economic zones created to bring jobs closer to where people are (National Planning Commisision, 2011).

In allowing for a more efficient and competitive electricity market, it is important that the role of buying and selling generated electricity be separated from Eskom. This vertical integration of these roles allows Eskom to be both a participant as well as the regulator in the electricity generation market. This raises significant concerns that can see Eskom continuing the monopoly power it has currently in the generation market. It is important thus as Steyn argues that an open market be created with an organization that would be responsible for being the auctioneer in the market (Steyn, 2003). This can

allow for variable electricity prices in peak demand times that can create a positive incentive for industry and household to enhance their energy saving activities, and shift productive activities so that the country cannot have times when the peak demand exceeds the available supply. While there may be higher costs in the short term, as the high generation projects under construction are finalized this will result in increasingly lower costs as there will be greater supply and consumers are likely to shift to using less energy intensive techniques. This variable pricing technique has delivered significant benefits in countries like Brazil that have been able to reform their previous power challenges (Brown, 2002).

Finally the electricity generation capital projects in the country could be further enhanced by more concerted government efforts in diversifying the generation sources. Allowing for strong relations with Mozambique to be able to mine the natural gas reserves the country has can be able to generate substantially more power. In addition to this, stronger political will in the Grand Inga in collaboration with the DRC can help to add significant hydroelectric power to the country if fast tracked. In addition to the above, the introduction of private management deals of this project can help prevent the maintenance backlog currently experienced by Eskom's power stations and introduce an additional carbon neutral source that can increase the generation energy sources. Further projects in politically stable countries like Namibia should be focused with greater emphasis on adding an additional nuclear power station that can secure more energy, utilizing some of the experience that has made Koeberg have some of the highest safety records in the world in nuclear energy (National Planning Commisision, 2011).

2.2 Enhancing electricity transmission

In South Africa, the infrastructure for transmission is owned and operated by Eskom and this function is part of its vertically integrated services. Like its other functions, this national grid has suffered from under investment that has resulted in a maintenance backlog (National Treasury, 2013). The electricity sector reform proposed by this report would like to see an independent agency that provides this national grid network, which can then price this part of the production according to a cost reflective cost. The license to operate the grade could be set up as a contestable market, with a provider that has a fixed term contract for its operation and maintenance. There would need to be some capacity improvement as a result of the variable pricing mechanism, this has proven successful in the Brazilian case (Brown, 2002).

2.3 Tackling Municipal Distribution Challenges

In South Africa, the distribution function is shared between Eskom and municipalities . Eskom distributes electricity straight to the key industrial clients that use 55% of the energy and are mostly well organized in the powerful lobby group, Energy Intensive User Group (Eskom , 2012). The rest of the electricity is sold by Eskom to municipalities who subsequently act as retailers to residential consumers and the rest of the commercial sector. While most of the distribution system suffers from underinvestment in the maintenance of the power lines, a key bottleneck exists in the distribution by municipalities. The municipalities will be the focus of this analysis.

For municipalities, the distribution and retail of electricity to end users represents the largest source of their revenue (60%) (Barnard, 2010). They own and operate the power lines and infrastructure in providing electricity and this represents a source of revenue that is highly enforceable as they can switch off the electricity supply in the case of non-payment. In addition to this, the municipalities have significant power to price electricity because while the price increases have to be approved by NERSA, they tend to use distribution revenue to finance other projects and misreport electricity distribution costs, allowing them to increase their revenue from this. The effect of this have been very high reported mark-ups from true costs charged by municipalities as high as 117% as reported in some media sources (Marais, 2013). In addition to this, for end users the distribution costs tend to be a very high percentage of the total costs that they end up paying (Marais, 2013). It is because of this reason thus that the NDP has sought to ring fence the distribution function of the major municipalities as they have the greatest impact on the high costs that commercial enterprises as well as residential consumers end up paying (National Planning Commisision, 2011).

This is the greatest key bottleneck that can help smooth the electricity price increases. This has the problem of heightening the ability of especially small manufacturing and small businesses to grow that are in different provinces, including the special development zones. The regulator, NERSA has been unable to successfully regulate the activities of the municipalities and indeed it is an advantage to have regional geographically dispersed distributors to deal with area specific challenges (Steyn, 2003). A solution to this problem is to introduce region based distributors that can act as distributors for a fixed term contract. Their role would be to conduct maintenance of the network, while they should then mark-ups that are lower and are closely regulated. Indeed, this has worked in the Asian Pacific countries, and these enterprises are able cost reflective fees, and would help to effectively ring fence their activity (Herber, 2012). It is critical that an intervention is placed here, as this hampers the growth of many labour intensive businesses as well as small businesses while placing a significant burden on household which could have adverse inflationary effects (Pan-African Investment and Research Services, 2011).

Compensating poor households through preferential rates

The provision of preferential electricity rates for poor households is currently funded through a cross subsidization mechanism from high income households and business to the poor households .34.6% of the households in South Africa have benefitted from preferential electricity tariffs for their use (Jordaan, 2010). Jordaan has argued that households in the lowest 3 deciles spend a greater proportion of their income on electricity prices compared to the rich households (Jordaan, 2010). In addition to this, most of the job losses as a result of the electricity increase are likely to be in low to medium skills, which the poor households provide (Pan-African Investment and Research Services, 2011). Thus they are severely negatively affected by the electricity price increases. This strong welfare effect presents a strong in In addition to this, the rich households have a more inelastic demand for electricity than the poorer households (Jordaan, 2010).This essay shall argue that preferential rates should be given to a smaller proportion of households, reflected through a tariff subsidization.

It is important to note however, that the cost of electricity should be fully cost reflective for all consumers to have the desired effect on consumers. The country may look at providing preferential tariffs for a smaller percentage than the 35% of households in the country (Jordaan, 2010). This would help ease the pressure on the commercial sector that would have been doubly disadvantaged by the high mark-ups that municipalities charge for power. While rich households have an inelastic demand for electricity, there are negative growth effects for the corporations when their electricity prices decline (Pan-African Investment and Research Services, 2011). This is exceptionally the case for labour intensive businesses that are highly vulnerable to electricity price increases. Jordaan finds that there is a greater costs to households when this is financed through the fiscas than tariffs increases as a result of the multiplier effect of taxes (Jordaan, 2010). This is especially true as many households and industries will suffer from higher carbon taxes and thus it will be best for electricity prices on aggregate to be fully cost reflective.

Supporting industries in pursuit of Vision 2030

The increases in the electricity costs to a more sustainable electricity market will have significant effects on a number of South African sectors. The effect of this could be a significant decline in GDP and loss in employment. It is important that the country supports those sectors that are most severely affected especially in terms of lost employment, are energy intensive and for those whose industries are most critical to meeting the nation objectives as outlined in eth NDP. It is with this in mind that this essays proposes support to the labour intensive manufacturing and transport and communication sectors.

The transport and communication sector comprises of the ICT industries, public rail and road transport as well as private transport and is a strong contributor to GDP. This public transport infrastructure has received large budget transfers, especially for rail and contributes to the vision of greater public transport that would allow the country to decrease its carbon footprint (National Treasury, 2013). The ICT sector would also allow for the technological advancement of more South Africans and contribute to the goal of providing universal broadband access by 2030. In addition to this, this industry is energy intensive and would be adversely affected by the electricity price increases decreasing employment (Pan-African Investment and Research Services, 2011). Pan African Research also finds that there would be significant job losses if this industry is not supported. It is important though that this support includes structural and financial incentives to move towards choosing an input mix that is less energy intensive in the medium term.

The manufacturing sector includes various activities that differ in their labour intensity as well as energy intensity. Collectively though, manufacturing represents a great percentage contributor to the national output and is a key contributor to exports in the country as well as employment. The effects of the electricity price increase will thus be significant in this industry and it is important that it is supported as most jobs that would be lost would those from the poorest households who provide low to medium skill labour. In addition to this, this sector that can greatly enhance the ability to absorb a large unemployed youth that would help solve some of South Africa's most pressing development needs. It is thus important that it gets support in adjusting towards decreasing their energy intensity, and getting more gradual tariff increases. Manufacturing activity tends to be more evenly spread across the special economic development zones and can thus help, lessen the pace if urbanization into the major cities.

Conclusion

The importance of substantial reform in the South African power sector cannot be understated as it can bring significant gains to the economy. Critically important in this is a reform towards a more competitive environment especially in power generation and distribution that will allow for additional capacity and smoothing the price increases from the build programme. South Africa must pursue more renewable energy projects in SADC countries and must raise prices to allow IPPs to play a significant role. Equally important is to form regional distribution networks, operated by private enterprise under deliberate regulation. The country should shield the poorest households from the increases and ensure that labour intensive industries like manufacturing are supported in the transition to cost reflective prices. This will allow the country to secure a stable electricity supply and maintain its place as a financial gateway to the African continent.

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