4th Annual Competition and Economic Development (ACER) Conference

Johannesburg, South Africa, 19-20 July

Asleep with the lights on:

Missed opportunities and the need to restructure the electricity supply industry[1]

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JEL Classification: Q42, Q48

Abstract

Consensus is growing that change in the South African electricity landscape is needed. The global trends supporting these sentiments include the growing prevalence of renewable energy in the energy mix, the need for competitive electricity supply industries, and the changing role of power utilities. These factors, along with Eskom's poor financial performance, continuous applications for tariff increases, and Eskom's role in the delays that IPPs have encountered, have put Eskom at the centre of debates on the restructuring of the electricity supply industry.

The pace of transformation of the electricity supply industry in South Africa has been slow relative to other countries. Renewable energy still makes up a small proportion of the energy mix despite South Africa having developed an IPP programme that received worldwide praise. Eskom remains vertically integrated and dominates the generation space with ageing plants that rely on what used to be cheap coal, and overpriced new-builds, a combination that has resulted in significant tariff increases.

The electricity supply industry and Eskom have missed out on opportunities to transform, opportunities that may have benefitted customers and Eskom itself. These opportunities include the introduction of competition, changing the Eskom business model and Eskom entering the renewable energy generation space more aggressively.

This paper will consider the current difficulties facing Eskom as well as opportunities missed within the South African electricity supply industry. From this this we draw some important lessons for South African electricity supply industry going forward.

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1. Introduction

Over the years, many electricity supply industries (ESIs) around the world have gone through some version of reform. Electricity utilities in some countries have also had to change the way that they are structured as well as how they operate. Traditionally, utilities operated as vertically integrated monopolies (or had very little competition) and generally built large power stations that ran on fossil fuels or nuclear energy. However, the growth of renewable energy and the manner in which renewable energy projects are undertaken has had a pronounced impact on the traditional utility business model.

The rapidly declining prices of renewable energy options and a push towards reducing emissions have made renewable energy increasingly attractive. This has also lead to a decline in the need for large, complex, and costly power stations that are traditionally built by utilities.

The trends in the sector have resulted in questions around the sustainability of ESIs in their traditional structure and the role of utilities in the near future. Specifically, how utilities should function in order to remain financially sustainable in a restructured ESI. Some utilities have reacted to the changes in their environments and have looked to change the way they operate. In this way they have managed to not only stop the decline in profits but also expand their operations and diversify their generation portfolios to remain profitable in the future. However, some utilities have been slow to deal with the changes in the electricity sector and have experienced significant reductions in their market values and incurred substantial asset impairments on their coal-fired and nuclear stations as the returns for these stations decline under pressure from cheaper alternatives.

Eskom falls under the category of utilities that have not adapted to the changes in the global electricity sector and the local ESI and is considered to have failed to deal timeously with the issue of renewable energy (Buckley and Nicholas, 2017). Eskom's limited involvement in renewable energy generation and stagnation in its business model, and structure has left it in a position where renewable energy has become a threat as opposed to an opportunity to allow Eskom to expand as well as ensure its sustainability in the long run. In addition, Eskom faces a number of challenges which have left it in a financially precarious position. This has had knock on effects on the performance of the South African ESI overall.

We begin by discussing international experience of ESI reform and reaction to renewable energy. We then identify the factors underlying Eskom's difficulties and the underperformance of the ESI in South Africa. In doing so we identify some of the opportunities that were missed by government and Eskom over the last 20 or so years and consider lessons we can take on board in thinking about South Africa's ESI going forward.

2. International experiences of ESI reform and utility transformation

2.1. ESI Reform

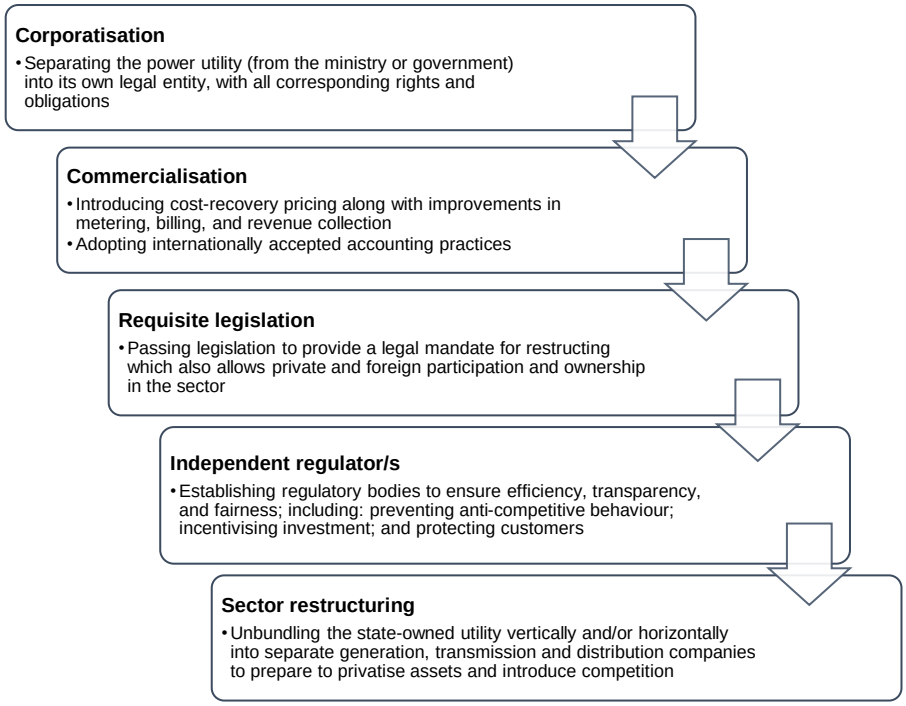
For decades, electricity supplies industries around the world have had their structures changed in order to achieve various objectives or resolve challenges affecting the ESIs they operate in. Almost all the countries that have undergone reform moved away from an ESI with a dominant (sometimes a monopolistic), vertically integrated utility supplying power. Each country that underwent reforms of this manner re-shaped its ESI and sometimes its utility to address the specific challenges that it was facing. Thus, not all reform processes were conducted in the same manner or for the same reasons. There are however a number

common reasons why reforms would be implemented and they are typical linked to policy objectives for the energy sector as identified by the International National Agency (2000:37) which include:

- Economic efficiency;
- Security of supply;
- Environmental performance;
- Social objectives (such as universal access).

A "standard" model of reform was proposed as the roadmap of steps that could be taken by governments with regards to policy as well as utilities in order to achieve the objectives of the ESI in a country.

Figure 1: Standard model of electricity sector reform



Source: Adapted from Gratwick, K. N. and Eberhard, A., 2008, Demise of the standard model for power sector reform and the emergence of hybrid power markets, Energy Policy, Volume 36, Issue 10 October 2008, pages 39-52. Also see Bacon (1999), Adamantiades et al. (1995), Jones (2006) and Williams and Ghanadan (2006).

Obviously not all countries have implemented their reforms as prescribed by the model. This was largely due to the need for more customised approaches that would be appropriate for country-specific challenges and objectives. The result was that some countries followed all the steps while others implemented hybrid models that had characteristics of an ESI reformed according to the standard model but also retained aspects of the traditional ESI configuration.

Table 1: Reforms in selected countries

Country	Reform drivers	Reforms
Brazil (First wave)	- The financial crisis led to a slowdown in the rate of growth of the capacity expansion but consumption increased. - Electricity companies were poorly managed as there was a lack of incentive for the efficient production. - Tariff regime allowed government to set tariffs to control inflation. At times this meant companies would not be compensated for costs they had incurred	- Introduction of a price-cap tariff system which allowed utilities to reap efficiency gains as profits. - Privatisation, mainly focused on the distribution segment of the ESI. By 1999, private companies accounted for 62% of distribution. - Introduction of IPPs in 1995. Creation of an autonomous regulatory body (ANEEL) in 1996. - Provision allowing large consumers of electricity (greater than 10MW) to purchase electricity from the supplier of their own choosing.
Brazil (Second wave)	- Stalled capacity expansion by government and private sector. - Need to revert to a more centralised institutional design. - Need for publicly-owned utilities to be relevant again to ensure sufficient capacity is added to the ESI.	- Power pool created with contracts that would be entered into by generators and distributors. This allowed certainty and economic feasibility for new projects. - Non-regulated residual market to create balance in case distribution companies underestimate demand forecasts. - Ministry of Mines and Energy to calculate the capacity going through the pool and identify projects to take priority in the pool.
China	- Inefficiencies of state-owned monopoly power utility. - Insufficient investment in capacity by state-owned utility.	- Opening of the market to IPPs. - Founding of State Power Corporation (SPC) to compete in generation but also responsible for planning, construction, monitoring and management of the network and the grid. - Unbundling of SPC into 2 grid companies and 5 generation companies.
Kenya	- Inadequate electricity supply. Including low access and coverage. - Need to diversity energy mix. Kenya relied heavily on hydropower. - High electricity prices.	- Introduction of competition through IPPs. - Establishment of the Electricity Regulatory Board, later replaced by the Energy Regulatory Commission. - Unbundling resulting in the establishment of separate state-owned entities for generation (KenGen), transmission and distribution (KPLC). KenGen and KPLC partially privatised.

Source: Teljeur, E., Sheik Dasarath, F., Kolobe, T., Da Costa, D. (2016) Electricity Supply Industry Restructuring: Options for the Organisation of Government Assets. A report prepared by Genesis Analytics on behalf of BLSA and TIPS.

2.2. Utilities' responses to renewable energy

Utilities have also had to change in order to deal with the effects of renewable energy on their business models. The cost of renewable energy has been declining rapidly and the outcome has been that some renewable energy projects now deliver electricity at the same or lower prices than large coal-fired and nuclear power stations that have long been the preserve of traditional power utilities. In addition, renewable energy also addresses environmental sustainability issues that have been a constant challenge for fossil fuel power stations.

The Institute for Energy Economic and Financial Analysis ("IEEFA") looked at the impact of renewable energy on the role and business models of power utilities using case studies from 11 utilities around the world (Buckley and Nicholas, 2017).

The growth in the prevalence of renewable energy has affected utilities as they now have to compete with lower priced renewables using large, complex, inflexible and often ageing fleets. What has however become apparent is that utilities can choose to adapt to these changes or remain rooted in their traditional business model. Utilities that adapt have been found to have the opportunity to expand and diversify their portfolios locally and in other countries, whereas those who do not are likely to experience declining market shares as well as falling revenues (S&P Global Rating, 2017).

The IEEFA case study discusses the results achieved by utilities that adapted to the advent of renewables and those that did not. The study found that the underperforming utilities in the study had suffered a combined reduction in market capitalisation of US$185 billion between 2007 and 2016, translating to a 67% loss in market share (Buckley and Nicholas, 2017:6). Many of the underperforming utilities have also incurred billions in asset impairments as coal-fired and nuclear plants either failed to realise their required revenue as market prices fell or were decommissioned (Buckley and Nicholas, 2017:5-16).

In contrast, other utilities had fared far better. Italian utility Enel SpA was one of the first to make changes to its operations investing heavily in renewable energy and implementing measures to reduce its fossil fuel generating capacity by 39% by 2019. Enel has shown healthy profits and even outperformed the Italian FTSE MIB Index over the last 10 years (Buckley and Nicholas, 2017:11).[4] In Germany, RWE and E.ON SE also responded to changes by creating businesses that would specialise in renewable energy. Both entities have seen recoveries in profitability thanks to their renewable energy businesses following years of losses and asset impairments of their fossil fuel generation assets. In addition E.ON has also established a trading division as it looks to leverage its position in European renewable energy market (Buckley and Nicholas, 2017:16).

[4] The Italian FTSE MIB Index measures the performance of 40 Italian equities and is the primary benchmark Index for the Italian equity markets, capturing approximately 80% of the domestic market capitalisation.

Table 2: Summary findings of case studies

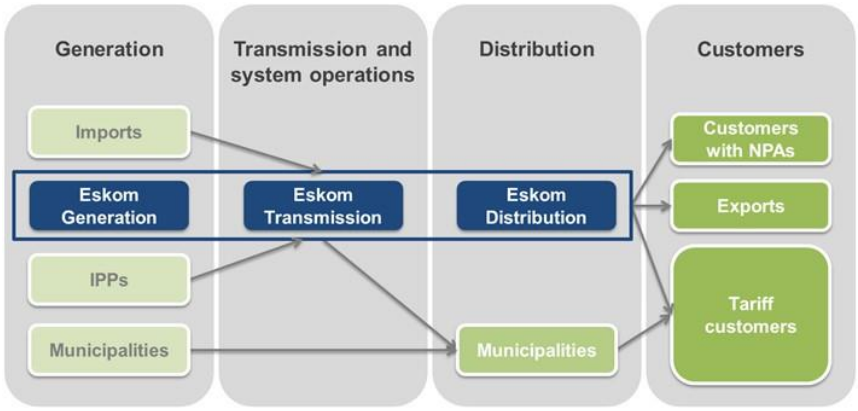
Utility	Category	Description
Enel (Italy)	Renewable energy leaders	Half of capacity is renewables. Targeting full decarbonisation
NextEra (USA)		North America's largest wind generator
Engie (France)	Belated transition underway	Hobbled y debt
RWE (Germany)		Declining revenues for 5 years
E.ON (Germany)		Imperilled nuclear capacity
AGL (Australia)		Coal capacity still supported through energy policy uncertainty
NTPC (India)		Coal capacity still supported electricity demand growth
CEIC (China)		Merger to cut reliance on coal
NRG (USA)	Laggards not modernising	Failure to act on technological disruption
TEPCO (Japan)		Nuclear capacity offline and dependent on thermal power
Eskom (South Africa)		Failure to recognise technological disruption

Source: Buckley, T and Nicholas, S., 2017, Global electricity utilities in transition: Leaders and laggards, 11 case studies, Institute for Energy Economic and Financial Analysis, page 3.

3. South Africa's ESI and Eskom

Eskom generates the majority of South Africa's electricity and owns 92% of generation capacity in South Africa. The rest of the generation is accounted for by imports, independent power producers (IPPs) and municipalities. In addition, Eskom has a monopoly over transmission and provides approximately 60% of distribution, with municipalities accounting for 40% of distribution (Trollip, 2018: 7).

Figure 2: Structure of the South African electricity sector



Source: Teljeur, E., Sheik Dasarath, F., Kolobe, T., Da Costa, D. (2016) Electricity Supply Industry Restructuring: Options for the Organisation of Government Assets. A report prepared by Genesis Analytics on behalf of BLSA and TIPS.

Despite several policy documents that have been drawn up that speak to reforms of the ESI, the ESI still remains in the traditional structure of a single buyer and dominated by vertically integrated utility across the value chain from generation to distribution.

The Eskom generation mix is still heavily in favour of coal, and coal-fired stations represented over 82% of its generation capacity in 2017 (Eskom, 2017:5). In addition to the current capacity, Eskom is still in the process of completing the construction of its Medupi and Kusile plants, with some units at these power stations still yet to come online.

Table 3: Eskom generation mix

Primary energy	Percentage of energy mix
Coal	82.5%
Pumped storage	6.2%
Gas-fired	5.5%
Nuclear	4.2%
Hydro	1.4%
Wind	0.2%

Source: Eskom annual integrated report, 31 March 2017, page 5.

Over the years, Eskom and the South African ESI have faced a number of challenges as a result of Eskom's management as well as the responses to changes by government who is the sole shareholder of Eskom. From 2008, South Africa started experiencing rolling blackouts as some of Eskom's generating capacity became unavailable. This situation was triggered by a number of causes, including:

- Delays in the decisions to build additional capacity despite warnings in the White Paper as well as from Eskom that additional capacity would be required;
- Delays in the construction of Medupi and Kusile which have had significant cost implications;
- Eskom's strained financial position;
- Poorly maintained and ageing coal plants.

Although load shedding was eventually brought under control largely through demand side measures, an intensive maintenance programme and the completion of some units of the Medupi and Kusile plants, Eskom still finds itself dealing with other challenges that came to light following the start of load shedding in 2008.

3.1. Eskom's difficulties

Eskom's deteriorating financial performance and operational challenges have snowballed and have led to concerns over its ability to keep the lights on including whether it can honour its financial commitments as well as fears that the utility may be facing a so-called utility death spiral.[5] Some the causes of the difficulties Eskom is facing are discussed below.

Increased primary energy costs

Eskom's electricity prices increased 350% in real terms from 2007 to 2017 (Steyn, Burton and Steenkamp, 2017:6). The price increases have been partly as a result of increased spending on primary energy. Firstly, there were costs that were associated with load shedding as well as billions of Rands spent on diesel required to run open cycle gas turbines when load factors were higher than expected. In the 2013/14 and 2014/15 financial years, Eskom spent over

[5] In February 2018, Eskom had to secure a R5 billion loan from the Government Employees Pension Fund in order to cover its expenses for February.

A utility death spiral is a cycle where a utility loses customers and has to recover its costs from a smaller customer base by charging them higher prices. The higher prices cause some customers to switch to alternatives, requiring the utility to increase prices further.

R20 billion on diesel. In FY 2014/15, Eskom spent R9.5 billion on diesel although it had only budgeted R6 billion (Eskom, 2015:54).

Secondly, Eskom experienced substantial increases in their coal costs. It is estimated that Eskom's average cost of coal almost doubled from the 2010 financial year to the 2017 financial year, increasing from R200 per ton to R393 per ton (Steyn, Burton and Steenkamp, 2017:6). Given that over 80% of Eskom generation capacity is coal based, this had a significant impact on costs, requiring prices to increase.

Capital expenditure

Eskom has had to apply for tariff increases to cover its increasing capital expenditure. According to Eskom's annual financial statements, in FY 2016/17 alone, capital expenditure amounted to about R66.5 billion, or 38% of Eskom's group revenue (Eskom, 2017:71). The Kusile and Medupi plants have contributed significantly to these costs as they have experienced continued delays as well as cost overruns. Although work began on Medupi in 2007 and on Kusile in 2008, both stations are still not completed. When construction began, it was estimated that the first unit at Medupi would come online in January 2010 but this only happened in August 2015. Kusile's first unit was brought into full commercial operation in August 2017, 9 years after construction began (Eskom:2017). This has seen Eskom have to raise additional funds in order to continue with construction.

Dampened demand and sales

The utility's revenues have been adversely affected by slowing economic growth, municipal debt and to a lesser extent (although still notable), customers switching to alternative sources of supply such as small-scale embedded generation. The global economic downturn affected economic growth locally. From 2009 onwards (where South Africa had a 1.4% fall in GDP), GDP growth in South Africa has followed a downward trend, with growth only exceeding 3% once between 2009 and 2017 (SARB). Over the last 10 years Eskom's sales showed an increasing trend from 2009 to 2012 but then showed a declining trend for the last 5 years. This affected Eskom's sales as many businesses scales back on production while in some cases, some businesses closed down.

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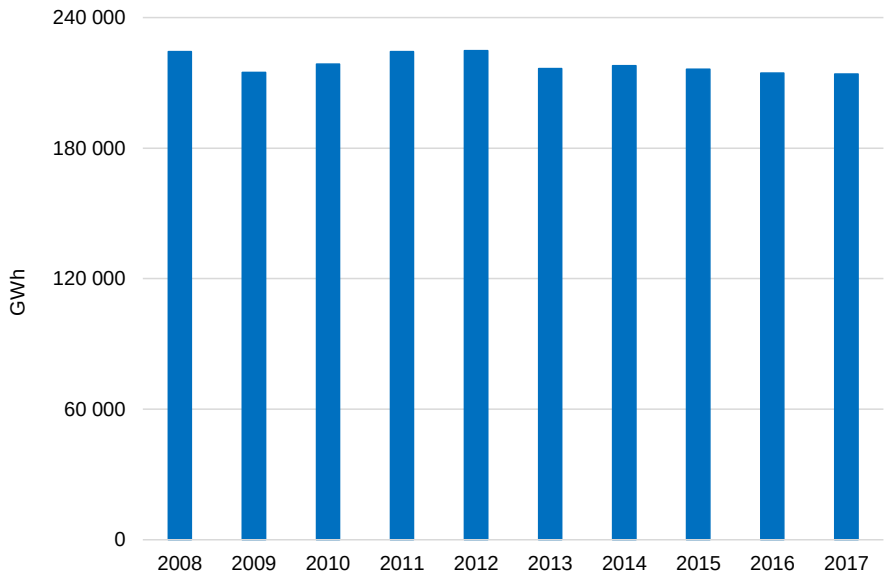
Figure 3: Eskom electricity sales by financial years (GWh)



Source: Eskom integrated reports 2009-2017.

Declining sales meant that Eskom has to apply for higher tariffs in order to reach their required revenue to cover their annual costs, driving prices higher.

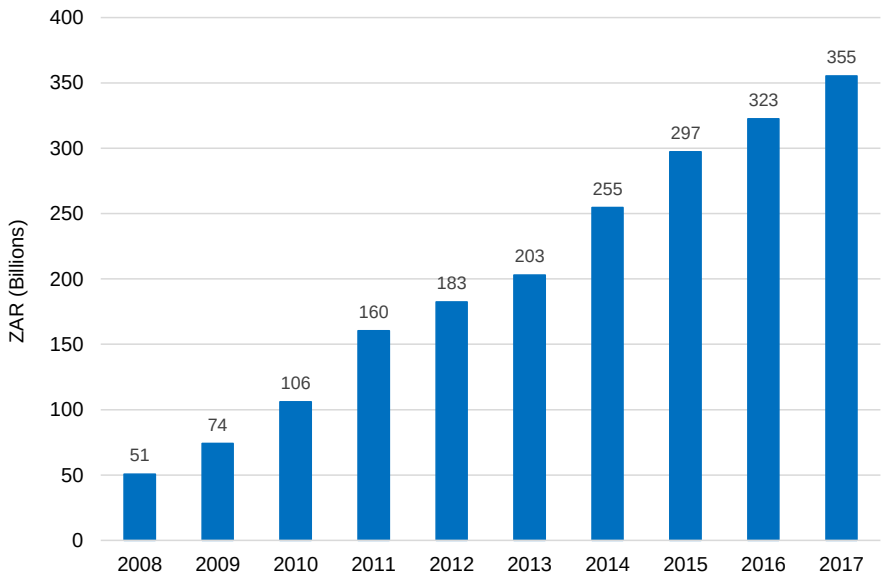
As mentioned, revenues have also been affected by municipal debt. In its 2017 integrated report, Eskom reported that municipal debt stood at R9.4 billion (Eskom, 2017:9). Early this year, Eskom reported that municipal debt had further increased to R13.5 billion, about 7.5% of group revenue for FY2016/17 (Omarjee, 2018).

Eskom debt

Eskom's debt has continued to grow in a difficult operating environment. Based in its interim financial statements, as at 30 September 2017, Eskom was carrying debt amounting to at over R350 billion (Eskom, 2017:4).[6] This debt has been increasing as Eskom has had to go to the market to raise funds. Eskom's annual financial statements show that long-term debt securities and borrowings have grown by 716% from about R41 billion in FY2007/08 to R336 billion in FY2016/17.

[6] In this instance, debt is a combination of current and non-current debt securities and borrowings.

Figure 4: Eskom current and non-current debt securities and borrowings by financial years (2008-2017)



Source: Eskom integrated reports, 2008 to 2017

Eskom's increasing debt has two notable implications. Firstly, as the debt grows, so too does the amount that Eskom has to pay in interest annually. Based on its integrated report, Eskom paid R28.8 billion in interest in FY 2016/17 (Eskom, 2017:9). This requires that Eskom either increases its revenue or diverts funds from other areas to service the debt so that no covenants are broken. Secondly, as Eskom's financial position weakens, it is perceived as a riskier borrower to creditors. The increase in negative sentiment around Eskom's financial standing is reflected *in part* in the credit ratings Eskom receives. In January 2018, both Moody's and Fitch downgraded Eskom. Both credit ratings agencies cited Eskom's deteriorating liquidity and uncertainty around its ability to honour its short-term financial commitments as the main drivers. Such downgrades increase Eskom's cost of borrowing on any debt that it will take on in coming years.

Effect of renewable energy

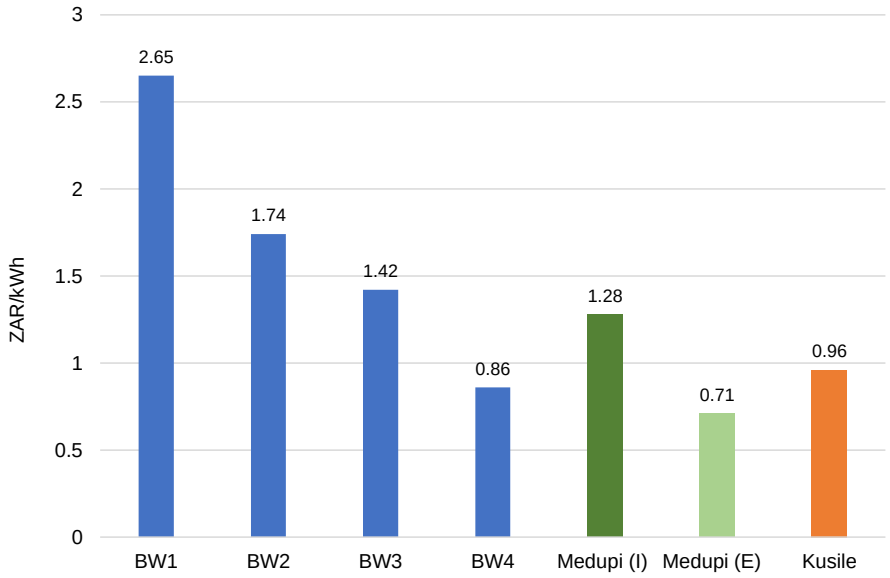
The introduction and spreading of renewable energy in South Africa has also had an impact on Eskom. Globally, the addition of renewable capacity has outpaced the growth in fossil fuel capacity. In 2016, renewable energy capacity saw its biggest annual increase with the addition of an estimated 161 GW of capacity, which represented an estimated 62% of net capacity additions worldwide. At the end of 2016, installed renewable energy capacity was sufficient to supply 24.5% of global electricity demand (REN21, 2017:33).

The driving force behind the uptake of renewable energy is the rapidly declining cost of renewables and their prices relative to fossil fuel alternatives. This trend has been evident in many instances. For example in Chile, some of the largest electricity companies in the country such as AES Gener and Colbún saw their share prices fall after they lost out on 20-year

contracts to competing generators including a solar power scheme that bid record prices below the prices of fossil fuels (Clark, 2017).

Locally, the REIPPP has provided a transparent view of falling renewable energy prices in South Africa. From bid window 1 to bid window 4, the average portfolio cost for all renewables has declined by 68% from R2.65 per kWh to R0.86 per kWh. The price of some technologies has fallen by as much as 75% per kWh over the 4 bid windows (Independent Power Producers Procurement Programme, 2017:19). These decreases in cost make it likely that IPPs in the subsequent bid windows will compete with or be cheaper than the coal-based electricity from Eskom.

Figure 5: REIPPPP estimated price trends



Source: Independent Power Producers Procurement Programme (IPPPP), An overview as at 30 June 2017, page 19.

Notes: Prices are contracted prices expressed in April 2017 terms. Contracted prices (at which power is sold to Eskom) price per IPP was weighted with consideration of the technologies and their relative projected annual energy contribution.

Medupi (I) refers to the industry estimate of the cost per kWh while Medupi (E) is the estimate given by Eskom.

Projects from bid windows 1 to 3 have begun commercial operation. The Nation Energy Regulator of South Africa (Nersa) found that the projects from these bid windows had produced 3 761 GWh in the first half of 2017, at a cost of about R7.6 billion (NERSA, 2017:15). The average price per kWh for bid window 3 PV was about a third of the bid window 1 price while the price of wind energy more than halved from bid window 1 to bid window 3.

Table 4: Average prices of RE IPP projects per BW in the first half of 2017 (ZAR/kWh)

Source	PV	Wind	CSP
BW1	3.686	1.607	3.832
BW2	2.476	1.359	3.680
BW3	1.270	0.727	N/A

Source: NERSA, Monitoring renewable energy performance of power plants, Progress in the first half of 2017, Issue 10 September 2017, page 15.

The introduction of renewables has reduced utilisation at some of Eskom's generation plants (to some degree). As a result of the price differential, some customers have also opted to source electricity from suppliers other than Eskom or look to use small scale embedded generation. This has served to further erode Eskom's revenues as Eskom customers opt to no longer be supplied by the utility. Also, as a result, Eskom has to recover its costs from a decreasing customer base, meaning that Eskom has to charge a higher price in a period to earn the same revenue as it did in the previous period.

Although renewables are still only as small proportion of generation capacity, it is likely that there will be pressure to add more renewables to the energy mix as their costs continue to fall.

4. Missed and future opportunities

Along the somewhat troubled path that our energy sector has taken, there would seem to have been a number of missed opportunities along the way – this is true for policy makers and Eskom. It is important to recognise this because, as it turns out, although they may have been *missed* opportunities, they are not necessarily opportunities that are completely *lost,* and scope still exists to make adjustments and set our energy sector on a solid trajectory.

We highlight below two broad categories of such opportunities: the embracing of renewable energy and the restructuring the ESI.

4.1. Embracing renewable energy

It is probably fair to say that the South African ESI and Eskom (in particular) have not fully embraced the prospects of renewable energy. Although Eskom may have initially flirted with the idea of being involved in renewable energy with its Sere wind farm as well as its plans to build a concentrating solar power plant near Upington, it has not aggresively pursued being involved in renewables at a scale that fundamentally shifts its focus in electricity generation relative to utilities that are benefitting from the introduction of renewables. Rather there seems to have been a strong preference within Eskom and parts of government for coal and nuclear technology.

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I think at some point they also had a planned solar park which never went ahead – should check and include detail – even if in a footnote.

Apart from not pursuing renewable technology itself, there is also a strong view that Eskom has actually played a role in stalling the penetration of renewable energy in South Africa. Eskom may well have had some incentive to do so as the single buyer of electricity in the ESI that is also active electricity generation. Renewable energy may also also crowd out the need for other technology such as nuclear which seemed favoured and was included in the draft IRP 2016 document that was published for public consultation. Most recently this culminated in delays in Eskom signing PPAs for winning bidders (Creamer, 2017).

Furthermore, the selected approach to the most recent coal plant builds at Medupi and Kusile may also have had an impact in dampening Eskom's participation in renewable energy generation. At the time when construction started at these sites there may have been an opportunity for Eskom to invest in staggered capacity additions. This approach would have given some flexibility to respond to changes in demand predictions, as well as allow for the supplementation of capacity with renewable capacity as these technology costs declined over time. A staggered approach may have limited some of the risk associated with cost over runs on large, complex coal powered stations and the changing primary energy costs.

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We need to reference this to something.

Despite these events that we term missed opportunities, the conditions for renewables in South Africa are now more favourable than they have ever been. Furthermore, there is also increasing consensus that the cost and economics of renewable energy are now more acceptable, as witnessed by the prices achieved in the latest bid windows of the REIPPPP. It is also expected that these costs will decline further in subsequent bid windows. Thus, renewable energy may create opportunities for Eskom to remedy some of the challenges that it faces as it has for some utilities in other countries. Below we discuss some possible options, supported by international experience.

Eskom should be more aggressively involved in renewables

As the cost of renewable energy declines relative to other technologies, it should make up a larger proportion of the energy mix. Indeed, this may have been the outcome of the latest IRP draft document were it not for the cap that was imposed on renewable capacity. In addition, renewable energy capacity need not be left to IPPs only. Eskom can also add renewables capacity. Eskom need not compete in the REIPPPP but rather replace some planned coal or nuclear capacity additions with renewable energy capacity. Below we discuss some examples of utilities that chose to invest in renewables and profited from this despite making losses in their traditional generation businesses.

Enel is Europe's largest power company by market capitalisation. It invested heavily in renewable energy, making it central to its business model and aims to reach 46 GW of renewables generating capacity by 2019. Enel has been impressively profitable and in FY 2017 recorded a gross margin increase of 233 million Euros in their renewables business (Enel, 2017:45). Enel has also indicated its intentions to reduced its coal-fired capacity and plans to close all coal-fired generation by 2030 (Buckley and Nicholas, 2017:11).

RWE is German company that was one of the largest German companies. However, following implementation of Germany's policy to transition towards more renewables in the generation mix, RWE found itself in a difficult position. The fall in energy market prices lead to the write-downs of generation assets. RWE shut down 12 GW of capacity between 2012 and 2017 and incurred €4.3 billion in asset impairments in 2016, mainly to its conventional power plants (Buckley and Nicholas, 2017:13). RWE also saw significant declines in EBITDA for its lignite, nuclear, hard coal and gas operations (Buckley and Nicholas, 2017:14). In reaction, RWE created a subsidiary called Innogy that generates electricity from renewable sources and offers services including storage technologies and energy efficiency. Innogy has proven to be a profitable venture for RWE and managed to increase its market value to double that of RWE (Buckley and Nicholas, 2017:14).

E.ON SE, once Germany's biggest utility, is another German company that was adversely affected by Germany's move to increase renewables in its energy mix. In 2016, E.ON reported

a net loss of €16 billion (Buckley and Nicholas, 2017:15). In 2016 E.ON decided to spin off its coal, gas and hydro assets into another company, Uniper, and focus on renewable energy. E.ON has seen some success from its focus on renewable energy and is looking to expand in the renewable energy space (E.ON, 2017:60). This has been reinforced by E.ON's plans to purchase RWE's Innogy business in a deal worth €43 billion (Massoudi and Buck, 2018).

The examples above illustrate that utilities that embrace the transition to renewable energy can remain financially sustainable even as conventional technologies become less profitable over time. Although Eskom itself may have not been able to participate in the REIPPPP, it could as a utility, invest in acquiring skills and adding capacity via renewable energy. Eskom could start positioning itself to also invest in this technology and participate in its benefits. By building a mix of plants, Eskom can create a natural hedge against rising coal costs; benefit from the falling costs of renewables and position itself to be more sustainable in the longer term as the country shifts away from coal and other fossil fuel sources.

Eskom should look to extend its footprint

It is not uncommon for utilities to operate outside of countries of their origin. Enel is am Italian utility that has operations in Italy and throughout Europe, South and North America, Africa and Asia. In 2017, 26% of Enel's electricity sales were in South America (Enel, 2017:26). Similarly, RWE operates in Germany, the Netherlands, the United Kingdom, Central and South Eastern Europe as well as Trinidad and Tobago (RWE,2017), while E.ON has operations in 9 countries across Europe.

Besides supplying South African customers with electricity, Eskom also sells electricity to customers outside of South Africa. In FY 2017, Eskom sold 15 093 GWh of electricity to customers outside of South Africa, a 12% increase from FY 2016 (Eskom, 2017:51).

Eskom could look into the rest of the African continent to generate further revenues. Eskom has decades of experience in the construction and operation of coal-fired plants. This could give it a selling point in countries where there is a need to increase capacity, which includes coal-fired capacity. To the extent that relatively cheap coal is available in certain countries, coal-fired stations may still be a viable alternative. Eskom may also look to supply generation capacity as an IPP for coal-fired generation in these countries.

A further benefit of investing in renewables is that it may enable Eskom to more easily participate as a player in other energy sectors across Africa if it so wished to do so. Expertise in coal-powered generation may be less applicable in other contexts (compared to renewable technology) due to the need to have economical access to coal as an input, and for which South Africa is particularly well endowed. This would entail Eskom building its capacity in renewable energy. However, if Eskom were to begin building renewable energy plants in South Africa, its expertise could then be applied to the building of power stations in other countries where there is a demand. It should however be pointed out that Eskom has already lost out on much of the steep learning achieved by renewable energy companies in recent years. It remains to be seen whether Eskom would be able to make up this lost ground, although partnerships with certain of these specialist renewable firms could be attractive to gain the necessary expertise.

4.2. Restructuring of the ESI

Eskom is vertically integrated, playing the dominant role in generation, transmission and distribution. However, as early as 1998 it was recognised a restructuring of the industry and a more curtailed role for Eskom would optimal. The Energy White Paper of 1998 envisioned a number of changes to the ESI which, inter alia, included a restructuring of Eskom and a revision of Eskom's role in the industry.

Many of the same drivers for ESI reform internationally also played a role in shaping these structural reforms which have been posited in the past. These include unreliable and insufficient supply, rising costs of electricity, lack of access for the poor, the need to attract investment into the sector, concerns over Eskom's long term financial sustainability and environmental sustainability.

However, over the past two decades since the Energy White Paper, still no substantive structural change has been made to the ESI. Many of the suggested reforms from the Energy White Paper and other policies that involved the restructuring of Eskom and ESI have not been implemented.

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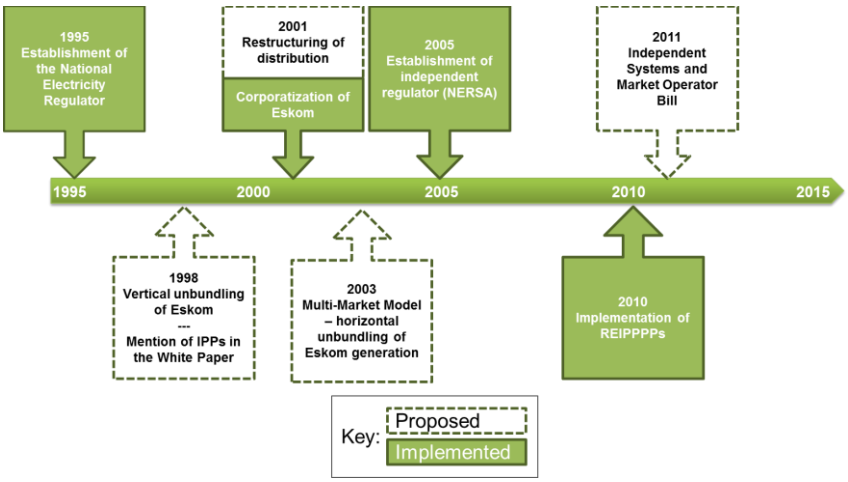
-I think it would be helpful to insert some/most of the write up from the tips paper on the suggested reforms and what happened. This will then culminate in the diagram below. I know it will add a page or so to the paper but (i) it is good research that adds value in explaining where we are today and (ii) some of that detail is needed to understand the diagram below
-Consider maybe putting in sub headings for this section. Maybe this first part can be a heading of "missed restructuring opportunities" and after the diagram can have a heading "the structure of the ESI looking forward" . Will help break it up

Figure 6: Implemented and planned reforms in the South African electricity sector



Source: Teljeur, E., Sheik Dasarath, F., Kolobe, T., Da Costa, D. (2016) Electricity Supply Industry Restructuring: Options for the Organisation of Government Assets. A report prepared by Genesis Analytics on behalf of BLSA and TIPS.

The same drivers that motivated the policy stance in the Energy White Paper are still present today offering a compelling reason for considering whether some form of restructuring of the sector is merited. Even more so, two further factors add weight to calls to once more revisit the restructuring debate:

- The first is Eskom's dire financial position. It is now apparent that things cannot simply continue as they have until now, and that without some form of intervention Eskom's operations will be unsustainable. In this regard certain experts have suggested that some form of restructuring could assist in easing financial situation at Eskom. This has included suggestions of Eskom selling off certain of its generation assets to third parties (Bischof-Niemz and Van Den Berg, 2017) and the decommissioning of certain

older power stations, as well as not proceeding with the completition of the remaining units at Kusile (Steyn, Burton and Steenkamp, 2017). Furthermore, any improved efficiency induced by a restructuring would not only benefit the final consumer but also Eskom's viability.

- The second factor that has added to the recent calls to revisit the restructuring debate has been Eskom's alleged role in stalling renewables by not signing PPAs from the REIPPPP bid window. Here, the thinking is that a restructuring could ensure a more level playing field and remove some of the conflict of interest that has the potential to arise with Eskom being the single buyer of renewable energy from IPPs.

As such, there would seem to be some justification in revisiting some of the suggestions made in the Energy White Paper regarding a restructuring of the sector. However, despite the theoretical benefits from restructuring it is also important to note that restructuring can potentially also carry with it other negative costs and there may well be "losers" from a restructuring process. Therefore, the nature and form of any restructuring is by no means a foregone conclusion. In engaging in this debate some key considerations and/or concerns which would need to be addressed, including the following:

- *The employment impact.* A restructuring of the industry that involves any early decommissioning of existing power plants will have some negative impact on employment (at least in the short term). As such, any related proposals can be expected to receive strong opposition from labour – as indeed has been borne out in recent experiences. The employment effect is a consideration that cannot, and should not, be merely brushed off.
- *Appetite for privatisation.* Whilst the notion of privatisation of Eskom is not mandatory outcome of a restructuring of the industry, it has certainly been implied by some of the proposals put forward by energy experts. Any restructuring proposal that involves the selling off of Eskom assets to third parties can also be expected to meet resistance from anti-privatisation lobby groups. Again, this is an important policy question which may, at the very least, impact the shape that a restructure of the ESI could take.
- *Impact on municipalities*. It is critical to understand how a restructuring of the industry would impact the financial viability of Eskom and the municipalities who currently undertake distribution. This could include any proposals of a consolidation of distribution responsibilities or the introduction of competition at the retail level and/or any increased abilities for IPPs to supply directly to large users in given municipality. In the past restructuring proposals that have had the potential to undermine the revenues municipalities could earn have been heavily opposed and largely unsuccessful (e.g. the notion of distribution being organised into REDs). Municipalities are an important component of South Africa's society and service delivery Therefore, the impact that any restructuring may have on their viability is an important consideration which will need to be taken into account.
- *Impact on Eskom*. Certain forms of restructuring could have the potential to side line Eskom – this could have negative implications for Eskom's financial position. For example, any strengthening of provisions for IPPs to supply directly to large customers (e.g. distributors or large users), whilst potentially good for efficiency and lowering of tariffs, may increase the financial pressure on Eskom. To be clear, this is not to say that only restructuring options that are positive for Eskom should be considered. However, given the importance of Eskom as an employer and given the amount of

capital that has already been invested in the entity, it is critical to at least understand and, where possible, mitigate any further negative impacts on the utility's financial position.

- *Impact on the tariff path*. Different structures for the ESI may well have an impact on the tariff path for the country. However, it would be naive to expect that a restructuring will dramatically and quickly reverse the rising electricity prices observed in the industry. The impact on the tariff path is more likely to be driven by the inducement of efficiency that a restructuring and competition can promise to bring to the sector. Therefore, it is important to gain a realistic expectation of how a restructuring process may impact the tariff path in South Africa.

Furthermore, it is also important to appreciate that multiple permutations of restructuring can exist – each with its own implications for benefits and costs to the ESI. Therefore, in our view, whilst it is appropriate to revisit the restructuring debate, it is important that further work is done to fully unpack the implications of each possible industry structure. A first step would need to be identification of the possible menu of restructuring options available to South Africa. A second step would then need to be to explore the effects (both positive and negative) that would flow from each structural permutation. At a minimum this should consider the impact of the restructuring option under consideration on the following elements:

- Eskom's financial position,
- Potential for competition in the industry,
- Efficiency of the ESI,
- Investment in the industry,
- Employment, and
- Revenues and financial sustainability of municipalities,

It should be recognised that the impact of restructuring on issues such as employment and anti-privatisation sentiment are genuine concerns that are likely to constrain some of the restructuring options in the immediate future. Given the strong vested interests linked to these concerns a degree of pragmatism will be needed. This may imply a restructuring (at least as a first step) which is less extreme than breaking up Eskom and selling off its generation assets. For example, an option may be a legal separation of Eskom's transmission and generation businesses into two separate subsidiaries of Eskom – each with autonomy in relation to operations, finances and corporate governance. This type of intervention could avoid much of the discomfort expressed by labour and anti-privatisation groups as it does not necessarily imply a closure of plants or a disposal of Eskom owned assets to a third party. At the same time this approach would still increase the business focus on each division and improve transparency and efficiency in the sector. The legal separation could also assist the transmission division which should be in a better position to raise capital given the healthier balance sheet and lower risks associated with that portion of the business. A similarly light-handed approach to improving efficiency in the ESI might be to strengthen provisions for IPPs to supply directly large customers such as distributors or even large industrial users.[7]

There are no doubt strong vested interests and trade-offs associated with a restructuring of ESI. As such the idea of restructuring is not an easy debate to have, but it is a debate that none the less needs to be had. In the medium to longer term it would seem apparent that

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[7] As noted earlier, the benefits here in terms of greater efficiency (and potentially lower tariffs) would need to be carefully weighed against any further negative impact this may have on the financial viability of Eskom.

some degree of restructuring of the industry will be required and that ultimately tough decisions may need to be made. The attractiveness of a further reformation of the ESI has been recognised for nearly two decades – but slow progress has been made largely because of the trade-offs it may require.

It was Winston Churchill who once said “Never let a good crisis go to waste”. This sentiment seems very applicable to where we find ourselves at present. From an outsider’s perspective, it would now seem imperative for the key stakeholders in the industry to seriously explore what a restructured ESI may look like, and indeed ways to mitigate negative implications. A collaborative industry approach is required involving players in the ESI (including Eskom), labour, business and government. At the same time, the perceived resistance to ESI reform may serve as an indication that structural changes are unlikely to happen in the near future. In this case, new solutions that will function within the current ESI and do not include restructuring need to be developed and tested. Hopefully the current crisis will give impetus to move toward a more reformed and optimal ESI structure – even though some tough decisions may need to be made.

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