

ROADMAP
FOR ESKOM
IN A REFORMED
ELECTRICITY
SUPPLY INDUSTRY



public enterprises

Department:
Public Enterprises
REPUBLIC OF SOUTH AFRICA





ROADMAP FOR ESKOM

IN A REFORMED ELECTRICITY SUPPLY INDUSTRY

2019

ISBN: 978-0-621-47981-2
RP: 369/2019

The Roadmap for Eskom in a reformed Electricity Supply Industry is compiled with the latest available information from departmental and other resources. Some of this information is unaudited or subject to revision.

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Printed by ABC Printers

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Republic of South Africa
October 2019



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ACRONYMS

DMRE	Department of Mineral Resource and Energy
Dx	Distribution
EAF	Energy Availability Factor
EFC	Eskom Finance Company
ESAs	Electricity Supply Agreements
ESI	Electricity Supply Industry
FGD	Flue Gas Desulphurisation
Gx	Generation
IEP	Integrated Energy Plan
IPP	Independent Power Producer
IRP	Integrated Resource Plan
LPU	Large Power Users
LTSO	Legally Separated Transmission System Operator
MES	Minimum Emission Standards
MYPD	Multi-Year Price Determination
MVA	Megavolt Amperes
NDP	National Development Plan
NEDLAC	National Economic Development and Labour Council
NERSA	National Energy Regulator of South Africa
PV	Photovoltaic
PPA	Power Purchase Agreement
RCA	Regulatory Clearing Account
REIPPP	Renewable Energy Independent Power Producers Programme
SAPP	Southern African Power Pool
SOC	State Owned Company
SOE	State Owned Enterprise
TSMO	Transmission System Market Operator
TDP	Technical Development Plan Planning Office
TE	Transmission Entity
Tx	Transmission

PREFACE

Energy is changing. Across the globe, emerging technologies, changing customer sensibilities and the effects of climate change are reshaping how electricity is generated, supplied and consumed. As South Africa responds to these changes, it must also confront the specific challenges that threaten its electricity supply and constrain its economy.

The need to reform the energy sector has been proposed in the past. In the 1998 White Paper on Energy Policy, Government had identified some of the reforms required to the electricity supply system, including the restructuring of Eskom, to ensure a reliable, competitive and transparent system.

Eskom was created in the 1920s to develop the mineral industrial complex that was taking shape following the discovery of abundant minerals in the late 19th century.

Eskom's vertically integrated structure was appropriate at its inception and served the country well for over 90 years. This configuration is no longer suitable to meet the country's energy needs and has made the business susceptible to the kind of problems it has recently experienced, including state capture. The restructuring of Eskom into three subsidiary businesses – generation, transmission and distribution – is necessary to reduce the risk that Eskom poses to the country through its dependence on fiscal allocations and inability to supply the economy with adequate power.

The Eskom that must emerge from these reforms must be capable, transparent, accountable, competitive and world class. Government has a responsibility to mitigate the systemic risk that Eskom has become to the country. This will start by making the organisation responsible in how it allocates resources to its operational activities, and that it is answerable for its performance at all levels.

The special paper therefore:

1. Outlines actions to overcome the current crisis at Eskom and set it onto a new path of sustainability that will benefit all South Africans for generations to come;
2. Defines the key steps in transforming the electricity supply system that are required, including the energy sources proposed by the 2019 Integrated Resource Plan (IRP);
3. Addresses steps to restore Eskom's finances, including government support;
4. Identifies measures to reduce the cost structure of Eskom to enable provision of affordable electricity; and
5. Details the process through which the restructuring of Eskom will take place, including the process through which a new transmission entity will be established.

The electricity reform process will take place over several years, and will ensure that South Africa has an appropriate electricity supply system capable of responding to the demands of a rapidly evolving world, to which South Africa, if it is to compete, needs to be responsive.

The Eskom that shall emerge will be characterised by optimised operations, restructured finances, a sustainable business model, and an environmentally responsive electricity system. The business shall implement appropriate controls to ensure that the recent incidences of irregular, fruitless and wasteful expenditure are a thing of the past.

Importantly the reform of Eskom, through the retiring of end of life power stations and diversification of primary energy sources, will minimise the impact on Eskom's and related industries' workers and communities. In managing the transition, alternative economic activities shall be developed and implemented to economically sustain communities dependent on the power stations and associated coal mines.

The success of the reforms will depend on South Africans fulfilling their civic responsibility to pay for services consumed. The State, through the executive and elected representatives in all three spheres, and

in collaboration with other social partners such as labour, religious organisations, organised business and civil society, will address issues of non-payment of services. The Free Basic Electricity system shall be resourced to adequately cater for indigent families unable to pay.

The product of the reform process that is being initiated by the special paper should be an agile Eskom capable of integrating emerging technologies and inevitable regulatory reforms. It will be an Eskom that is responsive to market demands through an optimised tariff structure that will provide South Africa with affordable and reliable electricity. Further, the business will generate from its operations adequate cash to fund its operational and capital programmes.

Importantly, the above reforms require leadership and personnel at Eskom that have the technical capability and capacity to manage a sophisticated and world class organisation that the aspirations of the country and its people demand.

To realise these reforms, tough decisions will have to be made and implemented. Government on its own cannot effect the changes required to realise the vision of a sustainable electricity supply system. This is a national effort that will require all institutions, organisations and citizens to play their part.

EXECUTIVE SUMMARY

In February 2019, I said that we will make big decisions and take bold steps to embark on a process to fundamentally restructure Eskom and the Electricity Supply Industry. South Africa needs reliable and affordable electricity.

South Africa is blessed with an abundance of energy sources with which to drive economic growth, social development and benefit all of its people. Energy security is critical for inclusive economic growth.

Government recently announced the Integrated Resource Plan 2019, which sets out the energy mix and the quantities required to ensure energy security for all South Africans. This Plan provides certainty on the energy path for the next 10 years. There is a profound commitment to systematically reduce carbon emissions.

Equally important is the role of electricity supply security and pricing to promote the competitiveness of the South African economy and to bolster industrialisation. Electricity supply at the lowest possible cost is key to our industrialisation and job creation efforts, as it will enable us to compete better in the global economy. Lowering the cost of electricity is also important for decreasing the cost of living.

The current domestic and global conjunctures are the drivers for change in the energy sector and will shape the future of electricity delivery in South Africa, these drivers for change include:

- Transition from the existing dependence on fossil fuels to the mix of electricity energy sources reflected in the IRP 2019;
- The restructuring of Eskom into Eskom Holdings with three new subsidiaries: Generation, Transmission and Distribution;
- An intensive focus on radically improving the current operations and eliminating inefficiencies in generation;
- A greater requirement for transparency in the governance of both Eskom Holdings and the subsidiaries;
- A rigorous approach to cutting wasteful costs, optimising revenue and resolving the debt burden; and
- A Just Transition involving all stakeholders to ensure sustainable livelihoods for workers and communities.

The formation of a Transmission Entity (TE) under Eskom Holdings will foster a competitive market and will encourage the use of diverse sources of energy.

Consideration is being given to create two or more generation subsidiaries to introduce intra-company competition among the generation subsidiaries and drive efficiencies in generation. This will include Eskom's participation in renewables.

The Distribution model of the future will take into account the reliance of municipalities on electricity as a significant source of revenue. However, many municipalities do not have the technical capacity to effectively reticulate electricity function, which is a constitutional mandate.

There are four key elements in the resolution of Eskom's financial challenges: significantly improving operations, cutting of costs; increasing revenue including collections; and debt management. Discussions have already commenced with coal producers and participants in the renewables programme to reduce the burden on Eskom. This is the time for all parties to make sacrifices as a contribution to a sustainable energy future. Greater efficiencies must be obtained from the operations of Eskom as a contribution to bolstering Eskom's financial position.

There is ongoing dialogue with labour and business to implement a Just Transition that can ensure minimal impact on communities and workers. There will be partnerships between Government, labour,

civil society and business, as agreed to at NEDLAC through the Presidential Working Group on Jobs. Government and Eskom will mobilise the resources needed for the Just Transition.

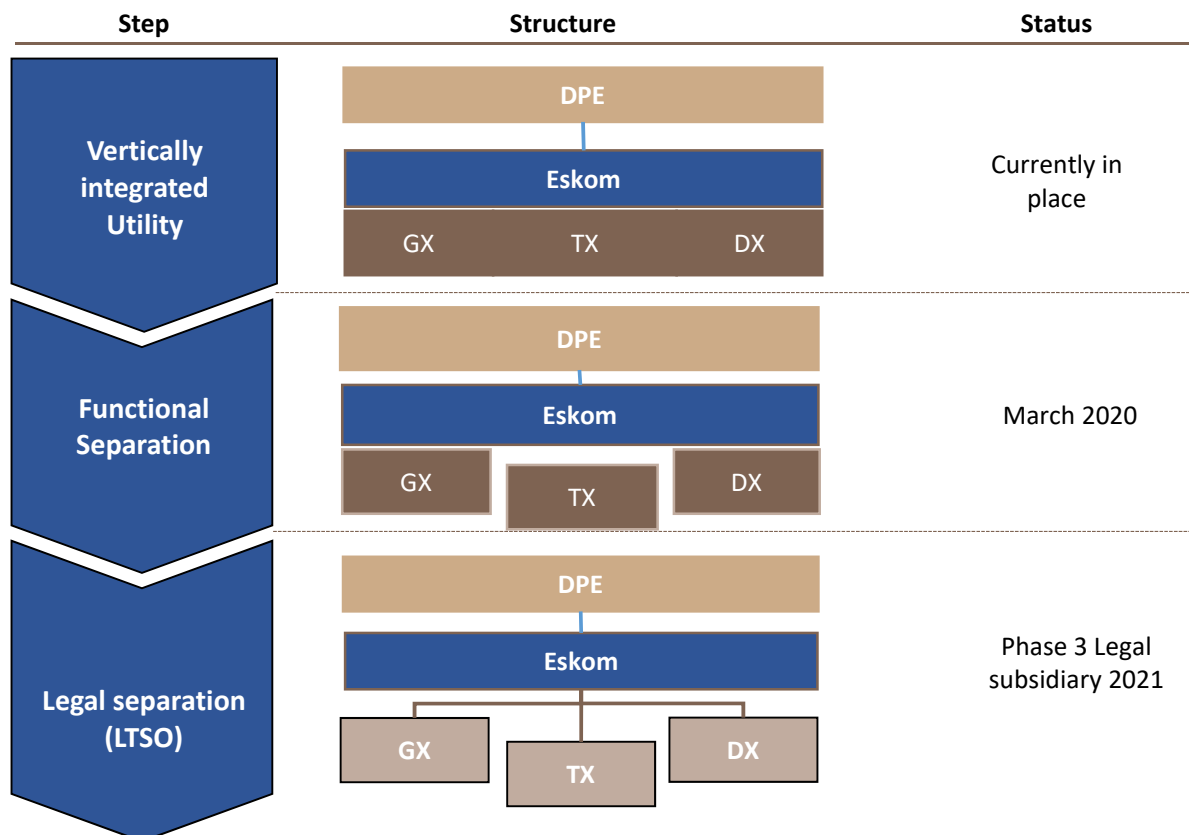
This Paper sets out the bold, actionable steps to mitigate the electricity supply risks, and to put Eskom and the industry on a new path.

Among the actions to effectively implement the above vision and transformation include the following:

- To immediately establish a subsidiary for Transmission within Eskom Holdings and to complete the current planning for the establishment of the generation subsidiaries;
- Eskom to appoint an executive to drive the implementation of the above plans;
- Reinforce the existing Eskom transformation team with the necessary skills;
- Establish a separate Eskom transformation unit reporting directly to the Board;
- Strengthen the Board and appoint a new CEO in the coming weeks;
- Radically improve operations, including maintenance of generation plant through strict oversight and consequence management; and
- Introduce radical cost saving initiatives including renegotiation of coal and IPP contracts.

Government and Eskom will ensure that there is sufficient capacity and expertise to oversee the execution of this Plan. Appropriate structures and processes are being put in place to ensure the effective implementation of this Plan. This will demand higher levels of accountability and transparency from Eskom.

This is the largest institutional transformation that South Africa has undertaken in a strategically important area in recent history.



INTRODUCTION

This Paper outlines bold actions to transform Eskom and sets it on a path to sustainable electricity supply to benefit all South Africans for generations to come. We define the key steps in this transformation;

- a) Integrated Resource Plan 2019 is our point of departure to embrace the emergence of renewables, gas, nuclear and hydro as set out in the IRP and the adaptation of clean coal practices.
- b) Eskom's finances as they relate to the resolution of the debt, the reduction of costs and the cost structure of Eskom itself.
- c) Importantly, we set out both the rationale and the process through which the restructuring of Eskom will take place and the manner in which a new Transmission Entity will be established.
- d) The Paper emphasises South Africa's climate change commitments to lower our carbon footprint and other emissions.
- e) The Paper also focuses on the wellbeing of workers and communities, and it provides Eskom employees with the assurance that Government will support them and the mining communities to reskill and adapt to the requirements of the new electricity sector as it transforms over the next few decades
- f) The vital role of business – big and small - in the energy transition and its impact on the economy.
- g) It advocates the need of a long-term partnership among all stakeholders to successfully undertake this transformation.

These are significant proposals which will change the character of Eskom and the Electricity Supply Industry. We shall strive to involve all stakeholders in this process so that the infrastructure and policy direction put in place over the next few years will have a long-lasting, positive impact for future generations.

Key steps and governance structures that are required to ensure the successful implementation of Eskom's reforms are defined.

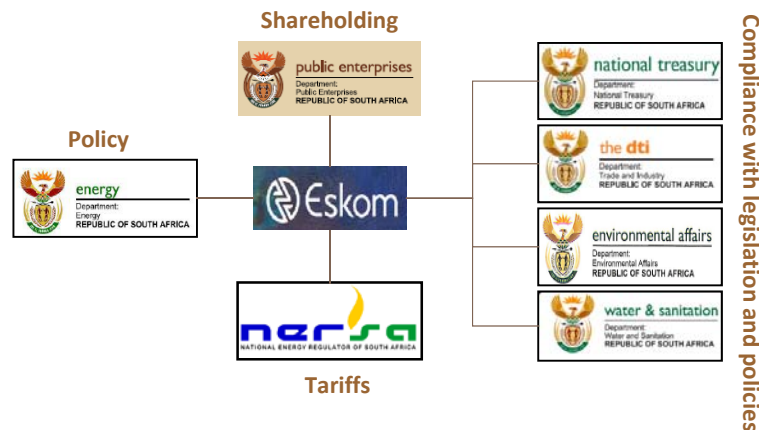
THE ELECTRICITY CONTEXT

The global electricity market has shifted from the traditional business model of centrally producing, transmitting and selling to a captive market. Instead, rapidly changing technologies, modern infrastructure and declining production costs have increased the complexity of managing the supply side. This includes managing a blend of diverse energy sources of traditional and renewable generation, distributed generation including those produced by small and household generators, multiple contracting arrangements and performance monitoring. Demand patterns are also changing with the availability of more affordable self-generation, energy efficiency and storage technologies. Large, unwieldy and vertically integrated institutions such as Eskom struggle to adapt to conditions in a dynamically changing market. De-carbonisation commitments to address climate change are accelerating investment in renewable infrastructure including new technology such as smart-grids and digitisation that improves both supply and demand management. Large, unwieldy and rigid institutions such as Eskom struggle to adapt to conditions in a dynamically changing market

South Africa is blessed with an abundance of energy sources with which to drive economic growth, social development and benefit its people from all walks of life.

South Africa’s Electricity Landscape

Figure 1: Legislative landscape of the South African Electricity Supply Industry



Legislative Context

South Africa’s energy landscape is regulated through an inter-linked series of laws, policy documents and position papers.

The White Paper on Energy Policy (1998), supplemented with the White Paper on Renewable Energy in 2003, sets out Government’s overarching position on the supply and consumption of energy.

Applicable policies include:

- The National Development Plan;
- The Integrated Energy Plan (IEP);
- The Integrated Resource Plans (IRP);
- The Electricity Pricing Policy (EPP);
- The Paris Agreement (2016) on Climate Change;
- The National Energy Act, 2008 (Act No. 34 of 2008);

- A range of legislation regulating Nuclear Energy¹; and
- National Environmental Management Air Quality Act (Act.39 of 2004).

The National Development Plan (NDP)

The National Development Plan (NDP) sets out South Africa's need to invest in a strong network of economic infrastructure to support the country's medium and long-term economic and social objectives.

Stable energy infrastructure underpins economic growth and should therefore be robust and extensive enough to meet the current industrial, commercial and household needs and those of the future.

The National Development Plan envisages that by 2030, South Africa's energy sector will be reliable, efficient and competitive, will be socially equitable through expanded access at affordable tariffs, and will be environmentally sustainable.

To achieve this, the NDP provides a 20-year planning horizon to roll out electricity infrastructure in line with Ministerial Determinations issued in terms of Section 34 of the Electricity Regulation Act of 2006. The NDP, together with the Ministerial Determinations, are policy signals investors use to plan their investments in the country's energy sector.

The Integrated Energy Plan and the Integrated Resource Plans

The Integrated Energy Plan (IEP) is South Africa's master energy plan. The Integrated Resource Plans lay out the details required to implement this.

The objectives of the Integrated Energy Plan (IEP) and the Integrated Resource Plan 2019 planning instruments are to:

- Guide the development of energy policy and set regulation for the sector;
- Guide the selection of appropriate technologies to meet demand;
- Guide investment in the development of energy infrastructure;
- Promote universal access, affordability and environmental sustainability;
- Ensure electricity security by closing the supply gap in the short-term; and
- Introducing energy mix and diversification in the medium to long term.

Both of these plans function within a framework which makes energy and electricity demand projections until 2050.

Government has developed various iterations of the IRP, in response to the changing energy landscape. The plans for 2010 and 2019 are relevant to this paper:

- i) The IRP 2010–2030 was promulgated in March 2011 and was envisaged as a “living plan”, to be revised by the Department of Energy as required.
- ii) IRP 2019 incorporates a number of changes to assumptions made in the IRP 2010. These changes include economic growth and electricity demand projections, which have not increased as envisaged; existing Eskom plant performance, which is well below the 80% availability factor assumed in 2010; additional capacity committed to and commissioned; and technology costs, which have significantly declined. IRP 2019 also extends the study period from 2030 to 2050.

IRP 2019 sets out various scenarios using the PLEXOS Integrated Energy Model, a commercial power system simulation software tool which is used to project electricity supply demand based on a least-cost

¹ Nuclear Energy Act 1999, Act 46 of 1999 and National Radioactive Waste Disposal Institute Act, Act 53 of 2008. National Nuclear Regulator (NNR) Act 1999, Act 47 of 1999. The Cabinet approved the Nuclear Energy Policy for South Africa in October 2008.

path. This includes the use of demand-growth scenarios where the impact of projected load demand on the energy mix is tested. Other future-focused scenarios are also tested, including using carbon budget instead of peak-plateau-decline as a strategy to reduce greenhouse gas emissions in electricity, the removal of annual build limits on renewable energy (unconstrained renewables), and varying the price of gas for power.

The scenario planning yielded the following results for the period ending 2030:

- The committed Renewable Energy Independent Power Producers Programme, including the 27 signed projects and Eskom's capacity rollout due to end with the last unit of Kusile in 2022, will provide sufficient capacity to cover the projected demand and decommissioning of plants up to about 2025.
- The installed capacity and energy mix for the various scenarios do not differ materially. This will be driven mainly by the decommissioning of about 12GW of Eskom coal plants over the next 15 years.
- Imposing annual build limits on renewable energy will not affect the total cumulative installed capacity and the energy mix for the period up to 2030.
- Applying carbon budget as a constraint to reduce greenhouse gas emissions, or maintaining the peak-plateau-decline constraint as in IRP 2010, will not alter the energy mix by 2030.
- The projected unit cost of electricity by 2030 is similar for all scenarios except for market-linked (as opposed to inflation-based) increase in gas prices.
- The scenario without renewable energy annual build limits provides the least-cost option by 2030.

For the period post 2030, the following results were observed:

- Decommissioning coal plants (total 28GW by 2040 and 35GW by 2050), together with emission constraints, show that coal will contribute less than 30% of the energy by 2040 and less than 20% by 2050.
- Imposing annual build limits on renewable energy will restrict the cumulative renewable installed capacity for this period.
- Adopting no annual build limits on renewables, or imposing a more stringent strategy to reduce greenhouse gas emissions, implies that no new coal power plants will be required, unless affordable cleaner forms of coal-to-power are available.
- The projected unit cost of electricity differs significantly between the scenarios tested. It is noted that a change in fuel cost (gas, for example) can significantly affect the projected cost.
- The scenario without renewable energy annual build limits provides the least-cost option by 2050.
- Overall, the installed capacity and energy mix for the various scenarios differ significantly and are highly influenced by the input assumptions.

In summary, the review and outcome of IRP 2019 implies the following:

- The pace and scale of new capacity developments required up to 2030 must be curtailed, compared to what was proposed in the IRP (2010).
- Ministerial Determinations for capacity beyond Bid Window 4 (27 signed projects) issued under IRP 2010 must be reviewed and revised in line with the new projected system requirements for the period ending 2030.
- The significant change in energy mix post-2030 indicates the sensitivity of the results to the input assumptions. In-depth analysis of the assumptions and the economic implications of the electricity infrastructure development path chosen post 2030 is needed to mitigate the potential risks.

Table 1: IRP 2019

Recommended Plan IRP 2019	Coal		Nuclear	Hydro	Storage	PV		Wind	CSP	Gas & Diesel	Other*
Current Base	37149		1860	2100	2912	1474		1980	300	3830	499
2019	2155	-2373						244	300		***
2020	1433	-557				114		300			
2021	1433	-1403				300		818			
2022	711	-844			513	400	1000	1600			
2023	750	-555				1000		1600			
2024			1860					1600		1000	500
2025						1000		1600			500
2026		-1219						1600			500
2027	750	-847						1600		2000	500
2028		-475				1000		1600			500
2029		-1694			1575	1000		1600			500
2030		-1050		2500		1000		1600			500
TOTAL INSTALLED CAPACITY by 2030 (MW)	33364		1860	4600	5000	8288		17742	600	6380	
% Total Installed Capacity (% of MW)	43		2.36	5.84	6.35	10.52		22.53	0.76	8.1	
% Annual Energy Contribution (% of MWh)	58.8		4.5	8.4	1.2	6.3		17.8	0.6	1.3	
	Installed Capacity										
	Committed/ Already Contracted Capacity										
	Capacity Decommissioned										
	New Additional Capacity										
	Extension of Koeberg Plant life										
	Distributed Generation Capacity for own use										

* Distributed Generation, CoGen, Biomass, Landfill

Source: DMRE

** Allocation to the extent of the short term capacity and energy gap

ESKOM CHALLENGES

Eskom has suffered severe damage as a result of governance and operational misdemeanours over the past decade, mainly as a result of state capture. This has had serious developmental and transformation consequences for governance and leadership within the entity, its constrained operations, its finances and its structure.

Financial

Eskom's long-term debt is currently at R441 billion (as at March 2019), up from R255 billion in 2014. Over the next five years, interest payments of approximately R148 billion and debt repayments of R180 billion are anticipated. The financial ratios illustrate the gravity of Eskom's financial challenge: in 2019, the debt service cover ratio was at an unsustainably low 0, 5 and interest coverage ratio at 0, 9. Furthermore, Eskom's increasing borrowing costs will increase its debt servicing obligations, placing it in an unsustainable position

For the 2019 financial year, Eskom reported a net loss after tax of R20.7 billion², with municipal debt rising to about R17.6 billion. A lower-than-expected 5.23% tariff increase, a 1.82% decline in sales volumes and cost pressures contributed to these losses.

A culture of non-payment, particularly among municipalities, has become a systemic problem. Currently municipalities and individual users owe Eskom over R36.5 billion (as at 30 June 2019).

Table 2: Break down of top 10 municipal and Soweto debt (R millions)

Municipalities	Total*	Interest
Maluti-A-Phofung , Free State	R 4 016	R 1 016
Emalaheni, Mpumalanga	R 2 761	R 504.9
Matjhabeng, Free State	R 2 361	R 511.5
Emfuleni, Gauteng	R 1 445	R 373.3
Govan Mbeki, Mpumalanga	R 1 236	R 209.6
Ngwathe, Free State	R 1 117	R 150.8
Lekwa, Mpumalanga	R 797	R 182.3
Thaba Chweu, Mpumalanga	R 591	R 63.3
Ditsobotla, North West	R 438	R 110.5
Modimolle- Mookgophong, Limpopo	R 418	R 53.9
Remaining municipalities	R 2 441	R 403.9
Total Municipal	R 17 621	R 3 580
Soweto	R 18 909	
Total arear Debt*	R	36 530

*As at 30 June 2019 (excludes current debt <30 days)

² The net loss after tax for the group was R20.7 billion (2018: R2.3 billion), reflecting a decline of R18.4 billion, mainly because of a decrease in earnings before interest, tax, depreciation and amortisation (EBITDA) as well as increased depreciation and net finance cost. The EBITDA of R31.5 billion in 2019 compared to R45.4 in 2018 decreased by R13.9 billion mainly as a result of increased primary energy expenditure. (Source – Eskom FY 2019 Annual Report)

Cost containment is a critical part of Eskom's stabilisation plan (resulting in a R9.9-billion saving over the past year), but this has been eroded by several countervailing factors. These include expenditure increases as result of higher coal costs, maintenance costs (over the past financial year, the focus has been on priority maintenance, however in the medium term, routine maintenance will increase by around 4% Compound Annual Growth Rate), use of expensive diesel to avoid load shedding, wage settlements³, and an increase in municipal debt.

Eskom has a target to reduce the overall annual cost base and to generate cumulative cash savings of approximately R77 billion over the next four years.

Initiatives to achieve these targets include:

- Reducing primary energy costs;
- Minimising coal costs through investments in cost-plus mines. Currently coal procurement lacks transparency because this has been conducted through individual agreements. To reduce and stabilise price volatility, Government is engaging with coal producers to consider indexing the price of coal supplied to Eskom in an attempt to contain price inflation; and
- Improving efficiency in generation and network excellence, minimising procurement costs and human resources initiatives.

In addition to this Eskom has been directed to implement further radical cost saving initiatives.

Governance and Leadership

The deterioration of Eskom over the past 10 years has resulted in acute skills and capacity erosion, both at the governance and technical levels.

Progress has been made to restore governance and to strengthen the Board and senior management. Despite this, it will take many years of substantial effort to rebuild and strengthen the skills and capabilities lost to Eskom.

In the short to medium term, the Board and management will be further strengthened with people who have global experience of large business turnarounds; market behaviour and key industrial consumers; engineering and project management; and of robust financial and management reporting and complex treasury/ financing activities. Vacant executive positions, including the position of CEO, will be filled by managers with appropriate experience.

Operational

Eskom's operational performance has seriously deteriorated, resulting in:

- Costly periods of load-shedding with severe consequences for the economy;
- Significant deterioration of plant availability, and record levels of unplanned outages, leading to the cumulative capacity of power stations (excluding the new build stations) declining to the lowest levels yet;
- The new mega-coal power stations – Medupi and Kusile– are not functioning reliably; nor optimally; and
- Since 2007 Eskom has stopped investing in cost plus mines and procured coal on expensive short term contracts which also attracted huge transportation costs. In addition, Eskom has not always procured this coal on time leading to major coal shortages that contributed to load shedding in some cases.

³ While the total number of employees in the group decreased from 48 628 (FY 2018) to 46 665 (FY 2019) as a result of natural attrition and a moratorium on new hires, net employee benefit costs increased from to R29.5 billion in FY 2018 to R33.3 billion in FY 2019 (after capitalisation of costs to qualifying assets). The settlement also included above-inflation wage increases and once-off payment to bargaining unit employees. (Source – Eskom FY 2019 Annual Report)

Eskom have implemented numerous initiatives and programmes to stabilise power supply. These include implementation of **Eskom's 9-Point Plan⁴**, as well as recommendations from the Ministerial Technical Task Team.

Operational performance however remains far from adequate and a sustained effort is required to restore power station performance to acceptable levels and to clear the massive backlogs in maintenance.

Inefficient operations, lack of maintenance, and sub-optimal plant performance particularly at Medupi and Kusile when combined with corrupt and inadequate procurement practices impose a massive strain on the financial sustainability of Eskom.

The Ministerial Technical Task Team made recommendations to improve operational performance as summarised in Table 3. These recommendations are currently being implemented by Eskom as part of the "9-Point Plan".

⁴ The **nine-point generation recovery plan** was designed to deal with unplanned breakdowns and coal shortages. The plan involves resolving maintenance and unplanned breakdowns, addressing the challenges affecting the newly built units at Medupi and Kusile, improving the coal stock days and strengthening management oversight capacity.

Table 3: Ministerial Technical Review team recommendations:

<p>People: Leadership and Performance</p>	<ul style="list-style-type: none"> • Appoint permanent key staff – lift embargo in Gx for critical positions and unlock operator pipeline. • Disciplined accountable leadership (shop floor to executive) • Revive rewards and recognition programmes • Performance through motivational leadership, mentoring and coaching • Relink staff and lift interstation embargo to encourage peer interactions and sharing of lesson learnt. • Launch a campaign to improve the Eskom brand and enhance internal Eskom communication
<p>Process: Governance and Systems</p>	<ul style="list-style-type: none"> • Implement the 9-point Plan and track progress at governance levels (Station, GEXCO and EXCO) • Update or reassign the right delegation of authority • Resolve the capital investment in cost plus mines to improve coal qualities • Ramp up EAF to 77% in 18months and 80% in 4 years • Manage and roll out technical action plans and oversight committees • Unlock budget and adhere to outage planning guidelines • Define Rotek’s position • Ensure contracts enable protection of Eskom of intellectual property • Implement a supplier management system by setting appropriate KPIs • Strictly manage internal procurement process with SLAs and track progress • Strictly manage internal procurement process with SLAs and track progress • Review and refine procurement strategies for various plant levels i.e. sole source vs open market vs closed market • Expedite the road to rail coal transportation
<p>Plant: Reliability and Performance</p>	<ul style="list-style-type: none"> • Each Power Station to identify top 5 contributors to partial load losses – create action plans with leading KPIs and track daily • Capacitate Engineering to quickly provide all necessary modifications • Prioritise the draught group plant • A clear plan for older plants and implement mid-life refurbishment for overdue stations • Resource the new build with teams across the value chain (recruitment, procurement, stores management etc.)

Structural

Eskom is a vertically integrated monopoly which is outdated and unsustainable. It belongs to an era when a large institutional structure with a diversified revenue base was required to finance large projects. With the fundamental technological and “eco-disruption” unfolding in the sector, this structure must change. If Eskom is to remain relevant, a new institutional framework is needed to exploit the emerging opportunities in the sector.

Eskom’s business model is that of a vertically integrated monopoly characterised by lack of transparency, lack of agility, lack of operational excellence, and wide spread inefficiencies due to lack of accountability and consequence management.

The lack of transparency on cost and allocation of resources makes it difficult for Eskom to understand its own competitive advantages. It has become very difficult to steer the organisation into a long-term healthy path. As highlighted in the Presidential Eskom Sustainability Task Team report, the lack of transparency and accountability present a fertile ground for corruption, rent seeking and fraud. This has been exacerbated in recent years by state capture and the consequent and deliberate lapses in oversight

Eskom’s operating business model is outdated and based on the era of excess electricity supply and captive customers. As the “sole” provider of electricity in South Africa and with the size of its Eskom balance sheet, Eskom is too systemic and critical important to the South African economy to be allowed to fail. This puts government in a perpetual cycle of granting bailout in order to avoid a collapse of the

entity and therefore the economy without benefiting from any internal reforms in the company. The 2007, 2015 and 2019 bailouts are evidence of this moral hazard.

With declining demand, Eskom is facing a utility death spiral. Modern systems have become increasingly decentralised, enabling the participation of multiple suppliers, including generation from renewables. The separation of the utility into three companies will allow government to more effectively address generation, transmission and distribution challenges separately.

Splitting Eskom into separate companies responsible for the different functions – starting with the creation of a transmission entity, combined with the system operator – will set the electricity sector on a new path. This proposed restructuring is in line with the 1998 Energy Policy White Paper, which intended that Eskom be restructured into separate generation and transmission companies and that independent distributors would be established.

Eskom's complex operating and financial situation is further complicated by its requirement to reduce its environmental footprint and its carbon emissions, in keeping with the Minimum Emission Standards (MES) that were published in 2010.

Eskom also has a number of subsidiaries such as Eskom Finance Company which must be reviewed and if need be, disposed of. The precise cost and "profit" of each power station, as an indicator of good management, efficiency, and cost control is not available. Compensation among state owned generators is not possible without the necessary transparency on finances.

Given these challenges, government intervention and support is required to implement a new business model and power sector reform. This includes support for financial and institutional restructuring for Eskom; otherwise it will be forced to plead for repeated bailouts. It also requires that investment in new electricity generation capacity be accelerated, at national and distributed levels, while reversing the backlog in network investments so that

Eskom's challenges are also structural in nature and therefore restructuring Eskom is necessary to set the sector on a more sustainable path.

Climate Change Commitments

South Africa acknowledges the global climate crisis and the pressing challenge this poses to humankind and the planet. The science shows that climate change will impact the poor most, and the African continent is especially vulnerable. This requires urgent and ambitious action to meet the objective of limiting global average temperatures to 1.5 degrees.

South Africa is committed to meeting its nationally determined contribution to achieving emissions targets as set out in the United Nations Convention to Combat Climate Change, its Kyoto Protocol and the Paris Agreement.

The Just Transition permits a systematic shift from coal and other fossil fuels over a few decades, whilst at the same time ensuring an increased reliance on renewables and other energy sources as in the 2019 IRP.

Given the current energy mix, the mitigation challenge posed to South Africa is considerable. Over 80% of emissions⁵ are from the energy sector.

Aside from the commitments to reduce greenhouse gases, the 2010 Minimum Emission Standards require Eskom to take steps to reduce emissions of sulphates, nitrates and particulate matter.

Progress in this regard is dependent on implementing abatement technologies.

⁵ 83.9% of net GHG emissions in 2015

MOVING ESKOM FROM CRISIS TO STABILITY

A New Business Model

President Cyril Ramaphosa has announced that Eskom will be unbundled into three entities – Generation, Transmission and Distribution. The immediate priority is the establishment of a subsidiary to manage the transmission grid as recommended by the Presidential Eskom Sustainability Task Team.

Creating separate entities under Eskom Holdings responsible for the different functions – starting with the creation of a Transmission entity – will set the electricity sector on a new path. This proposed restructuring is in line with the 1998 Energy Policy White Paper, which intended that Eskom be restructured into separate generation and transmission entities and that independent distributors would be established. However, distribution requires further deliberation which takes account of municipal finances and revenue from electricity sales.

Restructuring or “unbundling” into separate subsidiaries under Eskom Holdings will allow management focus, improve efficiency, create greater transparency around performance, provide greater protection against corruption and rent-seeking, and will give capital providers more visibility of the component parts of the sector, resulting in more investment comfort.

This new business model for Eskom must provide reliable, affordable, economically competitive and environmentally sustainable electricity that will drive inclusive economic growth in the context of the Fourth Industrial and Green Revolutions.

Eskom’s new business model will be informed by:

- Adopting appropriate best practices to provide energy security and universal access;
- Improving the utility’s financial position and minimising dependence on the state’s fiscus;
- Meeting the legislative requirements of a lower carbon trajectory;
- Implementing a Just Transition;
- Developing a pipeline of new products, based on research and development;
- In addition, develop and execute “no regret” products that can immediately increase revenue and position the business for longer term growth.

Figure 2: Value Chain for the reformed Electricity Supply Industry

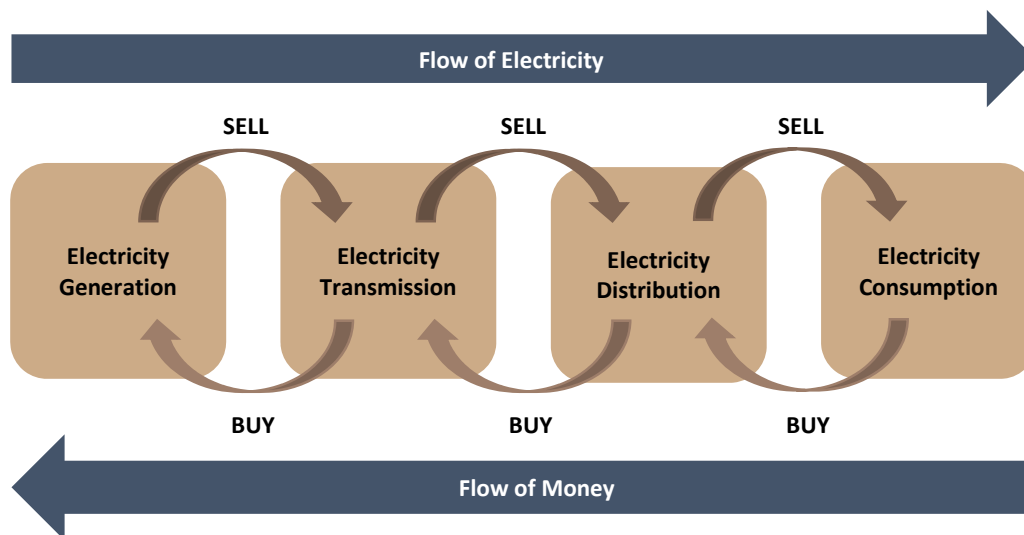
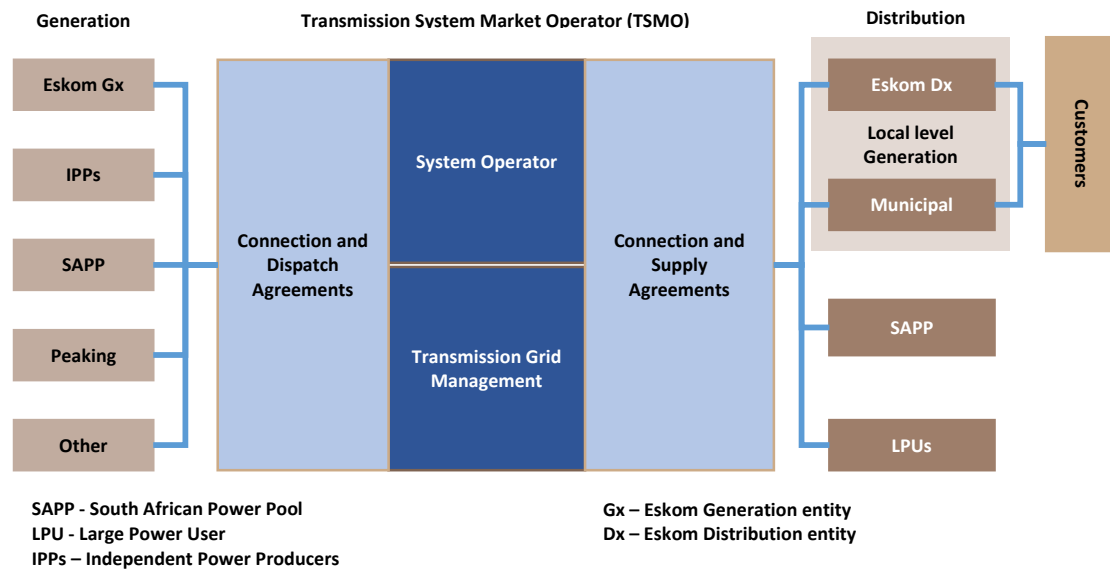


Figure 3: Reformed Electricity Supply Industry



Transmission

Overview

- Establishment of a Transmission Entity (TE) that is 100% Eskom owned and fully regulated.
- The TE will balance electricity supply and demand in real time.
- The TE will dispatch the generators according to least-cost merit order principles.
- The TE will be empowered to introduce additional markets and products if necessary, such as, a reserves market.
- In order to fast track the establishment of the TE, several processes will be undertaken in parallel as the separation and creation of the TE is dependent on the entire legal process being completed.
- The first step is to functionally unbundle Transmission and the formation of the new legal entity.
- The second step will be to corporatise the TE as a subsidiary of Eskom Holdings with its own independent Board of Directors.
- An organisational design based on the new mandate will be defined. This process will provide clarity on the assignment of human resource, finance, procurement, and IT systems.
- The accounting treatment of how debt will be allocated (if required) will be defined and lenders engaged accordingly.
- A trading system starting internally will be implemented, followed by legal contracting when required. As market rules and structure becomes clearer it will be rolled out to other providers.
- These processes are very complex and will need careful management to ensure that operations are not disrupted.
- Much effort will be invested in **transparent communication with all relevant stakeholders** and the required levels of consultation.

The Creation of a Transmission Entity (TE)

The establishment of a new Transmission Entity (TE) is the keystone in Eskom's reform. The new TE will be wholly-owned by Eskom Holdings. Its core functions will be to act as an unbiased electricity market broker, to promote capital investment within the industry and to catalyse energy efficiency and cost sustainability.

Over the past five years, the performance of the transmission network has deteriorated and requires capital for replacement. The system minutes lost due to interruptions on the transmission network has increased from 2.85 minutes to 3.16 minutes. This is primarily due to aging transmission lines, ranging between 30-40 years.

Eskom's transmission business comprises numerous sub-stations, transformers, and approximately 33,000 kilometres of transmission lines. The transmission network services the domestic market and also interfaces with the regional market through the Southern African Power Pool (SAPP)⁶.

To achieve the objective of a separate transmission business, it will be required to meet the following conditions:

- Provide access to the grid on a non-discriminatory basis to Eskom generation and IPPs;
- Dispatch electricity from the existing asset base of generators and following clear least-cost principles and penalise generating entities that do not perform as contractually agreed;
- Make available necessary reserves for reliable operation and in line with the proposed energy mix;
- Ensure voltage levels across the transmission system stay within the boundaries of the relevant grid code; and
- Provide full transparency about the performance of the power system to all market participants and the general public.

During the transitional period, the following important matters will be managed:

- Establishment of new decision-making and management structures for the TE, including its own Board.
- The migration of people, systems, assets and debt into the new TE, as well as the enactment of appropriate legislation through Parliament to enable the TE to be taken out as a separate state-owned company.
- Responsibility for power planning, procurement and contracting functions will be combined with the transmission and system operation.

To achieve the objective of a separate Transmission business, it will be required to meet the following conditions:

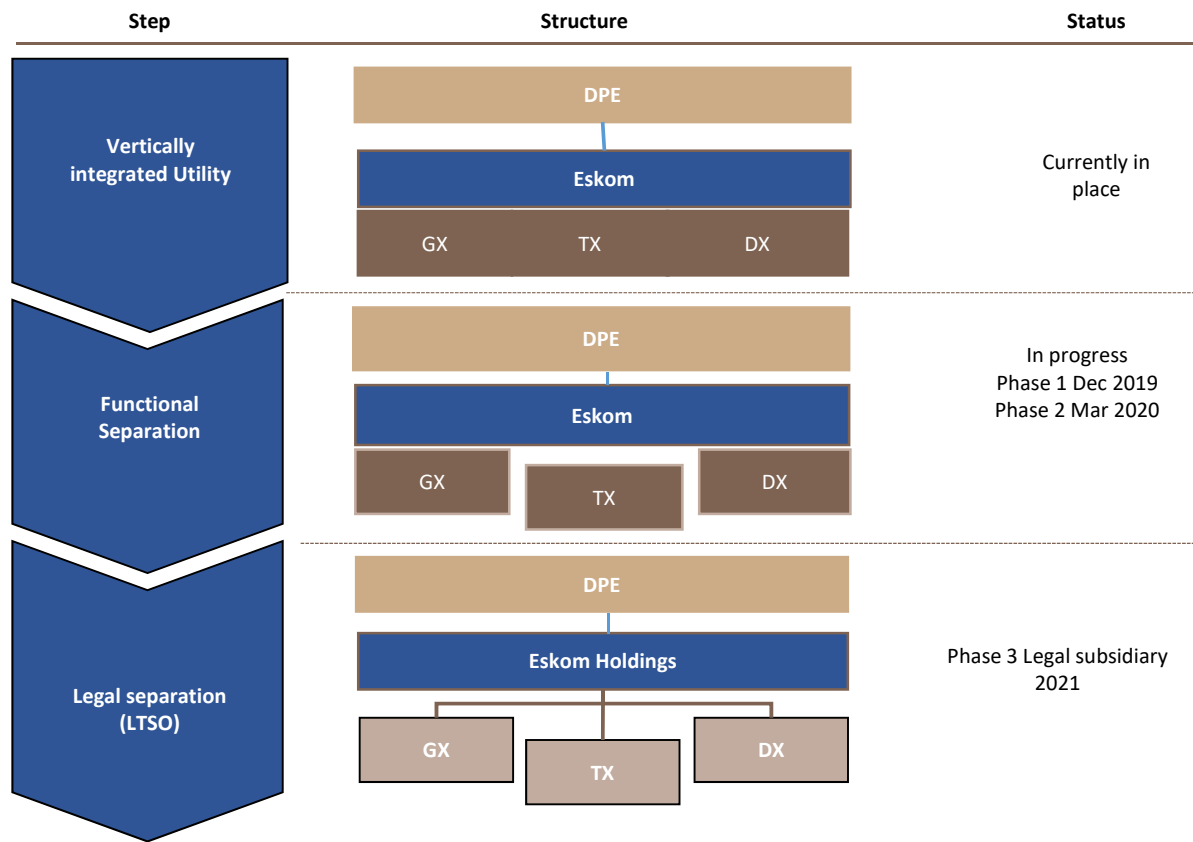
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- Make available necessary reserves for reliable operation and in line with the proposed energy mix;
- Ensure voltage levels across the transmission system stay within the boundaries of the relevant grid code; and
- Provide full transparency about the performance of the power system to all market participants and the general public.

During the transitional period, the following important matters will be managed:

- The movement of current generation peaking facilities to the transmission company;
- Establishment of new decision-making and management structures for the TE, including its own Board.
- The migration of people, systems, assets and debt into the new TE, as well as the enactment of appropriate legislation through Parliament to enable the TE to be taken out as a separate state-owned company.
- Responsibility for power planning, procurement and contracting functions will be combined with the transmission and system operation.

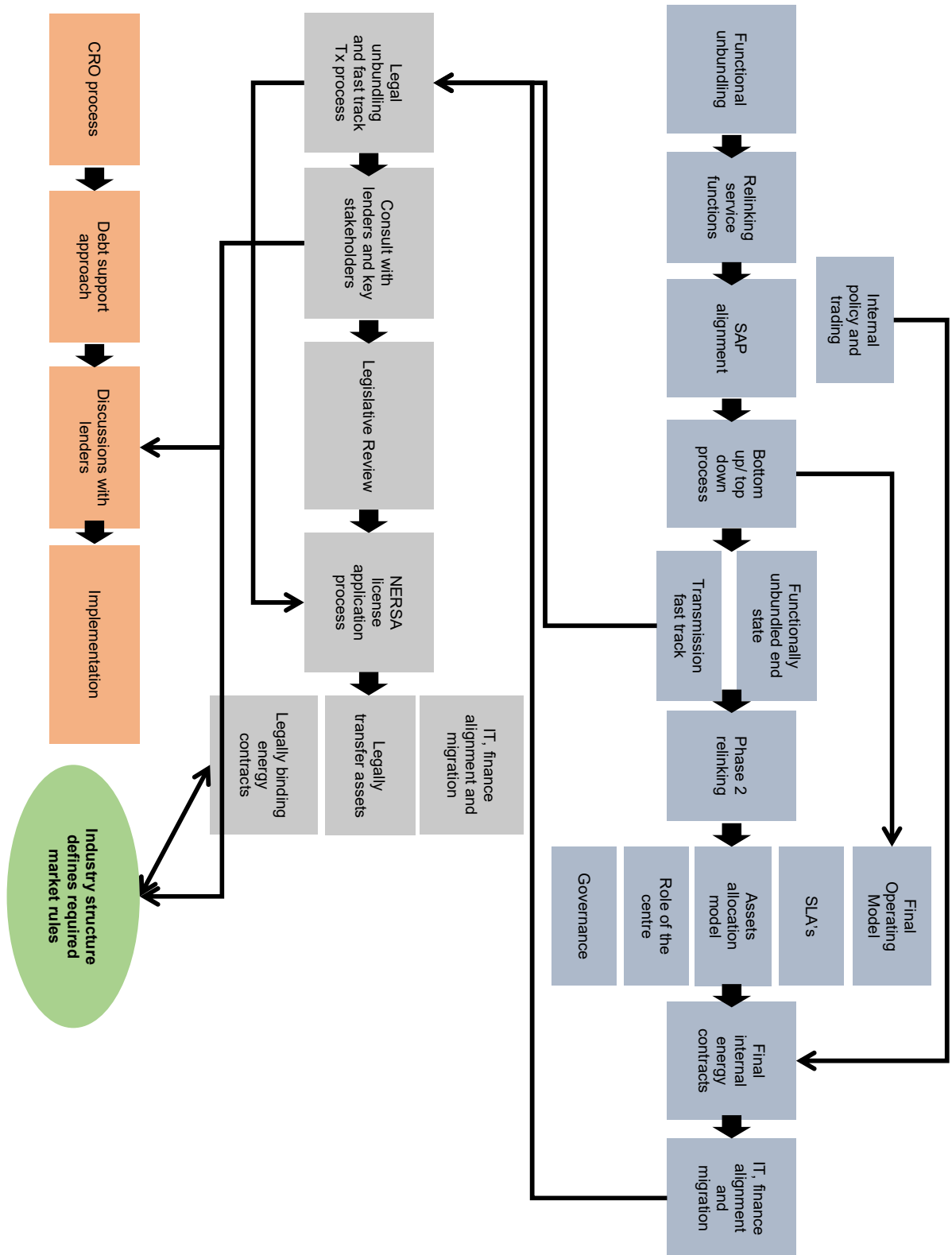
The Southern African Power Pool (SAPP) was created in August 1995, when member governments of the Southern African Development Community (SADC) (excluding Mauritius) signed an Inter-Governmental Memorandum of Understanding for the formation of an electricity power pool in the region under the name of the Southern African Power Pool. The MOU was revised and signed by SADC Ministers on 23 February 2006.

Figure 4: Phased restructuring approach



The following Figure 5 shows the process to be followed to separate out the Transmission Entity from within the current Eskom organisational structure. It highlights three processes that will run in parallel, including their dependencies.

Figure 5: Business Separation Process

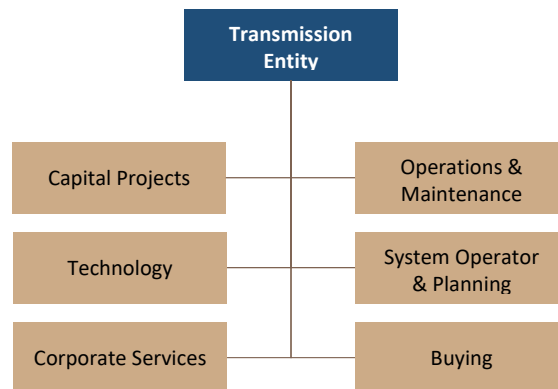


Proposed Functions of the Transmission Entity

Broadly the two key roles for the TE will be:

- i) Systems operator: management of supply and demand balances in real time through a range of least cost options. The TE will also consider regional demand and supply requirements.
- ii) Market operator: contracting with suppliers and distributors (including Eskom Distribution).

Figure 6: Key Functions of the Transmission Entity



Procurement of New Energy

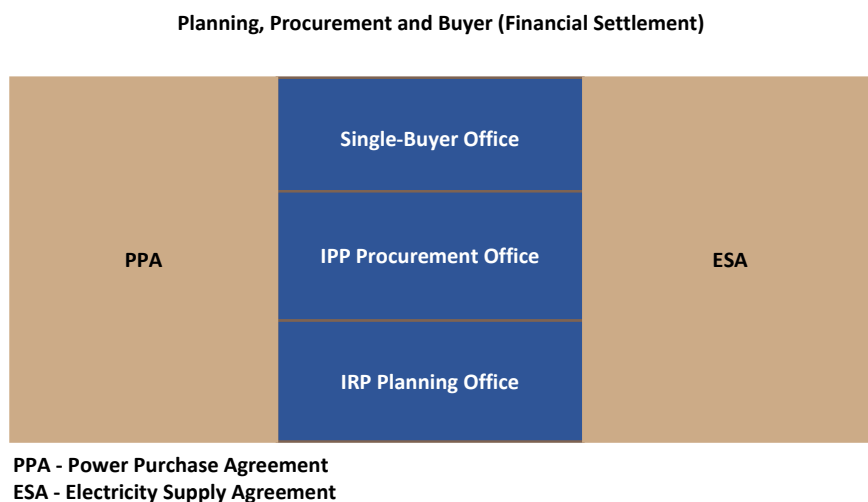
During the transitional separation process, this function of procuring new energy will remain within the Department of Mineral Resources and Energy.

The Buyer function will remain with Transmission entity. The TE will buy energy from generators as procured by the Minister of Mineral Resource and Energy. This function will sell to Eskom Distribution, municipalities and large power users. Eskom and other generators will initially all have PPA's with the TE, facilitated by the buying function, but will thereafter transition to an open-market model. Transmission will continue as the trading arm to and from the Southern African Power Pool (SAPP).

The TE will hold all the Electricity Supply Agreements (ESA) with the various distribution entities. The TE will have direct ESA's with the Large Power Users (LPU) to ensure security of supply.

It will be important to ensure that the Power Purchase Agreements (PPAs) do not contain risks that the buying function cannot tolerate.

Figure 7: Central Purchasing function of the Transmission Entity



Risks and Dependencies

A number of risks to the process of establishing a separate TE have been identified, which require management.

These risks include finalising agreements with key stakeholders such as labour, business (including investors), and relevant Government departments, particularly DMRE and DPE. In addition, the lenders will be engaged throughout the process to address any concerns.

Finances

Managing the financial sustainability of Eskom as a whole, and the new component business models will be the top priority during the reform process.

Depending on the final solution to the debt, part of this may be apportioned to the Transmission Entity (TE). There will also be apportioning of existing contracts.

Costs linked to migrating transmission into a new entity will be ring-fenced and defined. These will include:

- Establishment requirements;
- New and existing capital commitments;
- New and existing debt;
- The IPP guarantees;
- Determining the adequacy of whether the future Power Purchase Agreement's will be adequately covered by the transmission balance sheet;
- Whether the standalone transmission balance sheet can carry additional debt; and
- If and when additional Government support will be required.

Figure 8: Restructuring milestones and key steps



Generation of Electricity

Overview

- Each power station will be placed on its own Purchase Power Agreement (PPA) with predefined, fixed and guaranteed tariffs for energy and for firm capacity.
- The generation company will be enabled to keep the profits they make or may pay them out as dividends.
- The generation company CEO will be incentivised around ensuring Energy Availability Factor (EAF) that is in line with plant design so that the company is financially sustainable.
- All new generation will be procured on long-term PPAs that pay for energy and for capacity, depending on the technology.

Eskom dominates generation with a total nominal electricity generation capacity of 45 gigawatts. Of this, 40 gigawatts come from coal-fired power stations, with the remainder generated from renewables, nuclear and peaking power facilities.

The challenges in Eskom's generation capability are mainly the result of three factors: i) backlogs in and poor maintenance, ii) low reserve levels, and iii) insufficient coal stocks and frequent use of sub-standard coal.

Eskom's coal fired power stations are on average 37-years old and require maintenance and large-scale retro fitting to ensure continued operation. Delays in the commercial operation of the Medupi and Kusile power stations have affected Eskom's reserve capacity levels.

As a consequence of both the above factors, the generating capacity is constrained.

New Business Model for the Generation Market

Generation will become a separate subsidiary under Eskom, consisting mainly of the current power plant base, which will be separated into a number of feasible smaller generation units. Consideration is being given to create two or more generation subsidiaries to introduce inter-company competition and drive efficiencies in generation.

With the establishment of the TE, each power station will have its own Power Purchase Agreement with predefined, fixed and guaranteed tariffs for energy with the TE.

Over time the generation market will become more competitive and decentralised with new public, private and other generators entering this market as well as the IRP's energy mix, including Eskom 'new build power stations' under the New Generation Regulations. This will introduce the appropriate level of competition and efficiencies in the Eskom fleet, and in the power market generally.

Future of Coal

South Africa is endowed with substantial coal deposits, which have historically been a cost effective source of primary energy. Coal will remain important for future economic growth and industrialisation and the lifetime of Eskom's coal-fired plants will continue for at least another decade and more in the case of Medupi and Kusile. While coal remains an important part of the energy mix, the following considerations are important:

- Adoption of "Clean Coal" practices though the responsible and sustainable extraction and utilisation of coal in line with environmental policy and governance; and
- The price and quality of coal in terms of reducing and stabilising electricity costs.

As the generation environment changes through newer technologies, opportunities to innovate, increase affordability, reduce emissions and create jobs will emerge. In this regard, Eskom's generation business needs to be responsive, agile and innovative.

More research and innovation must be invested in by the mining industry to discover new and different uses for coal as is happening in some parts of the world

Distribution

The Distribution Environment

Eskom accounts for about 40% of electricity distribution throughout South Africa, while municipalities account for the balance, 80% of which is distributed by 12 metros and the largest municipalities. South Africa's GDP is mainly produced in these areas and it is therefore important that there should be a focus on Eskom Distribution and the 12 metros and the largest municipal electricity distributors.

Eskom owns the largest power-line system in Africa⁷, made up of about 48,000 km of distribution lines, 296,000 km of reticulation power lines and 7,500 km of underground cables.

Eskom distribution provides power to 40% of the end users in South Africa. The distribution operation includes construction and maintenance of equipment to transform the power supply to meet customer needs. At the administrative level, Eskom distribution measures customer consumption levels, provides the appropriate billing and collects the payments.

Municipalities are responsible for the reticulation of electricity and gas within their boundaries in terms of Schedule 4(b) of the Constitution, and subject to national legislation in terms of section 155 (7) of the Constitution. One hundred and eighty-eight (188) municipalities are licenced by the National Electricity Regulator of South Africa (NERSA) to distribute electricity to consumers. Eskom distributes or co-distributes electricity together with 90 municipalities. The current distribution model and legislation have created numerous challenges, including:

- Different tariffs between Eskom and municipalities in the same municipal area;
- Ownership of distribution infrastructure is often split between Eskom and municipalities (where there is co-distribution of electricity);
- Municipalities have varying capacities to reticulate electricity in the country, and a significant number of municipalities are in crisis, which impacts their ability to reticulate electricity sustainably and effectively;
- Quality and standards in the municipal distribution network have deteriorated with huge maintenance backlogs affecting security of supply; and
- Lack of investment in municipal infrastructure.

New Business Model for the Distribution Market

A Distribution Entity under Eskom Holdings will be formed and will be authorised to buy from the TE, licenced municipal generators and embedded generation. Embedded generation refers to small-scale residential and business generators. This will allow the separated distribution business to transparently manage a changing demand market more efficiently.

Further consideration will be given to the structure of the distribution sector as a whole, given the:

- a) Dependence of many municipalities on revenue from electricity tariffs; and the
- b) Development of roof-top solar and similar local embedded generation

This is a rapidly evolving area. A set of policy parameters appropriate to the current and medium-term should be formulated urgently.

⁷ The South African Energy Sector Report (2018)

ESKOM FINANCIAL SUSTAINABILITY

Current Status

Eskom remains the single largest risk to the South African economy in respect of its unsustainable debt levels and inability to provide sufficient electricity to support growth. Eskom has primarily survived on the back of strong Government support in the form of subordinated loans, direct equity injection and guarantees.

Since 2007, Eskom's electricity sales have been declining driven by increases in tariffs and the changing electricity generation market. Despite nominal tariff increases of more than 500% over this period, the tariffs have been inadequate to restore Eskom's financial sustainability due to escalating operating costs and cost overruns in the build programme. Coal costs have increased fivefold and payroll costs threefold over the past decade. Furthermore, municipal and Soweto debt arrears to Eskom now amount to R35.6 billion as at 30 June 2019 and are increasing steadily. The utility is currently not generating sufficient cash to cover debt service costs.

Addressing Eskom's Debt

As Eskom undertakes the structural, legal and operational changes enunciated in the "Roadmap for Eskom's Reform", continued liquidity and lender support will be critical. The South African Government has already given assurances and displayed its commitment to standing behind Eskom's liabilities within the fiscal constraints that the country faces.

A suite of interventions is required to return Eskom to financial sustainability, including maximising revenue, substantial cost reduction, operational turnaround and institutional restructuring. While these interventions are being executed to stabilise the entity, Eskom requires Government support to ensure that it can meet all its obligations and remain a going concern. In addition to the allocation of R23 billion per year for three years in the February 2019 budget, the Minister of Finance has tabled a Special Appropriation Bill that will allocate a further R26 billion in 2019/20 and further R33 billion for 2020/21. The R350 billion guarantee also remains in place.

There is a direct relationship between Eskom's operational efficiency, cost base and revenue generation on the one hand, and its future financial sustainability on the other. Any fiscal assistance provided, will be contingent on Eskom undertaking the immediate and short-term measures to improve its current operational performance.

National Treasury and the Department of Public Enterprises (DPE) are currently looking at the various mechanisms that could be employed to provide Eskom with appropriate debt relief within a responsible fiscal framework. In addition, and in return, Eskom will have to demonstrate progress with improvements in its operations, cost-cutting and undertaking the separation of its current business model into three entities as set out in the conditions.

Government has established the Chief Restructuring Office to consider a range of options to deal with Eskom debt and to advise Government accordingly. Fundamentally, the institutional reform of Eskom is critical to minimise the requirement for further Government support. The Minister of Finance will determine the appropriate treatment of debt in synch with the improvement of the operational performance and the execution of the institutional re-organisation.

With the announcement of the intended path to Eskom's reform, contained in this paper, capital providers must be assured that there will be transparent and clear communication on the process. As the potential solutions crystalize Government will undertake comprehensive consultations with the lenders, and particular attention will be paid to the following:

- Eskom is being restructured to become operationally and financially more sustainable;
- Eskom has the support of the Government to remain credit worthy and improve its overall credit rating over time;
- Government will stand behind Eskom to avoid a default (either financial or through some covenant breach) by the company; and
- The principles of fair treatment between lenders.

National Treasury have laid down the conditions that Eskom must adhere to for the proposed additional financial assistance to be provided which include the following:

Financial conditions

- Eskom to continue providing daily liquidity position updates and include sufficient detail on financing flows. Furthermore, Eskom to submit measures that will be implemented to manage the cash of the business within the funding limits to be provided by National Treasury.
- Eskom to submit and present quarterly management reports that are signed off by the Group Chief Executive Officer (GCEO), to include International Financial Reporting Standards (IFRS) Profit and Loss (P&L), Balance Sheet and Income Statements for Generation, Transmission and Distribution. The cash flow to be based on the current monthly management accounts at Eskom level, including commentary addressing all deviations from the annual budget that individually exceed ZAR500 million during the month. However, separate cash flows for the Generation, Transmission and Distribution to be submitted by 31 March 2020.
- The recapitalization will only be used to settle debt and interest payments and nothing else.
- Eskom must submit a monthly report on the amount and actions underway to recover all and any sums overdue (excluding the current accounts) for electricity sales, and for any debtor who owes in excess of ZAR 100 million. The first report must be submitted not more than a month from the enactment of the Bill.
- Eskom to provide monthly updates starting on 30 November 2019 on the status of actions being taken to maximize the cash value by either disposing of Eskom Finance Company or the loan book – target disposal prior to 31 March 2020.
- Eskom to report on the initiatives being implemented to reduce the primary energy costs (This includes the breakdown all items that makes up the primary energy costs). The first report must be submitted not more than a month from the enactment of the Bill and monthly thereafter.
- Eskom to provide a detailed cost, timing and benefit plan to the completion for Kusile and Medupi not more than a month from the enactment of the Bill.

Operational conditions

- Eskom to provide quarterly investment - plan on expected capex spend and rationale for each item individually in excess of ZAR 1.5 billion, including investment rationale and impacts of any deferral. The first report to be provided by not more than a month from the enactment of the Bill.
- Eskom must provide a report on the defects on the build programme and how they will be fixed by not more than a month after the enactment of the Bill, and quarterly thereafter.
- Eskom to provide regular monthly reports on the measures being implemented to improve the Energy Availability Factor (EAF) in line with its 9 Point plan and the approved Integrated Resources Plan 2019 to avoid further rotational load shedding.

Shareholder conditions

- DPE to ensure the appointment of the permanent GCEO by not more than a month from the enactment of the Bill.

- DPE to ensure that the Board is strengthened by 31 December 2019.
- DPE through the Board to ensure that Eskom's executive management performance agreement are linked to the Key Performance Indicators (KPIs) as contained in the shareholder compact and the conditions as set out by the Minister Finance by 31 December 2019.

Tariff Implications

The regulatory methodology for tariff setting for Eskom, municipalities and other licensees is regulated by National Energy Regulator of South Africa Act (NERSA), in compliance with the Electricity Regulation Act. The methodology was intended to create predictability and certainty in determining tariffs over a longer period. However, since the initial Multi-Year Determination there have been significant gaps between applied for and determined tariffs, which has eroded the intended certainty and predictability. This has also led to an increase in litigation between Eskom and NERSA, which creates further uncertainty on Eskom revenues. Furthermore, the lower tariff outcomes have worsened Eskom's financial position.

The finalisation of proposed amendments to legislation, the NERSA Amendment Bill is important to ensure that disputes over regulatory decisions can be resolved timeously by a competent body.

In addition, Government shall be seeking to direct NERSA on the implementation of the Electricity Pricing Policy to ensure that Eskom can fully recover efficient costs.

Wasteful and poorly managed expenditure

The expenditure culture in monopolies leads to wastefulness, lack of prudence and even neglect. A more intensive and tough process will be commenced to nullify this culture and identify new areas of savings. A tightening of cash management measures must be introduced.

Coal contracts

South Africa's competitive advantage in attracting industry for decades has been access to cheap coal for power generation. However, this advantage is being lost because of the rising electricity costs driven by coal costs and the Eskom build programme. At points during the past decade coal costs have at most times grown at double inflation. This is primarily due to poor and corrupt business decisions of not investing in cost plus mines and not procuring coal on a long term basis. Eskom now has a coal procurement strategy to reinvest in cost plus mines to reduce the rate of growth of coal costs as well as the extraction of efficiency on existing contracts.

Government has already engaged with coal suppliers to transparently review their cost structure, return on investment and a fair price/cost of coal to Eskom on existing contracts.

IPP contracts

The initial REIPPP contracts were concluded at higher energy prices and with substantial Government guarantees, in particular Bid Windows 1 to 3. Government has embarked on a process to engage industry on the possible reduction of prices. There has generally been willingness from industry to support this process in the interest of supporting the country's economic recovery. Discussions in this regard are continuing.

After a decade of experience with the current financial and guarantee model, there is a need to collectively engage in the development of a new model that takes into account the maturity of the process and, therefore, an appropriate risk sharing model.

A new approach to procurement

At the centre of Eskom's financial problems has been its inability to leverage its large procurement spend to achieve greater efficiencies and promote industrialisation. Furthermore, the lack of procurement controls has led to governance collapse in Eskom. Government will review an appropriate way for Eskom to procure in order to promote transparency, gain efficiency from large scale procurement and maintain value for money. Consideration will be given to different models of procurement to minimise corruption in key areas, including limiting Government liabilities and contingent liabilities.

Disposal and Partnerships of Certain Subsidiaries

In order to make Eskom as efficient and effective as possible, the disposal of non-core assets and subsidiaries continues. This will also contribute to the optimisation of Eskom's balance sheet. A process is under way to dispose of the Eskom Finance Company (EFC) with a target date of March 2020.

Recovery of outstanding fees

Non-compliance with respect to electricity fees payments needs to be addressed and resolved. Eskom management must demonstrate willingness to collect outstanding funds along with a call for all political entities, constituencies and civil society to come on-board to solve the current crisis of non-payment. This must include a campaign to improve the culture of payment at all levels and to recover municipal arrears from its equitable share transfers.

Execution of employee related cost savings initiatives

Eskom will conduct a review of unrealistic and unacceptably generous benefits which impose financial implications on the company.

Recovery of proceeds of corruption

Eskom has been at the heart of the state capture in South Africa and as a result has suffered severe damage which has directly led to its current financial and operational situation. Eskom demonstrates how public and private actors colluded to establish networks that clustered around the utility to corruptly extract benefit and rents from it [8]. Forensic investigations have revealed the abuse in a wide range of areas, including: the new build programmes of Medupi and Kusile Power Stations; the transmission projects associated with these builds; coal contracts; coal transportation; the contracting of a range of consultancies and service providers such as McKinsey, Trillian and Regiments Capital; the contracting of IT companies; and the involvement of several manufacturers. Of course, these activities were enabled and by Eskom employees and officials starting with the Board and Executive Management and then cascading down through the organisation. This situation has directly contributed to the Eskom's inability to sustainably provide electricity supply, the accumulation of mountains of debt, threaten the sovereign and have impacted disastrously on the potential for economic growth in South Africa.

Over the past two years Government and the new Eskom Board have implemented several measures to arrest the situation brought about by corruption. Eskom is reviewing various contracts, including those for coal and has stopped those contracts found to have been inflated. In its recent Annual Report Eskom stated that in already completed forensic reports 1,980 Eskom officials have been found not to have declared their business interests. The business wealth of these 131 officials alone are alleged to have engaged in business activities with Eskom to the value of R 5.7 billion. Several of these matters have been

[8] (Re)conceptualising State Capture – with a case study of South African Power Company Eskom, Catrina Godinho & Lauren Hermanus, October 2018

referred to the law enforcement authorities for criminal investigation and for the recovery of stolen assets.

Eskom has served notice on several companies and consultancy firms for improperly awarded work over the past decade. Already, Eskom has recovered R1 billion from McKinsey and R600m from Trillian. Several other consultancies and suppliers are under scrutiny and most recently Eskom has issued court papers against Deloitte Consulting for the setting aside of awards of contracts and recovery of funds amounting to R207 million relating to work done during 2016.

The Board has introduced new measures in Eskom to minimise the threat of threat of corruption and to build resilience within the utility, including the conduct of lifestyle audits on officials.

GOVERNANCE

The ravages of state capture demonstrate the importance of robust and transparent corporate governance and public oversight to protect our public resources. The leadership at both Board and management levels in Eskom must be commensurate with the nature of the challenges and aspirations reflected in this paper.

The Eskom Holdings Board will accordingly be reinforced with individuals with the appropriate skillset, while a new CEO for Eskom Holdings will be appointed soon.

A new Transmission Entity will be established in the shortest time possible. This will enable the appointment of a new independent Board to oversee the governance and operations of the Transmission Entity. This Board will appoint a CEO and a management team. A set of interim arrangements may be authorised by Government to facilitate the accelerated implementation.

IMPLEMENTING A “JUST TRANSITION”

The Climate Justice Alliance defines the Just Transition as follows:

“Just Transition is a vision-led, unifying and place-based set of principles, processes, and practices that build economic and political power to shift from an extractive economy to a regenerative economy. This means approaching production and consumption cycles holistically and waste-free. The transition itself must be just and equitable; redressing past harms and creating new relationships of power for the future through reparations. If the process of transition is not just, the outcome will never be. Just Transition describes both where we are going and how we get there.”

The National Development Plan provides the basis for a Just Transition “towards a low carbon emission economy”. Chapter Five of the NDP reminds us that South Africa has a rich endowment of natural resources, which is a relatively cheap and reliable source of energy. The NDP warns that this “could prejudice South Africa’s interests as global restrictions on carbon emissions to mitigate climate change are introduced” and that in anticipation of this, the country must leverage its solar resource and regional hydropower opportunities as competitive advantages, in parallel with the responsible exploitation of fossil fuels and minerals.

The pillars of South Africa’s Just Transition process include:

- To create an *inclusive* economy based on the cheapest energy available that attracts the largest amount of investment and creates jobs on scale.
- To protect and grow jobs, particularly in the downstream value chain, on the back of low-cost energy. The reform process will provide retraining and bridging opportunities for Eskom, power station and coal sector workers. This will be supported by a massive energy-related industrialisation programme (centred around Mpumalanga) with very high export potential, especially into Africa⁹.
- To enable energy access and security to all South Africans, particularly poor and vulnerable communities.
- Following current trends, to construct a decentralised energy grid infrastructure in South Africa’s small towns (e.g. Upington, De Aar, Alice, etc.), which will have a positive impact on spatial inequality.
- To provide a social safety net for those that are not able to transition to these new opportunities.

Government, together with labour and civil society, is in the process of formulating an appropriate pro-poor “Just Transformation” strategy and process. A joint working group to develop an operational plan for the just transition has been established. Eskom is committed to and will actively participate in this process, which will guide its investments and reform process.

The elements of the Just Transmission include:

Sustainability for Workers

The decommissioning of plants will impact on labour. Government will ensure that Eskom manages its decommissioning of coal-fired power stations in a responsible manner that takes into account the interests of all stakeholders.

South African trade unions have demanded “better work” for their members. Fortunately, the shift away from coal to other newer technologies offers this. This particular transition also offers the prospect of more jobs in the economy than the current coal-fired power station economy. The creation of an inclusive economy based on the cheapest electricity available will attract the largest amount of

⁹ It is estimated that a total of R500 billion (half a trillion) worth of renewable energy infrastructure will need to get built.

investment and creates jobs on scale. Most jobs will be in the downstream value chain, on the back of low-cost energy, not in energy supply itself.

Eskom will consider establishing a Fund for the retraining and re-skilling of workers to enable them to access opportunities within the burgeoning renewables sector.

South Africa's Climate Change Position

South Africa acknowledges the climate crisis and the pressing challenge this poses to humankind and the planet. The science shows that climate change will impact the poor the most, and that the African continent is especially vulnerable.

Climate change requires urgent and ambitious multilateral action by all countries and actors to meet the objective of limiting global average temperatures to an increase of 1.5 degrees, to adapt to inevitable climate impacts, and to ensure that the necessary international support is available to achieve these goals.

Climate change is both a challenge to and an opportunity for equitable, just and sustainable economic and social development. As a developing country we understand that the climate crisis cannot be solved outside of a development context, and is integrally linked to our ability to meet our Millennium Development Goals.

South Africa is committed to meeting its nationally determined contribution to achieving emissions targets as set out in the United Nations Convention to Combat Climate Change, its Kyoto Protocol and the Paris Agreement. Accordingly our National Climate Change Response Policy sets out how we will make a fair contribution to the global effort to address climate change, in the context of our national development priorities.

Given our current energy mix, the mitigation challenge posed to South Africa is considerable. Over 80% of our emissions¹⁰ are from our energy sector. Building a climate resistant society must strengthen development. Our shift to a low-carbon development path and embracing of the global energy transition must not only NOT leave anyone behind, but must at the same time create new opportunities for all in our economy.

IRP Commitments

The IRP 2019 intends to:

- Increase the share of renewable energy capacity to approximately 40% by 2030;
- Add other forms of clean energy, including hydro and nuclear; and
- Close existing power stations according to their stated de-commissioning schedules.

South Africa's Just Transition will utilise the following key opportunities:

- South Africa's abundance of wind and solar resources, which present an attractive return on investment;
- Access to concessionary funding for investing in renewables in Africa, plus unlimited non-concessionary funding in highly competitive markets, which will reduce the cost of capital;
- Modernisation of the grid to facilitate adding wind and solar resources in a decentralised manner to target development in the most impoverished areas;
- Reduce electricity access and costs to scale up inclusive economic growth and job creation; and
- Build the necessary skills for managing the entire value chain, from R&D (for example in partnership with CSIR and Universities), manufacturing, construction and operations.

¹⁰ 83.9% of net GHG emissions in 2015

Eskom's Plan for Reducing Emissions

Eskom's commitment to reduce its environmental footprint and its carbon emissions is guided by South Africa's international commitments and domestic legislation. Aside from our commitments to reduce greenhouse gases, the 2010 Minimum Emission Standards require Eskom to take incremental steps to reduce emissions of sulphates, nitrates and particulate matter.

To date Eskom has invested in technology to reduce particulate matter and nitrogen oxides in the majority of its coal fired power stations. Kusile has already been retrofitted with Flue Gas Desulphurisation (FGD). This process is currently also being implemented at Medupi. Eskom plans to spend R46 billion (real) or R67 billion (nominal) to reach environmental compliance. In addition, an estimated R2 billion will be spent on an offset project in domestic dwellings. While there are risks in timeous completion of these projects, there is commitment to meet MES.

Power stations scheduled for decommissioning by 2030 are not required to comply in all respects with new plant standards for emissions. Stations that will operate beyond 2030 must comply with new plant standards for emissions by 2025. Estimates of capital requirements will need to be revised in line with the decommissioning schedule.

Absolute decline in emissions from 2035 to optimistic indicative levels in 2050 infers that apart from Eskom's Kusile, Medupi, Majuba and Kendal power stations (based on plant age), all other coal-fired power stations must be decommissioned between 2035 and 2050 and replaced with zero-carbon emitting technology or operated at lower load factors.

Sustainability for communities

Government has recognised that the evolving electricity landscape, including smaller scale power generation technologies, creates an opportunity for the private sector and communities to invest in this sector. South Africa's rich solar and wind endowments hold the promise of a long-term comparative advantage in renewable power costs. A self-sustaining renewable energy development boom is therefore inevitable and presents large scale employment opportunities across the country. This transformation will have positive impacts on spatial inequalities, including diminished demographic pressures on the already over-burdened metropolitan areas and inclusive economic growth opportunities in the tertiary urban centres, which have previously had no viable tax bases.

As the transition unfolds, Government has an obligation to support these affected communities to adapt to the new opportunities and ensure that no one is left behind.

In the National Interest

Given the urgent need to resolve the crisis, the outcome of the Just Transition Process must agree on a new contract among social partners. Consideration will be given to establish 'Our electricity contract' which will require commitment from Government, business and labour.

Smart Grid

The management of power grids across the world is evolving to allow energy to flow into and out of the transmission grids in a decentralised manner as the technology intensifies. Evolving technologies, such as artificial intelligence, internet of things and improved connectivity is leading to power grids becoming more digitally automated. Eskom's Smart Strategy is to deploy smart capabilities despite limited resources through well-managed and incremental deployment. This will enable Eskom to respond to evolution in the electricity market which is already threatening to disrupt current revenue streams and business models.

IMPLEMENTATION OF ROADMAP

To ensure that the new direction for South Africa’s Electricity Supply Industry is achieved, a number of governance, support and execution offices will be established.

Restructuring and Reform Office - An interdepartmental office hosted by the Department of Public Enterprises and focusing on both Eskom and ESI restructuring, will be established and staffed by Government officials; and

Eskom’s Programme Office - Implementation of the Turnaround Plan within Eskom to look at cost saving, operational recovery and separation.

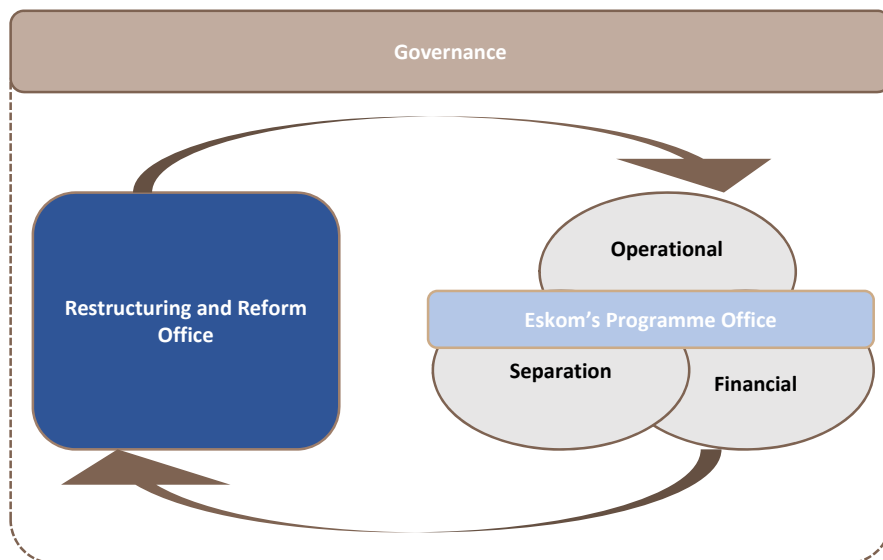
Table 4: Implementation Plan with key objectives for 2019 & 2020

Date	Generation	Finance	Restructuring
Nov ‘19	Roll out of Turnaround communications strategy Stakeholder Buy-In		
Dec ‘19	EAF:70%	Cost saving initiatives - Coal: Confirm baseline (R/ton) - Procurement: Confirm baseline (Negotiated percentage saved) Sales growth: Confirm baseline (Volume) Municipal Debt: Finalisation of Agreement	P&Ls established Org design approved PPAs and ESAs drafted
Jan – Mar ‘20	EAF: 73%	Cost saving initiatives - Coal - Procurement Sales growth Municipal Debt	Interim board and CEO appointed of TE
Apr – Jun ‘20	EAF:73%	Cost saving initiatives - Coal - Procurement Sales growth Municipal Debt	Support systems and functions complete
Jul – Sep ‘20	EAF:75%	Cost saving initiatives - Coal - Procurement Sales growth Municipal Debt	Legal requirements finalised
Oct – Dec ‘20	EAF:75%	Cost saving initiatives - Coal - Procurement Sales growth Municipal Debt	Functional unbundling of TE: complete

Table 5: Implementation Plan with key objectives 2021 & 2022

Date	Generation	Finance	Restructuring
Jan – Mar '21	EAf: 76%		
Apr – Jun '21	EAf: 78%	Cost saving initiatives - Coal - Procurement Sales growth Municipal Debt	Functional separation of Generation and Distribution complete
Jul – Sep '21	EAf: 78%	Cost saving initiatives - Coal - Procurement Sales growth Municipal Debt	
Oct – Dec '21	EAf: 76%	Cost saving initiatives - Coal - Procurement Sales growth Municipal Debt	Complete creation and operation of TE as a legal subsidiary of Eskom Holdings
Jan – Jun '22	EAf: 77%	Cost saving initiatives - Coal - Procurement Sales growth Municipal Debt	
Jul – Dec '22	EAf: 77%	Cost saving initiatives - Coal - Procurement Sales growth Municipal Debt	Complete creation and operation of Generation and Distribution as a legal subsidiary of Eskom Holdings

Figure 9: Implementation governance, support and execution offices



The critical variable in the success of the restructuring of Eskom will be leadership by Eskom board, management and other stakeholders. This requires commitment, disciplined execution, transparency, accountability and the firm adoption of consequence management. This road-map constitutes a common platform for all stakeholders to put Eskom on a path to recovery and restructuring.

CONCLUSION

This Paper outlines Government's roadmap for the future of Eskom and the electricity supply industry. In addition, the Paper provides the immediate issues to be addressed and time frames for implementation. Government is acutely aware that Eskom's crisis poses a massive systemic risk to the country, the economy and the people. Government has to act urgently to reform the electricity supply industry and Eskom. The Plan presented for Eskom's reform highlights three main propositions:

- i) The first step is to functionally separate Generation, Transmission and Distribution. This will allow for greater transparency and increase the efficient functioning of the three entities, while reducing the risks. Each legal and functional entity will become independently responsible for its operations and outcomes and will be measured separately for performance. In addition, while coal will fuel the existing plants until the end of their lifetime, the reformed structure will begin to increase the share of renewables in terms of the IRP. This is also in line with the global momentum
- ii) A Transmission Entity will be established as a separate entity within Eskom. This entity will act as both a Systems Operator that will invest in and manage the transmission grid, and as a Market Operator to balance demand with supply on a least cost basis.
- iii) Eskom's debt and poor financial state is a major threat to Eskom's going concern status and the country's fiscus. The Paper outlines intervention to address the utility's financial stability which a debt solution is being considered

The Paper demonstrates Government's commitment to a pro-poor just transition process, particularly any impact on workers and communities while complying with the agreed reduction of emissions levels.

ANNEXURES

DISTRIBUTION

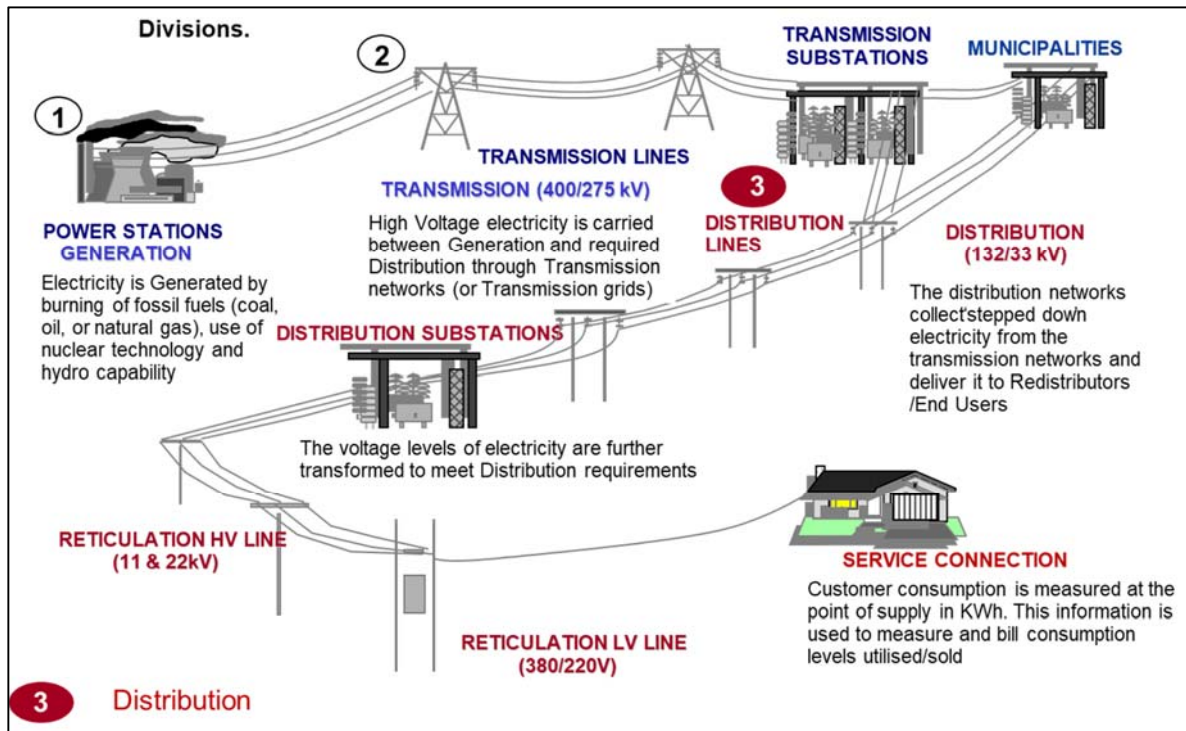
The flow of electricity

Electricity is generated at a power plant and transmitted on high-voltage power lines, then distributed to customers on local power distribution lines. As the generated electricity leaves the power station, the electricity is boosted by a step-up transformer to voltages such as 132 000 volts (132 kV) or 400 kV or 765 kV. These very high voltages are necessary to push the required flow of electricity through the wires and keep costs down.

Prior to reaching customers, the electricity is transformed down to 11 000 volts (11 kV) for local distribution and then further reduced according to the need for example, 240 or 220 volts for domestic use. Thus, the electricity entering homes at 240 volts has had to journey from the initial high voltage transmission grid to a lower voltage distribution network.

The distinction between transmission and distribution lines is not a hard and fast rule, but generally, distribution lines tend to have below 50 000 voltages. The full electricity value chain is reflected in figure A below.

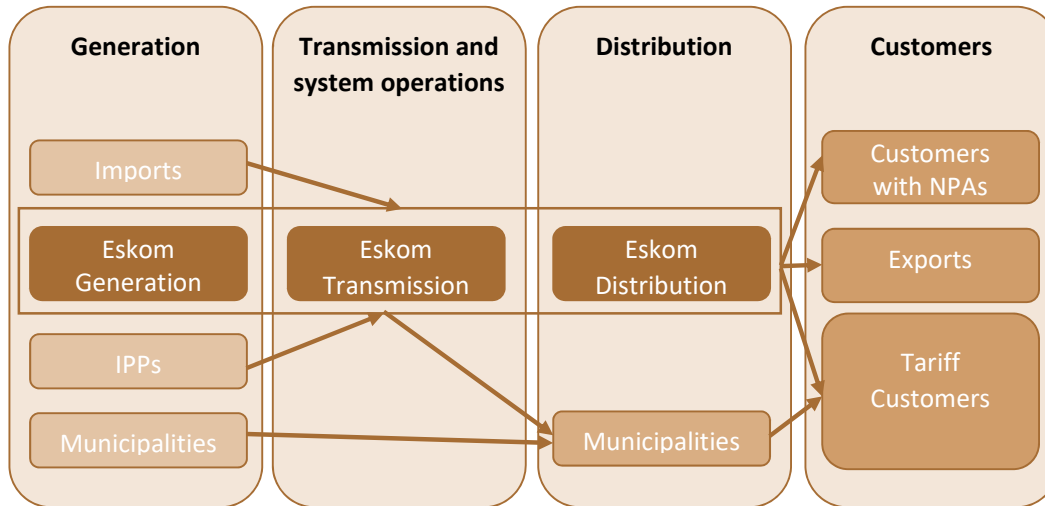
Figure A: Electricity value chain



South African electricity distribution industry structure

As shown in Figure B, the Electricity Distribution Industry (EDI) is a vital link between the supplier, usually Eskom and Municipalities (in the South African context) and customers that buy and use electricity.

Figure B: South African Electricity Supply Industry Structure



Source: Genesis

Eskom

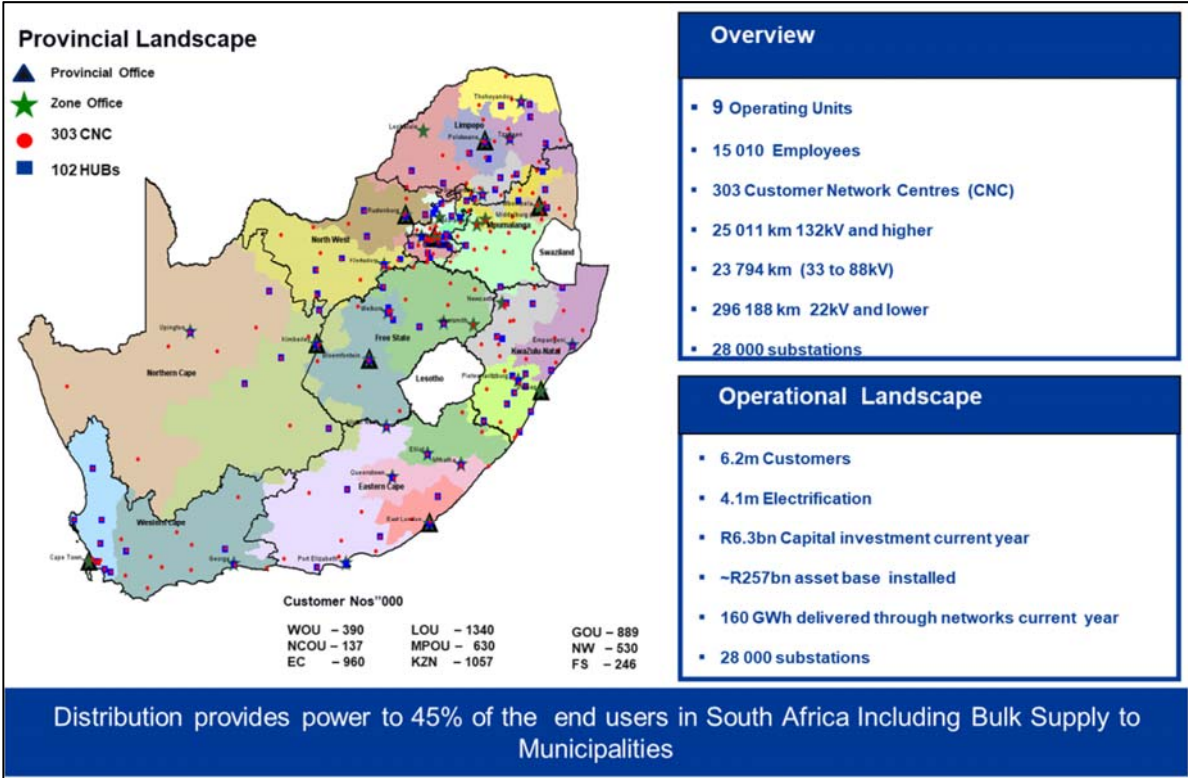
In South Africa, Eskom generates, transmits and distributes electricity to industrial, mining, commercial, agricultural and residential customers, as well as municipalities, who in turn redistribute electricity to businesses and households within their areas. Eskom also purchases electricity from Independent Power Producers (IPPs) in terms of various agreement schemes, as well as electricity generating facilities beyond the country's borders.

A distribution operation, constructs and maintains equipment that transforms the power supply to the type that meets the customer's needs, meters the amount the customer uses, provides the appropriate billing and collects the payments. Distribution operations (the current Distribution industry in South Africa) have been managed by Eskom and some local Governments (municipalities).

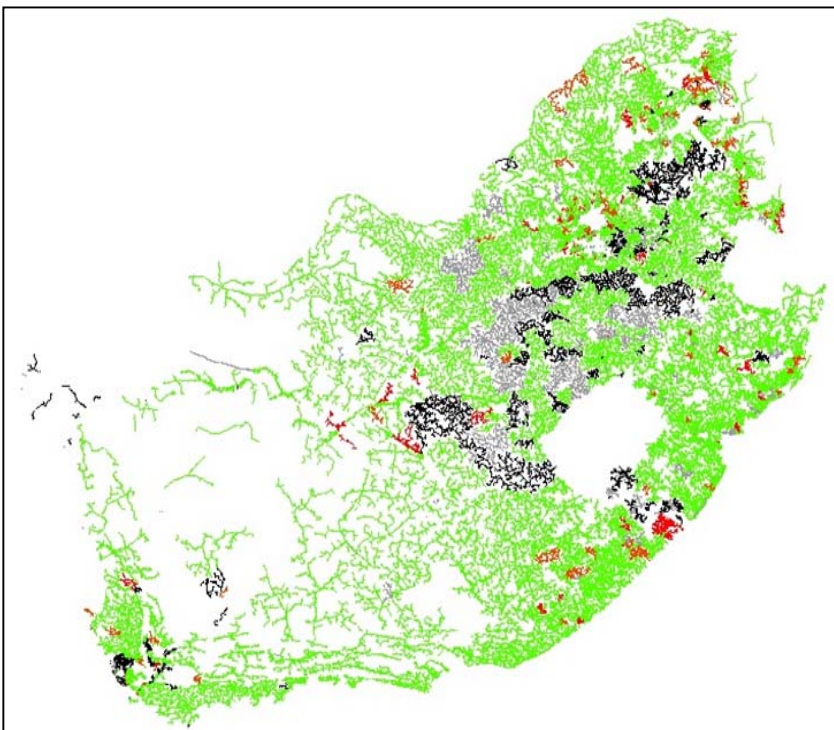
The South African Energy Sector Report (2018) indicates that Eskom owns about 48 805 km of distribution lines, 296 188km of reticulation power lines and 7 499km of underground cables in South Africa, representing the largest power-line system in Africa. Eskom Distribution provides power to 45 per cent of the end users in South Africa, including bulk supply to municipalities. The extent of Eskom's Distribution Division is further outlined in Map 1 below.

Eskom's Distribution Division's network coverage has 91 per cent visibility at high voltage (HV) and medium voltage (MV), enabling real time management of major outages. Figure 3 provides an indication of the coverage of Eskom's Distribution network.

Map1: Eskom Distribution Division Provincial landscape



Map 2: Eskom Distribution Network Coverage



Municipalities

Municipalities have the executive authority for electricity reticulation as per Schedule 4 of the Constitution; however, a large number of customers are supplied directly by Eskom as some municipalities do not provide electricity reticulation services and rely on Eskom as a distributor. The municipal distributors buy bulk electricity from Eskom, with some also generating small amounts for sale in their areas of jurisdiction. The operation of distribution facilities varies between regions and municipalities.

GENERATION AND THE IRP

Current Generation

Electricity generation in South Africa is primarily provided by Eskom, together with Independent Power Producers (IPPs) and imported power through the Southern Africa Power Pool (SAPP). Eskom Generation currently exists of the following (refer to Table A):

Table A: Eskom Power Station Capacities as at 31 March 2019

(The difference between installed and nominal capacity reflects auxiliary power consumption and reduced capacity caused by the age of plant.)

Name of station	Location	Years commissioned first to last unit	Number and installed capacity of generator sets MW	Total installed capacity MW	Total nominal capacity MW
Generation Group power stations					
Base-load stations					
Coal-fired (15)				40 170	36 479
Annot	Middelburg	Sep 1971 to Aug 1975	1x370; 1x390; 2x396; 2x400	2 352	2 232
Camden 1, 2	Ermelo	Mar 2005 to Jun 2008	3x200; 1x196; 2x195; 1x190; 1x185	1 561	1 481
Duvha 6	Emalahleni	Aug 1980 to Feb 1984	6x600	3 600	2 875
Grootvlei1,7	Balfour	Apr 2008 to Mar 2011	4x200; 2x190	1 180	570
Hendrina 2,6,7	Middelburg	May 1970 to Dec 1976	5x200; 3x195; 1x168, 1x170	1 728	1 293
Kendal 3	Emalahleni	Oct 1988 to Dec 1992	6x686	4 116	3 840
Komati 1,7	Middelburg	Mar 2009 to Oct 2013	4x100; 4x125; 1x90	990	410
Kriel	Bethal	May 1976 to Mar 1979	6x500	3 000	2 850
Lethabo	Vereeniging	Dec 1985 to Dec 1990	6x618	3 708	3 558
Majuba 3	Volksrust	Apr 1996 to Apr 2001	3x657; 3x713	4 110	3 843
Matimba 3	Lephalale	Dec 1987 to Oct 1991	6x665	3 990	3 690
Matla	Bethal	Sep 1979 to Jul 1983	6x600	3 600	3 450
Tutuka	Standerton	Jun 1985 to Jun 1990	6x609	3 654	3 510
Kusile3	Ogies	Aug 2017 to	1x799; 5x800	799	720
Medupi3	Lephalale	Aug 2015 to	3x794; 3x794	2 382	2 157
Nuclear (1)					
Koeberg	Cape Town	Jul 1984 to Nov 1985	2x970	1 940	1 860
Peaking stations					
Gas/liquid fuel turbine stations (4)				2 426	2 409
Acacia	Cape Town	May 1976 to Jul 1976	3x57	171	171
Ankerlig	Atlantis	Mar 2007 to Mar 2009	4x149.2; 5x148.3	1 338	1 327
Gourikwa	Mossel Bay	Jul 2007 to Nov 2008	5x149.2	746	740
Port Rex	East London	Sep 1976 to Oct 1976	3x57	171	171
Pumped storage schemes (3) 4				2 732	2 724
Drakensberg	Bergville	Jun 1981 to Apr 1982	4x250	1 000	1 000
Palmiet	Grabouw	Apr 1988 to May 1988	2x200	400	400
Ingula	Ladysmith	June 2016 to Feb 2017	4x333	1 332	1 324
Hydroelectric stations (2) 5				600	600
Gariep	Norvalspont	Sep 1971 to Mar 1976	4x90	360	360
Vanderkloof	Petrusville	Jan 1977 to Feb 1977	2x120	240	240
Total Generation Group power station capacities (25)				47 868	44 072

Name of station	Location	Years commissioned first to last unit	Number and installed capacity of generator sets MW	Total installed capacity MW	Total nominal capacity MW
Renewables power stations					
Wind energy (1)					
Sere	Vredendal	Mar 2015	46x2.2	100	100
Solar energy					
Concentrating solar power	Upington	Under construction	100	-	-
Other hydroelectric stations (4)				61	-
Colley Wobbles	Mbashe River		3x14	42	-
First Falls	Umtata River		2x3	6	-
Ncora	Ncora River		2x0.4; 1x1.3	2	-
Second Falls	Umtata River		2x5.5	11	-
Total Renewables power station capacities (5)				161	100
Total Eskom power station capacities (30)				48 029	44 172
Available nominal capacity - Eskom owned					91.97%

Source: Eskom

The non-Eskom Generators used in Integrated Resource Planning (IRP) are detailed below in Table B, while the IPPs in commercial operation and future projects per Province are detailed in Table 3 below. The information in Table C is provided by the National Energy Regulator of South Africa (NERSA) to Eskom, with Cahorra Bassa included for completeness.

Table B: Non-Eskom Generators used in IRP Planning

Generator	Capacity (MW)
Kelvin	324
Sasollinfrachem_Coal	128
SasolSynfuel_Coal	600
Sasollinfrachem_Gas	175
SasolSynfuel_Gas	252
Cahora Bassa	1,110
Mondi	145
SappiNgodwana	117
Steenbras	180
Other_Gas	77
Other_CoGen	220
Other_Hydro	10
Total	3,338

Source: Eskom

Table C: IPPs in commercial operation and future projects per Province

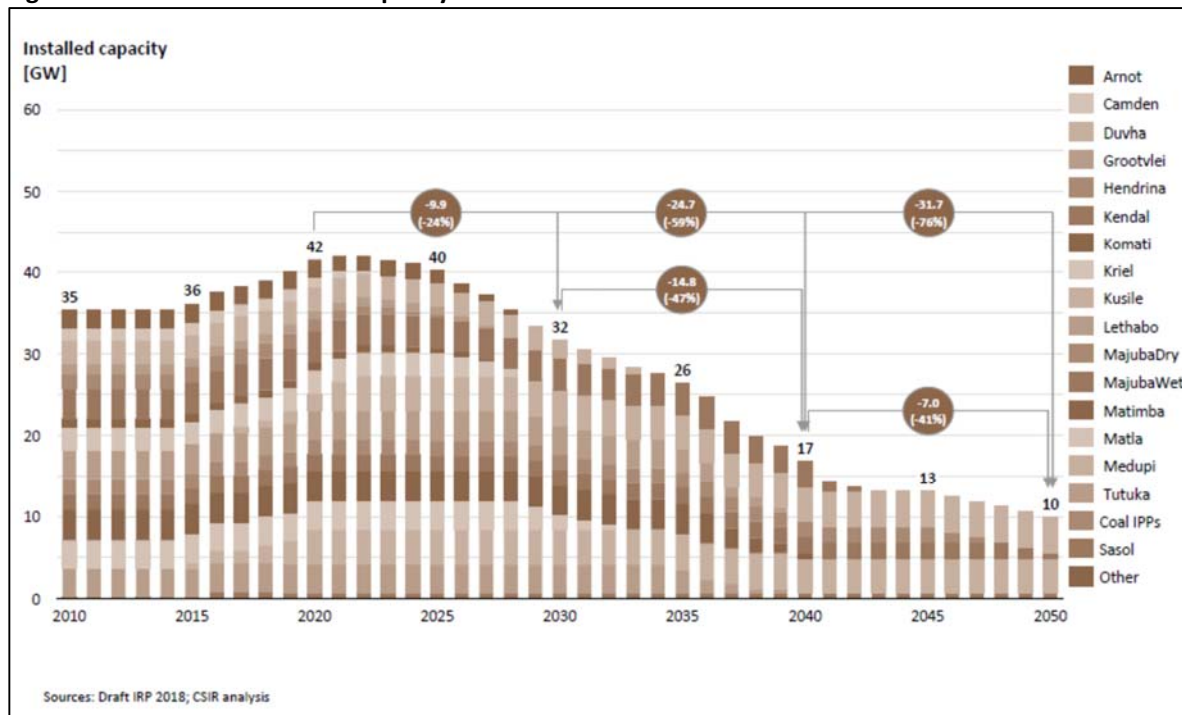
Region	Province	Projects in Commercial Operation (CO)		Projects Commercial operation Date (COD) in Future	
		Projects CO	Contracted MW	Projects COD in Future	Contracted MW
REGION 1	Western Cape (WC)	9	452,540	2	139,690
	Eastern Cape (EC)	14	1414,512	4	429,320
REGION 2	North West (NW)	1	6,930	4	267,900
	Northern Cape (NC)	33	2127,040	15	1438,830
	Free State (FS)	4	203,400	1	4,700
	Kwa-Zulu Natal (KZN)	1	669,928	0	0,000
REGION 3	Gauteng (GP)	1	11,000	0	0,000
	Limpopo (L)	3	118,000	0	0,000
	Mpumalanga	0	0,000	1	25,000
Total		66	5003,350	27	2305,410

Source: Eskom

Generation’s link to the IRP

Installed coal generation capacity is expected to decline from 2021 with the decommissioning of older power stations such as Camden, Grootvlei and Hendrina. The commissioning of all units at Medupi and Kusile is expected to increase the coal power capacity to 42 Gigawatts (GW). The IRP also includes the coal Independent Power Producers, i.e. Thabametsi (630 MW) and Khanyisa (300 MW) to come online in 2023/24.

Figure C: Installed Generation Capacity



In the forecasting period, over the next few years, improvement in Eskom plant efficiency is planned to increase to 80 per cent, due to improved maintenance, the completion of generation capital projects, and decommissioning of “least-cheap” power stations. However, integration of plans to recapitalise cost-plus

mines and recovery of sunk costs for environmental compliance impact (on plant performance), need to be included in the base-case and not as an IRP scenario.

The IRP assumes that 2,600 MW of embedded electricity generation will be added by households and businesses for their own use, at a rate of 200 MW a year. This is expected to boost investment from consumers to buy technologies aimed at selling electricity back to the national grid. Investment into management of micro grids and bidirectional electricity flow is needed in order to manage the flexible electricity generation stated in the IRP.

In 2030, total installed photovoltaic (PV) generation is expected to be 7,958 MW. Existing wind generation was 1,980 MW in 2018, while 1,362 MW is committed to be commissioned by 2021. There is then a three-year gap with another 8,100 MW to be installed from 2025 to 2030, adding up to a total of 11,442 MW. The gaps in commissioning PV and wind generation will likely deter investment in factories producing components for the renewable industry.

TRANSMISSION

Current transmission business

Transmission owns numerous sub-stations and transformers, with approximately 33,000km of transmission lines and has a national footprint in South Africa as detailed below in Tables D and E, as well as Map 3.

Table D: Eskom Transmission Substations

Transmission substations	28/08/2019
No. of substations	167
No. of transformers (> 30 MVA)	443
Transformer MVA installed (>30MVA)	152 135

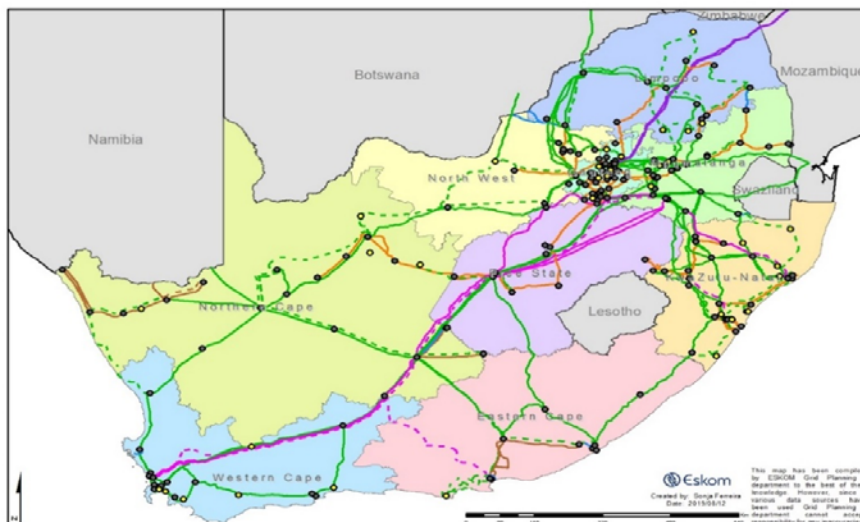
Source: Eskom

Table E: Eskom Transmission Lines

Transmission lines	28/08/2019
765 kV	2 784km
533 kV HVDC	1 032km
400 kV	19 523km
275 kV	7 222km
220 kV	1 352km
132 kV	889km
Total	32 802km

Source: Eskom

Map 3: Eskom's Transmission Lines



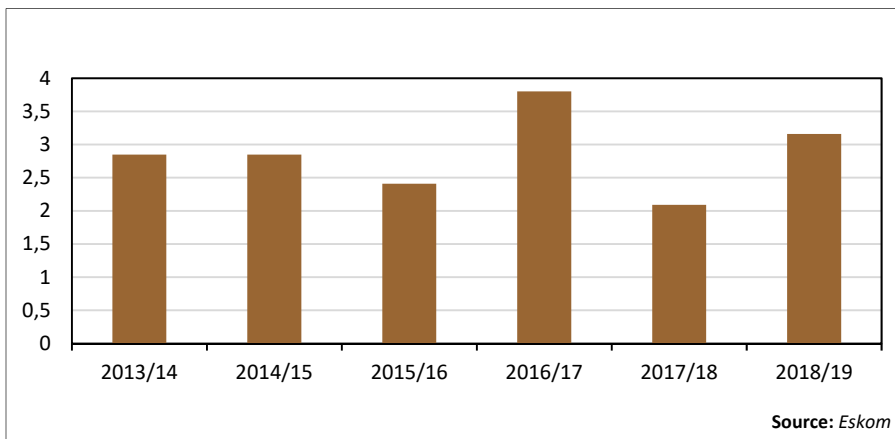
Source: Eskom

Transmission is also the interface with the Southern African Power Pool (SAPP), which was created in August 1995, when member Governments of the Southern African Development Community (SADC) (excluding Mauritius) signed an Inter-Governmental Memorandum of Understanding for the formation of an electricity power pool in the region under the name of the Southern African Power Pool. The ministers responsible for energy in the SADC region signed the Revised Inter-Governmental Memorandum of Understanding on 23 February 2006.

The transmission network performance

Overall transmission network performance, over the past 5 years, has deteriorated slightly and requires capital for replacement. The system minutes lost due to interruptions on the transmission network have increased from 2.85 minutes to 3.16 minutes (refer to Figure D).

Figure D: Transmission Network Performance System Minutes Lost



The reduced performance of the transmission network is due to the fact that the average age of transmission line assets ranges between 30-40 years, which is midlife for these types of assets (refer to figures E and F). Given this reality, there is a 10-year transmission refurbishment plan in place and it is based on asset condition assessments, asset criticality and network risks. The 10-year transmission refurbishment plan is incorporated into the 10-year transmission development plan.

Figure E: Transmission Substation Asset Age Profile

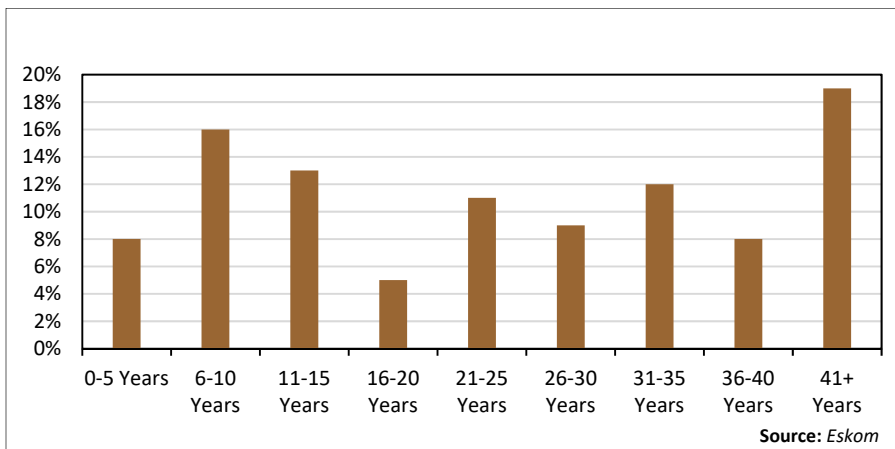
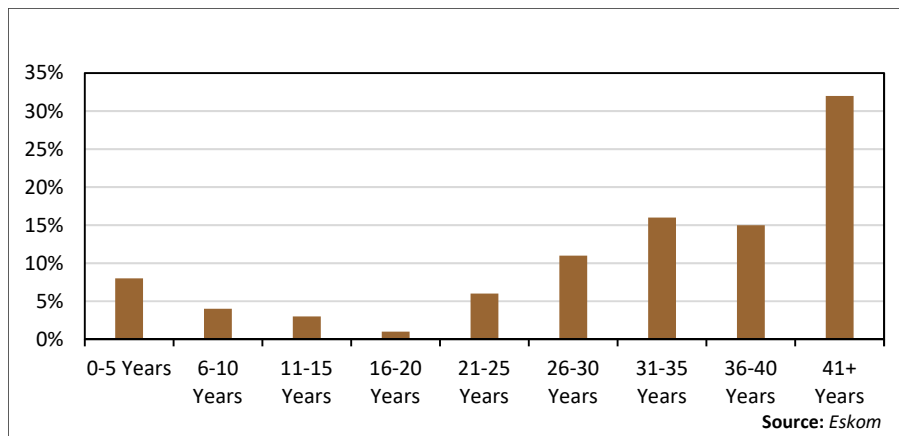


Figure F: Transmission Lines Asset Age Profile



Transmission Entity (TE) roadmap

Given these challenges and the technological change faced by the electricity network, a new roadmap of actions in the short, medium and long term is required if South Africa is to have an Electricity Supply Industry (ESI) that can serve adequately as a platform for economic development.

A major element of the turnaround is separation of the transmission activities, which has significant benefits for both Eskom and South Africa, as follows:

- It will create transparency within Eskom and the industry.
- A separate transmission company will boost investor confidence, as independence is assured (dispatch, contracting open grid access).
- This will enable security of supply through increased investment.
- It will foster accountability within the remainder of Eskom.
- It will allow South Africa (and Eskom) increased flexibility to adjust the future trajectory of the industry.

Timelines for Creation of Transmission Entity 100% Owned by Eskom Holdings

The following timeline outlines how the functional separation will take place. There are various activities that need to be undertaken to functionally unbundle Eskom. Firstly, an organisational design based on a new mandate and the activities the entity will undertake need to be defined. How debt will be allocated (if required) needs to be defined and lenders engaged. If a new legal entity is to be formed such as a subsidiary, then there are various legal processes that will need to be followed and legislation may need to be changed by Government. A trading system (internally to start) followed by legal contracting when required, will need to be evolved as market rules and structure becomes clearer.

During the last Eskom reorganisation, many functions were centralised. In order to reverse this, firstly service functions like Human Resources, Finance and Procurement have already been relinked back into the line functions, i.e. Distribution, Generation and Transmission (3704 people in total). However, in order to have a fully functioning standalone entity, it is necessary to relink the balance of centralised people, based on the agreed mandates (estimated to be a further 6000 people). The final step that needs to happen is for all the finance and other IT systems to be uncoupled and reorganised to allow independent operations. These processes are very complex and need to be carefully managed in order to ensure that operations are not disrupted.

The high level plan for the functional separation of Transmission is detailed below.

Figure G: Implementation plan for the creation of the Transmission Entity



ESKOM TARIFFS

Economic regulation of Eskom's tariff

The National Energy Regulator of South Africa (NERSA) is responsible for the regulation of the electricity prices as per the Electricity Regulation Act and the NERSA Act.

Eskom makes a tariff application based on the Multi Year Price Determination (MYPD) methodology, as set out by NERSA. The MYPD process entails Eskom submitting a tariff application to NERSA in which it provides the information required for the regulator to evaluate the tariff application. The following formula must be used to determine the Allowable Revenue (AR):

$$AR=(RAB \times WACC)+E+PE+D+R\&D+IDM \pm SQI+L\&T \pm RCA$$

Where:

AR	=	Allowable Revenue
RAB	=	Regulatory Asset Base
WACC	=	Weighted Average Cost of Capital
E	=	Expenses (operating and maintenance costs)
PE	=	Primary Energy costs (inclusive of non-Eskom generation)
D	=	Depreciation
R&D	=	Costs related to research and development programmes/projects
IDM	=	Integrated Demand Management costs (EEDSM, PCP, DMP, etc.)
SQI	=	Service Quality Incentives related costs
L&T	=	Government imposed levies or taxes (not direct income taxes)
RCA	=	The balance in the Regulatory Clearing Account (risk management devices of the MYPD)

The MYPD methodology is based on forecasts of costs and revenue during the time of application and NERSA applies the Regulatory Clearing Account (RCA) tool to reconcile the difference at the end of each financial year. The RCA is an account in which all potential adjustments to Eskom's allowed revenue, that has been approved by NERSA, is adjusted in favour of customers or Eskom based on the MYPD methodology. NERSA decides on how long the RCA balance is going to be liquidated in order to minimize the impact of increases on the customers.

Implementation of MYPD methodology

Eskom applies to NERSA for a tariff application for a period, normally three financial years. On 12 September 2018, Eskom applied to NERSA for the tariff increase of 15 per cent for each of the three year periods (i.e. 2019/20, 2020/21 and 2021/22 financial years). The major contributors to Eskom's revenue application are the debt service costs represented by depreciation and returns, primary energy costs and operating costs.

On 07 March 2019, NERSA approved standard tariff increases of 9.41 per cent, 8.10 per cent and 5.22 per cent for MYPD4 for financial years 2019/20, 2020/21 and 2021/22 respectively. This was lower than the 15 per cent applied for by Eskom, indicating that there are misalignments in the implementation of the MYPD methodology. Furthermore, NERSA has approved a Regulatory Clearing Account balance of R3.9 billion for the 2017/19 financial year, which were lower than R21.6 billion applied for by Eskom.

Challenges on implementation of MYPD methodology

Eskom has been receiving tariff increases below what was applied for. This misalignment between Eskom and NERSA has a negative impact on the price certainty experienced by customers. Eskom indicated that current tariffs are not cost reflective as this negatively impacts on both financial and operational sustainability of the SOC. Currently the regulatory framework does not have a clause on the dispute resolution mechanism between the parties. Eskom is relying on the High Court process, which is ineffective and protracted process. NERSA has not been responding timeous on Eskom's tariff and RCA application and this has compromised the implementation of the MYPD decision.

Although Eskom applies for tariff applications for Generation, Distribution and Transmission licences, NERSA offers a price increase for Eskom Holdings.

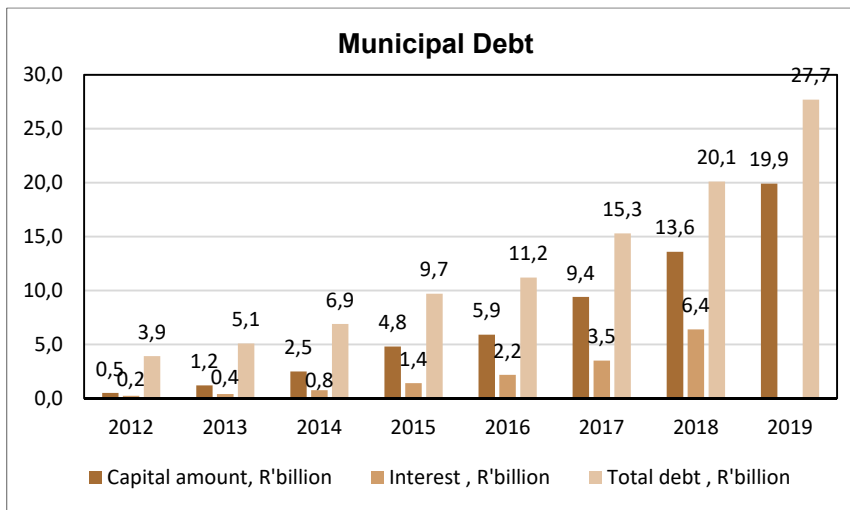
Solution to implementation of MYPD methodology

The finalisation of the NERSA Amendment Bill will improve the governance of the MYPD methodology. With the changes in the structure of Eskom, there is a need by NERSA to review the MYPD methodology in line with the new structure. The Country needs to develop a long-term price path to provide certainty to investors.

MUNICIPAL DEBT

The municipal arrear debt has over the years continued to escalate and amounted to a total R36.5billion (including interests) as of 30 June 2019. This figure represents about 71.7 per cent of total invoiced municipal debt (including interests). Figure 1 below depicts the escalation of municipal arrear debt over an eight-year period. The top 20 municipalities account for 81 per cent of the total invoiced municipal arrear debt, while Free State municipalities owe almost 44 per cent of the current debt.

Figure H: Escalating Municipal Arrear Debt



Source: Eskom

From an Eskom perspective, all legal avenues at its disposal to collect the amounts due (including interruption of supply to defaulting municipalities) have been exhausted, with no success in resolving the municipal debt crisis.

Financial sustainability and non-payment

Eskom has suffered serious financial losses as a result of non-payment of electricity accounts by certain municipalities and many Soweto residents. These two groups of nonpayers owed Eskom over R30 billion.

In his State of the Nation address in June 2019, President Ramaphosa asserted the principle that those who use electricity must pay for it. Extended efforts by Ministers and officials to resolve this non-payment problem have not resolved Eskom's problems in this area.

Eskom has through a carefully managed process gradually reduced electricity supplies to non-paying customers. However legal action by some municipal customers has resulted in Courts directing Eskom not to interrupt supply and directing Government to resolve the problem.

This practice of non-payment has contributed to Eskom becoming the single largest threat to the fiscus. No more time can be wasted in addressing this very serious problem.

A new approach is clearly required as all efforts thus far have not succeeded in resolving the problem.

POWER SECTOR REFORM EXPERIENCE: THE CASE OF VIETNAM

“Learning from Power Sector Reform Experiences Alan David Lee and Franz Gerner”

Rationale for Electricity Industry Reform

The motivations for reforming the power sector in Vietnam from the mid-1990s were to ensure: (i) long-term reliable power supply in a manner efficient and affordable to users and to the government;

(ii) minimal spill over effects on the macro economy; and

(iii) minimal spill over effects on the distribution of wealth across segments of society.

The key means for Vietnam to achieve these objectives included moving from a centrally-planned monopoly to a power market with private sector investment in power generation capacity and many competing participants buying and selling power.

Timeline of Key Power Sector Reforms in Vietnam, 1970-2018 (refer to figure 1)

The development of Vietnam’s national grid in 1994 (which was initiated by the 500 kV line from the north to the south) shaped sector institutions and subsequently spurred rural electrification as well as massive increases in demand. In 1996, work began to draft a new Electricity Law, involving a number of ministries and over the next eight years, 25 versions of this Law was prepared. In parallel to the drafting of the new law, incremental steps were taken to allow for private sector participation in generation and limited unbundling.

The Electricity Law was passed in 2004 and set the framework for comprehensive sector reform. In 2006 a 20-year ‘roadmap’ for implementation was laid that sets out the gradual development of a competitive electricity market in three stages:

(i) **Phase 1:** 2005-2014 - Create a competitive electricity generation market;

(ii) **Phase 2:** 2015-2022 - Create a competitive electricity wholesale market; and

(iii) **Phase 3:** after 2022 - Permission would be granted for a competitive electricity retail market.

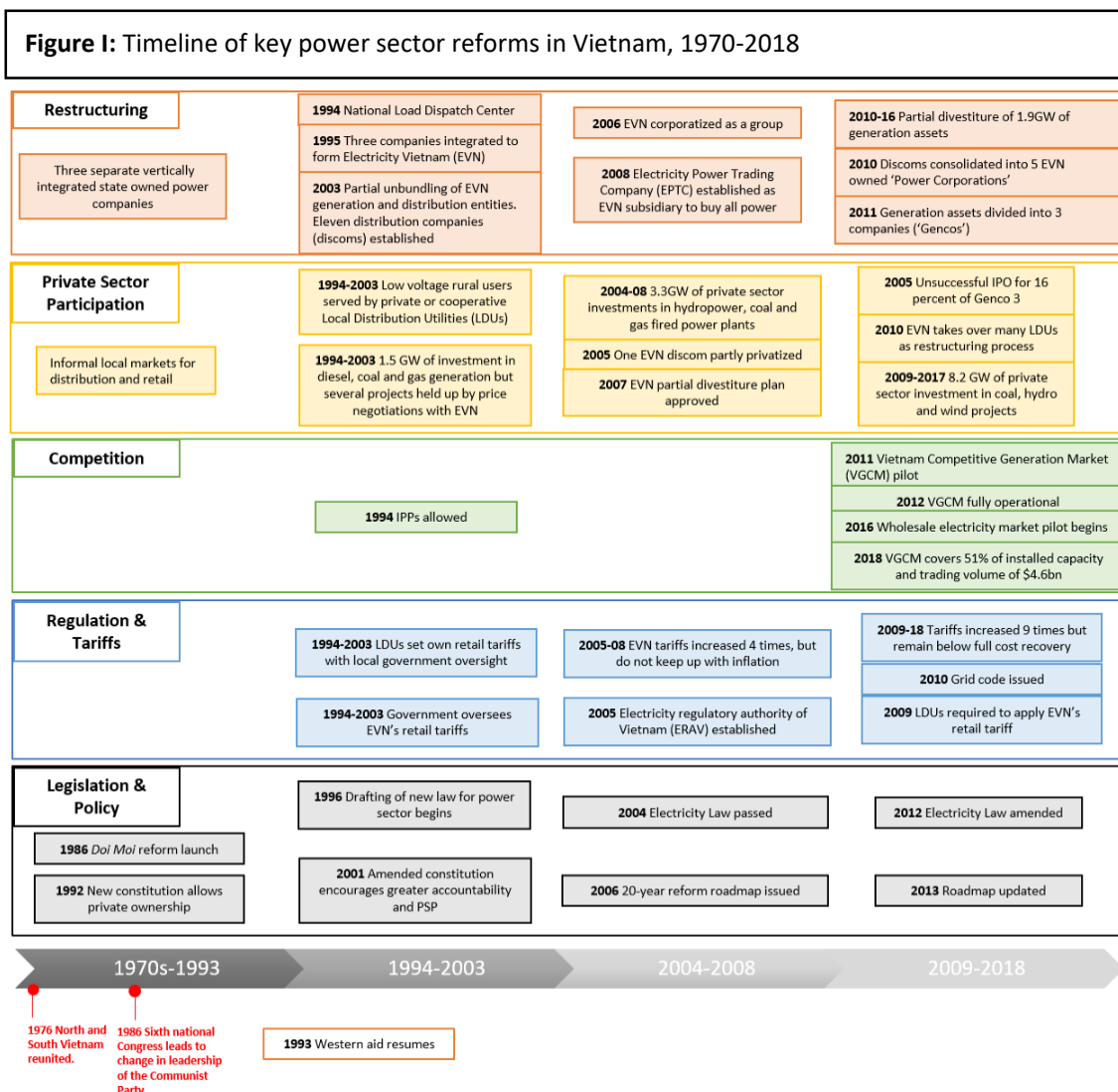
Vietnam’s Power Sector Performance

Between 1990 and 2018, power generation capacity in Vietnam increased dramatically from 2 gigawatts to over 45 gigawatts, with the national reserve margin at 35 percent in 2018. While in 1990, the share of households with a grid electricity connection was less than 14 percent, by 2011 universal access was reached. Furthermore, technical performance has improved after years of low efficiency: from 1990 to 2017 transmission and distribution losses fell from 25 percent to 7.6 percent. However, despite high collection rates, input price volatility and rigid tariffs make the utilities (Electricity Vietnam) depend on state backing. Furthermore, sporadic increases in average retail tariffs have not covered capitals costs or inflation.

Lessons from Vietnamese Electricity Reform

- State-centric institutions can rapidly and successfully develop a power sector with concerted efforts, notwithstanding the opportunity for well-regulated competition and private sector participation to improve efficiency and financial viability.
- Top-level government commitment is required.
- Highly-qualified staff in the SOC (e.g. Eskom) is required.
- Consensus-based decisions is required among sector institutions (refer to box 1).

- Gradually introduce competition to ensure long-term sustainability without jeopardising security of supply.
- Legislation (Electricity Law in Vietnam) is required to provide a framework to develop a competitive power market, unbundle the SOC (electricity market), set prices that better reflect costs, promote private investment, and establish the appropriate regulatory environment.
- Gradual reform steps offer the opportunity to build consensus each step of the way and learn by doing. This can lead to different outcomes than expected, as policy drivers evolve.
- The sequence of reforms matters: Introducing market mechanisms ahead of other vital elements may limit their effectiveness and make subsequent reform steps more difficult.



Box 1: Vietnam’s power sector institutions as of 2018

Ministry of Industry and Trade. Responsible for management of the energy sector both as line ministry and as ministry with oversight responsibility of state-owned energy enterprises.

National Load Dispatch Center (NLDC). Established 1994. Functions as market and system operator for the wholesale market. Expected to be converted to an independent accounting unit of EVN by 2021.

Electricity Vietnam (EVN). Established in 1995 as a vertically integrated state-owned corporation responsible for Vietnam’s power sector. EVN now serves a holding company for the three generation companies, single buyer, system operator, Transmission Company, and 5 distribution companies.

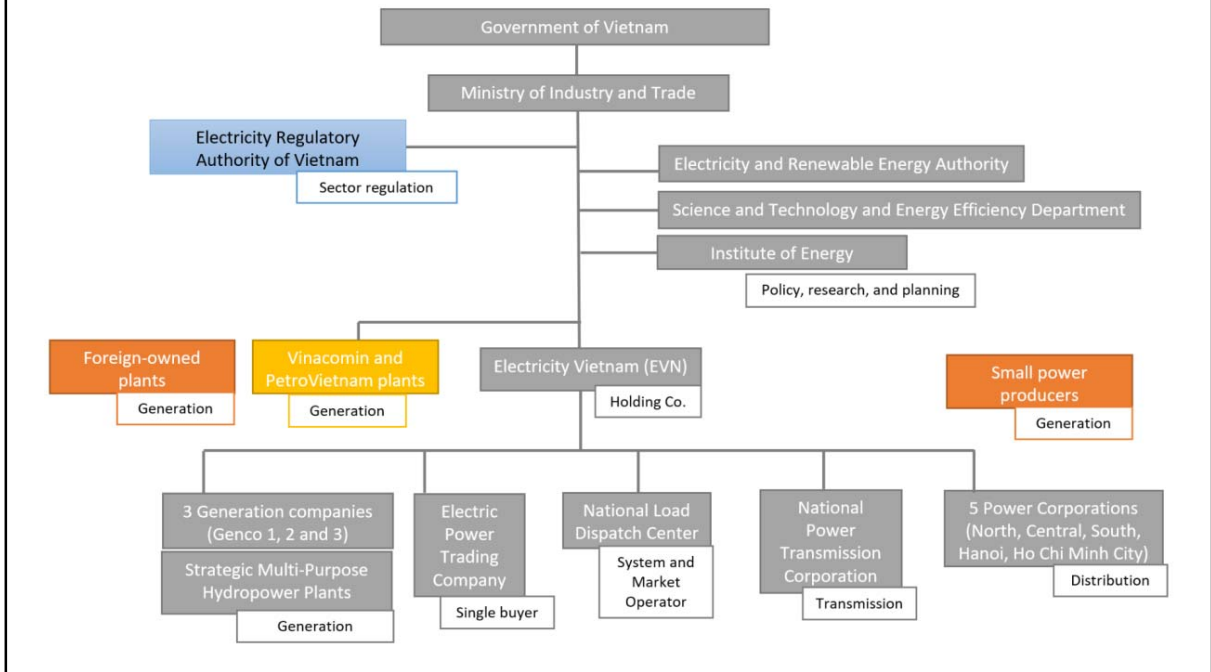
Institute of Energy. Established 1995, first as part of EVN then moved to the Ministry in 2010. Researches national energy strategies, policies, and development plans.

Electricity Regulatory Authority of Vietnam. Established 2005. Responsible for developing regulations to implement and regulate competitive power markets, as well as monitoring electricity tariff review and tariff setting.

Electric Power Trading Company (EPTC). Established in 2008 as a subsidiary of EVN responsible for purchasing all power.

Electricity and Renewable Energy Authority. Established 2017 from the former General Directorate of Energy. Responsible for energy policy development, including renewables, oil, gas and coal and power system planning.

National Power Transmission Corporation (NPT). Established in 2018 from ‘reunification’ of various regional EVN subsidiaries.



PARTNERS

Presidency

National Treasury

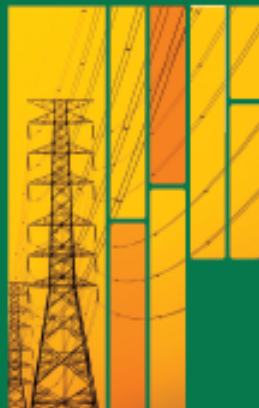
Department of Mineral Resources and Energy

Department of Environmental Affairs, Forestry and Fisheries

Eskom Holdings



ROADMAP
FOR ESKOM
IN A REFORMED
ELECTRICITY
SUPPLY INDUSTRY



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