Part 1

Revenue Application:

Multi-Year Price Determination

2013/14 to 2017/18

(MYPD 3)

October 2012

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EXECUTIVE SUMMARY

Introduction

The current Multi-Year Price Determination, MYPD 2, ends on 31 March 2013. Eskom must submit an application to the National Energy Regulator of South Africa (Nersa), who will determine the country's electricity price adjustment for the next period and tariff structures for 2013/14. In contrast to MYPD 1 and MYPD 2, both of which spanned three years, Eskom is proposing a five-year determination for MYPD 3, running from 1 April 2013 to 31 March 2018. This is to ensure a more gradual and predictable price path for households, businesses, investors and the country as a whole.

Eskom's five-year revenue request translates into average electricity price increases of 13% a year for Eskom's own needs, plus 3% to support the introduction of IPPs, giving a total of 16%. This represents a total price increase from the current 61 cents per kilowatt-hour (c/kWh) in 2012/13 to 128c/kWh in 2017/18.This revenue request includes targeted savings in operating and primary energy costs due to targeted improvements in efficiency over the period.

Why are price increases necessary?

Eskom needs to keep the lights on and this has a cost. For historical reasons, electricity is currently charged at below cost-reflective levels and is not sustainable. Electricity prices need to transition to cost-reflective levels to support a sustainable electricity industry that has the resources to maintain operations and build new generating capacity, guaranteeing future security of supply. Failing to accommodate the country's energy needs would limit investment, which would result in fewer jobs and lower economic output.

Cost-reflective prices minimise economic distortions caused by inadvertently subsidising all consumers of electricity. If prices are not cost reflective, then in effect every unit of electricity supplied is subsidised, either by taxpayers or by future users of electricity.

What is the impact of price increases?

The transition towards cost reflectivity poses several challenges. Eskom believes poor households should be protected from the impact of electricity price increases through targeted, transparent cross-subsidisation in accordance with a national cross-subsidy framework. Failure to achieve cost-reflective prices sooner will impact on South Africa's economy and its growth prospects.

The MYPD 3 revenue application aims to find an electricity price path that contributes to long-term economic growth and job creation while minimising the short-term effects on vulnerable sectors and offering protection to low-income households. The period over which this transition occurs is key. Gradually phasing in cost reflectivity may give the country time to adjust to higher prices, but there are limits to the extent to which this can be done. This application seeks to find a practical, sustainable path to achieve cost reflectivity over the medium term and predictable price path to the MYPD period following MYPD 3.

What is Eskom asking for?

In keeping with the Electricity Regulation Act (2006), Eskom is allowed to recover its costs, provided that they are efficiently and prudently incurred, and to make a reasonable return. The revenue being requested will cover the following:

- Primary energy: The cost of basic natural resources used to produce electricity – including coal, water, biomass and sorbent (excluding IPPs) – increases by an average of 8.6% per year and by 10% per year with IPPs incorporated.
- Operating costs: Eskom's operating costs increase by an average of just over 7% per year.
- Depreciation: Depreciation increases by 10% on average per year.
- Return on assets: The return moves from 0.9% in year one of the MYPD 3 period to 7.8% at the end of the period, below the Nersa targeted return of 8.16%, as well as Eskom's WACC of 8.31%.

Eskom's revenue requirement up to 2017/18 translates to price increases of 13% for each of the five years, for Eskom's needs, taking into account the Eskom capacity expansion (returns and depreciation) up to the substantial completion of the Kusile power plant, plus

3% to support the introduction of IPPs, mainly the impact of the DoE Peaker Plant (1020MW) and the inclusion of all three rounds of the renewable energy independent power producer (IPP) bid programme (3725MW), giving a total of 16%. It includes operating costs, primary energy costs, depreciation and a return on assets.

Assumptions

Eskom's application assumes that electricity demand will increase by 1.9% compound annual growth a year over the MYPD 3 period, and that Nersa will approve extending the control period from the current three years to five. It also assumes that:

- With regard to capacity expansion as a minimum, Eskom will only be required to secure financing up to the completion of its current capacity expansion programme, which ends with the commissioning of Kusile power station in 2018/19.
- Provision needs to be made for the 3 725MW renewable energy independent power producer (IPP) programme being undertaken by the Department of Energy (DoE) (in line with the Minister of Energy's Section 34(1) determination in terms of the Electricity Regulation Act) and the 1 020MW DoE peaker plant (comprising two open cycle gas turbine plants).
- There will be single-digit annual average increases in primary energy costs, excluding the IPPs.
- A mandatory Energy Conservation Scheme (ECS) to prompt South Africa's largest energy users to curb their usage will be in place (but only implemented if necessary).

Context of application

This application is made in the context of some uncertainty about the course of the electricity sector and Eskom's role within it. Long-term decisions regarding who will build South Africa's future generating capacity have yet to be made and this is being addressed by government. With regard to capacity expansion, Eskom's application is based on the new capacity (deprecation and return) up to the significant completion of Kusile power station. It includes the DoE's peaker plant of 1020MW and the renewable energy IPP bid programme, which caters for a total of 3 725MW of renewable capacity, pursuant to the determination by the Minister of Energy. Only determinations up to and including 30 September 2012 have been included in this application.

However, the country needs additional capacity beyond this to ensure future security of supply. It would be irresponsible for Eskom not to highlight the implications of the additional capacity needs. To provide an idea of the potential costs involved, Eskom has modelled the implications of two scenarios – Eskom being tasked with building 65% of the Integrated Resource Plan (IRP) 2010 capacity as well a scenario where Eskom is tasked to build 100% of the IRP 2010 capacity. We believe that these two scenarios will provide a reasonable basis on which to understand the pricing implications of the additional capacity needed.

Tariffs

Eskom's revenue requirement results in a single average price increase that is translated into specific tariff increases for each tariff. The summarised impact on the different customer categories is provided. In addition to the revenue request, Eskom requests that Nersa considers modifications to the existing tariff structure. Residential tariffs should be restructured to simplify understanding and to optimise the protection of the poor, while high-usage residential customers pay more cost-reflective prices. Further tariff restructuring proposals are also made to make the tariff structures more efficient, cost reflective and improve transparency.

Conclusion

The submission of this MYPD 3 application is the beginning of a public process to address the issues raised in Eskom's application – in particular, sustainability of the electricity industry and security of supply. Nersa is an independent regulator and will follow a process of public consultation prior to making its decision. Stakeholders are encouraged to participate in this process.

Eskom's MYPD 3 application strikes a balance between the possible short-term negative effects of increasing electricity prices, the sustainability of the industry and South Africa's long-term economic and social needs.

ESKOM PROFILE

Eskom is the country's primary electricity supplier and is wholly owned by the South African government. As at 31 March 2012, it generated, transmitted and distributed electricity directly to 3 000 industrial customers, 1 000 mining customers, 49 000 commercial customers, 84 000 agricultural customers and more than 4 million mostly prepaid residential customers, many of them in rural areas. It also sold electricity to 187 municipalities, which in turn redistributed it to businesses and households. Eskom supplied about 40% of the residential market directly, with the rest supplied by municipalities.

In 2005, Eskom embarked on a R337 billion capacity expansion programme to add about 17 000 megawatts (MW) of new generating capacity and 4 700km of new transmission infrastructure, plus associated substations, to the national electricity grid. It is building three new power stations – Ingula on the KwaZulu-Natal/Free State border, Medupi in Limpopo and Kusile in Mpumalanga – that together will add more than a quarter to the country's total generation capacity by the time the last of these stations, Kusile, will be substantially commissioned in 2018/19.

To finance the programme, Eskom has raised more than R180 billion in debt on local and international capital markets. It expects to increase this to over R360 billion by the end of the current capacity expansion programme. Key to the availability and cost of this debt are Eskom's ratings with international credit-rating agencies. Currently, the company relies on government support to anchor its investment-grade rating. Eskom is working to achieve a standalone investment-grade rating to minimise the need for this support in future. Most rating agencies see the company's current financial ratios as weak and expect this to be the case for the next three years.

Strategic objectives

Eskom's corporate plan, endorsed by its board and shareholder in September 2011, sets out strategic objectives that will enable the company to meet its long-term challenges. Eskom aims to provide electricity in a sustainable manner, improving the quality of life of all in South Africa and the region. This requires that Eskom is efficient and sustainable, and that it achieves standalone investment-grade status. The key imperative is to shift performance

and grow sustainably. The corporate strategy is centred on:

- **Becoming a high-performance organisation** by focusing on safety, improving operations, building strong skills and ensuring internal transformation.
- **Ensuring financial sustainability.**
- **Keeping the lights on** by managing demand and delivering on the capital expansion programme.
- **Reducing its environmental footprint** and pursuing low-carbon growth opportunities.
- **Securing Eskom's future** by obtaining the natural resources required for power production, working with the government to achieve its mandate, and creating an enabling environment for its operations.
- **Implementing coal haulage and the road-to-rail migration plan.** Eskom is shifting coal transportation from road to rail to improve safety, reduce environmental impact and scale back road damage.
- **Pursuing private-sector participation**. Eskom is acting as a catalyst for private-entity participation in South Africa's electricity industry.
- **Setting Eskom up for success** through transformation.

1 OVERVIEW OF MYPD 3 REVENUE APPLICATION

Key points

- South Africa's economy needs a reliable, stable electricity supply to support economic growth. This requires a financially sustainable electricity industry that has the resources to build the generating capacity necessitated by demand.
- In order for the electricity industry to be financially sustainable, electricity prices need to reflect the true cost of production. For historical reasons, that is not currently the case. During the forthcoming third MYPD period, South Africa will continue the transition towards cost-reflective electricity prices started in MYPD 1.
- Eskom's revenue requirement up to 2017/18 translates into price increases of 13% for each of the five years of the MYPD 3 period for Eskom's own needs, plus 3% to support the introduction of IPPs, giving a total of 16%.
- It takes into account operating costs, primary energy costs, depreciation and a return on assets, and capacity expansion up to the substantial completion of Kusile power plant, the DoE peaker plant and 3725MW in terms of the renewable energy IPP programme. This is a price increase of 67c/kWh from the current average of 61c/kWh (2012/13) to an average of price level of 128c/kWh (nominal in 2017/18) or reaching 96c/kWh (real in 2017/18)
- This revenue application is based on the following assumptions:
  - The revenue covers capacity expansion (only the return and depreciation component) up to the substantial completion of Kusile power plant.
  - Electricity demand will be as forecast.
  - Provision needs to be made for IPPs already contracted through the Medium Term Power Purchase Programme (MTPPP), short term purchases, the DoE's peaker plant and all three rounds of the DoE's renewable energy IPP programme.
  - There will be single-digit increases in the cost of primary energy.
  - Appropriate demand reduction will be achieved.

- The MYPD 3 period will follow a five-year price path.
- Long-term decisions regarding who will build South Africa's future generating capacity and what form that capacity will take have yet to be made. These decisions will have consequences for Eskom's current revenue request. For illustrative purposes, Eskom has modelled the consequences of being allocated 65% of the new capacity identified in the DoE's IRP 2010. An additional scenario where Eskom builds 100% capacity is also shown.
- Nersa needs to consider, as part of its deliberations, whether this revenue application should be based only on known decisions (in other words, up to the completion of the current new build programme) or whether it should consider the industry's longer-term revenue requirements.

The current MYPD period ends on 31 March 2013. Eskom must submit an application to Nersa, which will determine the country's electricity price adjustment for the next period and tariff structure for 2013/14. In contrast to MYPD 1 and MYPD 2, both of which spanned three years, Eskom is proposing a five-year determination for MYPD 3, running from 1 April 2013 to 31 March 2018. This is to ensure a more gradual and predictable price path for households, businesses, investors and the country as a whole.

South Africa needs an adequate, reliable electricity supply to build the economy and promote social development. This supply comes at a cost – a cost that electricity prices are not currently fully covering. Electricity prices have been moving towards cost reflectivity since MYPD 1. MYPD 3 continues this trajectory. Cost-reflective prices will enable Eskom to recover the cost of producing electricity while supporting the financing needed to build the extra capacity it has committed to build. They are necessary for both Eskom's financial health and the sustainability of the country's expanding electricity industry as a whole.

The route to cost reflectivity needs to be carefully chosen. Eskom and the government are committed to an electricity price path that moves towards cost reflectivity while mitigating the impact on the economy and offering protection to low-income households. Such a path needs to balance the short-term needs of vulnerable economic sectors with the long-term growth needs of the economy as a whole. Finally, it needs to demonstrate that South Africa's electricity industry is a viable, sustainable prospect to support investment, both in future

electricity infrastructure and in energy-efficient industries that will contribute to tomorrow's economy without placing an unnecessary burden on the electricity system.

The application is aligned with the President's 2012 State of the Nation address. It outlines a price path in support of economic growth and job creation, while striving to ensure that Eskom and the electricity industry remain financially viable and sustainable. It continues the move towards cost-reflective prices in line with government policy. It supports security of supply and covers Eskom's operating costs. It enables Eskom to service the debt raised for its new build programme and to build up retained earnings for future expansion. It proposes to maintain and enhance targeted protection for low-income households and it improves the transparency of the tariff structure. It aims to give lenders and rating agencies assurance that Eskom will be able to achieve a standalone investment-grade rating over time.

1.1 Context of application

This application is made in the context of some uncertainty about the course of the electricity sector and Eskom's role within it. According to the DoE's IRP 2010, South Africa will need to build over 45 000MW of new generating capacity between 2012 and 2030 to ensure future security of supply. This is in addition to the capacity already being built by Eskom's capacity expansion programme, up to 2018/19.

Eskom's application is based on the new capacity (only the depreciation and return component for capacity expansion) up to the significant completion of Kusile power station and includes the DoE's peaker plant and the three rounds of the renewable energy IPP bid programme pursuant to the determination by the Minister of Energy in terms of the Electricity Regulation Act. However, the country needs additional capacity beyond this to ensure future security of supply. This is being addressed by the government as a matter of urgency. However, it would be irresponsible for Eskom not to highlight the implications of the additional capacity needs. For illustrative purposes, Eskom has provided the implications of a scenario that assumes the company will be responsible for 65% and 100% of the capacity needs projected in IRP 2010. In terms of the 65% scenario, Eskom would have to build an additional 28 700MW of generating capacity after Kusile has been completed, at a total estimated cost of R1.8 trillion. The long-term implication is that electricity prices will need to reach 102c/kWh in real terms (inflation adjusted) by 2030. This would require a 20% average increase each year for the five years of the MYPD 3 period (2013/14 to 2017/18), followed

by a 9% average increase per year for the next five years (MYPD 4) and about 5% average increase per year thereafter. The results of the 100% scenario are similar and include an additional 2 700MW of capacity but the price path is the same. Eskom would like to emphasise that electricity prices will have to go up to this extent even if the additional IRP 2010 generating capacity is allocated to one or more parties other than itself. The key issue for the company is that, although its revenue application only considers new capacity up to the substantial completion of Kusile power station, and includes the DoE Peaker plant and the renewable energy IPP bid programme; this should not create the impression that long-term security of supply has been adequately addressed. Nersa needs to consider the pricing implication of additional capacity beyond Kusile and reach a decision on how to address these implications at this stage. If these issues are not addressed now, Eskom may have to apply to reopen the MYPD 3 application once policy decisions have been made.

The dilemma Eskom faces is that the government may decide to allocate a bigger or smaller portion of IRP 2010 capacity than the assumed 65%. This makes it impossible to predict Eskom's exact revenue needs if the IRP 2010 requirements were to be included in this application. Unfortunately, the MYPD 3 process cannot be delayed any further. Given the circumstances, Eskom can do one of the following:

- **Include all IRP 2010 requirements in the MYPD 3 application.** The advantage of this approach is that all the country's needs would be catered for. However, by making such assumptions, Eskom could be criticised for overstepping its mandate. Moreover, there would be no regulatory basis for Nersa to allow such costs until further determinations are made by the Minister of Energy. Most importantly, the final decisions regarding the timing, costs and type of technologies to be used could result in a different price path. .
- **Exclude all requirements for capacity beyond Kusile and the renewable energy IPP bid programme.** The advantage is that the revenue Eskom requests will be based on decisions that have already been made and that have a definable scope. However, this approach may do a disservice to the shareholder and the public by understating what is necessary to ensure security of supply over the longer term.

Eskom has decided that it will try to achieve both objectives – that is, ensure that South Africa is made aware of its future capacity needs and the pricing implications, while being

clear about Eskom's revenue requirements based on decisions already made. It will do this by presenting its revenue requirement taking into account the substantial completion of Kusile power station as well as the DoE Peaker Plant and renewable IPP bid programme, and outlining, in a transparent manner, the cost impact of Eskom implementing 65% or 100% of the capacity requirements contemplated in IRP 2010. In this way, Eskom's revenue needs will be addressed and the implications of future policy decisions will be transparent.

As contemplated in terms of Section 42 of the Municipal Finance Management Act (MFMA) (2003), Eskom has submitted its proposed application to the National Treasury and organised local government for comment. Eskom has received their input and has taken it into account in finalising its application, as discussed in the next chapter, *The MYPD process*. Eskom has also considered the government's inflation targets and other macroeconomic policy objectives. This is discussed in the chapter, *Balancing out the effect on the economy*. The steps Eskom has taken to be more efficient are discussed in *Moving towards a sustainable electricity industry*.

1.2 Why are price increases necessary?

Electricity prices currently do not cover the full cost of producing electricity. This is not sustainable, especially in light of the fact that the country needs to build additional generating capacity – over and above what Eskom is currently constructing – to support future economic growth and social development. Electricity prices need to transition to cost-reflective levels to support a sustainable electricity industry that has the resources to maintain operations and build this new generating capacity, so guaranteeing future security of supply.

1.2.1 Moving towards a sustainable electricity industry

Electricity powers our world. South Africa's economy needs a reliable, stable electricity supply to support economic growth. The costs of producing electricity are rising as South Africa's existing electricity infrastructure ages and the costs of inputs such as coal increase. The electricity industry also needs to expand to meet the country's development needs. Without sufficient electricity to accommodate growth, the country's economy will stagnate, resulting in less investment, fewer jobs and a lower quality of life for all South African citizens – especially the most vulnerable members of society. This requires a sustainable electricity

industry, one with the resources to operate and maintain current infrastructure while building the generating capacity necessitated by demand.

Infrastructure expansion is a costly exercise that requires financing from domestic and international sources. To secure this funding, Eskom needs to prove that it is financially viable and able to meet its debt commitments – something it can only achieve by moving towards cost-reflective prices. Since 2008, Eskom has been transitioning towards cost-reflective prices with the ultimate goal of achieving a standalone investment-grade credit rating. The MYPD 3 application continues along this path.

1.2.2 Ensuring security of supply

South Africa's electricity supply is currently constrained, with available power matched closely by demand. Even though Eskom's capacity expansion programme has already added considerable generating capacity to the national grid, the situation will remain tight for at least part of the MYPD 3 period. Eskom has stepped up its maintenance programme to ensure that existing power plants maintain optimal output. It has also implemented a range of integrated demand management (IDM) measures to motivate customers to limit demand by adopting energy-saving technologies and behaviours. In the long term, ensuring security of supply involves building the generating capacity outlined in IRP 2010.

1.2.3 A more equitable alternative to taxes

As long as tariffs are below cost-reflective levels, consumers of electricity are, in effect, being subsidised by the government – and, ultimately the taxpayer. It also means that the major beneficiaries of that subsidy are those who use the most electricity. The implicit subsidy provided by electricity that is not cost reflective therefore not only distorts the efficiency of the market but also means that wealth is effectively being transferred to large consumers of electricity, which is neither equitable nor desirable.

1.3 What effect will the price increases have?

The MYPD 3 revenue application aims to find an electricity price path that contributes to long-term economic growth and job creation while minimising the short-term effects on vulnerable sectors and offering protection to low-income households. The period over which this transition occurs is key. Gradually phasing in cost reflectivity may give the country time

to adjust to higher prices, but there are limits to the extent to which this can be done. This application seeks to find a practical, sustainable path to achieve cost reflectivity over the medium term.

Paying a fair and reasonable price for electricity

This revenue request is based on cost components that are subject to intense scrutiny by Nersa to ensure that they are incurred prudently and efficiently.

On average, the costs on which this application is based escalate at a rate slightly higher than inflation. This is largely due to input costs (such as primary energy) over which Eskom has no control. The tight supply-demand situation has resulted in Eskom using more expensive generation options including open-cycle gas turbines and demand-side measures to ensure it can balance supply and demand. This has had an adverse impact on costs.

Eskom remains committed to being as efficient as possible and has, despite these influencing factors, committed to savings of R30 billion over the MYPD 3 period. Its ability to achieve this target is supported by the R4.5 billion in savings that it posted for the 2011/12 financial year.

1.3.1 Economic effects

The country cannot afford the economic costs of not having a secure supply of power, and this depends on the electricity industry being financially sustainable. Eskom is acutely aware that the proposed tariff increases will have some short-term negative effects on the economy, and particularly on more vulnerable economic sectors and on poorer households.

In the past, cheap power attracted investment, particularly in energy-intensive industries such as aluminium and steel smelting. At the same time, there was little or no financial incentive for companies to invest in energy-efficient technologies. Consequently, the economy's energy intensity more than doubled between 1990 and 2007, while that of the Organisation for Economic Cooperation and Development countries increased by only 10%

(Inglesi-Lotz and Blignaut, 2011). The implication is that South Africa needs to invest more into new generating capacity, at considerable economic cost.

For purposes of this discussion the economic effect of the proposed increases can be grouped into five broad categories:

- *Inflation* – It is estimated that the proposed tariff increases could add between 0.3 and 0.6 percentage points to the inflation rate, but this could increase to between 0.7 and 1 percentage points with the reweighting of the consumer price index (CPI) basket and additional knock-on effects.
- *Economic growth* – Studies commissioned by Eskom indicate that the overall impact on the economic growth rate will be relatively muted, though some sectors will be affected more than others.
- *Sectors* – Generally, mining and manufacturing will be the hardest hit. There may be calls for differentiated pricing (subsidies) to support vulnerable sectors. Eskom supports the principle of support for such sectors. However, its view is that subsidisation of selected industries is an industrial policy matter to be addressed by the government, rather than through the tariff process, and that any subsidies should be routed through the fiscus.
- *Investment* – Price is more effective at promoting investment into energy-efficiency technologies than incentive schemes or other factors. If price levels provide the correct signals, consumers will respond by limiting electricity use and employing more energy-efficient technologies, reducing demand. Cost-reflective tariffs achieved through a predictable medium-term price path, as proposed, will attract future investment in energy-efficient companies and will not pose an undue long-term burden on electricity infrastructure.
- *Households* – Eskom supports the principle that targeted protection for low-income households should transparently be provided for in the tariff structure, but these cross-subsidies should be managed.

1.4 What is Eskom applying for?

Eskom's revenue requirement up to 2017/18, based on its operating costs, primary energy costs, depreciation and return on assets, translates to price increases of 13% for each of the five years, for Eskom's needs, plus 3% to support the introduction of new IPPs, giving a total

of 16%. It includes the Eskom capacity expansion (returns and depreciation) up to the substantial completion of the Kusile power plant, the DoE Peaker Plant (1020MW) and all three rounds of the renewable energy independent power producer (IPP) bid programme (3725MW). This is a price increase of 67c/kWh from 61c/kWh (2012/13) to 128c/kWh (nominal in 2017/18) and amounts to a revenue requirement of approximately R1.09 trillion.

Table 1: MYPD 3 revenue requirements up to substantial completion of Kusile

	2013/14	2014/15	2015/16	2016/17	2017/18	MYPD 3
Return	7 271	14 643	31 187	51 878	81 885	186 864
Eskom primary energy	62 328	65 368	69 657	75 330	82 266	354 949
Independent power producers - primary energy	5 189	13 302	18 043	20 143	21 042	77 719
Depreciation	30 792	34 631	37 076	39 669	43 218	185 385
Integrated demand management	2 941	2 709	1 862	1 966	3 612	13 090
Operating costs	44 857	48 952	54 934	59 346	61 478	269 568
Eskom revenue requirement (Rm)	**153 378**	**179 604**	**212 758**	**248 332**	**293 501**	**1 087 574**

Table 2: Licensee returns

	2013/14	2014/15	2015/16	2016/17	2017/18	MYPD 3
Generation	4 505	8 604	19 632	34 578	54 507	121 826
Transmission	988	1 886	4 467	8 475	14 360	30 175
Distribution	1 440	2 445	4 982	8 469	13 009	30 345
Regulated returns (Rm)	**6 934**	**12 934**	**29 081**	**51 521**	**81 877**	**182 347**
Southern African energy and other	338	1 709	2 106	357	8	4 517
Eskom returns (Rm)	**7 271**	**14 643**	**31 187**	**51 878**	**81 885**	**186 864**

Eskom's revenue requirement is broken down between Generation, Transmission and Distribution. These revenues are converted into cost splits that are used as inputs into the tariff design process (detailed in Part 2). In providing the cost splits, the following principles were utilised:

- Recovery of licensee own costs
- Returns earned by licensee on replacement asset basis
- Depreciation on replacement asset basis
- Corporate overheads allocated using the revenue allocation proportions
- Efficiency targets allocated to licensees using the operating costs as a basis for allocations

The cost splits are key to determining differentiated prices between the energy and network components. The returns generated over the MYPD 3 period are split between 67% for Generation and 33% for the network business.

Table 3: Effect of revenue requirement on MYPD 3 electricity prices

	2013/14	2014/15	2015/16	2016/17	2017/18
Eskom requirement for price increase % (nominal)	13%	13%	13%	13%	13%
IPPs requirement for price increase % (nominal)	3%	3%	3%	3%	3%
MYPD 3 price increase % (nominal) - Eskom's application	**16%**	**16%**	**16%**	**16%**	**16%**
MYPD 3 price increase % (real)	10%	10%	10%	10%	10%
Nominal incremental price increase for standard customers (c/kWh)	10c/kWh	11c/kWh	13c/kWh	15c/kWh	18c/kWh
Nominal price level for standard customers (c/kWh)	71c/kWh	82c/kWh	95c/kWh	110c/kWh	128c/kWh
Real price level for standard customers (c/kWh)	67c/KWh	73c/kWh	80c/kWh	88c/kWh	96c/kWh

In keeping with the Electricity Regulation Act, Eskom is allowed to recover the following costs, on condition that they are efficiently and prudently incurred:

- Primary energy costs
- Operating costs
- The cost of paying for (and ultimately replacing) its assets (depreciation of assets)
- A reasonable return on assets.

Together, primary energy and operating costs contribute more than 75% to the total revenue requirement in 2011/12, decreasing to about 60% by 2017/18. This includes a targeted R30 billion cumulative savings in operating costs and primary energy due to improvements in efficiency over the period. Increases in depreciation and the return on assets are the main drivers of the average price increases because of the need to move to cost-reflective prices.

1.4.1 Primary energy costs

Generation's primary energy costs excluding IPPs are projected to increase by an average of 8.3% a year. Coal is Eskom's largest primary energy cost – and indeed its biggest single cost component overall – and is projected to grow by 10% on average per year over the MYPD 3 period. The factors driving above-inflation coal cost increases include the rising cost of sourcing coal from the ageing "cost-plus" collieries tied to some of Eskom's power stations, as well as the increasing competition from export markets such as India and China for lower grades of South African coal, which in the past had been used mainly by Eskom.

1.4.2 Independent power producers

The cost of buying power from IPPs is escalating significantly as the amount of capacity increases over the MYPD3 period. Forecasts reflect an increase from R5 billion in 2012/13 to R22 billion in 2017/18 being procured from IPPs on the basis of 3725 MW of renewables and 1020 MW peaking technology from the DoE programmes. For regulatory purposes the IPP costs are included under the Generation licensee.

1.4.3 Operating costs

Maintenance and human resources make up the bulk of operating costs. Employee cost increases average 7% over the period, as do overall operating costs. Most of Eskom's power stations are in their mid-life and they require substantial spending on maintenance and refurbishment if their performance is to be sustained and improved. This means that maintenance costs will continue to increase by more than the inflation rate. The need to do more maintenance also adds to the challenge of managing an already constrained power system. The power system will continue to be constrained into the MYPD 3 and there are costs associated with balancing supply and demand in this context. These include the costs of demand-side measures to help Eskom manage the system in the short term. They also provide incentives to encourage customers to install technologies and adopt behaviours that will ensure they use electricity more efficiently on a permanent basis.

1.4.4 Depreciation of assets

Depreciation is set to rise at an annual average 10% over the MYPD 3 period. The government's Electricity Pricing Policy (EPP) requires that Eskom's assets are valued at depreciated replacement cost to ensure a cost-reflective price path that minimises price spikes as infrastructure is decommissioned and replaced. Depreciation of assets currently under construction is only included in the year in which they are commissioned.

1.4.5 Return on assets

Eskom does not fund its capacity expansion programme directly through electricity prices. Rather, electricity prices shape its income statement and balance sheet, influencing investor confidence and its credit rating. Price provides the basis for Eskom to raise the debt it needs to finance capital expenditure. Only a return on total capital invested is included in the price.

Determining a "fair" return on assets

In assessing its revenue requirement, Eskom is allowed to factor in a fair return on assets used to generate, transmit and distribute electricity, including assets under construction. The return is earned on the assets operated by Eskom and should represent the total cost of funding the business (both equity and debt) based on the weighted average cost of capital (WACC), as determined by Nersa. This return is applied to the depreciated replacement value of the assets (including assets under construction). The return is a key determinant of Eskom's financial sustainability: it provides the revenue to meet debt interest payments and build a base of retained earnings – essentially equity returns – that can anchor the balance sheet. This will enable future borrowing and expansion of the asset base and ensure that current debt can be repaid while providing Eskom with ability to achieve cheapest financing option supported by standalone credit rating.

The revised funding plan for MYPD 3 will see Eskom reach a total debt of over R333 billion on domestic and international capital markets at the end of the MYPD 3 period (peaking at over R 360 billion in 2016/17). The net finance costs (cash component) will total R115 billion over the same period. Total interest over the period is R140 billion including accruals. Eskom's ability to service this debt – and build a base of retained earnings to secure future borrowing – depends on its returns, which will swing from negative to positive after 2014/15, resulting in a total return of R186 billion for the period. This leaves a cumulative return of R46 billion to the shareholder at the end of MYPD 3. Eskom will sacrifice R209 billion by earning less than the 8.31% return on assets. The R46 billion will not be paid as a dividend but will be reinvested in the business, strengthening Eskom's balance sheet and contributing towards a standalone credit rating.

By 2017/18, Eskom's real returns will have reached 7.8% before tax, which is lower than Nersa's WACC of 8.16% (as determined for MYPD 2) and Eskom's currently calculated WACC of 8.31% before tax. Eskom's real returns are also well below the returns any private-sector investor would require. However, as a state-owned company with the benefit of government guarantees, Eskom can tolerate a lower rate of return and still source funding for its capacity expansion drive. The government of South Africa – Eskom's sole

shareholder, represented by the Minister of Public Enterprises – also accepts that lower shareholder returns are required.

Capital expenditure

Eskom's approximate R337 billion capital expenditure budget for the MYPD 3 period is not included in the revenue request (although depreciation is included when newly built assets are commissioned).

About half of the MYPD 3 capital expenditure budget (R160 billion) goes towards funding the current capacity expansion programme, which involves the construction of new generation, transmission and distribution infrastructure and the refurbishment of existing infrastructure to prolong its useful life. (Note that refurbishment – periodic maintenance and improvements – is separate to routine maintenance and repairs, which are included in day-to-day operating costs and form part of the revenue application.)

The capacity expansion programme includes the Medupi coal-fired station (4 764MW), the Kusile coal-fired station (4 800MW) and the Ingula pumped-storage scheme in the Drakensberg, which will deliver 1 332MW of hydroelectric power during peak demand periods. Eskom will also embark on the Sere wind plant of 100MW and concentrated solar (CSP) power plant of 100MW. It also includes expanding the transmission network.

As already explained, Eskom does not fund its capacity expansion programme directly through electricity prices. Only a return on capital expenditure is included. Even though capital expansion costs are not directly recoverable from electricity sales, these costs are closely linked to depreciation and return on assets. Depreciation is used to incrementally recover the cost of new plant over the lifetime of assets once they come into operation, while the return on assets is calculated on the regulatory asset base, and includes works under construction to service the debt incurred for infrastructure investment.

Depreciation of assets commissioned is used to earn revenues to build up retained earnings for future replacements of the current fleet, and repay debt borrowed to fund the construction of the assets.

The capacity expansion programme also influences Eskom's operating costs, particularly

staff and maintenance costs, since any new infrastructure will demand more skilled technicians, artisans and engineers.

Table 4: Eskom current generation expansion plan as at 1 April 2012

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	Total
Grootvlei (RTS)	30							30
Komati (RTS)	200	100						300
Camden (RTS)	30							30
Medupi (coal fired)		794	794	1 588	794	794		4 764
Kusile (coal fired)			800	800	800	800	1 600	4 800
Ingula (pumped storage)			1 332					1 332
Sere (renewable, wind)		100						100
Total (MW)	**260**	**994**	**2 926**	**2 388**	**1 594**	**1 594**	**1 600**	**11 356**

In addition, Eskom commenced the development of a 100MW CSP plant

Table 5: Summary of capital expenditure projections for MYPD 3 (R million)

	2013/14	2014/15	2015/16	2016/17	2017/18	MYPD3
Generation	48 288	43 995	37 931	29 929	36 955	197 098
Transmission	11 755	11 460	13 665	22 751	16 045	75 676
Distribution	8 890	10 454	11 334	12 933	11 390	55 001
Corporate - Support and Strategic functions	2 576	1 527	1 369	928	610	7 010
Corporate - Telecomms and Aviation	598	579	635	557		2 369
Total capital costs (Rm)	**72 107**	**68 016**	**64 934**	**67 098**	**65 000**	**337 155**

1.4.6 Underlying assumptions

Eskom's revenue requirement is based on assumptions relating to capacity expansion, IPPs, primary energy costs, the legislation South Africa will enact to curb electricity usage, the control period and electricity demand.

Assumption 1: The revenue request only considers capacity expansion up to the substantial completion of Kusile power station

With regard to expansion, the revenue being requested only considers depreciation on a replacement-cost basis and a return taking into account capacity expansion up to the substantial completion of Kusile power station. It does not include any provision for

additional build projects that are required or might be allocated to Eskom in terms of IRP 2010.

Assumption 2: IPPs to be included

The application includes IPPs, which have already been contracted through short-term energy purchases and the Medium Term Power Purchase Programme (MTPPP), the DoE's peaker plants of 1020MW comprising of two open cycle gas turbine (OCGT) plants planned to be constructed at Dedisa (near Port Elizabeth) and Avon (near Durban), and the renewable energy IPP bid programme, which caters for a total of 3 725MW of renewable capacity, pursuant to the determination by the Minister of Energy is also included. The assumptions for the renewable costs and energy were based on information provided by Department of Energy (DoE).

Assumption 3: Single-digit increases for primary energy costs

Primary energy increases will decline to single-digit percentages over the MYPD 3 period as major coal producers support the stakeholder pact.

A stakeholder pact to ensure a sustainable electricity industry

Eskom believes South Africa needs a stakeholder pact to curb electricity demand and limit increases in primary energy costs. Such a pact, as advocated by the President and the Minister of Public Enterprises, would help Eskom to contain operating costs and remain a sustainable entity over the long term. The pact would include:

- A clear path to cost-reflective prices.
- Measures such as the ECS to reduce electricity demand, particularly from large industrial customers.
- Single-digit increases in the price of coal over the medium term.

Such a pact would effectively ask South Africa to partner with Eskom and contribute to achieving the goals of economic growth through ensuring security of supply. Implementing such an agreement would require extensive public consultation and negotiation with major customers.

Assumption 4: A mandatory Energy Conservation Scheme will be implemented

Changes to the demand forecast pose a risk to the price path. Consequently, it is assumed that a safety net in the form of a mandatory ECS will be in place to ensure a stable power system, even if other supply-and-demand levers are not able to close the energy gap.

Energy Conservation Scheme

The mandatory ECS is a proposed safety net that can be relied upon in the event that targeted reductions are not realised through voluntary mechanisms. The scheme would apply to South Africa's 500 largest electricity users – those using more than 25 gigawatt-hours (GWh) a year – to reduce their energy usage. The ECS would involve recording these customers' baseline electricity consumption and using this information to set reduced energy-usage targets. Customers would be responsible for implementing and managing their own energy savings. Exceeding the monthly energy allocation would incur additional costs. Implementing a mandatory ECS would be the last resort to maintain security of supply in the short to medium term. Nersa still needs to approve this framework.

Assumption 5: Nersa will allow a five-year price path

A five-year price path allows electricity prices to move towards cost reflectivity over a longer period, smoothing the economic impact of increases and providing certainty to customers and investors, while supporting ongoing operations and progress on Eskom's credit rating.

Assumption 6: Electricity demand will be as forecast

A 1.9% compound average growth rate for sales (electricity demand) is projected for the MYPD 3 period. This is considerably lower than the 2.8% a year estimated in the MYPD 2 decision (see figure 1 below) and the IRP 2010 forecast of 2.9% up to 2030.

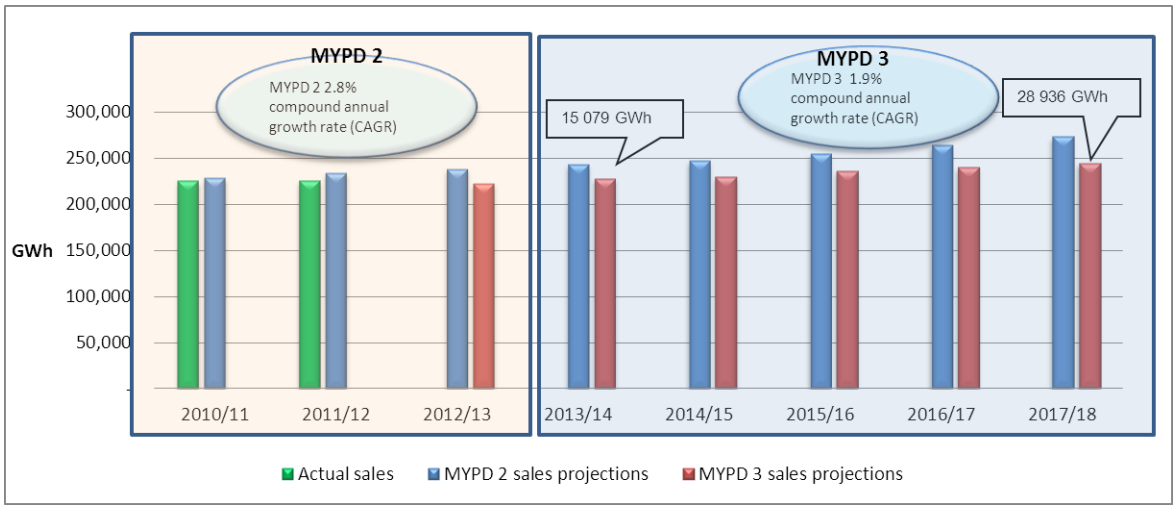


Figure 1: MYPD 2 sales and sales forecast versus MYPD 3 sales forecast

The main driver for low growth is the global financial crisis, which has led to local economic stagnation and low commodity prices. The proposed electricity price increases are also expected to have an effect on demand as customers implement energy-efficiency measures to reduce their costs. Reduced exports to Botswana, which is increasing its internal generation capacity, will also contribute to lower demand.

The demand forecast (Table 6) includes the following electricity consumption categories:

- Domestic sales
- International sales
- Energy spent on pumping at the hydro-electric pump-storage facilities
- Distribution and transmission technical and non-technical losses.

Table 6: Demand-side energy flows (GWh)

	Domestic sales	International sales	Pumping	Distribution losses	Transmission losses	Wheeling	En route sales	Demand
2012/13	212 645	9 383	4 062	14 638	8 603	3 691	429	253 451
2013/14	217 890	9 513	4 212	15 236	8 808	3 393	373	259 425
2014/15	219 744	9 769	7 008	15 700	8 973	2 711	94	263 999
2015/16	224 877	10 761	7 985	16 199	9 240	2 708		271 770
2016/17	229 495	9 618	7 888	16 828	9 381	2 690		275 900
2017/18	234 519	9 507	7 972	18 028	9 598	2 681		282 305

The demand projection is based on the impact of gross domestic product (GDP) and Eskom's generating capacity, as measured by a power station's energy availability factor (EAF) (see Table 7). It also takes into consideration the impact of energy-efficiency and demand-management measures.

Table 7: Assumed economic parameters for predicting electricity demand

	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Total sales (GWh)	225 130	222 028	227 404	229 513	235 638	239 112	244 026
Growth (%)	0.3%	-1.4%	2.4%	0.9%	2.7%	1.5%	2.1%
Energy Availability Factor (EAF %	83.3%	82.8%	81.5%	81.8%	82.1%	83.7%	82.7%
Economic Assumptions							
CPI	5%	5%	5.5%	6.0%	6.0%	6.0%	6.0%
PPI	8%	6%	6%	6%	6%	6%	6%
GDP growth	3%	4%	4%	4%	4%	4%	4%
Human capital inflation	7%	7%	7%	7%	7%	7%	7%

Higher levels of demand growth would add to the cost of primary energy and operations – and therefore to the revenue requirement – as additional generation capacity would be required. Should demand grow excessively, Eskom's generating capacity may be unable to match demand. In such a situation, Eskom's IDM programme and a mandatory ECS would become crucial to maintain security of supply.

Assumption 7: Achieving standalone investment grade by 2017/18

Eskom's financial sustainability is premised on achieving a standalone investment grade by 2017/18. During the migration to investment grade status Eskom assumes that there won't be any further credit ratings downgrades.

1.5 Requirement to meet IRP 2010 capacity needs

The energy plan for South Africa, set out in the IRP 2010, is estimated to cost about R3.5 trillion. Regardless of the final choice of implementation and the financing that needs to be secured, the price of electricity in South Africa will inevitably have to increase to cover this cost.

Integrated Resource Plan 2010 – 2030

The IRP 2010 sets out South Africa's long-term energy needs and discusses the generating capacity, technologies, timing and costs associated with meeting that need. The plan assumes average electricity demand growth of 2.9% up to 2030, with an average GDP growth of 3.5%. During this period, about 16,000MW of older generating capacity is projected to be decommissioned. The targets for new capacity build are outlined in **Table 8**.

Table 8: IRP 2010 new capacity targets (MW)

TECHNOLOGY	ESKOM (assumed)		IPPs (assumed)		IRP 2010
	MYPD 3	POST MYPD 3	MYPD 3	POST MYPD 3	TOTAL MWs
Nuclear	0	9,600	-	-	9,600
Coal	0	4,368	2,442	-	6,810
Gas	0	3,269	672	2,300 *	6,241
Wind	0	5,200	2,547	400	8,147
Solar and CSP	0	6,300	3,321	-	9,621
Other renewables	0	-	173	-	173
DoE peaker	-	-	1,008	-	1,008
Cogen	-	-	1,019	-	1,019
Import Hydro	-	-	-	2,609	2,609
Capacity (MW)	-	28,737	11,182	5,309	45,228
		65%	16,491MW	35%	

***** In the 100% scenario, Eskom will build the 2700MWs which is circled in.Table 8

The 9210MW is disclosed in the yellow highlights. This is the renewable capacity assumed to be procured from IPPs as proposed by the DoE.

For illustrative purposes, Eskom has provided the implications of a scenario that assumes the company will ultimately be responsible for 65% of the IRP 2010 projected capacity, with IPPs accounting for the remainder. The 35% allocation to IPPs includes 3,725MW of the DoE's renewable energy IPP programme, 1 020MW of DoE's peaking station and a further

5,500MW of IPPs in the window up to 2017/18. This culminates to approximately 9,200MW of IPP capacity in the MYPD3 period (2013/14 to 2017/18). A scenario assuming 100% Eskom build is also provided.

The allocations are based on the capacity of 45,637MWs not yet under construction shown in IRP2010.The example assumes a 1.9% compound average growth rate for electricity sales over the MYPD 3 period. Thereafter, sales growth aligns with IRP 2010 projections (2.9% average) up to 2030.

Table 9: Migration from the 65% to 100% build scenario

Migration from 65% to 100% scenario		
	Eskom	**IPPs**
Total MWs 65% scenario	28,737	16,491
MWs previously built by IPPs	2,700	(2,700)
Total MWs 100% scenario	**31,437**	**13,791**

The IPP total capacity of 13 791MWs comprises the base IPPs of 9210MWs, DoE peaker of 1020MW, co-generation of 960MW and hydro imports of 2609MW. These capacities cannot be allocated to Eskom.

1.5.1 Key findings of capacity expansion to 2030

Eskom has approached the long term implication of delivering on the country's IRP 2010 capacity plan by compiling two scenarios where the allocations to Eskom's build capacity are either 65% or 100% of IRP2010 beyond the MYPD3 period. In compiling these scenarios the following key principles where assumed:

Capacity and capital expenditure:

- Capacity expansion until 2030 is based substantially upon the IRP 2010, taking into account timing and capacity deviations based on recent guidance received from government and certain technical assumptions.

- Eskom supplies its own transmission and distribution infrastructure.
- The total capital expenditure excludes that related to municipal distribution infrastructure.
- No replacement capacity beyond 2030 is catered for and hence this impact is excluded from the financial implications in the latter years
- In the 65% scenario, IPP's build capacity of 9210MWs during the MYPD 3 period (as requested by DoE) and the total IPPs equate to approximately 35% of capacity not yet constructed. The remaining 65% capacity is built by Eskom
- In the 100% scenario Eskom will build all capacity required by IRP 2010 beyond the 9210MWs of renewable IPPs
- The difference between what Eskom builds beyond the MYPD 3 period in the 100% scenario when compared to the 65%scenario is only 2,700MWs. Hence the financial impact is insignificant and the results are similar for both scenarios. The key results are summarised below

Price path:

- The price path assumed over MYPD3 period will allow Eskom to reach standalone investment grade status by 2017/18 and maintain it thereafter.
- The return on assets (ROA) considered is the lower of the 8.16% as determined by Nersa during the MYPD 2 and the ROA required to maintain investment grade.
- Sales growth will be 1.9% for the MYPD 3 period, after which it will increase to IRP 2010 targets until 2030, after which it will return to 1.9% per year.

Funding:

- Funding of the capacity expansion for the generation and network requirements is provided through debt and tariffs only.
- Debt capacity is assumed at R60bn per annum in 12/13 real terms.
- No equity injections are assumed throughout the period to 2030.

Other:

- IPP contracting periods are assumed to be between 15 to 20 year for renewable technologies and 40 years for coal technologies.
- No carbon taxes will be implemented over the period to 2030.

- No dividend payments to shareholder will occur to 2030.
- Operating costs beyond the MYPD3 period escalate by an average of 6% per annum.
- Coal price increase by an average of 10% per annum after 2017/18.

65% build vs 100% build

The difference between what Eskom builds beyond the MYPD 3 period in the 100% scenario when compared to the 65%scenario is only 2,700MWs. Hence the financial impact is insignificant and the results are similar for both scenarios. The key results are summarised below.

Scenario 1: Eskom builds 65% of capacity post MYPD3

To achieve the 65% target, the electricity price would need to increase by 20% a year for the five years of MYPD 3, as shown in Figure 2 and five further years of 9% p.a. before inflationary adjustments p.a. are reached. The extended projected price path for electricity would be lower than the IRP 2010 price path, with the price reaching 102c/kWh in real terms in 2030/31 compared to the 110c/kWh in the IRP 2010.

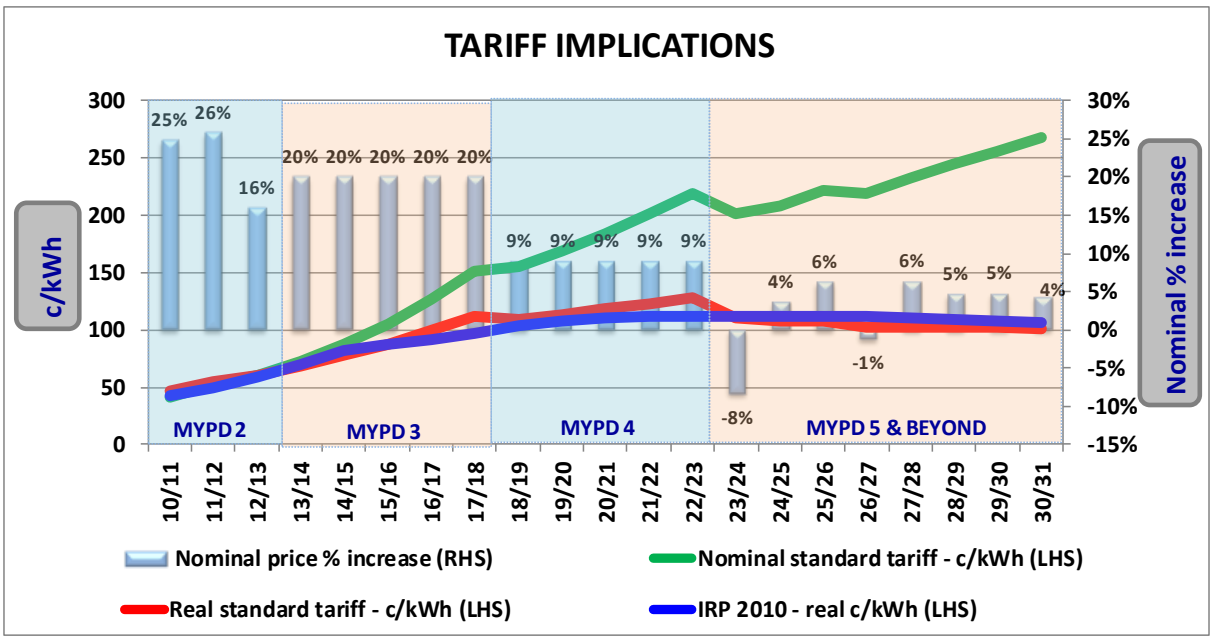


Figure 2: Revenue requirements for IRP 2010- 65% scenario

During MYPD 4 a price increase of 9% per year would be required for five years to ensure that the IRP 2010 capacity expansion is fundable. Thereafter, it is expected that prices will normalise around 5% annual price increase between 2023/24 and 2030/31.

Further findings are as follows:

- **Capital expenditure:** Eskom's total capital expenditure would be more than R3 trillion between 2013/14 and 2030/31. About half of this would be for new build beyond Kusile power station, of which about R180 billion would be spent during MYPD 3. The remaining period from 2018/19 to 2030/31 will add a further R1.6 trillion resulting in a cumulative R1.8 trillion cost for new build capital expenditure beyond Kusile
- **IPPs:** Purchasing electricity from IPPs could cost close to R750 billion between 2013/14 and 2030/31, of which about R150 billion could be spent during MYPD 3.
- **Debt:** Eskom would need to raise approximately R1.1 trillion in debt from 2013/14 to 2030, with a ceiling of about R60 billion per year in 12/13 real terms (based on an independent study).
- **Equity:** It has been assumed that no further equity injections would be made into Eskom.

Scenario 2: Eskom builds 100% of capacity post MYPD3

To achieve the 100% target, Eskom would need price increases of 20% a year for the five years of MYPD 3, as shown in Figure 2. The price path for the 65% and 100% scenarios up to 2017/18 is similar, as the substantial impact of the changes occurs post the MYPD3 window. The projected price path for electricity reaches 102c/kWh in real terms in 2030/31.

To achieve the 100% target, Eskom would need price increases of 20% a year for the five years of MYPD 3, as shown in Figure 3. The price path for the 65% and 100% scenarios up to 2017/18 is similar, as the substantial impact of the changes occurs beyond the MYPD3 window. The projected price path for electricity would be lower than the IRP 2010 price path, with the price reaching 102c/kWh in real terms in 2030/31 compared to the 110c/kWh in the IRP 2010.

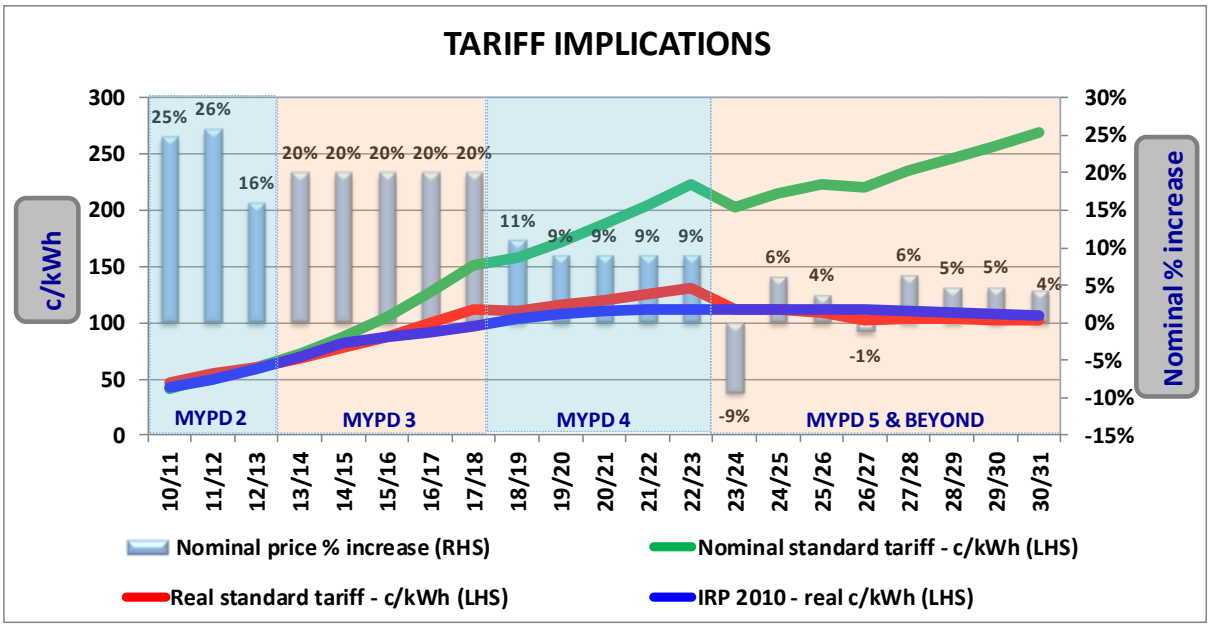


Figure 3: Revenue requirements for IRP 2010 -100% scenario

During MYPD 4 a price increase of 11% in 2018/19 would be required followed by a 9% increase for four years to ensure that the IRP 2010 capacity expansion is fundable. Thereafter, it is expected that prices will normalise around an annual price increase of 5% between 2023/24 and 2030/31.

Further findings are as follows:

- **Capital expenditure:** Eskom's total capital expenditure would be more than R3 trillion between 2013/14 and 2030/31. About half of this would be for new build beyond Kusile power station, of which about R200 billion would be spent during MYPD 3.
- **IPPs:** Purchasing electricity from IPPs could cost close to R720 billion between 2013/14 and 2030/31, of which about R150 billion could be spent during MYPD 3.
- **Debt:** Eskom would need to raise approximately R1.1 trillion in debt from 2013/14 to 2030, with a ceiling of about R60 billion per year in 2012/2013 real terms (based on an independent study).
- **Equity:** It has been assumed that no further equity injections would be made into Eskom.

1.6 Proposed changes to the retail tariff structures

Eskom's revenue requirement results in a single average price increase that is translated into specific tariff increases for each tariff. In addition to the revenue request detailed earlier in this chapter, Eskom requests that Nersa consider the following modifications to the existing tariff structure. This is based on the revenue requirement that translates into an average price increase of 16% per year over the MYPD 3 period.

1.6.1 Protecting the poor (subsidisation by other users)

Eskom and Nersa are aware of the need to protect low-income households from the impact of high price increases. In its MYPD 2 decision, Nersa implemented the inclining block tariff (IBT) to cushion poor households that use very little electricity. This structure, which also provides an incentive for all households to use electricity efficiently, divides consumption into four blocks, with the per-unit tariff stepped up as consumption increases.

The prices determined for the different IBT blocks successfully lowered the cost of electricity for all residential customers including the poor, but its implementation has had some unintended consequences. The tariff structure is complex and hard to understand. Eskom's residential customers receive lower-than-average tariff increases, with a built-in cross-subsidy from larger urban users, making the growth in IBT cross-subsidies economically unsustainable. Currently, residential customers receive about R4.5 billion that increases in cross-subsidies from Eskom's large customers growing to about R6 billion in 2013/14. Importantly, the mechanism also needs to be refined to better target low-income households.

Eskom proposes to amend the residential tariff structure to include a simplified, subsidised single energy rate "lifeline" tariff (Homelight 20A) to protect low-income households. It further proposes a modified IBT structure for larger low-consumption residential customers that will also cater for multiple homes, and thirdly, to reintroduce fixed-charge tariffs (based on the size and true cost of supply) for residential customers with high consumption.

1.6.2 Price increase date

Eskom's financial year runs from 1 April to 31 March, so tariffs for Eskom's non-municipality customers currently increase on 1 April. However, in terms of the MFMA, municipal tariffs are only allowed to increase on 1 July. To avoid a shortfall in revenue the delay in increases

to municipality tariffs are taken into account. Any shortfall or over-recovery needs to be recovered over a nine-month period, resulting in a higher increase.

Eskom considered moving the increase for its non-municipal customers to 1 July to align with its municipal customers' increase date. However, on modelling the impact of this move, it was found that the increase for non-municipality customers would be much higher for the remaining nine-month period of 2013/14 even though the annual increase would have been the same. It was felt that it would not be appropriate to propose the change at this time and the current implementation dates for municipal and non-municipal customers will remain in place.

1.6.3 Other proposed structural changes to the retail tariffs

Additional proposed changes to tariff structures aim to improve cost reflectivity and enhance transparency. Specifically, Eskom is proposing to:

- Recalculate the tariff components based on an updated cost-to-serve study with:
    - Rates to be updated to differentiate between actual cost increases per licensee i.e. for Generation (energy costs), Transmission (network costs) and Distribution (network and retail costs).
    - All cross-subsidies in the current tariffs to be unbundled and shown transparently.
    - Use-of-system charges (network charges) to be cost reflective for all customers and shown transparently, especially where cross-subsidies are paid or received.
    - The reliability service charge (cost incurred by the system operator to keep the national grid in balance) for the Megaflex tariff to be unbundled to show rates excluding energy losses.
- Revise time-of-use structures to start addressing the difference between seasonal rates by changing the time-of-use (TOU) peak to off-peak ratios.
- Incorporate the environmental levy costs into the energy charges.
- Apply the reactive energy charge for all time periods.
- Introduce Distribution and Transmission use-of-system charges for generators.

See the *Proposal to restructure tariffs* chapter at the end of this document for more detail.

2 THE MYPD PROCESS

Key points

- This application covers Eskom's revenue needs for MYPD 3, which begins on 1 April 2013 and is proposed to run until 31 March 2018.
- The MYPD process is supported by a range of policies and legislation, some of which are in the process of being reviewed, including the MYPD 3 regulatory rules being reviewed by Nersa.
- As part of the application process, Eskom sent a proposed MYPD 3 application to the National Treasury and the South African Local Government Association (Salga) for comment. Their responses are outlined in this chapter and have been considered in the final application.

2.1 Basis of application

Electricity prices are regulated by Nersa in terms of the Electricity Regulation Act. Nersa determines the revenue to which Eskom is entitled, which is in turn translated into an average price adjustment and, finally, the tariffs that customers are charged for electricity.

The current three-year price determination, MYPD 2, ends on 31 March 2013. This application is for the next period, MYPD 3, which commences on 1 April 2013 and will run until 31 March 2018 if Eskom's five-year proposal is accepted.

In keeping with the requirements of Section 42 of the MFMA, Eskom submitted a proposed MYPD 3 application to the National Treasury and Salga for their comment on 18 June 2012. Their comments were considered and taken into account in finalising this application. A summary of their responses appears at the end of this chapter. This application will now be submitted to Nersa for a determination. Before making its decision, Nersa will follow a public participation process to solicit stakeholders' views on the application.

2.2 Supporting legislation and policies

This application is based on the following legislation, regulation and policies:

- Electricity Regulation Act (2006).
- Nersa's MYPD methodology, including "Eskom's Multi-year Price Determination Revised Rules on Primary Energy Cost Variances, Capital Expenditure Cost Variances, Valuation of the Regulatory Asset Base and Triggers for a Re-opener", approved by Nersa in March 2009.
- Nersa's Cost Recovery Mechanism for Power Purchase Agreements (November 2009).
- Nersa's minimum information requirements ("Guideline on Minimum Filing Requirements for Eskom Multi Year Price Determination II Application").
- "The Electricity Pricing Policy of the South African Electricity Supply Industry" (2008).
- Section 42 of the MFMA, to the extent that this application intends to amend Eskom's pricing structure for the supply of electricity to municipalities.
- Determinations in terms of section 34 of the Electricity Regulation Act (2006) published or issued to Eskom on or before 30 September 2012.

Nersa is in the process of reviewing the MYPD regulatory rules. The finalisation of these rules is essential to address changes that may occur during the MYPD 3 period, especially with regard to the requirement to meet IRP 2010 capacity, possible implementation of a carbon tax and possible revision of the industry structure.

It is assumed that the electricity industry structure will have no impact on the revenue requirement set out in this application. Should this assumption be incorrect, the application may need to be revised.

Electricity Pricing Policy

The EPP, which was gazetted by the Department of Minerals and Energy in 2008, sets out three basic principles regarding cost reflectivity:

- Eskom's revenue requirement should be set at a level covering the full cost of production, including a reasonable risk-adjusted margin or return on appropriate asset values.
- Migration to cost-reflective prices should take place over five years (from 2008).
- All tariffs should become cost reflective, subject to specific cross-subsidies.

2.3 History of MYPD

From the late 1980s through to the mid-2000s, increases in electricity prices were consistently below the rate of inflation as measured by CPI, resulting in a steep price decline in real, inflation-adjusted terms. This was unsustainable. Electricity prices had to start increasing in real terms. To date there have been two MYPD cycles: MYPD 1 and MYPD 2.

2.3.1 MYPD 1

The first MYPD ran from 1 April 2006 to 31 March 2009 and allowed price increases slightly above the expected CPI inflation rate for each of the three years. The MYPD determination for the third year was reopened twice, and resulted in a 27.5% annual price increase for 2008/09. This was the highest percentage increase since 1977, when prices increased by 48.2%, and 1979, when prices increased by 32.5%.

In 2009/10, due to lack of clarity on the funding of the capacity expansion programme, Eskom, instead of submitting a full MYPD 2 application, applied for an interim increase to cover escalations in its primary energy and operating costs. Nersa implemented an interim price increase of 31.3% for that year. The MYPD 2 period therefore started in 2010/11.

2.3.2 MYPD 2

The current three-year determination, MYPD 2, began on 1 April 2010 and runs to 31 March 2013. Late in 2009, Eskom submitted an application that translated to a 35% annual average increase over the three years of MYPD 2. In February 2010, after extensive public consultation, Nersa granted Eskom annual increases averaging 25%, which would have raised the average price to 65.85c/kWh by the final year of the period (2012/13). Nersa indicated at the time that two further years of 25% increases may be required to enable electricity prices to reach cost-reflective levels by 2014/15. Eskom implemented the increases for the first two years of MYPD 2 but reduced its revenue requirement early in 2012, submitting a request to Nersa to implement a 16% average increase for the final year of MYPD 2. Nersa granted this request on 9 March 2012.

Eskom's request for the lower increase for the last year of MYPD 2 was made possible by the 25% annual price increases of the previous two years, the introduction of cost efficiencies and rephasing in the capital expenditure programme, below-forecast electricity demand, and government support in terms of a return sacrifice. Eskom's strong financial position gave it some flexibility to phase in its capital expenditure and debt drawdowns without jeopardising its ability to keep the lights on in the short term. Additional increases are still necessary for longer-term security of supply.

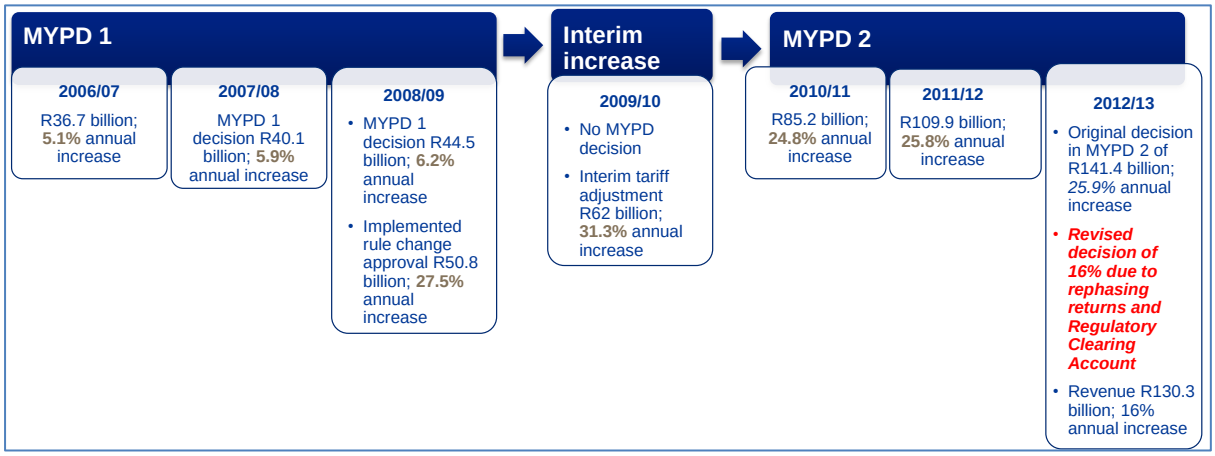


Figure 4: Revenue and price increases from 2006/07 to 2012/13

Accomplishments during MYPD 2

Keeping the lights on. There has been no load-shedding since April 2008. This achievement is the result of the effective management of Eskom's system operator and its generation capacity and operations, coupled with the purchase of some capacity from independent producers and with expanded initiatives to manage demand and raise awareness of the need for businesses and households to use electricity more efficiently.

Electrification. The electrification programme has connected more than 4.2 million households to the electricity grid since it was launched in 1991.

Progress on the capacity expansion programme. The first boiler at Kusile power station is under construction and will start generating power from the end of 2014. Medupi power station is on track to deliver first power to the grid in 2013. The Grootvlei power station has been returned to service, along with an additional three units at Komati power station (the remaining three are expected to be commissioned by 31 March 2013). The capacity expansion programme met its key performance targets during the period. A total of 850MW was added to the system in the first two years of MYPD 2 and a further 260MW is projected to be added by the end of the period. Since 2005, 4 164km of transmission network and about 20 195 MVA of substations have been installed.

Strengthening financial sustainability. Eskom earned a surplus that will be used to reduce debt and fund capital expansion over the next five years. Net profit for the year ending 31 March 2012 was R12.7 billion (2010/11: R7.9 billion). The company's cash reserves remain healthy. By 31 March 2012, Eskom had secured more than 77% of the R333 billion funding required for the capital expansion programme.

Improving operational efficiency. The company has completed the first phase of its Back-to-Basics programme – a performance-improvement initiative to standardise, simplify and optimise processes and systems. This has already yielded in excess of R4.5 billion in savings.

Enhancing environmental protection and mitigating the effects of climate change. Construction on the Sere renewable energy wind project in the Western Cape is expected to

begin during 2012 and on the concentrated solar thermal project, near Upington, in 2015. Solar panels were installed at Kendal and Lethabo power stations to supplement auxiliary power consumption – this was the start of a programme that will be rolled out at all coal-fired stations. In 2011/12, Eskom improved its performance regarding relative emissions, water usage and contraventions of legislation, compared with the prior year.

Expanding social investment commitments. Eskom takes responsibility for the way its operations affect the environment and promotes the objectives of the government's New Growth Path.

Building human capital and contributing to the national skills base. Over the past five years, Eskom has tripled the number of engineering/technical learners receiving training and continuously trains existing staff.

2.4 MFMA process: comments on proposed MYPD 3 application

On 18 June 2012, Eskom sent a proposed MYPD 3 application to the National Treasury and Salga for comment before making its final submission to Nersa. Eskom also had various engagements with other stakeholders informing them of the proposed application. On 30 July, Eskom received comment from the National Treasury and Salga on the proposed application. Eskom has considered the comments received and has taken them into account in finalising its application. A summary of the comments received, as well as Eskom's approach regarding the issues raised, is set out below.

2.4.1 Proposed application

The proposed MYPD 3 application submitted to the National Treasury and Salga put forward a "base case" outlining Eskom's minimum revenue requirements for the MYPD 3 period and "build-up options" that listed additional requirements, should certain decisions be made during the MYPD 3 period.

Base case application

The base case included only Eskom's operating and primary energy costs, depreciation and returns, assuming Eskom's committed new build programme up to the substantial completion of Kusile, as well as the first round of the DoE's renewable energy IPP bid programme and peaker plant. For the base case, the average annual tariff increase for the first four years was proposed at 16%, with a 9% increase for the last year of MYPD 3. This translated into an annual average increase of 14.56% per year for the five-year period. Certain information was also set out regarding changes to the tariff structures and tariff increase date for Eskom's customers.

Build-up options

The proposed MYPD 3 submission intended to empower stakeholders to make choices with regard to what role Eskom should play in South Africa's electricity market, not only over the next five years but also in the longer term. These options included:

- New build beyond Kusile using an allocation of 65% to Eskom and 35% to IPPs.
- Additional IPPs, including the DoE's full renewable energy IPP procurement process and others from the IRP 2010 allocation.
- The consequences of implementing the proposed carbon tax.
- Accelerating the national electrification programme by connecting 1 million households in Eskom's proclaimed licence area during the MYPD 3 period.

Including all the build-up options to the base case resulted in an average increase of 19% over the MYPD 3 period.

2.4.2 Feedback from Salga and the National Treasury

Additional options regarding capacity

The National Treasury and Salga both recommended that the price implications of all the new build options beyond Kusile, as well as the IPPs contemplated in IRP 2010, be included in the revenue requirement, as opposed to a base case application with options as outlined. It was felt that failing to reflect the implications of the country's capacity needs on the price path was misleading and irresponsible.

However, Eskom did not have the mandate to include the additional build contemplated in IRP 2010 in its revenue application, other than the IPPs as referred to below. Moreover, Nersa could well not be in a position to make a decision regarding IRP 2010 capacity in the absence of policy certainty.

Eskom acknowledged that referring to “build-up options” was misleading in that it did not adequately highlight the fact that these are not options but, in fact, necessary requirements to ensure security of supply. The company therefore revised its approach. The final application no longer refers to “build-up options” and clearly states that, even though the additional capacity of IRP 2010 capacity is not included in the revenue request, this additional capacity is nonetheless needed for future security of supply. The implications of such additional requirements on pricing, based on certain assumptions, have also been set out to help guide future decisions, as has been requested.

Carbon tax

As the carbon tax was still the subject of discussion and consultation, it was felt that it should not be included as a part of the revenue requirement. Eskom has agreed to this.

Accelerated electrification

Eskom indicated that additional steps were necessary to meet universal electrification targets within a reasonable time and suggested that consideration be given to funding these steps through the electricity tariff.

Both Salga and the National Treasury supported the need for accelerated electrification but proposed that it continue to be funded through the national fiscus, and not by electricity consumers through Eskom’s electricity tariff. Eskom has accepted this proposal.

Funding of energy-efficiency and demand-side management programmes

The proposed application included Eskom’s energy-efficiency and demand-side management programmes in the revenue request.

The National Treasury was of the view that energy efficiency and demand-side management should be funded through the fiscus via the electricity levy, and that Eskom and all other interested parties should apply to the revenue fund for these purposes.

Energy efficiency and demand-side management is an integral part of Eskom's strategy to keep the lights on in a constrained system. The company is concerned that any delays in funding through the suggested process could affect security of supply. Given the circumstances, these costs remain part of the final revenue requirement.

The principle put forward by National Treasury (as well as the DoE) that in future energy efficiency and demand side management initiatives need to be funded centrally through the fiscus is acknowledged.

Independent power producers

Eskom's base case made provision for integrating only those IPPs that have already been contracted through medium- and short-term power purchase agreements and phase 1 of the DoE's renewable energy IPP programme. The base case assumed that only 50% of this planned IPP generating capacity would be realised within the MYPD 3 period and that Eskom would be required to pick up the shortfall.

Salga proposed revising the assumption that only 50% of the planned IPP capacity would be realised upwards to 75%. The National Treasury did not oppose the assumption of 50% realisation but recommended that, given the IPPs' relatively minor effect on the cost of primary energy and operations, any additional revenue required as a result of IPPs exceeding the 50% assumption be dealt with through the regulatory clearing account.

This application now includes the projected costs of all three rounds of the DoE's renewable energy IPP programme (3725MW) based on the determination by the Minister of Energy in terms of section 34(1) of the Electricity Regulation Act.

Energy demand and GDP growth

Eskom's proposed application projected that energy demand would grow by 1.9% over the MYPD 3 period, derived from an average projected GDP growth of 4%. Salga stated that the GDP growth figure was optimistic, quoting lower forecasts from both the World Bank and the Reserve Bank. The National Treasury thought a GDP growth rate of 4% was reasonable, but that growth in electricity sales slowing to 1.9% for MYPD 3 was substantially lower than historical trends and the projections on which IRP 2010 are based. It proposed that Eskom's application add a projection based on an average growth in sales of 2.3% per year (0.5% higher than in the proposed application).

The MYPD 3 application continues to use a projected sales forecast of 1.9%, after which the forecast migrates across to IRP 2010 levels. The sensitivities of a higher path have been modelled.

A five-year price path towards cost reflectivity

The National Treasury supported both the move towards cost reflectivity and the proposed five-year price path. However, it warned that a prolonged control period reduced certainty regarding underlying assumptions and pointed out that any significant change in these assumptions could require a reopener. It also stated that targeted measures from government to support vulnerable businesses are more appropriate than tariffs that are below the cost of supply.

Salga agreed in principle that Eskom's tariffs need to become cost reflective, but argued that attempting to achieve this over five years would result in price increases too steep for the poor, the middle-income group and small and medium-sized businesses to absorb. It said that this would lead to increased levels of non-payment for electricity and non-viability of the electricity sector. It recommended considering a longer-term price path of, for instance, 10 years, even if the MYPD 3 period only covered the first five years of that. It also recommended that the government inject additional equity into Eskom and that a cost-reflective price path take such equity into account.

Eskom believes that further delays in reaching cost-reflective prices would have far-reaching negative consequences for the financial viability of the electricity industry as a whole and Eskom in particular. Delays compromise its ability to maintain operations and achieve standalone investment-grade status needed to obtain funding for future capital expansion.

Returns

Salga stated that the return on assets was clearly the main driver of the double-digit increases requested for MYPD 3. It said that, given the current economic environment, the shareholder should extend the revenue sacrifice over a longer period to reduce the impact of increasing returns on the overall revenue application.

The National Treasury saw the proposal to phase in returns over the MYPD 3 period as striking a reasonable balance between the competing objectives of ensuring Eskom's financial sustainability by transitioning to cost-reflective tariffs on the one hand, and the

possible impact of higher electricity prices on the economy and consumers on the other. It supported Eskom's ultimate goal of being able to raise funding for capacity expansion based on the strength of its own balance sheet, as opposed to using the government's support, as is currently the case. The National Treasury concurred with Eskom's assumption that no dividends would be paid out to the shareholder during MYPD 3.

The returns generated over the MYPD 3 period are less than the returns determined by Nersa and achieve an appropriate balance between the needs of Eskom and its customers. They therefore remain as projected in the proposed submission.

Macroeconomic indicators

Some of the proposed application's macroeconomic assumptions were questioned. Specifically, the National Treasury's CPI projections were lower. It believed the proposed electricity price increases would have a more pronounced effect on the CPI than Eskom predicted because of the planned reweighting of the CPI basket, adding between 0.7 and 1 percentage points to CPI as opposed to Eskom's projected 0.3 to 0.6 percentage points.

The National Treasury requested that further information on the economic impact be included in the application. This has been done.

Assumptions regarding coal costs and the Energy Conservation Scheme

There were concerns regarding Eskom's assumption of single-digit coal cost increases. It was suggested that the macroeconomic impact – specifically the possible unintended consequences of securing coal supplies for Eskom and limiting the increase in coal prices to single-digit increases – be assessed.

Since primary energy constitutes a third of Eskom's costs, it is critical for the company to exhaust all avenues to keep these cost increases within single digits. The broader economic impact will be assessed further.

It was suggested that introducing a mandatory ECS required prior policy decisions by the DoE. Eskom accepts that there are certain policy decisions needed to inform the way forward on these matters.

The National Treasury and Salga also felt that an ECS should only be used as a last resort. Eskom agrees, but has retained ECS in its submission as it is meant as a safety net that will need to be implemented quickly in case of a supply emergency. It has not requested any revenue for ECS during MYPD 3.

Costs

Concerns were expressed regarding certain costs and the efficiency of Eskom's technology choices. A request was made for Nersa to scrutinise these costs. This is indeed a part of the process.

Other issues

In general, there was support for Eskom's proposals regarding:

- Protection of the poor.
- Aligning the price increase date for Eskom's non-municipal customers to 1 July, when price increases for municipal tariffs take effect, although further analysis of the impact of this approach has led to a decision not to implement this change at this stage.
- Restructuring residential and municipal tariffs, subject to consultation with Salga and Nersa.
- Enhancing cross-subsidy transparency.
- The methodology used to value assets (depreciated replacement costs).

Conclusion

The input by National Treasury and Salga is greatly appreciated. It has been constructive and has shaped this final application.

3 MOVING TOWARDS A SUSTAINABLE ELECTRICITY INDUSTRY

Key points

- Cost-reflective prices represent the true cost of generating, transmitting and distributing electricity. Eskom's prices are currently not cost reflective. The application proposes a five-year price path towards cost-reflective prices.
- The revenue request consists of four components: primary energy costs, operational costs, depreciation and return on assets (both calculated using depreciated replacement value). Nersa's approved prices should cover the costs of all these components, provided they have been prudently incurred.
- Cost-reflective prices support the financial viability of Eskom and the energy industry. This in turn improves security of supply by enabling Eskom to continue with its operations and obtain optimum financing for capacity expansion, as well as providing the correct price signals to encourage users to use electricity efficiently.
- Economic modelling shows that one alternative to cost-reflective prices – increased taxes – would have undesirable consequences for the economy. The key issue is finding an optimal migration path to reach cost-reflective prices.
- Electricity prices have a direct influence on Eskom's credit rating. The longer prices take to achieve cost reflectivity, the longer Eskom will have to rely on government guarantees to secure financing.
- Electricity prices also have a direct impact on Eskom's ability to service existing debt, which was secured with the help of government guarantees to the value of R350 billion. Eskom's ability to service its debt is therefore as important for South Africa as it is for the company.
- An appropriate price trajectory can support investment in IPPs. It can also give electricity consumers who have the ability to generate or co-generate their own electricity the correct price signals to do so.

Many electricity utilities, particularly in developing countries, are expanding to meet growing demand. The International Energy Agency projects that global electricity demand will increase from 17.2 million GWh in 2009 to more than 31.7 million GWh in 2035. The large infrastructure investments required to meet this demand can either be recovered over time from customers, through prices that reflect some or all of the cost of supply (including appropriate returns), or by governments, which recoup the costs through taxes or subsidies, or a combination of the two. In the former case, payment is mainly made by the electricity customer and is closer to "cost reflectivity", whereas in the latter case the burden is ultimately borne by the taxpayer and may not be optimal from an economic perspective.

Eskom believes cost-reflective prices are optimal for the South African economy and the electricity industry, because they encourage efficient use of a scarce resource (energy) and do not unduly burden present or future taxpayers with the costs of infrastructure investment.

From the 1980s to the early 2000s, the price of electricity declined in real terms (taking inflation into account) to levels below the cost of production and lower than those required to support investment in electricity infrastructure. South Africa now finds itself in a catch-up phase, with electricity prices increasing to align with cost-reflective levels.

The government has highlighted the need to expand infrastructure to meet demand for electricity and provide the basis for economic growth, job creation and universal access to electricity. If electricity pricing does not reflect the cost of producing and supplying electricity, the resulting poor financial performance and probable downgrade in Eskom's credit rating will make it difficult to raise capital to finance this expansion.

Nersa rules require that Eskom's costs be represented in terms of four building blocks: primary energy costs, operating costs, depreciation and return on assets (both calculated using depreciated replacement value). The first two of these blocks relate to annual running costs, while the latter two relate to the costs of financing investment in new capacity in a sustainable way. A cost-reflective price is one that covers all these costs in full, provided that they are efficiently or prudently incurred.

The EPP calls for cost-reflective prices by 2014/15. There is general consensus that meeting this deadline would require price increases that are too steep for South African households and businesses to reasonably bear. Eskom is therefore proposing a price path that will lead South Arica towards cost reflectivity over the MYPD period.

3.1 Advantages of cost-reflective prices

3.1.1 Supporting a sustainable energy industry

Prices that cover the costs of operations and include reasonable returns will create a financially viable energy industry that is attractive to investors. Financial sustainability of the energy industry is one of the goals underpinning the MYPD 3 revenue application.

3.1.2 Best option available

If cost-reflective prices are not achieved, Eskom will have to find another source of revenue to pay for its operations and capacity expansion projects. One option would be to approach the government, as its sole shareholder, to add to the taxes already paid on goods and services (VAT), labour (income tax) and capital. If an IPP's price is not appropriately recovered by Eskom or the relevant buyer of that power, the shortfall will also need to be funded through alternative means.

A University of Pretoria study (Bohlmann and Van Heerden, 2012) modelled the impact of such tax increases. The study found that increasing taxes would negatively affect consumers' disposable income, resulting in reduced consumer spending (including on electricity, which would reduce Eskom's revenue) and lower domestic output. Similarly, high taxes on capital would discourage investment in businesses and reduce job creation, while increasing taxes on goods and services would affect the poor the most, undermining the country's developmental goals.

A similar study by Enerweb, specifically on the effect of additional taxes on households, also found that tariff increases were preferable to income tax or VAT increases. This was because households pay 56% of total national income tax but only 26.4% of the national electricity bill. If income taxes were used to finance electricity infrastructure, households would therefore be responsible for a far greater portion of the required revenue (56% rather than 26.4%) than if the revenue was acquired through tariffs. An increase in VAT would negatively impact on household consumption, with poorer households contributing a larger portion relative to their lower levels of income.

In summary, the research found that using taxes to fund the gap would have a severely negative impact on the economy and that, regardless of the price path adopted in principle, the effect on the economy of using state resources (in the form of taxes) was unpalatable.

3.1.3 Users pay for what they consume

Cost-reflective prices minimise economic distortions caused by inadvertently subsidising larger consumers of electricity. If prices are not cost reflective, then in effect every unit of electricity supplied is subsidised, either by taxpayers or by future users of electricity. In addition, there are also inter-tariff subsidies. Currently, energy-intensive industries and affluent customers contribute the largest subsidies.

3.1.4 Improved energy efficiency and reduced environmental impact

The University of Pretoria study cited earlier also found that non-cost-reflective prices failed to give customers an incentive to be energy-efficient. “Cheap” electricity would therefore result in increased energy demand, which would in turn put more pressure on generation capacity and require accelerated infrastructure expansion for little or no additional economic output.

Cost-reflective prices send the right price signals to motivate electricity users, particularly larger customers, to invest in energy-efficient technologies and processes. Such user behaviour has the potential to curb demand growth, helping to reduce environmental emissions from power generation and alleviating the need for purchasing additional costly primary energy and investment in generating infrastructure.

3.1.5 Improved security of supply

Cost-reflective prices improve security of supply in two ways:

- They improve Eskom’s creditworthiness, helping it to secure finance for future capacity expansion.
- They encourage customers to use electricity efficiently, contributing to a supply/demand balance that allows Eskom to do essential plant maintenance,

extending the useful life of generation, and transmission and distribution infrastructure.

3.2 Disadvantages of cost-reflective prices

3.2.1 Steep price increases

Transitioning to cost-reflective prices too quickly may require price increases that some customers, especially energy-intensive and low-margin businesses affected by the global economic downturn, may find difficult to adjust to. Eskom realises this and has proposed an extended period of price adjustment to smooth the impact of these increases.

3.2.2 Potential conflict with cross-subsidisation

If poorly implemented, cost-reflective prices have the potential to add to the financial burdens of South Africa's poorest households. A truly cost-reflective price, applied uniformly to all Eskom's customers, would effectively erase cross-subsidisation and run counter to the government's socioeconomic goal of protecting the most vulnerable. Eskom is working to ensure that cross-subsidies continue to be applied in parallel with the move towards cost-reflective prices. For more on cross-subsidisation see *Protection for the poor* in the *Balancing the economic effects* chapter.

3.2.3 Electricity theft and late payment

The perception that cost-reflective tariffs are too high may result in an increase in electricity theft, which is undesirable both because it poses a danger to the public and because of lost revenue to Eskom. Late payment and default on payment may also increase.

3.2.4 Possible disincentive to investment

Price increases may make South Africa seem less appealing for investment, particularly in the short term, because these price increases add to the basic costs involved in running or expanding a business.

3.3 Analysis of advantages and disadvantages

On balance, the advantages of cost-reflective prices and the better economic outcome over the long term outweigh any economic disadvantages, so the need to move towards cost reflectivity is necessary. Most of the identified disadvantages can be minimised by adopting an optimal migration path and employing targeted interventions using other mechanisms for those customers that require assistance.

3.4 Cost components

The move towards cost-reflective prices that started in MYPD 1 continues in MYPD 3 as Eskom applies for revenue to recover the following components:

- Primary energy, including costs relating to IPPs.
- Operating costs, including IDM.
- Depreciation, based on Eskom's recently valued replacement asset base.
- Return on assets, which by 2017/18, still fall short of the 8.16% target Nersa set for Eskom in MYPD 2.

In regulatory terms, a price that fully addresses all of the above components would be "cost reflective".

3.4.1 Generation primary energy costs

Generation primary energy costs are estimated to escalate at 8.3% annually. Coal and coal handling costs comprises 75% of the total costs and the balance is attributable to water, nuclear, gas, environmental levy and other direct generation-related primary energy costs.

Table 10: Components of Generation primary energy cost (R million)

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MYPD 3
Coal	35 376	37 010	41 966	47 282	52 351	57 703	236 312
Water	1 532	2 082	2 414	2 615	2 750	2 955	12 816
Start-up gas & oil	1 442	1 511	1 636	1 721	1 813	2 018	8 699
Coal handling	1 041	1 087	1 163	1 246	1 356	1 510	6 362
Water treatment	301	327	370	396	428	477	1 998
Nuclear	368	471	471	678	767	856	3 242
Open cycle gas turbines (OCGT)	2 642	3 592	3 258	1 788	1 898	2 056	12 592
Fuel procurement	457	435	435	443	452	485	2 250
Sorbent			10	56	139	251	456
Road maintenance	321	53					53
External electricity purchases	22	23	24	26	27	27	128
Enviromental levy	8 105	8 842	9 037	9 324	9 490	9 746	46 439
Displacement savings			- 405	- 710	- 959	- 1 061	- 3 135
Generation primary energy (Rm)	**51 606**	**55 433**	**60 380**	**64 865**	**70 512**	**77 022**	**328 212**

Coal and coal handling

The rand per ton cost of coal, excluding transport, which accounts for most of Eskom's primary energy costs, grows by a compound average of 10% over the MYPD 3 period. Coal costs vary depending on the contract type.

Table 11: Cost of coal purchases

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MYPD 3
TOTAL (Mt)	**128**	**131**	**133**	**136**	**141**	**141**	**682**
Delivered (R/ton)	271	299	334	355	397	438	366
Total Cost (Rm)	**34 805**	**39 197**	**44 331**	**48 270**	**56 003**	**61 760**	**249 561**

The amount of coal Eskom needs, which determines the overall cost of coal, is affected by the burn rate (the volume of coal required to produce a unit of electricity). Eskom's overall burn rate has increased from 0.55 tons per MWh in MYPD 2 to 0.57 tons per MWh for MYPD 3. The burn rate is affected by power-station efficiency and coal quality.

In addition, coal volume projections take into account the projected power from IPPs over the period and thus the reduced requirement for coal. Eskom has included all three rounds of the renewable energy IPP bid programme on the basis that it is pursuant to a determination made by the Minister of Energy. Should the programme not be implemented as planned, there may be a shortfall in capacity which will need to be made up with additional generation. In such event additional costs will be required for coal purchasers and will need to be addressed appropriately to mitigate this risk.

Coal quality

The quality of coal is vital for efficient power generation. Poor-quality coal has greater ash content, reduced calorific (energy) value and more rock impurities. This damages coal handling and grinding equipment, reduces the efficiency of power plants, causes load losses, and increases emissions and the ash-removal burden.

Mining conditions and coal quality in Mpumalanga have deteriorated in recent years because high-quality coal has already been extracted, leaving behind only poorer-quality deposits. Moreover, coal is now being mined in difficult geological areas. In certain instances there is a need for better mine performance. This is being addressed on an ongoing basis.

Coal beneficiation (purification), blending and online quality-monitoring capabilities were not built into most long-term coal supply agreements, making it a challenge to maintain consistent quality in the coal supplied to power stations. Eskom has undertaken various projects to improve the quality and consistency of its coal, including online coal-quality monitoring and beneficiation at cost-plus mines. Eskom is also engaging with mining houses to ensure the timely supply of life-of-mine plans to enable better quality control.

Eskom obtains its coal from a number of local mines and has negotiated supply contracts with new long-term mines that will come on-stream during the MYPD 3 period. These mines are expected to meet Eskom's projected demand for coal of the required quality up to 2017/18. This includes the coal for power stations that will be commissioned within the MYPD 3 period. Stock days have improved and currently hover between 40 and 45 days. Coal handling refers to all activities necessary to get coal to a boiler once it has been delivered to the power station. This includes stockpile maintenance and coal reclamation.

The price of coal is influenced by the following factors:

- The recent boom in the coal-export market.
- The Mpumalanga coal basin is expected to reach peak production within the next five to 10 years and then decline sharply. When this happens, the difficulty (and cost) of mining coal is likely to increase sharply.
- Increased rates of coal burn have shortened the lifespan of mines.

- Historic underinvestment, changes in environmental legislation and technical factors have led to higher operating costs at Eskom's cost-plus mines.
- Long distances between some power stations and the mines, especially those returned to service, have increased transportation costs.

The following steps have been taken to mitigate the risks related to coal supply:

- Eskom has contracted a number of junior mining houses to provide coal over the short and medium term. However, many of these mines are marginal, with high investment and production costs.
- All major new sources of coal will be contracted for the life of the resource to minimise overall costs, reduce supply risk and create price stability.
- Eskom is migrating a significant portion of its current coal-transport volume from road to rail, which is significantly more cost effective in the long term.
- Eskom is investigating the cost implications of beneficiation, purifying coal to a level that is more suitable for Eskom's coal-fired generation fleet.

Table 12: Type of coal contracts by volume (Mt)

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MYPD 3
Existing dedicated cost-plus mines (Mt)	54	53	54	51	47	46	251
Existing multi-product mines (Mt)	30	34	36	42	46	44	202
New long term mines (Mt)			6	15	21	26	68
Medium term mines (Mt)	44	44	37	28	27	25	161
Total coal (Mt)	**128**	**131**	**133**	**136**	**141**	**141**	**682**

Water and water treatment

Water volume consumption, which depends on the amount of electricity generated, is expected to remain relatively constant over the MYPD 3 period. However, as the projections in Table 13 indicate, the unit cost of water is expected to more than double as the Department of Water Affairs expands infrastructure. The projections do not make provision for the additional 10% price increase that the department may impose to reflect water scarcity in South Africa.

Table 13: Water costs and usage projections

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MYPD 3
Water consumption per station (ML)	348 129	348 129	347 461	347 100	340 027	337 020	1 719 737
Rand per million litres	4 400	5 982	6 947	7 533	8 088	8 768	7 452
Total costs (Rm)	**1 532**	**2 082**	**2 414**	**2 615**	**2 750**	**2 955**	**12 816**

Water-treatment costs are incurred for chemically purifying the water used in the turbines.

Start-up gas

Start-up gas and oil costs are incurred for the heavy fuel oil used to start up and shut down coal-fired power stations and stabilise their boiler flames when they are being operated at low loads.

Open-cycle gas turbine costs

Eskom has four open-cycle gas turbine stations in the Western Cape, with a total capacity of 2 400MW. They run mainly on diesel and were originally designed as peaking stations (to meet demand for short periods at peak times) and to provide reserves to cushion the power system in the case of emergencies. The cost of running the turbines is more than 10 times the cost of running coal-fired generating stations. The gas stations were planned to operate at less than 6% load factors.

The cost of the open-cycle gas turbines is difficult to forecast due to the volatility in the cost of diesel. For the purposes of this application, it is assumed that these stations will be limited to a 6% annual load factor, in line with average annual demand growth of below 2% over the MYPD 3 period. The open-cycle gas turbine stations are theoretically capable of running for 16 hours a day, equal to a 55% load factor.

Nuclear costs

Based on today's nuclear fuel-supply market prices and trends, Koeberg's nuclear fuel cost will increase to about R60 per MWh(e) (not levelised) by 2015. This increase is being phased in and will only be fully reflected in Koeberg's primary energy cost by 2014/15.

Nuclear fuel powers Koeberg's two units for between 45 and 54 months before it is spent. As a result, the burn (primary energy) costs of Koeberg during a given year will not reflect the actual nuclear fuel purchasing costs during that year.

Factors influencing nuclear fuel costs include:

- **Electricity demand forecasts.** Eskom has contracts that cover 100% of Koeberg's demand until the end of 2017 and 40% of Koeberg's demand from 2018 to 2020. Fuel-fabrication service contracts cover 100% of Koeberg's

demand until 2015. Eskom is entering into fuel-fabrication contracts that will cover Koeberg's fuel-fabrication demand until 2020.

- **Volatility in the nuclear fuel market.** Under Eskom's current contracts for nuclear fuel, 45% of the total nuclear fuel price for 2011 to 2017 will be market-related (fluctuating with market prices). The effect of price fluctuations will remain minimal as long as Koeberg is Eskom's only nuclear power plant.

Environmental levy

The National Treasury implemented an environmental levy of 2c/kWh on electricity generated from non-renewable sources in July 2009. This was escalated to 2.5c/kWh in July 2011 and to 3.5c/kWh in July 2012.

All Eskom generators, with the exclusion of hydro and pumped-storage power stations, are registered and licensed to pay the levy. The levy is paid to the South African Revenue Service. It is calculated by multiplying the measured energy sent out by identified Eskom's power stations, including electricity consumption by those stations' auxiliary plants, multiplied by the per-unit levy, currently set at 3.5c/kWh.

Eskom assumes the government will not introduce any further rate increases for the planning period.

Table 14: Environmental levy forecasts

	2013/14	2014/15	2015/16	2016/17	2017/18	MYPD 3
Energy sent out (GWh)	239 896	243 639	249 542	252 930	259 281	1 245 288
Renewable sent out (GWh)	3 719	5 662	6 601	6 726	6 599	29 307
Non renewable sent out (GWh)	236 177	237 977	242 941	246 204	252 682	1 215 981
System average auxilliary %	7.02%	7.11%	7.26%	7.33%	7.47%	
Generated volumes (GWh)	254 580	258 904	267 520	272 090	278 274	1 331 368
Environmental levy rate (c/kWh)	3.50	3.50	3.50	3.50	3.50	
Environmental levy cost (Rm)	**8 842**	**9 037**	**9 324**	**9 490**	**9 746**	**46 439**

Road maintenance

Eskom's transportation of coal by road has adversely affected the quality of life and the economy of local communities. The transportation of coal by road has accelerated the deterioration of Mpumalanga's road networks, which poses immediate and real risks to the security and continuity of coal supply. Eskom is therefore pursuing several initiatives to

minimise the impact of coal road transport on communities and to rehabilitate Mpumalanga's roads where feasible. Road-repair costs include only those rephased from MYPD 2. Subsequently, prioritised road repairs are being undertaken by the relevant national and provincial road authorities. Funding is through the fiscus, where a contribution is made through the increased environmental levy.

Higher growth impact

If a higher energy demand is experienced, the key impact is the utilisation of additional coal. The impact of a higher annual average economic growth rate of 2.3% compared to Eskom's assumption of 1.9% will require an additional 8 500Mt of coal (over the five year period) at an average cost of R347 per ton. The resultant overall additional cost for coal would be R3 billion were this higher growth rate experienced.

Table 15: Higher growth impact

Higher growth impact	2013/14	2014/15	2015/16	2016/17	2017/18	MYPD 3
MYPD3 coal production (GWh)	222520	226956	236035	238849	244226	
Change in demand (2,3% Vs 1,9%)	0.40%	0.40%	0.40%	0.40%	0.40%	
Change in coal production (GWh)	890	908	944	955	977	**4,674**
Extra coal required (Mt)	1,618	1,651	1,717	1,737	1,776	8,499
Coal cost R/t	294	316	327	377	416	
Additional coal costs (Rm)	476	522	561	655	739	**2,952**
Average cost of extra coal over MYPD3						**347**

3.4.2 Independent power producers

IPPs affect Eskom's costs in two ways. First, all IPPs have to be integrated into Eskom's transmission grid. These costs fall under Transmission's capacity expansion programme.

Second, once integrated into Eskom's grid, Eskom has to pay the IPPs for energy purchased at a c/kWh rate. IPP costs are calculated based on rates provided by the DoE and total R78 billion (gross) over the MYPD 3 period. This cost is offset by savings in Eskom's primary energy expenditure resulting from reduced demand on Eskom's generating facilities because of these energy purchases, calculated at an average of 15c/kWh over the MYPD 3 period. The introduction of further IPPs also provides an opportunity to relieve the constraint in the electricity system. Based on the assumption that demand remains constant, the calculated savings in primary energy costs will total R3 billion for MYPD 3. Despite this deduction, IPP

costs – especially those from renewable energies – are considerably higher than the cost of Eskom-generated electricity, totalling R78 billion (an average of 212c/kWh) for the MYPD 3 period.

The energy bought from IPPs is blended with Eskom generation costs and then sold to Eskom's customers at their normal tariff. IPP costs are recovered as a pass-through according to the Nersa-approved formula.

Stability and sustainability of the electricity industry would encourage international and domestic investment in IPPs. Higher levels of investment in IPPs would likely result in a lower cost of IPP-generated electricity as economies of scale are obtained over the longer term.

Figure **5** shows the IPP performance in MYPD 2 and the projected figures for MYPD 3. For the purposes of this submission, Eskom has included the costs related to:

- The DoE's peaking project (1020MW)
- The MTPPP (373MW)
- The three rounds of the DoE's renewable energy IPP programme, totalling 3 725MW of capacity.

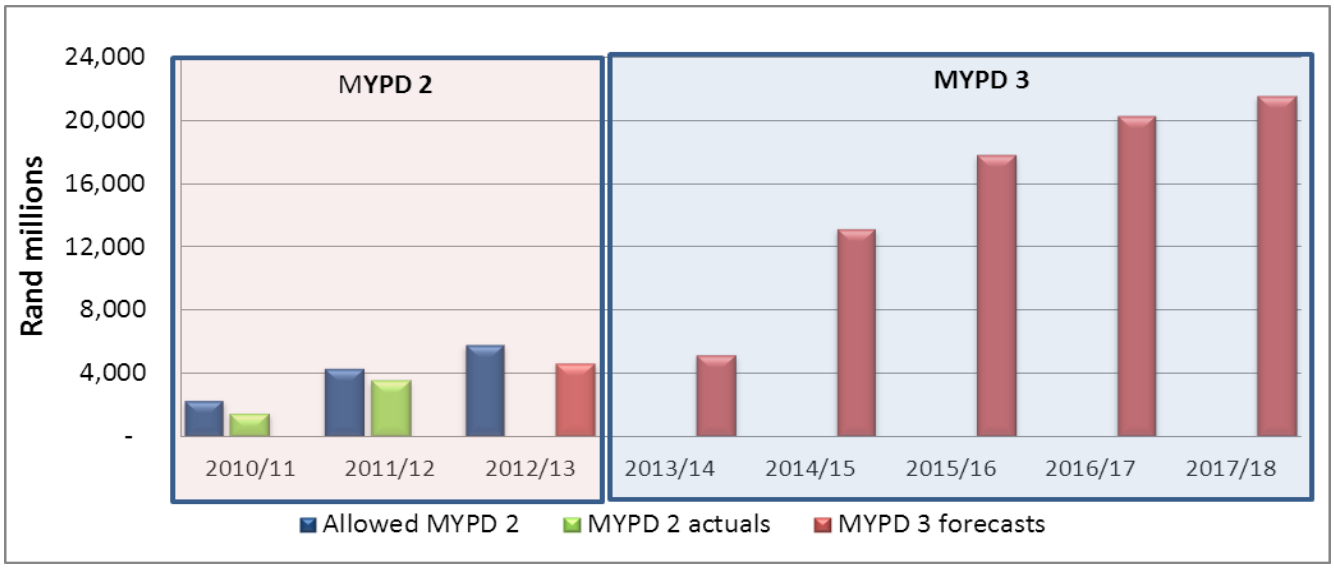


Figure 5: IPP performance in MYPD 2 and forecast for MYPD 3 (R million)

The Department of Energy's renewable energy IPP programme

The DoE has embarked on a three-round programme to procure a total of 3 725MW in renewable energy from IPPs. To date the department has awarded round 1 and round 2 allocations. The final round is still to be determined.

All three rounds have been included in this MYPD 3 application pursuant to the determination made by the Minister of Energy.

Eskom's role from this point on will be to sign power purchase agreements with the IPPs and connect them to the national grid. The contracts are subject to various assumptions, including load factors, availability and timing of grid connection. Should the awarded IPP generators not be completed on schedule or fail to achieve their desired load factors, Eskom's generators will be expected to compensate for the resulting shortfall in energy supply. Eskom's assumptions on IPPs over MYPD3 was based on guidance provided by government during interactions on the price application for MYPD3.

Table 16: Capacity of Department of Energy's renewable energy IPP programme (MW)

	MYPD 3
Wind	1 500
Concentrated solar power (CSP)	200
Solar	1 900
Hydro	75
Other	50
Total renewables capacity (MW)	**3 725**

Table 17 depicts the costs and expected generating capacities of the DoE's peaking IPP, MTPPP, short term purchases and the renewable energy IPP programme. Table 18 gives a further breakdown of the figures for the DoE peaking station. These show the price impact and increase, capacity and load factors over the MYPD 3 period.

Table 17: IPP projects (costs and energy supplied)

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MYPD 3
Renewable IPPs		1 428	8 987	13 879	16 249	17 353	57 895
MTPPP	2 051	1 523	618	546	550	579	3 816
DoE peaking		1 001	2 841	3 147	3 160	3 191	13 340
Short term purchases	2 599	1 022	503				1 525
Other charges	134	215	352	471	185	- 81	1 142
Total IPPs cost (Rm)	**4 784**	**5 189**	**13 302**	**18 043**	**20 143**	**21 042**	**77 719**
Renewable IPPs (GWh)		722	4 469	7 163	7 924	8 003	28 281
MTPPP (GWh)	1 493	2 083	765	629	651	628	4 756
DOE peaking (GWh)		164	440	441	440	440	1 926
Short term purchases (GWh)	1 302	1 183	540				1 723
Total IPPs cost (GWh)	**2 795**	**4 152**	**6 214**	**8 233**	**9 015**	**9 071**	**36 686**
Average IPP cost (c/kWh)	**171**	**125**	**214**	**219**	**223**	**232**	**212**

Table 18: Department of Energy peaking station

	2013/14	2014/15	2015/16	2016/17	2017/18	MYPD 3
DOE peaking (Rm)	1 001	2 841	3 147	3 160	3 191	13 340
Volumes (GWh)	164	440	441	440	440	1 926
Capacity (MW)	1 020	1 020	1 020	1 020	1 020	
Load Factors (%)	4%	4%	4%	4%	4%	

3.4.3 Other primary energy purchases

Eskom will spend R27 bn for acquiring import supply (R15billion), demand market participation and power buyback (R11billion) and a small amount on Distribution (R36 million). Import purchases are substantially derived from Cahorra Bassa.

Table 19 : Other primary energy purchases

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MYPD 3
Distribution IPPs	8	8	9	9	10		36
Imports	2 970	3 611	3 006	2 810	2 973	3 243	15 644
Demand market participation and power buy-back	4 552	3 275	1 973	1 972	1 835	2 001	11 056
Other primary energy purchases (Rm)	**7 531**	**6 894**	**4 988**	**4 792**	**4 818**	**5 244**	**26 737**

Demand market participation and power buy-back agreements

Power buy-backs are not included in the MYPD 3 period. They were applied during March 2012 to May 2012 only. Power buy-back costs are incurred to compensate companies for cutting down on electricity usage in the short term to help with the tight supply system, while demand market participation has longer-term arrangements. Refer to *Integrated demand management* in the *Ensuring security of supply* section for more detail on IDM initiatives.

Hence the overall cost of primary energy includes Generation, IPPs and other purchase costs equating to R432 billion over the period.

Table 20 : Total Eskom primary energy

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MYPD 3
Generation primary energy (Rm)	51 606	55 433	60 380	64 865	70 512	77 022	328 212
IPPs costs (Rm)	4 784	5 189	13 302	18 043	20 143	21 042	77 719
Other primary energy purchases (Rm)	7 531	6 894	4 988	4 792	4 818	5 244	26 737
Total Eskom primary energy (Rm)	**63 920**	**67 517**	**78 669**	**87 699**	**95 474**	**103 308**	**432 667**

3.4.4 Operating costs

Operating costs include all costs involved with the day-to-day running of the business, including staff costs, maintenance and repair costs, cost of cover, arrear debts, IDM and other costs such as insurance, training and travel.

While operating costs are separate from capital expenditure, the two are closely linked. For instance, the cost of building a new generating plant would fall under capacity expansion and would therefore not fall under Nersa's cost building blocks. However, as soon as that

plant is commissioned, the costs of the primary energy used to fuel it, the staff members that repair and maintain it and the depreciation on that plant will all be included as recoverable costs.

Table 21 reflects the costs incurred in operating the business. Human capital is the largest cost item, followed by costs incurred to maintain the assets of the business. These costs are net of capitalisation and are therefore directly recoverable through the electricity price.

Table 21: Operating costs forecasts (R million)

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MYPD 3
Human capital after capitalisation	21 166	22 540	24 740	26 765	29 313	31 364	134 721
Maintenance	10 261	12 020	13 288	15 839	18 120	16 855	76 122
Cost of cover	1 038	2 158	1 828	1 678	1 025	485	7 174
Arrear debt	763	927	1 051	1 215	1 388	1 511	6 092
Integrated demand management	7 784	2 941	2 709	1 862	1 966	3 612	13 090
Other	9 392	10 271	11 336	13 576	13 534	13 651	62 368
Operating costs before efficiencies target (Rm)	**50 404**	**50 857**	**54 952**	**60 934**	**65 346**	**67 478**	**299 568**
Efficiency targets	- 3 000	- 6 000	- 6 000	- 6 000	- 6 000	- 6 000	- 30 000
Net operating costs (Rm)	**47 404**	**44 857**	**48 952**	**54 934**	**59 346**	**61 478**	**269 568**

Human capital costs

Eskom employment is set to increase during MYPD 3 as new generating facilities come online, as operations expand deeper into rural areas and as Eskom strives to improve its technical and business performance. This will require greater numbers of skilled staff and additional training. Table 22 outlines how Eskom's staff complement and gross costs per head are expected to grow over the MYPD 3 period.

The gross employee costs directly incurred for capital projects are allocated to the projects (capitalised) and recovered over the life of the capital asset through amortisation when the asset is depreciated. These costs are therefore not recovered immediately through the price.

Table 22: Projection of employee numbers and gross costs per head for MYPD 3

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Gross human capital costs (Rm)	26 858	28 045	29 946	32 215	34 995	37 442
Human capital headcount	43 450	44 280	44 833	45 187	45 601	45 601
Gross human capital costs per head R000	618	633	668	713	767	821

Repairs and maintenance

Eskom's maintenance philosophy addresses statutory and emissions requirements, the safety of assets and of people, and plant performance. Many of Eskom's power stations are in their midlife and require higher levels of maintenance spending. In addition, the ageing supply network requires essential maintenance and upgrading. This includes providing the distribution infrastructure needed to support the electrification of an average of 100 000 households per year and establishing additional technical service centres in rural areas.

The increasing asset base also requires support and maintenance, and the extended transmission network requires additional resources to monitor and maintain assets.

Table 23 reflects the gross maintenance costs per division and the net amount after capitalisation. Gross maintenance includes the capitalised portion of major overhauls. Infrastructure refurbishment (periodic maintenance) is not included in repairs and maintenance costs (routine maintenance). Corporate maintenance refers to costs incurred to maintain assets held at corporate level such as head office buildings, IT infrastructure and other assets.

Regarding capitalisation of costs, the accounting treatment of some operating costs requires that not all the expense incurred in the year is reflected in the income statement. Some of the human capital and maintenance costs that are directly attributable to capital projects are allocated to those assets and depreciated with the asset over its useful life. They are therefore not included in the price in the years in which they are actually incurred.

Table 23: Gross maintenance costs per division (R million)

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MYPD 3
Generation	9 894	10 706	11 488	14 065	14 409	12 920	63 588
Transmission	397	383	399	424	473	501	2 181
Distribution	8 298	9 863	11 383	12 930	14 256	15 112	63 545
Corporate	211	204	205	200	208	221	1 038
Total gross costs (Rm)	**18 801**	**21 156**	**23 476**	**27 619**	**29 346**	**28 754**	**130 352**
Manpower included in gross	- 5 542	- 6 218	- 6 722	- 7 330	- 8 025	- 8 506	- 36 800
Consulting fees included in gross							
Capitalised	- 2 815	- 2 767	- 3 172	- 3 632	- 3 221	- 3 414	- 16 206
Total net maintenance (Rm)	**10 443**	**12 172**	**13 582**	**16 658**	**18 100**	**16 833**	**77 345**

Cost of cover

Eskom hedges all foreign currency or commodity exposures, imports and exports and foreign loan draw-downs exceeding R50 000 (commodity hedges are dependent on availability of an appropriate hedge instrument in the market). The total forward cover exposure of Eskom is shown in Table 24. These exposures decrease over the MYPD 3 period.

Table 24: Total forward cover

Forward cover	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Value in rand	41,818	41,956	35,561	32,642	19,936	14,840
Value in US dollars (US$)	5,690	5,435	4,390	3,836	2,232	1,587
Exchange rate (Rand/US$)	7.35	7.72	8.10	8.51	8.93	9.35

* Value in Rand based on projected forward cover required over the MYPD3 period which excludes the cross currency hedged positions on the foreign debt

** For ease of comparison all currencies are converted to US dollars

*** Exchange rates based on rate forecasts

The major contributors to the volume of cost of cover are the new build programme and nuclear costs and future fuel, as shown in Table 25. The forward cover in the rand market only provides sufficient liquidity and reasonable pricing for cover with maturities up to 12 months, as a result, forward cover that relates to settlement dates beyond one year must be rolled over annually which has temporary cash flow implications which reverse on final payment of the obligation.

Table 25: Cost of cover (R million)

Cost of cover	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Group Capital	580	622	601	681	491	340
Generation	178	205	163	272	164	77
Nuclear	282	232	271	231	143	68
Foreign debt		1,099	794	495	228	
Total cost of cover (Rm)	**1,040**	**2,158**	**1,829**	**1,679**	**1,026**	**485**

The principle of hedging all foreign currency and commodity exposures is based on the fact that Eskom's revenue is denominated in rand. Therefore, it is prudent to reduce any uncertainty in current and future cash flow requirements due to foreign currency fluctuations. It also assists with achieving better financial planning, funding options and reduced currency risks. Cost of cover is primarily a function of the interest differential between the different countries interest rate curves and, in addition, credit risk linked to both the entity and the

term of the cover which is provided. This premium is paid to the financial institution to obtain forward cover on the foreign currency exposure. The cost of cover currently equates to approximately 5 per cent of the value of the forward cover. The cost of cover is largely subject to changes in the interest rate differentials, forward interest rates and the credit profile of Eskom.

Arrear debt provision

Eskom's arrear debt is largely due to the poor economic climate, coupled with increased electricity prices. This results in lower payment levels among its business and residential customers.

Non-payment is a particular concern in Soweto, where there is a large and complex build-up of historical debt. Payment levels in Soweto are typically under 30%, compared to over 80% in other township areas. Eskom and the government are addressing this by engaging community and political leadership and other stakeholders in Soweto. Residential debt in Soweto accounts for 75% of Eskom's outstanding debt.

Eskom aims to keep arrear debt at an acceptable level – less than 0.6% of annual revenue, assuming no improvement in the Soweto situation – by increasing deposits and securities to control the potential risk and actively pursuing debtors before their debt days exceed 90 days. This is particularly important when dealing with redistributors and other key customer categories. The debtors' forecast assumes an average of 21 debtor days for distribution customers (excluding Soweto), and 19 days for key customers.

Table 26: Arrear debts as a percentage of revenue (R million and %)

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Arrear debts (Rm)	763	927	1 051	1 215	1 388	1 511
As a percentage of revenue	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%

Other costs

Other costs include information management systems, consultant costs, research costs, telecommunications, audit fees, marketing fees, travel and accommodation costs, vending commissions, property rates, vehicle fleet costs and insurance costs. Increases in insurance costs reflect the company's growing asset base and the resultant increases in premiums.

Operating efficiencies target

During the approval of the corporate plan to 2017/18 Eskom set a target to reduce its operating costs by R33 billion between 2012/13 and 2017/18, of which R30 billion will be saved during the MYPD 3 period. The Executive Committee (EXCO) set up a subcommittee to investigate and drive the implementation of this target across the organisation. The work is continuing with no final decision on the allocation across the business or licensees.

For the purposes of the MYPD 3 submission, the approach was to allocate the savings to the three licensees based on their own operating costs (human capital and operating costs) incurred. The respective licensees costs are divided into the total operating costs for the three combined which equates to a savings allocation of 44% to Generation, 51% to Distribution and 5% to Transmission. It must be highlighted that once the savings subcommittee completes its mandate, the allocations will change across the business or licensees. Eskom is not asking the consumer to contribute to this as the R30 billion is excluded from the utility's revenue requirements for the MYPD 3 period.

Table 27: Assumed operating expenses savings

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MYPD 3	Total allocations
Distribution (Rm)	- 1 519	- 2 945	- 3 060	- 2 979	-3,085	- 3 235	- 15 304	51%
Transmission (Rm)	- 174	- 335	- 284	- 267	-261	- 386	- 1 534	5%
Generation (Rm)	- 1 307	- 2 720	- 2 655	- 2 754	-2,654	- 2 379	- 13 162	44%
Total savings (Rm)	**- 3 000**	**- 6 000**	**- 6 000**	**- 6 000**	**- 6 000**	**- 6 000**	**- 30 000**	**100%**

Corporate overheads

Eskom's corporate costs are driven by two substreams: service functions and strategic functions. The principle of corporate costs that are recovered is based on achieving a breakeven situation. Corporate costs are either directly recovered from the business or indirectly recovered via a corporate overhead presented below.

Table 28 : Indirect corporate costs

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MYPD 3
Employee benefit expenses	4 765	5 088	5 210	5 322	5 500	5 885	27 004
Maintenance	81	164	169	165	179	190	868
Depreciation and amortisation	1 307	2 354	2 819	3 029	2 489	2 564	13 255
Interest income/cost & Fair value gains/losses	65	317	299	321	369	- 149	1 157
IDM	7 784	2 941	2 709	1 862	1 966	3 612	13 090
Other costs	- 101	- 410	- 963	- 1 338	- 739	- 737	- 4 187
Total gross costs (Rm)	**13 902**	**10 454**	**10 242**	**9 361**	**9 764**	**11 365**	**51 187**
IDM Recovery	- 7 784	- 2 941	- 2 709	- 1 862	- 1 966	- 3 612	- 13 090
Recoveries (Rm)	- 6 279	- 7 594	- 7 623	- 7 616	- 7 934	- 8 202	- 38 969
Costs attributable to unregulated businesses (Rm)	**- 161**	**- 81**	**- 89**	**- 117**	**- 136**	**- 449**	**- 872**

Table 29: Recovery of indirect corporate overheads

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MYPD 3
Generation (Rm)	11 976	8 070	7 940	7 196	7,548	9 382	40 136
Transmission (Rm)	735	1 121	1 018	866	867	896	4 768
Distribution (Rm)	1 352	1 345	1 373	1 416	1,485	1 535	7 154
Total corporate recoveries (Rm)	**14 063**	**10 535**	**10 332**	**9 478**	**9 900**	**11 814**	**52 059**

The underlying purpose of the corporate divisions is to provide a value-adding service to the licensees. Whereas direct costs are recovered from the responsible line divisions, the corporate divisions recover their indirect costs from the line divisions through the overhead recovery mechanism. On a net basis, the corporate divisions should break even in their recovery of costs and therefore cannot charge a profit to the line divisions.

3.4.5 Depreciation

Depreciation allows Eskom to incrementally recover the principal of the capital invested in assets over their lifetime. Regulators of long-asset-life industries in high-inflation environments favour depreciated replacement values because they offer long-term price stability without price shocks as the operating assets are replaced at the end of their lives. Avoiding the inherent price shocks of the historical asset value approach also provides greater comfort to credit-rating agencies and lenders.

Eskom's treatment of asset valuation is aligned with the EPP, which requires the use of an asset valuation methodology that accurately reflects replacement value. Using the depreciated replacement asset valuation allows Eskom to generate revenue that will enable it to replace assets with their modern equivalent in terms of performance and output at the end of the current fleet's useful life. This internationally recognised approach tracks the actual cost movement on new assets while factoring in technological improvements.

Eskom engaged Ernst & Young to independently determine the depreciated replacement value of its regulated assets. This was done at the end of 2009/10, and updated in 2010/11. The valuation was conducted on the basis of modern equivalent assets, taking into account service capacity, age, usage and the remaining useful life of assets. The revaluation is reflected in the regulatory asset base and corresponding depreciation. The useful life of the revaluation reserve – the positive difference between the value of assets and the replacement value of assets – is similar to the remaining useful life of the assets. Only regulated assets have been included in the valuation. The values are subject to Nersa's review.

Table 30: Replacement value asset base and depreciation (R million)

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Average regulatory asset base (Rm)	709 145	779 203	852 266	919 665	981 854	1 043 100
Replacement depreciation (excl corporate) (Rm)	25 884	28 438	32 028	35 419	38 357	41 706

3.4.6 Return on assets

The return on assets portion of the revenue requirement is made up of two components – a return to lenders and a return to the shareholder:

- The return to lenders represents the cost of debt interest, based on contractual obligations. With the acceleration of the build programme, the interest on borrowings has become a significant cost and will increase for the duration of the programme.
- The return to the shareholder (or equity portion) remunerates the equity provider for the capital invested into Eskom.

Table 31 shows the returns attributable to lenders and shareholders. The shareholder continues to forfeit returns until the end of 2015/16.

Table 31: Summary of return on assets (R million)

	2013/14	2014/15	2015/16	2016/17	2017/18	MYPD 3
Returns (Rm)	7 271	14 643	31 187	51 878	81 885	186 864
Interest costs (Rm)	21 198	26 503	30 223	31 824	30 619	140 366
Equity returns (Rm)	- 13 927	- 11 860	964	20 054	51 265	46 497

Return on assets forecasts

Based on the proposed revenue application and the valuation of the regulatory asset base, Eskom's projected return on assets will not reach Nersa's MYPD 2 benchmark return at the end of MYPD 3. A return of 7.8% will be achieved by 2017/18, against the benchmark WACC of 8.16%, as assessed by Nersa for MYPD 2. Eskom's revenue sacrifice (and therefore the shareholder's revenue sacrifice) is significant – about R203 billion over the period. Table 32 reflects the return sacrifices as a result of not earning the higher returns and represents an investment into the economy by the government as Eskom's shareholder.

Table 32: Revenue sacrifice at 8.16% on WACC

	2013/14	2014/15	2015/16	2016/17	2017/18	MYPD 3
Eskom revenue sacrifice (Rm)	- 58 208	- 58 628	- 48 243	- 31 256	- 6 299	- 202 633
MYPD 3 ROA %	0.9%	1.5%	3.2%	5.2%	7.8%	
Nersa target ROA @ 8,16%	3.2%	6.0%	8.2%	8.2%	8.2%	

Using the Eskom cost of capital of 8.31% the revenue sacrifice escalates to R209 billion.

Table 33: Revenue sacrifice at 8.31% on WACC

	2013/14	2014/15	2015/16	2016/17	2017/18	MYPD 3
Eskom revenue sacrifice (Rm)	- 59 374	- 59 914	- 49 416	- 32 739	- 7 875	- 209 319
MYPD 3 ROA %	0.9%	1.5%	3.2%	5.2%	7.8%	
Eskom WACC @ 8,3%	8.3%	8.3%	8.3%	8.3%	8.3%	

3.5 Cost components excluded (risks)

3.5.1 Industry restructuring

This revenue application assumes that the Independent System Market Operator will be implemented during the MYPD 3 period, but that this will have no impact on the revenue and related cash-flow requirements. Should this assumption be incorrect, the issue will need to be reviewed at the time of implementation.

3.5.2 Carbon tax

In December 2010, the National Treasury issued a discussion paper proposing a carbon tax as a way to reduce greenhouse gases. This matter has not been finalised and a policy decision is outstanding.

Identifying the consequences of a carbon tax is impossible without a more detailed proposal. However, the following possible high-level risks have been identified:

- A carbon tax would result in even higher electricity prices, which would strengthen the price signal to reduce demand. However, excessively reduced demand would reduce Eskom's revenue and, effectively, its operating and maintenance budget. This could be exacerbated by increased levels of non-payment due to high electricity prices.
- Existing coal-fired power stations may have to be retired early in response to the extra costs incurred by a carbon tax. This could have significant economic, social and environmental consequences, including the need for additional funding for replacement capacity and related long-term infrastructure such as rail, water and sorbent supplies.

3.5.3 Accelerated electrification

Eskom believes the current electrification programme needs to be accelerated if the government's objective of universal access to electricity is to be achieved within a reasonable period of time. The current national electrification backlog stands at 3.4 million households. Of this, 0.9 million households are within municipal areas, 1.8 million households are in the areas licensed to Eskom, and another 0.7 million households are in areas that have not yet been proclaimed.

Off-grid options such as 50W photovoltaic panels (solar panels) and self-generation options (diesel generators and micro hydro-generators) are less favourable alternatives because the solar panels require expensive batteries and produce very little output, the diesel generators require maintenance and costly fuel that requires storage, and micro hydro-generators pose a flooding risk.

The delivery of universal access would need to be discussed and decided upon by government.

3.6 Long-term financial viability and funding

An important principle on which the MYPD application rests is the need for Eskom and the electricity industry to be financially viable and sustainable. This section details what is required for Eskom to be viable and attract the requisite credit ratings, as well as what is needed to attract IPPs to the electricity industry so that they can play a role in building the generation capacity identified in IRP 2010.

To achieve sustainability and cost efficiency, Eskom needs to strike a balance between three sources of funding: equity, debt and revenue. Revenue is of particular importance for the MYPD 3 application since this is the one source that can be recovered through the tariff. Long-term financial sustainability requires that Eskom's revenue must pay the interest costs of debt and equity while recovering capital through depreciation. Although three funding sources are mentioned, adequate revenue is a key requirement for raising equity and debt.

The availability of financing depends largely on the regulatory framework for obtaining future revenue. Financing options may serve to smooth the impact of lumpy capital requirements, but ultimately it is the regulatory approach that allows for interest payments, recovery of capital expenditure and the long-term sustainability of the funding model.

Capital expenditure can be recovered through depreciation of an asset over its useful life. The implication is that Eskom funds its capital expenditure by making capital investment through loans and equity (where available) and recovering the investment over time through revenue. A sustainable price path will allow for recovery of the principal and longer-term returns on capital investment. These returns need to reach a level that will satisfy the requirements of both debt and equity providers.

Table 34: Eskom's funding over the MYPD 3

Company Cash Flow	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MYPD3 Total
Revenue	129,199	153,935	180,195	213,376	248,963	294,132	**1,090,601**
Arrear debts	(775)	(921)	(1,077)	(1,275)	(1,498)	(1,665)	**-6,436**
Primary Energy	(63,738)	(67,495)	(78,516)	(87,491)	(95,617)	(103,781)	**-432,902**
Amortisation (included in Primary Energy)	365	1,171	1,961	2,580	3,146	3,146	**12,005**
Working capital changes	3,305	976	(1,143)	299	744	744	**1,620**
Employee benefit	(20,992)	(22,572)	(24,791)	(26,931)	(29,491)	(31,555)	**-135,340**
Other opex	(27,694)	(23,211)	(25,118)	(28,114)	(30,601)	(31,868)	**-138,911**
Net from income statement (Cash from operations) [A]	**19,670**	**41,884**	**51,511**	**72,442**	**95,646**	**129,153**	**390,636**
Capex (incl NX future fuel) [B]	(65,044)	(72,107)	(68,016)	(64,935)	(67,098)	(65,000)	**(337,156)**
Net Borrowing (Requirement)/Surplus [A + B]	**(45,374)**	**(30,223)**	**(16,504)**	**7,507**	**28,548**	**64,153**	**53,481**
Debt Raised	53,371	57,348	52,077	52,546	30,392	9,000	**201,362**
Debt Repaid	-13,215	-9,829	-18,715	-30,723	-22,461	-44,972	**-126,700**
Net Finance Cost	-8,984	-13,048	-17,213	-26,970	-29,113	-28,844	**-115,188**
Cash from Funding activity	**31,173**	**34,471**	**16,148**	**-5,147**	**-21,183**	**-64,815**	**-40,526**
Net Cash Movement	-14,201	4,248	-356	2,360	7,365	-663	**12,954**
Existing Liquid Assets	33,911	17,772	20,352	18,231	19,402	25,565	
Closing Liquid Assets	**19,710**	**22,020**	**19,996**	**20,591**	**26,767**	**24,903**	
Balance Sheet							
Debt Securities / Borrowings	**232,242**	**287,951**	**330,617**	**355,982**	**366,914**	**333,011**	

The funding over the MYPD 3 period (see Table 34) will result in the increase of Eskom's debt book from a book value of over R232 billion in 2012/13 to a projected over R333 billion in 2017/18 (but peaking at over R360 billion in the MYPD 3 period). The funding programme over the MYPD 3 period will also result in increased levels of debt repayments, finance costs and critically low closing balances in liquid assets (including cash and cash equivalents).

3.6.1 Credit ratings

A credit rating is a current forward-looking opinion of a borrowing entity's capacity to repay its general financial obligations as they fall due, or of its capacity to fulfil the terms of a specific financial obligation. Credit rating opinions are expressed using a ratings scale that describes creditworthiness of the entity relative to other issuers rated on the same scale. Standard & Poor's ratings scale, for instance, ranges from "AAA" to "D". A rating of below BBB- is deemed sub-investment grade, not worthy of investment by the vast majority of investors due to prudent investment principles. Ratings comment on the likelihood of timely payment of principal and interest, and are thus focused on default risk.

Eskom's credit ratings

Eskom's current ratings assessment is shown in Table 35. The ratings of Eskom are directly linked to South Africa's sovereign rating because of the significant support Eskom receives

from the government. Without the government's support, however, Eskom has a sub-investment-grade standalone rating of B and Ba3 from Standard & Poor's and Moody's, respectively. This is not a sustainable situation for Eskom or the sovereign in the longer term.

Table 35: Eskom's credit ratings

	Quality of Credit	Moody's	S & P
Investment Grade	Gilt Edged	Aaa	AAA
	Very High	Aa1	AA+
		Aa2	AA
		Aa3	AA-
	Upper-Medium	A1	A+
		A2	A
		A3	A-
	Medium Grade	Baa1	BBB+
		Baa2	BBB
		Baa3	BBB-
Sub-Investment Grade	Questionable	Ba1	BB+
		Ba2	BB
		Ba3	BB-
	Poor	B1	B+
		B2	B
		B3	B-

Headline Rating
Standalone Rating

In October 2012, the rating agency Moody's has revised Eskom's headline rating downward to Baa3 from Baa2 and confirmed its negative outlook on this rating. This rating agency also highlighted the factors that could further negatively impact on this rating, (1) governments rating to be further downgraded, or (2) Eskom's liquidity profile deteriorates, or (3) regulatory and investment environment remains challenging. This was followed by a downgrading from S&P from BBB+ to BBB due to their similar downgrading of the sovereign credit rating. They did, however, earlier in October 2012 confirm Eskom's standalone rating at B. The key strengths and weaknesses of Eskom's credit rating are as follows:

Strengths:

- Dominant market position for the next few years

- Continued government support and the potential for the government to provide additional financial support if necessary.

Weaknesses:

- Eskom's operational challenges, given the build programme
- Regulated tariffs will not be fully cost reflective in the short term
- Regulatory risk and the government's plans to introduce IPPs
- Weak credit metrics on funding and liquidity

Projected credit profile based on MYPD 3

Table 36 sets out Eskom's credit metrics based on this application. Eskom does achieve most of the standalone investment-grade metrics in 2017/18.

Table 36: Credit ratios based on the MYPD 3 tariff adjustment

Credit ratios	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
FFO/Gross debt (Target >20%)	4.9%	9.5%	9.8%	12.0%	16.9%	27.3%
Gross debt?EBITDA (target <3)	16.1	8.2	7.3	5.7	4.4	2.9
Debt service cover ratio (target >2.5)	1.0	1.9	1.5	1.3	1.9	1.8

[1] **FFO: Funds from operations**

[2] Earnings before interest, depreciation, taxes and amortisation

3.6.2 Government support

Eskom currently receives extraordinary support from the government, its sole shareholder, which is related to the importance of electricity security to the country's economy.

The government has provided guarantees amounting to R350 billion and linked Eskom's credit ratings to its sovereign rating, raising Eskom's standalone sub-investment grade rating to that of the government. However, this support may have unintended consequences for the government and Eskom. Should the government be downgraded, Eskom's credit profile will follow. Similarly, should Eskom's credit position deteriorate, it will have a negative effect on the country's sovereign rating. Migrating towards a standalone investment-grade rating is therefore important not only for Eskom but for the whole country.

The R350 billion in guarantees from the government is linked only to debt issued up to the end of the current build programme, which ends with the substantial commissioning of Kusile power plant in 2018/19.

Figure 6 shows the projected net use of these guarantees, which will peak at about R150 billion in 2018/19. However, the total R350 billion guarantees remain critical to support Eskom's investment-grade rating.

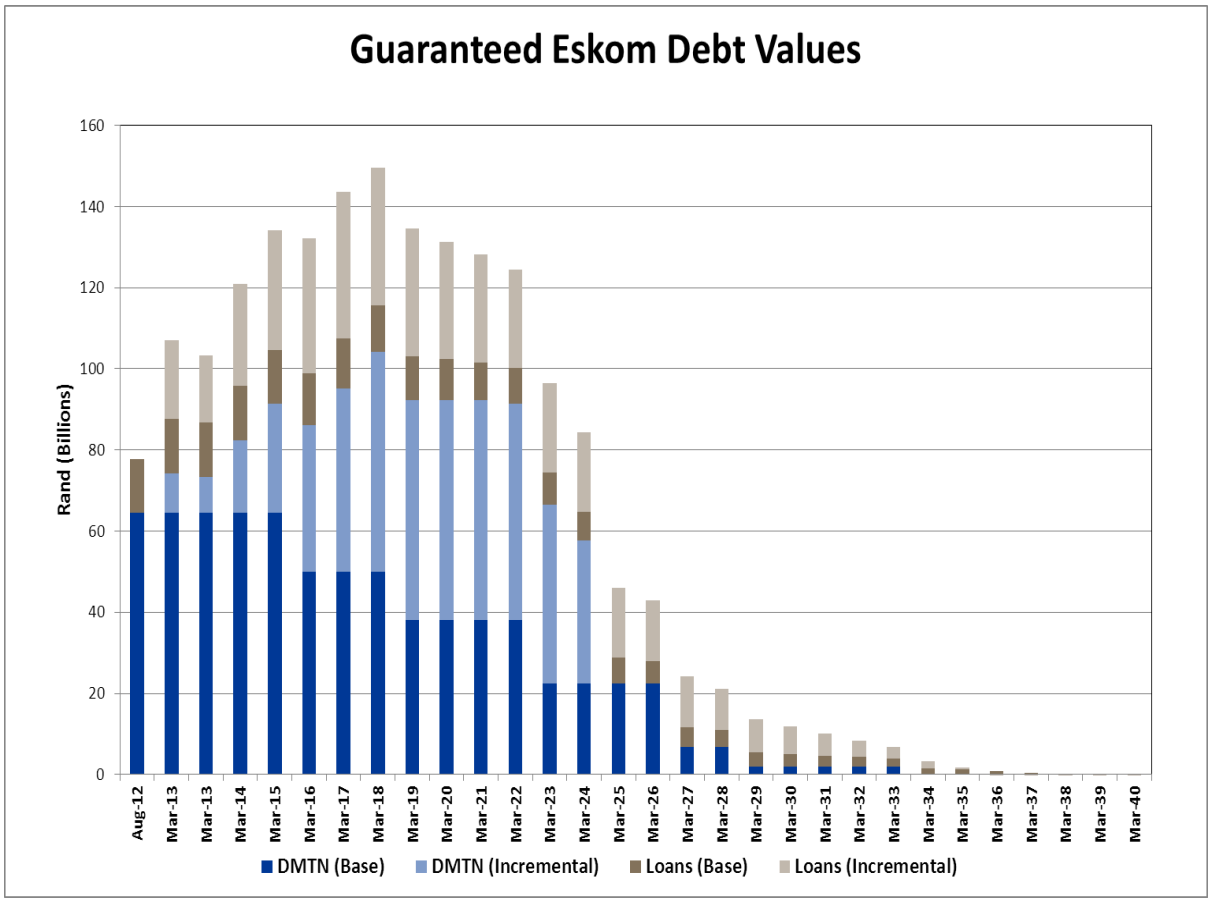


Figure 6: Eskom Holdings projected guaranteed debt profile

3.6.3 Funding

The willingness of investors to lend is positively related to an issuer's credit rating. Better credit ratings often result in access to a larger pool of funding, coupled with a reduction in the cost of borrowing due to a lower perceived default risk. The financial markets crisis has changed the financial landscape for all participants, resulting in a stricter regulatory

environment and the way that financial risk is assessed. It has also forced investors to review their risk appetite, as reflected by an issuer's credit rating.

In the case of Eskom, debt capital markets (credit markets) are the only available source of funding. This highlights the need for a supportive credit rating that reduces the cost of funding and therefore the need to increase electricity prices in future.

Eskom has a R300 billion funding plan for the new build programme which extends to 2017/18, of which 75% has already been secured as at 1 April 2010 2012. This comprises largely bond market funding (domestic and international), development finance and funding support from export credit agencies. These sources of funding and their associated costs depend on the credit profiles of Eskom and the country, as reflected by their credit rating.

Table 37: Funding plan to 2017/18 (R billion) updated as at 31 March 2012

Sources	Funding Sourced 1 Apr 2010- 31 Mar 2011	Secured to date	Draw Downs 1 Apr 2010 - 31 Mar 2011	Draw Downs 1 Apr 2011 - 31 Mar 2012	Draw downs to date	Amount supported by Govt
Bonds	90	32.9	26.7	6.1	32.9	20.4
Commercial Paper	70	70	10	10	20	0
ECA's	32.9	32.9	7.5	8	15.6	0
World Bank	26.1	27.8	2.6	3	5.6	27.8
AfDB	21	20.9	3.9	2	5.9	20.9
DBSA	15	15	1	2	3	0
Shareholder Loan	20	20	20	0	20	20
Other sources	25	13.2	0	0.9	0.9	4.9
Totals	**300.0**	**232.7**	**71.7**	**32.1**	**103.8**	**94.0**
Percentages		**77.6** (% of R300bn)			**44.6** (% of Secured)	**40.4** (% of Secured)

Loan covenants

Given the funding sourced from development finance institutions or from banks underwritten by export credit agencies, deterioration in the credit profile and rating will result in a breach of certain loan covenants. This may result in cross-defaults across all related loans and will negatively affect current and future funding of Eskom.

3.6.4 Conclusion

Eskom depends on credit markets for access to large volumes of funding. It is imperative for Eskom to achieve and maintain an investment-grade credit rating. Less funding will be available and the cost of funding will increase if Eskom's credit rating deteriorates.

The government enables Eskom to deliver on its mandate by positively supporting the company's credit profile. Given the government's competing priorities, it is important for Eskom to secure a standalone investment-grade rating. Price adjustments that move towards the achievement of cost-reflective tariffs will support and improve Eskom's overall credit profile and financial position. Conversely, if there is no commitment to a price path that migrates towards cost-reflective tariffs, it will affect Eskom's credit rating and therefore its access to funding.

Based on the MYPD 3 tariff application, Eskom will, over the 2013–2018 period, be close to achieving the three targeted credit metrics indicators that are indicative of a standalone investment-grade rating.

4 BALANCING THE ECONOMIC EFFECTS

Key points

- The path towards cost-reflective prices will inevitably have some negative short-term economic effects. However, these are outweighed by the long-term benefits, for the economy as a whole, of having a financially sustainable electricity industry with the resources to expand generating capacity to meet demand.
- This application seeks a price path that strikes a balance between the likely negative effects of increasing electricity prices in the short term and South Africa's long-term economic, social and environmental needs.
- Eskom believes that low-income households should be shielded from the impact of electricity price increases through targeted, transparent cross-subsidies.
- The money South Africa spends on electricity during MYPD 3 does have some short-term economic and social benefits: it enables Eskom to employ staff members, train tomorrow's engineers and technicians, and procure goods and services from local contractors and suppliers.

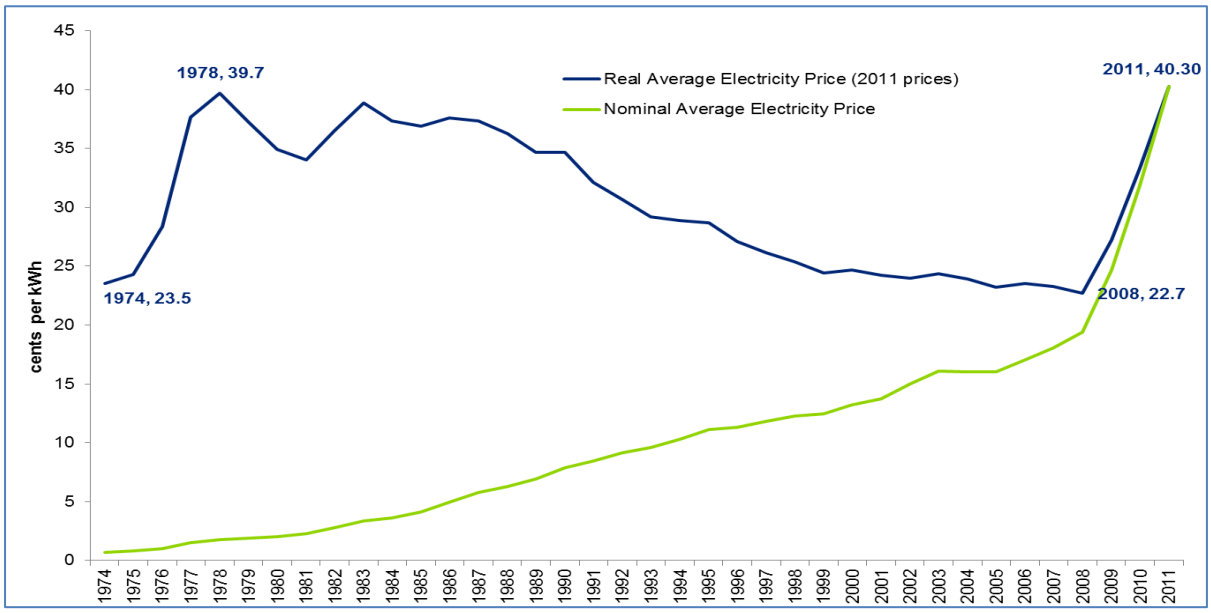
Electricity is the oxygen without which a modern economy cannot breathe. Electricity enables economic growth, investment and job creation, and it is fundamental to people's quality of life. Electricity is not just an essential service in itself – the delivery of other services such as water, rail transport and mobile telecommunications also depends on a secure supply of power. Historically, the extensive national grid and stable, competitive supply of electricity provided the basis on which South Africa developed as Africa's most industrialised economy, consuming almost half the power generated on the continent.

In Eskom's view, South Africa is at a crossroads, and choosing the right path is difficult. The more challenging road means higher electricity prices for households, businesses and the economy in general, but allows for the development of a sustainable national electricity industry over time. By contrast, the convenient road involves lower prices, but ultimately means that South Africans are not paying the real price for the power they consume, leading to long-term crises for industry and the country as a whole.

The choice, then, is stark. The negative effects of electricity price increases in the short term must be weighed against the benefits of having an adequate, reliable electricity supply to enable the economy to expand in the long term. Without an adequate supply of electricity, South Africa will stagnate. Ultimately, Eskom's financial sustainability – and its ability to meet the country's electricity needs – is linked to South Africa's future.

South Africa's electricity prices have already increased significantly off a low base (see Figure 7). This application sees them increasing further. Eskom is acutely sensitive to the fact that its proposed price increases will have some negative effects on the economy, particularly on more vulnerable economic sectors and poorer households. Eskom strongly supports the principle of targeted protection for poor households and believes this should be provided for in the tariff structure, with transparency on the cross-subsidies involved.

Figure 7: Real and nominal electricity prices in South Africa (1974–2011)



Eskom would like to emphasise that, if the revenue required for ensuring South Africa's security of electricity supply is not secured through price increases, it will have to come from another source. One alternative would be for the government to increase its equity injections, which would in turn require an increase in taxes. Eskom has modelled the effect of an increase in VAT, personal tax or company tax on the South African economic landscape. The outcome of such taxes was found to be unpalatable for the country's citizens, its businesses, and for Eskom itself.

Phasing in price increases over five years

In this application, Eskom seeks to balance the need for a sustainable electricity industry with the need for economic growth and development. Ultimately, these two objectives cannot be set in opposition. A secure supply of power is essential to enable economic growth. This, in turn, requires that the electricity industry be financially sustainable. However, this objective must be balanced against the negative economic effects of price increases. An electricity price path that migrates towards cost-reflective levels over time can best achieve the balance between these imperatives. This is a key reason why Eskom is proposing a five-year price path, rather than a three-year price path.

However, phasing in electricity increases over too long a time could be just as detrimental to the economy as phasing them in too quickly. According to a study by Deloitte, the longer electricity prices are not cost reflective, the more energy the economy will demand. Unchecked, this kind of cycle would require even more investment into capacity expansion than already envisaged, for potentially little net gain in economic output. The overall economic outcome of such a situation would be negative for the country.

The real costs of electricity and South Africa's competitiveness

In the past, cheap power attracted local and international investment in energy-intensive industries. At the same time, there was little or no financial motive for companies to invest in energy-efficient technologies or generate power for their own use. Consequently, according to a study by the University of Pretoria, the South African economy's energy intensity more than doubled between 1990 and 2007. By contrast, the energy intensity of Organisation for Economic Cooperation and Development countries increased by only 10% over the same period.

South Africa now needs to invest more into new generating capacity at considerable economic cost. The "competitiveness" that cheap electricity prices lent the economy in the past arguably conferred short-term benefits at longer-term disadvantage.

Economic impact

This application acknowledges that the proposed electricity price increases will have several short-term impacts on the economy.

Inflation – The National Treasury estimates that the impact of the price increase on the CPI could be between 0.7 and 1 percentage points. Further, the contribution of electricity to the inflation basket will be reweighted and, as a result, electricity price increases will probably have a greater effect on inflation than they have in the past. Electricity price increases will also have a pronounced knock-on effect on inflation. Businesses that can pass on price increases to customers will do so, resulting in "second-round" effects that could well be more severe than the direct impact.

Businesses – Generally speaking, mining and manufacturing will be hardest hit. The finance and business services sector are considerably less energy intensive than many other industries and are less likely to be negatively affected. Some sectors are more vulnerable than others and this could lead to calls for differentiated pricing – in effect, subsidies. Eskom's view is that subsidisation is an industrial policy question that must be addressed by the government, rather than through the electricity tariff process. Similarly, any subsidies deemed appropriate should be routed through the fiscus rather than the electricity tariff.

Investment – If the South African economy is inefficient in its electricity use, there is probably scope for firms to adapt to higher prices by investing in energy-efficient processes, and the economics of doing so would be attractive. If the economy is already fairly efficient in its energy use, however, then there is little room for firms to reduce electricity demand without also reducing their output.

The evidence on current efficiency is mixed. Eskom is of the view that price is more effective at promoting investment into energy-efficiency technologies than incentive schemes or other factors. And if price levels provide the correct signals, consumers will respond by limiting electricity use and employing more energy-efficient technologies, reducing demand on the grid. If the price is set too low, however, or if the migration to cost-reflective prices is done too gradually, energy-inefficient investment and consumption are likely to continue. Unchecked, this could result in electricity demand exceeding supply.

Cost-reflective tariffs achieved through a predictable medium-term price path, as proposed in this application, will attract future investment in industries and businesses that are as energy-efficient as possible and will not pose an undue long-term burden on South Africa's electricity infrastructure.

Low-income households – In economic terms it is more efficient – and more equitable – to implement targeted electricity subsidies for vulnerable population groups than it is to address their needs by curbing price increases for all. For MYPD 3, Eskom proposes introducing Homelight 20A, a subsidised single-rate tariff targeting poor customers. See the *Proposal to restructure tariffs* chapter for more detail.

4.1 Electricity prices in context

Between the early 1980s and 2007, electricity prices were low and declining in real (inflation-adjusted) terms. Even though the country needed to build new capacity and attract private-sector producers, electricity prices were not sustainable or attractive enough to do so. Prices were eventually so low that they failed to cover Eskom's running costs, while the price of coal and other requirements climbed at levels exceeding inflation. In 2008/09 Eskom sustained a loss of R9 billion, placing its credit rating at risk and forcing it to turn to the government for support through the fiscus. It had to suspend contracts on the Kusile power plant for almost a year in 2009/10 out of concern that the project could not be funded.

South Africa cannot run the risk of such events recurring. It needs to build a financially sustainable electricity industry that is attractive to independent investors and enables Eskom to obtain funding for future expansion.

In real terms, electricity prices increased by 78% between 2008 and 2011. This did no more than bring the price back to about 1978 levels – which was also the time of Eskom's last big build programme. At current levels, South Africa's electricity prices are still among the world's lowest, even though they are no longer at the bottom of the table.

Table 38: Comparison of Eskom and international electricity costs in 2010 (c/kWh)

Country	Utility	Average price (c/kWh)
Malaysia	TNB	190
Kenya	KPL	68
Thailand	EGAT	65
South Korea	Kepco	46
Argentina	Pampa	40
South Africa	Eskom	32
India	NTPC	32
China	CRPH	30

Source: LTE Energy, in association with EA Energy Analysis, 2012. Information sourced from annual reports. The unit price is obtained by a basic currency conversion. There is no indication of whether these prices are cost reflective or if the utilities have a similar energy mix to Eskom. These costs exclude Eskom's subsequent price increases.

A 2012 annual survey of electricity and natural gas prices by the NUS Consulting Group, an international energy consultancy, found that the country's electricity prices (in US cents per kilowatt hour) moved up from 16th place (ranked in terms of highest to lowest) in 2011 to 11th place in 2012 as a result of its 23% price change in the year. South Africa was one of eight countries with increasing electricity prices. The country with the greatest increase was Australia, where electricity went up by 27.8% due to the introduction of a carbon tax (Australia also relies on coal-fired generation for much of its electricity) and increased network and infrastructure costs.

Significantly, half the countries NUS surveyed – particularly those deriving a considerable portion of their power from hydroelectric schemes, natural gas and unconventional gas sources (fracking) – registered a decline in electricity prices. It should be noted, however, that almost all the countries in the NUS survey are advanced industrial countries. Their economic profile and customer needs are considerably different to those in South Africa, so there is limited scope for direct comparison.

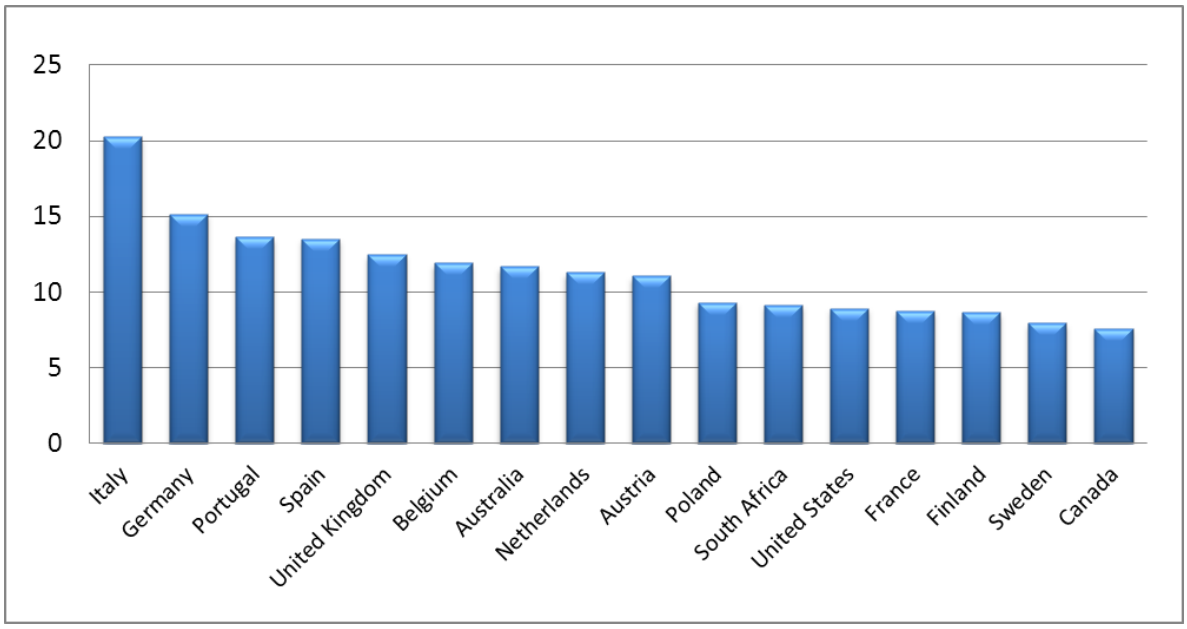


Figure 8: NUS survey of advance industrial countries average electricity price (2012)

4.2 Impact on the economy

Eskom is acutely aware that the proposed price increases will affect the country's economy. The extent of this impact depends largely on how quickly the increases are phased in. According to a 2011 study by the Pan African Investment and Research Services, the negative effects of moving to cost-reflective prices can be significantly reduced by adopting a gradual price path over the short term. This finding was echoed by a 2012 study by Deloitte, which went further in its recommendations, stating that electricity prices should increase towards cost reflectivity through three to four years of direct price increases – possibly longer, if the electricity industry's sustainability and cash-flow considerations allowed for this.

The Pan African Investment and Research Services study further stated that the electricity price levels and the path chosen to achieve them have the potential to shape the economy in favour of certain industries over others. For instance, businesses that are energy intensive, have small profit margins or rely on inflexible production technologies will be harder hit than those that use less energy, are able to adopt energy-efficient technologies or have larger profit margins.

Businesses that can pass on the electricity price increases to their customers will do so, while price-takers will not be able to. This practice, coupled with the direct impact of an increased electricity price on the CPI, will inevitably push up South Africa's inflation rate. This will put pressure on interest rates, which in turn will limit consumption, investment spending and job creation. Economic growth will, in the short term, almost certainly be stifled. However, as electricity supply becomes less constrained and electricity price increases level out, the country's expanded production ability will reinvigorate the economy, stimulating consumption, inviting investment and creating jobs.

4.3 Impact on inflation

Electricity currently accounts for 1.6% of the CPI basket. CPI is a tool for measuring changes in the price of a set of consumer goods and services. Because of its relatively low weight in the basket, a 16% electricity price increase for 2013/14 would translate to a direct increase of about 0.3 percentage points in the CPI.

However, the basket of goods making up the CPI is reweighted every five years to reflect changing patterns of expenditure. It is likely that electricity will be given a greater weight in the 2013 CPI basket reweighting to reflect the effect of the price increases over the past five years. The National Treasury estimates this reweighting could result in electricity price increases contributing to a CPI increase of between 0.7 and 1 percentage points.

Electricity price increases will also have a pronounced secondary effect on inflation. As noted earlier, those companies that can pass on electricity price increases to customers will do so, resulting in potentially severe "second round" effects.

4.4 Impact on investment

South Africa needs to carefully consider what kind of economy it would like to have. As the 2011 Pan African Investment and Research Services study pointed out, electricity prices affect the structure of the economy. An optimal price cannot be determined without a view on the kind of economy that would best serve the country.

Eskom believes that cost-reflective tariffs achieved through a predictable medium-term price path, as proposed in this application, will attract future investment in industries and

businesses that are as energy efficient as possible and will not pose an undue long-term burden on South Africa' electricity infrastructure.

Modelled effect of Nersa's 25% MYPD 2 proposal

A 2011 study by Pan African Investment and Research Services examined the macroeconomic impact of a 25% average increase in electricity prices over five years (MYPD 3) followed by a 6% average increase for a further five years, as proposed by Nersa in its MYPD 2 determination.

The study found that this price path would directly result in a 2.82% increase in inflation in the long term, which would lead to a decline of 1.8% in output (GDP), 0.22% in employment and 1.53% in investment. The effect of such price increases would be greatest on household consumption and exports in the short term, mainly due to the direct effect of inflation. The effect became less severe if price increases were spread out over a longer period, giving the economy time to adjust. Steep increases in the short term did not afford businesses much scope to implement energy-efficiency measures in order to limit overheads.

The study also found that the 25% indicative increase would result in the following energy-intensive sectors shedding the most jobs in the long run: mining (-2.78%), transport and communications (-1.21%), and wholesale and retail trade (-0.9%). Employment in the electricity, gas and water sector, on the other hand, would increase by 13.85% in the short term due to increased investment in capacity expansion, largely made possible by the electricity price increases.

These projections are based on a price increase that well exceeds the 16% average increase for five years (2013/14 to 2017/18) put forward in this application. The effect of the requested price hike on these macroeconomic markers is therefore likely to be considerably less pronounced.

4.5 Impact on economic sectors

The vulnerability of sectors to electricity price increases can be measured by the relative electricity intensity of the sector, as indicated in Table 39. Looking at the sectoral impact at such a high level may be misleading, however, as the different subsectors – or even different firms within a sector – will be affected differently. For example, the impact on the mining industry as a whole is vastly different to the impact on the basic metals sector.

Table 39: Relative vulnerability of economic sectors to electricity price increases

Sectors	Electricity intensity (GWh/USD million)	Ranking	Output share	Ranking
Basic metals	1.095	1	7.1%	7
Mining and quarrying	0.634	2	14.6%	2
Non-metallic minerals	0.524	3	1.6%	12
Agriculture and forestry	0.316	4	6.0%	8
Paper, pulp and printing	0.207	5	2.8%	10
Chemical and petrochemical	0.203	6	16.3%	1
Transport	0.089	7	12.5%	3
Wood and wood products	0.069	8	1.4%	13
Textile and leather	0.067	9	2.5%	11
Food and tobacco	0.021	10	12.0%	4
Machinery and equipment	0.005	11	2.9%	9
Transport equipment	0.003	12	9.8%	6
Construction	0.002	13	10.5%	5

Source: Inglesi-Lotz and Blignaut, 2011.

Generally speaking, mining and manufacturing will be hardest hit. Less energy-intensive sectors, such as the finance and business services sector (not indicated on Table 39), are less likely to be negatively affected.

The vulnerability of some economic sectors to electricity price increases should not change the country's approach to electricity tariffs in general. A case cannot be made for curbing tariff increases for all in an effort to protect the few: lower prices for all customers would

disproportionately benefit those who use the most electricity. Such an approach would come at a high cost to Eskom, in lost revenue, and to the economy, by expanding the need for generating capacity. This is especially so given that consumption by vulnerable sectors is likely to be relatively small in the context of total demand for electricity.

Generally speaking, it is more economically efficient and socially equitable to implement targeted electricity subsidies for poor households and consider other targeted interventions for vulnerable sectors. Eskom believes these subsidies for industry, manufacturing or other business sectors are a matter of national industrial policy and should be addressed through the fiscus.

Eskom would like to point out that, although it supplies electricity directly to its 134 largest customers, including South Africa's most energy-intensive firms, most manufacturing and commercial enterprises receive their supply from municipalities, whose pricing structures are different. An Eskom study of the six metropolitan areas it supplies found that average prices charged to end users were between 40% and 110% higher than the prices Eskom charges its direct customers. The impact on municipal customers of electricity price increases is therefore likely to be greater than the effect on non-municipal customers. Any assessment of the effect of the proposed tariff increases on manufacturing and commercial enterprises, and on small business, must factor municipal tariff structures into account.

4.5.1 The role of energy efficiency

Any sector or business with the scope to deploy energy efficiency measures in the short to medium term would benefit from doing so. A key question is how much room remains for South Africa's businesses to become more energy efficient. This is crucial to assessing the potential severity of the proposed MYPD 3 price increases.

The evidence on South Africa's current efficiency is mixed. According to a 2011 survey of 32 firms across 17 economic subsectors, conducted by DNA Economics on behalf of the National Treasury, energy efficiency levels in South Africa compare favourably with international norms. This suggests there is not much opportunity for further efficiency gains.

Based on the response that Eskom continues to have to its demand-side management initiatives, Eskom believes there is considerable scope for further energy efficiency in South

African business. Further study, of a larger statistical sample, is required for conclusive results to be determined.

4.6 Protection for the poor

Poor households are particularly vulnerable to high increases in electricity tariffs because they have little ability to adapt. Eskom believes it is important to protect these poor households from the full impact of the electricity price increase through targeted subsidies, with a transparent cross-subsidy structure aligned with a national cross-subsidy framework to be developed for the country.

Subsidies for low-income households

Eskom, the government and local authorities have put in place a number of measures to ensure that low-income households have access to affordable electricity. These include:

- **The electrification programme**, which subsidises the cost of connecting a house to a 20A (low consumption) electricity supply. This complements an already subsidised tariff.
- **The free basic electricity programme**, which provides 50kWh (more in some local authorities) of free electricity per month to identified indigent customers.
- **Free energy-efficient CFL bulbs** and **solar water-heater rebates,** which are available to all residential customers as part of Eskom's demand management programme.
- **The IBT,** which, together with **lower-than-average tariff increases**, has resulted in subsidies of up to 42% for all residential customers. These subsidies are currently recovered primarily from Eskom's direct large urban (municipal, industrial and commercial) customers, with Eskom direct industrial and commercial customers making the largest contribution to Eskom related subsidies because municipalities do not contribute towards the IBT-related affordability subsidies (they also need to cater for their subsidies).

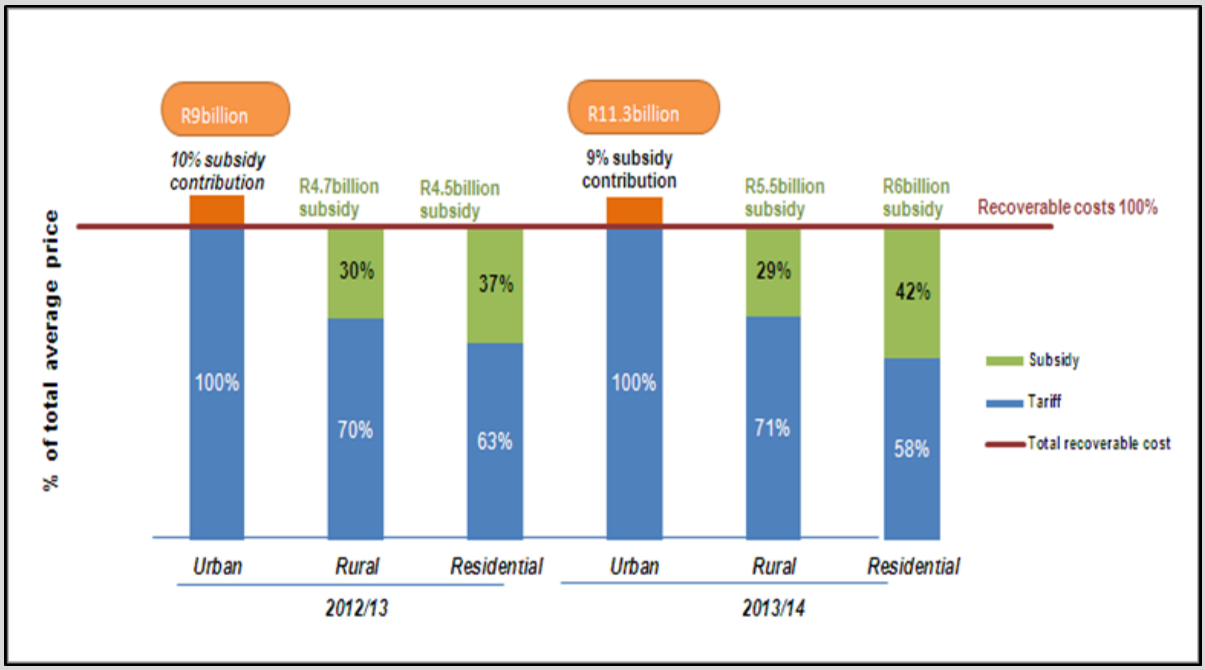


Figure 9: Current cross-subsidies in Eskom tariffs

Eskom believes that the IBT as it is currently structured does not sufficiently target low-income households and places an unsustainable subsidy responsibility on urban customers.

Eskom also believes that social support for South Africa's poor and disadvantaged is a necessity and that a national approach to electricity related social subsidies must be initiated. To date, tariff subsidies have evolved in the absence of a subsidy framework and there has been very little analysis of the long-term impact on consumers, whether subsidy contributors, recipients, or even the economy as a whole.

Eskom recognises that even in the absence of a national subsidy framework the poor still need to be protected against the impact of the high price increases. The proposals contained in this tariff restructuring plan, therefore do include recommendations to ensure a single digit increase to the poor. This option provides protection for the poor, but significantly increases the level of subsidies for the non-local authority urban tariffs (see *Proposal to restructure tariffs*).

4.7 Benefits of price increases

The money South Africa spends on electricity generates significant socioeconomic returns. Eskom is not just about megawatts; it plays a key role in developing local industry, broadening and deepening the country's skills pool, creating local jobs and transforming the economy through black economic empowerment. Its capacity expansion programme is a catalyst for economic growth and will leave a legacy for the country in terms of skills, local supplier industries and development, particularly in the communities where the projects are located.

As a state-owned company, Eskom has a responsibility to promote social and economic development. Eskom's goal is to provide a reliable source of electricity in a way that helps uplift all South Africans, especially those who are the most economically vulnerable. Its ability to do so effectively hinges on its own financial health, which in turn is greatly influenced by the revenue it recovers from electricity sales.

In addition to providing the electricity that allows South African companies and people to go about their business, Eskom contributes to South Africa's economy and development in a number of ways:

- ***Contribution to GDP*** – Through its sales of electricity, Eskom's economic value added at group level reached R54.9 billion in the financial year 2011/12. On a local level, expenditure on its capacity expansion programme contributed 95% to the gross regional domestic product of Lephalale (the town closest to where Medupi is being built), 27% to that of Delmas (near the new Kusile power plant) and 7% to that of Ladysmith (near Ingula hydro power plant).
- ***Local supplier development*** – Eskom has awarded R75.2 billion in contracts on its new build programme (63% of the total) to domestic suppliers, stimulating the expansion of local supplier industries.
- ***Employment*** – Eskom directly employs approximately 43 000 people, but there are over 130 000 people employed in the Eskom 'cloud', through contractors, sub-contractors, suppliers and service providers, and over 500 000 people who are supported, directly or indirectly, by Eskom.
- ***Skills development*** – Eskom recruits and trains thousands of learners to increase South Africa's pool of skilled workers. Almost 12 000 engineers,

technicians and artisans are currently being trained through learnerships, bursaries and other training programmes. Eskom spent more than R1 billion on training in 2011/12.

- ***Empowerment spending*** – Eskom awards more than 50% of its total expenditure to B-BBEE-compliant suppliers.
- ***Technological research and development*** – Eskom invests more than R150 million a year into research and development. Eskom constantly seeks ways to increase overall energy/electricity efficiency across different sectors of the economy.
- ***Electrification*** – Eskom has provided access to electricity to more than 4.2 million households since the electrification programme began in the early 1990s, and continues to connect more than 150 000 new customers to the grid each year.

Finally, as noted earlier, electricity price increases are a preferable alternative to taxes for funding Eskom's revenue requirement.

4.8 Conclusion

The negative effects of electricity price increases in the short term must be weighed against the benefits of having an adequate, reliable electricity supply to enable long-term economic growth. Without electricity, South Africa's economy will stagnate. Ultimately, Eskom's financial sustainability – and its ability to meet the country's electricity needs – is linked to that of South Africa.

5 ENSURING SECURITY OF SUPPLY

Key points

- Eskom's electricity sales are projected to grow on average at 1.9% per year over the MYPD 3 period. The drivers of low sales growth include a steady GDP growth, lower commodity prices, a reduction in exports, increasing electricity prices and the effects of IDM initiatives.
- The revenue request includes the cost of doing crucial maintenance, without which Eskom will not be able to guarantee a reliable electricity supply for the MYPD 3 period and beyond. The total maintenance bill for MYPD 3 comes to R77 billion.
- IRP 2010 states that the country will need above 45 000MW of new generating capacity (excluding Eskom's committed expansion programme) to meet South Africa's energy needs to 2030. The plan does not make it clear who will be responsible for building this capacity and determinations in this regard are expected in due course.
- The IRP 2010 allocation could affect Eskom's revenue requirements for MYPD 3 if a decision on the allocation is made during the control period. For illustrative purposes, Eskom has modelled the financial repercussions of being allocated 65% or 100% of new build, as requested.
- Various scenarios have been provided to assist in showing the implications of the capacity needs of the IRP 2010.

Eskom's purpose is to provide sustainable electricity solutions to grow the economy and improve the quality of life of the people in South Africa and in the region.

At present the country's energy demand is closely matched by Eskom's ability to produce, transmit and distribute electricity. In order to supply enough electricity during the MYPD 3 period, Eskom needs to know how much electricity South Africa is likely to require. This information is contained in its sales forecast, a projection of future electricity demand based on South Africa's likely GDP levels in the current global economic climate, given factors such as commodity prices and export levels. The forecast also considers the moderating effect on

sales of demand-management interventions. This chapter examines Eskom's sales forecast for MYPD 3, the assumptions on which it is based and the role and costs of IDM.

Eskom's ability to deliver enough capacity to meet the sales forecast is in part determined by the EAF of its generating plants, which in turn is influenced by the maintenance schedule followed. Many of Eskom's power stations are more than 30 years old and as they age, they require more maintenance. Eskom has also run its power stations at high load factors in recent years because of constraints on supply, and this has added to the need to maintain and upgrade plant and equipment. Maintenance work generally requires that units be taken out of service while maintenance is being done, and in an environment of constrained supply, finding the capacity to do that has been a challenge. In recent years the constrained supply-and-demand situation often led Eskom to shift planned maintenance work in order to ensure it had the generating capacity available to meet demand. This led to a maintenance backlog, which Eskom has been addressing since 2011. This chapter puts forward arguments as to why it was not a sustainable approach to defer maintenance and how Eskom is addressing the maintenance challenge. The exact maintenance costs are contained under operating expenses in the chapter, *Moving towards a sustainable electricity industry*.

Eskom's current expansion programme will help improve the constrained electricity situation in the medium term, especially after 2015, by which time both of the new coal-fired stations will have started generating power for the grid. However, according to IRP 2010, the country needs about 45 000MW of additional generating capacity (over and above Eskom's committed build programme) in order to guarantee long-term security of supply. How this capacity is apportioned will affect the trajectory of Eskom's prices.

5.1 MYPD 3 sales forecast

A crucial building block of Eskom's price increase application is the sales forecast. The sales forecast is based on the assumption that South Africa will experience modest economic growth and, consequently, slow growth in electricity demand during the MYPD 3 period.

In turn, the sales forecast forms the basis of projections of the true operating costs for MYPD 3. For example, the amount of primary energy to be purchased depends on how much energy will need to be generated, which in turn depends on the sales forecast. (Refer

to *Operating costs* in *Moving towards a sustainable electricity industry* for projections on primary energy and nuclear energy costs.)

The sales forecast for MYPD 3 was compiled in consultation with key customers and representatives from customer groups to determine their expected energy requirements. It projects that sales growth will slow to 1.9% a year for the five years of the proposed MYPD period, compared with the 2.8% growth projected in the MYPD 2 application.

Projected sales volumes represent net sales after accounting for IDM initiatives (see Table 40). As mentioned, the MYPD 2 sales forecast for 2013/14 to 2017/18 was significantly higher than the MYPD 3 sales forecast.

Table 40: MYPD 2 actual sales and sales projections versus MYPD 3 sales projections (net of IDM initiatives)

	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
MYPD 2 application (GWh)	228 266	233 400	237 932	242 472	246 494	254 140	263 325	272 560
Growth in MYPD 3 forecasts (%)		2.2%	1.9%	1.9%	1.7%	3.1%	3.6%	3.5%
MYPD 3 application (GWh)	224 446	225 130	222 028	227 404	229 513	235 638	239 112	244 026
Growth in MYPD 3 forecasts (%)		0.3%	-1.4%	2.4%	0.9%	2.7%	1.5%	2.1%
Decline in sales compared to MYPD 2 (GWh)	3 820	8 270	15 904	15 068	16 981	18 502	24 213	28 534

Table 41: Summary of IDM costs and energy savings

	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MYPD 3
Programmes - peak demand savings (MW)	344	343	1 286	458	358	221	232	461	
Programmes - annualised energy savings (GWh)	1 274	1 334	3 505	2 245	1,361	826	1 016	2 283	
Programmes - costs (Rm)	576	1 593	7 485	2 660	2,419	1 581	1 652	3 033	11 345
Operating costs (Rm)	246	485	309	463	480	484	518	580	2 525
Depreciation (Rm)	1	4	1	1	1	1	1	1	5
Total costs (Rm)	**823**	**2 082**	**7 795**	**3 124**	**2 900**	**2 066**	**2 171**	**3 614**	**13 875**
Other (Rm)	- 44	- 140	- 11	- 183	- 191	- 204	- 205	- 2	- 785
Net costs (Rm)	**779**	**1 942**	**7 784**	**2 941**	**2 709**	**1 862**	**1 966**	**3 612**	**13 090**

The energy requirements in the sales forecast will be served by:

- Eskom's current power stations, based on EAF projections that assume all planned maintenance will be done.
- Power stations that will be commissioned within the MYPD 3 period as part of the current capacity expansion programme.
- Known and signed non-Eskom generators (for instance, those owned by municipalities).
- Known and signed IPPs, including renewable energy IPPs.

- The Cahorra Bassa hydroelectric facility in Mozambique and other imports.

Table 42: Energy mix projections for MYPD 3 (GWh)

	Coal	Nuclear	Gas	Hydro	Pumped Storage	Wind	Total Eskom generation	IPPs	Distribution Municipality	Imports	Gross generation	Wheeling	Supply
2012/13	218 963	12 710	1 104	667	2 970		236 414	2 795	164	10 387	249 760	3 691	253 451
2013/14	220 520	14 239	1 284	671	3 114	69	239 896	4 152	162	11 822	256 032	3 393	259 425
2014/15	222 661	13 751	1 076	670	5 261	220	243 639	6 214	159	11 275	261 287	2 712	263 999
2015/16	229 194	12 959	540	672	5 955	222	249 542	8 233	157	11 131	269 063	2 707	271 770
2016/17	231 406	14 197	533	671	5 902	222	252 930	9 015	155	11 110	273 211	2 689	275 900
2017/18	237 325	14 577	538	671	5 943	228	259 281	9 071	152	11 120	279 624	2 681	282 305

Figure 10 depicts the breakdown of Eskom's sales customers in 2012. This mix is expected to continue throughout MYPD 3. Eskom would like to emphasise that the mix of customers within municipalities varies depending on the given municipality's jurisdiction. This differing customer portfolio creates problems when implementing tariff structures across the country based on Eskom's customer profile.

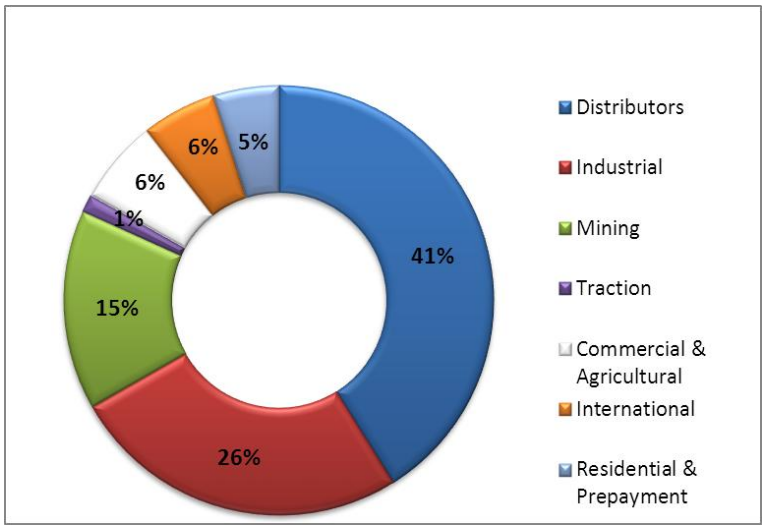


Figure 10: Sales mix for 2012

5.1.1 Drivers of low MYPD 3 sales

In addition to IDM, the MYPD 3 forecast assumes low sales growth due to the following factors:

Steady GDP growth

GDP growth is expected to remain relatively steady for two more years, with a slight increase expected only after 2014/15. Electricity use generally grows slower than economic growth, so GDP growth and electricity sales growth are expected to continue to diverge.

Lower commodity prices

With the exception of gold, most commodity prices have not reached pre-recession levels. As a result, Eskom's mining customers are not fully utilising their smelting facilities and, when they do, they are using more energy-efficient furnaces. The sales forecast assumes this will continue for at least the next two years, after which an increase in energy consumption is expected. In the case of platinum, growth will be driven by new projects and expansion by existing customers, whose projects are currently on hold.

Although the price of gold is at record levels and is expected to keep rising, gold mines remain under pressure to reduce costs and are closing high-cost shafts. The current gold price is partially driven by its status as a safe economic haven. There is limited investment in new mines, compounded by the fact that most remaining ore deposits are very deep and expensive to extract.

Reduction in exports

Exports to Botswana have substantially reduced in anticipation of an increase in that country's internal generation capacity. This has resulted in a decrease of 22.8% in international sales in 2012/13 compared to 2011/12.

Increasing prices

Given that present electricity prices are not yet cost reflective, further real increases are inevitable at least up to 2018. Increasing electricity prices provide consumers with a clear price signal to limit use in order to reduce costs.

Inclining block tariff

It is assumed that the IBT will continue to encourage residential users to limit usage as a way to contain their costs through the MYPD 3 period.

Co-generation and the Energy Conservation Scheme

Co-generation projects – in which large customers take responsibility for generating some or all of their own power – are increasing as more customers become aware of supply constraints. This is also driven by the proposed mandatory ECS legislation and the climbing price of electricity. Certain co-generation projects are at advanced stages of development and have been included in the sales forecast. Only projects in which customers generate for their own use are taken into account. Those that will sell electricity to the system operator have been excluded from the sales forecast but are included as IPP supply sources.

5.2 Integrated demand management

IDM implements measurable and sustainable demand-reduction interventions to increase the safety net between South Africa's energy usage and what Eskom can supply. These interventions take numerous forms, for instance, providing rebates for technology retrofits, communications campaigns, education programmes and pricing structures. They are specifically formulated to motivate customers to install energy-efficient technologies and adopt energy-saving behaviours. Such steps have, in the short, medium and long term, proven to:

- Be the most cost-effective mechanism for demand and energy reduction
- Have the least economic impact
- Take the quickest time to implement
- Be one of the most effective climate-change mitigation strategies
- Be a strong resource to improve overall energy productivity.

Demand-side management has reduced peak electricity demand by 2 717MW for the combined financial years 2005 to 2012. A single power station unit contributes about 600MW to national electricity supply, so demand-side management has conserved more than four generators' worth of output (a typical power station has six) in the past four years. These savings are expected to continue into the MYPD 3 period.

Eskom runs several demand-reduction programmes to encourage industrial customers, municipalities and households to reduce their energy consumption. These initiatives are largely funded by price applications approved by Nersa, as IDM is listed as a component

under operating costs. Eskom is, and will continue to be, the main administrator and implementer of Nersa-funded demand-management initiatives in South Africa.

Historically, the energy-efficiency and demand-side management programme, which now forms part of IDM, largely funded its demand and energy-savings initiatives through tariff applications approved by Nersa. The most recent approved application was MYPD 2, which was applicable from 1 April 2010 to 31 March 2013. The need for continuity beyond this period to realise further demand and energy savings has been identified. This document requests additional funding through the tariff to accommodate this during MYPD 3.

Eskom will continue in its current role as main administrator and implementer of the Nersa-funded demand-management programme in South Africa. IDM has been a focus area in "keeping the lights on" – a key Eskom strategic initiative over the past few years. Projections of the supply-demand situation indicate an energy shortfall, particularly between 2012 and 2014. IDM plays a significant part in mitigating this risk. The IRP 2010 also considers the effects of IDM on the country's future capacity needs.

IDM costs constitute peak demand savings, annualised energy savings, overhead costs and other costs. ECS costs do not form part of the IDM plan and are reflected separately. Overall IDM costs, excluding ECS costs, total approximately R13.9 billion for MYPD 3.

Table 43: IDM programmes and cost

	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MYPD 3
Programmes - peak demand savings (MW)	344	343	1 286	458	358	221	232	461	
Programmes - annualised energy savings (GWh)	1 274	1 334	3 505	2 245	1,361	826	1 016	2 283	
Programmes - costs (Rm)	576	1 593	7 485	2 660	2,419	1 581	1 652	3 033	11 345
Operating costs (Rm)	246	485	309	463	480	484	518	580	2 525
Depreciation (Rm)	1	4	1	1	1	1	1	1	5
Total costs (Rm)	**823**	**2 082**	**7 795**	**3 124**	**2 900**	**2 066**	**2 171**	**3 614**	**13 875**
Other (Rm)	- 44	- 140	- 11	- 183	- 191	- 204	- 205	- 2	- 785
Net costs (Rm)	**779**	**1 942**	**7 784**	**2 941**	**2 709**	**1 862**	**1 966**	**3 612**	**13 090**

5.2.1 Energy efficiency versus demand management

The electricity grid's total system load factor, at about 76%, is high. Such a profile requires energy reduction as well as load reduction. As a result, IDM has shifted focus towards energy efficiency. However, demand management is still needed to mitigate system risk. Projects, initiatives and targets must clearly distinguish between these two key objectives.

IDM aims to implement measurable and sustainable demand and energy-reduction interventions by introducing energy efficiency and load-reduction technologies and behaviours into customers' electricity purchasing patterns. If adequately funded, Eskom's current IDM initiatives can rapidly contribute to closing the foreseen energy gap. This is important, because the risk of load-shedding and the requirements to reduce energy consumption are crucial to ensuring security of supply.

5.2.2 Eskom's role in administering IDM

Energy efficiency and demand-side management are key levers for ensuring security of supply in the short to medium term. Success of the IDM programme is essential. Given Eskom's strong vested interest in ensuring security of supply and the constrained system capacity, Eskom believes it should play a key role in implementing energy efficiency and demand-side management in the foreseeable future, using the Nersa-appropriated funding recovered as part of the current and future MYPD processes.

However, it is acknowledged that the policy direction by government is that in future energy efficiency and demand side management initiatives will be funded centrally through the fiscus using the environmental levy.

IDM is an essential tool with which to manage the constrained electricity system. The following are key benefits:

- Eskom actively manages security of supply, focusing on all possible levers available to address the situation. Solutions are evaluated, costed and prioritised on an integrated "total basket of solutions" basis. Direct control over all key levers to address the challenge, particularly IDM, is essential to optimise cost, expedite delivery and ensure appropriateness of the selected solutions.

- Eskom has built momentum and continuity in its IDM programme. Change of governance could result in new challenges, negatively affecting delivery of savings at a time when it is most needed.
- Eskom has sound corporate governance structures, tried and tested in this environment.
- Eskom has economies of scale through optimised processes and product offerings, established over time.
- In order to meet IDM's goals, long-term strategic and commercial partnerships need to be established. Long-term certainty on IDM funding will provide the capability to ensure such commitments can be made.
- A strategic plan for targeting IDM markets needs to be developed that would gradually transition short-term requirements to a long-term, sustainable energy-efficiency environment. The market needs consistency, stability and clear strategies and guidelines to support the establishment of an external supplier support base and industry that practises energy efficiency.
- With IDM, Eskom has the ability in the short term to balance product offerings and prices to optimise overall cost, for example, by providing real-time pricing products that directly reduce expensive generation options, with direct and significant financial benefits to the industry.

5.2.3 Demand market participation

Demand Market Participation is a demand-response programme that started in Eskom in 2004/05. It was aimed at key industrial customers where big loads (10MW–80MW) could be reduced for a specified period of time on request by the system operator. The programme consists of two products – "Instantaneous Demand Market Participation" and "Supplemental Demand Market Participation".

Instantaneous Demand Market Participation is a product where customers reduce load within 10 seconds of receiving a signal from a frequency relay, and have to maintain this reduction for a maximum of 10 minutes or until the frequency has been restored to an acceptable level. This product assists the system operator to arrest frequency decay on the network and allow the system to be restored to normal frequency levels.

Supplemental Demand Market Participation is a product where customers reduce load within 30 minutes to an hour of receiving the request from the system operator. Customers have to reduce load for a minimum of two hours and are compensated for the energy reduced.

The original Demand Market Participation programme focused on a relatively small number of customers with high consumption levels. An opportunity exists to increase the market by focusing on smaller customers in the industrial and commercial markets. Due to the administrative burden of such an approach, an aggregation approach is being followed, using intermediate parties to contract and manage customers. The Demand Response Aggregator Pilot Programme was introduced to address the flexible load obtainable in the smaller commercial, industrial and agricultural sectors. The programme allows customers that have as little as 100kW of flexible load to participate in demand response. The aim is to sign up at least 500MW during 2012/13, increasing the total capacity to 1 500MW by winter 2013 and 2 500MW by winter 2014.

Funding for both the Demand Market Participation and Demand Response Aggregator Pilot programmes are included in the MYPD 3 submission.

Table 44: Demand market participation costs (R million)

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	MYPD 3
Demand Market Participation (Rm)	4 552	3 275	1 973	1 972	1 835	2 001	11 056

5.2.4 Energy Conservation Scheme

The ECS is a proposed energy reduction legislation for the 500 largest electricity users that sets a reduction target and imposes punitive charges for non-compliance. It is intended as a safety net and should not be activated if voluntary demand reductions are achieved.

ECS is a key element in the suite of solutions to reduce the supply-demand gap. It can be implemented in a relatively short period of time (nine to 12 months from finalisation of the rules) to provide the bulk of the required demand reduction and associated energy savings (up to 6 000GWh per year). In addition, ECS will provide the pricing signal to ensure the

uptake on other solutions such as demand-side management particularly among larger consumers.

Eskom strongly supports ECS as a “safety net” or “insurance policy” to mitigate security of supply risks. It supports a phased implementation approach, allowing for an initial simulation phase during which ECS charges will be set at zero.

Given the urgency of the supply-demand situation, preparations need to start immediately. ECS requires a number of legislative and regulatory measures to be implemented. A number of operational implementation issues also need to be addressed to ensure success. Eskom is engaging stakeholders to support it in unlocking these constraints.

ECS is an initiative driven by the DoE. However, Eskom will play an active part in the design and implementation of the scheme.

5.3 Maintenance

One way in which Eskom has kept the lights on in recent years has been by shifting planned maintenance work at its power stations, where possible. However, this was not an approach that could be sustained, because it detracted from the performance of the generation fleet, increased the possibility of shutdown due to issues such as boiler tube leaks, and added to safety or environmental concerns. To avoid this outcome, in 2011/12 Eskom put measures in place that significantly reduced the backlog of essential generation maintenance, from 36 scheduled generation maintenance jobs in May 2011 to 24 in March 2012. Its target is to eliminate the maintenance backlog by the end of 2013.

The price increase in the MYPD 3 application includes a budget for planned maintenance (see *Sustainability of the industry* for a breakdown of projected costs). Failure to address this maintenance would have financial consequences for Eskom’s future revenue needs and its ability to deliver on its mandate. These consequences include:

- Planned maintenance costs would be overestimated due to insufficient downtime to do the maintenance.
- Operational efficiency and energy availability would decrease due to lack of maintenance, with a corresponding increase in unscheduled maintenance costs due to unforeseen breakdowns.

- Ageing assets and lack of completion of design-specified maintenance would result in an increase in insurance costs.
- Lack of maintenance would increase the risk of catastrophic plant failure, which would incur considerable cost.
- Lack of maintenance on ageing plants would result in greater use of open-cycle gas turbines, which are more costly to run in terms of primary energy expenditure.

It is therefore more cost effective to pay for maintenance in the short and medium term than to pay for not doing maintenance in the long term.

It is also important to keep up with planned plant maintenance to improve the predictability of plant performance as measured by the EAF. EAF is a measure of a plant's availability to provide electricity minus external energy losses not under control of plant management and internal non-engineering constraints.

The capacity projections used in the MYPD 3 application rest on EAF forecasts that have been confirmed by analysis of stations' health by Eskom investigators and engineers from the German utility RWE, one of Europe's top electricity and gas companies. The analysis recommended that additional maintenance be done to improve or sustain plant integrity. This maintenance has been added to the EAF forecast.

5.4 Country needs excluded from application

5.4.1 Implementing IRP 2010 capacity

Even though Eskom and IPPs are currently building additional generating capacity, this will not be enough to address the country's long-term security of supply. When Kusile power station is fully commissioned, Eskom will operate a 43,000MW (43GW) fleet of predominantly coal-fired power stations. Over the next two decades to 2030, the fleet will lose 16,000MW (16GW) of capacity, requiring the decommissioning of some plants. Between 2030 and 2040, a further 21,000MW (21GW) will be lost. By 2040, only 6,000MW (6GW) of Eskom's current fleet will remain.

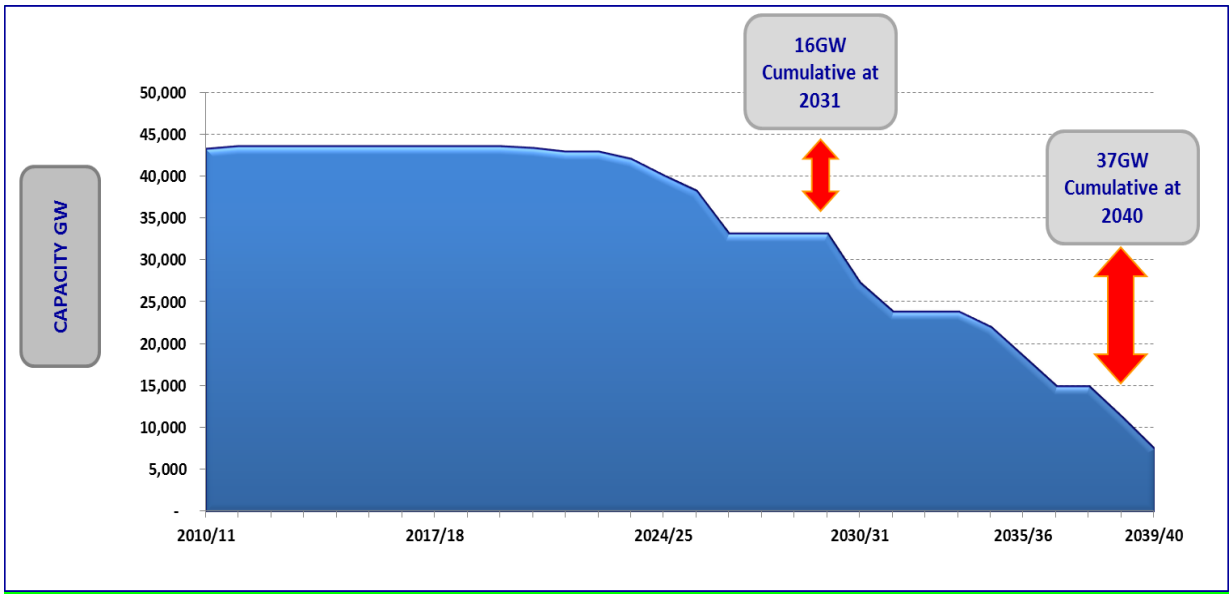


Figure 11: Thirty-year horizon of Eskom's existing generation capacity (GW)

According to IRP 2010, South Africa needs to build about 45,000MW of extra generating capacity by 2030 in order to meet the country's needs. This will cost about R1,8 trillion for new generating capacity, R1,3 trillion to expand and maintain the network capacity and a further R500 billion to cater for maintaining the existing power station fleet. Together, this will require a combined capital cost of R3.5 trillion in total between 2013 to 2030. The pricing implications of building this extra capacity needs to be considered and a decision made as to how this issue should be addressed at this stage. If it is not addressed now, Eskom may have to apply for a reopener of the MYPD 3 decision once the policy decisions have been made.

Given that expansion projects can take decades to plan, finance and execute, Eskom should start planning towards, and sourcing funding for, IRP 2010 capacity expansion during the MYPD 3 period. There has been engagement regarding the DoE's policy requirements and government is in the process of providing clarity in this regard. However, the government still needs to undertake feasibility studies regarding its projected generation requirement and how it should be allocated, so the allocation decision has not yet been made.

It would be irresponsible of Eskom not to reflect the implications of the additional capacity requirements on the price path. Therefore, for illustrative purposes, Eskom has provided the implications of two scenarios that assumes that it will ultimately be responsible for 65% **(scenario one**) or 100% **(scenario two)** of the capacity requirements projected in IRP 2010.

The long-term implication is that Eskom's electricity prices will need to reach 105c/kWh in real terms by 2030. This would require a 20% average increase each year for the five year MYPD 3 period, followed by further increases of 9% per year for a further five years for MYPD 4. Annual increases of approximately 5% thereafter. As noted earlier, electricity prices will go up to this extent even if the IRP 2010 capacity is allocated to one or more parties other than Eskom.

Assumptions behind scenarios

The scenarios assume the following conditions:

Capacity and capital expenditure:

- Capacity expansion until 2030 is based substantially upon the IRP 2010, taking into account timing and capacity deviations based on recent guidance received from government and certain technical assumptions
- Eskom supplies its own transmission and distribution infrastructure.
- The total capital expenditure excludes capital expenditure related to municipal distribution infrastructure.
- No replacement capacity build beyond 2040 is catered for and hence this impact is excluded from the financial implications in the latter years.
- The build allocation between IPP's and Eskom on the 65% scenario is depicted in Table 45:

Table 45: Technology breakdown on Eskom 65% build scenario

TECHNOLOGY	ESKOM (assumed) MYPD 3	ESKOM (assumed) POST MYPD 3	IPPs (assumed) MYPD 3	IPPs (assumed) POST MYPD 3	IRP 2010 TOTAL MWs
Nuclear	0	9,600	-	-	9,600
Coal	0	4,368	2,442	-	6,810
Gas	0	3,269	672	2,300 *	6,241
Wind	0	5,200	2,547	400	8,147
Solar and CSP	0	6,300	3,321	-	9,621
Other renewables	0	-	173	-	173
DoE peaker	-	-	1,008	-	1,008
Cogen	-	-	1,019	-	1,019
Import Hydro	-	-	-	2,609	2,609
Capacity (MW)	-	28,737	11,182	5,309	45,228
		65%	16,491MW	35%	

- The migration in MWs built by Eskom from the 65% to the 100% scenario is shown in Table 46:

Table 46: Migration from 65% to 100% build scenario

Migration from 65% to 100% scenario	Eskom	IPPs
Total MWs 65% scenario	28,737	16,491
MWs previously built by IPPs	2,700	(2,700)
Total MWs 100% scenario	**31,437**	**13,791**

:

- In order for Eskom to calculate the capital costs of future build, assumptions were made on capital costs per technology which is summarised below:

Table 47: Assumptions on capital and fuel costs per technology

Technology	Capital costs $/kW	Fuel costs real R/MWh
Nuclear	6,131	60
Coal	2,940	200
Gas - OCGT	1,029	2,772
Gas - CCGT	684	665
Wind	3,258	-
Solar Photovoltic	2,750	-
Concentrated solar power (CSP)	5,802	-

Price path:

- The price path assumed over MYPD3 will allow Eskom to reach standalone investment grade credit status by 2017/18.
- The Return on assets (ROA) applied is the lower of the return of 8.16% as determined by Nersa in MYPD 2 and a return required to maintain investment grade.
- Sales growth will be 1.9% for the MYPD 3 period, after which it will increase to IRP 2010 targets until 2030, after which it will return to 1.9% per year.

Funding:

- Funding of the expansion for the generation and network requirements is provided through debt and tariffs only.
- Debt capacity is assumed at R60bn per annum in 12/13 real terms.
- No equity injections are assumed throughout the period to 2030.

Other:

- IPP contracting periods are assumed to be between 15 to 20 year for renewable technologies and 40 years for coal technologies.
- No carbon taxes will be implemented over the period to 2030.
- No dividend payments to shareholder will occur to 2030.

- Operating costs beyond the MYPD3 period escalate by an average of 6% per annum.
- Coal price increase by an average of 10% per annum after 2017/18.

Scenario definitions

- In the 65% scenario, IPP's will build capacity beyond the 9210MWs such that the total IPPs equate to approximately 35% of the uncommitted build. The remaining 65% is built by Eskom.
- In the 100% scenario Eskom will build all capacity required by IRP post the 9210MWs Renewable IPPs.
- Uncommitted build refers to the new build options in IRP of 45,637MWs comprised of nuclear of 9600MW , coal of 6250MW, CCGT of 2370MW, OCGT of 3910MW, solar of 8400MW , wind of 8400MW, CSP of 1000MW and hydro imports of 2609MW.

Findings of scenario 1: Eskom builds 65% of IRP 2010 post MYPD3

A representation of the capacity allocations is presented in the figure below:

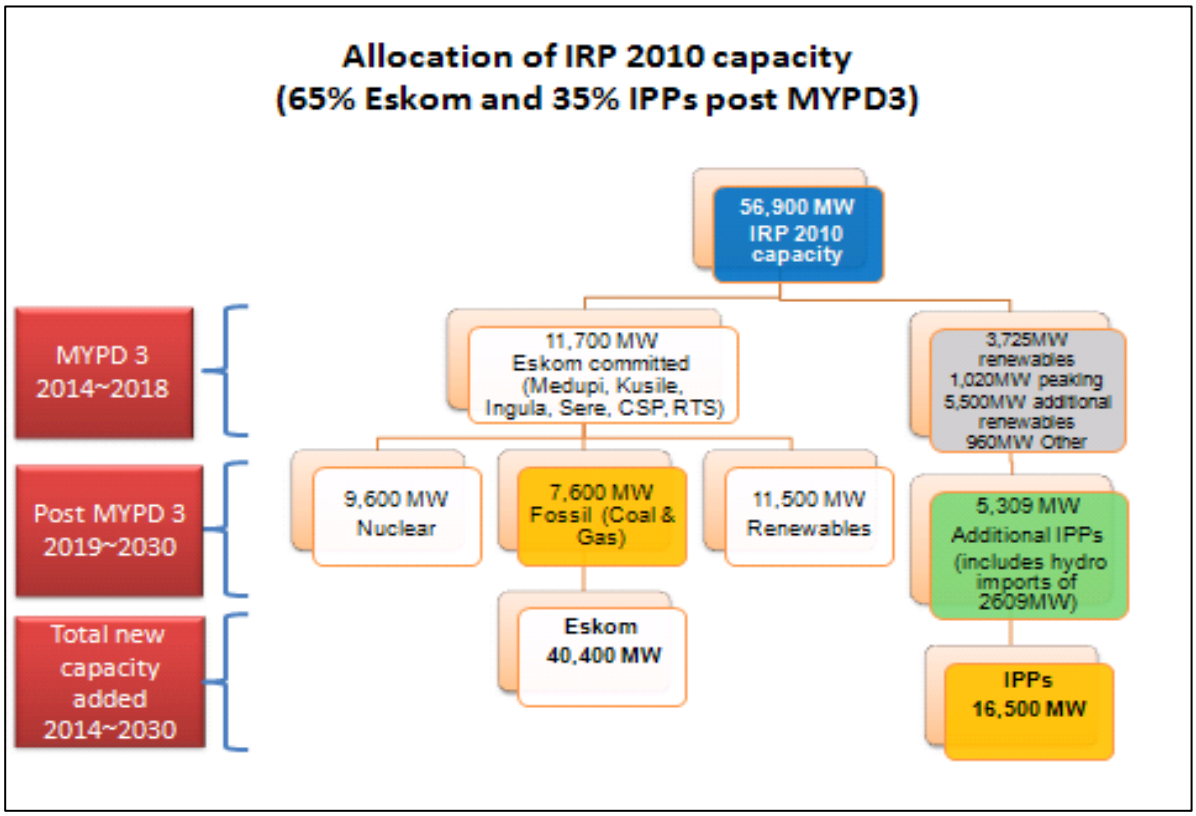


Figure 12: Allocation of the IRP 2010 capacity on the Eskom 65% build scenario

The results of the capacity allocations and cost of technology choices has revealed that to meet the IRP 2010 build commitments, Eskom would need to spend R1.8 trillion on capacity expansion beyond the substantial completion of Kusile of which approximately R180 billion would be spent during MYPD 3 **(**see Table 48**).**

Table 48: Capital expenditure for Eskom builds 65% of IRP 2010 (R million)

R'million	MYPD3 2014~2018	MYPD4 2019~2023	MYPD5 2024~2028	2029~2031	Total IRP 2030
Corporate, Distribution & Transmission	176,443	249,579	506,602	286,374	**1,218,998**
Total new build	**177,748**	**698,740**	**772,909**	**98,580**	**1,747,976**
Nuclear	129,459	425,970	334,641	24,137	**914,207**
Solar and CSP	9,343	83,124	170,714	68,945	**332,127**
Wind	9,367	65,460	217,668	-	**292,494**
Gas	-	9,075	38,823	5,497	**53,395**
Coal	29,579	115,111	11,063	-	**155,753**
Generation - technical capital expenditure	141,171	87,496	96,632	48,516	**373,815**
Total capex	**495,362**	**1,035,816**	**1,376,142**	**433,469**	**3,340,789**

Financing the amount of debt needed to fund such expansion, while still covering Eskom's operating costs and depreciation, would require average price increases of 20% per year for

the five years of the MYPD 3 period, followed by average price increases of 9% for a further five years thereafter (MYPD 4), and thereafter annual increases of 5%. The projected price path for electricity is 102 c/kWh compared to the IRP 2010 price path that reaches 110 c/kWh in real terms in 2030/31.

Further findings were as follows:

- Eskom would have to raise approximately R1.1 trillion in debt between 2013/14 and 2030, with a maximum level of debt per year of R60 billion in 12/13 real terms.
- IPPs would incur a projected total cost of close to R750 billion from 2013/14 to 2030. The costs incurred during MYPD 3 would total about R140 billion. Of this, about 80% would go to the renewable energy IPP programme. IPP costs are offset against deductions in Eskom's primary energy cost.
- Table 49 indicates the impact of 9,200MW of the renewable energy IPP programme in MYPD 3.

Table 49: Financial impact to 2030 for the 65% Eskom build scenario

R' million	MYPD3 2014~2018	MYPD4 2019~2023	MYPD5 2024~2028	2029~2031	Total IRP 2030
Eskom Primary energy	309,439	429,448	675,609	516,482	**1,930,977**
IPP's	139,532	204,826	222,395	172,137	**738,890**
Operating costs	309,536	526,248	757,414	549,659	**2,142,857**
Capex	495,362	1,035,816	1,376,142	433,469	**3,340,789**
Debt required	333,771	427,302	271,521	36,000	**1,068,593**
Interest costs	156,454	197,303	340,438	105,051	**799,246**
Revenue	1,206,697	2,358,214	3,269,978	2,546,062	**9,380,952**
Sales (TWh)	1,142	1,265	1,506	995	**4,908**

Some key financial and technical results are presented in a combined figure to understand the trade-offs between certain parameters. For example: a reduction in the debt to EBITDA ratio will result in an increase in the leverage ratio.

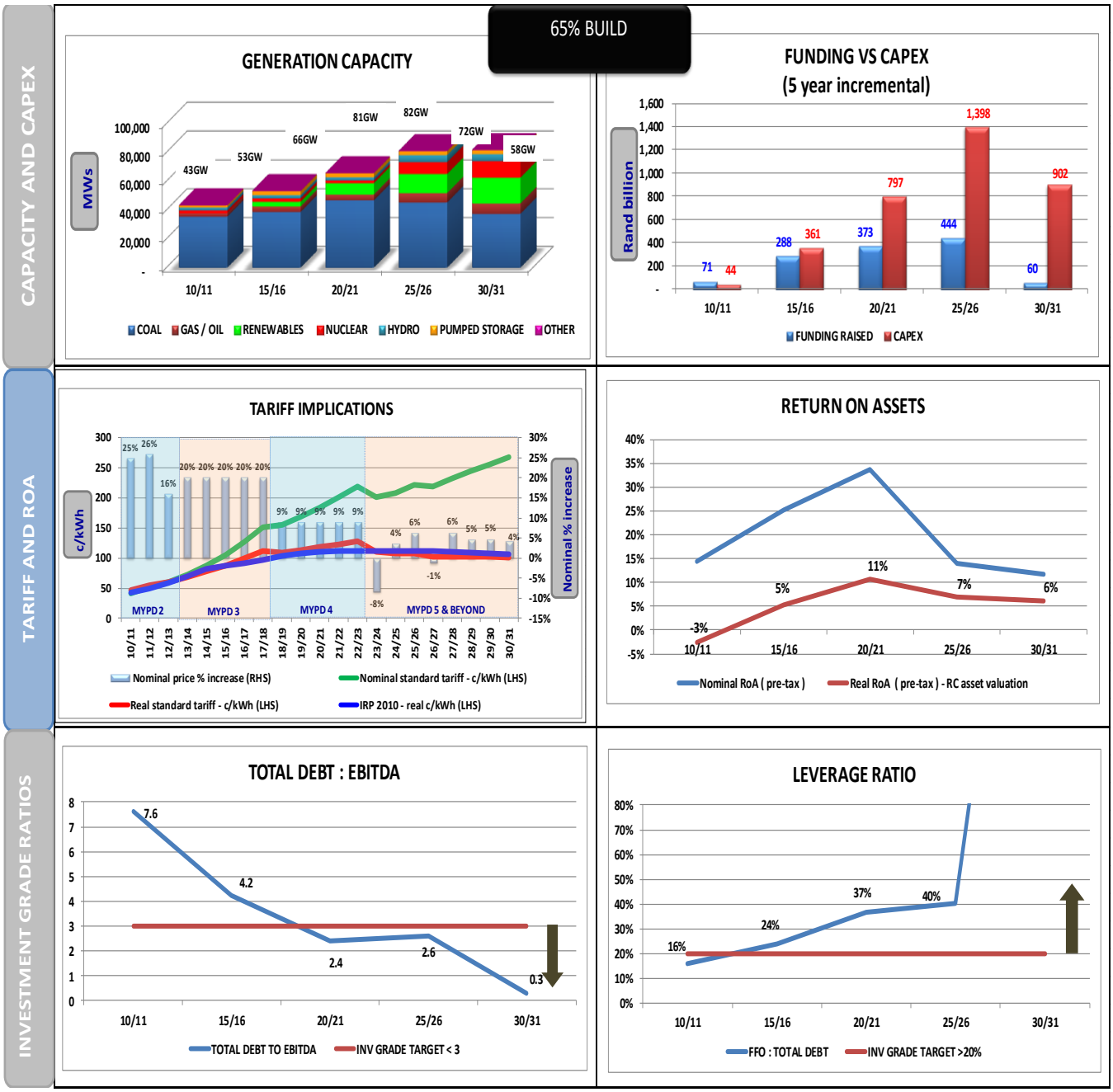


Figure 13: Analysis of Eskom 65% build scenario

Findings of scenario 2 Eskom builds 100% of IRP 2010 post MYPD3

A representation of the capacity allocations is presented in the figure below:

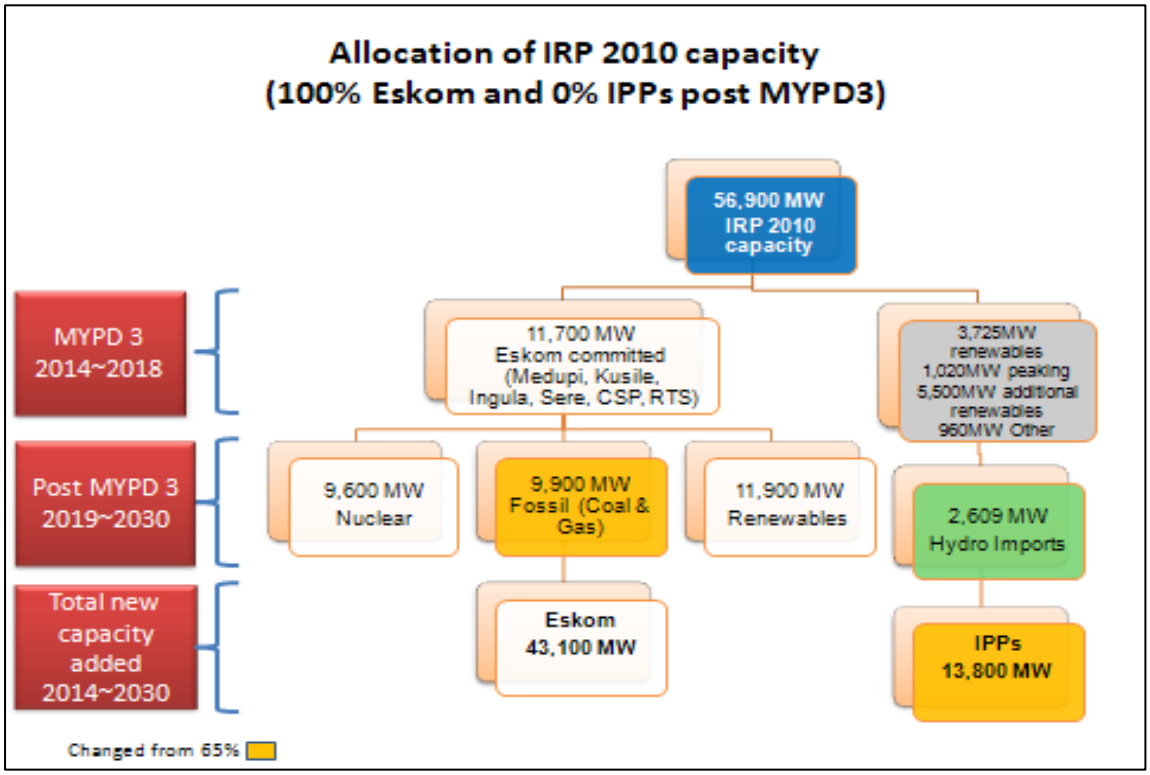


Figure 14: Allocation of the IRP 2010 capacity on the Eskom 100% build scenario

The results of the capacity allocations for the 100% scenario show that the additional 2700MWs built by Eskom has an incremental impact on the capital expenditure of an additional R57bn. This is further illustrated in Table 51.

Table 50: Movement in Capital expenditure from 65% to 100%

R' million	MYPD3 2014~2018	MYPD4 2019~2023	MYPD5 2024~2028	2029~2031	Total IRP 2030
Corporate, Distribution & Transmission	-	139	137	239	**515**
Total new build	**3,278**	**38,012**	**13,604**	**-**	**54,894**
Nuclear	-	-	-	-	**-**
Solar and CSP	-	-	-	-	**-**
Wind	3,278	14,287	-	-	**17,565**
Gas	-	23,725	13,604	-	**37,329**
Coal	-	-	-	-	**-**
Generation - technical capital expenditure	5	591	340	193	**1,129**
Total capex	**3,283**	**38,742**	**14,081**	**433**	**56,538**

The change in the capital expenditure profile is due to the additional build on wind and gas of 400MWs and 2300MWs respectively.

Financing the amount of debt needed to fund such expansion, while still covering Eskom's operating costs and depreciation, would require average price increases of 20% per year for five years (MYPD3), followed by 11% in 2018/19 and 9% for a further four years (MYPD 4), and thereafter 5% annual price increases. The projected price path for electricity is 102 c/kWh compared to the IRP 2010 price path that reached 110 c/kWh in real terms in 2030/31.

Further findings were as follows:

- Eskom would have to raise approximately R1.1 trillion in debt between 2013/14 and 2030, with a maximum level of debt per year of R60 billion in 12/13 real terms.
- IPPs would incur a projected total cost of close to R720 billion from 2013/14 to 2030. The costs incurred during MYPD 3 are approximately R140 billion. Of this, about 80% would be for the renewable energy IPP programme. IPP costs are offset by deductions in Eskom's primary energy cost.
- The findings are similar to that of the 65% due to the incremental change in the build profile. Table 51 indicates the incremental impact on the financial position when Eskom builds 100%.

Table 51: Financial impact – movement between 65% and 100% scenario

R' million	MYPD3 2014~2018	MYPD4 2019~2023	MYPD5 2024~2028	2029~2031	Total IRP 2030
Eskom Primary energy	-	- 153	- 215	- 137	**- 505**
IPP's	-	- 5,999	- 9,551	- 7,285	**- 22,835**
Operating costs	164	3,312	3,937	2,772	**10,184**
Capex	3,283	38,742	14,081	433	**56,538**
Debt required	3,138	- 41,750	8,603	-	**- 30,009**
Interest costs	188	- 797	- 13,154	- 10,116	**- 23,878**
Revenue	-	42,443	37,438	16,064	**95,945**
Sales (TWh)	-	-	-	-	**-**

Some key financial and technical results are presented in a combined figure to understand the trade-offs between certain parameters. The key differences between the 2 scenarios are shown in the cape and capacity section below.

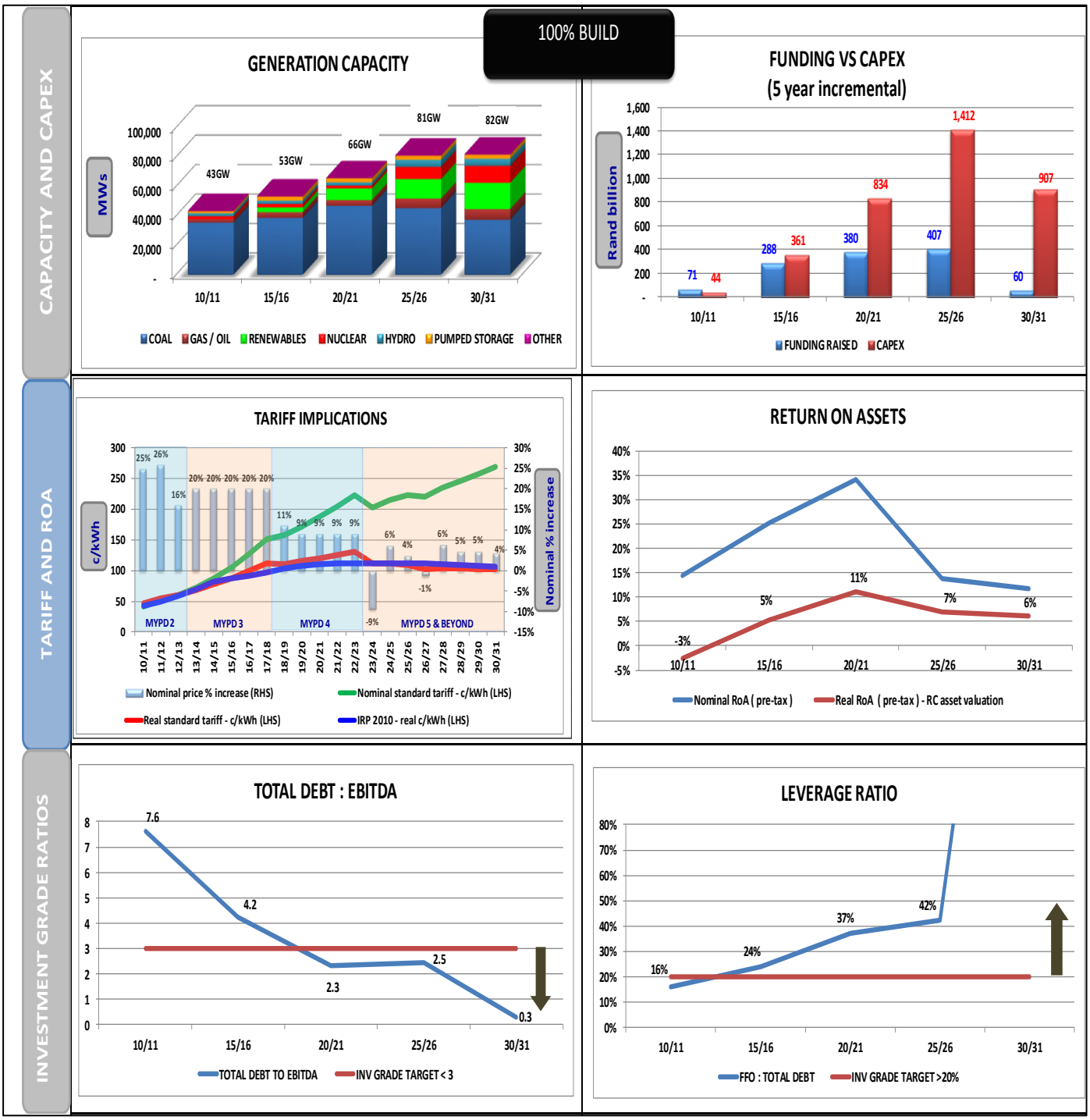


Figure 15: Analysis of Eskom 100% build scenario

The impact over MYPD 3 of the 65% and 100% scenarios are depicted in the tables below.

Table 52: Summary of 65% vs. 100% Eskom build scenario

65% BUILD	2013/14	2014/15	2015/16	2016/17	2017/18	MYPD 3
Primary energy						
Eskom primary energy (Rm)	57,267	59,828	63,003	64,255	65,086	**309,439**
IPP's (Rm)	13,196	15,840	23,198	35,736	51,562	**139,532**
Total primary energy (Rm)	70,463	75,668	86,202	99,991	116,648	**448,972**
Operating costs						
Total operating costs	48,387	54,072	61,841	69,838	75,397	**309,536**
Assets and depreciation						
Regulatory replacement asset base (Rm)	802,723	884,046	969,797	1,081,598	1,216,614	
Capital expenditure (excl interest during construction) (Rm)	73,584	80,355	89,752	116,659	135,011	**495,362**
Revenue and price increases						
Total revenue (Rm)	157,763	190,635	233,028	281,599	343,673	**1,206,697**
Regulated tariff increases	20%	20%	20%	20%	20%	
Funding						
Debt drawdowns (Rm)	42,061	91,314	58,404	64,408	77,583	**333,771**

100% BUILD	2013/14	2014/15	2015/16	2016/17	2017/18	MYPD 3
Primary energy						
Eskom primary energy (Rm)	57,267	59,828	63,003	64,255	65,086	**309,439**
IPP's (Rm)	13,196	15,840	23,198	35,736	51,562	**139,532**
Total primary energy (Rm)	70,463	75,668	86,202	99,991	116,648	**448,972**
Operating costs						
Total operating costs	48,387	54,072	61,841	69,862	75,538	**309,700**
Assets and depreciation						
Regulatory replacement asset base (Rm)	802,723	884,046	969,797	1,082,064	1,219,924	
Capital expenditure (excl interest during construction) (Rm)	73,584	80,355	89,752	117,126	137,827	**498,644**
Revenue and price increases						
Total revenue (Rm)	157,763	190,635	233,028	281,599	343,673	**1,206,697**
Regulated tariff increases	20%	20%	20%	20%	20%	
Funding						
Debt drawdowns (Rm)	42,061	91,314	58,404	64,830	80,300	**336,909**

Note that over the MYPD3 period, there is a marginal impact on the financial results as shown above. The difference between the 100% and 65% can be seen in the capital expenditure and funding.

The need for an integrated funding approach

Regardless of how the IRP 2010 projects are eventually allocated, a nationwide integrated funding approach will be required to define:

- **Price trajectory:** Without a sensible price trajectory the country's funding requirements may outstrip the pool of available funds.
- **Localisation:** (Funding from the local markets) to indicate which types of funding will be limited or precluded.
- **Technology and/or equity partners:** To define potential sources of third-party equity.
- **Potential future structural changes:** To the industry to use flexible funding structures such as joint ventures and public-private partnerships.

6 PROPOSAL TO RESTRUCTURE ESKOM'S RETAIL TARIFFS

Key points

- Eskom's revenue requirement results in a single average price increase that is translated into specific tariff increases for each tariff and the summarised impact on the different tariffs is provided.
- Residential tariffs should be restructured to simplify the tariffs while still optimising the protection of the poor, and ensuring that high-usage residential customers pay more cost-reflective prices.
- Each tariff charge is recalculated based on an updated cost-to-serve study and increases will be applied to the various components to ensure that the tariff structures represent costs more accurately. The various components of retail tariffs are also further unbundled to show cross-subsidisation and other cost structures clearly and transparently.
- Other proposed changes will revise time-of-use structures, include the environmental levy charge into the energy charges, spread the reactive energy charge across all time periods, revise the use of system charges for loads and introduce use of system charges for generators.

Eskom's revenue requirement results in a single average price increase that is translated into specific increases for each tariff. The effect of the tariff restructuring proposals is summarised below. In addition to the revenue request, Eskom requests that Nersa considers modifications to the existing tariff structure as summarised below. Further detail in this regard is set out in *Part 2: Proposal to Restructure Tariffs*.

The tariffs that will be approved by Nersa will only be applicable to direct Eskom customers and municipalities purchasing electricity from Eskom and not to customers of municipalities. Once the Eskom price increase is known, each municipality will determine their own tariffs and increases for their customers based on their unique situation.

6.1 Impact of MYPD3 price increase

The average price increase is not necessarily the same as the increase applied to the tariff rates for the different customer categories for a number of reasons. These include the tariff structure, volume changes (kWh and demand) and how electricity is consumed. The ultimate impact on the customer will depend on what is approved by Nersa on the average increase resulting from the MYPD 3 determination, any decisions on subsidies, the timing of the price increase implementation and the tariff restructuring.

Tariff categories

Eskom tariffs are set out in four main categories: local authority tariff (municipalities), urban, residential and rural and these are further categorised in local authority tariffs and non-local authority (or non-municipal) tariffs. The tariffs allocated to these categories are set out below.

Urban – Eskom's urban tariffs supply typically industrial, mining and commercial entities The following tariffs apply to the urban category:

- **Megaflex** is a time-of-use (TOU) tariff used for large electricity supplies (>5MVA).
- **Nightsave Urban** is an off-peak tariff that is used for small and large supplies (>25kVA).
- **Miniflex** is a TOU tariff for smaller industrial, commercial customers (<5MVA).
- **Businessrate** is a suite of four tariffs for smaller commercial customers (≤100kVA).
- **Public lighting** is a tariff used for public lighting supplies (streetlights, traffic lights and so on).

Rural – Eskom's rural tariffs supply mainly agricultural concerns. The following tariffs apply**:**

- **Ruraflex** is a TOU tariff used for larger, low-density rural power supply lines.
- **Nightsave** rural is an off-peak tariff used for larger, low-density rural power supply lines.
- **Landrate** is a tariff used for smaller rural supplies (≤100kVA).

Residential – The following tariffs apply to Eskom's residential customers. Both are charged at IBT rates, meaning that the more electricity used, the higher the rate per unit will be to allow for cross-subsidisation of the lower-use part of the tariff (see the section on IBTs for

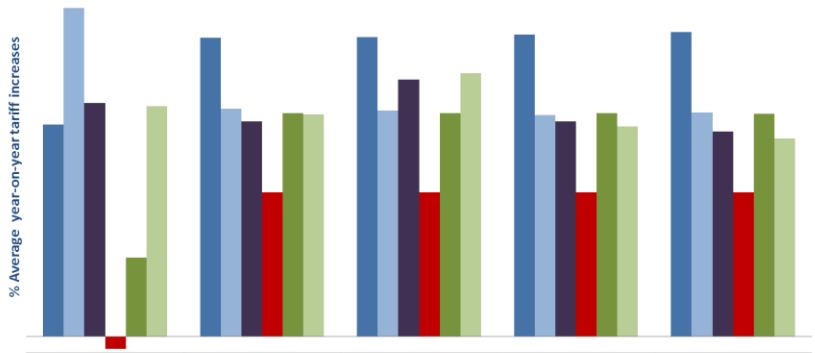
more detail):

- **Homepower** is used for higher-consumption residential customers – based on supply size.
- **Homelight** is used for prepaid customers with smaller supply sizes – 20A or 60A.

Local authority bulk supplies – municipalities are supplied on all of Eskom's tariffs, depending on the size, location and what the electricity is being used for.

Apart from the impact of the tariff restructuring, the timing of the implementation of the increases on tariffs also impacts the increase to customers. Eskom needs to take into account the fact that increases to the municipalities are delayed by three months and the shortfall needs to be recovered over a nine month period. Although the annual average increase for the year remains unaffected, the timing difference results in municipalities to receive a higher than the average tariff increase from 1 July.

Figure 16 provides indicative figures for the different tariff categories for the five year period, but the details of the impact on each tariff and the indicative rates submitted will only be for year 1 of the MYPD 3 and is outlined in *Part 2*: Proposal to restructure tariffs. Thereafter a tariff application will be made on annual basis to Nersa. Eskom is required to submit an annual tariff adjustments application for approval by Nersa as their decision depends on the actual revenues for the previous year and applicable regulatory rules.



	2013/14	2014/15	2015/16	2016/17	2017/18
Municipalities (1 July)	13.26%	18.65%	18.70%	18.85%	19.01%
Urban (key industrial, mining and commercial)	20.53%	14.23%	14.13%	13.85%	14.01%
Rural (agriculture)	14.59%	13.46%	16.07%	13.45%	12.79%
Eskom residential Homelight 20A (low usage)	-0.74%	9.00%	8.99%	9.00%	9.00%
Eskom residential Homelight 60A (medium to high usage)	4.95%	13.96%	13.95%	13.94%	13.92%
Eskom residential Homepower (high usage)	14.37%	13.88%	16.43%	13.11%	12.37%

Figure 16: Indicative Year-on-Year (Y-O-Y) tariff increases per tariff category

The year-on-year increases in the above figure compare the average price paid in the current year against the average price paid in the following year.

The Eskom Urban (Industrial, Mining and Commercial) customers will see a higher increase than the average as a result of an increase in the cross-subsidies due to lower than average increases to the poor (low usage users).

To protect the poor Eskom proposes for Homelight 20A (low usage) a single energy rate based on what the average Homelight 20A customer is paying currently on IBT. Thus the average customer will pay, before applying the price increase, approximately the same as what they are paying currently. This price is then increased by 9%. With the move from the IBT to the new single energy rate and the approach taken as described, the higher usage Homelight 20A customers will see a large reduction in their price. Consequently the Eskom low usage (Homelight 20A) customers as a tariff category will see a slight reduction in price, but the average customer in this tariff category (the majority of the customers have an average consumption of only 123kWh/month) will experience a price increase of around 9%.

Nersa also approves the tariff rates for each of the Eskom retail tariff categories. The average prices and increases for 2013/14 are provided per tariff in Figure 17 below.

		Average tariff rate increases compared to 2012/13 tariffs		
		2013/14 sales on 2012/13 tariffs c/kWh	2013/14 sales on 2013/14 tariffs c/kWh	Average tariff rate % increase
Municipality	Municipality tariffs	57.38	64.92	13.1%
	April to June 2013/14 (3mth on 2011/12 tariffs in 2012/13)	54.72	60.73	11.0%
	July to March 2013/14 (9mths)	58.29	66.35	13.8%
Non-municipality tariffs		63.86	75.43	18.1%
Urban (key industrial, mining and commercial)	NIGHTSAVE Large	65.50	79.63	21.6%
	NIGHTSAVE Small	82.69	99.90	20.8%
	MEGAFLEX	55.29	66.73	20.7%
	MINIFLEX	68.40	81.33	18.9%
	BUSINESSRATE	109.17	116.96	7.1%
	Transflex	70.36	84.44	20.0%
	Public Lighting	71.84	81.59	13.6%
	Total Urban	57.29	68.96	20.4%
Rural (agriculture)	NIGHTSAVE Rural	88.13	93.84	6.5%
	RURAFLEX	82.04	94.55	15.3%
	LANDRATE	132.62	153.00	15.4%
	Total Rural	104.69	119.61	14.2%
Eskom residential	HOMEPOWER (high usage)	105.03	121.94	16.1%
	HOMELIGHT			
	Homelight 20A (low usage)	76.16	75.58	-0.8%
	Homelight 60A (medium to high usage)	78.73	89.27	13.4%

Figure 17: 2013/14 average prices and percentage tariff increases for the different Eskom tariffs

6.2 Eskom retail tariffs restructuring proposals

Eskom's strategic pricing objectives are energy efficiency and economic sustainability, cost reflectivity, fairness, equity and transparency. In line with these objectives Eskom proposes to adjust its retail tariff structures for 2013/14, taking into account national imperatives, customer requirements, business needs and best practice. The impact on the tariff is based on these proposals being accepted.

The proposals aim to:

- Make the tariff structures more cost reflective and improve transparency
- Continue the protection of low-income groups with revised residential tariffs

- Simplify tariff structures
- Modify some price signals to customers.

The details of the proposed changes include indicative rates and tariff structures based on the costs per licensee. The final tariffs, based on the Nersa determination of the revenue application and the tariffs structures, will be submitted to Nersa to be approved annually.

6.2.1 Residential tariff structures – including protection of the poor

In 2009, Eskom had two residential tariff structures: the Homepower suite of tariffs aimed at customers with higher consumption comprised a fixed charge plus a single energy rate; and the Homelight suite of tariffs aimed at customers with lower consumption comprised a single energy rate.

In 2010, Nersa removed these structures when they introduced the IBT. The IBT was implemented to cushion low-income households that use very little electricity. The structure, which also provides an incentive for all households to use electricity efficiently, divides consumption into four blocks. The unit tariff per kWh is stepped up as consumption increases.

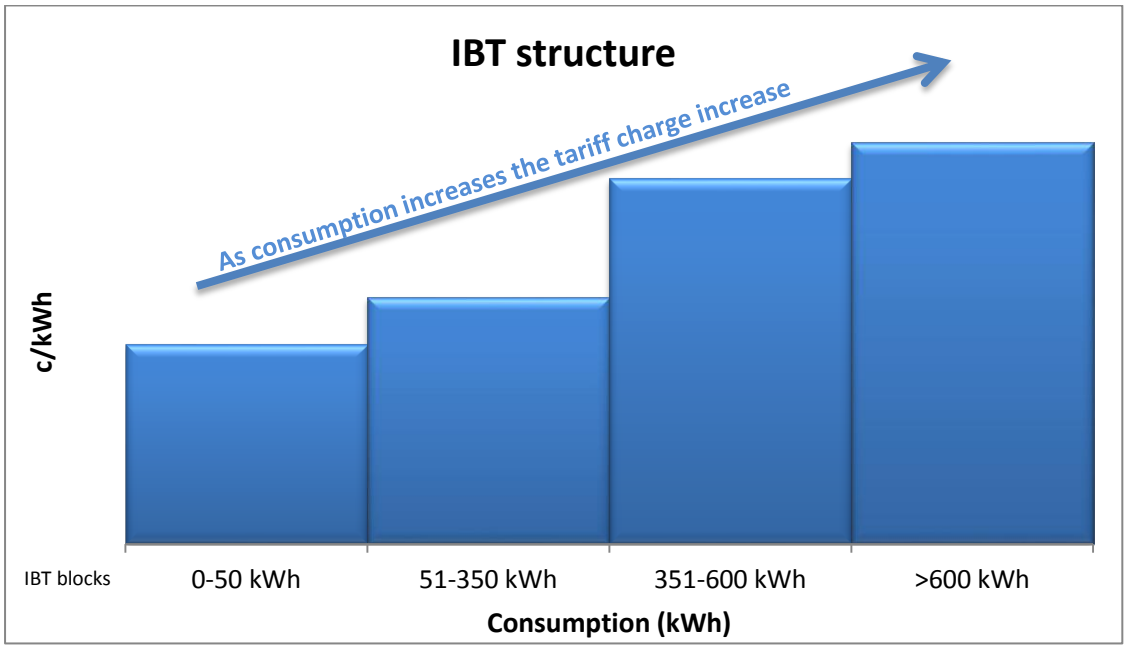


Figure 18: Inclining block tariff structure

The tariff has been successful in lowering the cost of electricity for the poor, but there have been a number of unintended consequences. Any shortfalls to Eskom's approved revenues due to the IBT are recovered from other non-municipality tariffs, excluding rural non-municipality tariffs. As a result, the IBT shortfall (subsidy) is recovered only from urban non-municipality tariffs. The complex IBT structure also makes it difficult for customers to understand and for utilities to implement equitably. The more blocks there are, the more complicated it becomes.

Most importantly, in the current IBT structure, rates and blocks are the same for all Eskom's residential customers. However, Eskom residential customers range from very wealthy residential customers to indigent customers in rural villages, with very different costs and usage patterns. The residential tariffs therefore need to be restructured to take into account costs and usage of different customers. Eskom has also provided input along the lines set out herein to NERSA regarding the IBT Consultation Paper issued for public comment.

Eskom proposes simplifying and refining the residential tariffs while ensuring that the poor are protected and that residential customers will be able to choose from a suite of possible tariff options, as follows:

- Homelight 20A (typically low-consumption rural and small urban households who only use power for a few electrical appliances): a single energy rate lifeline tariff to cater for the poor.
- Homelight 60A (typically suburban higher-usage households who use more electrical appliances, including a geyser. This tariff can also apply to non-governmental organisations, government facilities, churches, schools, halls, clinics and old-age homes in urban areas): a revised IBT with two blocks; combining the first three blocks with the rate slightly higher than the lifeline tariff rate and increasing second block rates.
- Homepower suite of tariffs: Homepower 1, 2, 3 and 4 with fixed-charge tariff options for higher consumption supplies.

Types of residential power supply

Eskom's residential customers receive one of two sizes of electricity supply.

Twenty-ampere (20A) single-phase supplies are typically used by low-consumption customers and can only power a few electrical appliances at the same time. Government housing projects typically use 20A supplies. Customers on a 20A supply usually qualify for a free connection and subsidised usage rates.

Sixty-ampere (60A) three-phase supplies are typically used by higher-usage residential customers and cater for customers that have more electrical appliances, including a geyser. They include communal facilities such as churches, schools, halls, clinics and old-age homes in residential areas. Customers on a 60A supply are also subsidised, albeit to a lesser extent, but have to pay a connection fee based on the cost of connection.

Greater than 60A supplies are used by high-consumption residential customers who have many electrical appliances. This tariff category is not subsidised and contributes to subsidies.

Medium-to-high-usage residential customers in urban areas with a notified maximum demand of up to 100kVA can currently also choose to go onto a TOU tariff option that charges a higher tariff during peak hours and for winter but lower tariffs for off-peak periods

and for summer as a way to encourage users to conserve energy in Eskom's high-demand periods. It is proposed that this option will become mandatory for all residential customers on a three-phase supply once smart meters are rolled out. This category of customers will also contribute to subsidies.

Eskom's proposal provides protection for the poor, but increases the level of subsidies to R11 billion for the non-municipality urban tariffs in 2013/14.

Table 53 shows the monthly amount paid at different consumption levels.

Table 53: Additional indicative monthly amount to be paid in 2012/13 values on the proposed residential tariffs (out-of-pocket)

	Eskom residential Homelight 20A (low usage)		Eskom residential Homelight 60A (medium to high usage)	
	2012/13	2013/14	2012/13	2013/14
100kWh payment	R 68	R 68	R 68	R 68
100kWh increase	R 0	R 8	R 0	R 14
Total	***R 68***	***R 76***	***R 68***	***R 82***
400kWh payment	R 367	R 367	R 367	R 367
400kWh increase	R 0	-R 27	R 0	R 2
Total	***R 367***	***R 340***	***R 367***	***R 369***
1000kWh payment	R 1,023	R 1,023	R 1,023	R 1,023
1000kWh increase	R 0	-R 267	R 0	R 167
Total	***R 1,023***	***R 756***	***R 1,023***	***R 1,190***
3000kWh payment	R 3,467	R 3,467	R 3,467	R 3,467
3000kWh increase	R 0	-R 1,200	R 0	R 1,214
Total	***R 3,467***	***R 2,267***	***R 3,467***	***R 4,682***

6.2.2 Management of cross-subsidies

Customers on certain tariffs subsidise those on other tariffs. These tariff cross-subsidies are a result of historical reasons, such as the electrification and rural subsidies, affordability-related subsidies to residential customers implemented since the introduction of the IBT, and subsidies to low-voltage customers on Eskom's urban large power-user tariffs (Megaflex, Nightsave and Miniflex).

To date, tariff subsidies have evolved in the absence of a subsidy framework and there has been very little analysis of the long-term impact on consumers, whether subsidy contributors,

recipients, or even the economy as a whole. Furthermore, the total subsidy level has increased substantially since IBT was introduced as the initial IBT rates were, on average, below cost. Since then, increases to these customers have been below Eskom's average price increases.

Currently, the subsidy is paid by Eskom's municipal, industrial and commercial customers, with Eskom's direct industrial and commercial customers making the largest contribution to Eskom-related subsidies because municipalities do not contribute towards the IBT-related affordability subsidies (they also need to cater for their subsidies).

This has resulted in tariffs paid by industrial and commercial customers increasing at a rate higher than the average price increase over the past three years. There is a view from customers contributing towards subsidies that these subsidies are becoming unaffordable and unsustainable.

It is generally accepted that the EPP contains sound policy principles, but still needs a proper implementation plan, subsidy framework and tariff guidelines. In the absence of such a national subsidy framework, cross-subsidies are currently not being managed properly.

It has become critical to put in place a sustainable national cross-subsidy framework for the industry.

6.2.3 Improved cost-reflectivity of tariff structures

The first step in designing cost-reflective tariffs is to conduct a cost-to-serve study, which breaks down the allowed cost of providing electricity into rational cost categories. The main cost categories are energy (generation), demand (network costs) and customer service costs (retail).

Eskom has completed an updated cost-to-serve study that allowed for up-to-date cost-reflective rates to be calculated and serves as the basis for the proposed design and changes to the retail tariffs. The tariffs contained in this document reflect the updated cost to serve and the submitted revenue requirement by Eskom in the MYPD 3 application.

As a result of the updated cost-to-serve study, Eskom proposes to differentiate between the cost components for Generation (energy costs), Transmission (network costs) and Distribution (network and retail costs) with rates updated based on the cost per licensee; to

calculate and show all tariff cross-subsidies transparently; to make use-of-system charges cost reflective for all large power customers and, where applicable, show low-voltage subsidies transparently and unbundle the reliability service charge for the large power tariffs from the energy rates.

6.2.4 Revision of time-of-use structures

TOU tariffs were introduced during the early 1990s to reflect the increased production cost of electricity generation during daily peak hours and the high demand of the winter season. As a result customers on TOU tariffs currently pay more for electricity during winter and at different times of day. This is reflected in the generation portion of their tariff, which, at the current summer-off-peak-to-winter-peak ratio of 1:9, has fallen out of line with the actual cost signal.

The rapid increase in the price of electricity in recent years has resulted in the peak winter price increasing significantly and becoming potentially out of line with the actual cost signal in the long run. A recent survey suggests customers would like a revision of the current TOU definitions.

Time-of-use periods

Time-of-use tariffs have different rates for the same components during different times of day and for different seasons. This more accurately reflects the shape of Eskom's long-run cost of energy supply. The charges for TOU tariffs differ from high-demand (June to August) to low-demand (September to May) seasons. These charges also differ by the time of day, with peak, standard and off-peak rates applying for different times of day.

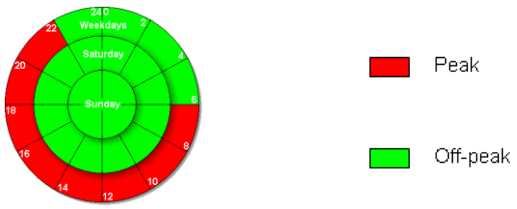


Figure 19: Nightsave Urban Large, Nightsave TOU tariffs

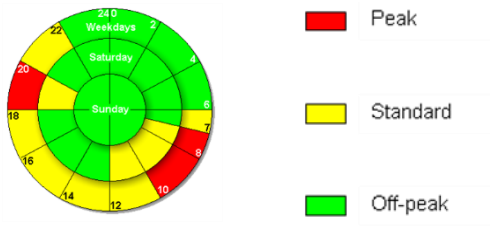


Figure 20: Megaflex, Miniflex and Ruraflex Urban Small and Nightsave Rural TOU tariffs

To ensure system stability while there are major constraints on the grid and a low reserve margin, it would be prudent for the sake of system stability, to postpone any significant amendments to the TOU tariffs until the Eskom reserve margin increases - at least until Medupi and Kusile are commissioned.

Eskom therefore proposes only a small change to reduce the peak winter energy price so that the ratio of the summer off-peak to winter peak is 1:8. This change needs to be balanced against higher increases to summer peak and standard periods.

6.2.5 Timing of tariff increases

In line with Eskom's financial year (1 April to 31 March), all customer tariffs should increase on 1 April. However, in terms of the Municipal Finance Management Act (MFMA), Eskom is only allowed to increase municipal tariffs on 1 July of any year. Currently, Eskom has to recover a year's worth of revenue from municipalities at the previous year's rates in the first three months, while the remainder of the revenue for its financial year is recovered at the new rates in the last nine months.

As a result the tariff increase that municipalities receive is different to that received by Eskom's direct customers. This apparent inconsistency has caused confusion due to the average increase that Nersa announces not being the one that is applied to municipalities.

Because changing the municipality increase date would require amending the MFMA, Eskom considered moving the increase for its non-municipal customers to 1 July to align with its municipal customers' increase date. This means that non-municipal customers would continue to pay the current rates and would not see any increase for the first three months of the first year of MYPD 3 (2013/14) and would receive their annual tariff increase on 1 July

2013. However, on modelling the impact of this move, it was found that the increase would be much higher for a nine month period, although the annual increase would be the same. It was felt that it would not be appropriate to make this change at this time and the implementation dates for municipal and non-municipal customers would remain unchanged.

6.3 Summary of proposed structural changes

Although only a number of the more important proposed tariff structural changes were highlighted above, a summary of all the proposed changes are provided in Table 54. The details of each one of these changes are provided in Part 2 of the document.

Table 54: Summary of proposed structural changes to tariffs

Proposed change	Driver	Timing
Tariff restructuring		
Update tariffs with new cost-to-serve study: • Apply differentiated price increase to different rate components - tariff restructuring • Explicit electrification and rural subsidies • The reliability service charge unbundled • Cost-reflectivity use-of-system charges	• Cost reflectivity and transparency - Will affect all customers	April/July 2013
Unbundle subsidies into a separate affordability (IBT) and network related subsidy	• Nersa requirement for use-of-system charges - Could affect customers having to pay IBT subsidies	April/July 2013
Review of TOU Structure	• Cost reflectivity and pricing signal - Will affect customers depending on load profile	Start April/July 2013
Residential tariffs	• Greater flexibility, simplicity and compliance with the DoE EPP and the Electricity Regulation Act	April/July 2013
Low power factor charge - phase 1 introduction of reactive energy charge in all TOU time periods instead of only winter peak and off-peak periods	• Pricing signal and improve system and network performance - Will negative impact customers with low power factor	
Include the environmental levy in energy rates - but still provide information on the value	• Simplicity - Will affect low-voltage customers due to losses being charged cost reflectively	April/July 2013
Use-of-system charges **- generators and loads** - Use-of-system to be shown cost-reflective and low-voltage subsidy shown explicitly	• Transparency; flexibility and business and customer need - Should on its own have no impact on customers	April/July 2013
Reducing the low-voltage subsidies for urban tariffs	• Cost-reflectivity and equity - Reduces the cross subsidy paid by higher-voltage customers - Will negatively affect low-voltage customers	April/July 2012

6.4 SUMMARY OF APPLICATION

Table 55: Components of revenue requirement for MYPD 3

	2013/14	2014/15	2015/16	2016/17	2017/18	MYPD 3
Generation primary energy						
Coal burn costs (Rm)	37 010	41 966	47 282	52 351	57 703	236 312
Coal handling	1 087	1 163	1 246	1 356	1 510	6 362
Water	2 082	2 414	2 615	2 750	2 955	12 816
Open cycle gas turbines (OCGT)	3 592	3 258	1 788	1 898	2 056	12 592
Nuclear	471	471	678	767	856	3 242
Other primary energy costs	2 348	2 070	1 932	1 901	2 197	10 449
Environmental levy (Rm)	8 842	9 037	9 324	9 490	9 746	46 439
Total Generation primary energy (Rm)	**55 433**	**60 380**	**64 865**	**70 512**	**77 022**	**328 212**
Independent power producers						
Department of Energy - renewable IPPs (Rm)	1 428	8 987	13 879	16 249	17 353	57 895
Department of Energy - peaking IPPs (Rm)	1 001	2 841	3 147	3 160	3 191	13 340
Short term IPPs, MTPPP (Rm)	2 760	1 473	1 017	735	498	6 483
Total IPPs (Rm)	**5 189**	**13 302**	**18 043**	**20 143**	**21 042**	**77 719**
IPPs (GWh)	4 152	6 214	8 233	9 015	9 071	36 686
Average cost for IPPs (c/kWh)	125	214	219	223	232	212
Other primary energy purchases						
Distribution IPPs	8	9	9	10		36
Demand market participation Rm)	3 275	1 973	1 972	1 835	2 001	11 056
Imports purchases (Rm)	3 611	3 006	2 810	2 973	3 243	15 644
Other primary energy purchases (Rm)	**6 894**	**4 988**	**4 792**	**4 818**	**5 244**	**26 737**
Total Eskom primary energy (Rm)	**67 517**	**78 669**	**87 699**	**95 474**	**103 308**	**432 667**
Operating costs						
Human capital net after capitalisation (Rm)	22 540	24 740	26 765	29 313	31 364	134 721
Maintenance	12 020	13 288	15 839	18 120	16 855	76 122
Cost of cover	2 158	1 828	1 678	1 025	485	7 174
Arrear debt	927	1 051	1 215	1 388	1 511	6 092
Other	13 212	14 045	15 438	15 500	17 263	75 458
Operating costs before efficiencies target (Rm)	**50 857**	**54 952**	**60 934**	**65 346**	**67 478**	**299 568**
Efficiency targets	- 6 000	- 6 000	- 6 000	- 6 000	- 6 000	- 30 000
Net operating costs excl IDM (Rm)	**44 857**	**48 952**	**54 934**	**59 346**	**61 478**	**269 568**
Integrated demand management	2 941	2 709	1 862	1 966	3 612	13 090
Net operating costs incl IDM (Rm)	**47 798**	**51 661**	**56 796**	**61 312**	**65 090**	**282 658**
Human capital gross (Rm)	28 045	29 946	32 215	34 995	37 442	162 643
Human capital staff complement	44 280	44 833	45 187	45 601	45 601	
Assets and depreciation						
Regulatory replacement asset base (Rm)	779 203	852 266	919 665	981 854	1 043 100	
Replacement depreciation (Rm)	30 792	34 631	37 076	39 669	43 218	185 385
Return on assets (Rm)	7 271	14 643	31 187	51 878	81 885	186 864
Return on assets - real (%)	0.9%	1.5%	3.2%	5.2%	7.8%	
Equity returns (Rm)	- 13 927	- 11 860	964	20 054	51 265	46 497
Returns sacrifice (Rm) @ 8,16% WACC	- 58 208	- 58 628	- 48 243	- 31 256	- 6 299	- 202 633
Returns sacrifice (Rm) @ 8,3% WACC	- 59 374	- 59 914	- 49 416	- 32 739	- 7 875	- 209 319
Capital expenditure (excl IDC) (Rm)	72 107	68 016	64 934	67 098	65 000	337 155
Revenue and price increases						
Total revenue (Rm)	153 378	179 604	212 758	248 332	293 501	1 087 574
Standard tariff revenues (Rm)	146 188	171 497	204 264	241 350	286 205	1 049 503
Exports and special pricing agreements (Rm)	7 191	8 107	8 494	6 982	7 297	38 071
MYPD 3 price increase % (nominal) - Eskom's application	16%	16%	16%	16%	16%	
Nominal price level for standard customers (c/kWh)	71c/kWh	82c/kWh	95c/kWh	110c/kWh	128c/kWh	
Real price level for standard customers (c/kWh)	67c/KWh	73c/kWh	80c/kWh	88c/kWh	96c/kWh	
Sales (GWh)	227 404	229 513	235 638	239 113	244 026	1 175 694
Eskom production (GWh)	239 896	243 639	249 542	252 930	259 281	1 245 289
Funding						
Interest costs (Rm)	21 198	26 503	30 223	31 824	30 619	140 366
Debt levels (Rm)	287 951	330 617	355 982	366 914	333 011	
Economic parameters						
Growth domestic product (GDP) %	4.0%	4.0%	4.0%	4.0%	4.0%	
Consumer price index (CPI) %	5.5%	6.0%	6.0%	6.0%	6.0%	
Producer price index (PPI) %	6.2%	6.0%	6.0%	6.0%	6.0%	
Sales growth (%)	2.4%	0.9%	2.7%	1.5%	2.1%	

7 CONCLUSION

The submission of this MYPD 3 application is the beginning of a public process to address the issues raised in Eskom's application - in particular, sustainability of the electricity industry and security of supply. Nersa is an independent regulator and will follow a process of public consultation prior to making its decision.

After Eskom's application has been submitted to Nersa, it will be made available to the public. This will be followed by a process of public consultation by Nersa as well as Eskom. Nersa will also call for written comments and this process will culminate in public hearings in January 2013. Nersa is also consulting with the public on the proposed MYPD methodology and IBT during 2012.

It is anticipated that Nersa would make its determination in February 2013, after the comprehensive public participation process has been concluded.

Eskom therefore encourages all South Africans to participate in this public process that follows.

The information in this document should provide the basis for debate on key issues that have shaped Eskom's application. Among these are the question of who should build South Africa's capacity beyond Eskom's current new build programme and how this should be funded, as well as questions around subsidies and incentives and who should pay these.

Eskom has set out its projected MYPD 3 costs and the rationale behind its application as comprehensively and transparently as possible to inform debate on the electricity price path and to allow for an open debate about the issue of pricing and security of supply.

In crafting its application, however, Eskom has recognised the impact of tariff increases on the economy. It has sought to strike the right balance between supporting economic growth, job creation and development and meeting the country's need for electricity in a way that is sustainable.

There is arguably no other industry that is as central to economy activity and to the way we live as the electricity industry.

HARDCOPY SIGNED AT SANDTON ON THIS 17 OCTOBER 2012 BY

B A DAMES

CHIEF EXECUTIVE

ESKOM HOLDINGS SOC LIMITED

APPENDIX A: LICENCED ACTIVITIES

This appendix provides background information on Eskom and Eskom's licenced activities and shows how all the cost drivers referred to above fit into the various licenced activities.

Purpose

Eskom's purpose is to provide sustainable electricity solutions to grow the economy and improve the quality of life of people in South Africa and in the region.

Nature of business and client base

Eskom is South Africa's primary electricity supplier. The company – which is wholly owned by the South African government – generates, transmits and distributes electricity to industrial, mining, commercial, agricultural and residential customers, and to 187 municipalities, which in turn redistribute electricity to businesses and households.

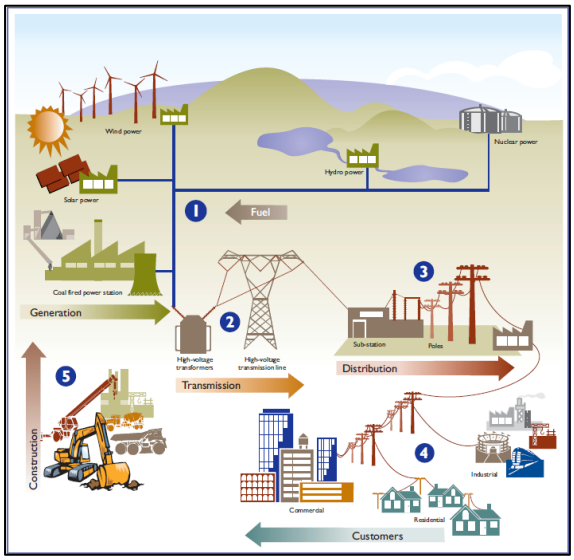


Figure 21: Eskom's value chain

Eskom sells electricity directly to about 3 000 industrial customers, 1 000 mining customers, 50 000 commercial customers and 84 000 agricultural customers. It also supplies electricity to more than 4.7 million residential customers – many of whom are in rural areas – who account for about 40% of all residential customers in the country.

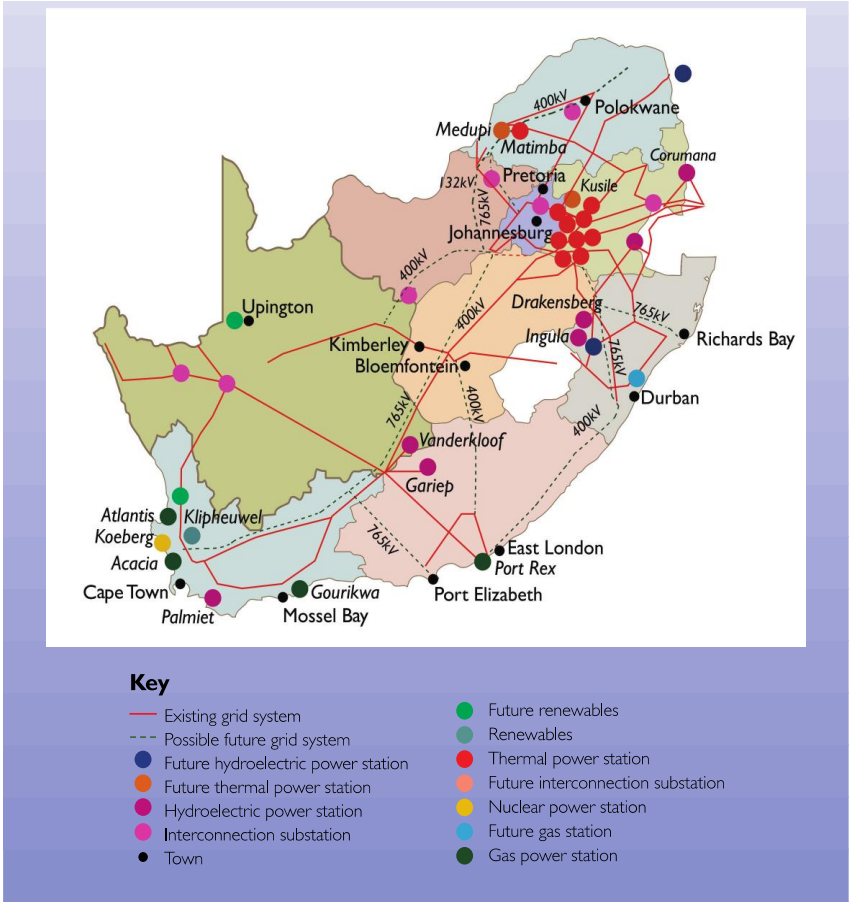


Figure 22: Eskom's power grid

Legal and operational structure

The group structure is shown in Figure 23 below.

Figure 23: Structure of Eskom Holdings SOC Limited

Eskom's structure

- Line functions (A) operate the business and focus on creating value.
- Service functions (B) safeguard Eskom's assets, provide expertise on day-to-day standardised services and optimise cross-cutting functions.
- Strategic staff functions (C) develop the enterprise, bringing about step changes in performance and providing broader strategic support to the group.

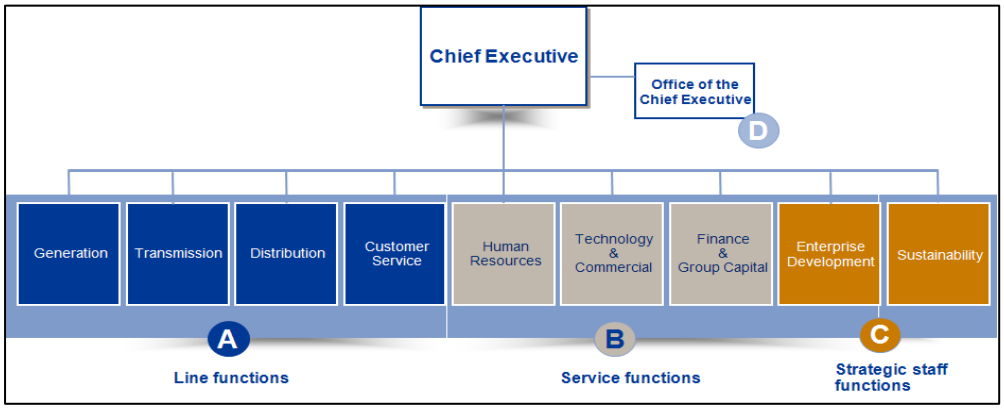


Figure 24: Eskom line, service and strategic staff functions

Licensee mandates

A number of cost categories detailed above are incurred in each of the licenced areas. For example, capital expenditure, operating expenses, depreciation and returns are applicable for each licenced area. In addition certain unique activities are carried out within each of the licensee functions. This is summarised below.

Table 56: Licensee mandates

Generation	Transmission	Distribution
Primary energy	Construction of transmission lines and infrastructure	Construction of distribution infrastructure
Power plant construction	Maintenance and operations of transmission infrastructure	Maintenance and operations of distribution assets
Generation plant operations and maintenance	System operations and Independent System and Market Operator	
	Import of electricity	Customer services
	Grid code secretariat	

Generation

Generation is responsible for providing reliable, available generating capacity with a target EAF of 90%.

Primary Energy

Primary Energy is responsible for identifying, developing, sourcing, procuring and delivering the necessary amounts of primary energy (water, coal, sorbent and biomass) of the required quality to Eskom's power stations, at the right time and at minimum cost.

Transmission

Transmission is responsible for planning, operating and maintaining transmission assets throughout their economic life and providing an integrative function for the reliable development, operation and risk management of the interconnected power system.

Independent System and Market Operator

In line with the Independent System and Market Operator Bill, Eskom has established a System and Market Operator division responsible for energy planning, feasibility studies, IPP procurement and market administration. The division is expected to be transformed into a subsidiary in the 2012/13 financial year as part of a phased approach towards a separate state-owned company.

Distribution

Distribution is responsible for operating Eskom's distribution network and providing reliable electricity by building, operating and maintaining distribution assets. It also has a mandate to partner with the wider industry to resolve distribution issues.

Customer Services

Group Customer Services is accountable for putting the customer at the centre of Eskom's business to ultimately create a fully satisfied and serviced customer base.

Corporate

There are a number of corporate functions that support each of the licensees.

Enterprise Development

Enterprise Development unites and shapes four key portfolios: Strategy and Risk Management, Regulation and Legal, Corporate Affairs, and Group Information Technology.

Group Capital

Group Capital is responsible for the allocation of capital at group level and for the planning, development, monitoring and execution of large-scale projects.

Group Technology and Commercial

The Group Technology and Commercial division is responsible for overseeing, monitoring and executing engineering and procurement activities across Eskom, and for overseeing the Eskom Enterprises SOC Ltd group of companies.

Technology

Group Technology includes engineering, outage management, asset management, operating model, research testing and demonstration. The overall objective is to ensure optimum performance of plant assets, and to infuse the capacity expansion programme with excellence in design and engineering.

Commercial

Group Commercial is responsible for managing external spending. It also ensures effective and efficient procurement (excluding primary energy) as well as optimal inventory management, warehousing and logistics, supplier management and development, and contract negotiations and establishment.

Sustainability

Sustainability offers solutions and decision support to enable sustainable business performance. The ultimate goal is to transform Eskom into an economically and environmentally sustainable entity, so improving stakeholder confidence.