Administered Prices

ELECTRICITY

A report for National Treasury

GROVÉ STEYN

Preface

This report was prepared for National Treasury to support its assessment of administered prices in South Africa. The objective of the study was to assess the processes involved in setting prices in regulated industries. By evaluating the efficiency, effectiveness and analytical rigour of the regulatory processes involved in setting prices for the services involved, an assessment can be made of the likelihood that the resultant tariffs approach efficient levels. Volume I of the report sets out the main findings and recommendations with supporting information relating to the individual sectors included within the scope of the study provided in a summarised form. Volume II contains more detailed sectoral reports, covering individual review of the water, electricity, telecommunications, transport, health and education sectors.

The report does not offer a detailed quantitative assessment of the performance of the regulatory regime, and is largely based on in-depth interviews and documentary analysis. The authors would like to thank the interviewees for their cooperation and valuable insights. Although much care was taken to provide a correct reflection of the opinions expressed, the authors remain entirely responsible for any inaccuracies.

CONTENTS

EXECUTIVE SUMMARY

The regulatory framework for electricity prices is well established, including an independent regulator with appropriate powers. However, the implementation of effective price regulation remains riddled with pitfalls, ranging from information asymmetries to institutional challenges. Although plans to introduce competition in electricity generation exist, the current market structure places a heavy regulatory burden on the regulator.

The electricity supply industry (ESI) in South Africa remains organised along the lines of the traditional public monopoly model. Eskom produces 96% of power generated in South Africa, while large municipalities generate 1.3%, and a small number of private power producers generate 3.1%. Eskom also owns and operates the national high voltage transmission grid, which conveys electricity from Eskom power stations to the main load centres across the country. Currently Eskom holds 55% of the distribution and retail market in terms of energy supplied, while the remaining 45% of its energy is sold to Municipalities who retail it to other end-users.

The desirable organisation model for the overall electricity supply industry has been subject to much debate in the last decade. At present the Government policy position is to introduce competition into the sector by separating Eskom Generation and Transmission and by selling off 30% of Eskom generation capacity, while the remainder should be organised into competing clusters (albeit under one holding company) participating individually in the open power market. The distribution industry will be restructured into a limited number of REDs. Large consumers and the REDS will purchase wholesale power in the market, or directly from the clusters. Studies are currently underway to identify the appropriate clustering and the market mechanisms.

Regulatory framework

The ESI is regulated by the National Electricity Regulator, which is responsible for: issuing licences for generation, transmission, distribution and retail of electricity; determining electricity prices; settle disputes; and advising the Minister of Minerals and Energy. The NER and the Competition Commission have concurrent jurisdiction, governed by a memorandum of agreement.

Electricity prices in a historical context

Eskom's investment history has been the dominant driver behind the changes in its price levels. In the 1980s Eskom embarked on a large power station construction programme, which turned out to be excessive compared to demand growth. Eskom effectively had surplus generating capacity from the middle 1980s onwards and its reserve margin increased significantly during the 1980s and 1990s as construction expanded.

After the price increases during the late 1970s of up 30% and 45% in nominal terms per annum, nominal average increases during the 1980s of between 15% and 23% were commonplace. By increasing its price levels in the late 1970s and then maintaining these levels for the following ten years Eskom was able to contain its rapidly increasing debt levels before allowing prices to decline gradually as real debt levels were brought down to manageable levels. Although Eskom allowed real prices to reduce during the 1990s, it did not do so at the cost of its financial position.

This apparently contradictory result of both improving its financial position while reducing prices was made possible by it making the best of the 'bad situation' of: its huge over investments in the 1980s; its monopoly position, which enabled it to raise and maintain price levels when it was stranded with surplus capacity (the opposite would have happened in a competitive situation); and its dividend free and tax exempt status. Eskom was also assisted in this process by the fact that it did not pay the full economic opportunity cost of the debt finance employed to finance its investments. Government guarantees, open-ended Reserve Bank forward cover, and its monopoly position effectively shifted most of its business and financing risk on to consumers and the state.

This meant that its borrowing costs did not reflect the economic opportunity costs (including the cost of the risk and uncertainty) of constructing new power stations.

Price reviews

Eskom's high price levels of the late 1970s and 1980s, were turned into a public relations triumph in the early 1990s, by announcing a pricing compact that would allow average prices to gradually reduce in real terms as Eskom's real debt continued to decline.

After the NER's establishment in 1995, Eskom average price levels were thus declining in real terms, in accordance with its self-adopted pricing compact. This situation left the NER with essentially little to do with regard to Eskom price levels, hence Eskom's annual price adjustment application to the NER entailed a relatively minor decision-making process and was always accepted without major queries.

Currently the approach used by the NER to assess Eskom's price increase application is focussed on the impact of Eskom's historic cost rate-of-return on nominal price levels relative to inflation. Due to human resource constraints the NER is not able to produce these indicators independently. To date the NER has also not conducted an independent review of Eskom's cost items or of the asset valuations used to determine these indicators. This severely limits its ability to conduct an independent review of Eskom's application. Essentially the price review is determined by a process of negotiations between the NER and Eskom, most of which does not take place in the public view.

The NER has developed a conventional rate of return methodology (ROR) which it proposes to use in the evaluation of Eskom and RED tariff increase applications. Although the principles of the methodology have influenced the NER's approach to regulating Eskom, it has not been implemented. The NER is currently undertaking further investigations into the regulatory approach and methodology.

It is important to realise the NER does not just approve average price levels (which are essential for cost recovery), but also approves tariff structures for the respective customer groups. This is a critical aspect of electricity pricing because it determines the balance between the cost reflectivity of prices, the affordability of prices to the poor and rural consumers, and the transfers from higher consuming households, commerce and industry to subsidies these. While cross-subsidies are important for equity reasons they have to be weighed up against the extra costs imposed on the system as a result of the inefficiencies resulting from incorrect price signals.

Municipal tariffs

Despite rationalisation at municipal level, the number of distributing electricity municipalities remains high. Given the magnitude of the task and the NER's limited resources, its approach to regulating municipal distributors has been to attempt to rationalise tariff structures and reduce the disparities in price levels. The NER does not apply the rate of return methodology to local authority distributors, and neither has it been able to investigate their costs. The finances of local authority distributors are not ring-fenced from other municipal costs and significant revenue shifting is thought to occur.

Two objectives currently inform the NER's regulation of local authority price levels. The first is to harmonise price levels for distributors that are within the same size class. The second is to converge the price levels of distributors that will fall within the same proposed regional electricity distributor (RED). Essentially thus, the local authority distributors are subject to 'regulation by comparison'. Currently, 60% of the 177 municipalities supplying electricity have 'illegal' tariffs (not formally approved by the NER), highlighting the backlog in addressing municipal tariffs that the NER faces.

Pricing influences

In practice, many factors have a direct or indirect bearing on Eskom's price levels. Some factors are a historical nature such as Eskom's investment and pricing history and its financial policies. The institutional and political pricing influences include not only the

NER, which as independent regulator has final power of approval over Eskom's price levels and structures, but also the Ministers of Public Enterprises and of Finance.

The Minister of Public Enterprises is the representative of the State's shareholding in Eskom; appoints its board; and has an important direct influence on Eskom's pricing decisions. On several recent occasions the Minister has also made public pronouncements concerning Eskom price levels, including a statement that Eskom would not be allowed to increase their price levels above inflation in 2004. Such direct political interference in the domain of the regulator creates significant political uncertainty about the government's respect for the role of independent regulatory processes. A more appropriate role for state as shareholder, would be set Eskom's dividend policy. Although no formal relationship exists between Eskom's price setting process and the National Treasury, concerns regarding inflation and media statements by the Minister of Finance to that regard are of direct concern to Eskom and the NER.

The social objectives pursued by Eskom are also of importance as they affect prices to the extent that such services have to be subsided from internal cash flows. The extent to which Eskom pursues social objectives is determined by its perspectives of what is politically required. Officially this is determined by guidance from the Department of Minerals and Energy through policy documents such as the White Paper on energy etc.

Lastly, a number of consumer groups have a bearing on Eskom price increases, in particular organised local government (AMEU/SALGA) and large industrial users, which are able to lobby or exert political pressure on Eskom, the NER and government.

Conclusions

To date, NER has not yet implemented a robust approach to regulating Eskom prices. Until recently this has not been a significant problem as Eskom prices were falling in real terms, however, the NER is currently grappling with the challenge of avoiding allowing Eskom excessive free cash flows, while ensuring adequate incentives for the investment in new capacity. While grappling with these challenges the NER aims to develop its regulatory approach and methodologies to improve its effectives for dealing with Eskom price increases. Its treatment of the increases for 2004 and 2005 will demonstrate whether it has come to terms with this task. At present it is unlikely that the regulatory framework is consistently and forcefully driving electricity prices towards efficient levels.

It is clear from the discrepancy between the formal regulatory framework and the practical pricing influences that Government has not found a definite solution to its multiple roles as shareholder, and industrial and social policy maker; and reconcile this with the state's decisions to allocate economic regulatory functions to an independent regulator. Current role confusion potentially limits the effectiveness of this governance system.

The ESI is rapidly approaching the time when investment in new capacity will be required. Current Government vacillation on implementing the competitive market framework is creating significant uncertainty. It is also become an issue for the NER to consider in its approach to assessing Eskom's annual price increase application.

The best, and only sustainable way, of limiting inflationary pressures from the ESI is to accelerate institutional reforms aimed at increasing cost efficiency and service delivery levels. Given the capital intensity of these industries it is especially important that this framework creates appropriate incentives that encourage investment which is appropriately timed and technologically configured to provide the appropriate levels of service delivery at lowest possible cost. These reforms have to be managed in such a way so that most cost savings are passed on to the economy in the form of lower prices. This is best achieved by aggressively promoting competition in the market for new capacity and in the market for wholesale power.

Eskom and municipal tariff structures should continually be moved closer to cost, including real-time costs, so as to impact on customer behaviour and delay further generation investment and encourage more efficient demand side adjustments and

investments. While costs would be higher at peak times this strategy would limit the increases in average costs over the long-term.

1. INTRODUCTION

In most countries the history of the development of the electricity supply industry (ESI), and its relationship to the political process, makes a long, complicated and fascinating story. Electricity prices are inevitably at the heart of this tale, and South Africa is no exception in this regard. The adage that 'history matters' is certainly true here. The long-life capital-intensive nature of the ESI means that to understand current price trends it is as important to understand the past, as it is to understand current circumstances and expectations of the future.

This report was prepared for a National Treasury review of administered pricing in South Africa. It comes against the background of increasing concern about the higher than inflation price increases in the infrastructure and public service sectors.

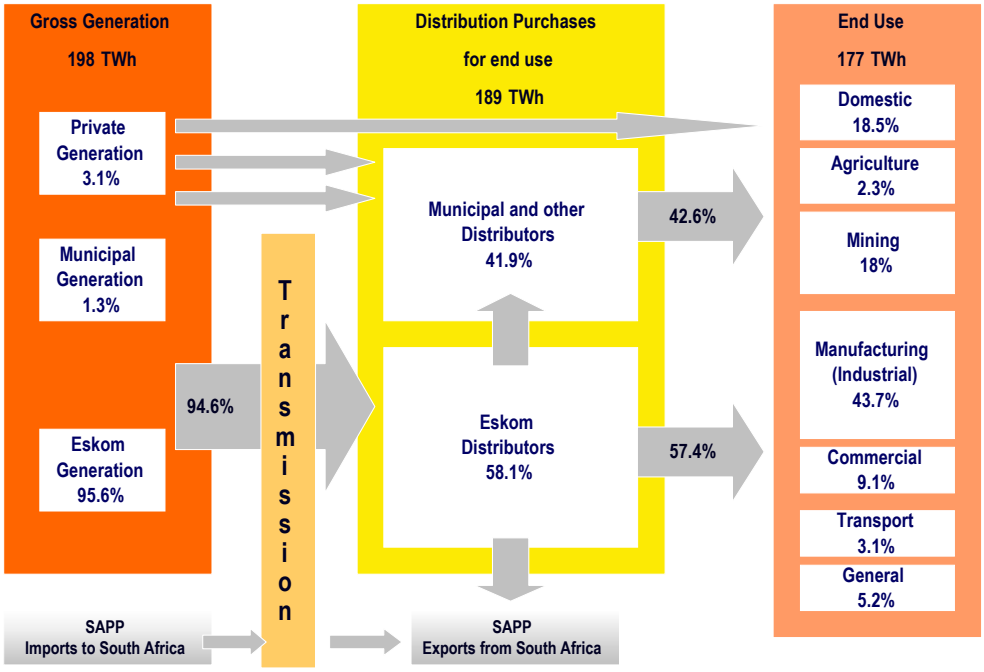
The report presents an overview of price trends and of the elements that make up electricity prices. It further identifies the key drivers behind price changes, and the issues relevant to social choice with respect to the future development of the electricity system.

2. BACKGROUND

This section provides a short background to the key institutions in the electricity supply industry (ESI) in South Africa. The ESI is still organised along the lines of the traditional public monopoly model. Eskom (recently converted to a wholly state owned, limited company), produces 96% of power generated in South Africa, while large municipalities generate 1.3%, and a small number of private power producers generate 3.1%. Eskom also owns and operates the national high voltage transmission grid, which conveys electricity from Eskom power stations (many of which are concentrated in the Mpumalanga highveld) to the main load centres across the country. Currently Eskom holds 55% of the distribution and retail market in terms of energy supplied (46% i.t.o. customers), while the remaining 45% of its energy is sold to Municipalities who retail it to the remaining 54% of end-users.

The total energy flows in the electricity economy for 2000 are shown in the figure below.

Figure 1: Power flows in the South African electricity system



[Source: NER]

From its establishment in 1922 until very recently, Eskom operated as a non-profit (i.e. dividend free) and tax-exempt public utility with implicit and explicit government guarantees for its debt. This lower financial cost structure[1] placed it at an advantage with respect to private sector generation. It ultimately purchased its largest private sector competitor, the Victoria Falls and Transvaal Power Company (VFTPC) on 1 July 1948 for a sum of £14 500 000, at the time the largest financial transaction in South Africa's history.

Municipal electricity distribution (and generation) has a long history in South Africa, dating back to 1882 when the first electric streetlights were turned on in the diamond-mining town of Kimberley.[2] Medium-sized and larger municipalities typically depend on

[1] Although its borrowing costs were lower in financial terms, this did not lower the opportunity cost of investing in economic terms.
[2] This predated electric public lighting in London.

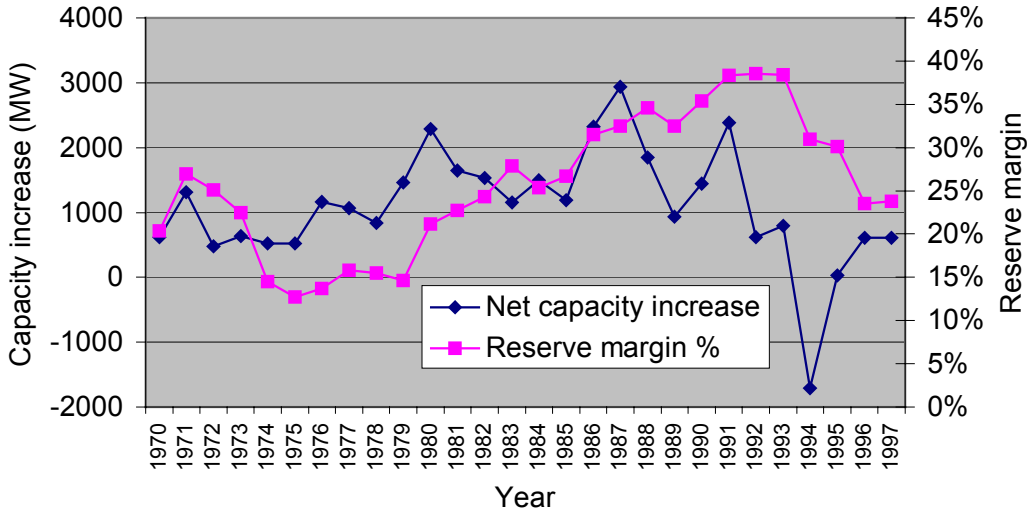
substantial financial surpluses (profits) generated from their electricity distribution activities to supplement income from property rates.

The ESI is regulated by the National Electricity Regulator, which was established on 1 April 1995. The primary legislation establishing the NER and governing its behaviour is the Electricity Act (No 41 of 1987) and its subsequent amendments. All significant electricity generation, transmission, distribution, and retail activities in South Africa have to be licensed by the NER, and are thus regulated by it.

2.1 Investment and prices

Eskom's investment history has been the dominant driver behind the changes in its price levels. In the 1980s Eskom (then known as ESCOM) embarked on a large power station construction programme, which turned out to be hugely excessive compared to demand growth. Figure 2 below shows Eskom's net annual capacity increase on the left axis and the reserve margin on the right axis.[3]

Figure 2: Eskom net annual capacity increase and reserve margin



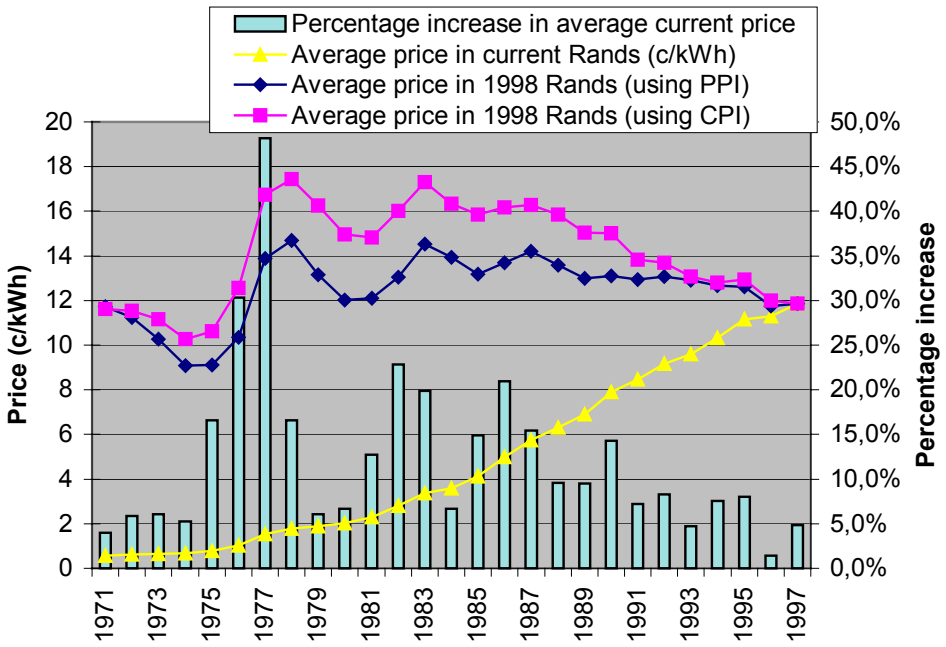
[Source: Previously compiled by the author from various public sources.]

This information shows that Eskom effectively had surplus generating capacity since the middle 1980s. Its reserve margin increased significantly during the 1980s and early 1990s as its construction programme expanded. The costs of the increased construction programme (which ran into the middle 1990s) and the lower than expected demand growth, meant that average prices had to increase drastically to service the increased debt burden Eskom was now carrying.

Figure 3 below shows that by the late 1970s, when Eskom's increased construction programme began, its prices had to increase drastically, from a band of around 11 c/KWh to around 16 c/KWh (in 1998 values). This amounted to a 45% increase in real terms.

[3] ESCOM's policy to maintain acceptable loss of load probability was based on planning for a 17 percent reserve margin and achieving an average annual availability in excess of 80 percent (de Villiers et al 1985: 54-55).

Figure 3: Historic Eskom electricity prices and average price increases



Figures are expressed in January 1998 Rands using either the producer price index (PPI) or consumer price index (CPI)[4]

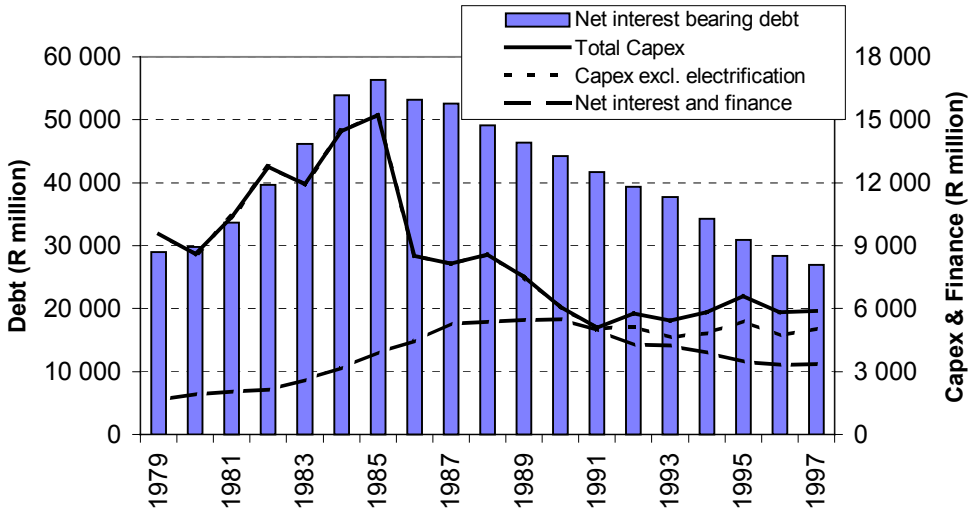
[Source: Previously compiled by the author from various public sources.]

After the shock price increases of the late 1970s of up 30% and 45% in nominal terms per annum, nominal average increases during the 1980s of between 15 and 23% were commonplace. Following on the initial price shocks in the late 1970s the second tranche of price increases in the early 1980s provoked a national outcry and led directly to the establishment of the De Villiers Commission of Enquiry into ESCOM's activities.[5] Real prices were only allowed to decline gradually after 1987 as Eskom reduced its hugely escalated debt burden. The impact of maintaining these higher prices on Eskom's debt burden is shown in the next figure.

[4] Note that the right hand axis refers to the % increase in average current price.

[5] The findings of the commission of enquiry did lead to the restructuring of ESCOM's governance and managements structure, and its name change to Eskom. Although the commission found that ESCOM's investment planning was severely defective and that it had substantially over invested, most of the excessive construction programme could only be partly delayed and was not cancelled. This meant that Eskom did not avoid the severe over capacity problem that emerged in the late 1980s and early 1990s.

Figure 4: Eskom's investments, debt and financing costs.



Figures are expressed in January 1998 Rands using the producer price index (PPI)

[Source: Previously compiled by the author from various public sources.]

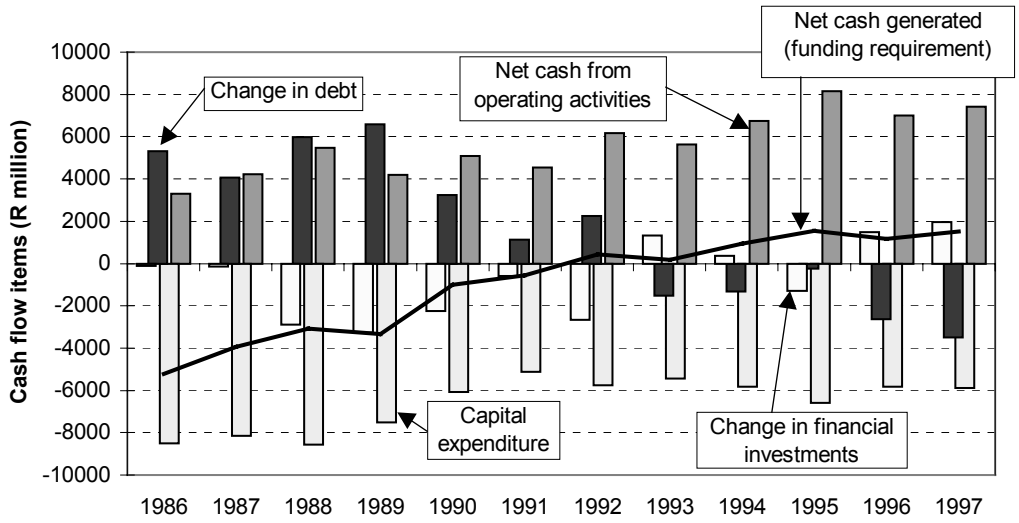
By increasing its price levels in the late 1970s and then maintaining these levels for the following ten years Eskom was able to contain its rapidly increasing real debt levels before allowing prices to decline gradually as debt levels were brought down to manageable levels.

The story is best revealed by Eskom's cash flow statements.

Figure 5 below shows the items from Eskom's cash flow statement grouped under the headings of Net cash from operating activities, Capital expenditure, Change in debt, and Change in financial investments. It can be seen that during the period 1986-1991, cash from operating activities[6] was inadequate to cover capital costs (investment activities), resulting in a funding requirement that had to be met by increasing debt and decreasing financial investments (financial assets).[7] In the period 1992-1997, the opposite occurred: cash flows from operations exceeded capital requirements. The net cash thus generated was absorbed in the financing activities by reducing debt and increasing financial investments (with the exception of 1995 when financial investments were reduced).

[6] Cash generated by trading operations (sales) minus interest and finance charges paid.
[7] However, from 1986 onwards debt increases were below inflation resulting in a real reduction in debt (see Figure 4).

Figure 5: Items from Eskom's cash flow statement[8]



Positive amounts refer to cash generated, and negative amounts to cash expenditure.
Cash from operating activities – Capex = Funding requirement (or net cash generated if positive) = Change in debt – Change in financial investments
Figures are expressed in January 1998 Rands (PPI)

[Source: Previously compiled by the author from various Eskom annual reports.]

The increase in cash from operating activities in the second half of the 1980's, driven first by real price increases and then by increased sales growth in 1987/8, was the main initial contributor to the reduction in the funding requirement. Between 1989 and 1991 the cash utilised for investment activities reduced again (following on from the significant decrease in 1985, see Figure 4) and contributed to a further reduction in the funding requirement, bringing it close to zero. Then in the rest of the 1990s Eskom generated a cash surplus, which grew at a modest pace as cash from operating activities was boosted by falling finance charges and growing sales.

The cash flow statement thus shows that the turn around in Eskom's financial position was driven by the gradual reduction in its funding requirement until it generated a cash surplus. Initially the reduction in the funding requirement resulted in a reduction in real debt levels while nominal debt continued to increase. After 1991 Eskom's nominal debt levels also began shrinking as it generated cash surpluses and self-financing levels exceeded 100 percent.

The bottom line of this analysis with respect to Eskom's prices is that although it allowed real prices to reduce during the 1990s, it did not do so at the cost of its financial position. In this respect it was greatly assisted by the fact that it did not pay out any profits and was tax exempt. By the end of 2002 Eskom was in the extraordinary position that it had a debt-equity ratio of 0,29 (down from 2,27 in 1992) and an interest cover of 2,79 (up from 1,5 in 1992)

This apparently wondrous feat of both improving its financial position while reducing prices was made possible by it making the best of the 'bad situation' of: its huge over investments in the 1980s; its monopoly position, which enabled it to raise and maintain price levels when it was stranded with surplus capacity (the opposite would have happened in a competitive situation); and its dividend free and tax exempt status. Eskom was also assisted in this process by the fact that it did not pay the full economic

[8] The basis for the preparation of Eskom's cash flow statement was changed in 1997 without explanation. The figures for 1996 were restated in the 1997 annual report. The figures presented in the earlier annual reports are presented here while the figures for 1997 are estimated pro-rata to the two sets of figures available for 1996.

opportunity cost of the debt finance employed to finance its investments. Government guarantees, open-ended Reserve Bank forward cover, and its monopoly position effectively shifted most of its business and financing risk on to consumers and the state. This meant that its borrowing costs did not reflect the economic opportunity costs (including the cost of the risk and uncertainty) of constructing new power stations.[9] These empirical findings stand in contrast with Eskom's claims that efficiency improvements or even monopoly rent erosion are behind the price decreases witnessed in the 1990s.

2.2 The ESI policy context

The current institutional and energy policy context, and plans to reform the ESI have an important bearing on electricity price considerations and are thus briefly reviewed here as background to the discussion.

The ESI policy context has been under constant investigation and subject to change since the initiation of the political changes in South Africa in 1990. At least two interrelated policy initiatives have direct relevance to electricity pricing questions.

Firstly, the calls for the rationalisation of the electricity distribution industry (EDI) gained substantial momentum with the recommendations made by the National Electrification Forum (NELF) in 1995 for the rationalisation of the more than 400 distributors in South Africa at the time. These general recommendations were accepted by Cabinet in 1996; were further developed in the White Paper on Energy Policy in 1998; and have been the subject of a number of Government appointed task teams. In 2001, Government determined that the distribution of electricity should be separated from municipalities and Eskom, and merged into six regional electricity distributors (REDs) wholly owned by municipalities.

EDI restructuring directly affects the finances of larger local authorities who typically make significant surpluses (either by means of profit or cost sharing) from electricity distribution. It will also undo the status quo with respect to geographical and other cross subsidies in the current system (proposals are under consideration to reintroduce such subsidies by alternative means, but it is unlikely that the status quo will be recreated). Decision-making on EDI restructuring has been slow, with the process often stalling. The protracted delays in final decision-making contributed to uncertainty, which has had a significant impact on the ability of the NER to regulate the EDI. It also has negative implications for the aim of introducing a competitive power market in South Africa.

Secondly, similar policy uncertainty exists with respect to the desirable organisation model for the overall electricity supply industry. At present the Government policy position is to introduce competition into the sector through a 'managed reform' process. The path chosen for the 'managed' liberalisation is that Eskom Generation and Transmission should be separated into two separate state-owned companies and that 30% of Eskom generation capacity should be sold, while the remainder of its power stations should be organised into competing clusters (albeit under one holding company) participating individually in the open power market. Large consumers and the REDS will purchase their wholesale power requirements in the market, or directly from the clusters. Studies are currently underway to identify the appropriate clustering and the appropriate market mechanisms.

The current ESI liberalisation policy creates a number of problems for regulating the industry. Firstly, it is widely accepted that while Eskom holds 70% of the market effective competition and efficient new entry will be highly unlikely. The potential impact of this

[9] The governance effect of the reduced financing costs was to dull managerial perceptions of investment risks (from a societal perspective), and of the opportunity cost of investing (as reflected in discount rates, for instance). This directly affected their technology choices and investment decisions with respect to factors such as investment timing, plant scale, and reliability of technology employed. In a supreme irony, the resultant inflexibility of the construction programme and over investment, to a large extent wasted the "saving" from cheaper financing costs.

situation depends on the time-span during which Eskom will hold the remaining 70% before this capacity is also sold off, if ever. Experience suggests that this will take longer than planned, most likely more than five, and possibly up to ten years. There is currently no clear government policy direction on this issue.

This likelihood gives rise to an important problem. Present electricity demand growth rates suggest that new capacity will have to come online between 2005 and 2007. At present the Government position is that Eskom will not be allowed to construct the next generation facility, and that it should come from new players in the liberalising market. However, the perceived threat of Eskom dominance to new entrants, and drawn out delays in the establishment of the new institutional framework, is likely to act as a strong disincentive to independent entrants. Moreover, it is widely accepted that current low electricity prices will not attract entry, as for any new build to be viable, prices will have to at least double. Irrespective of which technology is chosen the cost of newly built base load generation will be higher than the current average cost of baseload generation.

Baseload coal-fired plant currently achieves an average cost of approximately 9c/kWh, whilst the cost of new generation capacity (fossil fuel plant operated either on coal or gas) would be between 25c/kWh and 40c/kWh. Peak power costs are likewise likely to increase: currently the peak power price ranges between R0.45/kWh and R0.85/kWh, whilst new peaking plant costs could exceed R2.0/kWh.[10] At present therefore no independent power producer would be able to find buyers for its power, bar the establishment of special arrangements.

This leaves the NER with a dilemma with respect to where new capacity should come from, and increases the likelihood that Eskom will ultimately be called on to provide the new capacity. This possibility could have direct bearing on the appropriate pricing policy for Eskom, as is discussed later. It would also strengthen Eskom's dominance and undermine the objective of creating a competitive power market in South Africa.

[10] Based on NIRP data and industry interviews.

3. THE NATIONAL ELECTRICITY REGULATOR

This section provides a short overview of the institutional structure, mandate, resourcing and organisation of the NER.

3.1 Institutional structure

The NER has a part-time Board appointed by the Minister of Minerals and Energy. The Board consists of a Chairperson, the Chief Executive Officer (full-time), and seven other members. The Electricity Act provides a wide-ranging set of criteria for appointment: 'The members of the regulator shall as far as practicable include persons having sufficient knowledge of matters relating to electricity tariffs, cost accounting, legal aspects or electricity supply systems'. The Board is supported by full-time NER staff.

The NER board meets bi-monthly. However, the board has created a number of sub-committees who undertake most of its work supported by the NER staff. The committees are the following:

1) Audit Committee
2) Finance Committee
3) Policy Committee
4) Pricing and Tariffs Committee
5) Human Resources Committee
6) Licensing, Compliance and Customer Services Committee

3.2 Mandate

The primary mandate ('objects') of the NER is stated in the Electricity Act as:

'…to exercise control over the electricity supply industry so as to ensure order in the generation and efficient supply of electricity, and to perform such other functions as may be assigned to it by or under this Act.'

In its 2001/2 Annual Report the NER states that it operates under a mandate given by the Minister of Minerals and Energy to be:

'The custodian and enforcer of a regulatory framework to monitor and ensure that the interests and needs of present and future customers of electricity are respectively safeguarded and met, having regard to the efficiency, effectiveness and long term sustainability of the ESI.'

The key functions of the NER are set out in the Electricity Act (Section 4) as that it may:

- Issue licences for generation; transmission; distribution and retail of electricity (different terms are used in the Act);
- Determine the prices at and conditions on which electricity may be supplied by a licensee;
- At the request of any licensee or its consumer settle disputes between licensees among themselves, or between licensees and their consumers, or prospective consumers;
- Collect information which it deems necessary from [electricity supply] undertakers or consumers;
- Perform inspections of the equipment of licensees;
- Exercise the other powers assigned to it by this Act or the Eskom Act, 1987.
- Advise the Minister on any matter relating to the electricity supply industry and it may for this purpose carry out such investigations as it or the Minister deems necessary.

The NER and the Competition Commission have concurrent jurisdiction, which will become particularly important if plans to introduce competition into the wholesale

electricity sector proceed. The two parties have entered into a memorandum of agreement, in terms of section 82(3)(d) of the Competition Act (89 of 1998, as amended), which governs behaviour in such cases. The basic principle of the agreement is that actions, which fall within the jurisdiction of both organisations, will have to be approved by both. The agreement also governs cooperation and information sharing between the two parties.

3.3 Resources and organisation

The NER is funded by a levy on the generation of electricity. The Department of Minerals and Energy and the National Treasury approve its budget. Table 1 shows the annual levy income received by NER since its establishment in 1995.

The NER's staff component has grown from 50 in 2000 to 85 in 2003, with an additional 11 vacant posts.

The Executive Committee has recently been restructured reducing the number of General Managers from five to three. The three main departments are now ***Economic Regulation***, responsible for tariffs and pricing, compliance, industry infrastructure and operations and policy research; ***General Council***, responsible for legal services, board support and licensing; ***Value Enhancement***, responsible for human resources, finance and administration, customer services and information resource management. The ***Office of the CEO*** effectively constitutes a fourth department responsible for international liaison, project management and communications.

Table 1: NER annual income from its levy on generation

Year	Levy on generation (Rand)
1995/96	9 000 000
1996/97	5 719 470
1997/98	14 014 397
1998/99	16 939 984
1999/00	15 267 178
2000/01	21 904 364
2001/02	30 388 079
2002/03	50 389 903

4. REGULATING ELECTRICITY PRICES

A complicated set of factors determines end-use electricity prices. Simply put the chain that makes up the final price includes:

1) Eskom's costs for the generation and transmission of electricity. These include the cost of fuel, labour, services, materials and property, and the cost of finance (equity and debt).
2) The costs involved in distributing electricity to end consumers and providing retail services (borne either Eskom or municipal distributors)
3) Profits (or losses) in addition to the economic cost of the capital employed in the enterprise. Municipalities typically mark up retail tariffs to make substantial surpluses from their power sales, while Eskom profits from distribution activities are generally lower.

The issues relevant to these different aspects of the price chain are now discussed in more detail.

4.1 Eskom price and tariff regulation

As explained above, Eskom established high price levels in the late 1970s, which it maintained throughout the 1980s to service the debt from its excessive investment programme. By the late 1980s / early 1990s Eskom was under severe political pressure and had little choice but to reduce prices as soon as declining debt levels would allow it. The option of increasing profit margins significantly as debt servicing cost declined was not politically viable. By the early 1990s Eskom cleverly turned this situation into a public relations triumph by announcing a pricing compact which was designed to allow average prices to gradually reduce in real terms as its debt continue to decline in real terms. Real price levels could continue declining during the 1990s as Eskom did not need to construct further capacity for some time and could thus ultimately price below long-run marginal cost levels.[11]

For most of the 1990s, after the NER's establishment in 1995, Eskom average price levels were thus declining in real terms, in accordance with its self-adopted pricing compact. This situation left the NER with essentially little to do with regard to Eskom price levels. Given that the NER was recently established and had limited resources, and that Eskom's prices were declining, Eskom's annual price adjustment application to the NER entailed a relatively minor decision-making process and was always accepted without major queries.

More work had to be undertaken by Eskom to move its tariff structures closer to cost reflective levels. The NER also eventually realised that prices that were below full economic cost levels for too long could create substantial economic problems when Eskom finally ran out of surplus capacity a decade later.

More recently Eskom has argued that real price levels will have to rise to fund the construction of new generation capacity, leading to the development of more normal regulatory tensions between Eskom and the NER. Currently the approach used by the NER to assess Eskom's average price increase application is focussed on considering the impact on Eskom's historic cost rate-of-return on nominal price levels relative to

[11] Effectively Eskom's investment behaviour over the twenty-year period meant that consumers paid for capacity they would require at least ten years in advance. By the 1990s this situation resulted in price levels that were below full economic levels. This encouraged many energy intensive industrial projects on the basis of special pricing arrangements with Eskom that enabled it to reduce its surplus capacity. At least 10 years of sub-economic wholesale price levels and 'special deals' for large industrial consumers have created the erroneous impression that South African electricity is extremely cheap, and contributed to expectations that our industrial development strategies should continue to be based on this premise.

inflation. This approach is set out in a draft framework document available from the NER's website.[12] Eskom provides practically all the data. Due to severe skilled human resource constraints the NER is not able to produce these indicators independently. To date the NER has also not conducted an independent review of Eskom's cost items or of the asset valuations used to determine these indicators. This severely limits its ability to conduct an independent review of Eskom's application.

The Eskom price review cycle takes place over ten months. The process starts in July when the NER Board approves a terms of reference for Eskom's price application. After the Board has approved a new price level, generally around November/December, Eskom and NER officials undertake a 'post mortem' of the process covering the main areas of contention. The most recent 'post mortem' was conducted over seven separate sessions and the two parties have identified at least eight 'notable areas of disagreement'. No public hearings are held and most NER deliberations on the Eskom price levels are held 'in house'. Essentially the price review is determined by a process of structured negotiations between the NER and Eskom, most of which does not take place in the public view.

In practice, many factors have a direct or indirect bearing on Eskom's price levels. The most important of these are:

Financial / Economic

1) Investment history

   Past investment behaviour (and financial policy – see next point) has a large impact on the current price trajectory as it has a large impact on debt levels (gearing) and thus the price levels that have to be maintained to service and amortise its debt. The extent to which Eskom over invests also increases prices as the cost of its total capacity has to be carried by the electricity sales from the capacity that is actually used.

2) Financial policies

   In addition to investment history, past pricing and financial polices determine Eskom's current financial position and thus, given its current investment objectives, the prices that it will have to charge to achieve its current financial objectives (gearing and interest cover targets, etc.). Generally these objectives are expressed in terms of the rate-of-return to assets that it wishes to achieve.

3) Past pricing practices and path dependence

   The utility model of Eskom's financial structure, which shifted most of the financial risk onto its customer base, and the large financial subsidies it has received in the past, meant that Eskom's financial cost of capital has always been lower that the full economic opportunity cost. Given the capital-intensive nature of the ESI, this has always allowed Eskom to have lower prices than would otherwise have been the case (with the exception of the late 1970s and 1980s when its large over-investment resulted in dramatic price increases).[13]

   These sub-economic price levels have had a major impact on South Africa's industrial development by encouraging energy intensive (and highly capital intensive) natural resource extraction and beneficiation based investments (beyond the level that would have been justified by the nature of our resource endowments). The importance of the mining and minerals beneficiation sectors in South Africa's economy and their dependence on sub-economic electricity prices,

[12] www.ner.org.za.

[13] This financial structure was in fact one of the objectives of the Electricity Supply Commission's (ESCOM) institutional design, and was also the direct reason why ESCOM was able to expropriate the dominant private sector supplier, the VFTPC in 1948.

create strong path dependent inertia in electricity system which makes it difficult to move to full cost reflective prices in the medium-term.

Institutional and political

4) The National Electricity Regulator

   As outlined above, the NER has the final power of approval over Eskom's price levels and structures.

5) Minister of Public Enterprises

   As the representation of the State's shareholding in Eskom and with powers to appoint its board, the Minister of Public Enterprises has an important direct influence on Eskom's pricing decisions. On more than one opportunity in the recent past the Minister has also taken the opportunity to make public pronouncements concerning Eskom price levels, including a statement that Eskom would not be allowed to increase their price levels above inflation in 2004. Such direct political interference in the domain of the regulator creates significant political uncertainty about the government's respect for the role of independent regulatory processes. A more appropriate role for state as shareholder, in terms of financial matters, would be set Eskom's dividend policy.

6) Minister of Finance / National Treasury

   No formal relationship exists between Eskom's price setting process and the National Treasury. However, treasury concerns with inflation and its investigations into the impact of "administered pricing" is of direct concern to Eskom and the NER.

7) Social objectives

   The social objectives pursued by Eskom affect prices to the extent that such services have to be subsided from internal cash flows. While Eskom receives capital subsidies for electrification, operating costs in many poor areas still have to be subsided from internal resources. The extent to which Eskom pursues social objectives is determined by its perspectives of what is politically required. Officially this is determined by guidance from the Department of Minerals and Energy through policy documents such as the White Paper on energy etc.

8) Consumer groups

   A number of consumer groups directly reflect the interest of consumers with respect to Eskom price increases. The two primary groups are:

   a. AMEU / SALGA

   Organised local government have a direct and large interest in Eskom's prices, as the single largest bulk-purchasing group. Both the political level, represented by the South African Local Government Association (SALGA), and the executive level, mostly represented by the Association of Municipal Electricity Undertakings (AMEU), bring political influence to bear on the process.

   b. Large industrial users

   Large industrial users, particularly those for which electricity costs make up a large proportion of their input costs, are also directly affected by Eskom (and some times municipal) price increases. The Energy Intensive Users Group (EIUG), who remains well informed about electricity matters and lobby actively on matters affecting their interests, primarily represents their interests.

The NER recognised the need for an established methodology for the regulation of Eskom's price levels. It has progressed some way down the route of developing a conventional rate of return methodology (ROR) which it proposes to use in the evaluation

of Eskom and RED tariff increase applications.[14] Although the principles of the methodology have influenced the NER's approach to regulating Eskom, and Eskom's current price increase application (for 2004) is broadly based on this approach, it has not been implemented. This method sets prices at a level that allows Eskom to recover all the expenditure that has been prudently incurred with the production and supply of electricity, plus a fair rate of return on its productive electricity supply assets. The NER has called for comments[15] and has hosted at least one stakeholder workshop to discuss the proposals and its implementation in May 2003. It is currently undertaking further investigations, based on the comments it received, to adjust its regulatory approach and methodology.

4.2 Eskom price levels and tariffs

Eskom price level increases are effective from 1 January of each year. Recent Eskom price increases are given in Table 3 below. The first column shows the year to which the increase applied. The second column shows the average actual prices in each year. The third column shows Eskom's formally announced price level *increases* for each year. In practice this increase is implemented by increasing individual tariffs proportionally. It is based on assumptions about the sales volumes for the coming year. Because tariffs have fixed and variable components, variations in overall sales volumes from the levels assumed, or relative volume changes between customer groups, could result in an effective price increase outcome that differs from the announced level. This is what is shown in the fourth column under 'Effective price increase'. The table also shows the annual percentage change in the consumer price index for comparative purposes.

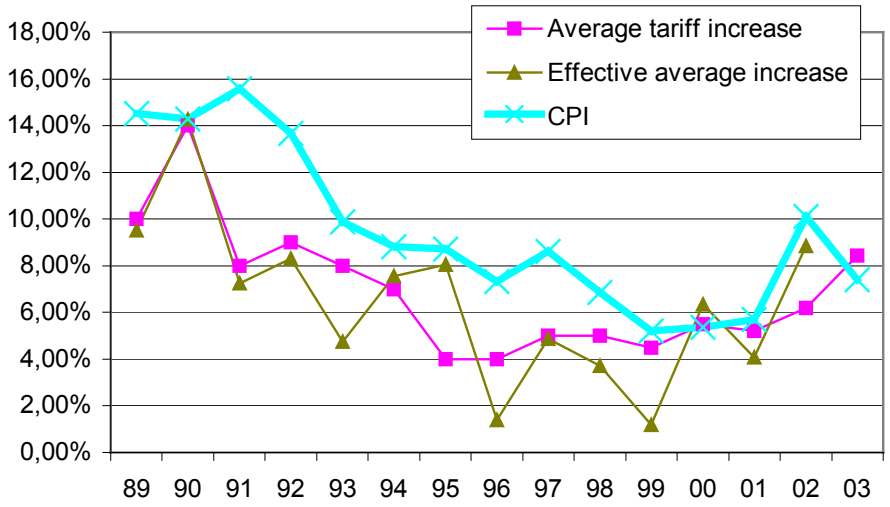
Table 2: Recent Eskom price increases

Year	Average price (c/KWh)	Announced price increase	Effective price increase	CPI
1989	6,90	10,00%	9,52%	14,51%
1990	7,88	14,00%	14,25%	14,29%
1991	8,46	8,00%	7,24%	15,57%
1992	9,16	9,00%	8,31%	13,67%
1993	9,59	8,00%	4,74%	9,87%
1994	10,32	7,00%	7,55%	8,82%
1995	11,15	4,00%	8,04%	8,71%
1996	11,30	4,00%	1,38%	7,32%
1997	11,85	5,00%	4,87%	8,62%
1998	12,29	5,00%	3,72%	6,87%
1999	12,44	4,50%	1,19%	5,21%
2000	13,23	5,50%	6,35%	5,37%
2001	13,76	5,20%	4,06%	5,70%
2002	14,98	6,20%	8,84%	10,10%
2003	n/a	8,43%	n/a	7,40%

[14] It is available from the NER's web site at http://www.ner.org.za.
[15] A summary of the comments it received is posted on its web site.

The difference between the announced average price increases and the actual outcome is shown graphically in Figure 6 below.

Figure 6: Eskom price increases and CPI



[Source: Previously compiled by the author from various Eskom annual reports.]

The first notable trend is that while effective increases varied more than the announced year-on-year increases, on average it followed the general trend closely. What is of equal interest is that, with only two exceptions in the period under review, effective prices were always *below* the increase of the CPI during this period. This finding is similar when compared to PPI trends.

The announcement of an increase for 2003, which is above the expected inflation rate for the year, and above the Government inflation target, has attracted considerable attention.

Table 3 shows the effect of the relatively increasing prices since 2000 on Eskom's historic cost (nominal) return to assets. Returns continued falling as Eskom implemented very low increases during the late 1990s. The trend was reversed from 2000 onwards as Eskom started increasing higher annual price increases.

Table 3: Eskom historic cost return to total assets

Year	Return to total assets
1992	10,54
1993	10,80
1994	11,52
1995	11,45
1996	11.65
1997	11.3
1998	9,69
1999	8,26
2000	9,79
2001	10,21
2002	11,92

It is important to realise the NER does not just approve average price levels (which are essential for cost recovery), but also approves tariff structures for the respective customer groups. This is a critical aspect of electricity pricing because it determines the balance between the cost reflectivity of prices (efficiency signals), the affordability of prices to the poor and rural consumers (including commercial farming), and the transfers from higher consuming households, commerce and industry to subsidies these. Table 4 shows the Eskom tariffs and sales for its different customer groups.[16]

Table 4: Data on Eskom market, sales and prices in 2002

	No of customers	GWh sold	% Change	Revenue (Rm)	% Change	Ave price (c/KWh)	% Change
Distributors	734	74 636	3,4	10 514	12,8	14,09	9,1
Residential	3 283 848	7 888	8	2 637	16,9	33,43	8,2
Commercial	48 514	6 483	1,2	1 265	9,9	19,51	8,7
Industrial	3 215	51 581	6	6 646	18,2	12,88	11,5
Mining	1 252	32 549	2	4 604	8,0	14,14	6,0
Agricultural	79 125	4 009	-5,1	1 061	-6,4	26,47	-1,4
Traction	511	3 259	-6,4	559	2,2	17,15	9,3
Distribution international	5	228	-20,1	33	-17,5	14,44	3,2
Eskom international	8	6 956	3,7	782	30,3	11,24	25,8
Internal	440	368	12,9	57	26,7	15,49	12,2
Total	3417652	187 957	3,5	28 158	12,7	14,98	8,9

[*Source: Eskom Annual Report 2002]*

The salient points that emerge from this table are that:

1) The increase of the price and sales to municipal distributors (and thus revenue) closely followed the trend of the overall average.
2) Revenue from industry increased by 18,2 % (5,5 more than the average) driven mostly by an increase in sales volume, but also by a moderately, above average increase in price.
3) Revenue to domestic customers also increased above average, driven entirely by an increase in sales.
4) Revenue from Eskom international sales increased by 30,3%, driven primarily by a price increase.

Table 5 shows Eskom's calculations of the subsidy flows between different consumer groups. The information is arranged according to Eskom's different tariff groups, and not according to the consumer groups as done above. A cross-subsidy is deemed to arise when the revenue from a customer differs from the costs associated with supplying the customer. Mostly cost are calculated for customer groups, which effectively mean that differences in costs for individual customers in a particular group are averaged out.[17]

[16] Similar data is not available for the municipal sector

[17] The calculation of subsidies depends critically on how costs are allocated between different groups. Eskom follows the NRS 058 methodology, which employs statistical methods based on

Table 5: Cross-subsidies between different Eskom consumer groups

Tariff Name	2003 Cost Reflective	Applied tariffs	Difference (Subsidy)	% Difference (% Subsidy)
Megaflex	10 585 346 572	11 884 259 026	1 298 912 454	10,93%
Miniflex	258 771 573	270 666 517	11 894 945	4,39%
Nightsave (Rural)	1 658 670 767	1 054 580 820	(604 089 947)	-57,28%
Nightsave (Urban)	4 275 652 733	4 948 786 829	673 134 096	13,60%
Ruraflex	644 370 777	286 143 135	(358 227 642)	-125,19%
Businessrate	164 766 075	206 079 236	41 313 161	20,05%
Homelight	1 733 518 754	1 114 153 282	(619 365 471)	-55,59%
Homepower	634 072 037	717 810 524	83 738 487	11,67%
Landrate	1 808 772 927	1 296 999 247	(511 773 680)	-39,46%

[Source: Eskom 2003]

These figures reveal a remarkable picture about the subsidies between the different tariff groups. In absolute terms, the users of the 'Homelight' tariff (mostly in poor, recently electrified areas) receive the greatest subsidy as a tariff group. This is followed by the 'Nightsave Rural' tariff group and then the 'Landrate' tariff as receivers of subsidies. Together with the subsidy for the 'Ruralflex' tariff this effectively means that rural farming and commercial users receive the greatest absolute subsidy.

By far the largest contribution to subsidies comes from Industrial and municipal consumers on the Megaflex tariff and the 'Nightsave' tariff.

Although these figures give a reasonable approximation of cross subsidies in the system at the Eskom level, the actual picture is even more complicated and becomes difficult to measure. Cross-subsidisation in tariffs exists at various levels:

- Inter-tariff cross-subsidisation: This is the subsidisation of one tariff class by another, such as the subsidisation of rural, electrification and domestic customers, mainly by large industrial customers, as is outlined in Table 5 above.
- Intra-tariff cross-subsidisation: This type of cross-subsidy happens if some customers within a customer class subsidise others in the same class, due to pricing *structures* that do not reflect the underlying cost structures.
- Geographic cross-subsidies result from incorrectly allocating the supply costs to customers in different geographical locations in South Africa. (or, if geographical differences in costs exist, from applying a uniform tariff) Cross-subsidisation takes place from low cost areas (i.e. those close to generation resources) to high cost areas, typically the coastal areas, far Northern Cape and Northern Province (Limpopo).
- Other levies and taxes, such as applying profits from electricity sales to municipal rate funds.

The issue of cross subsidies and pricing efficiency is critical for the effective functioning of the system. While cross-subsidisation are important for equity reasons it has to be

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the "demand and excess" approach. The data on which the allocations are based is not highly accurate.

weighed up against the extra costs imposed on the system as a result of the inefficiencies resulting from incorrect price signals.

4.3 Municipal price and tariff regulation

At the time of the creation of the NER, South Africa had 843 local government authorities and the NER was faced with the prospect of regulating more than 400 councils distributing electricity, who jointly had more than 2000 individual tariffs. The rationalisation of local authorities during 2000 reduced this number to 240, with 177 still distributing electricity and Eskom supplying in the remaining 63 local authority areas.

Given the magnitude of the task and the NER's limited resources, its approach to regulating municipal distributors has been to attempt to rationalise tariff structures and reduce the disparities in price levels. The NER does not apply the rate of return methodology to local authority distributors, and neither has it been able to investigate their costs. The finances of local authority distributors are not ring-fenced from other municipal cost and revenue streams and significant revenue shifting is thought to occur.

Two objectives currently inform its regulation of local authority price levels. The first is to harmonise price levels for distributors that are within the same size class. The second is to converge the price levels of distributors that will fall within the same proposed regional electricity distributor (RED). Essentially thus, the local authority distributors are subject to 'regulation by comparison'.[18]

The NER Board has delegated authority to the CEO to approve price increase applications from small municipalities, which fall within a specified set of criteria. These are reported *ex post* at Board meetings. Applications by larger municipalities and Eskom still go before the Board. The requirement to operate under a licence issued by the NER in terms of the Electricity Act gives it substantial powers to regulate the municipal sector.[19] However, the NER's ability to adequately regulate the municipal sector is significantly restricted by skilled human resource constraints.

A major concern for municipal distributors is the fact that Eskom's wholesale prices to them are generally substantially higher than Eskom's tariffs to its own regional distributors. In response to this concern the NER has developed a Wholesale Electricity Pricing System, in consultation with the key stakeholders, to equalise the playing field with respect to wholesale tariffs. After a trial period conducted 18 months ago, the process has stalled and the NER has not yet been able to implement it. Essentially the difficulties relate to the fact that the WEPS tariff structure will reflect costs more closely and many industrial and other consumers could end up paying more (while others will pay less).

While much less hard data is available about the history of municipal investment in their distribution networks, this is an area that could have important implications for future reliability of supply and end-use electricity prices. Most municipal investment into their networks over the past fifteen years has been to extend services to poorly served township areas. Much less investment has gone into replacing the aging lines, transformers and switchgear of the existing network infrastructure. While most popular concern about security of supply is generally focussed on South Africa's generation capacity requirements, by far the greatest risk of supply interruptions arises from the state of municipal distribution networks. This situation is likely to worsen if investments to replace aging municipal networks are not made. In addition to the financial pressure that local government is under, uncertainty about the implications of moving to REDs has created a further disincentive for local government to finance new infrastructure investments. Ways of financing the upgrading of aging networks will have to be found

[18] This can be viewed as a loose benchmarking approach to regulation

[19] Following a change of governing party the City of Cape Town recently abandoned a legal challenge to the constitutionality of the NER's rights to regulate municipal tariffs in terms of Section 155(3) and Schedule 4(B) of the Constitution.

urgently, and this could be expected in exert upward pressure on retail electricity service prices in municipal areas.

4.4 Municipal prices and tariffs

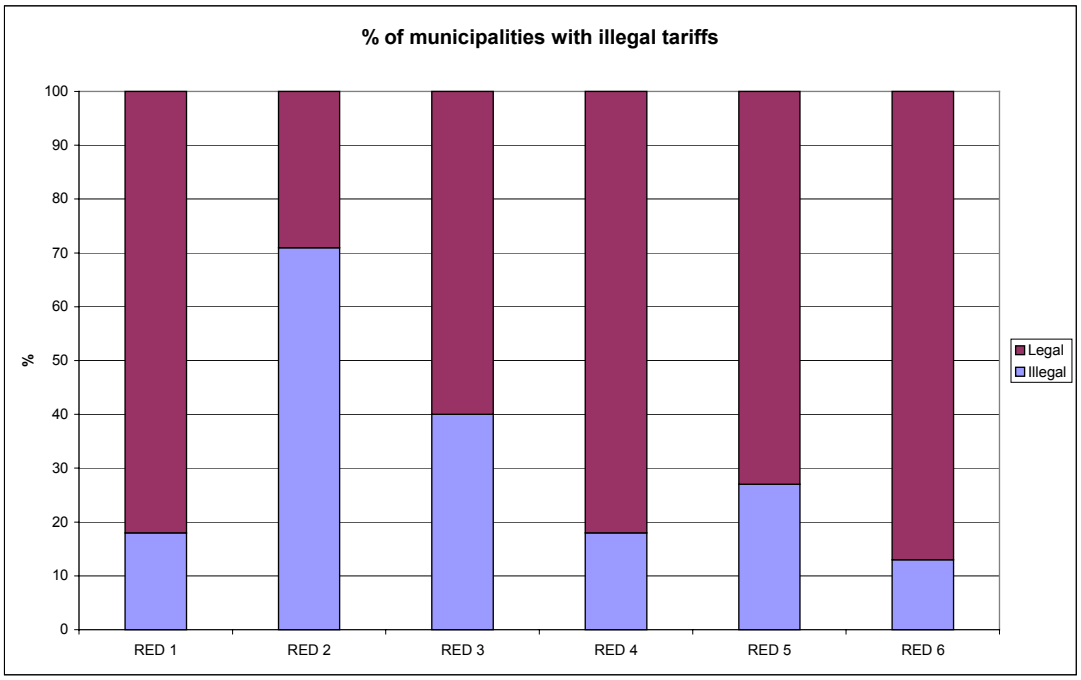
Table 4 above shows that municipal distributors buy electricity from Eskom at an average price of 14,09 c/KWh. In analysing the municipal tariff structures, the NER grouped the distributors according to the boundaries of the REDs that they will be merged into as part of the EDI rationalisation process. The following table shows the provinces which will have areas served by each RED.

Table 6: The geographic scope of the new Regional Electricity Distributors

RED Name	Areas included
RED 1	Northern Cape and Western Cape
RED 2	Free State, Gauteng, Mpumalanga
RED 3	Eastern Cape, KwaZulu-Natal
RED 4	Gauteng, Northwest, Northern Cape
RED 5	Guateng, KwaZulu-Natal, Mpumalanga
RED 6	Gauteng, Limpopo, Mpumalanga, Northwest

Of the 177 municipalities supplying electricity, 60 (42%) have illegal tariffs (tariffs that are not formally approved by the NER and which are thus in breach of the Electricity Act). Figure 7 shows the number of municipalities in each area with illegal tariffs.

Figure 7: Percentage of municipalities in each RED area with illegal tariffs

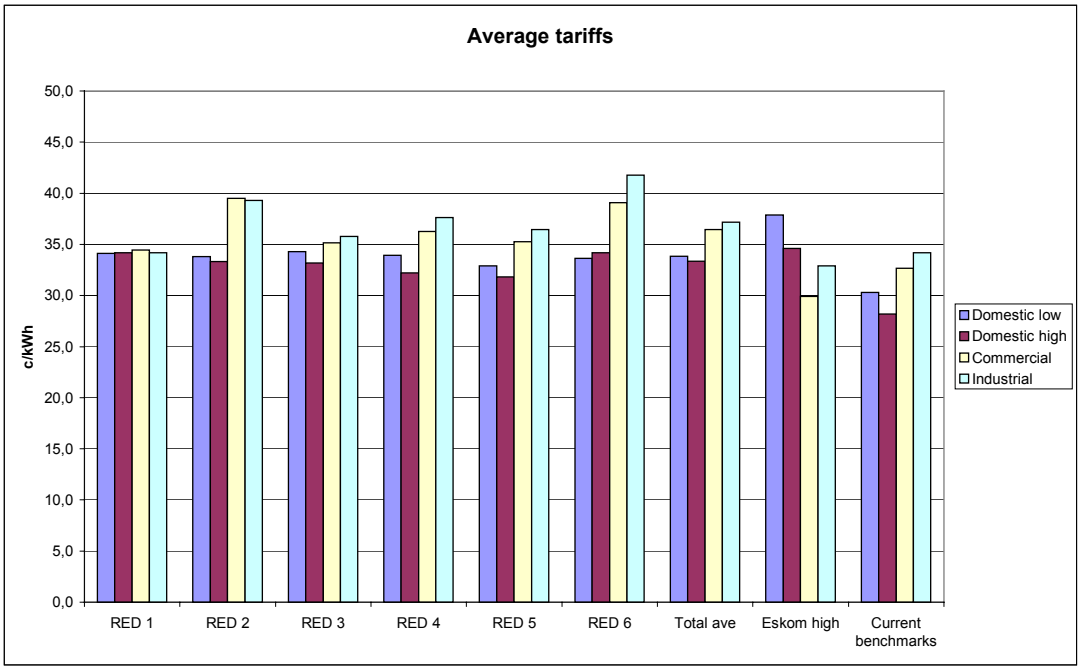


[

Source: National Electricity Regulator]

The following figure shows the average prices resulting from the different tariffs in each RED area compared to the NER's current benchmarks.

Figure 8: Average tariff levels in each RED area



[Source: National Electricity Regulator]

In general the domestic low consumption tariff is below the full cost of supply while all the other categories are above best estimates of full cost of supply.

The following table provides more details on the distribution of tariff ranges in the different RED areas. The values are expressed in terms of c/kWh only, based on typical average consumption levels for each category.

Table 7: The distribution of tariff ranges in RED areas

Tariff type	Domestic Low Consumption	Domestic High Consumption	Commercial	Industrial
No for which data avail. (total of 229)	159	208	206	195
Lowest value	22,50	18,50	21,50	13,61
Average	33,83	33,35	36,45	37,17
Highest value	45,00	62,37	67,49	62,22
Std Deviation	4,09	5,28	6,29	8,21

[Source: National Electricity Regulator]

With these tariff levels, particularly for industrial and commercial consumers, it is clear that, on average, municipal distributors either have high cost structures (including paying more for their bulk electricity than Eskom does), or make substantial surpluses. For instance, Table 4 shows that the average Eskom prices for industrial and commercial customers are 12,88 c/KWh and 19,51 c/KWh respectively, while the comparative figures from municipal distributors are 183% and 91% higher at 36,45 c/KWh and 37,17 c/KWh respectively. While this difference could partly reflect the higher bulk electricity costs municipalities face compared to the bulk costs the equivalent Eskom tariffs are based on, the difference in bulk costs can not account for large magnitude of the difference.

Data on the surplus of revenue over costs for a selection of municipal distributors is shown in Table 8 below.

Table 8: Surplusses in selected muncipal distributors

Municipality	2000 PwC Historic Surplus R'000		2001 SALGA survey - Ringfenced Surplus	
Mangaung (Bloemfontein)	35 137	12,70%	40 831	11,25%
Buffalo City (East London)	36 812	15,90%	n/a	n/a
Cape Town	306 824	18,20%	n/a	n/a
eThekwini (Durban)	70 950	3,30%	170 483	7,54%
Ekurhuleni (East Rand)	246 174	14,10%	402 494	19,23%
George	8 784	11,50%	10 210	11,92%
Johannesburg	245 650	11,60%	164 309	6,82%
Sol Plaatje (Kimberley)	3 127	3,40%	n/a	n/a
Middelburg	13 231	19,40%	9 588	12,01%
Nelson Mandela	107 403	16,60%	129 493	17,81%
Mbombela (Nelspruit)	3 784	4,70%	n/a	n/a
Msunduzi (Pietermaritzburg)	14 268	4,90%	50 638	14,60%
Polokwane (Pietersburg)	20 891	16,60%	n/a	n/a
Tshwane (Pretoria)	211 881	13,00%	306 436	18,34%
Umhlathuze (Richardsbay)	6 204	3,20%	4 576	2,64%
Khara Hais (Upington)	11 605	28,00%	16 871	37,11%

[Source: National Treasury, 2003, 'Intergovernmental Fiscal Review']

Overall these data illustrates that municipalities generally make substantial surpluses from their electricity distribution and retail activities. Even where formal surpluses are low, other municipal services typically benefit from shifting costs onto the electricity undertaking.

5. DISCUSSION AND CONCLUSIONS

This report has aimed to present sufficient information to enable a meaningful understanding of the trends in electricity prices and of the drivers behind them. The broader context of the industry, its institutional, investment and financial history, and the demands expected to be placed on it in the future, are all important factors relevant for the correct interpretation of the current price behaviour in the industry. This information furthermore highlights the importance of considering appropriate, and real, counterfactuals when policy choices for the future of the industry are considered.

This concluding section presents a discussion of the main points emerging from the data and of how the evidence relates to concerns about pricing and inflation.

5.1 Key cost drivers

Some important points arise from the data presented above. Firstly, it is clear that the drivers behind the decline in Eskom's wholesale prices since the early 1990s have been mostly exhausted and will be partly reversed in the future. Prices dropped largely because most of the debt associated with financing its power stations has been amortised thereby reducing its financing costs; and because the excessive surplus capacity it financed meant that the financing of new investment could be avoided for an unusually long time – after the bulk of the associated debt had been amortised. This "space" is now exhausted. South Africa has experienced a gradual increase in demand levels, particularly during the winter peak months and will soon reach the stage where spare capacity would be fully utilised under *current pricing* and *supply arrangements*.

Secondly, while a range of demand-side management (DSM) and more cost reflective pricing *structures* could be used to shift demand, ultimately new generation capacity will have to be constructed. Irrespective of whether Eskom, or new entrants are to construct this plant, power prices for *new generation* will have to rise to economic levels to allow new investment to be financed. More economic pricing structures and levels, will also elicit a demand-side response in accordance with elasticity of demand, particularly at peak times when prices will be at their highest. This will be an important part of the strategy to deal with demand growth in the most economic way.

Thirdly, it is important to realise that these first two points are related to wholesale power prices only and will thus have the greatest significance for energy intensive users. The industry economics underlying retail prices, particularly to households, low energy consuming commerce and light industry, work differently. Here costs are dominated by distribution and retail costs and retail margins; energy only makes up a small proportion of end-use costs. In addition to the energy costs from generation, final prices are made up to cover capital, maintenance and operational costs relating to transmission, distribution, reticulation, and retail (including metering) functions. At a retail level in municipal areas (where 45% of energy is sold to 54% of customers) the most important cost driver in future is likely to be the need to finance the upgrading off the existing distribution infrastructure.

5.2 The key price drivers

In addition to the underlying costs of the industry, a range of institutional and policy factors affect the price outcomes that ultimately occur in the industry.

On the short-term (before EDI and ESI restructuring is completed) the key price drivers are the following:

5.2.1 Eskom's rate of return

The methodology the NER uses to set Eskom average price levels is a key factor determining power prices on the short-term. At present the NER uses a structured negotiating approach based on key indicators derived from untested Eskom information, and has proposed to use a Rate of Return (on assets) methodology in future. This

approach is based on the capital asset pricing model (CAPM). In practice the approach faces many challenges to enable meaningful implementation. It is doubtful whether the NER has sufficient resources to enable the rigorous implementation this methodology requires to stand a reasonable chance of being successful. Furthermore, it is widely recognised in the regulatory economics literature that rate-of-return (or cost-plus) methodologies create weak efficiency incentives and thus often result in large-scale resource wastage.

Fundamental questions remain to be resolved in the NER's approach. Firstly, how should the economic rent from the industry be allocated? Current Eskom assets were developed on the basis of a monopoly utility model, where all investment risks were shifted onto the consumer base, which, in turn, benefited from non-profit (and tax free) prices. As it turned out substantial investment decision mistakes were made and consumers ended up paying the extra costs. Essentially the economy has already amortised the capital cost of current generation capacity, so, in this respect, it would not be equitable, nor feasible, to move to full economic (current cost long run marginal cost–based) pricing on the short-term. In economic terms this is a question of how the economic rent in the industry is allocated. Is it directly passed on to consumers in the form of low energy prices (inevitably this approach will benefit energy intensive consumers more, but they have also paid more for past investment excesses)? Or, are prices raised and Eskom allowed to invest the rent in electricity supply or (increasingly) other industrial activities. Or lastly, is the economic rent passed to the state by increasing prices and extracted the rent from Eskom by taxation and adequate dividend policies.

Secondly, this is not just a political economy question; the allocation of economic rent also has governance and allocative efficiency implications. If Eskom's prices were to increase on the short-term, it would generate substantial free cash flows, which it would not require for reinvestment in the power system (as current policy states that Eskom would not construct further capacity, or even if it would, it could debt finance new investments). Extracting free cash flows is not as simple as it might appear, and creates strong incentives to allocate resources to activities not related to the South African electricity supply needs – which has increasingly occurred over the past decade. The problems of regulating such resource flows are discussed below.

Thirdly, prices will have to rise to some extent to reflect economic costs, and to encourage efficient entry from new players. The best resolution of this problem would be to proceed with the ESI reforms the Government has committed itself to. A new institutional framework would allow the benefits of current low prices to be locked-in (for instance by long-term vesting contracts that fix prices between Eskom generators and distributors/REDs) while creating a separate market for new capacity at the margin, which could clear at prices reflecting the full long-run economic cost of capacity. On average prices would only rise gradually, while the system could benefit from capacity expansion based on the most efficient investment decisions.

Fourthly, while ESI and EDI reform is delayed, thereby creating uncertainty with respect to the institutional framework under which the next capacity investment will be undertaken, substantial ambiguity is created for the NER. Should it stick to low, average cost prices for Eskom, which is consistent with an ESI reform scenario, or should it now, effectively going against the *stated* policy framework for the ESI, allow the price increases Eskom argues is required to enable it to finance further investment? In terms of its potential impact on energy prices, this is probably the most important cost driver for wholesale electricity prices at present. Given Eskom's current exceedingly strong financial position it is doubtful whether it needs to immediately increase prices to fund new investment – it could, as in the past – raise corporate debt to finance its investments. This route is also likely to improve Eskom's governance and reduce the inefficiencies that are associated with large free cash flows. This dilemma highlights the importance of proceeding with ESI reforms as soon as possible.

5.2.2 Ring fencing and Eskom's 'non-regulated' activities

The current situation with respect to the distinction between Eskom's 'regulated' and 'non-regulated' activities creates significant difficulties for the NER. Despite ring fencing between Eskom's 'regulated' and 'non-regulated' activities, all 'non-regulated' activities were initially capitalised from electricity industry cash flows, mostly at a time when Eskom was still a non-profit public utility. It is also likely that electricity consumers still effectively underwrite most of the risks of Eskom's 'non-regulated' industries. It is further worth noting that the distinction between Eskom 'regulated' and 'non-regulated' activities was introduced by itself and has no basis in law.

In order to create greater transparency and to enable the NER to adequately regulate Eskom, greater institutional separation is required between Eskom (regulated) and Eskom Enterprises (non-regulated) in order to improve the actual separation of costs and risks that currently cross the boundaries between the two.

5.2.3 Municipal profits from electricity

A further factor directly affecting electricity prices to consumers relates to the profits municipal distributors make from electricity distribution activities in lieu of other income, such as rates and taxes. While taxes on electricity are likely in the future, the real problem here relates to the difficulty of determining the effective tax level on electricity, as municipalities mostly share costs between departments and tend to shift costs to revenue generating activities, and as there is a wide range of profit levels between municipal distributors.

While the EDI reforms are intended to address these problems, the process has now been delayed for many years, leaving the NER to manage the situation with limited resources and make-do systems developed in the interim while reforms are awaited.

5.3 Objectives for reform

From these shorter-term concerns the longer-term objectives for reform in the industry begin to emerge.

5.3.1 Economic pricing

Continued sub-economic pricing (prices below long-run marginal costs) in the industry ironically run the risk of increasing real costs in the economy (by reducing allocative efficiency). Furthermore, sub-economic energy prices benefit energy and capital-intensive growth, and places labour and skills intensive development paths at a disadvantage. Proper economic pricing of power will reverse skewed incentives in the long-term and support South Africa's primary economic aim, which is to establish labour absorbing development paths.

5.3.2 Institutional reform to improve allocative efficiency

Institutional reforms to encourage greater cost efficiency in the industry will be the most critical step to limit higher costs, and thus higher prices, in the long-run. Eskom experienced severe investment efficiency problems in the 1980s (and 70s?) and 1990s. Essentially the institutional framework and incentives that allowed this problem to occur are still in place.[20] Repeating such problems under current circumstances would have a substantial impact on prices. Avoiding perverse investment incentive problems and exposing financiers and investors at an appropriate level to the risk and uncertainty associated with investments provides the best chance of appropriate investment outcomes and low cost power in future.

[20] Although this argument is not developed here it has been done in Steyn, G 2001. 'Governance Finance and Investment: Decision making and Risk in the Electric Power Sector', DPhil dissertation, University of Sussex.

5.3.3 EDI restructuring

EDI restructuring will be crucial for the broader ESI reforms to work. Independent entry into the generation market will require effective demand side participation with EDI counter parties that are sufficiently stable to purchase power, particularly on the long-term market.

EDI restructuring is also required to improve the efficiency of the Distribution sector and reduce its underlying costs.

5.4 Inflation and economic growth

Concerns about the impact of administered prices, in this case electricity prices, on inflation, gave rise to this project. The following discussion reviews the findings of this report in the context of concerns about inflation.

When viewing the infrastructure industries from the point of view of concern with inflation, developing policy responses on the basis of price trends alone would run a serious risk of resulting in unintended consequences. Infrastructure prices are only one part of an integrated whole of each infrastructure institutional system. A broader view, incorporating the impact of these industries on: the cost of doing business in the economy; on the cost of final consumer goods and services; and on providing other public services (including the effects of fiscal transfers), should be considered if reducing overall inflation levels over the long-term is the primary consideration.

In the case of electricity the rationale is as follows:[21]

The impact of gradually increasing prices from its current sub-economic levels should be considered in a dynamic context, which differentiates between price and costs, and explores their combined effect on the economy. Moving to cost reflective prices will *save* real costs in the economy: (i) by encouraging efficient use of energy and capacity (including demand side investments) which, if electricity service is priced correctly, will be cheaper in real resource terms, than new supply capacity; (ii) by supporting the establishment of a market and new entry in generation which should lead to more efficient generation investment decisions than could reasonably be expected to occur under current arrangements.

These impacts should, in the aggregate, be positive in the long-term, because the effect of higher electricity prices can be expected to be more than compensated for by resource savings elsewhere. Effectively this implies a shift in the relationship between inflation and GDP growth.

It is furthermore worth exploring the scenario where under current institutional arrangements electricity prices are not allowed to rise to full economic levels, to discover a further important point that helps to place the appropriate choices in perspective. Lower prices mean that greater demand would soon lead to the need for new investment, most likely by Eskom, which would have to be financed from internal cash flows, or interest bearing debt. Less revenue would be available for taxes, dividends or other projects currently funded by Eskom on behalf of Government (such as Eskom's recent commitment to fund R1,5 bln worth of NEPAD projects). Effectively this means that this revenue has to be generated elsewhere and that prices of other Government funded services (or taxes) would have to be higher than they would otherwise have been, thus still affecting inflation rates. The reverse of this argument thus also holds true, higher prices = delays in capacity requirements = more FDI for capacity when it is required = higher government revenue = lower taxes and prices of other services in the economy. It

[21] A similar rationale probably holds for rail freight and port services, where at present the most significant cost associated with the service is often not the formal tariff, but the costs imposed by the undue delays and backlogs in providing the service. If higher prices are part of a well-conceived integrated approach to improving service delivery, the strategy could be expected to reduce overall costs.

is important to recognise that this argument does not hold true for increasing price levels *ad infinitum*, but only for effecting the gradual raising of prices (in an appropriate institutional context) to levels that are closer to full economic costs.

5.5 Summary

1. To NER has not yet implemented a robust approach to regulating Eskom prices. Until recently this has not been a significant problem as Eskom prices were falling in real terms as its debt was declining. The NER is currently grappling with the challenge of avoiding allowing Eskom excessive free cash flows, while ensuring adequate circumstances (including prices) for the investment in new capacity. While grappling with these challenges the NER aims to developing its regulatory approach and methodologies to improve its effectives for dealing with Eskom price increases. Its treatment of the increases for 2004 and 2005 over the next 18 months will demonstrate whether it has come to terms with this task.
2. Independent regulation in infrastructure industries is new in South Africa. Government officials, politicians, and the public in general are still becoming familiar with the system and with their appropriate respective roles. Government has to find greater clarity on its roles as shareholder, and industrial and social policy maker; and reconcile this with the state's decisions to allocate economic regulatory functions to an independent regulator. Current role confusion potentially limits the effectiveness of this governance system.
3. Many municipal distributors will have to invest significantly in upgrading their aging networks. In order to do this they will have to overcome the financing constraints faced by local government and will likely have to implement price increases, or reduce transfers to other municipal services.
4. The ESI is rapidly approaching the time when investment in new capacity will be required. Current Government vacillation on implementing the competitive market framework within which this was supposed to happen is creating significant uncertainty. It is also become an issue for the NER to consider in its approach to assessing Eskom's annual price increase application.
5. The best, and only sustainable way, of limiting inflationary pressures from the ESI (and probably from other infrastructure industries) is to accelerate institutional reforms aimed at increasing cost efficiency and service delivery levels. Given the capital intensity of these industries it is especially important that this framework creates appropriate incentives which, in the face of risk and uncertainty, encourages investment which is appropriately timed and technologically configured to provide the appropriate levels of service delivery at lowest possible cost.
6. Reforms have to be managed in such a way so that most cost savings are passed on to the economy in the form of lower prices. This is best achieved by aggressively promoting competition in the market for new capacity and in the market for wholesale power.
7. Eskom and municipal tariff *structures* should continually be moved closer to cost, including real-time costs, so as to impact on customer behaviour and delay further generation investment and encourage more efficient demand side adjustments and investments. While costs would be higher at peak times this strategy would limit the increases in average costs over the long-term.

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