TRADE AND INDUSTRY CHAMBER

FUND FOR RESEARCH INTO INDUSTRIAL DEVELOPMENT,

GROWTH AND EQUITY (FRIDGE)

Administered Prices Study on Economic Inputs

Water Sector

August 2007

Final report

Contents

Tables

Figures

Acknowledgments

This report was prepared by Mike Muller, Adjunct Professor at the Wits University Graduate School of Public and Development Management, with research support from Angelita Kithatu. The authors would like to acknowledge the help and support of the relevant officials of the municipalities, water boards and the Department of Water Affairs and Forestry, as well as the access to international data availed by the World Bank.

Executive summary

The water services and distribution sector component of the NEDLAC Administered Prices Study on Economic Inputs sought to research and quantify the impact of pricing and quality of services set through administered pricing mechanisms, on investment and job creation. This component of the study covered municipal supplies of water to domestic, commercial and industrial consumers as well as utility supplies to large industrial consumers by the trading units of the DWAF as well as water boards and related entities. It did not include waste-water collection, treatment and disposal, except insofar as the pricing of these services is directly linked to water supply, stormwater drainage water for irrigation and only addresses briefly incidental water use charges such as the water research levy and water resource management charge.

Data for a five year period was collected for all metropolitan municipalities and for a sample of a further six urban municipalities where there is a significant manufacturing industry. Data was also collected for all Water Boards over the period, based on their audited financial statements. Tariff data for the schemes of the Department of Water Affairs and Forestry was taken from published tariff schedules. Tariff data from comparator countries was taken from a variety of sources including national ministries and regulators, the utilities themselves while the World Bank's IBNET water utility database was also consulted.

The study found that prices for water supplied to industry in South Africa have generally risen faster than inflation over the period 2001/2 to 2006/7. Municipal water prices to industry have risen by an estimated 62% in the period 2001/2 to 2005/6. Domestic prices rose 60% in the same period, compared to PPIX and CPIX rises of 30% and 32%, respectively. Prices for bulk supplies from water boards rose by an average of 42% over the same period. Prices for bulk water supplied by DWAF varied widely as the new pricing strategy was implemented but rose by an average of 21% over the period 2002/3 to 2005/6 compared to a CPIX rise of 16% over the same period.

An understanding of these price changes is complicated by the relatively complex structure of the water industry and the limited information that is easily available about it. Prices vary according to source, supplier and location. Water may be supplied to industry directly by the national Department of Water Affairs and Forestry, by regional water boards or by municipalities, while some companies in isolated areas supply their own needs.

The formal processes through which South African water prices are determined are regulated by statute and are well documented, although it is not clear that the processes are always followed. While there is no independent regulator, price-setting involves systemic engagement with users and there is provision for Central Government to intervene where unreasonable decisions are taken.

Prices from all suppliers vary significantly from one location to another. These prices reflect:

- The water source and specific system requirements;
- Administrative decisions regarding tariff structures;
- Operating efficiencies; and
- Levels of investment in system maintenance and expansion.

The ratio of the domestic tariffs levied by municipalities to their industrial tariffs is a useful indicator of the extent to which there is cross-subsidisation from industry to other users. This indicator varies significantly for reasons explored in the report. In some municipalities, industrial charges are set at the top domestic rate, while in others charges are set at or below the average domestic rate. Since the unit cost of industrial supplies should be less than that for small volume users, this indicates that there is a degree of cross-subsidisation. However, particularly in the inland cities, this may be justified by the high long run marginal cost of augmenting supplies in situations of scarcity.

The international review shows that the South African situation is comparable to that in other countries, many of which share South Africa's institutional complexity as well as its limited information availability. It indicates, however, that despite the fact that the real price of water is rising in most countries, water is still often under-priced, which impacts on the reliability and sustainability of supplies in the longer term.

The cost of water supply to industry in South Africa is found not to be substantially different to that in comparator countries, although there are variations in the nature and quality of the services provided. Countries such as Malaysia and India that have lower costs also have a much lower quality of service. Independent comparison with OECD countries places South Africa's costs as the fourth lowest of 11 countries, although the rate of increase over the past five years, expressed in local currency, is amongst the highest.

There is limited evidence about the levels of investment in some key areas of the sector of relevance to industrial water users. Thus, while price levels may currently compare reasonably to those in other countries, the extent to which these prices reflect adequate maintenance and expansion of the underlying supply infrastructure is an important uncertainty which may have long-term repercussions. Similar challenges are reported from OECD countries where tariff differentials are ascribed, in part, to different levels of ongoing infrastructure investment.

One deviation from what some consider to be international best practice is that there is no independent economic regulator of water supply in South Africa. However, the comparative evidence does not demonstrate any major negative impact as a result of this and there is no evidence that South Africa's water sector performance is worse than that of sectors such as electricity and telecommunications, both of which have independent regulators. It is also notable that, in the majority of OECD countries, water supply is still in the public domain and regulated by government, not by an independent regulator.

Together with South Africa's positive comparative pricing performance, this suggests that the present institutional framework provides an element of systemic regulation,

with different actors able to use the mechanisms that have been provided to promote their own interests and address their concerns.

While the establishment of an independent regulator may not be a priority at the current stage, the evidence from both South Africa and the international review is that systemic regulation works better if there is greater transparency and that information dissemination and formal benchmarking may be an effective tool in maintaining equitable, efficient and sustainable water prices.

An issue that has not been addressed by this study is the cost of wastewater disposal and the management of other impacts on water resource quality. Wastewater constitutes a significant (but usually separate) proportion of the overall water services charges in most municipalities. Wastewater management also represents a rapidly increasing component of cost in most of the comparator countries. These and other environmental management costs will be more important in the future and may become higher than the cost of water supply itself.

Overall, South Africa's water pricing performance is reasonably good, considering that its water is relatively scarce. It does not (yet) face the problems of supply reliability that confront some of its developing country peers. The evidence does not present a strong case for independent regulation although existing "systemic regulation" could usefully be strengthened by greater transparency. However, the country will face growing challenges, particularly inland where absolute scarcity rather than price is becoming a limiting factor for industry in some areas. In this context, water may be under- rather than over-priced.

1. Background and methodology

1.1. Introduction

The availability of water, an essential input into most industrial processes, is an important dimension of industrial competitiveness, although water is rarely a major input cost for industry. However, in a physical climate of scarcity, the way water prices are determined may have significant impacts on competitiveness, both directly and in terms of their implications for future water supply conditions.

This study reports the levels and trends of water prices in South Africa and outlines the way in which those water prices are determined. It seeks to evaluate whether the price of water to industry is reflective of the costs incurred in making that water available and whether the price-setting process leads to optimal, or at least reasonable, outcomes. Water prices are compared with the two most commonly used indices of inflation, CPIX and PPIX. Since little difference was found between the two, CPIX has been used throughout the report.

In drawing conclusions, reference is made to relevant international comparator countries against which both price levels and price-setting processes can be benchmarked usefully.

This is not a simple exercise. The water industry is complex and often poorly understood, internationally as well as in South Africa.

In part, this is because the water industry draws its main input from natural systems whose management is best analysed using the tools of resource economics, recognising that water is a renewable resource, albeit one whose availability varies in space and time in a number of dimensions. The requirements of resource protection add to the complexity.

The industry is recognised to provide social goods as well as economic goods, which raises questions about the structure of its management in general and its pricing in particular. It is conducted largely in the public domain, often by multi-functional organisations, which adds to the challenge of assessing its costs and prices.

Water services are also provided in different forms and under a variety of conditions. Between the natural resource and the retail service there is often a bulk intermediary, structured as a monopolistic public utility. But retail, and sometimes bulk, services are also provided through institutions of local government as part of a bundle of municipal services which may include the management and disposal of wastewater.

A further consequence of the complexity and diversity of circumstances is that data sources are limited and fragmented.

To understand the pricing of water supply services in this context, it is necessary to understand the products, the institutions and the structure of pricing and regulation

within each sub-system and then to understand the interface and interaction between them in practice.

While the aim of the current study is to review and evaluate the price and pricing of water as an economic input, it is not possible to do this without considering the natural resource context or the interaction with services provided to 'social' consumers.

The analysis is helped by that fact that South Africa's water management policy and legislation were completely revised after 1994 and many of the institutions concerned were substantially restructured. While this may mean that it is difficult to obtain long-term data in a form which can be compared to the present, the system is relatively well described and takes into account many recent innovations.

As such, it is widely regarded as representing best practice in some dimensions, although deviating significantly in others. One challenge is that implementation of the new framework is still under way. It is widely recognised that water sector reform is a long-term business and Government's formal timeframe for the reform of the water resource sector, with its 20-year time horizon, is not exceptional.

As well as presenting South African and comparative data, this study seeks to answer the following questions:

- Are tariffs cost reflective?
- Are the processes through which tariffs are set transparent and do they provide opportunities for consultation and comment?
- Are tariffs adequate to sustain services in the long run and do tariff-setting processes take account of investment requirements and avoid the sharp changes inherent in a sector with large, lumpy investments?
- What is the balance between domestic and industrial prices and is there any formal or informal cross-subsidy between the two streams?
- What other factors impact on industrial water prices?

And, in a broader context:

- How do South Africa's industrial water tariffs compare internationally?
- How does South Africa's tariff-setting process compare to international practice?

1.2. Water services – the nature of the water 'product'

In order to understand the structure of South Africa's water industry, it is first necessary to understand the nature of the product and that water is not a simple product. As a starting point, it is useful to consider the distinction between:

- Water as a natural resource (which may occur in rivers, lakes or underground); and
- Water services (typically delivered and removed through pipe networks).

With regard to water supply services, a distinction is frequently made, implicitly or explicitly, between water as a social good and as an economic good. The 'social good' refers to water necessary for households to maintain a healthy level of living and is widely considered to be a human right, while the 'economic good' refers to usage for commercial purposes or to water used by households beyond the basic minimum required to sustain a healthy level of living. These distinctions are reflected in approaches to water pricing, although the boundary between them is often contested.

In addition to the quantity of water provided, there are other dimensions to be considered, which include:

- The quality of water supplied;
- The reliability of the supply; and
- The location to which it is supplied.

A distinction can further be made between consumptive use (where the water is not returned to the natural system, as in irrigation or evaporative cooling) and non-consumptive use (where it is returned, albeit in a different condition, as in the use of water for water-borne sanitation or the generation of hydroelectricity). The pricing of water may differentiate between the two types of use.

The provision of a water supply service inevitably impacts on the natural resource from which it is taken, as well as the environment into which wastewater is disposed, and arrangements for abstraction and disposal must be considered as an inherent part of the 'product'. This gives rise to a separate set of wastewater 'products' and industry structures.

In locations where water is relatively plentiful, its provision requires only abstraction, treatment and distribution infrastructure. However, in most parts of South Africa water is a scarce resource and substantial investment may be required in storage and transmission infrastructure simply to provide a reliable source.

Water resources (rivers, lakes and the sea) are often used to dispose of human and industrial waste. The 'absorptive capacity' of the resource is a valuable 'product' in its own right and needs to be managed. There are thus regulatory controls on wastewater discharges. The quality of wastewater is usually regulated, and pricing and charging for wastewater discharges are increasingly being applied worldwide, including in South Africa.

Conversely, recognition may be made of the value of wastewater and payment made for the supply of waste of a specified quality. In addition, conditions may be placed on the use of wastewater in view of its potential health and environmental impacts.

The management of the resource, both to ensure availability of supplies as well as to protect the resource from the impact of waste water discharges is an important activity that requires an effective regulatory framework as well as management structures. In some jurisdictions, including South Africa, water users are expected to contribute to these management costs.

In understanding the pricing of water, account must therefore be taken of the different steps along the value chain, from the natural resource to the service to the consumer. A schematic breakdown of the natural resource management and water services activities is as follows:

Natural resource

- Rainfall capture;
- Seasonal storage;
- Regulated release into a river/stream; and
- (Inter-system transfers).

Water service

- Abstraction from a dam or river;
- Treatment;
- Transmission;
- Peak storage; and
- Distribution to users.

(Wastewater disposal

Although wastewater disposal is not dealt with in this review, a similar set of activities applies.)

Water services 'products' may thus include

- Raw (untreated) water delivered to the user, in bulk;
- Treated water delivered to the user, in bulk;
- Treated water delivered to small retail and domestic users;
- Wastewater removed from premises, treated and disposed of; and
- Wastewater discharged directly into a water resource, after treatment by the user.

In all cases there will be implicit or explicit undertakings in respect of the bio/chemical quality and the reliability of the service, as well as, in some cases, the timing of its provision.

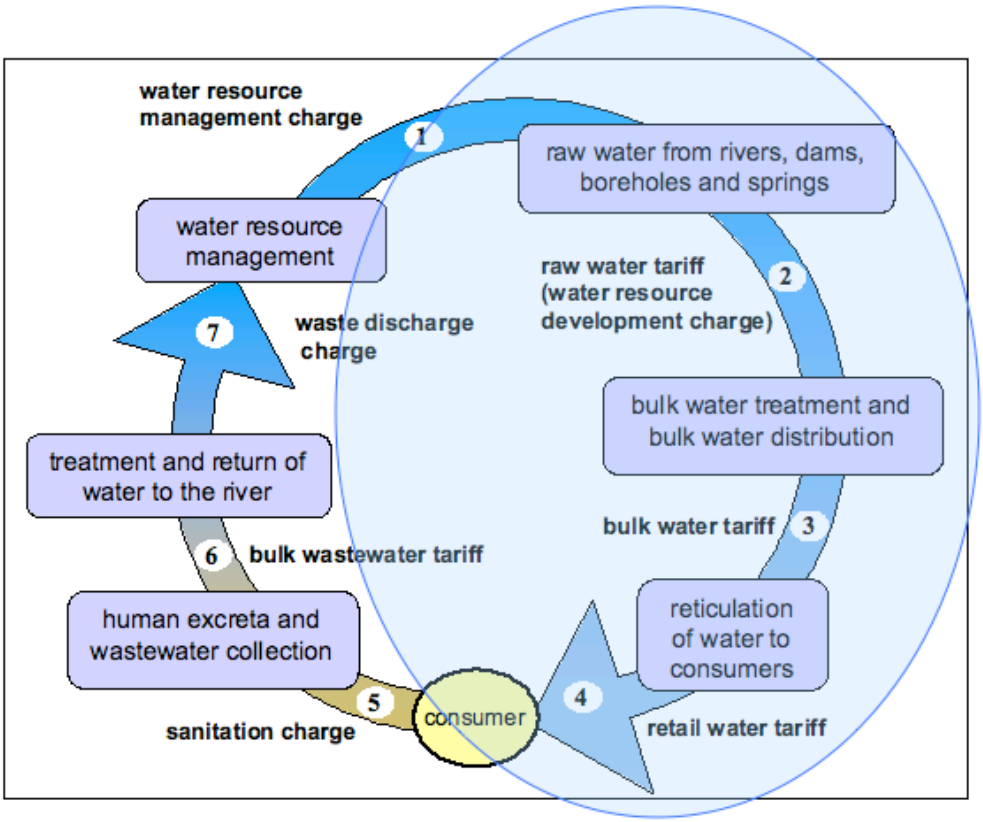
1.3. Structure of water supply institutions in South Africa and their regulation

1.3.1 Introduction

The institutional structure of the water industry provides the framework within which water products and services are priced. This reflects the spectrum of water products that it provides, as well as the different steps along the value chain. It is complicated by the fact that different institutions perform different sets of activities in different contexts.

The scope of the present study is outlined in the following illustration from the DWAF Strategic Framework for Water Services (2003). Figure 1 illustrates the various stages in water supply (and disposal).

Figure 1 – The various stages in water supply and disposal



The focus of this review, highlighted in the diagram, is on water supply. The waste disposal/quality management dimension, which is currently under reform, is not included, while the water resource management charge, which is largely concerned with resource quality, is touched on only briefly.

1.3.2 Water supply institutions

At the institutional apex of water supply institutions is the **Department of Water Affairs and Forestry (DWAF)**. At present, DWAF, under the guidance of the Minister of Water Affairs and Forestry, is both a policy setting and operational agency. Amongst a variety of other functions, it:

- Regulates allocations of water from the natural resource to users and controls activities such as pollution that could damage the resource;
- Develops and operates storage and transmission infrastructure for water resource systems supplying multiple users;
- Provides untreated water in bulk to large users using its own infrastructure, and sets and collects the tariffs for such supplies;
- Establishes and regulates Water Boards, which provide wholesale supplies of bulk treated water to retail suppliers such as municipalities as well as direct supplies to large end-users;
- Establishes and regulates Water User Associations, usually groups of farmers whose water needs are met using common infrastructure whose ownership may be with DWAF or with the associations themselves; and
- Sets norms and standards and regulates tariff structures for Water Services Authorities (those municipalities that have been allocated the function by the Minister of Provincial and Local Government).

DWAF also regulates the discharge of wastewater back into the water resource and may, exceptionally, undertake wastewater treatment activities to manage the quality of the water resource.

Provision is made in the National Water Act for the establishment of **Catchment Management Agencies** to which the Minister may delegate a range of the resource management functions currently undertaken by DWAF. Only a few CMAs have been established and none are yet undertaking functions in this regard.

The establishment and regulation of Water Boards are governed by the **Water Services Act (1997)**, while Water User Associations (normally focusing on irrigation) are provided for in the **National Water Act (1998)**. Since Water User Associations are primarily engaged in the supply of water for agricultural purposes, they are not considered further in this study. The South African Association of Water Utilities (SAAWU) provides a forum for the utilities to address matters of common interest and to interact with other stakeholders.

The functions of retail provision of water supply services and sanitation, including the removal and disposal of wastewater and the management of stormwater, are the responsibility of **municipalities**, which has been designated as **Water Services Authorities**. Where outside of the Metropolitan areas there are both a local and a district municipality, these functions may be allocated by the Minister of Provincial and Local Government to either the local or the district municipality. An important structure in this context is the South African Local Government Association (SALGA) which represents municipalities in policy and technical discussions with national government and utility organisations.

Given the variety of physical circumstances, there is a substantial variation in arrangements for the actual performance of the individual activities in the water supply value chain from one area to another, as illustrated in Table 1 below.

Table 1 – Individual activities in the water supply value chain

Function	Typical	Extensive intermediaries	Limited intermediaries
Natural resource			
• Resource management	DWAF	DWAF	DWAF
• Seasonal storage	DWAF	Water Board	Municipality
• Regulated release into river/stream	DWAF	Water Board	Municipality
• (Inter-system transfers)	DWAF	Water Board	Not required
Water supply service			
• Abstraction from dam/river	Water Board	Water Board	Municipality
• Treatment	Water Board	Water Board	Municipality
• Transmission	Water Board	Water Board	Municipality
• Peak storage	Municipality	Municipality	Municipality
• Distribution to consumers	Municipality	Municipality	Municipality
Example	**Johannesburg**	**Polokwane**	**Steve Tshwete (Middelburg)**

In many cases, different organisations may provide the same function. For instance, some municipalities own and operate a dam but supplement their supplies from water boards or DWAF. The implications of different configurations are demonstrated in the makeup up the tariff for Ethekwini and Johannesburg:

Table 2 – Composition of tariffs in 2004

Municipality / Bulk supplier	DWAF element	Water Board element	City element
Joburg Water / Rand Water	43.3%	32.0%	24.6%
Durban Metro / Umgeni Water	7.4%	41.8%	50.8%

1.3.3 Choice of supplier

The water supply industry in a particular area is usually an effective monopoly and industrial water users have limited and often no choice of supplier. However, some institutional choice is available in terms of the Water Services Act, which distinguishes the role of **Water Services Authority** (which is always the municipality to which the relevant powers and functions have been allocated) from the **Water Services Provider**, which is either the Authority itself or an organisation contracted by it to undertake the operational provision of services. In terms of this provision, a range of private sector or public providers may be engaged, although S.19 (2) of the Act requires that public options be considered before a private provider is contracted.

S.7 of the Water Services Act also makes specific provision for **industrial water users** to take water from a source other than the "nominated water services provider", albeit with the approval of the Water Services Authority. S.8 of the Act further outlines the factors that the Water Services Authority must take into account when considering such an application and provides recourse to the Minister in the event that approval is unreasonably withheld.

This has been tested in a number of cases and the decisions taken have established the precedent that large industrial consumers cannot be 'held to ransom' by municipalities which seek to impose a supply monopoly but are not able to provide an effective service and simply seek to impose a levy on the user.

1.3.4 Regulation

Arrangements for the regulation of water reflect the Constitutional distinction between water as a natural resource and water as a municipal service.

The use of water as a natural resource is regulated by national legislation, specifically the National Water Act (1998), although some other legislation, in particular that dealing with environmental matters, also applies.

Municipal water supply and sanitation services are regulated under the framework of the Water Services Act (1997), whose scope is limited in terms of S.44 of the Constitution to establishing and maintaining standards. These services are also regulated by municipal legislation of the Department of Provincial and Local Government, as well as the municipal financial legislation of the National Treasury, which sets standards for the general administration of Local Government.

There is no independent regulator for water, although a Water Tribunal was established by the National Water Act to provide independent review of DWAF's administrative decisions in terms of the National Water Act.

2. Findings: water prices and price-setting processes in South Africa

Price data has been collected, collated and summarised for:

- All six Metropolitan municipalities;
- Six secondary cities with different institutional configurations: Buffalo City, Polokwane, Mangaung (Bloemfontein), UmHlatuze (Richards Bay), Sol Plaatjie (Kimberley) and Steve Tshwete (Middelburg, Mpumalanga);
- Four Water Boards serving the majority of the municipalities sampled (Rand, Umgeni, Amatole and Bloem Water); and
- Bulk water supplied directly by DWAF.

The objective was to obtain data sets providing:

- Time series, preferably from the establishment of new municipalities (2001/2); and
- Data aggregated by type (industrial/commercial and domestic).

Reasonably complete data sets were obtained, although some municipalities and Water Boards had difficulties in providing data for past years, while the DWAF data set is of limited use because of the introduction of new pricing approaches over the time period considered.

2.1. Water prices and price trends: municipal

The municipal data obtained have been summarised by municipality and user category (domestic and industrial/business/commercial). Since in many cases, different tariffs are charged depending on the volume of water supplied, a simple average was taken to obtain a single tariff for domestic and industrial/business uses, respectively. While it would be a more appropriate and accurate method to use a volume weighted average, the data to calculate this are simply not available in South Africa, as in many other countries, including OECD countries. Since tariffs are taken from municipal tariff schedules, they include VAT.

Average municipal tariffs were also calculated using simple averages. In this case, the inclusion of all six Metros provides some weighting against the relatively small sample of other municipalities. Where data were not available, annual national averages were calculated, excluding that municipality.

The summary municipal data are presented in Table 3 below.

Table 3 – Municipal water prices in South Africa: summary

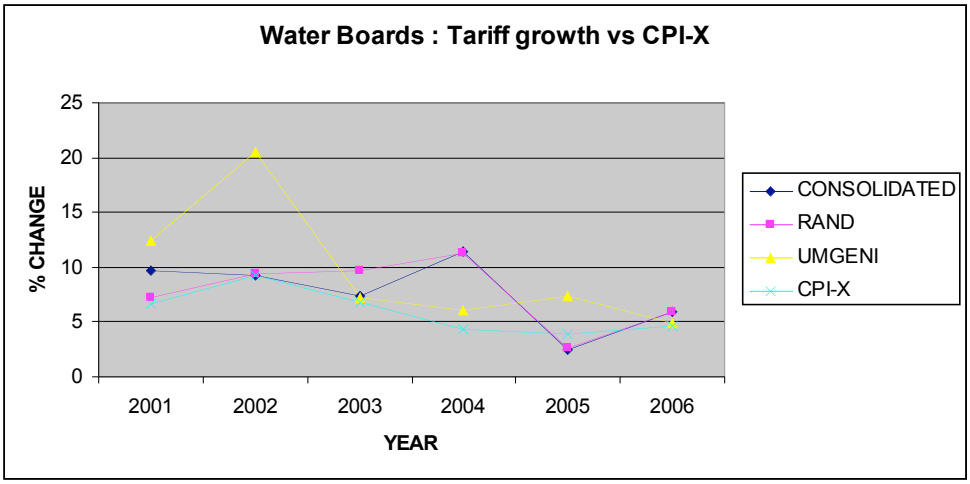
Summary	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07
Domestic						
JOHANNESBURG	0.00	4.15	4.60	5.02	5.40	5.85
CAPE TOWN	3.78	3.12	4.22	4.22	6.11	6.54
NELSON MANDELA	3.83	4.05	4.46	4.86	5.10	5.36
ETHEKWINI	4.25	4.53	5.02	5.15	5.83	6.27
TSHWANE	4.39	4.63	4.99	5.51	6.15	6.53
EKURHULENI	5.39	0.00	0.00	0.00	5.53	6.14
UmHlatuze	2.33	2.40	2.63	2.62	2.55	2.44
Polokwane	4.42	4.73	5.12	5.43	5.70	6.07
Buffalo City	2.76	2.94	4.05	4.45	4.68	4.94
Steve Tshwete	1.94	1.87	2.04	2.19	2.28	2.40
Mangaung	4.54	4.98	5.48	6.02	6.47	6.98
Sol Plaatjie	3.89	4.43	5.19	5.66	6.05	6.62
Average	*3.77*	*3.80*	*4.35*	*4.65*	*5.15*	*5.51*
% increase		*0.75*	*14.32*	*6.94*	*10.92*	*6.88*
CPI	*6.60*	*9.30*	*6.80*	*4.30*	*3.90*	*4.60*
Industrial						
JOHANNESBURG	0.00	7.09	7.80	8.50	9.15	9.90
CAPE TOWN	3.16	0.00	0.00	0.00	5.45	5.83
NELSON MANDELA	0.00	3.06	3.24	3.56	3.88	4.07
ETHEKWINI	4.25	4.17	5.02	5.42	5.83	6.27
TSHWANE	0.00	0.00	0.00	0.00	5.80	6.15
EKURHULENI	4.02	0.00	0.00	0.00	7.58	7.94
UmHlatuze	2.35	2.56	2.87	2.48	2.69	2.88
Polokwane	6.45	6.90	7.46	7.91	8.31	8.84
Buffalo City	3.66	4.21	4.51	4.96	5.20	5.49
Steve Tshwete	2.18	2.18	2.29	2.45	2.56	2.70
Mangaung	4.57	5.01	5.52	6.06	6.52	7.03
Sol Plaatjie	5.33	5.86	6.78	7.28	7.78	8.51
Average	*4.00*	*4.56*	*5.05*	*5.40*	*5.90*	*6.30*
% increase		*14.11*	*10.83*	*6.87*	*9.16*	*6.86*
CPI	*6.60*	*9.30*	*6.80*	*4.30*	*3.90*	*4.60*

2.2. Bulk water prices and price trends: Water Boards

While DWAF maintains a systematic record of Water Board financial statements, this does not include tariffs so a dual approach was taken. The Board's income statements were used to provide an average price for volume sold, using total revenue as the denominator. As a check, tariffs for the Boards sampled were obtained directly, and since the Boards concerned provide a predominantly bulk service, an average bulk tariff for treated water was calculated and used. Comparison of the two approaches correlated reasonably well, but since tariff data were missing for some years and the financial statement route enables 'volume-weighting', the data from the financial statements have been used for analysis. This has the defect of including some retail supply revenue where Boards undertake this function although this is a relatively minor component and does not significantly alter the findings.

The results (see Figure 2) show an increase from 2001/2 to 2006/7 of 42% compared to a CPIX increase over the same period of 32.7%. There were a number of specific challenges over the period, notably the increase at Umgeni in 2003/4 of 20.5%, which was part of the resolution of that organisation's longstanding financial management problems. Similar events affected Lepelle. Tariffs in other Boards fluctuated more, reflecting, in part, extensive changes in jurisdiction, the impact of drought and the commissioning of new capacity.

Figure 2 – Water Board tariff growth versus CPIX



While some Boards have adopted uniform tariff structures, others, notably Rand Water, have maintained a degree of differentiation between users based on history, geography, the nature of service provided and particularly, user-specific infrastructure. There is a move to bring all users into a common, cost-reflective and non-discriminatory system. Thus Rand Water's 2004 Annual Report explained that:

Water tariffs

The following increases were implemented from 1 July 2004:

- *Municipal customers received a 5.7% increase, bringing their tariffs to R2.63 per kl excl. VAT and the Water Research Commission (WRC) levy.*
- *Crushing mines received a 5.7% normal increase for domestic water usage.*
- *For crushing mines' operational use and for Spoornet, the agreed-upon phasing out of the preferential tariff for water was in its third year of a four-year phasing out period and gave rise to a 10.9% increase, resulting in a tariff of R3.67 per kl, excluding VAT and WRC levies.*
- *Non-crushing mines received a 5.7% increase, bringing their tariff to R3.99 per kl excl. VAT and the WRC levy.*
- *Direct customers received a 5.7% increase, bringing their tariffs to R4.94 per kl excl. VAT and the WRC levy.*

This reflects Rand Water's tariff policy, in terms of which:

"… the tariff for each municipality will be calculated as the product of various factors multiplied by the average cost of water. It is proposed that the various factors will be calculated according to the following principles:

- *According to the level of unaccounted for water.*
- *According to the lifeline need of the population served.*
- *According to the demand patterns.*
- *According to the efficiency of water consumption.*
- *According to the availability of water.*
- *According to the scarcity of water.*
- *According to the capital costs of the water supply system, which are also related to the distance of the consumer from the water resource.*

However, the Board sought to ensure that:

"Tariffs will, as far as is practicable, reflect the required revenue necessary to cover all costs, including levies, incurred in the making of a sustainable supply to any particular region of Rand Water's service area. Regions would in general terms be those areas away from the main supply base… This means that different tariffs may apply in different regions of the services area and to different consumer sectors.

The bulk potable water tariffs will be uniform for any consumer sector in any particular region of the service area. The tariff, if the same for any consumers in a particular region, will cover a level of service which will be capable of being described as being equivalent in nature."

(Extracted from Rand Water: Corporate Policy available at www.randwater.co.za/About_RandWater/corporate_policy.asp#bulk)

2.3. 'Raw water' prices and price trends: DWAF charges

The tariffs levied by DWAF for the supply of water from its schemes are calculated in terms of the approved National Water Pricing Strategy which takes into account actual operational and financing costs and fixed asset depreciation based on current asset values. Tariffs are thus scheme specific, although such schemes can cover a wide

area, as is the case of the Vaal system, which covers Gauteng and many parts of surrounding provinces. As a result, raw water prices vary widely and in some cases real prices have decreased.

In order to give an indication of price trends, a sample of schemes was taken to give average price and percentage increases. The sample included schemes supplied from the Vaal system, including the 'Trans-Caledon Tunnel Authority (TCTA) levy', as well as smaller and older schemes with much lower costs. Schemes supplying Water Boards and sample municipalities were included. For this sample, the average raw water price was 66c/kl (range 3.97 to 306.78) and grew at an annual rate of 7% (range -9.7% to +35.3%) between 2003 and 2006, the years in which data were available.

Table 4 – Water resource charges

Water resource charges		2003	2004	2005	2006	Increases 2003/6 (%)	Increases 2005/6 (%)
Gauteng region							
Vaal system		142	150.7	158.4	167.65	18	6
TCTA		116	122.4	131.58	140.83	21	7
Komati Duvha Hendrina		90.74	99.81	110.99	110.99	22	0
Usutu Kendal		163.28	179.61	199.72	221.29	36	11
Usutu Vaal Douglas		198.1	282.67	270.085	257.5	30	-5
Western Cape region							
Berg Voelvlei - CT		23.17	28.8	30.53	30.53	32	0
Breede Brandvlei Conservation Board		16.19	15.9	15.9	16.7	3	5
Mossel Bay		67.36	74.1	78.55	83.18	23	6
Palmiet CT		23.17	30.71	n/a	33.72	46	
Riviersonderend system - Paarl		25.1	24.72	26.2	26.2	4	0
KwaZulu-Natal							
Goedertrouw Mhlatuze WB		22.78	24.94	27.34	29.92	31	9
Hazelmere 72		49.42	52.93	53.5	53.5	8	0
Midmar		15.64	15.64	15.64	15.64	0	0
Pongolapoort		14.63	14.63	14.63	14.63	0	0
Spioenkop		9.23	10.15	11.29	12.42	35	10
Limpopo							
Blyde - Lepelle		2.93	3.22	3.58	3.97	35	11
Ebenezer Lepelle		2.71	2.98	3.32	3.99	47	20
Tzaneen		9.55	10.51	11.56	12.71	33	10
Middle Letaba Dam		57.39	63.13	63.13	63.13	10	0
Eastern Cape							
Amatola Wriggleswade dam		53.99	65.15	69.71	76.43	42	10
Fish Sundays Mistkraal weir		18.08	19.89	22.12	24.51	36	11
Gamtoos Loerie		33.22	36.68	36.78	37.36	12	2
Kat		83.29	83.29	83.29	83.29	0	0
Mthatha		54.48	55.35	60.36	64.13	18	6
Lower Sundays Scheepersvlakte		33.22	36.68	60.99	67.58	103	11
Nahoon		107.99	65.15	69.71	76.43	-29	10
Mpumalanga							
Kwena		11.61	11.61	11.61	11.61	0	0
Bronkhorstspruit (to Magalies)		8.54	9.39	9.39	11.06	30	18
Komati Drikop Mag		21.37	21.37	21.37	21.77	2	2
Flag Boshielo		25.24	25.45	25.45	25.71	2	1
Loskop Middelburg		7.42	8.16	9.07	9.65	30	6
Usutu Vaal Witbank dam	TCTA	270.3	282.67	266.14	306.78	13	15
Free State							
Welbedacht Bloem		17.29	17.29	17.29	17.29	0	0
Sand Vet		19.11	21.02	23.27	25.89	35	11
Vaal system		142	150.7	158.4	167.65	18	6
Average increase	*%*					*21*	*6*
Average price	*c/kl*	*56*	*60*	*64*	*66*	*19*	*4*

An illustrative extract is given from the Gauteng region, which manages a number of major systems, including the Vaal system which supplies Rand Water and key bulk users such as Eskom, as well as a number of municipalities and other bulk users. Water supplied directly from the Heyshope dam, one part of the Usutu Vaal scheme, is charged at just 8c/kl; water provided from a canal on the Tugela Vaal scheme is charged at 12c/kl. Meanwhile, water from the Usutu scheme to an Eskom power station is charged at R4.34/kl. R3.53/kl, including a TCTA charge of R1.41, is charged for supply from the Usutu Vaal scheme to another Eskom installation. Users drawing from the main Vaal system pay less – a uniform R1.68 including the TCTA charges. Similar schedules are prepared for each of the DWAF water management regions and are available on the DWAF website.

The basis on which the charges were calculated reflects the principles and approaches outlined in the pricing strategy (see below). The prices are influenced by the costs of new investments, as in the case of the TCTA component of the tariff which funds the Lesotho Highlands Water Project, as well as by phasing-in arrangements over a 10-year period, which impacts differently in different schemes.

In addition to the water resource infrastructure charges, all water users pay a Water Resource Management charge and a Water Research levy. Both charges are small relative to the Water Resource Infrastructure charge, except for users such as the forestry industry and self-supplied industrial users who do not contribute to the Water Resource Infrastructure charge. The Water Resource Management charge ranges from 0.42c/kl to 3.25c/kl, while the Water Research levy is presently set at 3.1c/kl.

The Water Resource Management charge will eventually provide a source of income to Catchment Management Agencies to support their core management activities as DWAF withdraws from direct operational activities in terms of its Institutional Development Programme.

The Water Research levy funds the Water Research Commission which guides and administers South Africa's extensive Water Research Programme which is undertaken by service providers in universities and industry who bid on a competitive basis for research funds to meet strategic priorities which are set in consultation with users. (The methodology for the determination of the research levy is currently under review).

Table 5 – Water resource management charge (c/m^3)

Water Management Area	Water Resource Management Charge (c/m3)		
	Domestic & industrial	Agriculture	Forestry
1 Limpopo	1.07	1.07	0.52
2 Luvuvhu Letaba	2.13	1.27	0.80
3 Crocodile (w), Marico	1.02	1.02	0.52
4 Olifants	1.32	1.05	0.48
5 Inkomati	0.88	0.90	0.49
6 Usutu-Mhlatuze	0.65	0.56	0.31
7 Thukela	0.45	0.45	0.27
8 Upper Vaal	1.32	0.84	0.56
9 Middle Vaal	1.55	1.20	N/A
10 Lower Vaal	0.95	0.69	N/A
11 Mvoti-Umzimkulu	1.20	1.15	0.66
12 Mzimvubu-Keiskamma	1.62	1.20	0.68
13 Upper Orange	0.42	0.27	N/A
14 Lower Orange	0.90	0.60	N/A
15 Fish-Tsitsikamma	1.41	0.77	0.37
16 Gouritz	2.51	0.76	0.41
17 Olifants/Doorn	1.66	0.70	0.41
18 Breede	2.64	0.64	0.25
19 Berg	3.25	0.84	0.54

The Water Research levy is 3c/m^3 in all areas.

2.4. Price setting processes: mandates

In all cases, the price setting process is regulated by statute. Four key pieces of legislation are relevant in this regard:

National Water Act (1998)	Water resource and DWAF bulk water supplies
Water Services Act (1997)	Bulk water services (water boards) and Structure of tariffs for municipal water services
Municipal Finance Management Act	Municipal price levels
Municipal Systems Act	Municipal price levels

2.5. Price setting processes: institutional responsibilities

The tariffs for water supply to individual users are built up from the water resource costs, the bulk water production costs and finally (where applicable) the municipal costs incurred in distributing the water (see Appendix 1). The institutional responsibility for tariff setting and regulation for the different water 'products' and institutions is outlined in Table 6 below (areas covered by this study are highlighted since wastewater management and related issues are not included).

Table 6 – Institutional responsibility for tariff setting and regulation

Tariff / charge	Responsibility for setting tariff and source of authority	Responsibility for regulating the tariff (and comments)
Water resource management charge. (Recovers the costs of water resources management*.)	Catchment Management Agency in terms of National Water Act.	DWAF. Where there is no catchment management agency, DWAF also sets the tariff (self-regulation).
Raw water tariff (water resource development charge). (Recovers the infrastructure and operating costs of schemes.)	DWAF in terms of the national raw water pricing strategy and in consultation with water users including local government.	DWAF (subject to National Treasury oversight). (Note: raw water tariffs are also implicitly set by Water Services Authorities and Water Boards where these organisations manage raw water systems.)
Bulk water and wastewater tariffs. (Recovers the cost of conveying and treating bulk water and wastewater.)	Negotiation between Water Board and Water Services Authority (or its appointed provider) in the case of a Water Board. Water Services Authority where bulk function undertaken itself or by an entity owned by the Water Services Authority. Consultation between Water Services Authority and external provider of service (for example, another municipality).	DWAF (direct regulation of Water Boards). Water Services Authority. DWAF (these are subject to National Treasury oversight).
Retail water tariff and sanitation charges. (Includes the bulk water and wastewater tariff and recovers the retail costs.)	Water Services Authority in terms of the Water Services Act and Municipal Systems Act.	Water Services Authority (subject to DWAF oversight). DWAF sets national norms and standards for the setting of retail tariffs.
Waste discharge charge (proposed). (A water resource charge based on the 'polluter pays' principle.)	Catchment Management Agency in terms of National Water Act, in consultation with water users, including local government. DWAF where there is no CMA.	DWAF (subject to National Treasury oversight).

***** *Includes evaluating and issuing licences, monitoring water resource quality against the water resource objectives, detecting and prosecuting unlawful use, promoting water conservation and demand management and removing and managing alien vegetation.*

2.6. Process for price setting in water resources: national

The DWAF is empowered to set tariffs by the National Water Act (1998) which provides that: "The Minister may, with the concurrence of the Ministry of Finance… establish a pricing strategy for charges for any water use within the framework of existing relevant government policy" (the full text of S.56 can be found in Appendix 2).

The process of establishing prices for the bulk water supplied by DWAF is described in a statutory Water Pricing Strategy first established in 1999 after wide consultation and revised in 2005. As outlined in the 1999 Strategy:

> *"The broad principles underlying the new approach to the pricing of water use are already reflected in the* White Paper on a National Water Policy for South Africa, 1997, *and in Chapter 5 of the* National Water Act, 1998 *(the Act). This document expands on those broad principles, in a manner consistent with the provisions of the Act, and provides a framework for implementing the new pricing strategy for water use.*
>
> *This strategy refers to pricing the use of water from South Africa's* ***water resources,*** *and not to the pricing of* ***water services****. Water services, including the pricing thereof, have been dealt with separately in the Water Services Act, 1997. In other words, the new approach deals with first tier water, i.e. the use of raw water from the water resource. It does not deal directly with second and third tier water, i.e. water supplied in bulk (often by water boards) and distributed to households (usually via a water services authority), except for water supplied by Government water schemes. The strategy deals with all first tier water as reflected in the use of ground and surface water resources and covers the setting of prices by the Department of Water Affairs and Forestry (DWAF) as well as by water management institutions as defined in the Act."*

The strategy notes that South Africa faces water scarcity and that demand management (of which water pricing forms part) must be a priority. It considers the setting of water use charges for:

- Funding water resource management;
- Funding water resource development and use of waterworks; and
- Achieving the equitable and efficient allocation of water.

It further indicated that charges would be differentiated on a water management area basis and that the end-user sectors for which unit sectoral charges would be calculated annually were the following:

- Water Services Authorities;
- Industrial, mining and energy;
- Irrigation; and
- Stream flow reduction activities.

For the industrial, mining and energy sector, a process of phasing-in the new tariff structure is under way which substantially affects pricing trends. It is noted that:

> *"The application of the first tier pricing strategy to this sector will be identical to that of the water services authority sector, except for the aspect of dealing with basic human needs. The introduction of the water resource management charge will be based on full financial cost recovery by charging for "economic" uses of water in the water management area and will be implemented after registration of water uses in the area. The water resource development and use of waterworks charge will be subject to increases of the PPI + 10% over current tariffs for the first number of years from April 2000 onwards. The objective is to reach the target*

charges within ten years. Thereafter, annual tariff increases will be limited to the inflation rate (PPI). Tariffs will not be reduced below the level of the previous year."

The 1999 Pricing Strategy (Para 5.4) contains formal commitments to processes of consultation in the setting of annual prices, which include a commitment to sound and transparent financial management and to detailed discussion with users and other stakeholders of the actual expenditures on which prices have been based:

"Transparency and accountability

In establishing the pricing strategy, every attempt must be made to control costs by the application of sound financial management principles such as strict budgetary control. The new pricing strategy embraces the principle of transparency, which of itself should promote cost control. In terms of this principle, the forthcoming year's sectoral charges that are developed during the budgetary process for each water management area will be forwarded to regional offices for dissemination and discussion with interested parties. Final sectoral charges will then be formalised and made available to the regional offices for re-distribution to the area offices, prior to the commencement of the financial year.

In addition, a summarised version of the budgeted trading accounts for the forthcoming year, detailing estimated deficits and surpluses of accounts, will be made available at the regional offices for discussion with the representative bodies of stake-holders, prior to the commencement of the financial year. Similarly, after financial year end, summarised trading accounts reflecting actual expenditure and revenue compared to budget expenditure and revenue for the year, will be made available at the regional offices. CMAs must introduce similar accounting practices."

An example of consultation in practice is that tariffs are now prepared in time to serve as an input into the annual water tariff consultations of the Water Boards and municipalities, for which DWAF prices are an important cost element.

Since a substantial part of the country is served by the Vaal system, augmented by the Lesotho Highlands Water Project, the approach to the determination of this system tariff is of particular relevance. Infrastructure costs are known but operational costs and the (variable) finance costs must still be covered. In order to provide certainty to financiers as well as to users, an income agreement was entered into between DWAF and TCTA, setting out the approach to be used for setting the TCTA component of the tariff (see Appendix 3).

2.7. Process for price setting in bulk water services: Water Boards

DWAF regulates the price-setting process of the Water Boards. S.40 of the Water Services Act requires that a Board's mandatory Annual Business Plan should include, inter alia, "the tariff applicable to each service, the method by which it was determined, the motivation for the tariff and the estimated tariff income" as well as forecasts of capital expenditure, etc:

Business plan

40. (1) A water board must, not later than one month before the commencement of each financial year, prepare and adopt a business plan relating to the following five financial years.

(2) The business plan must at least contain information regarding –
(a) each specific primary and other activity to be undertaken and the performance targets for each;
(b) the tariffs applicable to each service, the method by which it was determined, the motivation for the tariff and the estimated tariff income;
(c) forecasts of capital expenditure for the primary and other activities for the next five years; and
(d) any other information which the Minister may prescribe from time to time.

(3) A water board may, with the approval of the Minister, exclude commercially sensitive information from its business plan.

(4) Every business plan must be submitted to the Minister.

(5) A business plan may be amended from time to time.

Water Services Act 108 of 1997

The Minister has the power to direct a Water Board to amend its Business Plan (including its tariff) if it:

(40) 6 (a) (i) is not in the best interests of the general population within its service area; or
(ii) is not in accordance with the parameters laid down in section 34 (1).

Water Services Act 108 of 1997

The parameters laid down include specific financial requirements:

Parameters for functions of water boards

34. (1) In performing its activities, exercising the powers and carrying out its duties a water board must achieve a balance between –

(a) striving to provide efficient, reliable and sustainable water services;
(b) optimally using available resources;
(c) striving to be financially viable;
(d) promoting the efficiency of water services authorities;
(e) taking cognisance of the needs of water services institutions, consumers and users;
(f) taking into account national and provincial policies, objects and developments;
(g) acting in an equitable, transparent and fair manner;
(h) complying with health and environmental policies; and
(i) taking reasonable measures to promote water conservation and water demand management, including promoting public awareness of these matters.

(2) For the purpose of subsection (1)(c) a water board is financially viable if it is able to –
(a) repay and service its debts;
(b) recover its capital, operational and maintenance costs;
(c) make reasonable provision for depreciation of assets;
(d) recover the costs associated with the repayment of capital from revenues

(including subsidies) over time; and
(e) make reasonable provision for future capital requirements and expansion.

Water Services Act 108 of 1997

In practice, DWAF oversight has been based on requiring the Boards to motivate any price increases in excess of inflation, under the threat that the Minister will direct that the Business Plan (including tariffs) be amended if the proposed tariffs – or the activities and expenditure underlying them – are unreasonable.

DWAF has required Water Boards to enter into contracts with their municipal clients, a process which is still under way. In addition, National Treasury has prescribed that Water Boards must consult formally with their local government clients. S.41 of the Municipal Finance Management Act (2003) also requires the National Treasury to monitor the pricing structure of bulk resource suppliers (including water) as well as requiring the suppliers to provide monthly reports on the payment of invoices by municipalities. S.42 outlines a timetable (see Appendix 8) for the communication of draft tariffs for consideration by National Treasury and affected municipalities and, in a provision that reflected DWAF's existing practice, requires that any price increases be motivated in terms of inflation targets and steps to improve efficiency.

There is a further possible step in the tariff-setting process. Where users of Water Board services do not agree with the proposed tariffs, they may approach the Minister to adjudicate. This process has been formalised as a mediation provision in a number of contracts between the Boards and their users, a process that has been encouraged by DWAF, with the involvement of SALGA. While this process has only occasionally been applied, its existence has encouraged parties to reach agreement when disputes arise.

Other provisions in the Water Services legislation seek to ensure that the interests of users are protected. Boards are obliged to consult with users on the general conditions of service and are empowered to enter into specific agreements with them.

Conditions for provision of services

33. (1) A water board must set conditions for the provision of services not inconsistent with this Act, relating to at least –

(a) the technical conditions of supply, including demand patterns, water storage, units or standards of measurement, verification of meters, acceptable limits of error and procedures for settlement of disputes relating to the measurement of water services provided;
(b) the installation, alteration, operation, protection and inspection of water services works and consumer installations;
(c) the determination and structure of tariffs;
(d) the payment and collection of money due to the water board;
(e) the circumstances under which water services may be limited or discontinued and the procedure for such limitation or discontinuation; and
(f)water conservation and the prevention of wasteful or unlawful use of water provided by the water board.

(2) Conditions may be set generally or agreed specifically.

> *(3) Before setting general conditions a water board must invite comment from water services institutions within its service area, its consumers and users.*
>
> *(4) General conditions set by a water board must be accessible to the public.*
>
> *(5) Every person who uses services provided by a water board does so subject to any applicable general conditions set by that board, unless specifically agreed otherwise.*
>
> *Water Services Act 108 of 1997*

The legislation also establishes the principle that Boards have a 'primary activity' and 'other activities', similar to the approach which separates 'regulated and non-regulated' activities in other jurisdictions and determines that:

> *42. (1) A water board must manage its primary activity and each of its other activities as separate units.*
>
> *(2) A water board must maintain separate and itemised financial accounts for its primary activity and each of its other activities.*
>
> *(3) All transactions between units of a water board engaged in different activities of the water board must be carried out on terms and conditions which could be expected to apply to similar transactions between unrelated businesses.*
>
> *Water Services Act 108 of 1997*

In practice, oversight and 'regulation' of the Water Board tariff-setting process thus occurs at both a local level, through the municipal consultations, and at national level through the presentation of Business Plans, while National Treasury has an additional opportunity to review tariff proposals. Non-municipal bulk users are able to comment on conditions of service and to negotiate supply contracts with Boards.

2.8. Process for price setting in retail water services: municipalities

The price-setting process for municipalities is established in terms of three related sets of legislation. Tariff structures are regulated by DWAF in terms of regulations promulgated under the Water Services Act (1997). However, municipal processes are also directed by regulations in terms of the Municipal Systems Act which prescribes the municipal planning process, including budgeting. Finally, the Municipal Finance Management Act prescribes a detailed programme for the budgeting process. Organised local government, through its association SALGA, have made substantial representations about these processes.

In terms of the Water Services Act, the Minister is empowered to set norms and standards for water services tariffs, in concurrence with the Minister of Finance. These include a provision enabling a distinction to be made between different types of users.

Norms and standards for tariffs

10. (1) The Minister may, with the concurrence of the Minister of Finance, from time to time prescribe norms and standards in respect of tariffs for water services.

(2) These norms and standards may –

(a) differentiate on an equitable basis between –

(i) different users of water services;
(ii) different types of water services; and

(iii) different geographic areas, taking into account, among other factors, the socio-economic and physical attributes of each area;

(b) place limitations on surplus or profit;

(c) place limitations on the use of income generated by the recovery of charges; and

(d) provide for tariffs to be used to promote or achieve water conservation.

(3) In prescribing the norms and standards, the Minister must consider, among other factors –

(a) any national standards prescribed by him or her;

(b) social equity;

(c) the financial sustainability of the water services in the geographic area in question;

(d) the recovery of costs reasonably associated with providing the water services;

(e) the redemption period of any loans for the provision of water services;

(f) the need for a return on capital invested for the provision of water services; and

(g) the need to provide for drought and excess water availability.

(4) No water services institution may use a tariff which is substantially different from any prescribed norms and standards.

Water Services Act 108 of 1997

Regulations were promulgated in 2001 which outline the expenditures that must be considered in setting tariffs and require, *inter alia,* that water services tariffs should distinguish between household and industrial water use.

Municipal budget-setting processes are prescribed by the Municipal Systems Act (which provides the basic planning and management framework within which budgets are drawn up) and the Municipal Finance Management Act (which determines specific budgetary approaches and timing.

The Integrated Development Planning processes are well known and documented, with the challenges resting mainly in the implementation rather than in the conception. The municipal budgeting processes have also been extensively publicised within the Local Government community. (A summary of the process can be found in Appendix 9). Links with the planning, budgeting and tariff-setting processes of the Water Boards are described above.

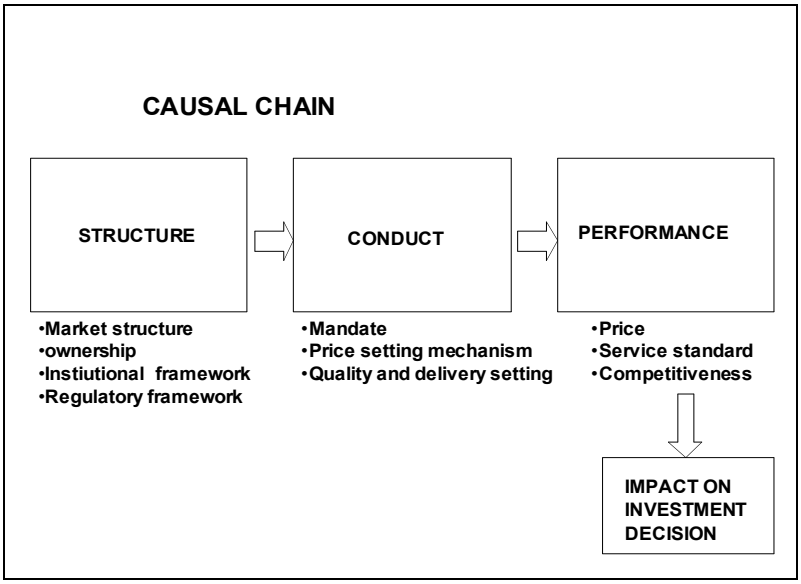
A key consideration in the Local Government budgeting and price-setting process is that water supply and sanitation priorities are subsumed in the broader municipal process. While there is a provision, through general percentage caps on price increases, to prevent excessive increases, less attention has been paid to mechanisms to ensure the sustainability of water and sanitation services, particularly where the investments required will raise tariffs above the caps. This may result in under-funding of key operational or investment activities, to the detriment of longer-term service provision.

In consultations on the Municipal Systems Act, the impact of tariff caps on Public-Private Partnerships was highlighted. It was noted that "this introduces great uncertainty into the financeability of any municipal infrastructure dependent, in whole or in part, upon tariff revenues". The response was to make provisions in the Municipal Finance Management Act for situations where contract conditions required price increases. This places municipalities that do not have PPP contracts at a disadvantage and may, in the long run, prejudice their users.

2.9. Price outcomes: an analysis

The framework guiding the present study begins with the formal structure of the industry and its regulation and considers the actual performance outcomes, since it is the actual service standards and prices received that will have an impact on the decisions of investors.

Figure 3 – Formal industry structure and regulation framework



The focus is on industrial water prices, although it is clear that price alone is not the only, or even the most important, indicator of performance. The outcomes analysis that follows addresses price, using data from other sources as a comparator to test the

robustness of the estimates. Other non-price (but price-related) issues are dealt with in the 'policy issues' and 'international comparison' sections below.

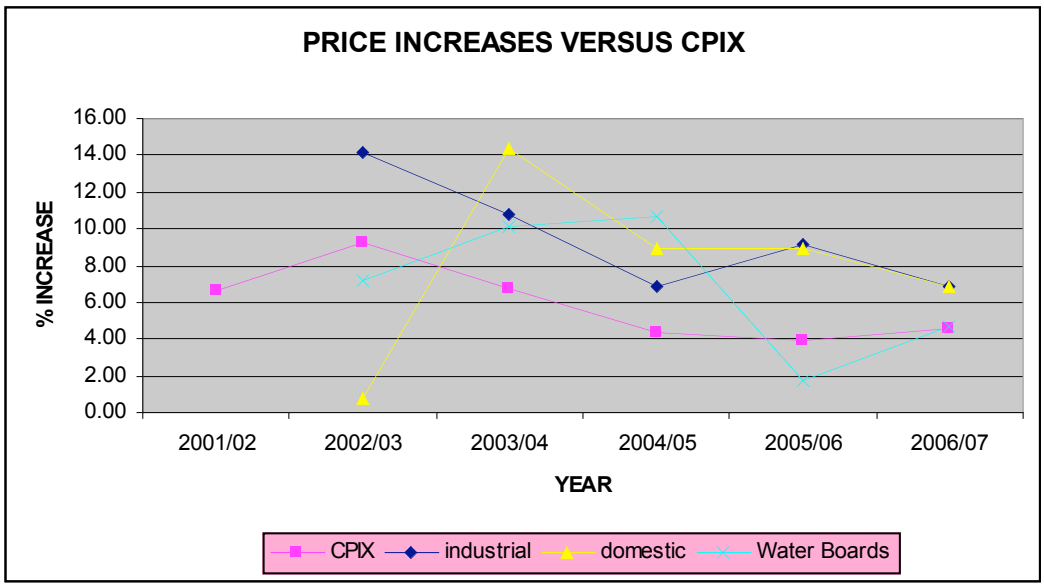
2.10. Price outcomes: municipal

The average industrial water price for potable water (as calculated for this study) in 2005/6 was R5.90c/kl compared to an average domestic price of R5.15c/kl. (This compares with the estimates from another survey, the NUS 2006 survey, which used a different sampling methodology and considered only a 'typical' industrial user consuming 10,000m^3 annually and estimated the average industrial tariff as US$0.918 or R5.85.)

The average industrial water price charged by municipalities increased by 62% between 2001 and 2006. (The NUS 2006 survey reported an increase of 50.2% in the five-year period 2001/2 to 2005/6 for its 'typical' industrial user).

Average domestic water prices increased by 60% over the same period. This compares with a PPI increase of 30% and a CPIX increase of 32%.

Figure 4 – Municipal price increases versus CPIX



Another useful statistic is the ratio between domestic and industrial prices, since this can indicate whether the industrial sector is being used as a source of cross-subsidy for other users. At a national level, the ratio between industrial and domestic tariffs was 1.14 in 2005/6, a slight rise from 1.10 in 2001/2, reflecting a (relatively) stable ratio. Since there are differences between inland and coastal areas, the two have also been presented separately.

Table 7 – Ratio between domestic and industrial prices

	Industrial / domestic (average)					
	2001/02	**2002/03**	**2003/04**	**2004/05**	**2005/06**	**2006/07**
JOHANNESBURG		1.71	1.70	1.69	1.69	1.69
CAPE TOWN	0.84	0.00	0.00	0.00	0.89	0.89
NELSON MANDELA	0.00	0.75	0.73	0.73	0.76	0.76
ETHEKWINI	1.00	0.92	1.00	1.05	1.00	1.00
TSHWANE	0.00	0.00	0.00	0.00	0.94	0.94
EKURHULENI	0.74				1.37	1.29
UmHlatuze	1.01	1.07	1.09	0.95	1.05	1.18
Polokwane	1.46	1.46	1.46	1.46	1.46	1.46
Buffalo City	1.32	1.43	1.11	1.11	1.11	1.11
Steve Tshwete	1.12	1.17	1.12	1.12	1.12	1.13
Mangaung	1.01	1.01	1.01	1.01	1.01	1.01
Sol Plaatjie	1.37	1.32	1.30	1.29	1.29	1.29
Arithmetic average	**1.10**	**1.20**	**1.17**	**1.16**	**1.14**	**1.15**
Coastal	0.83	1.04	0.98	0.96	0.96	0.99
Inland	1.14	1.33	1.32	1.31	1.27	1.26

A final indicator considered was the difference between Metros and other municipalities. The differences between Metro and others were greater in domestic tariffs (+20% higher) than in industrial tariffs (+8%).

Table 8 – Tariff differences between Metros and other municipalities

Metro / other	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	
Domestic							
JOHANNESBURG	0.00	4.15	4.60	5.02	5.40	5.85	
CAPE TOWN	3.78	3.12	4.22	4.22	6.11	6.54	
NELSON MANDELA	3.83	4.05	4.46	4.86	5.10	5.36	
ETHEKWINI	4.25	4.53	5.02	5.15	5.83	6.27	
TSHWANE	4.39	4.63	4.99	5.51	6.15	6.53	
EKURHULENI	5.39	0.00	0.00	0.00	5.53	6.14	
Average	*4.33*	*4.10*	*4.66*	*4.95*	*5.69*	*6.11*	
UmHlatuze	2.33	2.40	2.63	2.62	2.55	2.44	
Polokwane	4.42	4.73	5.12	5.43	5.70	6.07	
Buffalo City	2.76	2.94	4.05	4.45	4.68	4.94	
Steve Tshwete	1.94	1.87	2.04	2.19	2.28	2.40	
Mangaung	4.54	4.98	5.48	6.02	6.47	6.98	
Sol Plaatjie	3.89	4.43	5.19	5.66	6.05	6.62	
Average	*3.31*	*3.56*	*4.09*	*4.39*	*4.62*	*4.91*	
Domestic							
Metro	4.33	4.10	4.66	4.95	5.69	6.11	
Other	3.31	3.56	4.09	4.39	4.62	4.91	
Metro/other	**1.31**	**1.15**	**1.14**	**1.13**	**1.23**	**1.25**	**1.20**
Industrial							
JOHANNESBURG	0.00	7.09	7.80	8.50	9.15	9.90	
CAPE TOWN	3.16	0.00	0.00	0.00	5.45	5.83	
NELSON MANDELA	0.00	3.06	3.24	3.56	3.88	4.07	
ETHEKWINI	4.25	4.17	5.02	5.42	5.83	6.27	
TSHWANE	0.00	0.00	0.00	0.00	5.80	6.15	
EKURHULENI	4.02	0.00	0.00	0.00	7.58	7.94	
Average	*3.81*	*4.77*	*5.35*	*5.83*	*6.28*	*6.69*	
UmHlatuze	2.35	2.56	2.87	2.48	2.69	2.88	
Polokwane	6.45	6.90	7.46	7.91	8.31	8.84	
Buffalo City	3.66	4.21	4.51	4.96	5.20	5.49	
Steve Tshwete	2.18	2.18	2.29	2.45	2.56	2.70	
Mangaung	4.57	5.01	5.52	6.06	6.52	7.03	
Sol Plaatjie	5.33	5.86	6.78	7.28	7.78	8.51	
Average	*4.09*	*4.45*	*4.90*	*5.19*	*5.51*	*5.91*	
Industrial							
Metro	3.81	4.77	5.35	5.83	6.28	6.69	
Other	4.09	4.45	4.90	5.19	5.51	5.91	
Metro/other	**0.93**	**1.07**	**1.09**	**1.12**	**1.14**	**1.13**	**1.08**

2.11. Industrial water prices in South Africa: conclusions

Overall, water prices have increased at a rate significantly higher than inflation between 2001 and 2006.

At a national level, municipal industrial water prices have not increased at a rate significantly different to that of domestic water prices.

Bulk water prices from Water Boards, an important component of some municipal costs, generally increased at a slower rate over the same period (Rand Water: 45%, Umgeni Water: 54%, Lepelle Water: 45% and Bloem Water: 21%, while there were some outliers such as Amatole Water with a 91% increase, although this may reflect a change in service provision arrangements over the period).

There was no clear trend in the price of bulk water from national (DWAF) schemes. In some areas, tariffs increased at a rate substantially above inflation, reflecting the phasing-in of new tariff policy and payment for new infrastructure.

Industrial water prices tended to reflect average domestic prices in the coastal cities, while in Tshwane and Johannesburg and some of the inland towns, prices were set towards the top end of the domestic price tiers. On average, industrial prices were 15% higher than domestic prices.

Prices in Metros were generally higher than those in smaller municipalities for both domestic and industrial users.

2.12. Pricing policy issues in water supply in South Africa

The following key domestic pricing issues were identified:

- Are tariffs cost reflective?
- What is the balance between domestic and industrial prices? Is there cross-subsidy, either way?
- Are tariffs adequate to sustain services (investment adequacy) and do tariff-setting processes allow for investment requirements? If so, how?
- Is the process through which tariffs are set transparent and does it provide opportunities for consultation and comment?
- What other factors impact on the water prices paid by industrial users?

And in comparative terms:

- How do South Africa's industrial water tariffs compare internationally?
- How do South Africa's industry structures and therefore tariff-setting processes compare with international practice
- **Are tariffs cost reflective? Do they reflect long run marginal costs?**

In the case of bulk water resources (DWAF) and bulk water services (Water Boards), there is an explicit effort to ensure that tariffs reflect the actual costs of providing the service. In municipalities, while the Water Services Act requires tariffs to be set on the basis of the actual, ring-fenced costs of water service provision, tariff levels are constrained by other regulations from the National Treasury and the Department of Local Government, which cap tariff increases.

In the case of bulk water resources, a precedent has been established by DWAF in terms of which part of the cost of large, long-term and 'lumpy' future augmentation projects can effectively be pre-financed through tariff structures (this has occurred in the Lesotho Highlands Water Project supplying the Vaal System and the Berg River Project supplying Cape Town). This contributes to ensuring that long-run marginal costs (LRMCs) are reflected in price setting as well as avoiding sudden rate increases or an unsustainable build-up of debt. A similar approach has been adopted in some of the Water Boards, notably Umgeni (see tariff-setting approach, Appendix 10).

It is notable that industrial water prices tended to reflect average domestic prices in the coastal cities, while in Tshwane and Johannesburg and some of the inland towns, prices were set around the top tier of the domestic prices.

This is appropriate since LRMCs at the coast will be determined by desalination costs (which are falling – the retail price of water from the small Albany Coast Water Board which uses desalination to meet peak tourist demands in summer is R5.38/kl.) Inland, water scarcity makes it likely that the unit costs will increase as new, more expensive, schemes are brought on stream. Indeed, in Polokwane, the shortage of water has seen competition between mining companies for access to sources of municipal wastewater. The coastal/inland differences could thus indicate a tendency for LRMCs to be reflected in pricing structures, although no explicit reference to this has been found.

In general, however, it is not clear that adequate attention is being given to the long-term investment requirements in municipal water supplies. While there is extensive evidence of pressure to 'cap' tariffs, both from the overall perspective of National Treasury's limits as well as from internal allocations pressures within municipalities, there is less evidence of structured infrastructure management and investment plans being developed and funded to meet future needs. Indeed, National Treasury amended the 'capping' provisions of the MFMA only to accommodate payments to private service providers rather than to enable the necessary capital investments to be undertaken. In addition, the investment focus tends to be on the extension of distribution services with less attention to the concomitant expansion of the bulk supply infrastructure.

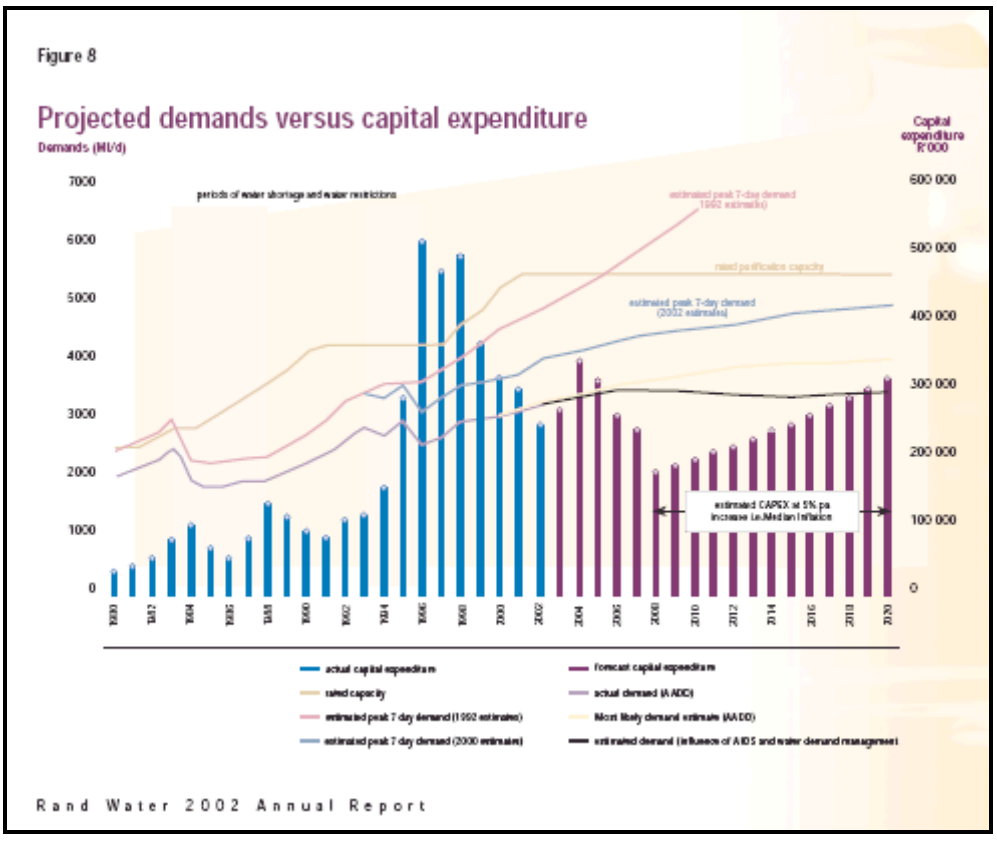
- **Are tariffs adequate to sustain services (investment adequacy) and do tariff-setting processes allow for investment requirements? If so, how?**

Determining the adequacy of capital investment is one of the more difficult technical and regulatory challenges, involving as it does an assessment of appropriate technical determinants of investment, costing the investments identified and timing their implementation. The interpretation of demand curves and the management of

demand is as much an art as a science. This is particularly the case where the user base is in a process of rapid transition and where there are substantial uncertainties about future trends.

An example of this is the efforts of Rand Water to assess likely future water demand, taking into account various economic growth scenarios as well as social trends such as urbanisation and the evolution of the HIV epidemic.

Figure 5 – Projected demands versus capital expenditure



One measure of adequacy of infrastructure investment in water supply is the frequency of interruptions of service due to inadequate infrastructure. In jurisdictions such as the UK, this is measured by the frequency with which demand-limiting measures such as 'hosepipe bans' are imposed.

At the level of the water resource, a further uncertainty relates to the variability of the rainfall that feeds the supply. This is addressed by using hydrological analysis to estimate the volumes available from a system at different levels of reliability. There is thus an implicit assumption that supplies are provided for a defined level of reliability (which in urban and industrial water supply ranges from allowing failure once in 20 years to once in 200 years).

Using these measures and considering the Metros, the areas supplied by the Vaal system have not been affected by restrictions in the past five years, reflecting the additional security provide by the Lesotho Highlands Water Project. Ethekwini has similarly not suffered major interruptions, while restrictions imposed by the Nelson Mandela Metro in 2006 were caused by a mismatch between water availability and treatment capacity and not by a shortage of raw water. Meanwhile, Cape Town suffered water restrictions in 2004/5, predicted due to environmental challenges which delayed the construction of additional water storage (which will be provided by the Berg River dam, now being completed).

A further measure of infrastructure adequacy, related more to the maintenance of existing infrastructure stock at municipal level, is the occurrence of pipe breaks and pressure reductions due to limited transmission capacity (equivalent to 'brownouts' in electricity supply). No comparative statistics are available on these trends.

In general, the perception is that the supply of water to major users is still reliable. It should be noted, however, that infrastructure backlogs develop over time and that by the time they become evident, through some of the symptoms identified above, the investment and time required to remedy the problems might be substantial. In this regard, the comments made by the South African Institution of Civil Engineers (SAICE) in its recent infrastructure report card are relevant:

> *"**Water***
>
> *The management of water resources and the provision of raw water in bulk is the responsibility of the Department of Water Affairs and Forestry. Many of the dams, weirs, canals, pump stations, pipelines, siphons and tunnels are old and in need of major refurbishment or replacement. Although DWAF has conducted regular maintenance, certain portions of the infrastructure have reached the end of their useful life. Of particular concern is the estimate that 43% of dams have safety problems and require urgent refurbishment. DWAF is doing what it can, including engaging in partnerships with users of water. Its major constraint appears to be the size of the available budget. This appears to be forcing DWAF to focus on its most strategic infrastructure, with the result that the remainder will continue to decline. It gets a grade of D+.*
>
> *South Africa remains one of the few countries in the world where, in most urban areas, water can be drunk with confidence directly from the tap. Major strides have been taken towards the Millennium Development Goals by bringing water to every household by 2008. However, there remains erratic compliance with water quality*

requirements in most other municipalities. The wastage of water is also, in many cases, above the international average, in some cases by a factor of 2 or more. As in the other aspects of infrastructure managed by local councils and municipalities, the dire skills shortage mentioned earlier is a primary constraint. For major urban areas, the grade is C+; and for all other areas, a D-."

- **What is the balance between domestic and industrial prices? Is there cross-subsidy, either way?**

At the bulk level, the tariffs of DWAF and water boards do not discriminate between municipal (predominantly domestic) and directly supplied bulk industrial users. While there are substantial price differences, they usually reflect the costs of user-specific infrastructure and conditions.

At a municipal level, while there are substantial variations between municipalities, the overall trend is for industrial prices to be about 15% higher than retail domestic prices. Since it is cheaper to provide and administer a water supply in bulk to a single user in a single location than to extensive, dispersed networks of small users, this is evidence of a small but significant cross-subsidy. This is particularly notable in inland areas.

This is partly explained by the inland/coastal differences discussed above. However, since industrial users are usually cheaper to supply in bulk, the fact that average industrial and domestic tariffs are approximately equal, even at the coast, is a crude indication that there is some cross-subsidisation from industry to domestic users. This does not apply to most bulk water tariff structures from DWAF and Water Boards.

There may, however, be economic reasons for this situation. In inland areas where water scarcity is a factor and the unit cost of augmenting water supplies is much higher than existing supplies, it may be appropriate to set prices high (at the LRMC) in order to incentivise efficient use and ration water between users.

This is related to a social argument in terms of which the first (usually cheaper) tranche of water would be allocated to meet domestic needs and subsequent tranches (usually more expensive) to other users.

Table 9 – Tariff differences depending on coastal/inland location

	Industrial / domestic (average)					
JOHANNESBURG		1.71	1.70	1.69	1.69	1.69
CAPE TOWN	0.84	0.00	0.00	0.00	0.89	0.89
NELSON MANDELA	0.00	0.75	0.73	0.73	0.76	0.76
ETHEKWINI	1.00	0.92	1.00	1.05	1.00	1.00
TSHWANE	0.00	0.00	0.00	0.00	0.94	0.94
EKURHULENI	0.74				1.37	1.29
UmHlatuze	1.01	1.07	1.09	0.95	1.05	1.18
Polokwane	1.46	1.46	1.46	1.46	1.46	1.46
Buffalo City	1.32	1.43	1.11	1.11	1.11	1.11
Steve Tshwete	1.12	1.17	1.12	1.12	1.12	1.13
Mangaung	1.01	1.01	1.01	1.01	1.01	1.01
Sol Plaatjie	1.37	1.32	1.30	1.29	1.29	1.29
Average	*1.10*	*1.20*	*1.17*	*1.16*	*1.14*	*1.15*

Inland *Coastal*

- **Is the process through which tariffs are set transparent and does it provide opportunities for consultation and comment?**

There are extensive opportunities for consultation and comment in the development of the National Water Pricing Strategy, as well as in the development of the Water Services Act S.10 Regulations Governing Norms and Standards for Water Service Tariffs.

At a more operational level, there are similar opportunities. The formal Local Government planning and budgeting process also provides extensive opportunities for participation, although it is not always clear that these are fully exercised.

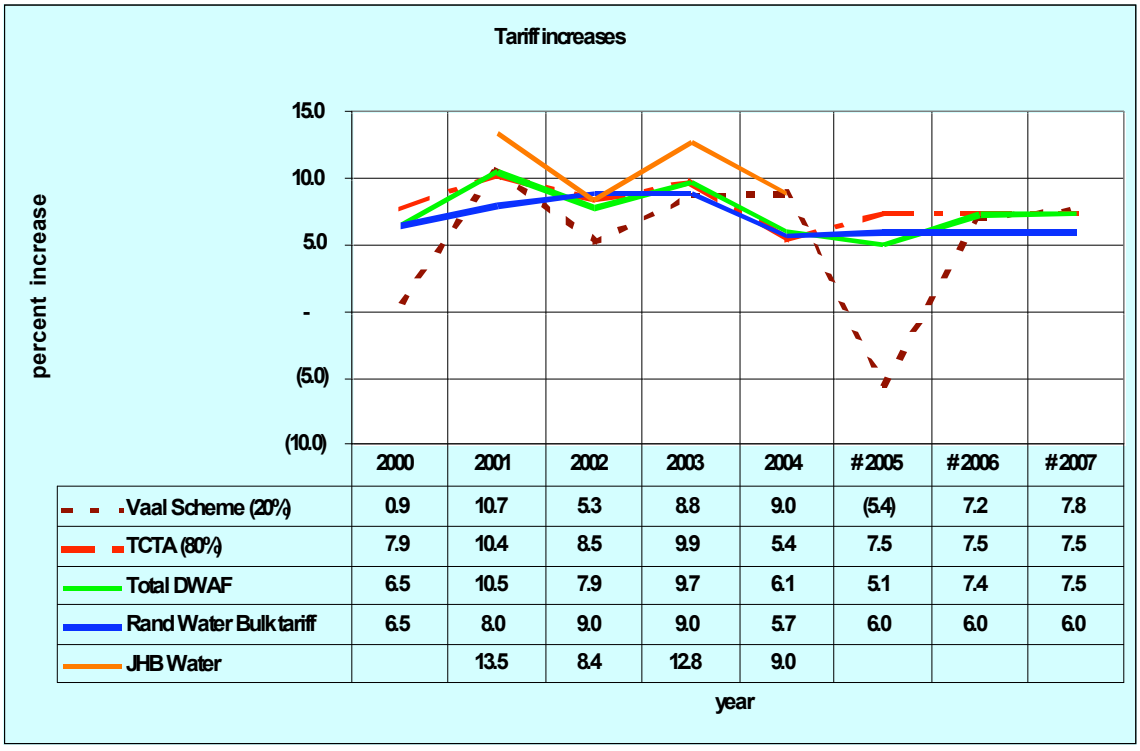
There is an extensive process of oversight over Water Boards. The membership of their governing bodies is explicitly required to have representation, not just of municipalities but also of "other interests served by the Board". In addition, there are multiple opportunities to interrogate their tariff proposals:

> *35 (3) When appointing a member, the Minister must have regard to –*
>
> *(a) the objects of the water board;*
>
> *(b) the need for the board to be representative of –*
>
> *(i) the water services authorities to which it provides water services;*
> *(ii) the other interests served by the water board; and*
> *(iii) the broad population;*
>
> *(c) the expertise required for the board to function effectively; and*
>
> *(d) the desirability or otherwise of executive employees being members of the board.*

> *(4) The extent to which relevant water services authorities should be represented on a water board must be determined by the Minister after consultation with every relevant organisation representing municipalities having jurisdiction in the service area.*
>
> *Water Services Act 108 of 1997*

At national level and with the larger regional and metropolitan organisations, there is evidence of extensive consultation over the establishment and implementation of the water pricing strategy (see, for instance, the breakdown of tariff increases in the 2004 presentation by Rand Water of its Annual Report to Parliament's Portfolio Committee on Water). On large projects, there is intensive involvement of users at the design stage, reinforced by the trend for DWAF to fund economic projects off-budget through the TCTA. All this contributes to transparency and provides opportunities for the concerns of users to be expressed and addressed.

Figure 6 – Rand Water tariff increases



	2000	2001	2002	2003	2004	#2005	#2006	#2007
Vaal Scheme (20%)	0.9	10.7	5.3	8.8	9.0	(5.4)	7.2	7.8
TCTA (80%)	7.9	10.4	8.5	9.9	5.4	7.5	7.5	7.5
Total DWAF	6.5	10.5	7.9	9.7	6.1	5.1	7.4	7.5
Rand Water Bulk tariff	6.5	8.0	9.0	9.0	5.7	6.0	6.0	6.0
JHB Water		13.5	8.4	12.8	9.0			

At the municipal level, the discussion is more subject to the broader municipal processes. In this regard, the statutory processes provide formal opportunities for input, although it is not always clear how effective this is – the detailed tariff proposals and calculations are seldom available on municipal websites, for instance. To address this, the provision of information is an essential element of effective consultation. While the Water Services Act requires the Minister to monitor the performance of every water services institution and to ensure that there is an accessible national information system, this is not yet in place.

- **What other factors may impact on industrial water prices?**

There is some evidence that the price of water is subject to economies of scale and that many of South Africa's smaller municipalities are not large enough to capture these economies. This issue is a global one and will be considered in the international comparator section (below).

Since water is a natural resource, albeit a renewable one, a key factor in determining its price is its availability, where and when it is required and its absolute scarcity. In coastal areas, as mentioned above, water can be produced by desalinating sea water at a cost which is increasingly competitive with natural freshwater supplies. In other areas, availability depends on the exploitation of naturally occurring water sources.

This exploitation has an impact on the natural environment of which water ecosystems are a critical component and which is controlled by environmental legislation – specifically the National Water Act and the National Environmental Management Act (NEMA) of 1998. This legislation constrains the extent to which water may be abstracted and used – the National Water Act through specific provisions for maintaining flows in rivers to meet the "environmental reserve" and the NEMA through the requirement for environmental impact assessments of major projects.

In many inland rivers, abstractions have or will soon reduce flows to below the levels required for environmental protection and a process of reviewing water allocations is likely in some cases to reduce existing allocations. While it is likely that this will impact most severely on large volume, low value water use in agriculture, industry will also be affected.

These trends may be aggravated by climate change, which is expected to have particular impacts in the west and south of the country.

To address these constraints, water import from one river basin to another or from an external river is an option. South Africa has only a limited number of rivers with 'excess capacity' – notably the Umzimvubu in the Eastern Cape and the Thukela in KwaZulu-Natal. Both are being considered as sources for supply augmentation. External sources that have been mentioned are the Zambezi, the Okavango (a river the size of the Orange, South Africa's largest river, where it enters Botswana) and the Congo. While it is technically feasible to bring water from these sources, the unit costs of water would be an order of magnitude greater than present supplies. Since South Africa has no rights to the rivers concerned, the external options would be politically challenging and even more expensive than internal transfers.

3. Institutional structure, water prices and regulation in comparator countries

To provide international comparison and inform the analysis of South Africa's performance, the structure of water tariffs and the industry structures within which they are determined were reviewed in a number of countries. The countries were selected to give a cross-section of income levels, public/private mixes and degrees of de/centralisation. Data were collected for:

- Australia (selected states);
- Brazil (Sao Paulo state);
- Chile;
- India (Delhi);
- Malaysia (national); and
- UK (England and Wales).

Due to the size of the supplier universe, the varied nature of the institutional arrangements and limited data availability, it was only possible to obtain a limited record of prices in Brazil and India. However, the quality of the information from Chile and Malaysia, as well as Australia and the UK, enables useful comparisons to be provided while data from India and Brazil contribute specific elements to the analysis.

Information was also obtained on the structure of the water industry and its regulatory framework in the sample countries. For each country, information is thus provided on:

- The structure and characteristics of the water industry;
- Water price levels and trends; and
- Other relevant issues and relevance for South Africa.

A summary of prices is presented in Table 10 below.

Table 10 – Water prices in comparator countries

	US Dollar			Local currency	
	Industrial	Domestic		Industrial	Domestic
Summary			**Local / US$ 1 Jan 06**		
Australia	0.701852	0.792309	*1.36515*	0.958133	1.08162
Brazil (SABESP)	2.695379	1.364326	*2.35171*	6.33875	3.2085
Chile	0	1.07611	*513.95*		553.0667
India (Delhi)	0.691448	0.094037	*45.195*	31.25	4.25
Malaysia	0.341135	0.169182	*3.7801*	1.29	0.64
UK	0.859196	1.269326	*0.58061*	49.88576	73.69833
SA	1.01925	0.862442	*6.37724*	6.5	5.5
	0.87	*0.73*	*7.50*	*6.50*	*5.50*
	1.18	*1.00*	*5.50*	*6.50*	*5.50*

3.1. Australia

The Australian water industry provides a useful comparison for South Africa, in the first instance because the underlying resource framework is similar, with significant resource constraints and competition between users. As important is the fact that the Australian industry has been undergoing a process of reform since 1994 when the Council of Australian Governments (COAG) agreed on a Water Reform Agenda. In 2004, this evolved further with the formation of the National Water Commission and adoption of the National Water Initiative (NWI).

The 19th century Constitution of the Commonwealth of Australia gave responsibility for natural resource policy, including that relating to water, to the States and restricts the role of the Commonwealth in relation to water. (This has raised significant problems in the Murray Darling Basin, which is shared between states.) The economic reform process has seen a common approach adopted by consensus between the Commonwealth and States, which has been well documented. The industry's structure is thus well described, if complex and dynamic.

Reference: "Water and Public Policy", in Consumer's Guide to Drinking Water, May 2006, Co-operative Research Centre for Water Quality and Treatment, Australia

3.1.1. Structure of the industry

Given the allocation of responsibility for water matters, the States have significantly different institutional structures for both water resources and water services. Thus, in New South Wales there is a two-tier structure of water supply to Sydney that closely mirrors the structure of supply to major metropolitan areas of South Africa. The Sydney Catchment Authority provides a wholesale supply to the Sydney Water Corporation, which is responsible for the purification, transmission and reticulation to retail consumers. On the other hand, in Western Australia, almost all water supply is the responsibility of a parastatal Water Corporation.

In Melbourne, three government-owned companies are the retailers and the wholesaler is a government-owned corporation (Melbourne Water Corporation). The wholesaler also controls the catchment for most of its supply. In Adelaide, a privately owned water company provides water services under an agreement with the government authority. In Canberra, a public-private multi-utility partnership provides services.

3.1.2. Water prices

Given the diversity of structures and arrangements at state and local government level and the absence of a comparative national data set, prices were sampled in five of Australia's States using data published in February 2007 as part of the NWI's Urban Water Charging Stocktake.

Table 11 – Domestic and industrial water tariffs: Australia

Australia	Industrial average Au$/kl	Domestic average Au$/kl
Capital Territories	0.92	0.92
New South Wales	1.26	1.45
Queensland	0.94	1.02
Victoria	0.90	1.07
Western Australia	0.78	0.95
Average	*0.96*	*1.08*
	ZAR 4.48	*ZAR 5.10*

3.1.3. Relevance for South Africa

A first point to note is that the actual price levels are slightly below those for South Africa using the exchange rates of January 2006 (with March 2007 current exchange rates, they are very similar). The average price for industrial water is lower than that for urban water.

The Australian approach to water pricing mirrors that of South Africa in important respects. The industry is fragmented between jurisdictions and user types in a manner very similar to the situation in South Africa. It seeks to achieve full cost recovery within a social framework, including the introduction of a contribution by users to the

costs of managing the resource itself. In a resource-constrained environment, pricing for conservation has taken on a high priority. In coastal areas, desalination is an important future source of supply.

Australia's approach diverges sharply from South Africa's in two important respects. First, the decentralisation of functions to the States has created significant water resource management problems. Second, the rigorous approach to price regulation, with price setting and service provision separated and a family of independent regulators, with separate structures in each State, has produced a plethora of institutions and outputs. While the intention is to benchmark outcomes (including price and quality) at national level, this process is only just beginning to produce data.

It is evident that substantial institutional and financial resources are required for institutional separation and independent regulation, as evidenced by the volume and analytical quality of material produced by the various authorities. It is unlikely that this intensity of input and oversight is feasible in South Africa, given current skills availabilities. Further, it is not clear whether the benefits that could be derived would exceed the costs of regulation. As far as could be ascertained, this has not been formally reviewed in Australia.

3.2. Brazil

Brazil is a large country with a federal government in which many powers and functions are allocated to the State and municipal level. Water supply to domestic and industrial users is carried out at municipal level, with extensive State support.

While in aggregate Brazil is a water-rich country, there are many regions which are arid; in others, around the main urban centres, local water sources have been fully exploited and managing water quality has become a major challenge. A reform of the water sector was initiated in the 1990s and a new Water Law passed at Federal level in 1997. Implementation at State level has been patchy but it is emphasised that this, in part, reflects the different challenges and priorities of the different regions.

In view of the diversity of approaches taken across and within Brazil's 28 States, this review focuses on the State of Sao Paulo whose urban challenges are a more extreme example of those facing South Africa.

3.2.1. Structure of the industry

The division of responsibility between States and municipalities is contentious. According to the Brazilian Association of Municipal Suppliers of Water and Electricity (ASSEMAE):

- *"Approximately 71% of the municipalities have sanitation services passed in a regular or irregular manner and without any control and regulation system, to State Companies;*
- *Approximately 28% of the Municipalities provide the services directly through municipal services; and*

- *Less than 1% of the Municipalities have passed the services completely or partially to private companies."*

Sao Paulo is one of the States where, by virtue of the complexity and challenges of supplying water in the most populous region of Brazil, a State Company (SABESP) was established in 1973. SABESP currently serves 367 municipalities with a total population of 25-million people and 6.5-million metered consumers.

SABESP is structured as a listed company, traded on the Brazilian and New York stock exchanges, with 49.7% of its shares in the hand of private investors and 50.3% held by the State, opening up the possibility of further privatisation.

In view of the contentious relationships between municipalities and the State government, which are often controlled by different political parties, efforts are being made to sign contracts between municipalities and SABESP stipulating clear duties, obligations, recourse and penalties. The regulatory arrangements for SABESP are also under discussion, with the local government authorities of the City of Sao Paulo proposing the establishment of a formal regulator to oversee SABESP's activities at city level, in addition to regulatory structures at State and national level. A new national regulatory system, the so-called "marco regulatorio de saneamento" (sanitation regulatory landmark) was established in late 2006.

3.2.2. Water prices

The tariff policy is established by the State government and takes into consideration actual service costs, provision for non-payment, amortisation of investments and volumes actually consumed.

SABESP has a stepped tariff system with a social tariff for households using less than 10 kl/month, which is claimed to be one of the lowest in Brazil. It distinguishes between industrial and residential use and its charges "aim to balance the viability of the company with the social aspects of sanitary services".

The average domestic and industrial tariffs were calculated from SABESP's 2006 tariff sheet for the Metropolitan areas (tariffs vary by a factor of ± 40% depending on location in the State).

Table 12 – Average domestic and industrial water tariffs: Brazil

Brazil (SABESP)	Industrial average (Real)	Domestic average (Real)
	6.34	3.21
	ZAR 4.48	*ZAR 5.10*

3.2.3. Relevance for South Africa

The challenges of meeting the needs of a large inland Metropolitan area are shared with South Africa. In Sao Paulo, as in South Africa's Metros, the water supply challenge is intricately linked with that of managing wastewater, and SABESP's future focus is on increasing the volume of wastewater collected and the percentage treated.

The dynamics of addressing these challenges within a decentralised political system with relatively strong federalism are also relevant to South Africa, particularly since the timing of the two country's water sector reform processes correspond closely. So too are the challenges of establishing effective regulatory arrangements which have the support of all parties.

3.3. UK (England and Wales)

By virtue of the public interest in the extensive reorganisation and privatisation of water services in terms of the UK's 1989 Water Act, the British water sector is intensively regulated and well documented.

The regulator, OFWAT, determines the policy with respect to the setting of water prices to what are simply described as 'large water users'. It aims to:

- Prevent undue discrimination and preference;
- Prevent abuse of dominant market position and other anti-competitive behaviours; and
- Ensure that tariffs are structured to send appropriate price signals.

The principles applied in making such determinations are relevant to the South African case. They include:

- *"Unit charges should not be lower for large business customers simply because they use a large amount of water.*
- *Charges can reflect the lower costs of providing services to large users, such as:*
    - *delivering large quantities of water to a single point of delivery, which does not require the use of all levels of the distribution system;*
    - *supplying water to customers whose peak demands do not occur during the period when the system is at peak; and*
    - *delivering a lower level of service to customers on an optional basis.*
- *Charges should provide incentives for customers to avoid wasting water.*
- *As far as possible, we expect companies to justify large user tariffs on a robust allocation of accounting costs over the classes of customers concerned. Failure to do this will be the principal means by which we will assess abuses of market power and undue discrimination.*
- *Large user tariffs must also be consistent with robust estimates of the long-range marginal cost of supply. This is particularly important in areas where water resources are constrained."*

The result of these approaches is seen in the following tariff tables, which indicate the mean volumetric tariff and the actual tariff applied to different levels of bulk use.

3.3.1. Structure of the industry

The water industry in England and Wales was privatised in 1989 and water is currently supplied by 23 private companies, 10 of which provide both water and sewerage

services (different arrangements apply in Scotland and Northern Ireland.) The industry is regulated by the independent regulator OFWAT, which is responsible for economic issues, with other agencies regulating environmental issues and drinking water quality.

The formal motivation for privatisation was the need for a substantial programme of investment to rehabilitate old infrastructure and meet new environmental standards. In the 15 years from 1989 to 2004, an estimated £50-billion has been invested – one consequence of this has been a 35% real price increase over the period.

The new environmental standards are the reason for substantial price increases; indeed they were part of the motivation of the original privatisation of the industry. However, the fact that other jurisdictions have chosen to achieve standards more slowly than the UK highlights their subjective nature and the need for a sound policy process when standards are set with substantial financial implications. Where independent regulators are established, they may impede the public policy discussion about standards as was implicitly recognized by the Northern Ireland Economic Council which complained that a reform proposal:

> *"… does not provide the necessary detail in support of the case for Water Service reform. For example, the consultation document should have presented separate estimates of the resources needed for:*
>
> *(a) Rectifying the decaying infrastructure,*
>
> *(b) Expanding the infrastructure,*
>
> *(c) Improving the technology and*
>
> *(d) Meeting European Directives."*

The implication is that some objectives are less important than others. However, standards set through technical processes and implemented by independent regulators are more difficult to challenge, even if there are legitimate public policy concerns.

3.3.2. Water prices

Water prices for six of the largest water companies are shown below, derived from the 2006 OFWAT using simple averages where multiple tariffs are available.

Table 13 – Water prices for six of the largest UK water companies

	Industrial (UK£)	**Domestic (UK£)**
Anglian	0.78	.86
Northumbrian	0.38	0.72
Severn Trent	0.61	1.00
Thames	0.68	0.89
United Utilities	0.86	1.01
Yorkshire	0.54	0.94
Average	*0.64*	*0.90*
	ZAR 7.04	*ZAR 9.90*

3.3.3. Relevance to South Africa

England and Wales is one of the jurisdictions where the 'market best practice' approach of establishing privately owned providers with strong independent regulation has been taken furthest. This is evident in both the structure of the industry and the intensity of the regulatory oversight.

Water supply tariffs have risen steadily in real terms since the sector was reformed, reflecting the investments that were required, particularly in the wastewater sector. This trend is planned to continue for at least another five years.

A key success of the UK system has been in the area of service delivery performance, with systematic improvements in water quality and reliability. While many of the indicators are of more relevance to domestic users, many also address the concerns of industrial users.

OFWAT has sought to evaluate the competitive situation of large water users and set out a systematic approach, which is of relevance to South Africa. It balances direct market issues, such as the need to prevent undue discrimination and the abuse of dominant market positions, with the broader need to ensure that tariffs are structured to send appropriate price signals.

As in Chile, there is evidence of economies of scale in service provision. In a system where some suppliers serve populations of almost 10-million people, there are also questions raised about the ceiling at which diseconomies of scale begin to occur and for which activities.

It is also relevant to note the UK experience that that seasonal tariffs, peak tariffs and special tariffs for 'subscribed demand' and interruptible supplies are only occasionally offered and do not represent a significant element of the market. This reinforces the conclusion that water supply, by virtue of being a relatively small item in firms' cost profiles, as well as the 'storeability' of water, is not as susceptible to such micro-market mechanisms as electricity and gas supply.

Figure 7 – Total number of breaches of water quality numerical standards in England and Wales, 1994-2003

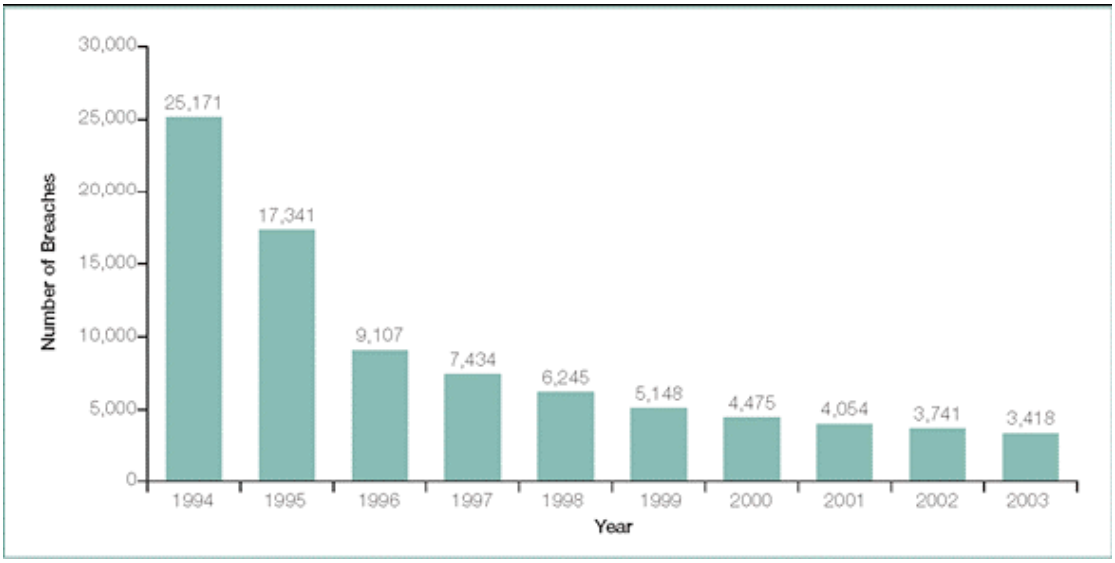


Table 14 – Drinking water quality performance

Performance is now stabilising at levels that broadly meet customers' expectations. Customer research carried out for the 2004 price review by Ofwat and other stakeholders, including WaterVoice and the companies, indicates that customers in general believe the companies have achieved broadly satisfactory levels of service in relation to costs.

Table 7.3 Industry customer service performance 1990-91 to 2003-04

Description	1990-91	1992-93	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04
	%	%	%	%	%	%	%	%	%	%	%
Properties at risk of low pressure	1.85	1.26	0.78	0.43	0.25	0.16	0.13	0.11	0.10	0.06	0.04
Properties subject to unplanned supply interruptions of 12 hours or more.	0.42	0.38	0.58	0.21	0.15	0.05	0.06	0.11	0.12	0.05	0.14
Population subject to hosepipe bans	41	12	39	30	3	3	0	0	0	0	0
Properties subject to sewer flooding incidents (overloaded sewers and other causes)		0.06	0.02	0.02	0.03	0.02	0.03	0.03	0.02	0.02	0.01
Properties at risk of sewer flooding incidents (once in ten years)			0.07	0.07	0.07	0.07	0.08	0.08	0.05	0.04	0.03
Properties at risk of sewer flooding incidents (twice in ten years)		0.09	0.07	0.06	0.05	0.05	0.04	0.04	0.02	0.01	0.01
Billing contacts not responded to (within five working days)	31.18	20.15	10.00	8.16	4.74	2.53	1.52	0.86	1.23	0.53	0.47
Written complaints not responded to (within ten working days)	31.09	18.14	5.79	5.07	1.99	1.28	0.64	0.44	0.66	0.15	0.14
Bills not based on Meter readings			3.67	2.32	0.87	0.34	0.33	0.70	0.45	0.16	0.15
Telephone calls not answered within 30 seconds				26.97	18.76	9.70	9.21	7.64	6.37	5.89	5.85

Note:
It is not appropriate simply to add up the totals for each indicator to determine the overall total of customers receiving poor service. Some customers may be included in more than one row. For example, a customer at risk of low pressure may also have written to the company to complain. Where information was not collected, it is shown as a blank space.

3.4. Chile

The reform of the water sector in Chile rivals that of England and Wales as one of the most comprehensive in the world. As a middle-income developing country, it may also offer a more relevant case for South Africa than the UK. Although its urban levels of water supply and sanitation coverage are impressive (99.8% with access to safe water and 95.1% with sewered sanitation), lower levels of sanitation access in rural areas as well as gaps in wastewater treatment (only 73.4% treated) still have to be addressed by new investment. Chile's water prices thus reflect the challenges of service expansion in addition to the operation and maintenance of existing services.

3.4.1. Structure of the industry

Water supply and sanitation service provision are now delegated to 52 companies which act as service providers. Of these, 16 are responsible for 99% of water supply. The majority of water companies are privately owned, although the Chilean State has substantial minority holdings in a number of them.

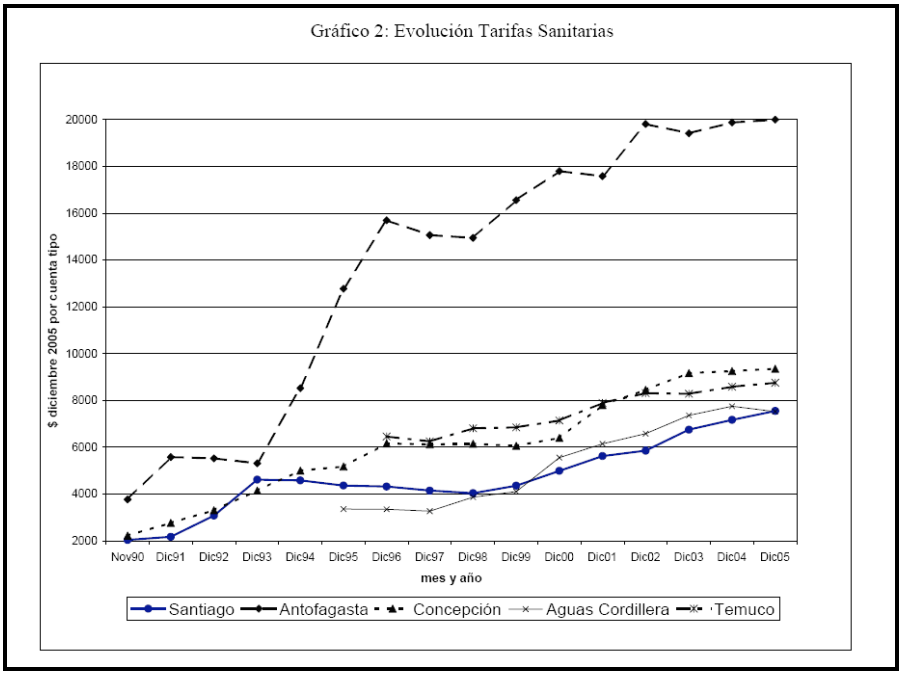
As part of the sector reform, the Chilean Government has established a substantial regulatory function. A semi-autonomous regulator, SISS (Superintendencia of Sanitary Services) recommends prices to the Ministry of Economy for approval and provides technical insight to the Ministry of Public Works which oversees the water companies.

3.4.2. Water prices

Since the government of Augusto Pinochet was voted out of power, water prices have risen substantially – up to five times in real terms since 1990. This reflects a policy designed to eliminate large, regressive subsidies which had been applied historically, through a structured programme of increases to the base tariff.

Price levels in 2005 were between ZAR6.22 and ZAR16.45 per kilolitre.

Figure 8 – Water tariffs: Chile



Ex Anuario, Indicadores De Regulacion, Servicios de Utilidad Pública, 2005. Ministerio De Economia, Fomento Y Reconstruccion, Subsecretaria De Economia, Division Desarrollo De Mercados, Agosto 2006. "cuenta tipo" = 15kl/ month

3.4.3. Relevance to South Africa

The Chilean experience is relevant to South Africa first because Chile has achieved almost universal access through a totally different structural model to that adopted in South Africa which has approximately the same per capita income.

However, the sequencing followed in Chile is unlikely to be applicable to South Africa. In Chile, radical restructuring and privatisation of the water supply sector were

followed, after a long political transition, by a more inclusive approach in which the social and competitive impacts where addressed.

The reform of water resource management also provided significant lessons. The introduction of fully marketable water rights was accompanied by an accumulation of rights in corporate (often power company) hands, to the disadvantage of other sectors.

A final lesson from Chile is that substantial economies of scale may be achieved, particularly in smaller systems, with a population of 500,000 to one million people being optimal. This is one reason given for the Chilean decision to take the water supply function from local government and establish regional providers.

3.5. India

The urban water supply situation in India would, in other parts of the world, be described as a national crisis. Few cities enjoy 24-hour service through the public network (which almost invariably means that water supplied is not safe to drink); many domestic and industrial users are reliant on 'self-supply' mechanisms, often boreholes on their own properties. One consequence of this is rapidly falling groundwater levels. There are also thriving tankering and water carrying businesses in many cities. Associated with this is poorly managed wastewater disposal which has resulted in serious pollution of many rivers.

According to a 2002 review of the National Planning Commission:

> *"On the urban water supply front, transmission and distribution networks are largely of very poor quality, in addition to being outdated and badly maintained, resulting in higher operating costs. Physical losses are typically high, ranging from 25 to over 50 per cent. Low pressures and intermittent supplies lead to back siphoning, resulting in contamination in the distribution network. Water is generally available for only two to eight hours a day in most Indian cities…. unsatisfactory service standards has led to low tariff structures, which in turn has resulted in poor resource positions of ULBs, poor maintenance and service – a vicious circle. The problem is compounded by the rapid growth of urban centres and corresponding growth in the demand for services."*

3.5.1. Structure of the water industry

Water supply was originally the responsibility of State governments which, in terms of India's Constitution, have responsibility for water resource management as well as for water supply. While traditionally, this function was undertaken by State engineering departments some States had established public water and sanitation boards. Following a Constitutional amendment allowing decentralisation, some larger cities (Urban Local Bodies), such as New Delhi, have established semi-autonomous public bodies to manage water supply. The Delhi Jal (Water) Board is an example. These agencies, while nominally dependent on local government for their authority, have more autonomy, although their freedom of action is limited by active local democracy,

as the experience of trying to restructure the Delhi Jal and improve its management and financial position has demonstrated.

3.5.2. Water prices

Water prices for Delhi are shown below in Table 15, in Rupees.

Table 15 – Delhi water prices (Rupees/kl)

R/kl Monthly consumption	Delhi Jal Board Category i domestic	(Category ii instit)	Category iii Industrial
0-6 kl	0		15
6-20 kl	2		25
20-40 kl	5		35
40+ kl	10		50
Average	*4.25*		*31.25*
	ZAR 0.60		*ZAR 4.41*

The differential between industrial and domestic tariffs is notable, with the highest domestic tariff tier being below the lowest industrial tariff tier.

3.5.3. Relevance to South Africa

Urban water supply in India is a cautionary tale for South Africa. Years of low tariffs have resulted in low levels of investment and low qualities of service. Attempts to increase tariffs have been resisted on the grounds of the poor quality of the service – and in some cases by private borehole and tanker suppliers whose livelihoods would be threatened by better public services. The state of water supply infrastructure and operation is now recognised to be a serious barrier to broad economic and social development and its improvement is one of the priorities in the current 11th Plan Period.

3.6. Malaysia

Malaysia is a water-rich country but still faces water problems, notably flooding, pollution and seasonal shortages. Malaysia has, since the early 1990s, sought to bring greater private participation into its water industry but this has proceeded with difficulty. Pricing policies have been identified as part of the problem. As summarised by the Director General of Malaysia's Economic Planning Unit:

> *"State water supply authorities have problems covering the cost of services and many have deferred maintenance due to capital shortages. This has led to deterioration in the quality of services, such as poor water quality and low pressure. In fact, there are water supply authorities that have not reviewed the water tariff in the last 20 years. Non - revenue water (NRW) in the water supply*

sector is high, with a national average of 40.6% and a range of 18.0 to 73.9% (2002). Besides incurring revenue losses to the State Governments, high NRW lead to the difficulty of payment by certain State Governments for bulk water purchases from concessionaires that had constructed and operate the water treatment plants.

(Water Services Agenda In The Ninth Plan, Raja Datuk Zaharaton Raja Zainal Abidin, Director General Economic Planning Unit Prime Minister's Department, Water Malaysia Issue No 10 (August 2005)

3.6.1. Structure of the industry

Until 2005, water supply within Malaysia's federal system, sewerage was managed as a national function while water supply and water resource management was a state function. Although there are nominally regulators at State level, these have generally not been able to address the challenges. After a Constitutional amendment, national government has taken oversight responsibility for water supply, leaving water resource management with the States.

At a state level, Malaysia had invited private providers to take over the water supply function previously undertaken by government agencies.

"Some states have fully privatized or corporatised their water supply services whilst some states have privatised the operations and maintenance of water treatment plants. The privatisation is done through concession agreements. In addition, the water tariffs differ from state to state and most states experience high non-revenue water (NRW) ."

The conclusion is that:

"individual problems… such as NRW in the water supply sector or bill collections in the sewerage sector, cannot be solved in isolation. The core problems such as poor governance, low tariffs and lack of funds, need to be resolved first. The solutions may include transparent policies, independent regulatory bodies, a paradigm shift in tariffs, and the involvement of civil society.

"Following the Constitutional Amendments in January 2005, … the National Water Commission will regulate all water service providers irrespective of government or private ownerships, whilst the management of water resources will remain within the jurisdiction of the State Governments.

The approach of the new National Water Commission will be to develop national Key Performance Indicators and benchmarking standards, working together with the Malaysian Water Association, a sectoral professional association.

3.6.2. Water prices

Water tariffs, which are set at state level, are differentiated between industrial and domestic users (see Table 16). The general rule, evident from the structure of tariffs although not formally enunciated in any documents found, is that industrial water users should pay more than domestic users. Whether this is intended to provide a cross-subsidy or to ensure that industrial tariffs are cost reflective is not clear.

Table 16 – Water tariffs for industrial and domestic users: Malaysia

State	Domestic (Ringitts)	Industrial (Ringitts)	Industrial/domestic (Ringitts)
P.Pinang	0.31	0.94	3.03
Terengganu	0.52	1.15	2.21
Kedah	0.53	1.2	2.26
Kelantan	0.55	1.25	2.27
Sarawak	0.56	1.19	2.13
Perlis	0.57	1.3	2.28
Pahang	0.57	1.45	2.54
Bintulu	0.61	1.21	1.98
Kuching	0.62	1.06	1.71
Sibu	0.62	1.06	1.71
Sri Aman	0.62	1.06	1.71
Limbang	0.62	1.06	1.71
Sarikei	0.62	1.06	1.71
Kapit	0.62	1.06	1.71
Perak	0.67	1.4	2.09
N.Sembilan	0.68	1.59	2.34
Selangor	0.72	1.91	2.65
Melaka	0.72	1.4	1.94
Labuan	0.9	0.9	1.00
Sabah	0.9	0.9	1.00
Johor	0.9	2.93	3.26
Average (MRt)	*0.64*	*1.29*	*2.02*
	ZAR 1.10	*ZAR 2.18*	

3.6.3. Relevance to South Africa

Malaysia's problems, particularly with inadequate revenue and investment, the failure of its regulators and its response of centralizing a previously decentralised system should be instructive for South Africa. The move to establish a National Water Commission to manage subsidies and to benchmark state level providers, engaging with professional associations to do this rather than relying on independent regulators is of specific relevance to South Africa.

4. Comparison of costs, institutional arrangements and regulation between South Africa and comparator countries

The international comparison group provides a useful framework for analysing the price performance of the South African water industry, highlighting as it does the general challenge of cost and performance comparisons in the sector.

A number of comparative international reviews of water price have been undertaken by the OECD and the UK's OFWAT, which cover a mix of OECD, European and a few developing countries. These reviews provide helpful pointers to the common structural and institutional issues facing the sector, the wide variety of regulatory approaches used and the price consequences of these.

Data availability is a common problem. In 1999, the OECD report commented:

> *"…. the report had to rely on existing information…. it was rarely possible to collect water price information for more than one year for most countries. Hence, it is difficult to draw conclusions about trends (such as variations in industrial water uses as a result of variations in prices)."*

The fact that the scope of the water service functions covered by the price determinations may or may not include sewage collection and disposal, storm water drainage and environmental management adds to the difficulties.

While many inter-country reviews address the overall performance of the sector, their focus is usually on domestic rather than bulk or industrial users. As an example, the most comprehensive water industry database, the World Bank's Benchmarking system IBNet (www.ib-net.org) identifies the ratio of industrial and domestic tariffs as a useful indicator but very few respondents have actually provided the relevant information.

Further, in many of the countries reviewed, the different approaches adopted to providing and charging for sanitation services create some difficulties in comparative analysis of prices and performance in water supply.

In all jurisdictions, difficulty has been encountered in determining the adequacy of investment in optimal maintenance and expansion as well as determining appropriate quality standards and the financial implications of different scales of operation, which have a significant impact on costs and prices.

- **How do South Africa's industrial water tariffs compare internationally?**

A good example of the challenges of comparison – but also of the useful outputs that can be derived from such comparison – is the attempt by the UK's OFWAT to

identify and then explain the differences between the UK industry's performance and that of some of its European neighbours:

3.2 Business charges

Table 7 shows estimates of charges to business customers in a range of European countries, taken from a 2004 National Utility Services (NUS Consulting) survey. Figures are calculated on the basis of a model supply for a business occupying 45,000 square feet of city centre office space and consuming 10,000 cubic metres of water a year. It appears that the UK (including Scotland) was the third most expensive country in 2004, although this may reflect varying levels of subsidy, service and investment to maintain and enhance assets. Some countries, such as Italy and Spain, appear to be holding tariffs below the levels required to fund necessary improvements in infrastructure. Prices have increased since 2001, though, as companies move to ensure security of supply and improve water quality in order to meet EU directives such as the Urban Waste Water Treatment Directive.

Table 7 Charges to business customers in a range of European countries (p/m^3)

	1998	1999	2001	2003	2004
UK	74	75	78	80	83
Germany	119	118	107	127	122
Denmark	103	106	103	124	120
Belgium	80	79	53	72	68
Netherlands	79	77	69	82	78
France	77	77	66	77	76
Italy	47	48	43	51	52
Finland	43	41	37	45	43
Sweden	36	36	36	43	41
Spain	36	35	41	52	47

Source: NUS Consulting 2003/4 International Water Report and Cost Survey (2004)
Notes:
Data are in outturn prices.
Currency conversions use the daily exchange rate at a given point during the year.

Key conclusions

- *Bills for domestic customers in England and Wales are in line with those of customers in most other countries.*
- *UK businesses face similar charges to their European counterparts.*

Ex: OFWAT International comparison of water and sewerage service 2006

Issues such as under-investment as a potential reason for comparatively cheap services and the need to meet environmental targets as a key cost driver are also relevant in South Africa.

The 2006 NUS survey suggests that South Africa performs well against international comparators.

Table 17 – NUS Consulting Group International Water Report: 2006 cost comparison

NUS Consulting Group
International Water Report
2006 Cost Comparison

2006 Rank	2005 Rank	Country	Cost (US¢)/m³	2005/2006 Change	5 Year Trend (2001/2006)
1		Denmark	224.6	+4.6%	+1.9%
2		Germany	224.5	+1.6%	-2.7%
3		United Kingdom	190.3	+7.8%	+32.3%
4		Belgium	172.3	+1.9%	+51.1%
5		France	157.5	+3.5%	+11.8%
6		The Netherlands	149.0	+1.0%	+0.3%
7		Italy	114.7	+2.0%	+23.2%
8		Finland	103.3	+9.7%	+30.2%
9		Australia	100.5	+13.8%	+45.4%
10		Spain	93.0	+3.1%	+5.2%
11		South Africa	91.8	+8.8%	+50.2%
12		Sweden	85.9	-2.4%	+10.7%
13		Canada	78.9	+8.9%	+58.0%
14		United States	65.8	+4.4%	+27.0%

The survey is based on prices as of 1 July 2006 for an organization with an annual usage of 10,000 cubic meters. All prices are in US cents per cubic meter and exclude VAT. Where there is more than a single supplier, an unweighted average of available prices was used. The percentage change is calculated using the local currency in order to eliminate currency movement distortion.

2005-2006 NUS Consulting Group International Water Survey & Cost Comparison
July 2006 ©

This report suggests that South Africa still enjoys amongst the lowest industrial water supply costs, although its advantage is steadily slipping away due to higher than average price increases (SA was until recently one of the two cheapest suppliers, although this decline may now have been mitigated by currency depreciation).

Comparisons against developing country, and even other developed countries, using data from the present study, offer a somewhat different perspective:

Table 18 – Industrial water supply costs: comparing South Africa to developing and developed countries

Summary		Industrial US $	Exchange Local/US$ 1 Jan 2006
Australia	4	0.70	*1.36515*
Brazil (SANBESP)	1	2.70	*2.35171*
Chile	?	1.08???	*513.95*
India (Delhi)	5	0.69	*45.195*
Malaysia	6	0.34	*3.7801*
UK	2	1.10	*0.58061*
SA	3	1.02	*6.37724*
		0.87	*7.50*
		1.18	*5.50*

In this group, Brazil (Sao Paulo) emerges as more expensive even than the UK; South Africa comes third, with Australia and India next and Malaysia by far the cheapest. This demonstrates both that the gap between different countries is not particularly great but also that low prices are often associated with poor quality services.

- **How do South Africa's industry structures and therefore tariff-setting processes compare with international practice?**

Since it would be of limited relevance to interrogate the detailed tariff setting processes for the comparator countries, the study has focused on the structures and regulatory approaches adopted.

International comparison shows that the South African situation of relative complexity is reflected in many other countries. While in public debate the impression may be created that private management and independent regulation are the global best practice, it is interesting to consider the findings of the 1999 OECD review of industrial water pricing in OECD countries. This reported, *inter alia,* on the ownership, management and regulatory arrangements found that, of 30 countries surveyed,

Ownership	7 some private 2 all private
Management	14 some private 1 all private
Independent regulators:	
Environmental	3
Economic	5

Table 19 - Institutional arrangements (private provision/independent regulators)

	Public supply	Ownership*	Management *	Economic regulator	Environmental regulator
Australia	Regional	Both	Both	Regional/ Independent	Independent
Austria	Municipal	Public	Public	Municipal	Central govt
Belgium	Inter-municipal	Both	Both	Federal govt. (prices)	Regional
Canada	Regional	Public	Public	Provincial govt	Provincial govt
Czech Republic	Municipal	Private	Both	Central govt	Central govt
Denmark	Municipal	Public	Public	Municipal	Central govt/municipalities
Finland	Municipal	Public	Public	Municipal	Central govt
France	Municipal	Public	Both	Municipal	Central govt
Germany	Inter-municipal/ Municipal/ Regional	Both	Both	Municipal/ Regional	Regional
Greece	Municipal	Public	Public	Central govt	Central govt
Hungary	Municipal	Public	Both	Central govt	Central govt/ Independent
Iceland	Municipal	n.a.	n.a.	n.a.	Central govt
Ireland	Regional	Public	Public	Regional	Central govt
Italy	Municipal	Public	Public**	Central and regional govts	Central and regional govts
Japan	Municipal	Public	Public**	Central govt	Central govt
Korea	National/ Regional	Public	Public	Central govt/ Regional	Central govt
Luxembourg	Municipal	Public	Public	Municipal	n.a.
Mexico	Municipal	Public	Both	Central govt	n.a.
Netherlands	Municipal	Public	Both	Central govt/ Regional	Central govt/ Regional
New Zealand	Municipal/ Regional	Public	Both	Central govt	Central govt
Norway	Municipal	Both	Both	Central govt	n.a.
Poland	Municipal	Public	Public	Central govt	Central govt
Portugal	Municipal/ Regional	Public	Both	Central govt	Central govt
Spain	Municipal	Public	Both	Central govt	Central govt/ Independent
Sweden	Municipal	Public	Public	Municipal	Regional
Switzerland	Municipal	Public	Public	Central govt	n.a.
Turkey	Municipal	Public	Public	Central govt	Central govt/ Regional
UK (England & Wales)	Regional	Private	Private	Independent	Independent
US	Municipal	Both	Both	Independent	Independent

Notes:

* *"Both" means that both public and private ownership structures co-exist.*

** *Private management exists, but is marginal.*

"n.a." Denotes "not available".

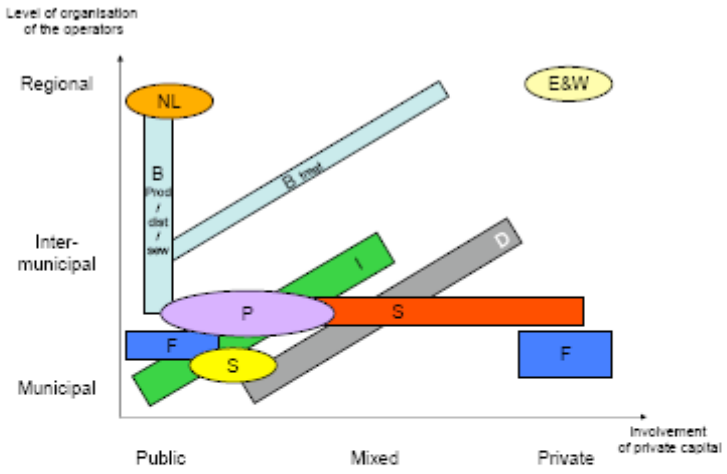
Ex OECD, Industrial Water Pricing In OECD Countries, 1999

A subsequent 2004 study, which also reviewed institutional arrangements, found that the picture was little changed and that UK (England and Wales) was still an outlier,

both in terms of the degree of regionalisation and in the extent of private participation.

Figure 9 – Dominant types of public and private actors in selected EU countries

Figure 11-1: Dominant types of public and private actors in selected EU countries



Comments: The current figure shows a trend in the organization of the WSS sector in the selected countries and cannot refer to national specificities. It is worth mentioning some exceptions in different countries. In Sweden, although the main form is public and municipal services or companies, some inter-municipal cooperation is observed (15% of connections) and public-private partnerships exist (in 8 out of 289 municipalities). In Germany, inter-municipal companies represent 20% of the total companies and private involvement (in mix or private companies) 14%. In the Netherlands, sewerage is a municipal competence, and the municipalities are amongst the shareholders of the Public Water PLCs. Only Amsterdam and Tilburg kept a municipal service of drinking water supply. One single case of privatization is noticed, concerning the construction of a wastewater treatment plant.

Ex water liberalisation scenarios, EC Community research, 2004
http://www.ecologic.de/download/projekte/1950-1999/1977/1977_d4_final.pdf

It is noteworthy that, even in the UK, the benefits of the full regional private provider, independent regulator model are being questioned in the context of the restructuring of Northern Ireland's water sector. In 2003 the Northern Ireland Economic Council commented on the relevance of the English experience for Northern Ireland that:

> *"… it is not clear whether the benefits experienced in GB were the result of privatisation or the presence of an independent regulator. According to OFWAT figures for 1997, the private companies with the most leaky pipes also spent less on repairing them. To overcome this problem, the then Secretary of State for Environment, Transport and the Regions, John Prescott was forced to enhance the Regulators powers to penalise firms who did not meet stringent repair targets. Thus it could be argued that regulation rather than privatisation will ensure the*

> *necessary efficiencies in water provision. Alternatively, innovative incentives (e.g. personnel incentives) for efficiency improvements within the public sector might also prove successful."*

They considered that another approach might achieve the same result:

> *"By using the experience of privatisation in GB to highlight the necessary areas of water service reform, it would in theory be possible that the Northern Ireland Water Service might be able to deliver changes to customers using benchmarking studies."*
>
> *"Although privatisation was chosen as the preferred option to deliver reform in GB in the late 1980s, this does not necessarily mean that it would be the most suitable option for Northern Ireland at the current time. Northern Ireland's economic situation is by no means in crisis and the current water service should be capable of adopting new and updated technology requirements. Therefore it is reasonable to assume that private sector ownership of Northern Ireland's water service is not* essential.

5. Conclusions and recommendations

The study has found that the cost of water supplied to industry has increased by substantially more than CPIX in the period 2001/1 to 2006/7. However, this is not out of line with international trends. A key water pricing issue is whether adequate funds are being raised and efficiently spent to develop and maintain the infrastructure base. In some inland areas, water availability is already a constraint on development.

5.1. Water prices and trends

Water prices have risen faster than inflation in the period 2001/1 to 2006/7 and there are reasons to expect that trend to continue:

- The unit costs of the additional supplies needed for a growing urban population that expects higher levels of service will be higher than presently as new sources are developed in conditions of scarcity;
- Existing infrastructure will need to be rehabilitated to avoid larger expenditures, later; and
- Environmental regulations may impose additional costs by reducing yields from existing schemes as well as by requiring higher quality standards.

One exception to this may be in coastal areas where the cost of sourcing water will be capped by the cost of desalination. This is coming down to levels where it is competitive with conventional sources. Since desalination is an energy intensive process, desalinated water prices are linked to energy prices. This has the advantage of diversifying current exposure to the dominant hydrological/climate risk. There are indications that this advantage is already implicitly recognized in the coastal cities.

5.2. Industry structures

While the structure of South Africa's water supply sector is complex and diverse, it is comparable to that of many other countries both developing and OECD. It is also notable than even in the more mature jurisdictions of the OECD, the structure of the industry is still dynamic.

One feature common across jurisdictions is the evidence that economies of scale can be achieved in water supply. This is a factor that has led to the regionalisation of supplies in countries such as England, Chile and Brazil. Some of South Africa's smaller municipalities may be operating at a scale below what is optimal.

5.3. Tariff-setting processes

The processes for setting tariffs reflect the diversity and complexity of the water industry. While they provide for the engagement of users, it is not clear that this is

always effective. Nonetheless, the fact that South Africa's water prices compare reasonably well with both developed and developing countries suggests that this "systemic regulation" is achieving reasonable outcomes. Its effectiveness depends however on the actual functioning of key processes as well as the availability of data to support them.

Life cycle costs of maintenance, refurbishment, replacement and expansion are often not adequately catered for. This is aggravated by the fact that arbitrary price caps are applied to the municipal processes. Thus, to the extent that prices are not cost reflective, they are likely to err on the side of under-pricing rather than over-pricing.

5.4. Data

Data on water prices for industry is not systematically maintained despite a statutory requirement that the Minister must maintain a establish a National Information System on Water Services (S.67(1) of the WSA). However, South Africa's performance in this regard is similar to many other countries; even OECD countries have been found to have deficient data in this regard.

Data issues need to be addressed since the provision of information which allows water prices and other dimensions of service to be compared ('benchmarking') can be a useful and effective mechanism to encourage better performance.

5.5. Regulatory structures and processes

It is concluded above that South Africa's 'systemic regulation' and the absence of an independent regulator reflects the most common practice in the majority of OECD countries, although whether it is best practice is contentious. While regulatory structures in the UK and Chile are well established, independent regulators are a relatively recent introduction in jurisdictions such as Australia and the regulatory cost-effectiveness of the human-resource-intensive process has not been convincingly demonstrated.

It must be emphasised that the absence of an independent regulator in South Africa does not mean that there is no regulatory processes in place. Indeed, contrary to the reported experience of some of the developing country comparators, there was a clear understanding that tariff setting should be formalized and subject to consultation and review through structured processes. Not only is there a formal process in place for most elements of the water cycle but there is evidence that it has been followed in many cases and that consultative processes did have an impact on tariff decisions.

5.6. Regulation by benchmarking

While reasonably good data is available on request, this is not being presented in a format that allows for comparison. While a number of efforts have begun to benchmark service delivery, these have not yet become effective.

Since this is an important dimensions of ensuring service delivery quality as well as price performance, it is suggested that the generation and presentation of comparative data on service performance should receive priority from the institutions overseeing the sector.

Price is only one dimension that would be benchmarked. Other key indicators are biological and chemical quality as well as service reliability and sustainability.

5.7. Standards

Implicit in all approaches to regulation is the establishment of clear and binding service delivery standards. A potential disadvantage of independent regulators is that they may impede the public policy discussion that should necessarily accompany the setting of delivery standards. Given the often substantial financial implications of apparently technical details, standards should be set through transparent public processes and their implementation subject to review.

5.8. Dealing with scarcity

The final dimension of the pricing discussion is scarcity. In many inland parts of South Africa, absolute water availability may become a limiting factor for industrial development. This has already occurred in the Limpopo province where expansion of platinum mining is constrained and unit costs of new water supplies are at levels significantly higher than current industrial tariffs.

Normally, when a commodity is scarce, its price rises. This often does not occur with water supply. While water trading is allowed in terms of the National Water Act and is occurring formally and informally in many areas, there is no trading process to obtain access to limited municipal or Water Board supplies. In this context, if demand for water supply services is not managed through a process of development planning, augmentation through trading outside the municipality or the imposition of penalty prices, it is likely that supply reliability and quality rather than price will determine the impact of water services on industrial competitiveness.

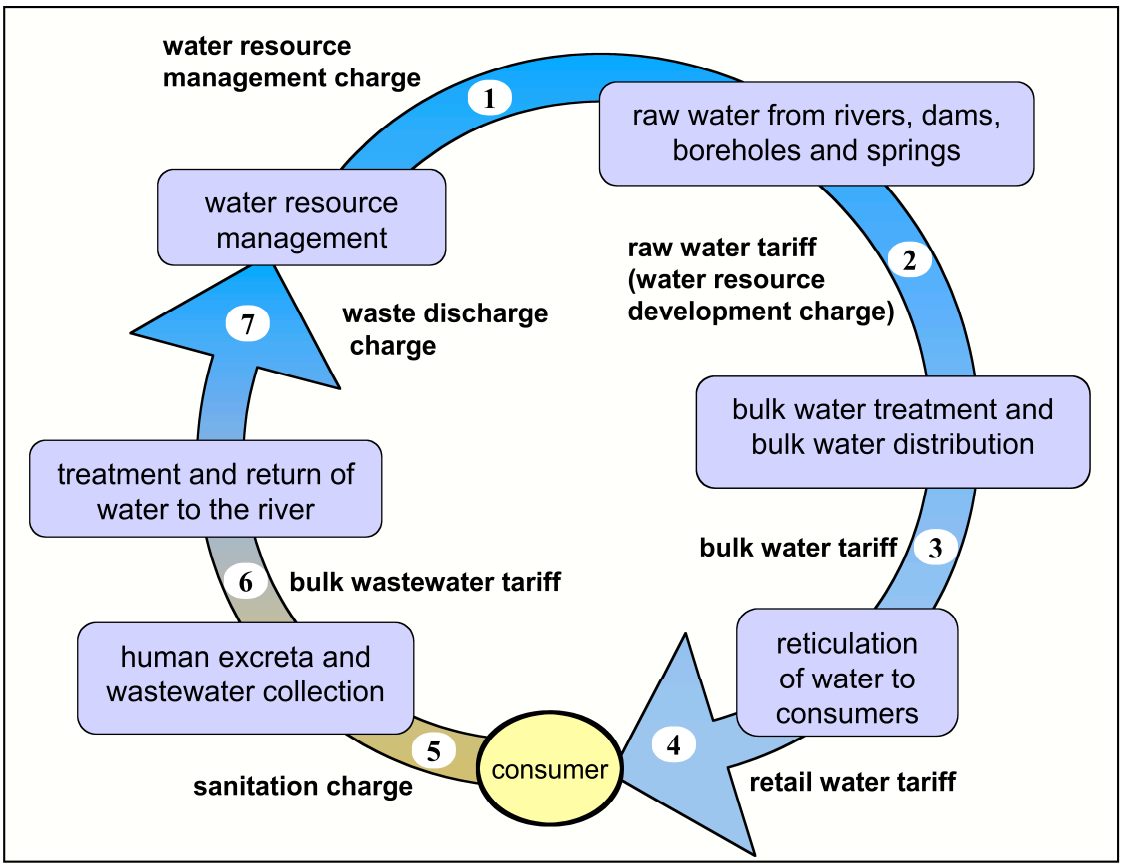
Some key references

- Water Services Act of 1997.
- National Water Act 36 of 1998.
- Norms and Standards in Respect of Tariffs for Water Services in terms of Section 10(1) of the Water Services Act (No. 108 of 1997).
- Guidelines for Compulsory National Standards and Norms and Standards for Water Services Tariffs (under Section 9 & 10 of the Water Services Act, April 2002).
- Guidelines for Water Service Provider Contract Regulations (section 19 (5)) of the Water Services Act, August 2002.
- A Pricing Strategy For Raw Water Use Charges, in terms of National Water Act (Act no. 36 of 1998), Government Gazette 20615 12 November 1999.
- Local Government: Municipal Finance Management Act. Act 56 of 2003.
- Local Government: Municipal Systems Act. Act 32 of 2000.

Appendix 1: Build-up of water supply tariffs

The structure of the full cost of water supply and sanitation services and the related tariffs and charges are shown in Figure 10 below.

Figure 10 – Water supply and sanitation services cost structure and related tariffs and charges



Ex SFWS

Appendix 2: National Water Act: pricing strategy for water use charges

56. (1) The Minister may, with the concurrence of the Ministry of Finance, from time to time by notice in the *Gazette*, establish a pricing strategy for charges for any water use within the framework of existing relevant government policy.

(2) The pricing strategy may contain a strategy for setting water use charges -

(a) for funding water resource management, including the related costs of -

(i) gathering information;

(ii) monitoring water resources and their use;

(iii) controlling water resources;

(iv) water resource protection, including the discharge of waste and the protection of the Reserve; and

(v) water conservation;

(b) for funding water resource development and use of waterworks, including

(i) the costs of investigation and planning;

(ii) the costs of design and construction;

(iii) pre-financing of development;

(iv) the costs of operation and maintenance of waterworks;

(v) a return on assets; and

(vi) the costs of water distribution; and

(c) for achieving the equitable and efficient allocation of water.

(3) The pricing strategy may -

(a) differentiate on an equitable basis between -

(i) different types of geographic areas;

(ii) different categories of water use; and

(iii) different water users;

(b) provide for charges to be paid by either -

(i) an appropriate water management institution; or

(ii) consumers directly;

(c) provide for the basis of establishing charges;

(d) provide for a rebate for water returned to a water resource; and

(e) provide on an equitable basis for some elements of the charges to be waived in respect of specific users for a specified period of time.

(4) The pricing strategy may differentiate under subsection (3)*(a)* -

(a) in respect of different geographic areas, on the basis of -

(i) socio-economic aspects within the area in question;

(ii) the physical attributes of each area; and

(iii) the demographic attributes of each area;

(b) in respect of different types of water uses, on the basis of -

(i) the manner in which the water is taken, supplied, discharged or disposed of;

(ii) whether the use is consumptive or non-consumptive;

(iii) the assurance and reliability of supply and water quality;

(iv) the effect of return flows on a water resource;

(v) the extent of the benefit to be derived from the development of a new water resource;

(vi) the class and resource quality objectives of the water resource in question; and

(vii) the required quality of the water to be used; and

(c) in respect of different water users, on the basis of -

(i) the extent of their water use;

(ii) the quantity of water returned by them to a water resource;

(iii) their economic circumstances; and

(iv) the statistical probability of the supply of water to them.

(5) The pricing strategy may provide for a differential rate for waste discharges, taking into account -

(a) the characteristics of the waste discharged;

(b) the amount and quality of the waste discharged;

(c) the nature and extent of the impact on a water resource caused by the waste discharged;

(d) the extent of permitted deviation from prescribed waste standards or management practices; and

(e) the required extent and nature of monitoring the water use.

(6) In setting a pricing strategy for water use charges, the Minister -

(a) must consider the class and resource quality objectives for different water resources;

(b) may consider incentives and disincentives -

(i) to promote the efficient use and beneficial use of water;

(ii) to reduce detrimental impacts on water resources; and

(iii) to prevent the waste of water; and

(c) must consider measures necessary to support the establishment of tariffs by water services authorities in terms of section 10 of the Water Services Act, 1997 (Act No. 108 of 1997), and the use of lifeline tariffs and progressive block tariffs.

(7) Before setting a pricing strategy for water use charges under subsection (1), the Minister must -

(a) publish a notice in the *Gazette* -

(i) setting out the proposed pricing strategy; and

(ii) inviting written comments to be submitted on the proposed strategy, specifying an address to which and a date before which the comments are to be submitted, which date may not be earlier than 90 days after publication of the notice;

(b) consider what further steps, if any, are appropriate to bring the contents of the notice to the attention of interested persons, and take those steps which the Minister considers to be appropriate; and

(c) consider all comments received on or before the date specified in the notice.

Appendix 3: TCTA tariff-setting processes

The bulk raw water tariff for the Vaal River system is determined by a pricing policy that strives to peg the price of raw water to present levels in real terms. It takes into account the demand for water and further Vaal River System augmentation schemes. The water tariff charged to end-users comprises the following elements:

- Bulk raw water that includes the Lesotho Highlands Water Project (charged by the Department of Water Affairs and Forestry);
- Bulk purified water (charged by Water Boards); and
- Reticulated water (charged by local authorities).

Revenue comprises a portion of the bulk raw water tariff collected by the Department of Water Affairs and Forestry. This revenue is generated over the life of the Project and will be sufficient to pay for the construction, maintenance, operation, royalty and finance costs of the water delivery component of the Project, within 20 years of completion of the construction of each sub-phase. On 3 August 2001 TCTA entered into an Income Agreement with the Department of Water Affairs and Forestry, whereby the tariff will be adjusted annually by the year-on-year CPIX. Should the annual CPIX adjustment exceed 7.5% or be lower than 4.5%, the adjustment to the tariff would be negotiated. Other than the annual adjustments mentioned above, negotiated adjustments could also be triggered by changes in water demand, changes in timing and size of capital expenditure for further augmentation.

http://www.tcta.co.za/article.jsp?menu_id=185

Appendix 4: Rand Water 2004 tariff increase

Following an annual increase on raw bulk water announced by Department of Water Affairs and Forestry (DWAF) with effect from 1 April 2004, Rand Water will increase its bulk water tariff with effect from 1 July 2004. This is after three months of absorbing costs by Rand Water in deciding not to immediately pass the 6.1 % increase imposed on it by DWAF, saving the municipalities millions of rands thus reducing the impact.

To further reduce the impact to its customers and ultimately the end consumer, Rand Water is passing 5.7% increase absorbing the 0.4% of the DWAF's 6.1%, which translates to millions of rands. This is a demonstration of Rand Water's commitment to make water accessible and affordable. This it has continued to achieve through productivity and efficiency improvements, which enable it to keep price increases at a lower level.

Over the past five years R86 million has been ploughed back to the customers through absorbing the increase costs.

The 5.7 % increase from July 1 is attributable both to increases in operating costs and the need to fund additions to the utility to meet rising demand from a growing population**.** The raw water cost is a major component of Rand Water's input costs amounting more than 55 % of the total. Another general attributing factor is the Lesotho Highland Water Project agreement, which requires South Africa to continue importing water from Lesotho even if local dams are full. This is because Lesotho needs to release water continuously from Katse Dam to run turbines for electricity generation.

Rand Water, through municipalities, supplies an average of 3340 million litres of water daily to Gauteng households and consumers as far afield as Rustenburg and Carletonville in the North West province, Bethal in Mpumalanga and Heilbron in the Free State.

Current water demand management initiatives, if effective, will help in the postponement of costly future interbasin water transfer schemes, and the cooperation of both the municipalities and the public will be vital to the achievement of this cost saving programme.

Appendix 5: DWAF water management regions: Gauteng price schedules (consumptive charges effective 1 April 2006)

Scheme	SMP	Tariff (c/m3)			Irrigation quota m^3/ha
		Domestic & industrial	Irrigation	TCTA	
Komati River (Vygeboom and Nooitgedacht Dams) (51)	DAM (79)	-	1.11	-	7810
Komati River (Vygeboom and Nooitgedacht Dams) (51)	DUVHA TO HENDRINA PIPELINE (656)	110.99	-	-	
Komati River (Vygeboom and Nooitgedacht Dams) (51)	FROM GLADDESPRUIT CANAL (11)	-	4.80	-	
Komati River (Vygeboom and Nooitgedacht Dams) (51)	UPPER KOMATI (I.E. ESKOM] (162)	11.21	-	-	
LICENSE BOREHOLE APPROVALS (GA:ZONE C) - UPPER VAAL (353)	PENDIO INV CC (758)	26.82	-	140.83	
Mooi River (Boskop and Klerkskraal Dams) (79)	CANAL (19)	51.39	7.34	-	7700
Mooi River (Boskop and Klerkskraal Dams) (79)	DAM (134)	10.29	2.37	-	
MOOI RIVER (BOSKOP AND KLERKSKRAAL DAMS) (79)	FROM THE CANAL SYSTEM TO POTCHEFSTROOM (653)	-	51.39	-	
Namahadi River GWW (Fika Patso & Metsi Matso dam) (354)	NAMAHADI RIVER GWW (FIKA PATSO & METSI MATSO DAMS) (760)	26.67	-	-	
Slang River GWS (Zaaihoek Dam) - (WM Table 5 – DWAF water management regions: Gauteng price schedules (consumptive charges effective 1 April 2006)A Thukela) (348)	FROM THE DAM (657)	27.73	-	-	
Slang River GWS (Zaaihoek Dam) - (WMA Upper Vaal) (115)	FROM THE PIPELINES AND THE AQUEDUCT TO GROOTDRAAI DAM (442)	26.82	-	140.83	
Tugela Vaal GWS (WMA - Thukela) (126)	FROM SYSTEM UP TO AND INCLUDING THE JAGERSRUST BALANCING DAM [TUGELA-VAAL RIVER AQUADUCT] (220)	11.78	-	-	
Tugela Vaal GWS (WMA - Upper Vaal) (351)	FROM STERKFONTEIN DAM [TUGELA-VAAL RIVER AQUADUCT] (680)	121.50	-	-	
Usutu River GWS (Jericho, Morgenstond and Westoe Dams) (129)	CAMDEN [ESKOM] (636)	68.36	-	-	
Usutu River GWS (Jericho, Morgenstond and Westoe Dams) (129)	CAMDEN LILLIEPUT (451)	265.51	-	-	
Usutu River GWS (Jericho, Morgenstond and Westoe Dams) (129)	CAMDEN/KRIEL PIPELINE (447)	197.89	-	-	
Usutu River GWS (Jericho, Morgenstond and Westoe Dams) (129)	FROM THE DAMS: (JERICHO, MORGENSTOND AND WESTOE DAMS) (224)	136.90	-	-	
Usutu River GWS (Jericho, Morgenstond and Westoe Dams) (129)	FROM THE DAMS: (JERICHO, MORGENSTOND AND WESTOE DAMS) (224)	136.90	-	-	
Usutu River GWS (Jericho, Morgenstond and Westoe Dams) (129)	JERICHO/CAMDEN PIPELINE (225)	136.90	-	-	
Usutu River GWS (Jericho, Morgenstond and Westoe Dams) (129)	KENDAL (ESKOM) (450)	221.29	-	-	
Usutu River GWS (Jericho, Morgenstond and Westoe Dams) (129)	KHUTALA/KENDAL PIPELINE (449)	434.01	-	-	
Usutu Vaal River (Phase 1) (Grootdraai Dam) - WMA Upper Vaal) (349)	KRIEL (ESKOM) (448)	85.10	-	-	
Usutu Vaal River (Phase 1) (Grootdraai Dam) - WMA Upper Vaal) (349)	New SMP	49.43	-	140.83	
Usutu Vaal River (Phase 1) (Grootdraai Dam) - WMA Upper Vaal) (349)	GROOTDRAAI TO KNOPPIESFONTEIN (661)	72.06	-	140.83	

Scheme	SMP	Tariff (c/m3)			Irrigation quota m³/ha
		Domestic & industrial	Irrigation	TCTA	
Usutu Vaal River (Phase 1) (Grootdraai Dam) - WMA Upper Vaal) (349)	GROOTDRAAI TO TUTUKA (660)	81.84	-	140.83	
Usutu Vaal River (Phase 1) (Grootdraai Dam) - WMA Upper Vaal) (349)	KNOPPIESFONTEIN TO BOSSIESPRUIT (662)	77.47	-	140.83	
Usutu Vaal River (Phase 1) (Grootdraai Dam) - WMA Upper Vaal) (349)	KNOPPIESFONTEIN TO TRICHARDSFONTEIN (663)	114.82	-	140.83	
Usutu Vaal River (Phase 1) (Grootdraai Dam) - WMA Upper Vaal) (349)	MATLA ESKOM (665)	67.17	-	140.83	
Usutu Vaal River (Phase 1) (Grootdraai Dam) - WMA Upper Vaal) (349)	NAAUWPOORT TO DUVHA (666)	212.15	-	140.83	
Usutu Vaal River (Phase 1) (Grootdraai Dam) - WMA Upper Vaal) (349)	PUMPED FROM TRICHARDSFONTEIN DAM TO OTHER USERS (743)	208.15	-	140.83	
Usutu Vaal River (Phase 1) (Grootdraai Dam) - WMA Upper Vaal) (349)	PURIFICATION WORKS (658)	116.67	-	140.83	
Usutu Vaal River (Phase 1) (Grootdraai Dam) - WMA Upper Vaal) (349)	RIETFONTEIN TO MATLA (664)	186.30	-	140.83	
Usutu Vaal River (Phase 1) (Grootdraai Dam) - WMA Upper Vaal) (349)	TUTUKA ESKOM (659)	26.82	-	140.83	
Usutu Vaal River GWS (Phase 1) Grootdraai dam WMA Upper Vaal) (349)	New SMP	104.13	-	140.83	
Usutu Vaal River GWS (Phase 1) Grootdraai dam - Olifant WMA (131)	DOUGLAS COLLIERY (ALBION) (OLIFANTS WMA) (753)	165.95	-	140.83	
Usutu Vaal River GWS (Phase 1) Grootdraai dam - Olifant WMA (131)	DOUGLAS COLLIERY (OLIFANTS WMA) (752)	165.95	-	140.83	
Usutu Vaal River GWS (Phase 1) Grootdraai dam - Olifant WMA (131)	DOUGLAS COLLIERY (VAN DYKSDRIFT) (OLIFANTS WMA)	165.95	-	140.83	
Usutu Vaal River GWS (Phase 1) Grootdraai dam - Olifant WMA (131)	DOUGLAS COLLIERY (VAN DYKSDRIFT) (WOLWEKRANS) (OLIFANTS WMA) (754)	165.95	-	140.83	
Usutu Vaal River GWS (Phase 1) Grootdraai dam - Olifant WMA (131)	KLEINKOPJE MINE (OLIFANTS WMA) (751)	165.95	-	140.83	
Usutu Vaal River GWS (Phase 1) Grootdraai dam - Olifant WMA (131)	TRICHARFDSFONTEIN TO WITBANK DAM (459)	165.95	-	140.83	
Usutu Vaal River GWS (Phase 2) (Heyshope Dam) (130)	A. GREEN [VAAL RIVER DEV SCHEME] (687)	26.82	-	140.83	
Usutu Vaal River GWS (Phase 2) (Heyshope Dam) (130)	AELIONS CLUB [VAAL RIVER DEV SCHEME] (681)	26.82	-	140.83	
Usutu Vaal River GWS (Phase 2) (Heyshope Dam) (130)	BALFOUR MUNICIPALITY [VAAL RIVER DEV SCHEME] (691)	26.82	-	140.83	
Usutu Vaal River GWS (Phase 2) (Heyshope Dam) (130)	BETHAL MUN - A (736)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	BETHAL MUN - A (737)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	BETHAL MUN - A (738)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	BETHLEHEM MUN - APPLE ORCHIDS (727)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	BETHLEHEM MUN - SAULSPOORT DAM 1 (724)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	BETHLEHEM MUN - SAULSPOORT DAM 2 (725)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	BETHLEHEM MUN - UNICO FEEDLOT (726)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	COMFRAMAT (PTY) LTD (S HEAP) (759)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	DENEYSVILLE METRO (729)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	DIHLABENG LOCAL MUNICIPALITY: BETHLEHEM (748)	26.82	-	140.83	

Scheme	SMP	Tariff (c/m3)			Irrigation quota m^3/ha
		Domestic & industrial	Irrigation	TCTA	
Vaal River (System) Upper Vaal (134)	DIHLABENG MUN [REITZ[(714)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	EARLY BIRD FARM [VAAL] (710)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	ENDICOTT FARMING [VAAL RIVER DEV SCHEME] (686)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	ERASMUS J.P. (742)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	ERIKA KWEKERY [VAAL RIVER DEV SCHEME] (685)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	ERMELO MUN - GOLF (734)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	ERMELO MUN - MINE (735)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	ERMELO MUN - TOWN (733)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	F. SUPRA (E.P. ROSSOU) [VAAL RIVER DEV SCHEME] (684)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	FRANKFORT A MUNICIPALITY (716)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	FRANKFORT B MUNICIPALITY (717)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	G. COLEMAN [VAAL RIVER DEV SCHEME] (690)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	HARRISMITH MUN - BERGSIG BOTANICAL (720)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	HARRISMITH MUN - FEEDLOTS (722)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	HARRISMITH MUN - GRAVITATIONAL LINE (721)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	HARRISMITH MUN - NUWEJAARSPRUIT (723)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	HARRISMITH MUN - TOWN CENTRE (718)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	HARRISMITH MUN - TSHIANE (719)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	HEILBRON MUN (728)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	KARAN ESTATES [VAAL RIVER DEV SCHEME] (682)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	LAMBERTI M.J. (739)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	METSIMAHOLO LOCAL MUNICIPALITY (ORANJEVILLE)(749)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	MORGENZON MUN (732)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	MSUKALIGWA MUNICIPALITY: BREYTON LOCAL AUTHORITY (747)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	PARKIN BRICKS SAND AND CLAY [VAAL RIVER DEV SCHEME] (683)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	PETRUS STEYN MUNICIPALITY (GOLF) (712)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	PETRUS STEYN MUNICIPALITY (TOWN) (711)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	PRETORIUS W.P. (741)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	R.F. GARMANY [VAAL RIVER DEV SCHEME] (688)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	RAND WATER (709)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	SCHEME (230)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	STANDERTON MUN TOWN (731)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	T. FORD [VAAL RIVER DEV SCHEME] (689)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	TENNANT S.R. (740)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	TWEELING MUNICIPALITY (713)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	VILLIERS MUNICIPALITY (730)	26.82	-	140.83	
Vaal River (System) Upper Vaal (134)	WARDEN MUNICIPALITY (715)	26.82	-	140.83	

Appendix 6: Act 32 of 2000: Local Government: Municipal Systems Act

Part 1: Service tariffs

Tariff policy

Sect 74 (1): "A municipal council must adopt and implement a tariff policy on the levying of fees for municipal services; provided by the municipality…"

(2): A tariff policy must reflect the following principles, namely that –

(a) users of municipal services should be treated equitable in the application of tariffs;

(b) the amount individual users pay for services should generally be in proportion to their use of that service

(c) poor households must have access to at least basic services through:

(i) tariffs that cover only operating and maintenance costs;

(ii) special tariff or lifeline tariffs for low levels of use or consumption of services for basic level of service; or

(iii) any other direct or indirect method of subsidization of tariffs for poor households;

(d) tariffs must reflect the costs reasonably associated with rendering that service, including capital, operating, maintenance, administration and replacement costs; and interest charges;

(e) tariffs must be set at levels that facilitate the financial sustainability of the service, taking into account subsidization from sources other that the one concerned;

(f) provision may be made in appropriate circumstances for a surcharge on the tariff for a service;

(g) provision may be made for the promotion of local economic development through special tariffs for commercial and industrial users;

(h) the economical, efficient and effective use of resources, the recycling of waste and other appropriate environmental objectives must be encouraged;

(i) the extent of subsidization of tariffs for poor households and other categories of users should be fully disclosed

(3) A tariff policy may differentiate between categories of users, debtors, service providers, services, service standards, geographical areas and other matters as long as the differentiation does not amount to unfair discrimination.

By-laws to give effect to policy

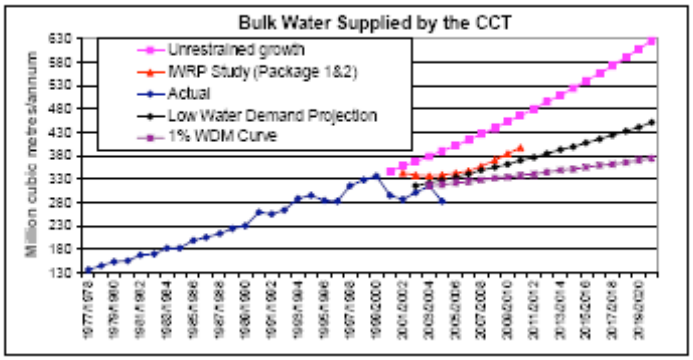
Sect 75 (1) A municipal council must adopt by-laws to give effect to the implementation and enforcement of its tariff policy.

(2) By laws in terms of subsection (1) may differentiate between different categories of users, debtors, service providers, services, service standards, geographical areas so long as differentiation does not amount to unfair discrimination.

Appendix 7: City of Cape Town demand projections

Figure 11 – Demand growth projections

Figure 4.2: Demand growth projections



Ex CT WSDP

Appendix 8: MFMA Guidelines on pricing of bulk resources for municipal services

(National Treasury, MFMA Circular 23, September 2005)

Action date

1 The organ of state (bulk provider) should consult with all municipalities and municipal entities within their supply area on proposed pricing increases. This would ideally take the form of a meeting or workshop at which relevant motivations supporting the increase are tabled and explained, allowing opportunities for questions and feedback.

Municipalities at this stage to consider and plan ahead for compliance with other regulatory processes prescribed for setting municipal tariffs, i.e. NER for electricity.

Oct and Nov

2 A request must be lodged with the National Treasury and organised local government (SALGA) seeking written comments on the proposed pricing increase. This request should be accompanied by sufficient information to enable constructive comments, such as that information required in step 3 below and feedback from consultation with municipalities and municipal entities from step 1 above.

No later than 1 Dec

3 National Treasury and SALGA provide written comments on the proposed pricing increase.

No later than 25 Jan

4 No sooner than 40 days after lodging the request with National Treasury and SALGA the organ of state must lodge a "submission" on the proposed pricing increase to:

- its executive authority within the meaning of the PFMA; and
- any regulatory agency for approval, if national legislation requires such approval e.g. NER for electricity

Such submission must be accompanied by:

- a motivation of the reasons for the proposed amendment;
- an explanation of how the amendment takes account of;
    - government's inflation targets and other macro economic policy objectives;

  - steps taken by the organ of state to improve its competitiveness or efficiency in order to reduce costs;
  - any objectives or targets as outlined in any corporate or other governance plan applicable to that organ of state;
- any written comments received from the National Treasury, organised local government or any municipalities; and
- explanation of how such comments have been taken into account.

5 The executive authority of the organ of state must table the pricing amendment and the documents referred to in 3 above in Parliament or the relevant provincial legislature, as may be appropriate.

15 Feb

6 Unless approved otherwise by the Minister, an amendment to a pricing structure which is tabled in Parliament or the relevant provincial legislature

- on or before 15 March in any year, does not take effect for the affected municipalities or municipal entities before 1 July in that year; or
- after 15 March in any year, does not take effect for the affected municipalities or municipal entities before 1 July the next year.

1 March

7 The organ of state (bulk provider) must notify in writing all municipalities and municipal entities of the price increase.

15 March

8 Municipalities to comply with other regulatory processes prescribed for setting municipal tariffs, i.e. NER for electricity.

As soon as possible after 15 March

9 Municipality to table draft budget before council.

No later than 31 March

Appendix 9: Municipal budget key deadlines

Mayor to Table in Council 10 Months Prior to Start of Budget Year		
Month	**Municipality _____**	**Budget Year _____**
	Mayor and Council / Entity Board	**Administration - Municipality and Entity**
July	Mayor begins planning for next three-year budget in accordance with co-ordination role of budget process **MFMA s 53** Planning includes review of the previous years budget process and completion of the Budget Evaluation Checklist	Accounting officers and senior officials of municipality and entities begin planning for next three-year budget **MFMA s 68, 77** Accounting officers and senior officials of municipality and entities review options and contracts for service delivery **MSA s 76-81**
August	Mayor tables in Council a time schedule outlining key deadlines for: preparing, tabling and approving the budget; reviewing the IDP (as per s 34 of MSA) and budget related policies and consultation processes at least 10 months before the start of the budget year. **MFMA s 21,22, 23;** **MSA s 34, Ch 4 as amended** Mayor establishes committees and consultation forums for the budget process	
September	Council through the IDP review process determines strategic objectives for service delivery and development for next three-year budgets including review of provincial and national government sector and strategic plans	Budget offices of municipality and entities determine revenue projections and proposed rate and service charges and drafts initial allocations to functions and departments for the next financial year after taking into account strategic objectives Engages with Provincial and National sector departments on sector specific programmes for alignment with municipalities plans (schools, libraries, clinics, water, electricity, roads, etc)
October		Accounting officer does initial review of national policies and budget plans and potential price increases of bulk resources with function and department officials **MFMA s 35, 36, 42; MTBPS**
November		Accounting officer reviews and drafts initial changes to IDP **MSA s 34**
December	Council finalises tariff (rates and service charges) policies for next financial year **MSA s 74, 75**	Accounting officer and senior officials consolidate and prepare proposed budget and plans for next financial year taking into account previous years performance as per audited financial statements
January	Entity board of directors must approve and submit proposed budget and plans for next three-year budgets to parent municipality at least 150 days before the start of the budget year **MFMA s 87(1)**	Accounting officer reviews proposed national and provincial allocations to municipality for incorporation into the draft budget for tabling. (Proposed national and provincial allocations for three years must be available by 20 January) **MFMA s 36**

February	Council considers municipal entity proposed budget and service delivery plan and accepts or makes recommendations to the entity **MFMA s 87(2)**	Accounting officer finalises and submits to Mayor proposed budgets and plans for next three-year budgets taking into account the recent mid-year review and any corrective measures proposed as part of the oversight report for the previous years audited financial statements and annual report Accounting officer to notify relevant municipalities of projected allocations for next three budget years 120 days prior to start of budget year **MFMA s 37(2)**
March	Entity board of directors considers recommendations of parent municipality and submit revised budget by 22nd of month **MFMA s 87(2)** Mayor tables municipality budget, budgets of entities, resolutions, plans, and proposed revisions to IDP at least 90 days before start of budget year **MFMA s 16, 22, 23, 87; MSA s 34**	Accounting officer publishes tabled budget, plans, and proposed revisions to IDP, invites local community comment and submits to NT, PT and others as prescribed **MFMA s 22 & 37; MSA Ch 4 as amended** Accounting officer reviews any changes in prices for bulk resources as communicated by 15 March **MFMA s 42**
April	Consultation with national and provincial treasuries and finalise sector plans for water, sanitation, electricity etc **MFMA s 21**	Accounting officer assists the Mayor in revising budget documentation in accordance with consultative processes and taking into account the results from the third quarterly review of the current year
May	Public hearings on the budget, and council debate. Council consider views of the local community, NT, PT, other provincial and national organs of state and municipalities. Mayor to be provided with an opportunity to respond to submissions during consultation and table amendments for council consideration. Council to consider approval of budget and plans at least 30 days before start of budget year. **MFMA s 23, 24; MSA Ch 4 as amended** Entity board of directors to approve the budget of the entity not later than 30 days before the start of the financial year, taking into account any hearings or recommendations of the council of the parent municipality **MFMA s 87**	Accounting officer assists the Mayor in preparing the final budget documentation for consideration for approval at least 30 days before the start of the budget year taking into account consultative processes and any other new information of a material nature
June	Council must approve annual budget by resolution, setting taxes and tariffs, approving changes to IDP and budget related policies, approving measurable performance objectives for revenue by source and expenditure by vote before start of budget year **MFMA s 16, 24, 26, 53** Mayor must approve SDBIP within 28 days after approval of the budget and ensure that annual performance contracts are concluded in accordance with s 57(2) of the MSA. Mayor to ensure that the annual performance agreements are linked to the measurable performance objectives approved with the budget and SDBIP. The mayor submits the approved SDBIP and performance agreements to council, MEC for local government and makes public within 14 days after approval. **MFMA s 53; MSA s 38-45, 57(2)** Council must finalise a system of delegations. **MFMA s 59, 79, 82; MSA s 59-65**	Accounting officer submits to the mayor no later than 14 days after approval of the budget a draft of the SDBIP and annual performance agreements required by s 57(1)(b) of the MSA. **MFMA s 69; MSA s 57** Accounting officers of municipality and entities publishes adopted budget and plans **MFMA s 75, 87**

Abbreviations: ***IDP*** *- Integrated Development Plan;* ***MFMA*** *- Local Government: Municipal Finance Management Act, No. 56 of 2003;* ***MSA*** *- Local Government: Municipal Systems Act, No. 32 of 2000, as amended;* ***MTBPS*** *- National Treasury annual publication, Medium Term Budget and Policy Statement;* ***NT*** *- National Treasury;* ***PT*** *- Provincial Treasuries;* ***SDBIP*** *- Service Delivery and Budget Implementation Plan*

Appendix 10: Discussion document

The New Umgeni Water Tariff

Methodology and the associated accounting impacts

Table of contents

Umgeni Water tariff methodology

Background

Recognising that its tariff methodology was not in the best interests of the organisation itself nor those of its stakeholders, Umgeni Water decided to revisit its tariff methodology. This issue was discussed with Umgeni Water's newly appointed treasury managers, the Trans-Caledon Tunnel Authority (TCTA). In conjunction with the TCTA a new, cash flow model was developed and approved by the Board of Umgeni Water for use with effect from the financial year beginning 01 July 2002.

Old tariff model

The old methodology that used to be applied to calculate Umgeni Water's tariff, was based on an Income Statement methodology. This involved an annual calculation to result in a break-even position on the Income Statement. The process required Umgeni Water to solve for the following year's tariff, based on forecast growth in demand and forecast Income Statement incomes and expenditure, that would equate to a break even on the Income Statement at the end of the next financial year.

The impact of this methodology was as follows:

- Increases could fluctuate above inflation in any year;
- It was based on reserve accounting whereby cash was allocated to invest in financial assets to meet replacement of assets and redemption of loans in future. This resulted in an asset and liability mismatch as the average lifespan of the physical assets, and the terms of the financial assets and liabilities often differed;
- It was implemented in isolation of stakeholder interest which resulted in poor relationships which in turn resulted in extended debtors periods (particularly in years of dispute);
- Amortisation of interest receivable on zero coupon bonds was included in this methodology which resulted in a cashflow shortage, as Umgeni Water did not actually receive this cash before maturity of these instruments;
- It was focused on the short-term;
- Umgeni Water did not take the risk of any cashflow implications from decisions taken in the management of Umgeni Water, as the financial implications were simply passed on to the stakeholders by means of an increased tariff.

New tariff model

The basis of the cash flow methodology is to have a constant tariff in real terms. This implies that the tariff will only increase in line with CPI-X annually. The trade off is a changing debt level. Debt will firstly increase slightly as net cash flows are out, and then decrease as net cash flows become positive driven by the higher tariff levels in future years.

A constant tariff promotes stronger stakeholder relationships due to the transparency of this approach. The stakeholders can do longer-term planning which will impact

positively on the cash management of the stakeholders and decrease the risk of extended debtors periods for Umgeni Water.

The methodology focuses on two main debt-related parameters to be managed via cashflows being:

- The peak of the debt curve:
    - rand value where debt peaks;
    - timing of when debt peaks; and
- The final repayment date of debt.

The effect of this method is two-fold:

1. It has a long-term perspective; and

2. It is a management tool.

Long-term perspective

A major focus area of this methodology is to have a long-term view on Umgeni Water. Debt is managed over a pre-determined time whereby increased income over this period will be applied to repay debt. Debt can either be repaid completely or partly, depending on Umgeni Water's view on the minimum level of debt required to suit the business.

Reserve accounting

This methodology does not require the continuance of the reserve accounting practice. The investments can therefore be sold to repay debt and that will put Umgeni Water immediately on a lower debt level to manage, and decreased finance costs. As some of the investments are held for liquidity reasons, the extent of Umgeni Water's liquidity risk will be addressed in the liquidity strategy.

Cashflow deficits

The debt curve can, and will grow by the cashflow deficits in the earlier years. This situation occurs in both methodologies (refer to the impact of zero coupon bonds in the current methodology). This is normal for infrastructure projects where the income to fund the infrastructure is recovered over a long period due to the average lifetime of the physical assets.

Long-term planning / timing of augmentation schemes

This involves long-term planning instead of a one-year horizon or shorter-term planning, and therefore is to the benefit of Umgeni Water. Planning is essential especially from the engineering perspective as Umgeni Water has to manage the timing of when augmentation schemes are required in accordance with the long-term view on growth in demand and rainfall patterns e.g. droughts etc. It is costly to build

capacity that will not be utilised. The long-term supply of water therefore, will be managed against the long-term demand for water per area.

A negative to zero growth in demand does not require augmentation schemes or new capital expenditure. A positive growth in demand only requires augmentation when demand grows above supply.

The timing of capital expenditure is essential for the long-term cash and debt planning of Umgeni Water and has a direct impact on the peak of the debt curve and the repayment date of debt, since under utilised capacity involves unnecessary finance charges. The relationship between Capex and growth in demand is important and not the actual numbers in isolation. This is because increased volume will fund Capex expansion.

It is relevant to note that Umgeni Water not only incurs Capex in response to volume increases but also due to:

- Refurbishment of assets (maintenance and renewals)
- Safety reasons
- Assurance of supply
- Waste water requirements
- Strategy related issues

All Capex affects the debt curve and as such should be minimized and/or delayed as long as is practicable.

Long-term solvency

The long-term solvency of Umgeni Water is a key factor to be managed and this method underpins this area of focus.

Long-term business objectives

It is important that decisions taken should support Umgeni Water's long-term business objectives. Any proposed decision can be tested based on what the impact of the decision will be on the debt curve. This model increases the possibility of achieving the agreed long-term business objectives, which in turn supports the ultimate well being of Umgeni Water.

Management tool

The cashflow model with its long-term view is a very powerful management tool. The main benefits and functionality of the model are as follows:

Quantification of impact of decisions

Any decisions to be taken can be measured using this model, by quantifying what the impact of a decision will be on the peak of the debt curve and the final repayment date.

Debt management

It is up to Umgeni Water to decide on a maximum peak of the debt curve and a maximum repayment period of debt. These levels should be in relation to the business objectives and provide a comfortable level that will be part of decision evaluations in future. Should a situation arise where these levels will be exceeded, the best action to be taken can be determined by testing the possible methods to manage the debt curve within the agreed parameters.

Umgeni Water has requested National Treasury to approve its borrowing limits. We await this approval.

Sensitivity analysis

The model has the flexibility to quantify Umgeni Water's potential exposure via sensitivity analysis, scenario testing and stress testing. Refer to the section under sensitivities for detailed information.

Smoothing of corrective action

Should any factor have a negative impact on the debt curve which results in a under recovery of costs, it can be managed by smoothing additional increases in the tariff over a period. Sudden high increases will not be required if this method is applied correctly.

Debt curve in real terms

The model also has the capability to show the debt curve in real terms i.e. the present value of future debt in 2002 terms by addressing the impact of time value of money.

Base case

The following input (see below) was used to determine the base case debt curve for Umgeni Water.

Inflation rate		
• CPI	6%	Income and certain expenses
• PPI	7.2%	Other expenses
Interest rate for refinancing		
• Real	6%	
• Nominal	12%	
Interest rate		
• Stock of debt	Current funding rates	
Growth in demand		
• 2002 - 2007	Avg -0.86%	
• 2008 - 2031	Avg +1.36%	
Tariff increase		
• 2002 Tariff increase	19.5%	Received only 8% from July 2001, interest charged on difference
• 2003 - 2031	CPI or CPI-X	
Debtors		
• Debtors period	30 days	Currently 45 days
• Interest on late payment	Prime interest rate	Currently 14%
• Provision non-payment	0.1% Bulk Water 40% Rural Water	
Liability curve		
• Opening debt	At mark-to-market value of net debt Includes loan 60, 61 and 62	
Rural schemes		
Transfer of O&M costs		
• Durban	Transfer At bulk tariff	From 1 February 2002
• Pietermaritzburg	No transfer At rural tariff	Charge costs after revenue to municipality
DWAF subsidy	Included in Base Case	
Commercial activities	Excluded from Base Case	
Capital expenditure		
• Ongoing		
• Major augmentation	± 2013	

Sensitivities

The following sensitivity scenarios were reviewed:

- Real interest rates;
- Inflation rates; and
- Margin above CPI on annual tariff increase.

The model is not limited to the abovementioned sensitivities. These were just selected as they are the most common factors that might have a significant impact on the debt curve.

Umgeni Water is currently highly sensitive to any movement in real interest rates. The reason being the debt maturity profile that has fixed debt only to 2010 when the UG65 matures. All maturities are assumed to be refinanced with call funding to simplify the model. A further step will be to test various redemption strategies to de-sensitise the curve to movement in real interest rates. This is a classic example of the why the model acts as a management tool.

The impact therefore would not have to result in a tariff increases per se, but merely a more sophisticated redemption strategy to roll maturing fixed rate-bearing debt into the longer term.

Inflation rates

Umgeni Water is moderately sensitive to changes in the rate of inflation. Since the income would be directly linked to CPI or CPI-X increases, it might be beneficial for Umgeni Water to issue a CPI-link bond as a measure to de-sensitise the debt curve to movement in inflation rates. This will be explored further as part of the funding strategy for the organisation.

Margin above CPI on annual tariff increase

Although the most acceptable increase for stakeholders would be CPI-X only, Umgeni Water can decide to add a margin above the CPI-X rate for a predetermined period or for the full period. This decision will be closely interlinked with the predetermined peak of the debt curve and repayment period. Should the debt curve, based on inflation-linked increases, grow above the level Umgeni Water would have selected, this scenario could be applied. The margin as such, would also be determined based on the impact on the debt curve and which margin would suit Umgeni Water's long-term objectives and would suit the stakeholders' long-term planning. In the current environment of decreasing volumes, it is probable that a margin will be necessary.

Stakeholder relationships

Transparency leads to informed stakeholders, which in turn results in better relationships. It would be beneficial to Umgeni Water to educate the major stakeholders on the impact of this model on their business and keep them informed in future. The debt curve should not be an internal secret to Umgeni Water but should be applied to prove the long-term existence and hands-on management of the business.

Summary of benefits of the new tariff model

- Constant tariff in real terms over long period
- Allows deficit in earlier years
- Based on relationship between future cash inflows vs cash outflows

- Promotes stronger stakeholder relationships due to transparency and certainty
- Allows for sensitivity analysis over long-term and improved planning.

Accounting impact of new tariff model

The following matters will be affected by the change in tariff model.

Loan redemption fund (LRF)

The outgoing model of redemption of loans uses the following principles:

- Over the duration of the asset that the loan is funding, a reserve will be built up (along with the necessary investments of this cash) so as to have sufficient investments to repay the debt.
    - It is assumed that the cash invested will yield a return on investment of at least 12%. This has been achieved since inception of this funding model. Interest received greater than 12% is credited to the income statement.
    - Due to the fact that the investment earns interest, which is credited to the reserve, it is not necessary to charge the consumer with the full cost of the asset.
- E.g. if an asset was purchased for R100 and was anticipated to have a useful life of 10 years, one would not need to debit (charge) the income statement with the full R100 over the 10 years, this being due to the fact that this amortisation is invested and earns interest.
- So, in this example the income statement would only have to be debited by approximately R57, the balance being raised via interest earnings.

The new tariff model uses the assumption that all debt will be repaid out of future positive cash flows generated from operations. Therefore it is not necessary that Umgeni put aside monies now for future debt redemption but will use cash as and when generated for debt redemption.

The debit to the income statement of the Contribution to the LRF is thus effectively the depreciation of the organization's immovable assets. The difference in Umgeni Water's set of financial statements is that Accumulated Depreciation/LRF" is shown as a Non Distributable reserve in the balance sheet. This being a portion of Umgeni Water's "equity" that will be used to repay debt.

Effect at 1 July 2002

The LRF will be written back to retained income through the Statement of Changes in Equity, effectively transferring it from Non Distributable Reserve to Distributable Reserve. At the same time Accumulated Depreciation at 1 July 02 will need to be raised and shown against fixed assets, also transacted through the Statement of Changes in Equity.

Depreciation will now be charged to the income statement on immovable assets during the year as an expense.

Loan discount reserve

When one raises debt in the capital market there is usually a discount or premium generated on the issuance of the debt. This arises because the debt is not usually traded at par value i.e. at the nominal rate of interest implicit in the bond. Due to this trading away from the par (nominal) value of the bond, investors are exposed to an appropriate adjustment to the amount that they actually pay for the bond to compensate for this.

- E.g., a bond is issued at a nominal value of R100 at a nominal rate of interest of 15%.
- On the date the bond is traded, the rates in the market are actually 15.78%. As the investor will only physically receive interest on a bond based on its nominal value and interest rate, he will only be prepared to pay a lower amount for the bond to compensate for this, e.g. he will pay R95.
- When the investor thereafter receives an interest payment (coupon) of R15, this translates into an effective rate of return of 15.78% pa.
- The difference between the R95 paid and the nominal value of R100 is called a loan discount.
- On maturity of this bond the organization will be required to repay an amount of R100. Thus the R5 discount needs to be amortised in the income statement over the life of the bond.

The current method of amortization of this loan discount is to have a Loan Discount Redemption Fund (LDRF) that is built up over time, along with interest earned, in order to be able to write off this commitment at the end of the life of the bond.

The new model enables Umgeni Water to do away with this reserve and the discount will be amortized over its life, similar to depreciation of a fixed asset.

Effect at 1 July 2002

The LDRF will be written back to retained income through the statement of changes in equity, effectively transferring it from Non Distributable Reserve to Distributable Reserve. At the same time the Loan Discounts will need to be written down to amortized value, this requiring a debit to Distributable Reserve through the Statement of Changes in Equity and a credit against the loan discount.

Abstraction cost stabilisation reserve

The Abstraction Cost Stabilization Reserve was created when it was realized that in future years there are going to be step changes in the payment amount to DWAF for water abstraction charges. The coupons will be paid out of future cash flows as and when they occur.

The current tariff calculation of DWAF is based on 4 % of the value of an asset owned and built by them with a depreciation charge on movable assets. This payment will grow at PPI.

This reserve was notably set up for the Springrove Dam coming on line in about 2015 and the Mkomazi Transfer Scheme coming on line in about 2020.

Accordingly, on the old tariff methodology, these step changes would need to be budgeted for in the particular year in which it became due and payable. This would thus require a large tariff increase in that year to make up for the increased costs.

As it was felt that this could not be done to Umgeni Water's consumers a reserve was being built up in order to stabilize these costs.

The new tariff model takes these dramatic cost changes into account over a long period of time and thus it is not necessary to have this stabilization reserve any more.

Effect at 1 July 2002

The balance in this reserve will be transferred from Non Distributable reserves to Distributable Reserves through the statement of changes in equity.

The payments made to DWAF will be debited directly to the Income Statement as a Cost of Sale.

Capitalisation of a portion of administration costs

An accounting practice that has been in place for many years is the capitalisation of Administration and Technical costs – these are effectively the cost of running head office. Now this practice is to be dramatically altered as from the F03. This change in practising is not due to the new cash flow model per se but more to remove a practice that has not true economic effect.

A number of years ago an analysis was done of non New Works staff members at head office to determine the amount of time and effort spent of administering the large capital works program of Umgeni Water. It was determined that on average 30% of time spent could be attributed to administering the capital works program (Indirect Admin and Tech costs).

Naturally the costs associated in running the New Works division can be directly attributable to the implementation of capital works and accordingly are fully capitalised.

This accounting practice not only resulted in the cost of an asset reflecting its true cost but also enabled UW to pass on lower tariffs to its consumers.

This practice of capitalization has been in place until the F02 financial year. It is important to note that although the overall quantum of the capital works program has reduced dramatically over the last few years (R500 million one year) the time and

effort has not necessarily reduced. This being due to the fact that there is still a large number of low value projects in progress.

For the F03 financial year, the capitalization of Indirect Admin and Tech costs has been ceased. In the past year this was in the order of R40m. The costs associated with running the New Works division (about R15m) will continue to be capitalized.

The reason that this practice can be terminated all in one year is that it is now not necessary to capitalize a portion of these costs in order to achieve an affordable tariff.

Effect on the F03 financial year

This will have the effect of bringing a large portion of costs previously capitalized onto the Income Statement, therefore increasing the accounting deficit. This has no tariff impact as it did in the previous model, as the cash flow will be incurred anyway.

30 Sep 2002