

ABSTRACT

This research report contains a critical examination of Johannesburg's water tariff structure. The examination employs normative criteria formulated through reviews of tariffs in theory and in practice, and of the political economy of water supply in Johannesburg.

The research found that the tariff structure is generally progressive, geared towards furthering the social objectives of ensuring the universal provision of an accessible, affordable, and sufficient supply of safe water. At the same time, the research found that there are shortcomings within the tariff structure and social, economic, and political factors that threaten to undermine the extent to which these objectives can be achieved.

The report's analysis includes recommendations that could enable the tariff structure to better serve as a central mechanism in meeting the objectives of sustainable and equitable water supply.

DECLARATION

I declare that this report is my own, unaided work. It is submitted in partial fulfilment of the requirements of the degree of Master of Management (in the field of Public and Development Management) at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other university.

Nathan Krystall

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DEDICATION

To my mother, Abigail Krystall, and to my father, Eric Krystall, for serving as role models in the field of development and in service to society.

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CONTENTS

Abstract	i
Declaration	ii
Dedication.....	iii
Acknowledgements	iv
Contents.....	v
List of Acronyms.....	ix
List of Tables.....	x
List of Figures	xi
Chapter 1: Introduction.....	1
1.1 The research question.....	2
1.2 RESEARCH METHOD	2
1.3 LIMITATIONS OF THE RESEARCH.....	5
1.4 OVERVIEW OF REPORT.....	5
Chapter 2: A theoretical Review of Water Tariffs	7
2.1 GENERAL THEORETICAL APPROACHES TO WATER TARIFFS	7
2.2 ECONOMIC EFFICIENCY	8
2.3 EQUITY.....	12
2.3.1 <i>Increasing block tariffs (IBTs)</i>	14
2.3.2 <i>Lifeline supply</i>	16
2.3.3 <i>Differential charging</i>	17
2.3.4 <i>Space and time</i>	18
2.3.5 <i>Means-testing</i>	18
2.4 AFFORDABILITY AND PRICE ELASTICITY OF DEMAND	19
2.5 COST RECOVERY AND SELF-FINANCING.....	20
2.6 EXTERNALITIES	22
2.6.1 <i>Health</i>	22
2.6.2 <i>Water conservation and environmental impact</i>	23
2.6.3 <i>Local economic development (LED)</i>	24
2.6.4 <i>Externalities and water pricing</i>	25
2.7 EASE OF IMPLEMENTATION	26
2.8 POLITICAL ACCEPTABILITY	27
2.9 INDUSTRIAL AND COMMERCIAL TARIFFS	29
2.10 IMPORTANCE OF CONTEXT.....	29

2.11	TOOLKIT A: CRITERIA FROM THEORY	30
Chapter 3: Water tariffs in practice		33
3.1	CONTEXT	33
3.2	ECONOMIC EFFICIENCY	33
3.3	EQUITY.....	35
3.3.1	<i>Free water for all.....</i>	35
3.3.2	<i>IBTs and lifeline tariffs.....</i>	35
3.3.3	<i>Differential charging.....</i>	39
3.3.4	<i>Means-testing</i>	41
3.4	AFFORDABILITY AND PRICE ELASTICITY OF DEMAND	42
3.5	COST RECOVERY AND SELF-FINANCING.....	42
3.5.1	<i>Public-private partnerships, cost recovery and affordability</i>	44
3.6	EXTERNALITIES.....	47
3.6.1	<i>Health and local economic development.....</i>	47
3.6.2	<i>Water conservation and environmental impact.....</i>	48
3.7	EASE OF IMPLEMENTATION	48
3.8	POLITICAL ACCEPTABILITY	49
3.9	INDUSTRIAL AND COMMERCIAL COMPETITIVENESS	49
3.10	TOOLKIT B: CRITERIA FROM COMPARATIVE SKETCH.....	50
Chapter 4: The Research Context – Water Supply and Tariffs in Johannesburg and South Africa.....		52
4.1	SELECT WATER LEGISLATION AND POLICY RELATING TO TARIFFS	52
4.1.1	<i>Reconstruction and Development Programme (1994).....</i>	53
4.1.2	<i>Water Supply and Sanitation Policy White Paper (1994).....</i>	53
4.1.3	<i>Constitution (1996).....</i>	55
4.1.4	<i>Water Services Act (1997).....</i>	55
4.1.5	<i>National Water Act (1998)</i>	56
4.1.6	<i>Municipal Systems Act (2000)</i>	56
4.1.7	<i>ANC Municipal Election Manifesto (2000).....</i>	57
4.1.8	<i>DWAF Free Basic Water Documents (2001)</i>	57
4.1.9	<i>The Revised Municipal Infrastructure Investment Framework (MIIF) (2001)</i>	58
4.1.10	<i>National Water Resource Strategy (2002)</i>	60
4.1.11	<i>Draft White Paper on Water Services (2002).....</i>	61
4.2	SUMMARY OF LEGISLATION AND POLICY	62
4.3	THE POLITICAL ECONOMY OF WATER IN JOHANNESBURG, SOUTH AFRICA	65
4.3.1	<i>Water tariffs in South Africa.....</i>	67
4.3.2	<i>A culture of non-payment or unaffordable tariffs?.....</i>	68
4.3.3	<i>Johannesburg: Water and the city's development.....</i>	69
4.3.4	<i>The City of Johannesburg's development plans</i>	71
4.3.5	<i>Johannesburg's 'special cases' policy</i>	72
4.3.6	<i>Water services within the context of CoJ's budget.....</i>	73
4.3.7	<i>Formation of Johannesburg Water</i>	74

4.3.8	<i>Supply chain of water to Johannesburg</i>	75
4.4	A SUMMARY OF THE RESEARCH CONTEXT	77
4.5	TOOLKIT C: A MODEL FOR JOHANNESBURG'S WATER TARIFFS	78
4.5.1	<i>Equity and cost recovery</i>	78
4.5.2	<i>Economic efficiency and marginal cost pricing</i>	79
4.5.3	<i>Affordability</i>	80
4.5.4	<i>Health and LED externalities</i>	80
4.5.5	<i>Water conservation externalities</i>	80
4.5.6	<i>Ease of implementation</i>	81
4.5.7	<i>Political acceptability</i>	81
4.5.8	<i>Industrial and commercial tariffs</i>	81
4.5.9	<i>Related criteria</i>	81
4.5.10	<i>Model criteria for Johannesburg's water tariffs</i>	82
Chapter 5: Johannesburg's Water Tariff Structure		84
5.1	PROFILE OF JOHANNESBURG WATER	84
5.2	COST STRUCTURE FOR WATER: BULK WATER PURCHASES FROM RAND WATER	87
5.3	THE SERVICE DELIVERY AGREEMENT	90
5.3.1	<i>Water tariffs in the SDA</i>	90
5.4	WHO DETERMINES WATER TARIFFS IN JOHANNESBURG?	92
5.5	COST RECOVERY AT JOHANNESBURG WATER	95
5.6	DETERMINING THE IBT AND DIFFERENTIAL CHARGING STRUCTURES	98
5.7	JOHANNESBURG'S WATER TARIFFS, 1996-2001	100
5.8	2001-2002 CHANGES TO THE TARIFF STRUCTURE	101
5.8.1	<i>FY 2001/02 changes and the introduction of free basic water</i>	101
5.8.2	<i>FY 2002/03 tariff increases</i>	108
5.8.3	<i>Overview of IBT structure changes</i>	109
5.9	ISSUES IMPLEMENTING THE FREE BASIC WATER ALLOWANCE	112
5.9.1	<i>Backyard dwellings</i>	112
5.9.2	<i>Flats</i>	115
5.9.3	<i>The free basic water allowance: is it enough?</i>	115
5.10	DEEMED CONSUMPTION	118
5.11	LOW-INCOME AFFORDABILITY	121
5.11.1	<i>Connection fees</i>	124
5.12	LOW-INCOME SERVICES	125
5.12.1	<i>Service levels</i>	125
5.12.2	<i>Sanitation</i>	126
5.12.3	<i>Upgrading and relocation – proposed tariff schedule</i>	127
5.12.4	<i>The Stretford Extension 4 pre-paid pilot project</i>	129
5.13	COMMERCIAL AND INDUSTRIAL CUSTOMERS IN JOHANNESBURG	130
5.14	CREDIT CONTROL AND DISCONNECTIONS	132
5.15	WATER DEMAND MANAGEMENT IN JOHANNESBURG	133
5.16	PRICE ELASTICITY OF DEMAND IN JOHANNESBURG	136
5.17	MARGINAL COST	137

5.18	MANAGEMENT CONTRACT	138
5.19	INFLATION RATE FACTOR	139
5.20	PLANNED DEVELOPMENTS AND FUTURE TRENDS.....	140
5.20.1	<i>FY 2003/04 tariff increases</i>	140
5.20.2	<i>Metering of deemed consumption areas</i>	140
5.20.3	<i>Pre-paid meters and flow-limitation devices</i>	141
5.20.4	<i>Disconnection of low-income households</i>	142
5.20.5	<i>Volumetric pricing for sewerage</i>	142
5.20.6	<i>Polluters' tariffs</i>	142
5.20.7	<i>Shared services centre</i>	143
5.20.8	<i>Tariff study and model</i>	144
5.20.9	<i>The City of Johannesburg's Draft Water Services By-Laws</i>	145
5.20.10	<i>Increased grassroots pressure</i>	145
5.20.11	<i>National and international expansion</i>	145
5.20.12	<i>An independent national regulator</i>	146
6.1	CRITERIA AND OBJECTIVES.....	149
6.1.1	<i>Equity</i>	149
6.1.2	<i>Cost recovery</i>	151
6.1.3	<i>Marginal cost pricing</i>	152
6.1.4	<i>Affordability</i>	152
6.1.5	<i>Externalities</i>	153
6.1.6	<i>Ease of implementation</i>	154
6.1.7	<i>Political acceptability</i>	154
6.1.8	<i>Industrial and commercial tariffs</i>	155
6.2	RELATED CRITERIA	155
6.2.1	<i>Standards and service levels</i>	155
6.2.2	<i>Credit control</i>	156
6.2.3	<i>Regulation</i>	157
6.3	SUMMARY OF ANALYSIS.....	157
Chapter 7: Conclusion		160
References		161

LIST OF ACRONYMS

AIC	Average incremental cost
CFO	Chief Financial Officer
CMU	Contract Management Unit
CMIP	Consolidated Municipal Infrastructure Programme
CoJ	City of Johannesburg
CSM	Combined Services Model
CPI	Consumer Price Index
DPLG	Department of Provincial and Local Government
DWAF	Department of Water Affairs and Forestry
FY	Fiscal year
GGP	Gross geographical product
GNP	Gross national product
GJMC	Greater Johannesburg Metropolitan Council
IBT	Increasing block tariff
IDP	Integrated Development Plan
JW	Johannesburg Water
JOWAM	Johannesburg Water Management (Pty) Ltd
LED	Local economic development
LHWP	Lesotho Highlands Water Project
LRMC	Long-run marginal cost
lcd	Litres per capita per day
MBE	Municipal Business Enterprise
MIIF	Municipal Infrastructure Investment Framework
MLC	Metropolitan Local Council
PDG	Palmer Development Group
PPP	Public-private partnership
RDP	Reconstruction and Development Programme
SDA	Service Delivery Agreement
SMMEs	Small, medium, and micro-enterprises
SRMC	Short-run marginal cost
UACs	Utilities, agencies, and corporatised entities
VIP	Ventilated improved pit latrine
WSA	Water service authority

LIST OF TABLES

Table 1: Toolkit A – Assessment criteria derived from tariff theory	30
Table 2: La Paz/El Alto tariff structure	40
Table 3: Columbia’s cross-subsidy strata, 1994.....	41
Table 4: Monthly tariff changes in Uganda, unmetered use.....	43
Table 5: Toolkit B – Assessment criteria derived from review of water tariffs in practice	51
Table 6: MIIF water and sanitation service levels.....	58
Table 7: Summary of water-tariff related South African legislation and policy	62
Table 8: PDG Guideline for pricing municipal services according to income.....	69
Table 9: Contextualisation of South African water tariff policy and legislation	77
Table 10: Toolkit C - Model assessment criteria for Johannesburg’s water tariff structure	82
Table 11: Johannesburg Water’s income statement (all figures in R million)	95
Table 12: Johannesburg Water’s medium-term capital budget	97
Table 13: Average trends in the water bills and block tariffs for the Johannesburg Metro, 1995-2001	100
Table 14: Four scenarios considered by Johannesburg Water for implementing free water policy	101
Table 15: Johannesburg Water’s comparison of free water tariff scenarios	102
Table 16: Johannesburg water tariffs 2000-2001 highlighting percentage change to tariff bands.....	104
Table 17: Change in residential customers’ bills, 2000-2002	105
Table 18: Johannesburg domestic consumption profile, 2001	107
Table 19: PDG guidelines for water and sanitation affordability.....	121
Table 20: Summary of analysis and recommendations concerning Johannesburg’s water tariff structure	158

LIST OF FIGURES

Figure 1: Steadily increasing short-run marginal cost (SRMC) curve	11
Figure 2: Increasing block tariffs representing class struggle	15
Figure 3: Gaborone IBT structure	36
Figure 4: Durban water tariff structure 2000/1 (Rands/kl).....	37
Figure 5: Durban domestic consumption frequency distribution, 1996-2001.....	38
Figure 6: La Paz/El Alto tariff structure	40
Figure 7: Monthly tariff changes in Uganda, unmetered use	43
Figure 8: Water consumption and living standards	47
Figure 9: Segmentation of Johannesburg Water sales, 2001-2002	86
Figure 10: Contributions to the final retail price of Johannesburg's water	88
Figure 11: Johannesburg Water's 'balancing act'	94
Figure 12: Johannesburg's water tariff structure, FY 2002/03.....	99
Figure 13: Johannesburg Water's Free Water Tariff Scenario 4.....	103
Figure 14: Change in Johannesburg residential customers' bills, 2000-2002.....	106
Figure 15: Johannesburg domestic water consumption profile, 2001	107
Figure 16: Johannesburg water tariff structure changes, 2000-2002	110
Figure 17: Average Johannesburg residential water bill trend, 1996-2001.....	111
Figure 18: Average Johannesburg block tariff trend, 1996-2001.....	111

CHAPTER 1: INTRODUCTION

This research report examines Johannesburg's water tariffs. It addresses issues of vital significance to public and development managers. Broadly speaking, these issues fall under the rubric of the following question: How do governments and public utilities balance the twin and sometimes competing demands of financial sustainability and socio-economic equity?

This question is of particular concern in South Africa. The country shook off the apartheid regime in 1994, but has since been confronted with the abysmal inequality upon which the system of segregation thrived. This gap manifests itself clearly and dramatically in the delivery of municipal services, including the supply of water. Some South Africans enjoy luxuries associated with the ability to consume plentiful quantities of water, while for others access to sufficient water to drink, let alone bathe, is in and of itself a luxury.

There are many factors that determine the level of access to and consumption of water available for any given person. Of these factors, wealth is the most significant. It determines in which neighbourhood people can live. It decides whether or not they can afford a connection to the municipal water supply and sanitation system. Wealth ultimately sets the parameters of how much water they may use. In this correlation between wealth and water access and consumption, tariffs play a crucial role.

While some may never in their lives pay attention to the price of water, for others it may contribute to a difference between health and disease, socio-economic mobility and dire poverty. Water tariffs are therefore one of the many mechanisms which can trigger the economic development for which South Africa is striving. Tariffs are also essential on the supply side of economic development to ensure that delivery of water services is financially sustainable through adequate cost recovery. How South Africa chooses to integrate the imperatives of cost recovery with those of equity will

in large part determine the course of its development. These issues come to the fore through this research report's inquiry into water tariffs in theory and in practice, followed by a hands-on investigation into Johannesburg's water tariff structure,.

1.1 The research question

The question at the heart of this research report, simply put, is as follows:

How is the tariff structure for water in Johannesburg decided?

Implicit in this question is a series of further questions and sub-questions:

- What are the central criteria used in determining the tariff structure?
- What are the major outcomes according to which Johannesburg's policy makers determine the success of the tariff structure?
- What are related factors that help determine the success of a tariff structure?
- What is the current tariff structure for water in Johannesburg?
 - Who decided this tariff structure?
 - To what extent does this tariff structure help fulfill the decision makers' criteria?
 - How did this tariff structure develop from the tariff structure of previous years?
 - Have alternative tariff structures been considered or are they presently being considered?

1.2 Research method

To explore these questions, the research employed the following method. It developed a normative set of criteria which it subsequently used as a toolkit to assess

Johannesburg's tariff structure. The toolkit and its set of assessment criteria progressed through three iterations. Toolkit A (Table 1) is the product of a review of academic and other theoretical literature relating to water tariffs. It contains a broad range of normative criteria found in various water tariff theory. Toolkit B (Table 5) adds value to Toolkit A with the insights gained from a review of how water tariffs have been applied in developing country contexts. Toolkit C (Table 10), the ultimate instrument of analysis, is a synthesis of Toolkits A and B, together with criteria derived from an examination of the political, socio-economic, and legislative context of water tariffs in Johannesburg.

With Toolkit C's criteria in mind, it was possible to critically examine Johannesburg's water tariff structure. The data-gathering process, which took place between October, 2002 and January, 2003, involved qualitative research. It consisted of in-depth interviews with relevant officials and the study of documents relating to the tariff structure. The documents are included in the bibliographical references at the end of the report. The officials interviewed included the following persons, listed in chronological order according to the date of interview:

- Vinnie Naidoo, Project Manager: Customer Development, Johannesburg Water (October 3, 2002).
- Heleen Kulyk, Chief Financial Officer, Johannesburg Water (November 14, 2002).
- Jean-Marc Lotthe, Customer Executive, Johannesburg Water (November 19, 2002 and December 17, 2002).
- Paul Viljoen, Low Income Services Manager, Johannesburg Water (December 13, 2002).
- Anthony Still, Executive Director, Johannesburg Water (December 17, 2002).
- Christine Kere, Business/Tariff Analyst, Contract Management Unit, City of Johannesburg (December 18, 2002).

- Prem Govender, Director, Contract Management Unit, City of Johannesburg (December 18, 2002).
- Richard Payne, Managing Director, 3P Consulting (December 23, 2002).
- Phiroshaw Camay, Chairman of the Board, Rand Water (January 10, 2003).

Applying Toolkit C to the findings gleaned from the hands-on investigation of Johannesburg's water tariff structure generated the report's analysis and recommendations.

The perspective from which this research was conducted is a developmental one. Since the term 'development' has myriad connotations, it is worth proffering a definition or two. Firstly, to quote Todaro (1977: 16), development is:

...a multidimensional process involving major changes in social structures, popular attitudes, and national institutions, as well as the acceleration of economic growth, reduction of inequality, and eradication of poverty.

To this we can add the criterion that development should be sustainable, employing the commonly accepted definition of "sustainable development" coined by the World Commission on Environment and Development (1987), that is:

...development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

These views guided the development of the normative criteria and informed the data-gathering process.

1.3 Limitations of the research

While water is often considered together with sanitation, this investigation concentrated primarily on Johannesburg's tariff structure for water. For reasons of space and time, it treated sanitation as a secondary consideration. For similar reasons, the research did not fully delve into other issues that have direct bearing on the outcome of a tariff structure, such as billing and collection efficiency, production efficiency, and unaccounted for water.

A primary aim of the data-gathering process was to enter the minds of Johannesburg's policy makers to understand how they decide the city's water tariff structure. One shortcoming of this approach is that the research did not include interviews with any of the other hundreds of thousands of Johannesburg residents who do not directly set policy, but nevertheless live with its consequences. The research, however, did attempt to represent the perspective of these residents, particularly the more marginalised, through its critical approach.

The research did not engage in econometric analysis or modeling of tariff structures. For such an approach, readers are advised to see the series of Palmer Development Group working papers by Rolfe Eberhard (1999) on 'Supply Pricing of Urban Water in South Africa'.

1.4 Overview of report

The report's second chapter examines the theory of municipal tariffs, with a particular focus on water tariffs, and concludes with Toolkit A. The third chapter looks at some of the ways that tariffs have been applied in various developing country contexts, which are incorporated into Toolkit B. The fourth chapter grounds the report in the legal, political, and economic context of water service delivery in

South Africa, particularly in Johannesburg, and presents Toolkit C's fully integrated assessment criteria used to assess Johannesburg's water tariff structure. The fifth chapter entails a detailed description of Johannesburg's water tariff structure and issues of direct relevance to the tariff structure. The sixth chapter applies Toolkit C's assessment criteria to Chapter 5's findings, and analyses the tariff structure's strengths and weaknesses, offering recommendations for improvement. The brief conclusion provides an overall assessment of Johannesburg's water tariff structure.

CHAPTER 2: A THEORETICAL REVIEW OF WATER TARIFFS

This chapter reviews theoretical approaches to water tariffs, particularly those of relevance to developing countries. The chapter divides itself into sections and sub-sections according to the various criteria that would be of potential import to a water tariff structure identified in the theoretical review. A table at chapter's end highlighting these criteria constitute Toolkit A. Subsequent chapters will develop and refine the toolkit which we will ultimately use to assess Johannesburg's water tariff structure.

2.1 General theoretical approaches to water tariffs

A tariff structure is a set of procedural rules used to set the conditions of service and the monthly bills for water users in various categories or classes (Boland & Whittington, 1997). Power relations determine the overarching framework, for example the legislative framework, in which these procedural rules operate. And how politicians and civil servants in a given water authority decide the procedural rules is informed by a variety of factors, including where they are situated in the political economy, whom they see as their constituents, and what they hold as their future vision and theoretical foundations (regardless of how subliminally these constructs may have entered their consciousness). It is the academic theory surrounding tariffs that is of immediate concern in this literature review.

Academic theoreticians, however, are subject to the same interest-shaping factors as politicians and civil servants, and the literature review reveals that economists dealing with tariff theory are no exception. At the risk of oversimplification, let us divide tariff theory into three broad academic approaches. The first is a neo-classical approach, typified by World Bank economists such as Roy Bahl and Johannes Linn (1992). Of prime importance to neo-classical economists is that a tariff achieves

economic efficiency. These economists do not preclude concerns commonly thought to be of social importance, like socio-economic equity, but rather relegate them to the imperative of economic efficiency. On the other side of the spectrum are academics of the tradition of political economy, such as Patrick Bond, who gauge tariffs by whether they redress or perpetuate societal inequality. Less prominent, and sometimes dismissed, in analyses by these political economists are financial considerations faced by a water provider, such as cost recovery. Somewhere in between these two poles lies institutional economics, as practiced by Rolfe Eberhard (1999a). This latter approach, while critical of blind allegiance to principles of economic efficiency, attempts to balance financial concerns with larger political and economic needs, while contextualising its analysis within the institutional arrangements that give rise to the tariffs in question.

Below is a discussion of key criteria of import to tariff theory in determining a pricing structure for water. And since we must begin our discussion somewhere, let's start with economic efficiency.

2.2 Economic efficiency

Bahl and Linn (1992: 242-271) engage in an extensive discussion of the theory of economic efficiency as it relates to user charges. Underlying this theory is the rule of marginal cost pricing, which states that the price of a public service should be set equal to the marginal cost of producing the service. The justification of this rule:

...is that welfare is maximized when the benefit of an additional unit of the service to the consumer—which is reflected by his willingness to pay the price—is equal to the cost of producing this additional unit, that is, its marginal cost....The rule thus allocates resources efficiently in that it identifies the level of output that produces the greatest net benefit from service provision. (Bahl and Linn, 1992: 241-242)

It is interesting to contrast this interpretation with a more critical assessment of economic efficiency and marginal cost pricing, albeit in these principles' most conventional form, and how they relate to another criterion to be addressed subsequently, namely equity:

This [marginal cost] pricing schema seeks to improve allocative efficiency and relies implicitly or explicitly on the Kaldor-Hicks compensation principle to address issues of inequality through the political process. In this view, the primary "task" of prices is to improve allocative efficiency so as to achieve a Pareto-efficient outcome in which no-one's welfare can be improved without another person's welfare being adversely affected. Pricing for efficiency in this way is seen as being objective and value neutral. (Eberhard, 1999a: iii)

Eberhard rejects the implicit value neutrality in the principles underlying marginal cost pricing. As we will see later, he is especially critical of attempts to impose marginal cost pricing in a blanket manner to water tariffs in developing countries where, he writes, "the application of standard neo-classical pricing theory may have unfortunate and regressive consequences for income distribution" (Eberhard, 1999a: iii).

In a discussion of marginal cost pricing, it is necessary to distinguish between short-run marginal cost (SRMC) and long-run marginal cost (LRMC). SRMC applies when supply is able to meet demand through minor adjustments in production, for example, by pumping more water to existing connections. SRMC considerations, in this case, would include the marginal cost of treating and pumping the extra units of water. LRMC comes into play when demand stretches production capacity to its limit and a major new investment, such as a dam, is required.

Extension of most public services is characterised by 'lumpiness of investment'. Technological economies of scale make continuous addition of capacity in small

increments uneconomical and unfeasible. Also, in developing countries capital construction can be carried out only by securing large loans and grants. This sometimes leads to larger scale projects than may be warranted on purely technological grounds (Bahl and Linn, 1992: 263). To meet the cost of this new investment, user charges normally would increase.

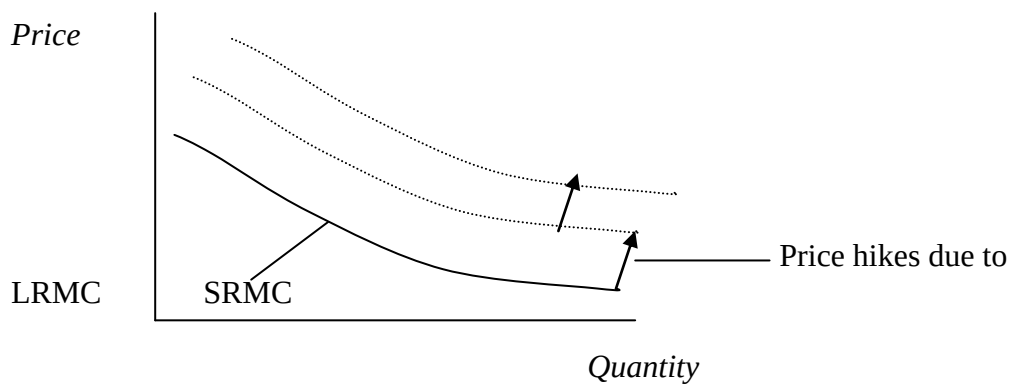
Bahl and Linn's (1992: 299-302) main features of an efficient user charge pricing structure for water, which will ensure that each individual weighs the marginal costs of each decision against its benefits, are as follows:

- A use-related price reflecting the marginal cost of production and distribution. In other words, the short-run operating and maintenance costs incurred by the utility in producing and transmitting potable water. These costs include water treatment and pumping, equipment maintenance, and labour costs.
- A connection charge, levied as a flat periodic fee or a lump sum, reflecting the marginal connection costs (capital and recurrent) and the capacity costs related to the need to be ready to serve those who are connected. These costs include the material and labour costs of installation (excavation, pipes, plumbing, and meter) and the recurring administrative and clerical costs associated with a water connection, including reading and maintenance of meters, record keeping, and billing.
- A location charge, otherwise known as a development or access charge, reflecting the cost of installing the necessary distribution and reticulation network, which "should be levied on all property owners at the time the system is built whether or not a particular owner chooses to connect to the system at that particular time" (Bahl and Linn, 302). This cost varies with the density of connections and geological conditions in the area.

In discussing tariff structures in developing countries, a major implication of adhering to principles of economic efficiency is the maxim of charging consumers equal prices for services unless they impose differential marginal costs on the system

(Bahl and Linn, 1992: p. 244). A likely outcome of a tariff structure based on marginal cost pricing is that large consumers of a service, who are also often the wealthier consumers, will pay less per unit than smaller, often poorer, consumers, due to economies of scale. This would result in a downward-sloping SRMC curve in which, as consumption increases, the price per unit of water decreases.

Figure 1: Steadily increasing short-run marginal cost (SRMC) curve



(Source: Bond, 2002a)

Coupled with periodic price increases due to LRMC (for example, following construction of a dam, as mentioned above), the SRMC curve would steadily be pushed higher, as shown in Figure 1, resulting in unaffordable prices for poorer, smaller users of water (Bond, 2001: 2). Such a situation, as aptly phrased by McMaster (1991: 40-41), “favours large industrialists at the expense of small enterprises, householders with two bathrooms, a lawn to sprinkle, and a Mercedes to wash, at the expense of poor families with one tap”.

Another risk of charging at marginal cost is that it can generate substantial cash surpluses which may lead managers to believe that attending to other inefficiencies, related to such factors as production, billing, collection, and unaccounted for water, is less urgent than may be the case (McMaster, 1991: 39). Furthermore, economic efficiency theory assumes at least a modicum of price elasticity: that is, consumer

demand will change in response to price which, in turn, results in an efficient allocation of resources. Demand for an essential good like water, however, will likely be less price elastic than for many other goods and services, especially at low, basic levels of consumption.

Eberhard engages in a substantial critique of the principles of economic efficiency and marginal cost pricing for water services, including some of the problems mentioned above, and their numerous limitations not only in theory but also in practice. His conclusion is that “it would indeed be foolhardy to hold onto an unambiguous pareto-efficiency claim for marginal cost pricing in the urban water sector” (Eberhard, 1999a: 57).

2.3 Equity

Particularly in developing countries, socio-economic equity¹ is a prime consideration when determining tariff structures for basic services such as water.

According to most tariff theory, charging low-income households for water consumption below cost through subsidisation is justified because water is not only a basic human need but also both a private and a public good. That is, its consumption benefits both the user and also society at large. Charging low-income households at full cost would likely exclude or severely restrict their access to the service, which would impact negatively not only on them but on their surrounding communities, as well (McMaster, 1991: 39).

Lobo, Foster & Halpern (2000) list three types of information required for subsidy-design, and likely sources of this information. These are:

1. Willingness-to-pay data: *The maximum amount that a household would be prepared to spend for a given level and amount of service.* Subsidies should be set to cover the shortfall between a vulnerable household's willingness to pay for a basic level of consumption and the associated bill. This information is difficult to obtain. Common techniques for measuring willingness to pay are the 'revealed preference method' and the 'contingent valuation method'. Revealed preference surveys show what households are currently paying for the official tariff plus personal investments to improve the quantity and quality of supply. Contingent valuation surveys are based on face-to-face interviews, posing future water system scenarios to get a sense of how much people are willing to pay for them (UNDP-World Bank, 1999). Another technique is the 'surrogate market approach', which is based on how much households spend for alternate sources to the public water supply, such as water vendors. Willingness-to-pay can also be estimated from regional or international benchmarks (Section 2.4 provides a critique of 'willingness-to-pay' data).
2. Water consumption data: *The pattern of demand for different types of households, used to establish lifeline tariffs and increasing block tariffs* (see Section 2.3.1). A source for this information is the client database in a water utility (or a municipality's line department for billing), which typically contains monthly information on the number of customers, the value of their bills, the level of consumption for customers with water meters, the location of customers, and the tariff structure applicable to each customer. Consumption by unmetered users can be estimated from newly metered households before the metering alters their consumption behaviour.
3. Socio-economic data: *This information helps determine the target group for the subsidy and the proportion of household income spent on water and sanitation.* Sources for this information are household expenditure or socio-economic surveys. Relevant indicators include household income or expenditure levels,

¹ Unless specified otherwise, 'equity' in this report refers to considerations that lead to increased socio-economic equality and fairness and not, as used by some authors, equal treatment of everyone

poverty lines, the receipt of other welfare benefits, and general indicators of basic needs, including quality of housing, property value, and durable goods ownership.

There are several tariff structure models, sometimes employed simultaneously, that integrate principles of equity and fairness, and are also seen as means of income redistribution, including:

- An increasing block tariff, which imposes increasing unit prices as consumption rises.
- Differential tariffs with higher rates for certain classes of user, usually commercial and industrial, or according to space and time.
- Charges based on property values.
- Means-testing.

The following sub-sections address these tariff structure models more fully.

2.3.1 Increasing block tariffs (IBTs)

Increasing block tariffs (IBTs) are structured to provide water at below cost for the first blocks of consumption and above cost for the final blocks. In this way, large water users subsidise small users. Due in large part to their perceived redistributive outcomes wherein large, wealthier users subsidise small, poor users, most, if not all recent water tariff studies performed for developing countries propose IBT structures (Boland & Whittington, 1997). A common feature of IBTs are lifeline tariffs, in which a basic allotment of water is provided well below cost to ensure that indigent residents are able to consume a ‘lifeline’ supply.

Designing an IBT requires three fundamental decisions, namely:

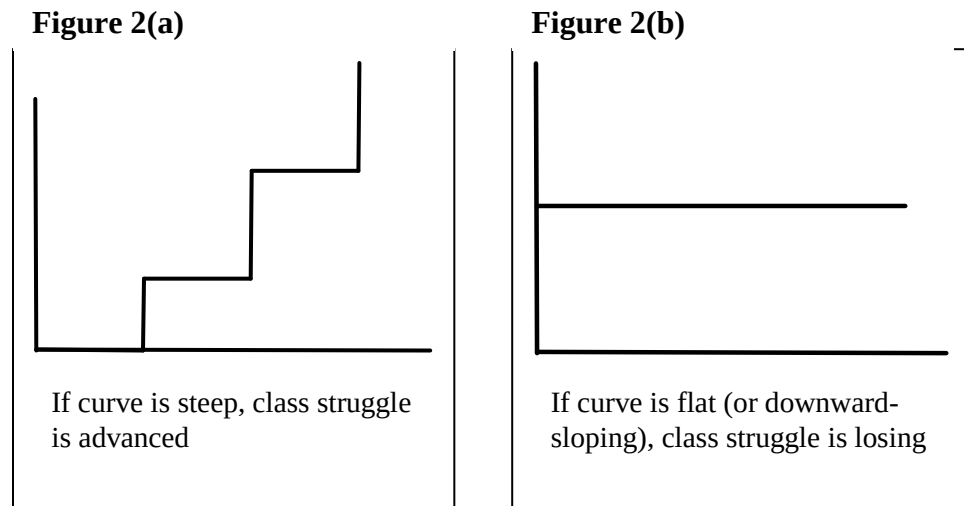
1. How many blocks will there be in the structure?
2. What volume of water use will be associated with each block?

regardless of status.

3. What prices will be charged for water use within each of these blocks? (Boland & Whittington, 1997).

Bond (2002a) perceives the gradient of an IBT as being reflective of the state of class struggle in a particular location, as portrayed below. Figure 2(a) represents an IBT with a high level of subsidy from high-volume (and assumedly wealthier) users to low-volume (and assumedly poorer) users. The IBT represented by Figure 2(b) indicates no cross-subsidy.

Figure 2: Increasing block tariffs representing class struggle



Source: Bond, 2002a

Bahl and Linn (1992: 316-318) list three limitations of IBTs' redistributive effects:

1. The low income elasticity of water demand, i.e. water demand increases little with income.
2. Other variables, in particular family size and the number of families per connection, may partially or even fully offset the income effect. Bahl and Linn quote studies indicating a higher correlation between family size and consumption than between income and consumption.

3. More than one household often draws water from a single residential connection, especially in lower-income residential areas consisting of apartment complexes and single room tenements.

These complexities will likely result in an IBT incurring a degree of subsidy ‘leakage’, whereby the subsidies reach some individuals who do not require them, and miss some who do (Whelan, 2002: 16).

2.3.2 Lifeline supply

As mentioned above, one of the common features of an IBT is a lifeline tariff to allow a basic level of consumption to even the poorest of residents. A water authority determines the quantity of water supplied by lifeline tariffs in large part according to the minimum deemed amount necessary to help ensure good health. As discussed in the next chapter (Section 3.6.1), this quantity is subject to debate. In addition to essential litre per capita per day (lcd) consumption, policy makers must determine the average number of people who rely on each water connection, in particular the number of poor people, who are, after all, the ones targeted for the lifeline subsidy. Underestimating these numbers will likely lead many poor residents to consume beyond the lifeline block and to be charged higher than anticipated water bills.

The benefits of a lifeline tariff available to all residents are listed by Bond, Dor, & Ruiters (2002d: 193) as:

- Avoiding the administrative nightmare and stigmatisation of the poor associated with means-testing indigent residents.
- Guaranteeing access to water, which in some countries (including South Africa) is a constitutional right.
- Keeping intact an alliance of poor, working-class and middle-class people, a necessary part of defending and maintaining social welfare policies.

2.3.3 Differential charging

Differential charging includes imposing higher charges upon certain categories of consumer, often commercial and industrial users, and fewer, or even no charges upon others, such as residents drawing water from standpipes in informal settlements². The intent is for consumer categories being charged above cost to subsidise those being charged below cost.

As with IBTs, however, there can be negative unintended consequences of this redistributive method. If differential charging does not take into account the price elasticity of demand of industrial and commercial users, revenue may fall short of the amount required to subsidise poorer domestic users when industry and commerce fail to consume the expected quantity of water (Yepes, 1999: 4).

Bahl and Linn (1992: 253), viewing differential charging from the viewpoint of economic efficiency, see no problem with imposing higher charges for water on, for example, industrialists, if their price elasticities of demand are low. If, however, an efficiently operating industrialist reduces consumption, or locates elsewhere in response to higher charges, this will produce market distortions. Also, an inefficiently large demand for water due to subsidised residential consumption may lead to premature investments in expanding capacity (Bahl and Linn, 1992: 324-325).³

With differential charging, there is also the risk of the burden of the subsidy ultimately falling upon low income groups. For example, the incidence of higher

² Public water taps present special administrative difficulties in preventing vandalism and wastage. Attendants can help but they can be costly and may add illegal surcharges. Water authorities must foster a sense of community responsibility in order to maintain a well-functioning, wastage-free system of public water taps (Bahl and Linn, 1992: 309).

³ It is interesting to compare Bahl and Linn's concern with premature expansion of capacity to that of Bond (2001; 2002a). Bond's concern stems not from subsidised residential consumption, but as a result of what he sees as overuse of water by commerce and industry due to marginal cost pricing, precisely what Bahl and Linn advocate.

water tariffs on a beverage industry could fall heavily on soft drink and beer consumers, who may happen to be predominantly poorer residents. And if high water prices cause capital to locate elsewhere, the burden will be on labour. Other large users, in response to high prices, may choose to exit the system by digging a well. The water provider will lose the economy of scale in serving these large users, which could ultimately result in higher prices for smaller users. Due to these risks, and the economic inefficiency of consumption wrought by differential charging, both Bahl and Linn (1992: 325) and Boland and Whittington (1997) argue against it as a method of income redistribution.

Differential charges based upon property values can also be levied. The advantage of property value-based charges for water is that property values may be more income elastic than water consumption. This could make such charges positively redistributive. Eberhard (1999a: 53) cautions, however, against poor assessment practices in developing countries, particularly in favour of the rich, and of the likelihood of exemptions for certain interest groups with political influence.

2.3.4 Space and time

Prices are sometimes levied differentially according to space and time. For example, a water company may incur higher energy costs for pumping to hilly regions or during peak hours. Principles of economic efficiency would justify higher charges to hill-dwellers and peak users. Developing countries, however, seldom implement such temporal and spatial differential charging, in large part due to the added administrative complexity and cost of such systems (Bahl and Linn, 1992: 247-249).

2.3.5 Means-testing

Means-testing allows subsidies to be targeted directly at vulnerable groups, such as the poor and the elderly, and reduces subsidy 'leakage'. Furthermore, means-testing enables government to bestow not only a subsidy for one particular service, such as

water, but also to provide a basic income grant which can be used for whatever range and level of goods and services that the recipient chooses. Neo-classical economists in particular may advocate means-testing because it allows utilities to price goods approximate to marginal cost, which will help to avoid consumption ‘distortions’ and allow the efficient allocation of resources (Whelan, 2002: 15). However, a major drawback of means-testing, especially in developing countries, is that the administrative process is often costly and difficult (McMaster, 1991: 41) and, as mentioned above, can lead to social stigmatisation of the poor.

2.4 Affordability and price elasticity of demand

The criterion of affordability, or ability to pay, is directly related to that of equity. Bahl and Linn (1992: 286-287) provide estimates from the early 1970s of shares of household incomes spent on water in 11 selected cities in developing countries. On average, the lowest-income households in these cities spent a higher share of income than any of the richer households. In Manila, for example, the lowest income quintile spent an estimated 9.27 percent of household income on water, 12 times larger than the share spent by the richest quintile. Where a poor household’s expense for water is such a large share of household income, the tariff structure is clearly unfair and inequitable, and works against objectives of income redistribution.

For low-income groups, demand for water consumption is less price elastic than for higher-income groups. Therefore, price elasticity of demand—that is, the extent to which demand falls as prices rise—is an unreliable determinant of affordability for poor households. However, Bahl and Linn (1992: 270) differentiate between price elasticity of demand for water consumption and for service connections. They postulate that a high degree of price elasticity of demand for service connections is likely among low-income consumers, who may consider access to clean water a luxury compared to other needs such as food, clothing, and shelter. Relatively

speaking, higher-income groups may perceive regular access to a clean water supply as essential, and will therefore have a low price elasticity of demand for service connections. In such a situation, in order to fulfill the principle of efficiency of resource allocation, it is possible to price service connections for high income groups at above cost and for low-income groups below cost. A price that would deter low-income groups from connecting to the water mains is deemed inefficient. McMaster (1991: 41) also notes that water connection charges for initial installation requiring a lump-sum payment—in contrast to an extended payment plan—have frequently prevented poorer households from access to service entirely.

Affordability, or ‘ability to pay’, is frequently conflated with ‘willingness to pay’. A household may appear to be ‘willing’ to pay exorbitant prices for water from, for example, a ‘surrogate market’ supplier, such as a water vendor, but this choice may be at the expense of other basic goods and services (food and electricity). To avoid such a situation, authorities responsible for service provision should establish the maximum amount that poor households can be expected to pay for water as part of a municipal basket of services. Conversely, inability to pay should not be confused with unwillingness to pay. If a household is unable to pay for services because they are unaffordable, this by no means implies that the household is unwilling to pay.

2.5 Cost recovery and self-financing

Many economists are adamant that a tariff structure should ensure self-sufficiency; that is, it should generate an *adequate* level of revenue to enable a water provider to sustain and improve service levels and to extend coverage to meet extra demand. Among the benefits of a self-financing utility cited by Bahl and Linn (1992: 310) are improved local autonomy, better planning, more appropriate standards for service delivery, and more efficient management. Self-financing utilities commonly set user charges to cover operations and maintenance costs, and also the investment cost of

water and sewer trunk lines, while relying on connection fees to cover the cost of secondary network expansion and the installation of individual household connections (Komives, n.d.: 22).

Financial self-sufficiency is calculated by simple cost recovery analysis in which the revenue collection amount is divided by total costs. If revenues exceed or equal costs, the service is self-financing.⁴ Monitoring cost recovery over time is helpful in gauging whether a provider is becoming more or less financially self-sufficient. Cost estimation always includes operations and maintenance costs, often excludes capital costs. Whether to recover capital costs through user charges or to meet these costs from general public revenues is a choice every authority responsible for water provision must make. Even where capital debt has been discharged, it is desirable to take the capital costs of asset maintenance and replacement into consideration when calculating costs (McMaster, 1991: 38, 53-54).

Eberhard (1999a: 45) categorises three approaches for ensuring adequate revenue, as follows:

1. Using tax revenues to finance capital expenditures and operating revenues within a short-run marginal cost pricing framework.
2. Using long-run marginal cost pricing and investing surpluses.
3. Stipulating self-financing and revenue neutrality within the urban water sector and adapting the water pricing schema accordingly.

Using average incremental cost (AIC)⁵ as the guiding principle for pricing decisions, according to Bahl and Linn (1992: 311), is the best way for a water service provider to generate surplus funds and achieve financial self-sufficiency. The provider can then use the surplus to subsidise consumption and connections for poor consumers.

⁴ Of course, cost recovery ratios are not only a function of user charges but also of billing and revenue collection efficiencies, water losses, and production efficiency.

⁵ Average incremental cost is derived by smoothing and raising the short-run marginal cost curve, which tends to fluctuate greatly over time, by introducing long-run marginal cost considerations.

To achieve financial self-sufficiency, it is necessary to regularly adjust user charges for inflation, but since increasing water charges is unpopular they tend to fall behind the rate of inflation (Bahl and Linn, 1992: 308; McMaster, 1991: 40). And in order to avoid revenue shortfalls and efficiency losses, Bahl and Linn (1992: 276) emphasise the necessity of knowing the price-elasticities of demand for various consumer categories when designing tariff structures. They concede, however, that price-elasticities of demand are notoriously difficult to estimate.

Another central question regarding adequacy is how to achieve full cost recovery and at the same time place a minimum financial burden on the poor while not discouraging other users from efficient use of water or opting for other sources (Mehrota, R. & Kumar, 1996). Indeed, regarding poor users, smaller tariff increases than called for by the exigencies of revenue adequacy may be necessary in the interests of equity (Whelan, 2002: 16).

2.6 Externalities

Bahl and Linn (1992: 253) define externalities as “benefits and costs which are not received by the service user but by other members of society, and which are therefore not taken into consideration by the user in deciding to consume or seek access to the service”. Health, environmental impact, and local economic development are three externalities directly related to water access and consumption.

2.6.1 Health

Residents without access to an affordable and regular supply of clean water are at high risk of contracting water-borne diseases such as cholera. Ensuring a water supply adequate to maintain sound hygiene and good nutrition will therefore yield external benefits to society at large. The cost savings to society, more specifically to

the health sector, of improved access to and consumption of water can be readily estimated (Bond, 1999).

The amount of water necessary to help ensure good health is subject to debate. Bahl and Linn (1992: 305) cite research which “has shown that 20-40 litres per capita per day (lcd) of readily available water, if accompanied by adequate waste disposal facilities and sound hygienic practices, are sufficient to attain the main health benefits of water use”. Other studies assert, however, that more than 40 lcd is a necessary, but not sufficient, condition for improved health (Eberhard, 1999a: 36).

Levels of affordable water consumption also impact on community and societal health by determining sanitation options. In-house water-borne sanitation is realistic only if a household can afford the relatively large amounts of water necessary for flush toilets. Otherwise, these households will be restricted to other options such as pit latrines, the use of which may jeopardise societal health by polluting aquifers (Bond, 2002a; Menard & Clarke, 2002: 7).

Foster (1998: 6) cites a study by Water and Sanitation and Health investigating the link between six major water-borne diseases and the availability of water and sanitation. The study found that provision of basic sanitation was the most effective intervention leading to health improvements, followed by an increase in the *quantity* of water available for household hygiene.

2.6.2 Water conservation and environmental impact

Steadily increasing water consumption has not only diminished the available sources of clean water but also resulted in the negative environmental impacts and human dislocation associated with large-scale dams. In this respect, it is desirable to practice demand management and discourage the wasteful use of water.

Water tariffs can be very useful in curbing the excessive and wasteful use of water and in promoting water conservation. IBTs, which levy higher tariffs on higher rates of consumption, can discourage large users from excessive use. Metering is a necessary corollary of IBTs, and Bahl and Linn (1992: 297) point to several studies that indicate a strong inverse correlation between metering and levels of water consumption. Furthermore, consumer education is necessary to make users aware of the tariff design and the significance of the various consumption thresholds (Boland and Whittington, 1997). Where water is made freely available, for example, through public standpipes in informal settlements, a nominal consumption fee is sometimes advisable to discourage wastage resulting from unnecessary spillage (Bahl and Linn, 1992: 305).

According to Boland and Whittington (1997), who argue from the viewpoint of economic efficiency, setting the price of water at marginal cost, which will require each user to pay the full cost of replacing each unit of water used, will discourage wasteful use. Boland and Whittington, however, do not consider the implications of combining marginal cost pricing with economies of scale which could lead to relatively inexpensive water prices for large-scale users. This coincidence would likely lead to self-regulation of use by small-scale users but more liberal use by large-scale users, resulting in increased water consumption. In this case, Boland and Whittington would need to factor the negative externalities of increased consumption into their calculations of long-term marginal cost.

2.6.3 Local economic development (LED)

A readily accessible, affordable, and regular supply of clean water can produce not only external benefits related to health, but also external benefits related to local economic development (LED). Water and other basic services will in many instances be inputs into economic activities or will support them indirectly (Hentschel & Lanjouw, n.d.: 2). Entrepreneurs in low-income communities may be discouraged

from opening a business due to unaffordable basic services. Conversely, subsidised basic services can serve as a stimulus for small, medium, and micro- enterprises (SMMEs), as for example, a restaurant, which requires large amounts of water to run hygienically. In addition, an adequate water supply is positively correlated to work productivity, and can allow more time and resources, especially for women, to balance multiple responsibilities of child-rearing, household maintenance, and career aspirations (Bond, 1999).

In short, availability of basic services is an important stepping stone out of the trap of poverty, and such external benefits to LED are, of course, related to the health of the economy as a whole:

Apart from being unfair, the exclusion of any group of people in a country from an acceptable quality of life prevents the economy as a whole from receiving its contribution from this group. Yet growth in the cities of many countries runs parallel to the unavailability of basic services for large groups of poor people. This only contributes to increasing and consolidating their poverty. The lack of water and sanitation alone can be a good indicator of the worst poverty, since it is closely associated with morbidity and mortality in urban settlements where on-site solutions are not always safely feasible. (Alfaro, 1997: 2)

2.6.4 Externalities and water pricing

We can see that water consumption can lead to both positive externalities (health, LED) and negative externalities (environmental impact). In the presence of externalities, setting the price of water equal to marginal cost will result in over- or under-consumption (Bahl and Linn, 1992: 253). For example, marginal cost pricing may lead to under-consumption by poor residents which could have negative health and LED impacts on society at large. To allow low-income residents to consume a quantity of water that would have external benefits for society, the price for this quantity needs be set below marginal cost. At the same time, due to economies of

scale, marginal cost pricing could result in relatively low prices for the largest industrial users, which could lead to over-consumption and negative environmental impacts for society. To reduce this negative externality, a water utility might set prices for large industry and for high quantities of water consumption above marginal cost. However, as noted by Eberhard (1999a: 36), there is often an inconsistent approach in integrating these externalities into tariff structures, which may have negative consequences for economic distribution:

Neo-classical economists are quick to point out the uncertainties involved in the estimation of positive externalities arising from investment in urban water supplies and use these uncertainties to caution against using them to justify a deviation from marginal cost pricing. Yet at the same time, these same economists are not self-critical concerning the uncertainties and subjectivity inherent in the estimation of negative externalities and the choice and calculation of the “appropriate” marginal cost on which to base the price. Such an inconsistency in approach is particularly serious when the distributional impacts of the pricing policy are regressive.

The ramifications of such an inconsistent approach would be setting the price of water above marginal cost to compensate for negative externalities, but providing no corresponding compensation for the positive externalities associated with consumption by low-income residents. As a result, poor people would face higher prices, which would further limit their consumption.

2.7 Ease of implementation

All tariff structures require certain administrative mechanisms, and these are associated with relative levels of ease or difficulty of implementation. For example, a tariff structure involving means-testing requires a large administrative investment. IBTs require meters which, in turn, require inspection, reading, repairs, accounting,

and billing. Monitoring mechanisms are required to ensure that revenue collectors do not extort extra charges from residents. Sanction procedures must be in place and implemented to discourage non-payment (McMaster, 1991: 41-42).

Cost-benefit analysis can help determine whether it is worthwhile to add a given feature to a pricing scheme, such as, varying charges according to consumer category or amount of consumption. Economies of scale may render a complex tariff structure for commerce and industry more administratively cost-efficient than for residential users (Bahl and Linn, 1992: 262-263). Furthermore, costlier administrative mechanisms such as metering may only be warranted where the cost of water is relatively high or where water meters are already in place due to past price practice (Bahl and Linn, 284, 307-308)

The degree of complexity of a tariff structure also informs the required degree of consumer education. For Bahl and Linn (1992: 261-262), educated consumers are a necessary pre-condition for economic efficiency. Only consumers who understand exactly what they are paying for basic services will be able to make informed decisions about consumption levels and capital investments for production processes. However, supplying consumer information is costly so, again, it may be of benefit to simplify the tariff structure accordingly.

2.8 Political acceptability

In order for a tariff structure to be successfully implemented, it needs to be generally acceptable, to both political decision makers and to public at large. However, over-emphasis on acceptability can lead politicians to refrain from making difficult choices, such as imposing tariffs adequate to ensure financial sustainability. In large part, past practice, that is, the existing system of financing or charging for a service, determines acceptability. For example, where services have been financed by general

funds, it may be politically difficult to initiate a system of tariffs for water use. On the whole, residents may more easily accept user charges when they perceive a direct link between price and quantity and quality of service. For a utility with a record of poor service, introducing a new price scheme which will charge at least some consumers higher prices will likely face resistance. But the utility will be caught in a vicious circle because it will be hard-pressed to improve service without raising more revenue (Bahl and Linn, 1992: 280-285).

Shirley, Xu, & Zuluaga (n.d.: 8-9) posit that a dysfunctional water system, with large unmet demand, poor operations, and a high level of debt, is not, in and of itself, what usually motivates water reform, including a revision of the tariff structure, but rather political pressure:

...reform occurs when a macro-economic crisis shifts political circumstances so that reform becomes politically desirable, in the sense that the political benefits outweigh the political costs, and politically feasible, in the sense that those favoring reform can win control of the veto gates and overcome opposition. (Shirley, *et al.*, n.d.: 8)

They provide three reasons for the high political costs of water reforms that help perpetuate the status quo:

1. Many governments inherit a history of heavily subsidised water prices, often accompanied by under-investment in maintenance of infrastructure and equipment, and expansion of services. To improve and expand services, therefore, water authorities will usually raise water prices.
2. As a human necessity, water is often a politically charged issue, enshrined in some constitutions as a basic right, while increased prices may lead to inability to pay and, in some cases, disconnection from the supply.
3. The immediate beneficiaries of water reform tend to be from the more marginalised sectors of society, while opponents tend to be the relatively

wealthier, better organised workers and consumers who are already connected to the water system.

One implication of the last point regarding the political weakness of the poor and marginalised is that it may be difficult to sustain subsidy schemes based on ability-to-pay criteria (Department of Constitutional Development, 1999: 14, cited in Whelan: 2002: 16).

2.9 Industrial and commercial tariffs

Different countries, and even different cities within the same country, battle with each other to attract and retain investment. Imposing higher water charges on industrial and commercial consumers may subsidise low-income residential users, but it may also deter investment, especially by highly water-dependent industries such as computer chip manufacturers and beverage makers. At the same time, a city which consistently promotes fair and equitable access to basic services will likely, over the long run, prove to be a more livable place—also a factor in attracting investment.

2.10 Importance of context

We can see that tariff structures are subject to many considerations and that there are diverse opinions on how these considerations should be applied, and whether some should even be applied at all. When equity issues are introduced, it is clear that “no universal theoretical prescription for an ‘optimal’ pricing rule exists...[and] that pricing policy must be grounded in an understanding of the political-economy context” (Eberhard, 1999a: 72). As noted above, Eberhard also emphasises the importance of the institutional context within which the tariff structure occurs.

2.11 Toolkit A: Criteria from theory



The purpose of the toolkit that will be developed and refined throughout this report, as mentioned previously, is to establish a set of assessment criteria that will enable us to effectively analyse and appraise Johannesburg's water tariffs. Part of the process of refining the toolkit will be to prioritise certain criteria over others. However, the first conclusion that we may draw from this chapter's review of tariff theory is that different theoreticians prioritise different criteria, depending on their political and economic outlook. For the moment, therefore, let us ascribe equal weight to all criteria that emerged from our review of the theoretical approaches to water tariffs. These criteria are listed in Toolkit A (Table 1).

Table 1: Toolkit A – Assessment criteria derived from tariff theory

Criterion	Main features	Advisory
Economic efficiency and its corollary, marginal cost pricing	• Efficient allocation of resources • Prioritises cost-recovery	• Could favour larger (wealthier) users over smaller (poorer) users
Equity and its corollary, cross-subsidisation	• Provides more equitable access to water, an essential human resource	• Well-functioning cross-subsidy arrangements are information-heavy, requiring willingness-to-pay data, water consumption data, and socio-economic data
➤ IBT, including a lifeline tariff (Equity)	• Larger-scale (wealthier) users subsidise smaller-scale (poorer) users • Lifeline tariff guarantees free-basic access	• Subsidy leakage limits cross-subsidy impact and access by target groups
➤ Differential charging (Equity)	• One or more (wealthier) groups subsidise one or more (poorer) groups	• May discourage subsidising groups from consumption, investment, etc., therefore reducing subsidy revenue
➤ Means-testing (Equity)	• Specific subsidy targeting • Increased allowance for economic efficiency	• Costly and difficult to administer • Administrative process can induce social stigma

Affordability	• Affordable tariffs for water usage and connections promote low-income access	• Price elasticity of demand for water usage is not a good indicator of low-income affordability
Cost recovery/Self-financing	• Leads to improved local autonomy, better planning, more appropriate standards for service delivery, and more efficient management	• Takes careful financial planning to fully recover costs without increasing the financial burden of poorer, more vulnerable groups
Health (externalities)	• Adequate water can improve the health of vulnerable groups and in the long-term save health-care costs	• Inadequate water supply puts vulnerable groups at high-risk of contracting water-borne diseases
Water conservation (externalities)	• Demand management can conserve water resources and help protect environment	• Excessive water use reduces water resources and has a negative environmental impact
LED (externalities)	• Accessible and affordable water promotes LED	• Unavailability of water for low-income groups increases and consolidates poverty
Ease of implementation	• The costs of implementing a tariff structure affect its sustainability and effectiveness	• A tariff structure should be easy and affordable to implement • The costs of implementing a tariff structure should not outweigh the benefits
Political acceptability	• An acceptable tariff structure eases implementation • Improved service quality facilitates acceptability of tariff reform	• Over-emphasis on acceptability can lead politicians to refrain from making difficult choices regarding tariff reform
Industrial & commercial tariffs	• Special industrial and commercial tariffs can be used to generate cross-subsidies	• Do not want to impose such high tariffs on industry and commerce that will deter further investment • Cross-subsidy and increased equity can lead to more social harmony, which can lead to increased investment

Context	• The political economy and institutional context inform the extent to which particular criteria are	• Cannot simply apply tariff theory regardless of context; a tariff structure must be grounded in political-economy and institutional context
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CHAPTER 3: WATER TARIFFS IN PRACTICE

This chapter highlights practical applications in developing countries of the tariff theory outlined in Chapter 2. The objective is not to arrive at a definitive conclusion regarding the relative success or failure of various tariff structures, although in some instances such opinions are cited. Rather, the intention is to add value to the criteria discussed in Chapter 2 by gaining critical perspective into the ways that certain governments have incorporated them into their tariff structures. Toolkit B at the end of the chapter summarises the insight gleaned through this practical review.

3.1 Context

Some important aspects of a developing country context (as opposed to the industrialised west) are:

- A relatively high proportion of the population has sub-standard access to water and sanitation services, and is therefore at greater risk of disease and remaining in poverty.
- A relatively high proportion of the population can barely afford even the most nominal of tariffs for water and sanitation services.
- A relatively high proportion of the population is unemployed. This lessens the tax base, but at the same time creates a greater need for welfare in service provision. It puts a greater strain on financial sustainability in providing water and sanitation, among other municipal services.

3.2 Economic efficiency

Eberhard undertakes a review of water pricing in a wide range of both developing and industrialised countries, seeking “to illustrate the diversity of tariffs applied in

practice and show the *rarity of marginal cost based pricing* despite the prominence given to it in the theoretical and multinational agency policy literature” (Eberhard, 1999b: 1; emphasis added). In particular, he singles out the World Bank, which wields considerable influence as a financier of development projects, for consistently advocating marginal cost pricing, regardless of equity implications and despite the fact that strict marginal cost pricing is seldom the basis for tariff structures in the industrialised west:

Although its policies on water pricing can be read as giving due consideration to equity issues, in practice World Bank policy specialists emphasise marginal cost pricing, removal of subsidies and privatisation. The equity implications of these policies are seldom adequately addressed. Similarly, the advocacy of marginal cost pricing is usually unsophisticated and selective - for example, the virtual absence of marginal cost pricing in the developed world (in the form advocated by the World Bank) is ignored when advocating it in the developing world. (Eberhard, 1999b: 32)

Furthermore, Eberhard (1999b: 46) finds no evidence of tariff structures in which all water to all consumers is priced at average incremental cost (AIC), as recommended by neo-classical economists. In addition, as noted in Chapter 2, in their zeal to commend the benefits of adhering to principles of economic efficiency, World Bank water economists sometimes omit important information in their analyses. For example, Yepes (1999: 4-5) analysed Guayaquil’s IBT structure through the lens of economic efficiency. He calculated that, due to the changes in consumption patterns among both the ‘subsidisers’ (decreased consumption) and the ‘subsidised’ (increased consumption), the municipality would suffer a ‘welfare loss’ of approximately \$4.4 million. However, Yepes failed to factor into his equation the welfare effects of externalities, such as the health and economic gains to the municipality of increased consumption by the poorer, smaller users, and the mitigated environmental impact due to reduced consumption by larger, wealthier ones.

3.3 Equity

3.3.1 Free water for all

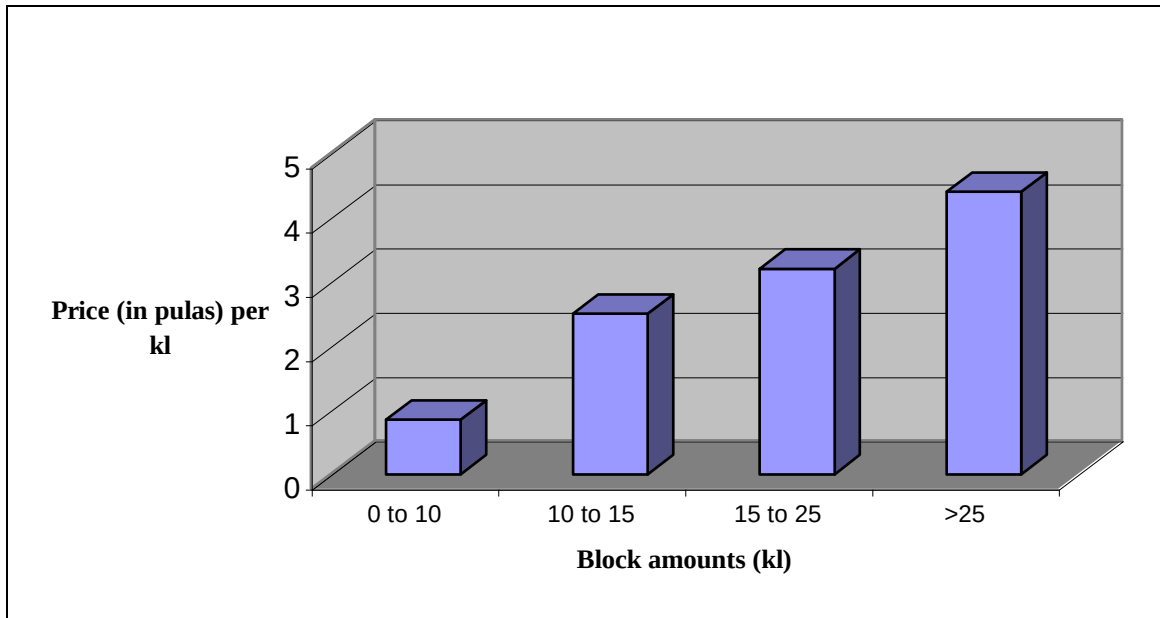
Many developing countries, viewing water as a basic right and a ‘gift of God’, have attempted to make water freely available to all citizens. While such a policy often stems from admirable equity objectives, it is fraught with obstacles of financial sustainability, especially in water-scarce regions. Eberhard (1999b: 61-63) describes how the policy in Hanoi, located in a water-rich region, was, until 1991, to fully fund water provision from the public coffers. Because the city was unable to finance universal provision, this resulted in a highly inequitable situation in which only 25 percent of residents, predominantly the wealthy ones, had access to water services.

In general, while some developing countries have always had water tariff structures in place, since the 1980s there has been a rapidly growing trend to implement systems of user charges.

3.3.2 IBTs and lifeline tariffs

Gaborone had an effective IBT structure, facilitated greatly by the fact that 95 percent of residents had on-site metered supplies (the remaining five percent relied on communal standpipes). The IBT structure, shown in Figure 3, was as follows. Households using less than 10 kl per month received subsidised water. Households consuming between 10 and 25 kl per month paid an amount approximating the cost of the service, and those consuming more in effect subsidised the small consumers. As large-scale water consumers were thought to be, on average, wealthier than small-scale water consumers, this structure was viewed as promoting income equality. Importantly, while the structure enabled effective subsidisation, it also allowed for full cost recovery, including the recovery of capital costs (Eberhard, 1999b: 51-55).

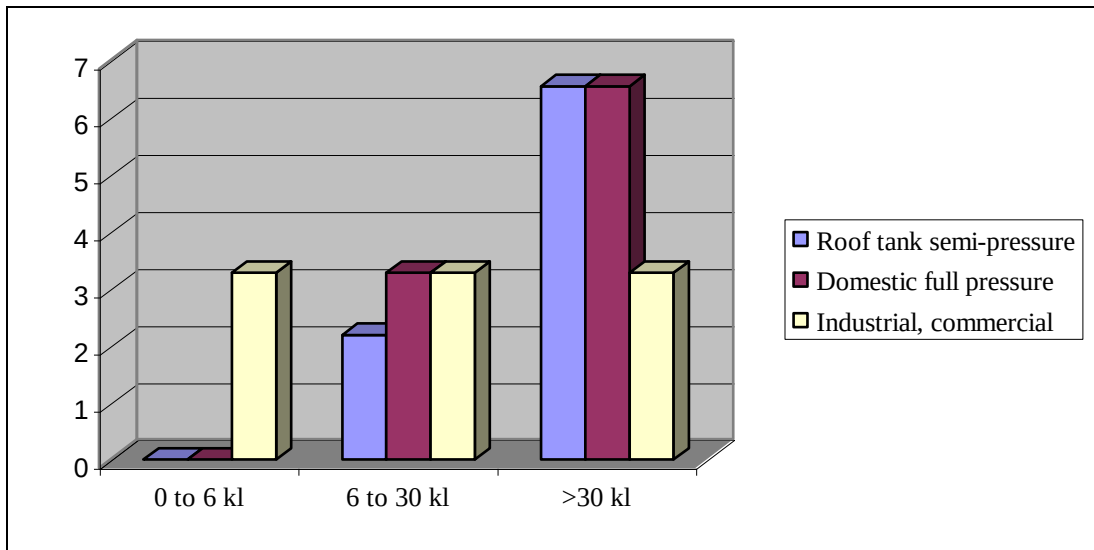
Figure 3: Gaborone IBT structure



Data source: Eberhard, 1999b: 51-55

Durban was one of the first cities in South Africa to implement a free lifeline tariff of 6 kl per month. The free 6 kl constituted the first block of a three-block IBT structure (see Figure 4). The municipality attempted to achieve cost recovery by combining the IBT structure with the approximate marginal costs of supply. Therefore, the water tariff for the second block was based on the average historical cost of water supply and was lower for generally poorer, semi-pressure customers because of lower system costs. The water tariff for the third block, double that of the full pressure second block, was designed to approximate the long run marginal cost of supply. Industrial consumers were charged a flat rate at the average historical cost of supply (PDG, 2001a: 6).

Figure 4: Durban water tariff structure 2000/1 (Rands/kl)



Data source: PDG, 2001

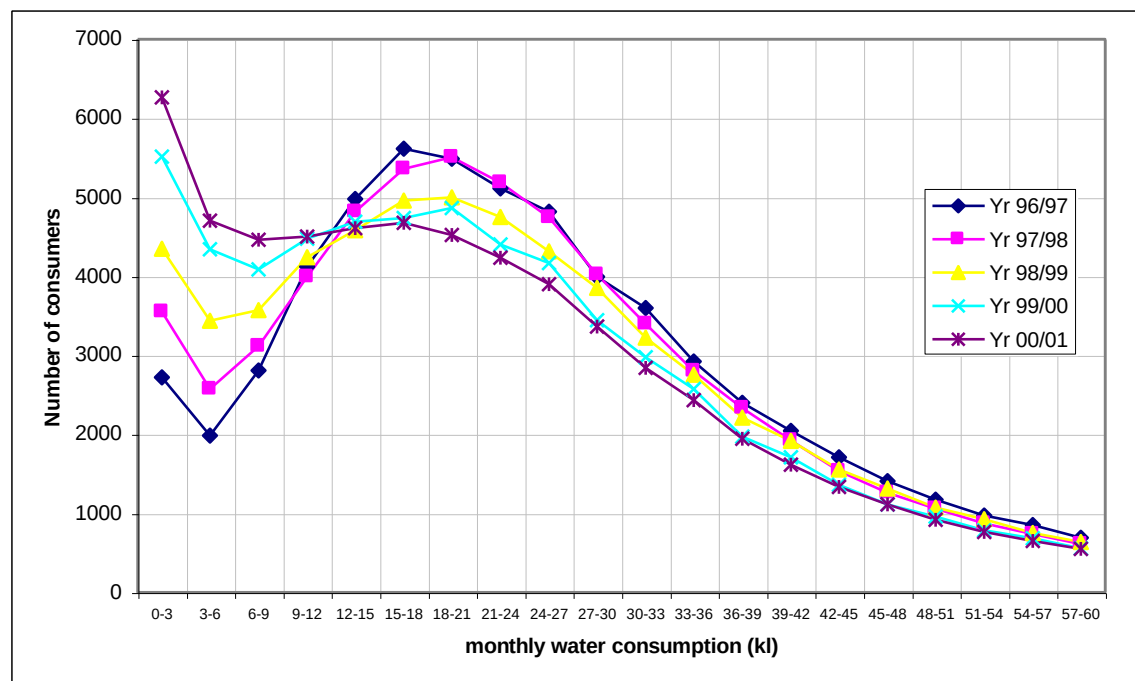
Durban's tariff structure included fixed charges for domestic full pressure users (beyond 6 kl consumption) and for industrial and commercial users (of between R23.20 and R2320, depending on connection size). For ground tank and roof tank semi-pressure users, there was no fixed charge "because the Council felt that this would undermine the objective of a free basic water supply to all" (PDG, 2001a: 6). But for domestic full pressure users, the fixed charge meant that they could consume 6 kl (6000 litres) free of charge, but once they consumed their 6001st litre, they would be charged for the full 6001 litres. Bond (2002a) sees this fixed charge as one of several tricks employed by water providers to flatten an IBT so that it approximates a flat or downward-sloping SRMC curve—in effect minimising the cross-subsidy.

Yepes (1999: 5) highlights the complexity of ensuring cost recovery within an IBT framework. He points to the price elasticity of demand feedback loops that may occur in water tariffs in Guayaquil when extending coverage to a hitherto unserved population whose water use would then be heavily subsidised. The utility would be

forced to increase rates for the ‘subsidisers’, but higher rates would force them to reduce consumption. The reduced consumption, in turn, would result in even higher rates. Yepes calculates that service expansion of 500,000 new connections would increase tariffs for the ‘subsidisers’ from \$1.35/kl to \$2.42/kl.

The effect of price elasticity of demand was also noted in Durban, where, using an IBT structure, average domestic consumption declined from 36 kl per month to 26.6 kl per month between 1996 and 2001. This decline was attributed largely to simultaneously occurring increases in water prices. Industrial consumers, also displaying a fairly high price elasticity of demand, reduced water consumption significantly over the same period (PDG, 2001).

Figure 5: Durban domestic consumption frequency distribution, 1996-2001



Source: PDG (2001: 5)

Figure 5 displays a frequency distribution chart showing how domestic consumption in Durban shifted away from the two higher tariff blocks (6 to 30 kl and over 30 kl)

towards the lifeline tariff (6 kl and under). Whereas in 1996/97 only 8 percent of Durban's domestic consumers used less than 6kl per month, in 2000/1 the figure had increased to 18 percent. Decreased consumption in the higher blocks reduced revenue for the utility and, as a result of a drop in demand by the utility, to the bulk water supplier as well. The bulk supplier, Umgeni Water, invested in bulk infrastructure based on higher demand projections, so reduced demand and revenue were likely to result in higher bulk prices, which would probably be passed on to the consumer (PDG, 2001).

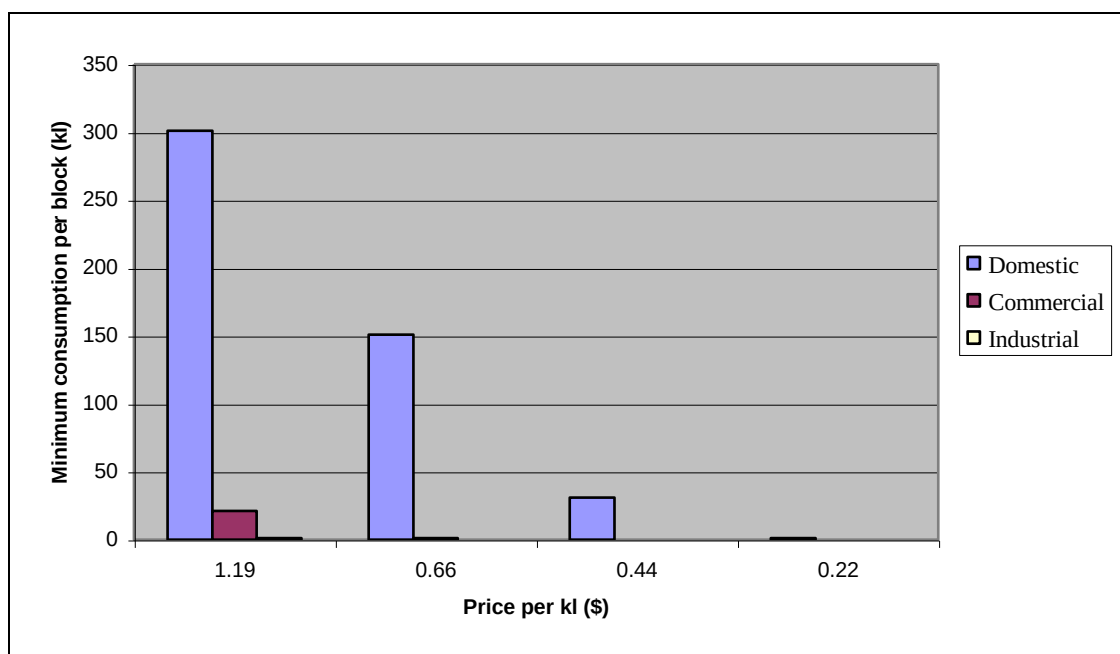
3.3.3 Differential charging

In Uganda, unmetered charges were levied differentially depending on whether the user was located in a residence or in a government office or business. Still, within this differentiation there existed a secondary tariff structure setting charges according to number of taps per residence, and the number of consumers per institution and government office. Standpipe users paid approximately one-third the charges paid by commercial and industrial users (Onek, 1997: 135-136).

The La Paz/El Alto tariff structure combined differential charging, with industrial, commercial, and government customers subsidising the vast majority of residential users, and a progressive IBT structure, as shown in Figure 6 and Table 2. Figure 6 portrays the *minimum* consumption amount per tariff block in US dollars. As can be seen, an industrial user paid the highest block tariff (\$1.19 per kl) regardless of amount consumed, whereas a domestic user would have had to consume 300 kl before paying this price. The first 30 kl for domestic consumers was subsidised to a price well below marginal cost, and most households used less than this amount. A private sector concessionaire ran the La Paz/El Alto utility and, according to Komives (n.d.: 24), we could have expected the company to prioritise service to the wealthier 'subsidisers' (industrial, commercial, and high-volume domestic users) over the 'subsidised' low-volume domestic users. Contractual conditions, however,

helped maintain the utility's focus on the needs of unserved and poorly serviced residents.

Figure 6: La Paz/El Alto tariff structure



Data source: Komives, n.d.: 21

Table 2: La Paz/El Alto tariff structure

Tariff US\$/cubic meter	Domestic	Commercial	Industrial
1.19	301 kl and above	21 kl and above	1 kl and above
0.66	151 to 300 kl	1 to 20 kl	
0.44	31 to 150 kl		
0.22	1 to 30 kl		

Source: Komives, n.d.: 21

In the 1980s, Columbia developed a property-based indicator for wealth, which the government used in formulating differential charges for water billing. The indicator consisted of a six-band nation-wide classification of all properties. The band, or stratum of wealth, for a neighbourhood was based on the predominant physical characteristics of the properties in the area (for example, construction materials and

number of floors) and the neighbourhood itself (condition of roads, presence of lighting, public gardens, and other local amenities). The government then used these strata to determine a household's level of subsidy to be received or surcharge to be paid for water (see Table 3). This Colombian system of property value-based cross subsidies has been deemed, on the whole, successful (Foster, 1998: 9).

Table 3: Columbia's cross-subsidy strata, 1994

Stratum	Subsidy or surcharge limit
1	maximum subsidy of 50%
2	maximum subsidy of 40%
3	maximum subsidy of 15%
4-6	maximum surcharge of 20%
Commercial	maximum surcharge of 20%

Source: Foster, 1998: 9

3.3.4 Means-testing

In Chile, as of the mid-1990s, the government offered poor families a targeted subsidy. Alfaro (1997: 6-8) describes how eligible families received a 'social card' from municipalities, which gave them, among other subsidies, a discount from water utilities of between 50 percent and 85 percent for the first 20 kl of monthly consumption. The utilities would send an invoice to the municipalities with the total monthly subsidy, and municipalities would reimburse the utility with funds transferred from central government. In 1995, the Santiago utility, EMOS, distributed \$4 million in subsidies, 2.5 percent of the total billed by the company. Following implementation of the targeted subsidy, the rate of slow payments (more than two months of unpaid bills) almost halved. Alfaro advocates targeted subsidies as improving the ability of low-income households to pay their water and sanitation bills without adversely affecting a utility's financial situation, and without causing price distortions. However, the targeted subsidy necessitated significant administrative requirements and close collaboration between the utilities, local governments, and community organisations.

3.4 Affordability and price elasticity of demand

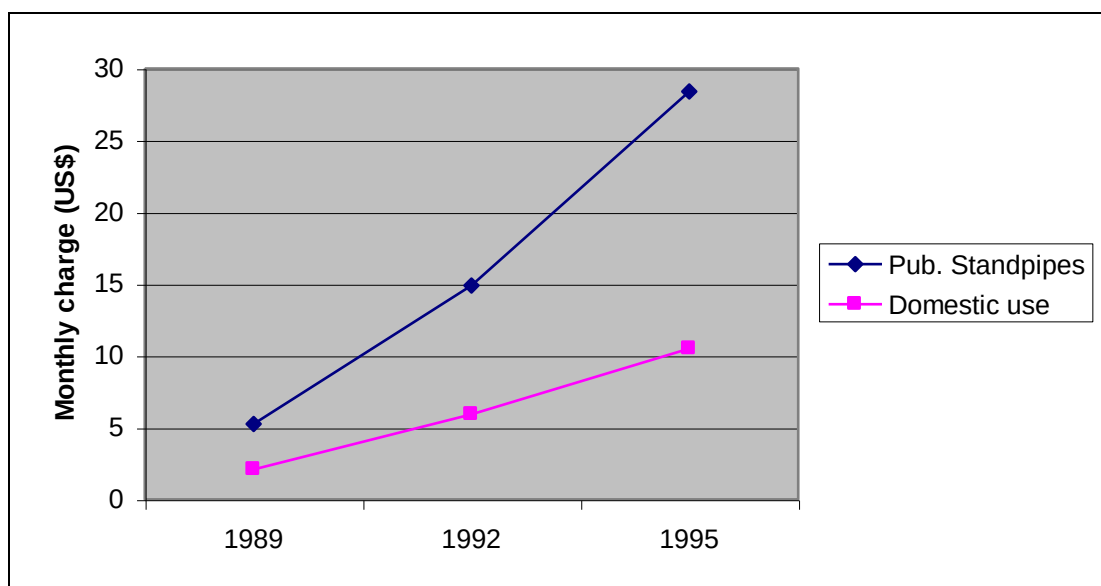
In Santiago, the average water and sanitation bill in 1997 was about \$8 per family per month, which represented less than 3 percent of the average household monthly income for low-income families. As a reference point for affordability, the Pan American Health Organization recommends that the water bill not exceed 5 percent of family income (Alfaro, 1997: 5). This recommendation coincides with results from a range of studies showing that low-income households are willing to pay for piped water supplies when their price falls between 3 and 5 percent of household income (Lobo, *et al.*, 2000). A widespread survey in East Java in 1985 found that residents were generally willing to pay above the 3 to 5 percent threshold for a private connection, signaling a readiness to pay for a more expensive service of a better quality (Foster, 1998: 6).

Gaborone listed ‘affordability’ as one of the prime objectives of its tariff structure, and generally achieved this goal through an IBT structure, including a lifeline tariff. The small minority of users who relied on standpipes paid a general service charge which worked out to be less than the lifeline tariff (Eberhard, 1999b: 51-55). And in Durban, affordability for low-income households was the major reason for implementing a free-lifeline tariff of 6 kl a month (PDG, 2001).

3.5 Cost recovery and self-financing

The comparative survey confirmed some of the findings of the theoretical review regarding cost recovery, particularly that without careful planning, a decision to recover costs can easily increase the financial burden faced by the poor. Starting in the 1980s, Uganda instituted a policy aimed at full cost recovery, including all operations, maintenance, depreciation and capital costs (Onek, 1997: 136). As a result of the cost recovery policy, water tariffs increased significantly, as evidenced by the changes in tariffs for unmetered use shown in Figure 7 and Table 4.

Figure 7: Monthly tariff changes in Uganda, unmetered use



Data source: Onek, 1997: 136

Table 4: Monthly tariff changes in Uganda, unmetered use

	Dec. 1989	Sept. 1992	April 1995
Public standpipes (unmetered)	\$5.23	\$14.9	\$28.4
Domestic use (2-4 taps) (unmetered)	\$2.09	\$5.92	\$10.5

Source: Onek, 1997: 136

As described above in Section 3.3.2, Durban attempted to combine a progressive IBT, including a free lifeline tariff of 6 kl per household per month, with cost recovery. One way that it recovered the cost of supplying the free 6 kl was by levying a fixed charge to those full pressure domestic consumers who consumed beyond the first block (PDG, 2001), reducing the progressive nature of its IBT.

As noted in Chapter 2, a decision to recover costs often translates into full cost recovery. In some cases, however, governments may under-recover costs for fear of incurring a political backlash. For example, in Brazil, there was a major push to institute bulk water pricing, but the state had historically provided bulk water free of charge. The new fee that users paid to state companies covered operation and

maintenance costs of water resource projects, but not investment or even resource costs (Azevedo, 1997: 32).

3.5.1 Public-private partnerships, cost recovery and affordability

In Bond's opinion (2002a), public-private partnerships (PPPs) inevitably lead to increased inequality in the provision of water and other basic services. Similarly, Eberhard links the institution of public-private partnerships⁶ to tariff increases, providing the example of Conakry, Guinea (Eberhard, 1999b: 42). In Conakry, a majority foreign-owned company held a 10-year lease to run the hitherto dysfunctional state water utility. A primary condition of the lease was to achieve financial self-sufficiency within six years. Tariffs had been subsidised well below cost, and the water provider deemed large price hikes necessary. Average tariffs increased from \$0.12/kl in 1989 to \$0.84/kl in 1996. Furthermore, the water provider implemented a minimum bimonthly payment of \$13 for the first 20 cubic meters of water, whether a household consumed this amount or not, plus a connection fee of \$90 a month. In a country where high-paid public servants earned \$150 a month, these prices were beyond the reach of most people (Menard & Clarke, 2002: 25-26).⁷

Similarly, in La Paz/El Alto, Bolivia, a 1997 concession for water and sewer services led to a major tariff revision. The state-run utility's tariffs had never been set to achieve cost recovery, but the desire to involve the private sector in the operation and expansion of the La Paz/El Alto water system produced the tariff hikes—just one month before the start of the concession (Komives, n.d.: 21).

However, the question needs to be asked: are PPPs the cause of tariff hikes, or do they ultimately stem from a desire by water authorities to improve and extend their

⁶ Eberhard's preferred term is 'privatisation', under whose rubric he includes service contracts, management contracts, leases, concessions, and outright sale of assets.

⁷ Conakry's very high water prices were attributed to debt repayment on World Bank loans, invested for expansion and rehabilitation of the water system, and to provisions for bad debt due to a high level of non-payment by consumers, both private and public (Menard & Clarke, 2002: 36).

services by becoming financially viable and sustainable institutions? Surely, a water authority that is fulfilling its mandate to provide quality and affordable services to all residents, while at the same time running a financially viable utility, will not seek to overhaul its institutional structure. However, debt-ridden authorities that are heavily subsidising the price of water to some residents and which are unable to finance coverage extension to others will likely, at some point, consider radical transformation. There is no golden rule ensuring that transformation will be more successful under a PPP than under a fully-state run water provider. There are many reasons that governments turn to the private sector, not least of these being increased access to investment finance. And there is no doubt that private sector partners would need to perceive profitability before entering a partnership, and would likely negotiate tariff revision. But even a floundering water authority undergoing ‘in-house’ transformation to improve and extend services would almost certainly be unable to keep tariffs constant. The previously cited example of Uganda is a case in point: The government, the full owner of the national water and sewerage utility, instituted a policy of full cost recovery and, as a result, raised tariffs steadily and significantly. It should be noted, however, that although average prices in Uganda were higher than in Conakry, Uganda’s relatively progressive tariff structure made water for domestic users more affordable (Menard & Clarke, 2002: 36). In Hanoi, another fully government-owned and -operated utility, there was little chance of meeting the goal of extending service coverage by implementing user charges, as these charges were insufficient to meet operating costs, let alone recover capital outlays (Eberhard, 1999b: 61-63).

The case of Santiago, Chile is worthy of particular mention. In the late 1980s, the Chilean government made changes in the operations of EMOS, the state-run water utility, and in the regulatory environment for water and sanitation. These changes were a precursor to an expected PPP, and they enabled the utility to run along business lines. EMOS was a relatively well functioning utility, but was not generating enough surplus revenue to invest in expansion of services and in

maintenance. The utility continued to function under full state control for ten years, and in this time its financial situation, and its level of service, improved greatly. As part of these initial reforms, tariffs, formerly set according to ministerial discretion, were re-designed to allow the utility a 7 percent rate of return on investment. The tariff-setting formula was based on a model that provided incentives for increased efficiency: on the one hand, certain parameters such as unaccounted-for-water and collection rates were benchmarked to those of an efficient firm; on the other hand, efficiency over and above the model led to additional profits for EMOS, which translated into staff bonuses (Shirley, *et al.*, n.d.: 33). The general success of the reform—with tariff revision as a centrepiece—is described as follows:

...the changes allowed significant price increases, which helped fund improved maintenance and enabled EMOS to expand as Santiago's population grew. The reform produced net benefits in economic welfare that are surprisingly large given the relatively good initial conditions. These gains largely accrued to government, although consumers benefited from almost 100 percent coverage of expanding demand, better water pressure and fewer interruptions of service. Consumers also had to pay higher prices, but the effects were ameliorated by a direct subsidy. Employees gained from wages closer to market wages. (Shirley, *et al.*, n.d.: 5)

This discussion indicates that a PPP is not a necessary condition for achieving the better functioning of a water utility, including an improved financial situation. Water services reform appears to be more directly related to firm government commitment. This commitment would often translate into higher water prices, but whether these prices negatively affect vulnerable sectors of society depends on the design of the tariff structure and, in the case of PPPs, other contractual arrangements. In other words, there does not appear to be a necessary correlation between the establishment of a PPP and unaffordable water prices, especially given an appropriate regulatory framework.

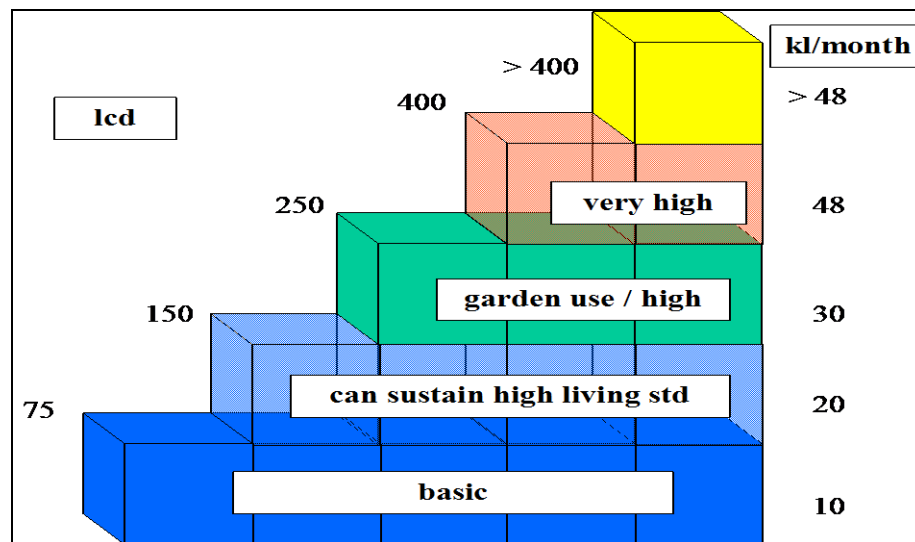
3.6 Externalities

3.6.1 Health and local economic development

Reforms in the Chilean water and sanitation sector that led to increased coverage have been linked to poverty reduction. Between 1987 and 1994, the urban population with access to water from public networks grew by 18 percent, resulting in a national coverage of 98.5 percent, while sewerage coverage reached 88 percent. Alfaro (1997: 8) associates these gains with growth of 38.5 percent over the same period in per capita GNP and a decrease in infant mortality by 47 percent. She also credits the improved water and sanitation with Chile's ability to cope with the 1991-1994 cholera epidemic that resulted in over 1 million cases, only 150 of which occurred in Chile (most of these came through the borders, according to Alfaro).

A global survey of selected countries by Eberhard (1999b: 33) demonstrates the wide range of average urban domestic water consumption, from 110 lcd in Portugal and 124 lcd in the UK to 360 lcd in Canada and 465 lcd in the USA.

Figure 8: Water consumption and living standards



(source: Eberhard, 1999b: 45)

Figure 8 portrays his conceptual framework of water consumption levels, in which he considers 75 lcd as able to sustain a ‘basic’ living standard and 150 lcd a level which ‘can maintain a high standard of living’. The latter classification is based on the evidence of European countries with high standards of living, and average urban domestic consumption below 150 lcd.

3.6.2 Water conservation and environmental impact

IBTs are seen as effective tools for curbing excessive water usage and, as mentioned in Chapter 2, meters are an indispensable corollary of IBTs. Data from Panama revealed that, following installation of meters, average monthly consumption for households declined by about 25 percent over the first four months of metering (Lobo, *et al.*, 2000). In Gaborone, located in a water-scarce region, where reducing water wastage was a top priority, an IBT structure was in place and 95 percent of users had on-site metered connections (Eberhard, 1999b: 51-55). By contrast, in Guayaquil, Ecuador, as noted below in Section 3.7, due to the administrative costs associated with metering small users, only 26 percent of connections were metered. This had a negative environmental impact, as the majority of users, not being charged according to consumption, had little or no incentive to conserve water (Yepes, 1999: 6).

3.7 Ease of implementation

In Guayaquil, it was more cost-efficient for the utility to not bill the most heavily subsidised consumers because the costs of billing and collecting from these consumers would outweigh the revenues. As a result, only 26 percent of the water connections were metered. The utility generally found it cheaper to provide free service than to incur the costs of connection and collection (Yepes, 1999: 5).

Durban found that providing a free lifeline tariff of six kilolitres per month was administratively easier and cheaper than means-testing and targeting poor households in order to provide them with a rebate on the water account (PDG, 2001).

3.8 Political acceptability

A study in India revealed that Indian residents, both urban and rural, were prepared to pay more for a reliable, safe, and adequate water supply. This willingness to pay was not mirrored, however, by politicians' willingness to increase tariffs. The study also questioned the need for high-cost willingness-to-pay studies. It indicated that policy makers' commitment to price reform and to improving service play a more important role in successfully raising tariffs to achieve cost recovery than willingness-to-pay studies (UNDP-World Bank, 1999).

Residents affected by tariff increases may show particular resistance in the case of PPPs, as they may associate the increases as being caused by private sector involvement. This was the case in La Paz/El Alto, where protest marches against price hikes made the concessionaire cautious of implementing further tariff increases (Komives, n.d.: 22). In Guinea, as mentioned above in Section 3.5.1, large price increases followed the institution of a PPP. To make these price hikes politically acceptable, the government heavily subsidised prices for six years, aided by World Bank credit. Still, the end of the subsidised period led to many complaints of unaffordably high tariffs (Menard & Clarke, 2002: 25, 36)

3.9 Industrial and commercial competitiveness

In Gaborone, industrial and commercial users were subject to the same IBT structure as residential users. Facing large-scale consumption in the high-usage and highest

priced tariff block, however, manufacturers considered water prices as too high. This perception by commercial and industrial users was considered a possible disincentive for new investment in industry and consequent retarded economic growth (Eberhard, 1999b: 51-55).

3.10 Toolkit B: Criteria from comparative sketch



It is easier to draw definite distinctions between the various criteria that may determine a tariff structure in theory than in practice, where lines become blurred. Of note is the theoretical distinction made between marginal cost pricing and IBTs. As evidenced in the case of Durban, it is possible—perhaps desirable—to incorporate aspects of marginal cost pricing into an IBT in order to recover costs. It is important to be aware, however, of the effect that marginal cost considerations have on the IBT. In Durban, SRMC pricing added to the progressive nature of the IBT because it translated into a lower water tariff for poorer, semi-pressure users. Where SRMC pricing means higher costs for poorer users, it clearly undermines the progressive nature of an IBT. Furthermore, it is important to factor into any tariff structure LRMC, including the environmental impact of another long-term investment in water supply. Similarly, we cannot in good faith draw teleological conclusions about the impact of a PPP on a tariff structure, specifically on water prices for low-income groups. It would be more accurate to infer that the outcome of a PPP in large part results from the quality of the contract between a water authority and its partner, and the willingness of the government to enforce the contract's regulation.

It is possible to conclude that how policy makers approach these issues can lead to a colossal difference in a tariff structure's outcome. Take, for example, a water authority whose point of departure is equitable, affordable, and sustainable access to water for all residents and, as part of this mission, incorporates into its tariff structure short- and long-term marginal cost pricing in a progressive way. This approach will

likely yield far different results than a water authority whose point of departure is cost recovery and, as an afterthought, attempts to ameliorate regressive tendencies within its tariff structure.

Toolkit B (Table 5) sums up the value that our brief review of water tariffs as applied in some developing country contexts has added to the criteria listed in Toolkit A.

Table 5: Toolkit B – Assessment criteria derived from review of water tariffs in practice

Criterion	Main features	Advisory
Developing country context	Relatively high levels of population • With sub-standard water and sanitation • Cannot afford even small payments for water	• Greater strain on financial sustainability of service provision
Marginal cost pricing (economic efficiency)		• Strict marginal cost pricing rarely used, even in industrialised countries
Free water for all (equity)		• Makes financial sustainability very difficult, particularly in water-scarce regions
IBT, including a lifeline tariff (equity)	• Properly designed, allows for both subsidy of small-scale users and cost recovery	• Should factor in LRMC, and sometimes SRMC • Should factor in price elasticity of demand
Affordability		• Water and sanitation bill should not exceed 3-5 percent of low-income household income
Cost recovery and PPPs	• Institution of a PPP is invariably accompanied by a decision to recover costs	• Cost recovery could impact negatively on vulnerable groups in cases of poor regulation
Health and LED (externalities)		• 75 lcd is necessary for basic living standards
Water conservation (externalities)		• Metering greatly contributes to water conservation
Political acceptability		• PPPs may exacerbate opposition to tariff reform

CHAPTER 4: THE RESEARCH CONTEXT – WATER SUPPLY AND TARIFFS IN JOHANNESBURG AND SOUTH AFRICA

*...after jobs and housing, water supply is the issue South Africans want to see the
Government address most urgently*

- Water Supply and Sanitation Policy White Paper, 1994

The purpose of this chapter is to contextualise our assessment criteria within the reality of water supply and tariffs in South Africa, in general, and Johannesburg, in particular. To this end, Section 4.1 reviews key South African legislation and policy concerning water pricing, presented in chronological order. To avoid redundancy, the review generally highlights new policies in each document and omits policies that are re-statements of previous ones. Section 4.2 summarises the legislative and policy review, highlighting the main objectives and key features of each document. Section 4.3 further sets the stage for an examination of Johannesburg's water tariff structure by reviewing social, economic, political, and environmental issues of relevance to water tariffs in South Africa and in Johannesburg. Section 4.4 provides a summary of the research context, the reviewed tariff-related policy and legislation, and implications relating to water supply in Johannesburg. Section 4.5 is a synthesis of the research report thus far, integrating the knowledge gained from the reviews of water tariffs in theory and in practice into the context of water supply and tariffs in Johannesburg. The result is Toolkit C, which provides a model of prioritised criteria that we will use in the subsequent chapters to analyse Johannesburg's water tariff structure.

4.1 Select water legislation and policy relating to tariffs

All municipal water authorities and providers in South Africa operate within the context of national legislation and government policy. To aid our understanding of

the legal authority and political mandate of Johannesburg's water authority and provider in setting tariffs, this section undertakes a review of key South African water-related legislation and policy concerning water pricing. On the whole, the policy and legislation under review reflect changes in the South African government's developmental discourse. They represent the transition from the quasi-socialist, centralised-planning 'houses for all' vision of the Reconstruction and Development Programme to the 'enabling' vision of developmental local government. This has meant a shift from a top-down approach to rolling out water and sanitation services towards one that emphasises local provision, and which prioritises cost recovery and links service levels to affordability.

4.1.1 Reconstruction and Development Programme (1994)

Prior to South Africa's first democratic elections in April 1994, the ANC published its socio-economic policy framework, the Reconstruction and Development Programme (RDP). The RDP's top priority was to meet people's basic needs, including clean water and sanitation for all (ANC, 1994: 1.4.2). The RDP states that almost one-third of South Africans do not have access to clean water, and set the short-term objective of providing all households with a supply of 20-30 lcd at a distance of no more than 200 metres. Its medium-term objective is to provide an on-site supply of 50-60 lcd.

To ensure an adequate supply of water, the RDP proposes a lifeline tariff and urban internal cross-subsidies through progressive IBTs and urban-rural cross-subsidies. The document specifies that the progressive IBTs would meet the long-term costs of providing water for large-volume users (ANC, 1994: 2.6).

4.1.2 Water Supply and Sanitation Policy White Paper (1994)

Soon after the ANC-led government came to power, the newly instituted Department of Water Affairs and Forestry (DWAF) issued the Water Supply and Sanitation

Policy White Paper. The White Paper's stated goal is "to ensure that all South Africans have access to essential basic water supply and sanitation services at a cost which is affordable both to the household and to the country as a whole" (DWAF, 1994: Section A). The shift in language is subtle, but to *ensure* universal access can be interpreted differently from the RDP's promise to *provide* universal access. As part of this shift, the White Paper is more forthcoming about the imperative of cost recovery.

The White Paper also emphasises the link between access to water and improved health and socio-economic development. It highlights the fundamental issue in the water sector as being one of redressing the historically inequitable water allocation and supply along lines of race and class. It sets basic water supply at 25 lcd within 200 metres, while recognising that this amount "is not adequate for a full, healthy and productive life which is why it is considered as a minimum" (DWAF, 1994: Section C).

The White Paper's water pricing principles are based on a philosophy of "the user pays...to ensure sustainable and equitable development, as well as efficient and effective management" (DWAF, 1994: Section C). It is careful to justify a policy of charging for a naturally occurring resource, explaining that the cost of water stems from abstraction, treatment, and transport. It establishes a basic policy of self-financing water services at the local level, with the caveat that Government may subsidise capital costs in poor communities. For water usage, poor communities would be charged only operating expenses, while other users would be charged the full cost of supply.

The White Paper endorses a three-step IBT, as follows:

- A lifeline tariff for basic use of no more than 25 lcd, covering only operation and maintenance costs.

- A normal tariff for ‘normal’ use of no more than 250 lcd, covering operation, maintenance, and (sunk) capital costs, plus the losses incurred by the lifeline tariff.
- A marginal tariff for use exceeding 25 lcd, covering long-term marginal costs, defined as “the present day cost of the latest or next augmentation scheme” (DWAF, 1994: Section C).

4.1.3 Constitution (1996)

The Bill of Rights enshrines the RDP and the 1994 White Paper objective of universal access to water, and, more specifically, access to “sufficient” water as a constitutional right (RSA, 1996: 27,1b). The constitution mandates municipalities to ensure service delivery in a sustainable manner (RSA, 1996: 152,1b) and grants them powers to impose surcharges on fees for services provided (RSA, 1996: 229,1a).

4.1.4 Water Services Act (1997)

The Water Services Act (RSA, 1997: Section 3) returns to the 1994 White Paper’s emphasis by guaranteeing everyone the right of access to a “basic water supply”. It provides a broad national framework for norms and standards, including those related to tariff setting, for water services. According to the Act (RSA, 1997: Section 9), the Minister for Water Affairs and Forestry maintains the discretion to set these norms and standards and, in so doing, must consider the following:

- The need for equitable access to water services.
- The operational efficiency and economic viability of water services.
- Any guidelines recommended by official standard-setting institutions.
- Any impact which the water services might have on the environment.

Furthermore, the Water Services Act (RSA, 1997: Section 11) obliges municipalities, being water services authorities (WSAs), to ensure efficient, affordable, economic, and sustainable access to services. This duty is subject to resource availability, the

need for equitable resource allocation, consumers' obligation to pay reasonable charges, and an overall responsibility to conserve water resources.

The Water Services Act (RSA, 1997: Section 10) states that, in defining a water pricing strategy, the Minister may differentiate on an equitable basis between different categories of users, different types of water services, and different geographic areas. S/he may also place limitations on surpluses or profits generated by tariffs and ensure that tariffs are used to promote water conservation. The Minister must also consider social equity, financial sustainability and cost-recovery associated with service provision, including the cost of capital investments.

4.1.5 National Water Act (1998)

The stated goals of the National Water Act (RSA, 1998: Sections 2, 56) reiterates objectives listed in previous legislation and policy documents and the Minister's prerogatives and obligations regarding a water pricing strategy. It adds that the Minister must consider measures necessary to promote the use of lifeline tariffs and progressive block tariffs. The preamble to Section 56 National Water Act expands on the Water Services Act in stating that water charges may be used to achieve not only an *equitable* allocation of water, but an *efficient* allocation of water, as well.

4.1.6 Municipal Systems Act (2000)

Chapter 8 of the Municipal Systems Act (Republic of South Africa, 2000) concerns itself with the equitable and sustainable provision of municipal services. Part 1 of the chapter deals specifically with service tariffs, establishing the following principles:

- Tariffs should be applied equitably.
- The amount users pay should be in proportion to their use of the service.
- Basic services, at least, should be provided to poor households through lifeline tariffs.
- Tariffs must reflect all the costs associated with service delivery.

- Tariffs may be specially set for commercial and industrial users to promote LED.
- Tariffs must encourage environmental objectives.
- The extent of cross-subsidisation should be transparent.

4.1.7 ANC Municipal Election Manifesto (2000)

A key part of the ANC platform for the 2000 municipal elections was a promise to implement a policy of providing free basic services. The party's 'Municipal Election Manifesto' (cited in Bond, *et al.*, 2002d: 189) reads: "ANC-led local government will provide all residents with a free basic amount of water, electricity and other municipal services, so as to help the poor. Those who use more than the basic amounts will pay for the extra they use".

4.1.8 DWAF Free Basic Water Documents (2001)

The ANC-led government followed through with its promise for the 2000 municipal elections by issuing the Free Basic Water: Implementation Strategy Document (DWAF, 2001) and detailed guidelines for municipalities to implement a policy of free basic water delivery. The Strategy Document establishes the minimum free basic water allowance at 6 kl per household per month, and provides for municipal discretion to increase the allowance. The standard of 6 kl a month, according to the document, stems from the WHO standards of 25 lcd to ensure minimum health. Implementation of the free basic water allowance therefore provides 25 lcd to a household of eight persons. The document sets the date for implementing the policy at July 1, 2001.

The document states that while inter-governmental transfers such as the equitable share may cover some of the municipal costs involved in providing the free basic water allowance, most of the subsidy would need to be generated internally. To finance the free basic water provision, the document recommends that municipalities adopt one of the following:

- IBTs (for wealthier municipalities with a large ‘subsidiser’ base).
- Targeted credits, whereby poor residents receive a credit on their municipal account to cover the cost of the free basic water (for municipalities with a relatively large proportion of poor residents, and with adequate administrative capacity).
- Service level targeting, whereby the municipality provides a restricted flow of free basic water (for poor municipalities with low capacity).

The document also leaves open the option of municipalities generating cross-subsidy revenue through increased water tariffs on commercial and industrial enterprises.

4.1.9 The Revised Municipal Infrastructure Investment Framework (MIIF) (2001)

Since 1995, the Municipal Infrastructure Investment Framework (MIIF) has been the government’s dominant paradigm in its attempt to end service delivery backlogs. While the MIIF has gone through several reincarnations, its basic tenets remain the same. MIIF’s main methodological instrument is the Combined Services Model (CSM), designed to help municipal managers model various service delivery scenarios involving various service levels. In this way, they can assess the implications of a particular service level for funding requirements and tariffs. MIIF’s definition of service levels for water and sanitation are shown in Table 6.

Table 6: MIIF water and sanitation service levels

	Basic services	Intermediate services	Full services – low income	Full services – high income
Water	Communal standpipes	Yard taps	In-house	In-house
Sanitation	Ventilated improved pit latrines (VIPs)	Waterborne	Waterborne	Waterborne

Source: Tomlinson & Gildenhuys, 2001: 6

The philosophy underlying appropriate service delivery levels is summed up as follows:

The objective of government policy is to provide households with at least a basic service level, but then aim to deliver higher service levels, depending on what municipalities and households can afford. In effect, households should have at least a basic services level and should pay according to their ability. (Tomlinson & Gildenhuys, 2001: 31)

Bond *et al.* (2002d: 203-205) engage in a vociferous critique of MIIF as spearheading a ‘neo-liberal’ policy agenda and for perpetuating segregation through “class based services”. They decry the fact that by 2006, according to MIIF projections, 30 percent of urban residents and 70 percent of rural residents will still be subject to the most basic service levels. They take issue with MIIF’s basic levels for water and sanitation, in particular communal standpipes and VIPs, which they regard as permanent development policy in informal settlements, rather than emergency measures. They claim that it would be extremely costly to upgrade these settlements’ infrastructure to a full service level, and that in this way MIIF policy will create “new, post-apartheid racial ghettos”. Contrary to many other policy experts, they view VIPs (such dry sanitation systems are necessary for households without water connections) as a health hazard. VIPs, they claim:

- Do not allow for proper drainage of water used for bathing, washing, and cooking.
- Are costly to construct properly.
- Are costly for poor households to suck (clean).
- Are hazardous to health since e.coli and other bacteria can penetrate into the water table, which is a higher risk in areas like Johannesburg with porous dolomitic rock.

The most recent MIIF (Tomlinson & Gildenhuys, 2001) calls for a revision of assumptions underlying housing infrastructure policy, particularly regarding the use of households (in the western sense of a nuclear family) as the basic social unit. The two main reasons for this are the widespread incidence of extended families within

one dwelling, often in backyard dwellings, and the devastation wrought on family structures by HIV/AIDS. Basing provision of services like water on ‘the household’ does not take into account extended families and others sharing the same stand, with the result that basic services are insufficient. Furthermore, the revised MIIF calls for increasing service levels from ‘basic’ to ‘intermediate’ to cater for the additional requirements of HIV/AIDS sufferers. For example, increased availability of clean water helps prevent opportunistic infections and water-borne diseases to which HIV/AIDS sufferers are often extremely susceptible.

4.1.10 National Water Resource Strategy (2002)

The National Water Resource Strategy (NWRS) (DWAF, 2002a: 12-16) outlines the water situation in South Africa as follows. South Africa’s water resources are, in global terms, scarce and extremely limited. At the same time, relatively high rates of urbanisation and industrialisation have led to significant demand for water, resulting in dams and other mechanisms for collecting, abstracting, and diverting water. This has in some instances compromised the quality of river water and aquatic life. The imperative of water resource development has overshadowed that of conservative and efficient use. The NWRS offers a vision of balancing between the needs of a strong economy, high social standards, and healthy aquatic ecosystems.

The NWRS explains a water use charge to achieve equitable and efficient allocation of water as an “economic charge” relating to “the value of water to particular users”. Furthermore, the NWRS introduces the concept of *economic* efficiency of water use, whereas the two water acts use the concept of efficient use to refer to *use without wastage*. “The ultimate intention of the pricing strategy,” according to the NWRS, “is to ensure that the real financial costs of managing water resources and supplying water, including the cost of capital, are recovered from users” (DWAF, 2002a: 71).

4.1.11 Draft White Paper on Water Services (2002)

The Draft White Paper on Water Services (DWAF: 2002b) is the government's most recent policy statement on water services. The document:

- States self-critically that the 2001 cholera outbreak was a wake-up call, and that government has not done enough to provide water and sanitation services.⁸
- Highlights the strong link between adequate water and sanitation and the ability to surmount poverty.
- Urges that water services should maximise their potential to support LED through job creation, use of local resources, and skills development on the supply side, and, on the demand side, providing water to support economic activities.
- Mandates that, to facilitate planning for water service delivery, every municipality must develop a Water Services Development Plan and integrate it with its IDP.

While maintaining that water assets should continue to be publicly owned, the Draft White Paper (DWAF, 2002b:11) states that water services “must be run in accordance with sound business principles within a sound subsidy framework”. As part of these principles, the document continues, water tariffs, aside from the free lifeline tariff, “should be based on full historic costs and reflect marginal costs”.

Furthermore, the document mandates that:

- Tariffs should be linked to level of service provided and, as far as possible, residents should be able to choose the level of service they require and can afford.
- Metering is necessary for cost recovery and demand management purposes (the document also makes provision for pre-paid meters and controlled flow connections) (DWAF, 2002b: 46).

⁸ The Draft White Paper also establishes delivery targets (see Section 4.3).

Effective credit control is also essential, according to the Draft White Paper. It charges WSAs with the right to disconnect and/or restrict domestic users while protecting the rights of poor households to receive the free basic water allowance.

4.2 Summary of legislation and policy

Table 7 provides a summary of the legislation and policy relating to water tariffs reviewed in Section 4.1.

Table 7: Summary of water-tariff related South African legislation and policy

Year: Legislation/Policy	Main objectives	Tariff policy
1994: RDP	• Clean water and sanitation for all • Short-term: 20-30 lcd within 200 m • Medium-term: 50-60 lcd on-site	• Lifeline tariff • Urban cross-subsidies through progressive IBTs • Urban-rural cross-subsidies
1994: Water Supply and Sanitation Policy White Paper	• Universal access to essential basic water supply (25 lcd within 200 m) at a cost which is affordable both to the household and to the country as a whole • Redressing historically inequitable allocation and supply of water	• The user pays • Water services should be self-financing • Poor users charged operating costs • Other users charged full cost of supply • Three-step IBT (lifeline, normal, and marginal)
1996: Constitution	• Universal access to <i>sufficient</i> water is a constitutional right	• Service delivery is a municipal competency • Grants municipalities powers to impose surcharges on fees for services provided
1997: Water Services Act	• A framework for norms and standards for water services • Equitable access • Operational efficiency and economic viability	The Minister may: • Impose differential charges • Cap tariffs • Use tariffs to promote water conservation The Minister must consider:

		• Social equity • Financial sustainability • Cost recovery, including capital investments
1998: National Water Act	• Restatement of previous legislation and policy	Adds to Water Services Act by obligating Minister to consider: • Use of lifeline tariffs • Progressive block tariffs Water charges may be used to achieve not only an <i>equitable</i> allocation of water, but an <i>efficient</i> allocation of water.
2000: Municipal Systems Act	• Equitable and sustainable provision of municipal services	• Tariffs should be applied equitably • The amount users pay should be in proportion to their use of the service • Provision of at least basic services to poor households through lifeline tariffs • Tariffs must reflect all the costs associated with service delivery • Tariffs may be specially set for commercial and industrial users to promote LED • Tariffs must encourage environmental objectives • The extent of cross-subsidisation should be transparent.
2000: ANC Municipal Election Manifesto	• Free basic services	• Free lifeline tariff • Those consuming above the lifeline tariff will pay
2001: Free basic water	• Starting July 1, 2001, to provide every household with a minimum of 6 kl per month of free basic water	• Generate through internal cross-subsidies most of the revenue to cover the costs of free basic water provision • In large, wealthy metros use rising block tariffs
2001: Revised MIIF (and preceding MIIF documents)	• End service delivery backlogs	• Service levels should be in line with what residents (and municipalities) can

		afford <i>Revised MIIF</i> • Service levels should cater for the special needs of extended families (and those living, for example, in backyard dwellings) and HIV/AIDS sufferers
2002: National Water Resource Strategy	• Conservative and efficient use of water • Balance strong economy with high social standards and a healthy aquatic system	Tariff should achieve • Economic efficiency • Full cost recovery
2002: Draft White Paper on Water Services	• Accelerate delivery of basic water and sanitation services, which are strongly linked to poverty alleviation and LED	• Based on sound business principles within a sound subsidy framework • Aside from the free lifeline tariff, tariffs should be based on full historic costs and should reflect marginal costs • Tariffs should be linked to service levels

Section 4.2 has revealed that South African legislation and policy incorporate many of the criteria for water tariff structures highlighted in Chapter 2 and Chapter 3. As discussed in the next section, some of these criteria are consistent with South Africa's social, political, and economic context, such as an emphasis on IBT structures and lifeline tariffs. Others, though, appear to be incongruous with the South African context, especially the uncritical calls to implement principles of economic efficiency and marginal cost pricing.

4.3 The Political Economy of Water in Johannesburg and South Africa

South Africa is considered one of the most socio-economically unequal countries in the world.⁹ The country's economy can be characterised by what Mhone (1997: 29) calls a 'settler dominated economy' in which "enclave economies evolved on the basis of institutionalising the exploitation and marginalisation of the majority of the labour force as a source of cheap labour". While politically South Africa enjoys democratic, majority rule, socio-economically the country is mired in its apartheid legacy: a capitalist or formal sector existing in "a sea of under-employment", the non-formal sector (Mhone: 1997: 9).

The provision of basic services—water, sanitation, electricity, solid waste removal, and stormwater drainage—mirrors this dual economy. The formal sector generally enjoys services on par with the highest standards of the most economically developed countries in the world. Many in the non-formal sector, however, are either without direct access to services or use the most rudimentary of service options. In urban informal settlements, people commonly fetch water from communal standpipes, while for sanitation they resort to poorly built and therefore unhygienic pit latrines.

Following the democratic transition, the government immediately stated its commitment to deliver universally a readily accessible, clean and affordable water supply as part of realising a more equal society. To cite the 1994 Water Supply and Sanitation Policy White Paper:

The fundamental issue to be addressed in the water sector is that of equity. The line which divides those with adequate access to those without is the same line dividing

⁹ Measured by the Gini coefficient, in 2001 South Africa was the second most unequal country in the world, after Brazil (Streek, 2001).

the rich from the poor, the hungry from the well fed, the line of race and privilege.
(DWAF: 1994)

Despite efforts by the government to deliver services, there are still millions without sufficient water and sanitation services. The 2002 Draft White Paper on Water Services estimates that, in 1994, there were approximately 12 million South Africans without adequate water services and 20 million without adequate sanitation services. The document states that the government has since provided 10 million people with access to basic water services, but that there are still 7 million (15 percent) without adequate access. It also estimates that 18 million people (38 percent) remain without access to adequate sanitation (DWAF: 2002b: 1).

The Draft White Paper further sets targets for delivery of water and sanitation and related services, as follows (DWAF, 2002b: 9):

- To serve an additional 7 million people with basic water services by 2008 and an additional 18 million people with basic sanitation services by 2010.
- To help prevent further outbreaks of water-borne diseases such as cholera, to deliver hygiene education in all schools by 2005 and similar education directly to households.
- To apply the free basic water policy to all people with access to basic water services by 2004.

Even if DWAF meets these targets, it is questionable whether water services at the basic level are sufficient to prevent water-borne disease. In South Africa, according to Bond (1999) diarrheal disease is responsible for almost 25 percent of deaths amongst black and coloured children between 1 and 4 years of age. Bond also cites research showing a high correlation between decreased child morbidity and on-site piped water and sanitation, and an even higher correlation when water is piped into the house. He points out that for South Africans to accrue these health externalities,

basic standards of water and sanitation would need to be raised beyond the standards established by MIIF.

Water supply, therefore, is a public management issue of the highest concern in South Africa. And water supply in urban areas will surely not fade from the public agenda in the foreseeable future. The government's economic development policy, simplistically represented, is one of redistribution through economic growth, that is, to expand the formal sector in the hope of absorbing the non-formal sector. While the formal economy has not grown sufficiently to create the jobs necessary to steadily absorb non-formal sector workers (indeed, layoffs have outstripped new jobs), continued commercial and industrial growth and rural-urban migration will likely maintain high water demand in urban areas.

The government's economic development model has not gone without criticism. Of particular relevance are critiques made by Patrick Bond, whose analysis represents both an alternative vision of economic development and an alternate model of resource use and delivery. Bond writes from the perspective of what he terms 'brown politics', a combination of social justice (red) and environmental awareness (green), and against urban commodification (see Section 4.3.8).

4.3.1 Water tariffs in South Africa

In the current South African political-economic context dominated by capitalism, with 80 percent of income in the water sector derived from the sale of water (DWAF, 2002b: 37), tariffs are a key instrument in providing and extending water services.

Historically in South Africa, water services not only recovered costs but also generated surpluses, allowing local governments to subsidise non-trading, or general, services. This was, however, in the context of apartheid, when government policy was to deliver services—or not—on the basis of race. In the new dispensation, with

the need to finance water infrastructure extension in an attempt to provide universal coverage, and to cross-subsidise basic services, water surpluses have been largely phased out. Furthermore, while municipalities in South Africa often set tariffs on water and electricity to cover a portion of capital costs, they frequently do not budget for depreciation of assets. This practice may lead to a shortfall of funds as assets wear out and need to be replaced (Whelan, 2002: 20, 39).

4.3.2 A culture of non-payment or unaffordable tariffs?

South African municipalities have a high rate of debt due to outstanding accounts. Local authorities in Gauteng province are responsible for half of the country's R24 billion municipal debt. Debt on water bills comprises the highest category of municipal debt at 26 percent of the total. The high rate of debt has provoked a debate about whether this state of affairs is due to a 'culture of non-payment' prevalent among South Africans, or is a result of other factors such as many people's inability to pay. Local Government Minister Sidney Mufumadi, citing a report on municipal debt, addressed this question. He dismissed the 'culture of non-payment' argument, and said that many people simply cannot afford to pay. The report found that many others were not paying because of improper billing systems and insufficient customer-care centres (Tabane, 2002).

McDonald (2002), following an analysis of results from a Human Sciences Research Council survey of 2,530 South Africans on the affordability of municipal services, found that "aggressive cost recovery on municipal services is imposing enormous hardships on low-income families". The survey found that while low-income families are subject to municipal bills representing up to a quarter of household income, upper-income families' municipal bills represent a proportionately far smaller share of household income. Seventeen percent of the survey's respondents said that they can only pay for services if they cut back on other essential goods like food and clothing, while 18 percent said that they cannot afford to pay for municipal

services “no matter how hard they try”. The survey showed a high correlation between unaffordability and race, with the vast majority of the respondents indicating extreme hardship regarding payment being ‘Africans’ and ‘coloureds’. McDonald concludes that ‘ability to pay’ is at the root of the payment crisis, not a ‘culture of non-payment’.

A PDG report (2002: 30) uses Table 8 a rule of thumb in determining the affordability of municipal services for various income groups in South Africa. The table highlights both the percentage of household income that would *affordably* be spent on water (2 percent) and on municipal services as a whole (5-6 percent).

Table 8: PDG Guideline for pricing municipal services according to income

Income	800	1,500	2,500	3,500
<i>Water</i>	<i>16</i>	<i>35</i>	<i>50</i>	<i>60</i>
Sanitation	6	14	20	30
Electricity	16	37	60	90
Solid Waste	4	9	12	15
Total	42	95	142	195
% of income	5%	6%	6%	6%
Water as % of total income	2%	2%	2%	2%

Source: District Services Model, PDG (1999), cited in PDG (2002: 30)

The same PDG report (2002: 39) expresses particular concern over the high fixed monthly charges for sanitation tariffs that are “so widely applied as these have a negative impact on the poor”. A household may receive a very low bill for water, but a high sanitation fee would make the joint bill unaffordable.

4.3.3 Johannesburg: Water and the city’s development

Johannesburg, the nation’s economic powerhouse, epitomises South Africa’s inequality, with some of the wealthiest suburbs in Africa amidst hundreds of thousands of people who lack access to, or cannot afford, basic goods and services. Well over half of the households in Johannesburg are classified as residing in an

informal settlement or 'low-income' area (JW, 2002: 63). With an unemployment rate of 29 percent, over half of Johannesburg's households earn less than R2,500 a month, while nearly one-fifth (18.2 percent) survive on less than R500 a month. At the same time, with 13 percent of households earning over R8,000 per month and one percent earning in excess of R30,000, a minority of residents can afford the conspicuous consumption of water in their swimming pools, on their lawns and for washing their multiple cars (Allan, Gotz, & Joseph, 2000: 10).

According to Bond (2002c: 150, 155), escalating water prices in Johannesburg starting in the mid-1990s were quickly followed by protests. As early as July 1996, thousands of Soweto residents marched to the Johannesburg city council to protest a 30 percent increase in their water tariffs. In 1998, Alexandra residents initiated calls for a lifeline tariff, "a basic water service available to even the very poor". The residents decried the high water tariffs that led them to forego other necessities, and a "dramatic increase in residential water cutoffs in Gauteng since early 1997". These protests have coalesced into social and political movements mobilising Johannesburg residents around the right to free and affordable water and other municipal services. In 2002, a militant protest over municipal services at the home of the Johannesburg Mayor led to arrests and bullets from the police ('Protestors lay siege to Jo'burg Mayor's Home', 2002).

At the same time, the City of Johannesburg (CoJ), facing an overwhelming municipal debt problem, stepped up its credit control measures, including water and electricity cutoffs. In FY 2001/02, CoJ paid R19 million to ten contractors hired to execute cutoffs and reconnections, disconnecting a total of 124,046 customers from their water and electricity accounts (Ndlangisa, 2002). CoJ official Maxwell Nkosi, in charge of cutoffs, said that CoJ's credit control drive had paid off, with the City recording a collection rate of 95 percent in October 2002, compared with an average

of 87 percent for the previous six years ('Building a world class revenue collection service', 2002).¹⁰

The drive to minimise debt is part of a growing trend towards cost recovery and fiscal discipline taking place at both national and local levels. Belt-tightening in Johannesburg started in 1997, when the Greater Johannesburg Metropolitan Council, responding to a fiscal crisis, radically restructured itself into the Johannesburg Metro.¹¹ The restructuring involved separating the water services authority from the water services provider, hitherto under the same municipal umbrella. As discussed in Section 4.3.7, Johannesburg Water (JW), an arm's length utility for water and sanitation services, was established in early 2001. CoJ became the sole shareholder of JW and the regulator of the utility's operations through the monitoring of a Service Delivery Agreement (SDA). JW, however, became responsible for its own business sheet, prompting some concern that operating along business lines would cause the utility to neglect poorer, less profitable residents.

4.3.4 The City of Johannesburg's development plans

CoJ has delineated its short-to-medium-term plans in its Integrated Development Plan (IDP) (CoJ, 2002c) and its long-term strategy in its 30-year planning document known as 'Joburg 2030' (CoJ, 2002e). CoJ's overriding long-term strategic outcome is to build a "better city". Consistent with national macro-economic policy, the City's planners see the main conduit towards this vision as being economic growth through "harnessing economies of urbanisation" and "increasing the factor of productivity of key inputs such as labour, transport, commercial space, services and

¹⁰ According to CoJ, its revenue collection rate declined in FY 2001/02. The rate in FY 2001/02 was 84.6 percent, down from 86.9 percent in FY 2000/01. CoJ attributes non-payment to the following factors: systemic weaknesses in processing meter information; lack of management and administrative skills within the revenue function; and customers' ability and willingness to pay (CoJ, 2002 IDP: 85).

¹¹ The extent of the fiscal crisis, and hence the need for a radically altered fiscal approach, is subject to debate. For contrasting perspectives on the matter, see Beall, J. Crankshaw, O., & Parnell, P. (2002); Bond, *et al.* (2002d: 215-216); Allan, *et al.*, 2000; and GJMC, 2000.

supply chains”. At the same time, CoJ plans to prioritise “social support and poverty management programmes” (CoJ, 2002c: 16).

The IDP, however, insouciantly dismisses concern over service delivery in the city. According to the document, CoJ does not view service delivery as being in crisis, with “only” 16 percent of Johannesburg’s residents receiving services below minimum standards. The IDP continues: “Service delivery in the city is far from a crisis and room exists for the council to concentrate on economic growth and job creation” (CoJ, 2002c: 20). This attitude seems to belie the reality on the ground, at least concerning water and sanitation services. As pointed out already, even basic service levels seem to be inadequate; “below minimum standards” clearly pose a major health risk for 16 percent (over half a million people). Demographically, the IDP claims that Johannesburg does not have a pressing population growth problem, since fertility rates have declined, migrant in-flow has stabilised, and HIV/AIDS has had negative growth effects. The document projects a one percent population growth rate over the next 10 years.

4.3.5 Johannesburg’s ‘special cases’ policy

One of CoJ’s ‘social support and poverty management programmes’ is its ‘special cases policy’ (CoJ, 2002b). This policy locates itself within a context of the ‘urbanisation of poverty’ and the increasing social devastation wrought by the HIV/AIDS pandemic. At the same time, the policy recognises the urgent need for a safety net for special cases in light of the Council’s increasingly stringent credit control measures.

CoJ’s policy for residents who qualify as ‘special cases’ is to provide a social package that includes free basic refuse removal and sanitation and a rebate on assessment rates for properties valued at less than R20,001. CoJ also includes the universal allotment of free basic water (6 kl) and electricity (50 kw hours) as part of

its special cases policy. CoJ estimates that 250,000 residents will benefit from the package which will cost the City approximately R335 million (CoJ, 2002d).

CoJ admits that implementation of its special cases policy has hitherto been “tedious and cumbersome...and only accountholders could apply for the subsidy” (CoJ, 2002b: 4). Indeed, Patrick Bond (2002c: 157) writes that:

The city’s strategy, until July 2001, was to provide only a small grant – R 30 per month for water and a bit more for other services – to ‘indigent’ households whose poverty status could be confirmed through stigma-inducing ‘means-testing’. Instead of finding several hundred thousand qualified households, the city signed up only a meagre 24,000 recipients.

CoJ’s slowness in rolling out a safety net is particularly glaring in light of the fact that the City’s definition of ‘special cases’ includes pensioners and disabled and unemployed residents with incomes of less than R1,100, and HIV/AIDS breadwinners and/or their orphans. As Bond implies, there are certainly hundreds of thousands of Johannesburg residents who meet these criteria.

4.3.6 Water services within the context of CoJ’s budget

Revenue from user charges—R5 billion—generates half of CoJ’s total operating income. Revenue generated via JW’s tariffs accounts for approximately two-fifths of this income (CoJ, 2002 IDP: 68, 70). CoJ, like all local authorities, receives a national government grant, known as an equitable share, intended to subsidise operating revenue for provision of basic services to poor households. However, PDG (2002: 15) concluded that it was impossible to determine the extent to which CoJ (and other municipalities within Rand Water’s supply area) devoted these funds to water and sanitation provision. Similarly, 3P Consulting’s Richard Payne (December 23, 2002, personal interview) said that the equitable share enters CoJ’s general revenue fund, from where it is used to offset the City’s considerable bad debt.

On the capital side, JW's capital budget of R187 million represents 15 percent of CoJ's overall capital budget (CoJ, 2002c: 78). CoJ projects that its overall capital budget will decrease by 64 percent by 2004/05. Over the same period, it will make huge cuts in its utilities' capital budgets, including 49 percent to JW's capital budget (CoJ, 2002c: 78).

4.3.7 Formation of Johannesburg Water

Before 1994, Johannesburg consisted of eleven local authorities divided along racial lines. Following the political transition in 1994, the eleven councils merged into five separate councils with five independent administrations. They were divided into four geographical entities with one overarching metropolitan council. The municipality's 1997 cash-flow crisis precipitated an internal review which, in turn, led to the iGoli 2002 plan to restructure the City administration (Seedat, 2001: 27-31). Following the December 2000 municipal elections, the ANC-led councils initiated implementation of iGoli by unifying the five councils into the single Unicity of Johannesburg.

One of iGoli 2002's most far-reaching changes was the creation of Municipal Business Enterprises (MBEs) consisting of utilities, agencies, and corporatised entities (UACs). An MBE:

- Is a company under the ownership and control of a municipality.
- Is assigned financial and operational authority to carry out a business activity.
- Provides goods or services in accordance with ordinary business principles.

Distinctive characteristics of utilities, compared to agencies and corporatised entities, are that utilities attract user charges, possess their own balance sheets, and are able to access their own funding (GJMC, 2000: 8).

Out of the three types of MBEs, the creation of utilities has generated the most debate, perhaps due to the fact that the delivery of basic services is at stake. The three utilities are:

1. City Power Johannesburg – the electricity utility.
2. PikitUp – the solid waste utility.
3. Johannesburg Water (Pty) Ltd – the water and sanitation utility company.

Johannesburg Water (JW), established in January 2001, is run by a board of directors appointed by the Council, and is required to enter into extensive licensing agreements containing terms, conditions, and obligations. Utilities are regulated by the Council, creating a separation between the regulatory and operational functions. Regulatory functions are performed by both the unicity council and administration as follows:

- The council establishes a policy framework for service delivery, service standards, tariffs and the utility's business plans.
- The administration, through the Contract Management Unit (CMU), monitors performance standards, customer care, environmental management, and operational efficiencies. It advises the Council concerning applications for tariff adjustments, and business and financial plans. It can impose penalties for lack of performance (GJMC, 2000: 11).

Regulation is a function of the utmost importance as it both sets the terms of a contract and helps ensure that the utility will meet these terms.

4.3.8 Supply chain of water to Johannesburg

JW buys bulk, purified water from Rand Water which, in turn, purchases raw water from DWAF. The immediate source of the raw water is the Vaal Dam (built in 1938), 100 km south of the city. Water transfer schemes have been built to augment the Vaal Dam. Prominent among these being the Tugela-Vaal Water Transfer Scheme (operational since 1974) and the Lesotho Highlands Water Project (LHWP) (operational since 1998). LHWP has become the largest supplier of water to the Vaal Dam and to Johannesburg, but it has been wrought with controversy. Bond (2002c: 138-141) details how South Africa's apartheid regime forged plans for the gigantic

dam in the mid-1980s to consolidate control of Lesotho, and how its construction has been riddled with corruption scandals.

Water from these various sources is responsible for helping to build and continuing to feed South Africa's economic powerhouse, as described on DWAF's web site:

The area supplied by the Vaal River System generates more than 50% of South Africa's gross geographical product (GDP), more than 80% of the country's electricity and includes some of the largest gold, platinum and coal mines in the world. (DWAF, n.d.)

Bond (2002b: 11) is particularly critical of the policy of continuing to harness massive quantities of natural resources in order to fuel unbridled economic growth in Johannesburg, "the planet's largest metropolis with no substantial water source". He warns against the resulting social and environmental destruction, especially as a consequence of LHWP and plans for the dam's extension¹². He also calls attention to other externalities of Johannesburg's industrial growth: skewed urban-rural resource distribution, uneven regional development as a result of the city's draining competing economies, and heavy pollution¹³ (Bond, 2002a).

In retrospect, it is unclear whether Johannesburg and its environs have sufficient need for the massive quantities of water generated by LHWP. Water supply executives interviewed for this report questioned whether there is sufficient demand for the first phase of LHWP, let alone its second phase (Anthony Still, December 17; Phiroshaw Camay, January 10, 2003, personal interviews). As explained later in this

¹² According to Bond (2002c: 143), "The Katse Dam directly displaced 2,000 people – approximately 300 households – but indirectly affected at least 20,000 more who lost the use of common resources or income through the submersion of 925 hectares of arable and 3,000 ha of grazing land. Ancestral burial grounds were also flooded".

¹³ According to a newspaper report ('Joburg water a health hazard', 2002), Johannesburg's dams and streams pose a health hazard, particularly to children and homeless people.

report, the construction of Phase 1 of LHWP was responsible for a sharp rise in water prices in Johannesburg.

4.4 A summary of the research context

Having sketched the political economy of water supply and tariffs in South Africa in general, and Johannesburg in particular, we can contextualise our discussion of tariff-related policy and legislation, as shown in Table 9.

Table 9: Contextualisation of South African water tariff policy and legislation

Situation/context	Tariff-related policy and legislation	Advisory
• Capitalism • Formal sector-centred, economic growth-driven strategy • Huge cuts to CoJ's capital budget	• Self-financing of water service providers • Tariffs are necessary for cost recovery • Effective credit control	• A high level of unaffordability and inability to pay for municipal services • Danger of neglecting poorer, less profitable residents • Increased grassroots mobilisation for affordable services • Cost-recovery often does not include cost of asset depreciation/replacement
• Highly unequal access to water services • Urbanisation of poverty • HIV/AIDS • Practically no social safety net	• Universal access to sufficient water • Service levels should be in line with what people can afford, but special provision should be made for extended families and vulnerable groups • Redressing historical inequity • A free lifeline supply of 6 kl per household per month • Cross-subsidies through	• It is questionable whether basic water and sanitation service levels are sufficient to maintain high levels of health and raise living standards • Very high incidence of municipal service delivery backlogs strains local authorities financially

	- progressive IBTs - Differential charging	
Adoption of neo-classical economic models	- Economic efficiency - Tariffs should reflect marginal cost	Policy out of synch with South African reality
- Water scarcity - Environmental damage and high costs due to LHWP	Conservative and efficient use of water	Risk of building LHWP Phase 2
Decentralisation and restructuring	Regulation of utilities	Regulation necessary to enforce standards

4.5 Toolkit C: A model for Johannesburg's water tariffs



Now that we have established our research context, we will proceed to design our final toolkit, a model for assessing Johannesburg's water tariff structure. The model will be based on our reviews of water tariffs in theory and in practice and on our just concluded discussion of the context of water tariffs in Johannesburg. By establishing and prioritising assessment criteria for the water tariff structure that we may reasonably hope to find in Johannesburg, the model will be our central tool in the subsequent chapters' examination and appraisal of Johannesburg's water tariff structure.

Let us briefly review the main water tariff-related criteria pertinent to Johannesburg before building Toolkit C.

4.5.1 Equity and cost recovery

In designing a water tariff structure for Johannesburg, two considerations clearly top the agenda: equity and cost recovery. The ability of the water authority to balance these two often competing objectives would likely determine the success of the tariff structure.

Johannesburg's high level of socio-economic inequality, its many residents with sub-standard water and sanitation services, and promises of service delivery by the ANC-led municipality lead us to designate equity considerations as a high priority. We would expect that the tariff structure, in an attempt to achieve equity, would employ either or both IBT and differential charging due to these mechanisms' redistributive capacities. Providing direct subsidies through means-testing would be a less likely option given its high costs. In line with national policy, we would expect that the IBT would include a lifeline tariff for free basic water.

South Africa's current economic paradigm, together with JW's status as an arms' length utility, make it imperative that the tariff structure be designed to allow for full cost recovery. However, this must be not be done at the expense of the tariff structure's progressive objectives, especially the intention to avoid increasing the financial burden of vulnerable sectors of society.

4.5.2 Economic efficiency and marginal cost pricing

Neo-classical economic theory prioritises marginal cost pricing in the design of a tariff structure as a means of achieving economic efficiency. Marginal cost pricing, strictly applied, runs the risk of giving a tariff structure a regressive slant by favouring wealthier consumers over poorer ones. South African policy and legislative exhortations that tariffs should reflect marginal costs in order to encourage economic efficiency appear to be culled directly from neo-classical economic textbooks and are included in official documents in the most uncritical manner. For example, the Draft White Paper on Water Services does not engage in an analysis of marginal cost pricing, does not differentiate between SRMC and LRMC, and gives no indication of when marginal cost pricing should be applied and when not. Given the lack of distributive tendencies inherent in marginal cost pricing, the assumption that this pricing model can be applied in an indiscriminating manner does not seem to be consistent with a developmental approach. Our findings match

those of Eberhard (1999c: iii) who, in his discussion on the principles and goals of urban water pricing and South Africa, employs the following two points of departure:

(1) that marginal cost pricing cannot and should not be used as an absolute pricing rule for both theoretical and practical reasons...and (2) that equity concerns are of paramount importance within the water sector in South Africa.

We can safely consign marginal cost pricing to low-priority status in the design of our model tariff structure.

4.5.3 Affordability

The criteria of affordability is closely linked to that of equity and therefore of high priority. Using the PDG guidelines cited in Section 4.3.2, we would expect that a water tariff would consume no more than 2 percent of a low-income household's income. To properly determine affordability, it is important to place the water bill in the context of a household's overall municipal bill.

4.5.4 Health and LED externalities

We would expect policy makers to factor health and LED externalities into the tariff structure. The tariffs should be designed to guarantee all residents a minimum consumption of 75 lcd, a quantity necessary to sustain basic living standards (see Section 3.6.1). Since consuming less than this amount poses risks to health and aggravates poverty, this criterion is of high priority.

4.5.5 Water conservation externalities

With the severe scarcity of water in the Johannesburg region and the high costs and environmental damage associated with large-dam building, we would expect the

tariff structure to prioritise water conservation through an adequate IBT structure together with metering.

4.5.6 Ease of implementation

We would expect the tariff structure to be administratively easy and affordable to implement and straightforward enough to explain to residents.

4.5.7 Political acceptability

Given the increasing grassroots mobilisation around municipal service provision in Johannesburg, it would be foolish of CoJ to ignore the criterion of political acceptability. However, policy makers should not let political pressure from any sphere interfere with the establishment and implementation of a sound tariff structure.

4.5.8 Industrial and commercial tariffs

While tariffs on industrial and commercial consumers should not be set so high that they deter investment, they should be set high enough to generate adequate cross-subsidies and encourage water conservation by large users.

4.5.9 Related criteria

Directly related to our criteria for a reasonable water tariff in Johannesburg are the following considerations:

- *Service levels:* The developmental credentials of the MIIF (2001) standards, which strongly link service levels to affordability, appear suspect. As Bond *et al.* point out (see Section 4.1.9), taken to its logical conclusion, this would create superior service levels for the wealthy and basic or even sub-standard levels for the poor. Justifying water provision via communal standpipes through the argument that there is no charge for consumption is not a developmentally sustainable approach. A more suitable approach would be to mandate service

levels sufficient to maintain adequately high living standards and to ensure that these levels are affordable for low-income groups.

- *Standards:* Being the wealthiest municipality in South Africa, we could expect CoJ to try and exceed national standards of service delivery.
- *Credit control:* Credit control policies that allow disconnection of water supply appear to be in contradiction with the constitution, which guarantees universal access to a sufficient supply of water. In order to carry out ‘effective credit control’, mechanisms need be in place that guarantee a supply to groups at high risk of defaulting on their payment.
- *Regulation:* Regulation is necessary to ensure that the utility meets its mandates regarding operations, expansion of coverage, and raising service delivery levels.

4.5.10 Model criteria for Johannesburg’s water tariffs

Combining these criteria produces a concise model toolkit (see Table 10), consisting of prioritised assessment criteria, which we will keep in mind during our investigation of Johannesburg’s water tariffs in the next chapter.



*High
priority*



*Medium
priority*



*Low
priority*

Table 10: Toolkit C - Model assessment criteria for Johannesburg’s water tariff structure

Criterion	Important considerations for tariff structure
Equity	• Top priority due to the need to provide access to water and to help achieve greater socio-economic equality • Cross-subsidisation through IBT and differential charging most appropriate • Nationally mandated lifeline tariff providing free basic water
Cost recovery	• Imperative due to economic the paradigm and JW’s status as an arms’ length utility • Must avoid adding financial burden to vulnerable sectors

Marginal cost pricing	• Runs risk of making tariff structure regressive • Best applied selectively
Affordability	• Water should account for no more than 2 percent of household income, and the rest of the municipal account should be affordable
Externalities - Health & LED	• Ensure consumption of a minimum of 75 lcd to accrue externalities
Externalities – Water conservation	• Should encourage water conservation • IBT and metering
Ease of implementation	• Administratively easy and affordable to implement and straightforward enough to explain to residents.
Political acceptability	• Need to consider grassroots pressure • Political pressure should not deter formulation of sound tariff structure
Industrial & commercial tariffs	• Should not deter investment • Should generate adequate cross-subsidies and encourage conservation
Related criteria	• <i>Standards and service levels:</i> Johannesburg has enough wealth to exceed national standards. Should mandate service levels sufficient to maintain adequately high living standards • <i>Credit control:</i> Disconnection of water supply is unconstitutional • <i>Regulation:</i> Necessary to ensure that the utility meets objectives

CHAPTER 5: JOHANNESBURG'S WATER TARIFF STRUCTURE

This chapter involves an in-depth examination of Johannesburg's water tariff structure and directly related issues. It draws extensively on interviews with executives from both Johannesburg Water (JW) and the City of Johannesburg (CoJ), and documents from those same institutions. The chapter highlights information of relevance to the model criteria listed in the previous chapter's Toolkit C.

5.1 Profile of Johannesburg Water

The formation of JW in 2001 involved the integration of 2,500 staff and the amalgamation of 12 different operating departments and support clusters from the former Greater Johannesburg Metropolitan Council's (GJMC) structures. The utility reticulates water to Johannesburg residents through a network of over 9,500 km of pipes and over 100 reservoirs and water towers, and collects and treats Johannesburg's wastewater through a 9,000 km network of sewers and seven treatment plants. Its supply area stretches from Orange Farm in the south, Midrand in the north, Roodepoort in the west, and Alexandra in the east. JW purchases bulk water from Rand Water, which in turn purchases water from the Department of Water Affairs and Forestry (DWAF) (JW, n.d.(a)).

According to JW's figures (2002: 63), the utility provides water to approximately 643,000 residential units (pop. 2,935,000), including:

- 280,000 middle- to high-income units (43 percent of total) (pop. 1,120,000).
- 192,000 low-income units (30 percent of total) (pop. 960,000).
- 170,000 units in informal settlements (27 percent of total) (pop. 855,000).

Middle- to high-income units and low-income units (i.e., 73 percent of all households) generally have full service levels (individual connections with water-

borne sanitation), while informal settlement units (27 percent) have basic or sub-standard service levels.

In line with its master plan, JW has recently re-formulated its service provision levels into three broad categories, as follows:

- Level 1: Communal standpipes and ventilated improved pit latrines (VIPs).
- Level 2: Individual connections to water supply and a sewer connection, but without a connection between the water supply and sanitation system.
- Level 3: Individual connections with full water-borne sanitation.

According to JW Customer Executive Jean-Marc Lotthe (November 19, 2002, personal interview), JW perceives the service levels as follows:

Level 1 is for informal settlements. Level 3 is the service we should deliver. And Level 2 is a transitional stage from Level 1 to Level 3, where there is an affordability issue.

JW currently meters, bills, and collects revenue from only Johannesburg's 'top' 14,000 customers, those consuming at least 100 kl of water per month, representing 10 percent of water services customers in the city. While these top customers are predominantly commercial and industrial businesses and institutions, the category also includes some residences, particularly owners of flats. In 2001, top customers represented 40 percent of total billing (JW, 2002: 179). The City Finance Department (Revenue) handles metering, billing, and collection for the rest of the city's residents.

JW recognises that the provision of water, being a basic human need, is a politically-driven process. According to JW Executive Director Anthony Still:

It's not only because Johannesburg is one of the world's few cities not situated on a river and the fact that South Africa is not a water-rich country. Water is an essential

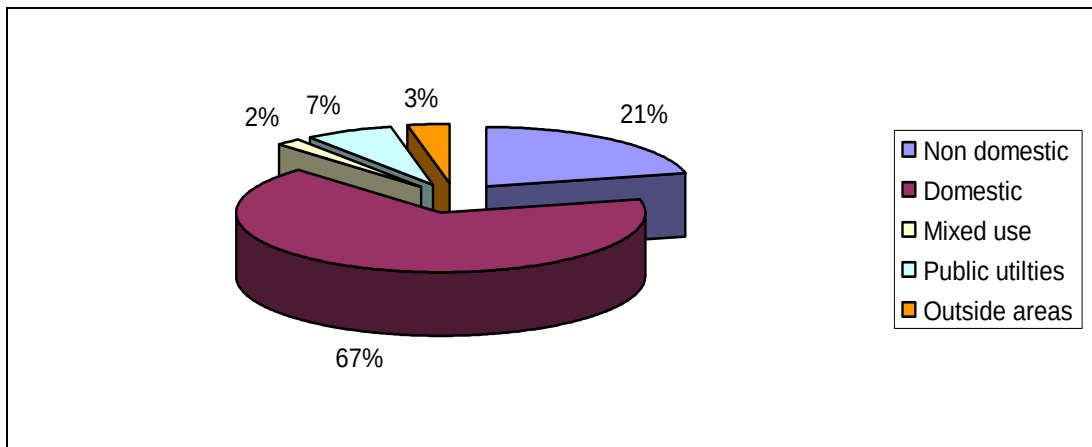
and valuable commodity and thus will always be a ‘political’ commodity affected by social and value driven issues within the community. We are faced with resolving the past inequalities in many of our poor and marginalised communities while ensuring a continuous supply of water to the growing number of people and businesses in the Johannesburg metropolitan area. (JW, n.d.(a))

As such, the utility believes it is important to strike a balance between the following competing objectives:

- Improved service quality.
- Increased access to an ever increasing level of service/free provision.
- Financial return to the “shareholder” [i.e. the City].
- Customer affordability (JW, 2002: 13).

Figure 9 shows that JW sells most of its water to domestic residents, while non-domestic users, consisting of commerce, industry, and institutions, are the next largest category of consumers.

Figure 9: Segmentation of Johannesburg Water sales, 2001-2002



Statistics source: Jean-Marc Lotthe, JW

5.2 Cost structure for water: bulk water purchases from Rand Water

CoJ, along with JW, sets the City's water tariff schedule according to various criteria that are explored in this report. There are several layers of costs that determine the amount of a Johannesburg resident's water bill.¹⁴ An initial layer is JW's cost structure.

Statistics provided by JW Customer Executive Jean-Marc Lotthe show that JW's FY 2001/02 sales of water were as follows: JW sold 226 million kl of water for R1,148 billion. The average price of JW's water sales was therefore approximately R5/kl. JW's primary cost driver is the price of bulk water it purchases from Rand Water. When combined with the budget for operating expenditure, bulk water purchases from Rand Water constitute almost 50 percent of JW's operating expenditure (JW, 2002: 178). Excluding extraordinary expenditure and capital charges, bulk water purchases constitute 80 percent of JW's total water costs (CoJ, 2002g). The bulk water bought by JW from Rand Water includes a high rate (42 percent) of unaccounted for water (UFW). The high UFW rate meant that in FY 2000/01, JW bought 392 million kl of water from Rand Water, but only sold (billed) 227 million kl (PDG, 2002: 16).

For its part, Rand Water sets the retail price of bulk water according to the price of raw water it purchases from DWAF, plus other costs incurred as part of purifying and pumping the water. In proposing and setting water tariffs, JW and CoJ are supposed to stay within the bounds of the National Treasury's inflation targets. However, according to JW CFO Heleen Kulyk (November 14, 2002, personal interview), JW has deemed keeping tariff increases within these limits financially unfeasible due to bulk water price increases by Rand Water consistently above the inflation targets.

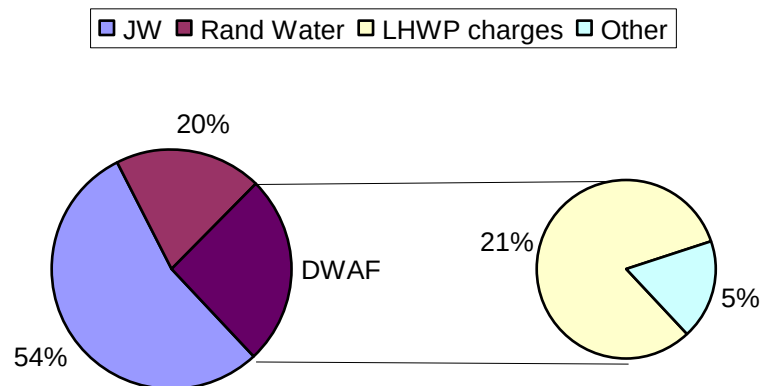
¹⁴ Included in the same municipal statement is a bill for sanitation. The main focus of this report, however, is user charges for water.

The cost of one kilolitre of water in Johannesburg can be broken down as follows:

- DWAF sells raw water to Rand Water at 129.50 cents/kl (this price includes LHWP charges of 105.6 cents/kl and other costs of 23.9 cents/kl) (Rand Water, 2002).
- Rand Water adds a 'mark-up' of 98.58 cents and sells bulk water tariff to JW at 228.09 cents/kl.
- JW adds a 'mark-up' of 223.09 cents and sells water at an average price of 500 cents/kl.

These figures are represented in percentage terms in Figure 10.

Figure 10: Contributions to the final retail price of Johannesburg's water



Two aspects of this water cost breakdown are immediately noticeable. Firstly, a large percentage of the cost of water (54 percent) is due to JW's 'mark up'. This observation, however, should be placed in perspective: JW's 'mark up' represents a 119 percent increase over and above the Rand Water retail price; Rand Water's 'mark up' represents a 76 percent increase over and above DWAF's retail price.¹⁵

¹⁵ An assessment of the degree of efficiency employed in the operations of JW and Rand Water is outside the scope of this report. However, it is noteworthy that officials at each of these utilities

Furthermore, JW's average retail price is bracketed by widely differentiated pricing, ranging from R0/kl to R7.09/kl.

Secondly, the vast majority of DWAF's costs for raw water (82 percent) are devoted to financing charges incurred by Lesotho Highlands Water Project (LHWP). CoJ (2002e: 51) describes the impact of LHWP on retail water prices in Johannesburg as follows:

Between 1996 and 2000, bulk water billings by Rand Water to Johannesburg increased from R404 million to R712 million (as a result of Rand Water's need to recover the cost of two new dams brought on stream during the period). This increase in bulk rates was passed on to consumers whose average tariffs increased 35 percent between 1995 and 1998. Should the demand for water in the area increase substantially in the future, Phase 2 of the Lesotho scheme may need to be implemented. In this case analysts predict that Rand Water bulk rates will increase from R2/1000 litres to R3/1000 litres... Lower than anticipated demand for water in Phase One of the Lesotho Highlands water project has resulted in higher costs per unit than anticipated. There is thus a fine balance regarding the optimal demand for water which will allow economies of scale with respect to Phase One of the Lesotho project, with no requirement for the establishment of Phase Two.

It would initially appear that LHWP has led to a 'Catch 22' situation regarding water supply and demand in Johannesburg and its environs: it is only by keeping water demand high that users will prevent unit costs, and by extension retail prices, from escalating. High water demand, however, runs the risk of justifying the construction of LHWP Phase 2, in which case, to quote JW Executive Director Anthony Still (December 17, 2002, personal interview) "we're dead, because the price of raw water will double". Section 5.15 further explores this demand-management quandary.

indicated that water tariffs in Johannesburg would be lower if only the other utility would be more efficient.

5.3 The Service Delivery Agreement

In February, 2001, CoJ entered into a Service Delivery Agreement (SDA, 2001) with JW. The SDA is CoJ's primary regulatory instrument regarding JW's operations. An analysis of the SDA by Seedat (2001: 113) found the agreement to be:

...short on depth and detail. The absence of substance in the agreement is qualified by the proviso that the finalisation of issues targets, standards, levels of services and so on, will occur in the future. Moreover, the agreement requires the utility to propose performance standards for approval by the council. This is a reactive approach, which undermines the policy-making prerogative of the council.

As evidenced in this chapter, JW has until now largely determined key performance areas—such as tariffs and service levels—with CoJ playing a minimal oversight role. Regarding tariffs, this could be ascribed to what Seedat (2001: 111) describes as a short supply of skills required for regulation within CoJ, specifically within the Contract Management Unit (CMU), the City body responsible for monitoring the contract with JW and all other city utilities. Only in late 2002 did the CMU fill the position of Business/Tariff Analyst with the appointment of Christine Kere (Christine Kere, December 18, 2002, personal interview). Regarding the determination of service levels for low-income areas, however, the SDA for the most part relinquishes this competency to JW, as will be noted in the next section.

5.3.1 Water tariffs in the SDA

Section 10 of the SDA (2001) and SDA Annexure 1 (2001) concern themselves with tariff determination procedures. According to the SDA, the City Council bears responsibility for determining tariffs for the supply of water services by JW, and for reviewing and reconsidering the tariffs every three years. The first review date was scheduled for July 1, 2002. The SDA stipulates that, outside of the review years, tariff increases be based largely on the rate of increase in bulk water costs linked to

the proportion of bulk water costs that constitute JW's budget (80 percent), together with the rate of inflation linked to the rest of JW's operating costs (20 percent) (SDA Annexure 1, 2001: 5).

The SDA states that tariffs coming into force on July 1, 2002, and every subsequent review year, will be determined by the Strategic Business Plan prepared by JW in agreement with the City. The SDA has stipulated a central criterion for the business plan and for the setting of tariffs, namely "to render [JW] financially sufficiently strong to achieve and maintain investment grade status to facilitate the fulfilment of its functions in the interests of the citizens [of Johannesburg]" (SDA, 2001, 19).

Tariff-related information required of the business plan includes:

- Recommendations for tariff progression.
- Proposals for changes in tariff structure A threshold analysis (supply/demand balance).
- Forecasts of revenue collection efficiency, and an assessment of willingness and ability to pay amongst existing and proposed customers.
- Forecasts of Council subsidy requirements.
- A fifteen-year capital investment programme including a detailed three-year capital investment programme.
- Forecasts of cash flow, profit and loss, and balance sheet over a fifteen-year period (SDA Annexure 1, 2001: 6-7).

The SDA also obliges JW to comply, with effect from July 1, 2001, with the national government policy relating to the provision of 6 kl of water per household per month, free of charge. The SDA 'entitles' JW to provide water to informal settlements, and leaves the matter of service levels to the utility's discretion *unless* the Council requests such supply. In the event that the Council requests water services be supplied to informal settlements and other individuals and communities

that are unable to pay the tariff rate, the Council will subsidise the cost of provision (SDA, 2001: 21).

The SDA further obliges JW to raise capital loans, but licenses the Council to assist in raising capital insofar as JW is unable to do so. The Council undertakes to apply for national and provincial funding to finance development and extension of water services. Finally, the SDA entitles JW to collect revenue generated from its supply of water services, and to enforce payment of debts.

Another of the utility's obligations is to pay the City an annual dividend of R100 million (JW, 2002: 181). JW's balance sheet refers to this dividend as a 'shareholder's loan', the terminology due to financial management peculiarities of CoJ's restructuring. In forming its utilities, agencies, and corporatised entities (UACs), CoJ re-allocated conduit loans. So any loans earmarked for water and sanitation services were moved onto the books of the newly created JW. However, this exercise left a liability of approximately R1 billion remaining on CoJ's books, so it allocated these loans to UACs, as well, in proportion to the size of the conduit loans. These last loans are referred to as 'shareholder's loans'. When JW pays its 'dividend' to CoJ, therefore, it is actually paying off loans pre-dating the formation of the water and sanitation utility (Richard Payne, December 23, 2002, personal interview).

5.4 Who determines water tariffs in Johannesburg?

Every year around March the mayoral committee takes a decision regarding the water tariff schedule, which is promulgated by July 1. JW, like other UACs, begins its business planning cycle before the end of the previous calendar year. According to CoJ mandates, its business plan for FY 2003/04 will need to be projected over the

medium term, including proposed tariff increases (Richard Payne, December 23, 2002, personal interview).

In JW, the decision-making body that establishes the water tariff proposal to be forwarded to Council consists of the Executive Director, the CFO, and the Customer Revenue Department executive. Also, the JW Board of Directors must approve the proposal before forwarding it to CoJ (Heleen Kulyk, November 14, 2002, personal interview). CoJ's Contract Management Unit (CMU) then reviews JW's proposed tariff with authority for its final approval residing with the mayoral portfolio committee. The mayoral committee takes note of whether the tariff structure is aligned with mayoral priorities. Furthermore, the mayoral committee is greatly concerned that tariff increases do not exceed governmental Consumer Price Index (CPI) caps (Christine Kere, December 18, 2002, personal interview).

Figure 11 represents JW executives' perception of how the tariff structure both overdetermines and is overdetermined by other primary considerations for the utility and the City. These considerations are as follows: the cash return to the shareholder, that is the annual dividend that JW is obligated to pay the City (currently R 100m); the quality of services provided to the customer; and the access and levels of service provided to customers. A further factor directly related to customer tariffs is economic growth.

Figure 11: Johannesburg Water's 'balancing act'

5.5 Cost recovery at Johannesburg Water

Both JW Executive Director Anthony Still (December 17, 2002, personal interview) and JW Customer Executive Jean-Marc Lotthe (November 19, 2002, personal interview) cite full cost recovery—including capital costs and the cost of depreciation of assets—as the primary objective of the tariff structure. Lotthe said that such an approach is necessary to ensure the utility’s sustainability. According to Still, “[JW has] to be financially sustainable. There’s no one else giving us money”. Also, CMU Business/Tariff Analyst Christine Kere (December 18, 2002, personal interview) said that JW, since corporatisation, is no longer simply a socially-driven entity, but also a business-oriented one, so CoJ recognises that cost recovery is a primary objective of the tariff structure.

Its income statement (Table 11) gives the impression that, by the end of the medium term, JW will be fully self-financing.

Table 11: Johannesburg Water’s income statement (all figures in R million)

	Original Budget 2001/02	Draft Estimate 2002/3	Projection 2003/4	Projection 2004/5
Revenue	1,947	2,166	2,395	2,594
Water sales	1,218	1,354	1,502	1,634
Sanitation sales	723	795	872	938
Sundry income	6	17	21	22
Cost of Sales	844	974	1,067	1,168
Bulk water purchases	844	974	1,067	1,168
Gross margin	1,103	1,192	1,328	1,426
Operating overheads	936	986	1,053	1,126
Salaries	258	283	312	356
Fleet	57	61	67	74
Contractors	120	93	87	71
Electricity	30	32	33	35
Chemicals	25	26	28	29
Maintenance	12	12	12	13
Other	150	171	183	195

Bad debt provision	156	172	190	206
Depreciation	128	136	141	147
Profit before interest	167	206	275	300
Long-term loan interest	179	177	188	197
Shareholder loan interest	65	60	57	53
Profit/(loss)	(77)	(31)	30	50
Retained income at beginning of year	40	(37)	(68)	(38)
Retained income at end of year	(37)	(68)	(38)	12

Source: JW, 2002: 178

However, according to JW Customer Executive Jean-Marc Lotthe (November 19, 2002, personal interview), the income statement is misleading because the cost projections do not take into consideration the full cost of maintaining and replacing assets. Indeed, according to Lotthe, JW is unable to factor these costs into its budget projections because the utility currently lacks sufficient information on the status of its assets. This means that JW is unable to accurately project financing costs for the capital loans that will be required to cover maintenance and replacement costs.

Joburg 2030 (CoJ, 2002e: 52) confirms Lotthe's anxiety over the likelihood that JW is not devoting sufficient funds to asset maintenance. Regarding capital expenditure on maintenance and refurbishment of assets, the document states:

Internationally the benchmark for water asset maintenance should be 1.7% of the asset base. In 1999, the Council budgeted less than 10% of this figure, withholding maintenance expenditure in favour of an expansion of services. Although maintenance expenditure increased by 4.3% in 2000, this was insufficient to deal with the backlog of maintenance and refurbishment required to keep the City's systems operating efficiently.

JW has a 15-year capital budget master plan, including the capital requirements of extending water coverage to under-serviced and unserved areas, the replacement of network, and extension of capacity. The final decision for JW's capital budget rests with CoJ, which secures capital funding via external loans¹⁶. JW's medium-term capital budget is as follows:

Table 12: Johannesburg Water's medium-term capital budget

2002/03 R 000	2003/04 R 000	2004/05 R 000
187,500	91,000	95,000

Source: (CoJ, 2002c: 78)

According to these figures, JW's capital budget will decrease 49 percent by the end of the medium term.¹⁷ This is because, according to JW Customer Executive Jean-Marc Lotthe (November 19, 2002), the capital budget is based on “not what needs to be done, but on what they are able to fund”. In 2002, CoJ cut JW's approved capital budget months after approving it, forcing the utility to further limit the scope of its capital projects¹⁸. According to Lotthe, this capital budget process is far from ideal:

It should not be like that. We should look at what has to be done. We should look at how we can finance it, and incorporate the costs of this financing into the tariffs—which we are not doing now.

In addition to uncertainty over its capital budget, JW lacks models to help it accurately determine tariff levels in order to successfully recover costs. For example, the utility currently possesses no model to determine the costs of each new low-

¹⁶ JW's FY 2001/02 capital budget included a two-year National Treasury restructuring grant of R130 million and R26 million worth of provincial CMIP funding (Heleen Kulyk, November 14, 2002, personal interview).

¹⁷ At the same time, the City's overall capital budget will decrease by 64 percent (CoJ, 2002c: 78).

¹⁸ In 2002, CoJ made significant cuts in the capital budgets of all City utilities due to a revenue shortfall resulting from lower than expected collection (Christine Kere, December 18, 2002, personal interview).

income, or ‘subsidised’, consumer, and therefore what should be the corresponding cross-subsidisation requirements¹⁹ (Paul Viljoen, December 13, 2002, personal interview). Also, JW does not possess information regarding price elasticity of demand for water, so that the utility must make ‘calculated guesses’ regarding the likely impact on consumption, and therefore revenue, of the tariff increases (Heleen Kulyk, November 14, 2002, personal interview). For these reasons, JW’s water tariff may be sufficient for short-term self-financing, but it may not lead to long-term sustainability.

5.6 Determining the IBT and differential charging structures

JW uses the following rather simple method, according to Customer Executive Jean-Marc Lotthe (November 19, 2002, personal interview), to determine its pricing structure. The utility first arrives at its average cost for water by dividing the total of its capital and operating costs by the number of kilolitres of water it sells. The result is JW’s cost price per kilolitre, which in 2002 stood at approximately R5/kl. With this average cost of water in mind, the utility can then determine the prices for the various residential tariff consumption blocks, and for commercial, industrial, and institutional consumption categories.

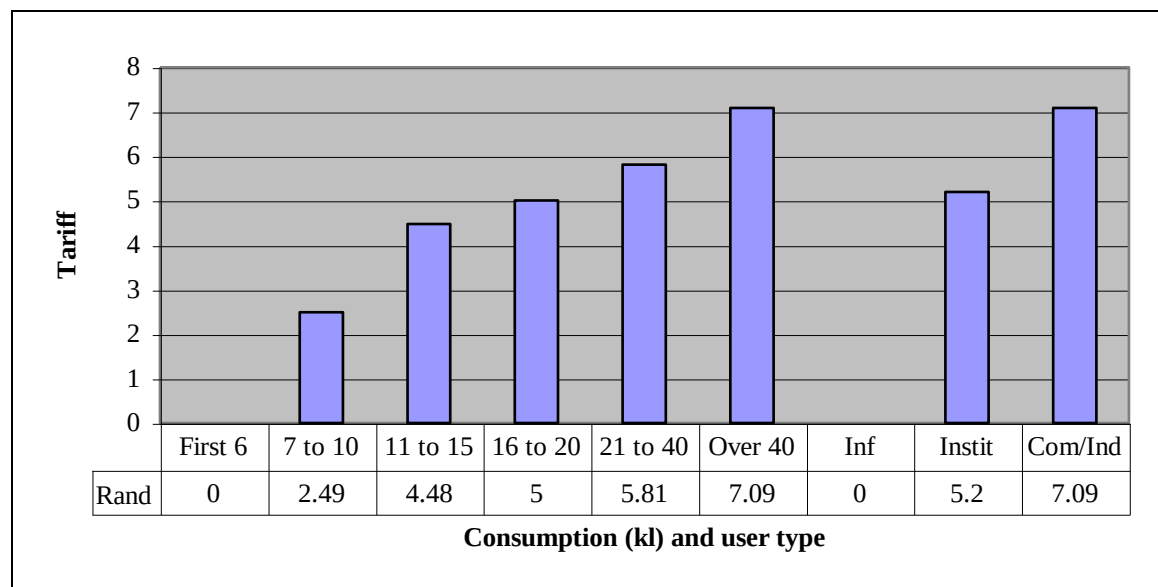
Since its establishment in 2001, JW has not sought to alter the pre-existing IBT and differential charging structures. The utility has proposed that CoJ institute tariff increases that approximate increases to JW’s costs (Jean-Marc Lotthe, November 19, 2002, personal interview). The one major change to the tariff structure resulted from the City’s implementation of the national policy of providing 6 kl/month per household free of charge.

¹⁹ JW is currently working on a tariff model (see Section 5.20.8).

Lotthe (November 19, 2002, personal interview) explained that JW’s philosophy, which is reflected in the IBT and differential charges, is to “penalise big consumers and subsidise low consumers”. The ‘subsidisers’ are industrial and commercial consumers and large-consuming residences, while the ‘subsidised’ are lower-consuming residential households. The subsidisation ‘threshold’ band roughly approximates the average cost of water; that is, the 16 to 20 kl band at which water is priced at R5/kl. Prices for the three tariff bands below this price (first 6 kl; 7 to 10 kl; and 10 to 15 kl) are subsidised. The two tariff bands above this price (21 to 40 kl and above 40 kl), together with the commercial and industrial fixed prices (R7.09/kl) subsidise the low-consumption bands. Institutions—including schools, hospitals, and clinics—are charged roughly at cost (at R5.20/kl).

Perusal of a CoJ municipal bill, however, indicates that the IBT structure, its tariff bands, and cross-subsidies, would not be transparent to an average resident. The bill lists an amount owed for water services, but does not explain to the account holder how the amount is derived.

Figure 12: Johannesburg’s water tariff structure, FY 2002/03



Data source: CoJ, 2002a

Figure 12 shows CoJ's water tariff structure as approved and promulgated by the CoJ Council on July 1, 2002.

5.7 Johannesburg's water tariffs, 1996-2001

PDG's report 'Rand Water: Tariff Database Survey 3' (2002: 20-21) provides the following table and charts of Johannesburg's water tariffs between FY 1996/97 to FY 2001/02.²⁰ The report usefully translates prices into 2001 prices in order to express all tariffs in real terms. Overall, the report finds, "[Johannesburg] has had a very low increase over time of around 1 percent in the tariff especially for the first 6 kl" (PDG, 2002: 20). Even residents consuming 20 kl would have been charged less in real terms in 2001 than in 1997, as can be seen in Table 13.²¹

Table 13: Average trends in the water bills and block tariffs for the Johannesburg Metro, 1995-2001

	Average Bills (Constant 2001 prices)						
Block Definition	1995	1996	1997	1998	1999	2000	2001
6 kl	N/A	14.40	14.76	13.23	13.78	13.97	0.00
20 kl	N/A	49.33	56.18	55.37	57.83	59.50	52.90
35 kl	N/A	102.57	125.20	122.47	128.09	127.65	133.30
50 kl	N/A	163.89	204.83	200.24	209.96	208.02	225.50
	Average Block Tariffs (Constant 2001 prices)						
6 kl	N/A	1.96	2.19	2.21	2.30	2.33	0.00
20 kl	N/A	2.50	2.96	3.01	3.15	3.25	3.78
35 kl	N/A	3.55	4.60	4.47	4.68	4.54	5.36
50 kl	N/A	4.09	5.31	5.18	5.46	5.36	6.15

Source: Rand Water: Tariff Database Survey 3' (2002: 20)

²⁰ In the PDG report, the tariff calendar year generally refers to the fiscal year starting the previous year: for example, 2002 tariffs generally refer to FY2001-2. The PDG's dates have been altered in this research report for the sake of consistency. For example, 2001 tariffs refer to FY2001-2.

²¹ See Sections 5.8.2. Also, Figure 17, a graph on average residential water bill trends in Johannesburg, shows that the only noticeable increases in real terms over time have been to those consuming in the highest tariff band (over 40 kl).

5.8 2001-2002 changes to the tariff structure

Since its inception, JW has proposed two water and sanitation tariff changes to CoJ. The first, in 2001, involved not only price increases as a result of inflation but also fundamental changes to the tariff structure in order to comply with CoJ's instructions to implement the national policy of a free basic water lifeline of 6 kl per household per month. The second proposal, in 2002, involved across-the-board price increases to the tariff structure based on inflation. CoJ approved and promulgated both of JW's proposals.

5.8.1 FY 2001/02 changes and the introduction of free basic water

After CoJ instructed JW to implement the national government policy of providing a free basic lifeline supply of 6 kl per month to every household, the utility considered four alternative tariff structures. A Jowam document entitled 'Free Water Policy Implementation: Designing a fair and affordable tariff structure' (n.d.) sketches scenarios for each of the four alternatives, which are summarised in Table 14.

Table 14: Four scenarios considered by Johannesburg Water for implementing free water policy

Tariff Scenario	Main features
1	• No charge levied for consumption of 6 kl or less • A charge of R12 levied on customers consuming more than 6 kl • No change to non-domestic tariff
2	• First 6 kl free for all domestic customers • No cross-subsidisation from non-domestic customers • No change to length of existing domestic tariff bands
3	• First 6 kl free for all domestic customers • A 5 percent increase to the non-domestic tariff to increase the cross-subsidisation to the domestic sector • No change to the length of the existing tariff bands
4	• First 6 kl free for all domestic customers • A 5 percent increase to the non-domestic tariff to increase the cross-subsidisation to the domestic sector

	• A new tariff band added between 15 and 20 kl per month
--	--

Source: Jowam, n.d.

JW compared and prioritised the scenarios described in Table 14, as shown in Table 15. Note that the first criterion of ‘Benefit to low-income customers’ has a weighting factor of ‘3’, appropriately granting it three times the importance of each of the other criteria.

Table 15: Johannesburg Water’s comparison of free water tariff scenarios

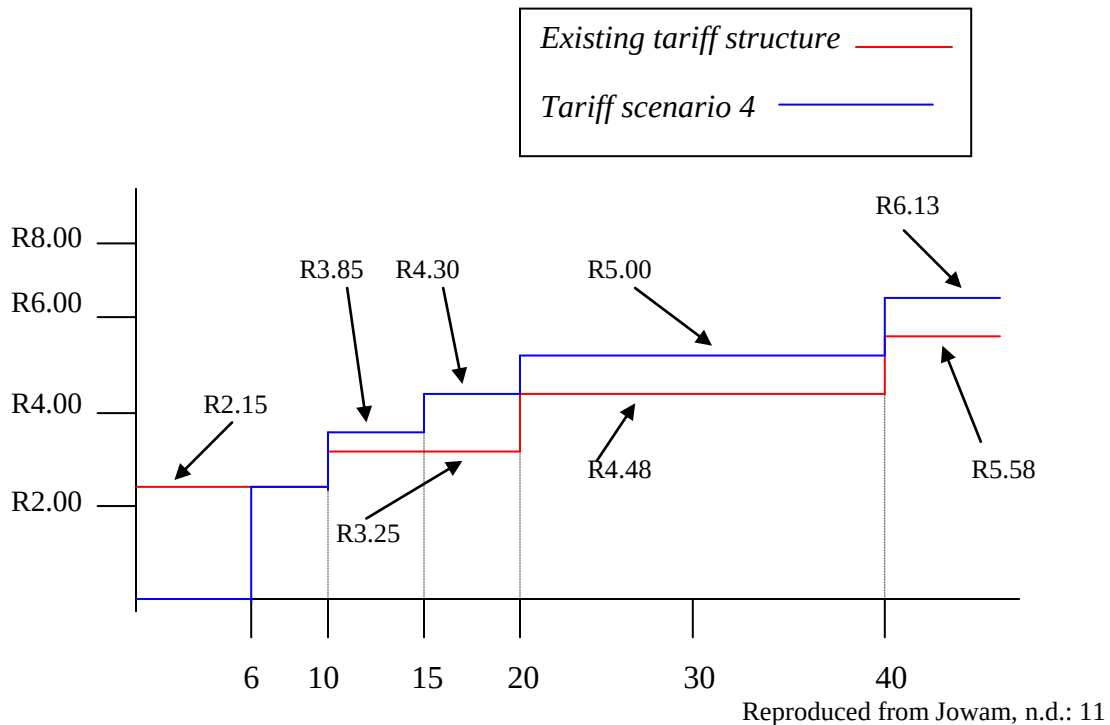
Scenario	1 Fixed Charge	2 No non-household cross-subsidy	3 Same bands & cross-subsidy	4 New band & cross-subsidy
Benefit to low-income customers (weighting factor 3)	1	2	3	4
Impact on non-domestic consumers (weighting factor 1)	4	4	2	2
Impact on high consumers (weighting factor 1)	4	1	3	2
Marketing perspective (weighting factor 1)	1	2	3	4
Total	12	13	17	20

Source: Jowam, n.d.

The most favourable scenario, according to the prioritisation exercise, was Scenario 4, which involved providing 6 free kl of water to all domestic customers, cross-subsidisation from commerce and industry to the domestic sector, and the addition of

a new tariff band between 15 and 20 kl per month. The existing tariff structure had four bands. Scenario 4 presented six bands, as seen in Figure 13.²²

Figure 13: Johannesburg Water's Free Water Tariff Scenario 4



Scenario 4 translated into JW's 2001 tariff proposal to CoJ, is represented in Table 16. The last column on the right contains the proposed prices for the various tariff bands, including increases adjusted for inflation.

²² The scenarios' proposed tariffs for the various bands did not take into account inflationary increases on the existing tariffs.

Table 16: Johannesburg water tariffs 2000-2001 highlighting percentage change to tariff bands

<i>Kilolitres</i>	2000/01 tariffs	Percentage change	2001/02 proposed tariffs (before weighted average of 7.2%)	2001/02 proposed tariffs (after weighted average of 7.2%)
0-6	R 2.15	- 100%	Free	Free
7-10		0%	R 2.15	R 2.30
11-15	R 3.25	+ 18%	R 3.85	R 4.13
16-20		+ 32.3%	R 4.30	R 4.61
21-40	R 4.48	+ 9.3%	R 5.00	R 5.36
41+	R 5.58	+ 9.3%	R 6.10	R 6.54
Institutional	R 4.48	0%	R 4.48	R 4.80
Indst/Comm	R 5.81	+ 5%	R 6.10	R 6.54

Data source: Still, 2001

A report by JW Executive Director Anthony Still (Still, 2001) motivated the FY 2001/02 JW tariff proposal to CoJ. Still's criteria for a sound tariff structure were the joint objectives of financial sustainability, economic competitiveness, and social equity, but he acknowledged that the city and the utility lacked sufficient data to determine the effect of tariffs on these objectives.

Still justified the proposed tariff structure changes through a need to recover revenue foregone by the free basic water provision. According to Still, the lifeline subsidy necessitated that R80 million per annum be recovered from higher tariff bands or commercial and industrial consumers. He recognised that precisely where to recover this revenue would be a political decision. He rejected the adoption of Durban's solution of a fixed charge for domestic in-house connection consumers who exceed the lifeline supply.²³ Still's reason for rejecting the 'Durban option' was that such a fixed charge "is counter to the principles of a rising block tariff and has the effect of

²³ See Section 3.3.2. JW considered this option in Scenario 1.

not reducing charges to low volume consumers once consumption exceeds 6 kl/month – which it does in nearly all metered consumers” (Still, 2001).

The burden of subsidy ultimately fell on high-consumption residences and also on commercial and industrial consumers. As shown in Figure 14, only households consuming over 20 kl a month saw increases in their water bills. More accurately, only after consumption of the 23rd kilolitre would the bill increase—in 2000, a water bill for 23 kl was R67.44, while in 2001 it was R67.90. As can be seen in Table 16, the highest percentage increases for any tariff band or category fell on residential consumption between 16 and 20 kl per month. Due to the free lifeline tariff, however, these households—along, of course, with households consuming under 16 kl per month—were slated to enjoy a reduction in their water bills (see Table 17 and Figure 14).

Table 17: Change in residential customers' bills, 2000-2002

	5	10	15	20	25	30	35	40	45	50	55	60
2000	10.75	21.5	37.75	54	76.4	98.8	121.2	143.6	171.5	199.4	232.1	264.8
2001	0	9.2	29.85	52.9	79.7	106.5	133.3	160.1	192.8	225.5	253.4	281.3
2002	0	9.96	32.36	57.36	86.41	115.5	144.5	173.6	209.0	244.5	279.9	315.4

Tariff bands (2001 & 2002) relative to bill amounts		
	First 6 kl	 11-15 kl
	7-10 kl	 16-20 kl
		 20-40 kl
		 >40 kl

Figure 14: Change in Johannesburg residential customers' bills, 2000-2002

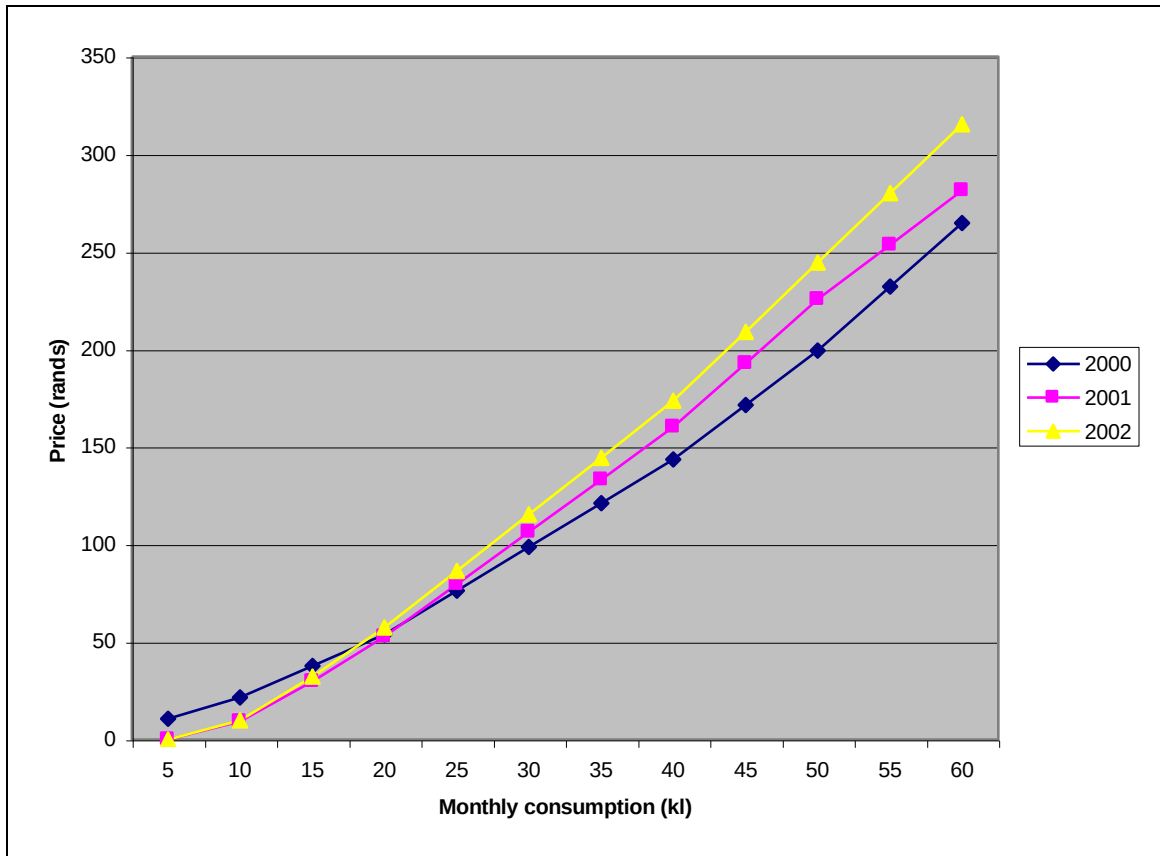
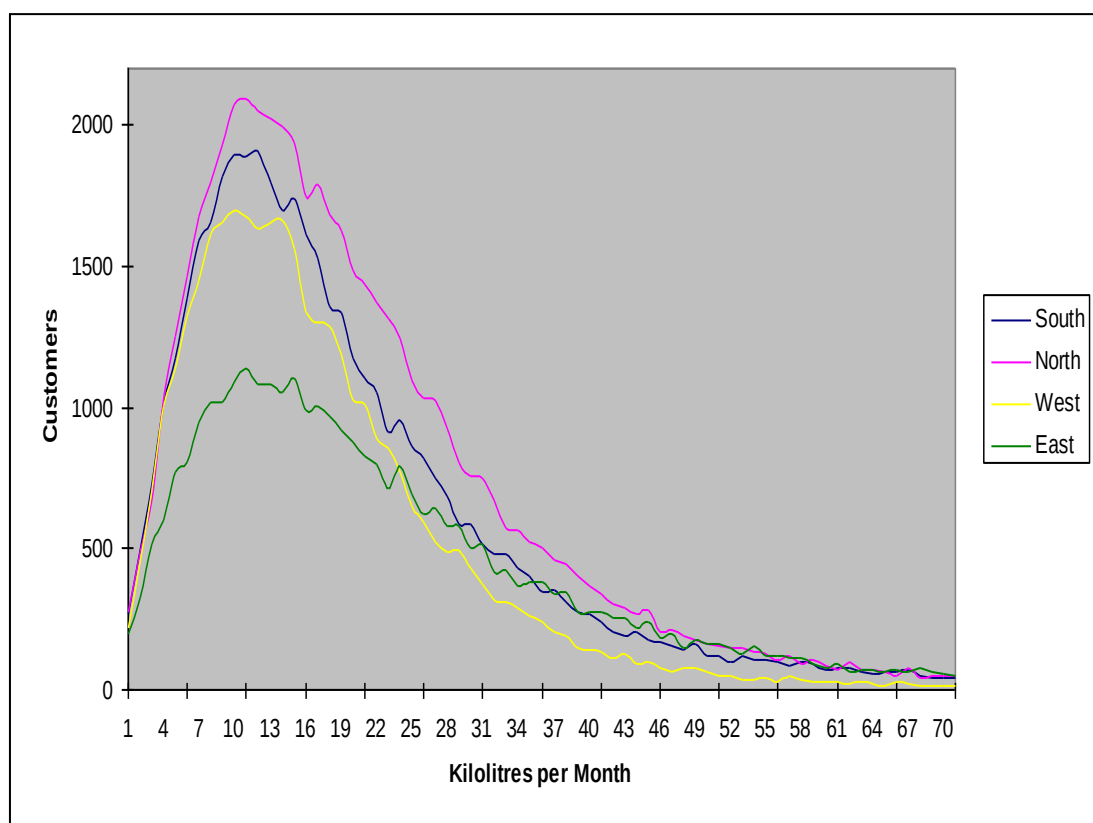


Figure 15 displays Johannesburg's residential water consumption patterns, according to the four former Metropolitan Local Councils (MLCs), prior to the introduction of the free basic water allowance. The consumption profile shows that the majority of Johannesburg residents consumed less than 23 kl month.

Figure 15: Johannesburg domestic water consumption profile, 2001



Source: Jowam, no date: 3

Expressed another way, the consumption profile informed JW of the percentage of customers consuming various amounts of water per month, as shown in Table 18.

Table 18: Johannesburg domestic consumption profile, 2001

Monthly consumption per kl	Percentage of customers consuming kl amount or less
10 kl	25%
15 kl	45%
20 kl	60%
30 kl	79%
40 kl	88%
50 kl	93%

Source: Jowam, no date

With these statistics in hand, Still was able to reassure CoJ that more than 60 percent of customers would not see an increase in their monthly water account. Only the minority of consumers, namely the generally wealthier households being metered and billed for higher volumes of water consumption, would receive higher water bills. CoJ approved these tariff hikes because “the City ultimately saw it as a way of squeezing a little bit more money out of wealthier individuals” (Richard Payne, December 23, 2002, personal interview).

Following the FY 2001/02 tariff adjustments, JW accrued a 15 percent increase in revenue from its top customers, those consuming over 100 kl per month. The utility attributed 5 percent of the revenue increase to the impact of the tariff adjustment, a further indication of the IBT structure’s progressive nature. JW attributed 10 percent of the revenue increase to better management of the top customers, over whom JW had recently gained control of metering, billing, and collection (JW, 2002: 179; Jean Marc-Lotthe, November 19, 2002, personal interview).

5.8.2 FY 2002/03 tariff increases

Despite the fact that the SDA designates July 1, 2002 as a review date for the tariff structure, JW requested that the Council approve an across the board tariff increase of 8.4 percent for FY 2002/03. Lacking accurate information on customer profiles and on the utility’s assets, JW was not ready to propose a new structure that would have long-term implications for the utility and its customers (Jean-Marc Lotthe, November 19, 2002, personal interview).

The extent of the FY 2002/03 tariff hike was largely based on a corresponding increase in the price of bulk water purchased from Rand Water, and a decision by JW to pass this increase through to consumers (JW, 2002: 180). In the previous year Rand Water’s bulk water prices had increased by 9 percent (Rand Water, 2002). Using the weighted cost basis mentioned in Section 5.3.1, the tariff increase was

calculated by multiplying Rand Water's 9 percent increase by the proportion of JW's costs associated with bulk water purchases (i.e. $9\% \times 80\% = 7.2\%$). This figure was then combined with the product of multiplying the rate of inflation by the proportion of JW's operating costs not associated with bulk water costs (i.e. $6\% \times 20\% = 1.2\%$). The sum of this exercise produced the tariff increase percentage rate for 2002/03: $7.2\% + 1.2\% = 8.4\%$ (CoJ, 2002g).

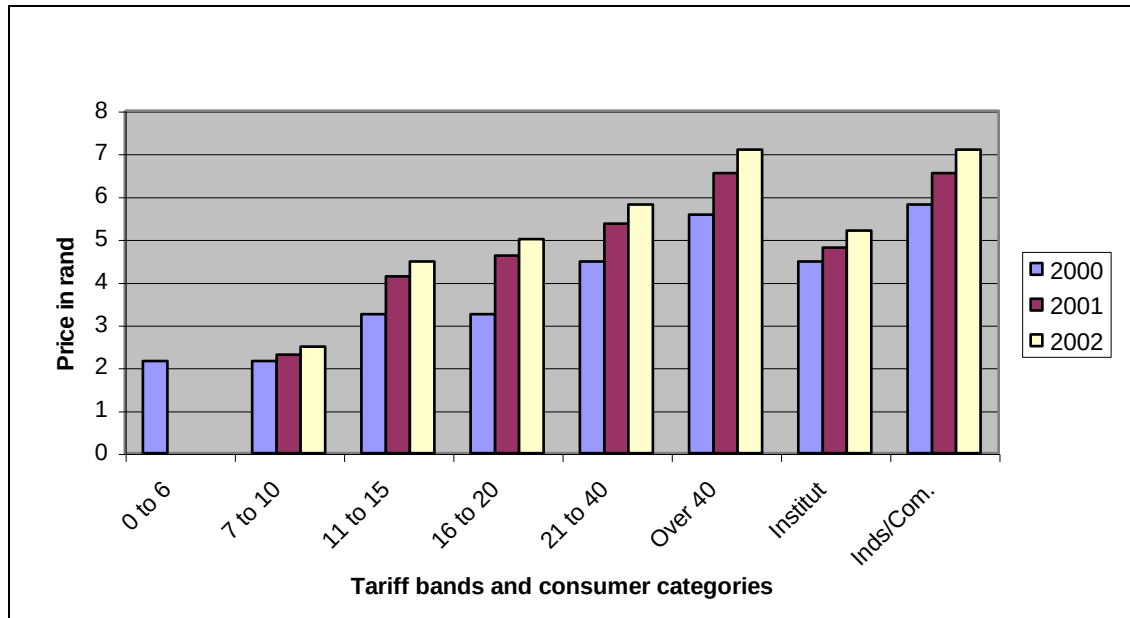
Out of all the City's services, water tariffs increased by the highest percentage rate in FY 2002/03, as seen in the following comparison:

- Water – 8.4%
- Sanitation – 8.0%
- Minor tariffs – 6.9%
- Property rates – 6.9%
- Refuse removal – 6.5%
- Electricity – 6.2% (City of Johannesburg, 2002).

5.8.3 Overview of IBT structure changes

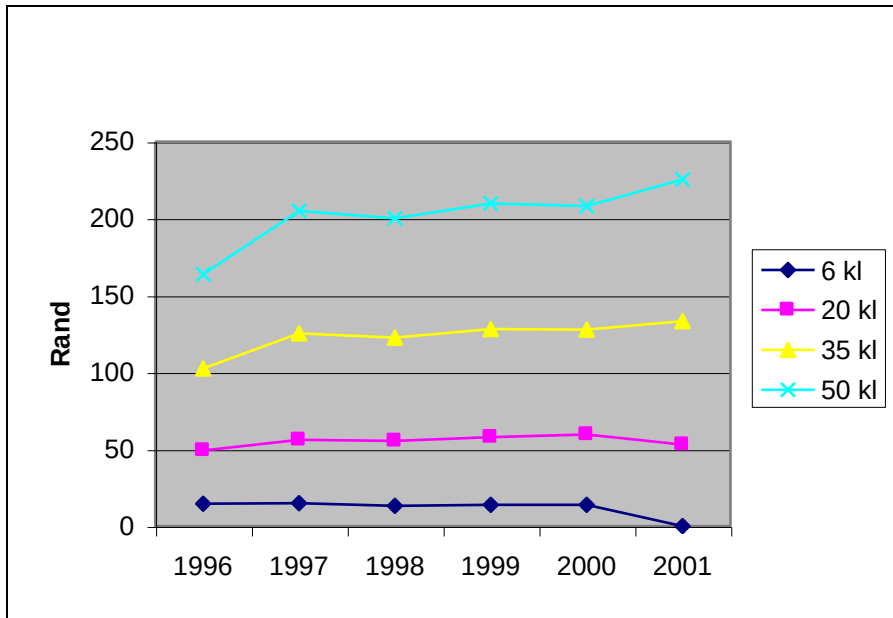
Figure 16 provides a visual summary of changes to CoJ's water tariff structure between FY 2000/01 and FY 2002/03. It shows that, since the introduction of the free basic water allotment in FY 2001/02, the price to quantity slope has become steeper and more upward sloping.

Figure 16: Johannesburg water tariff structure changes, 2000-2002



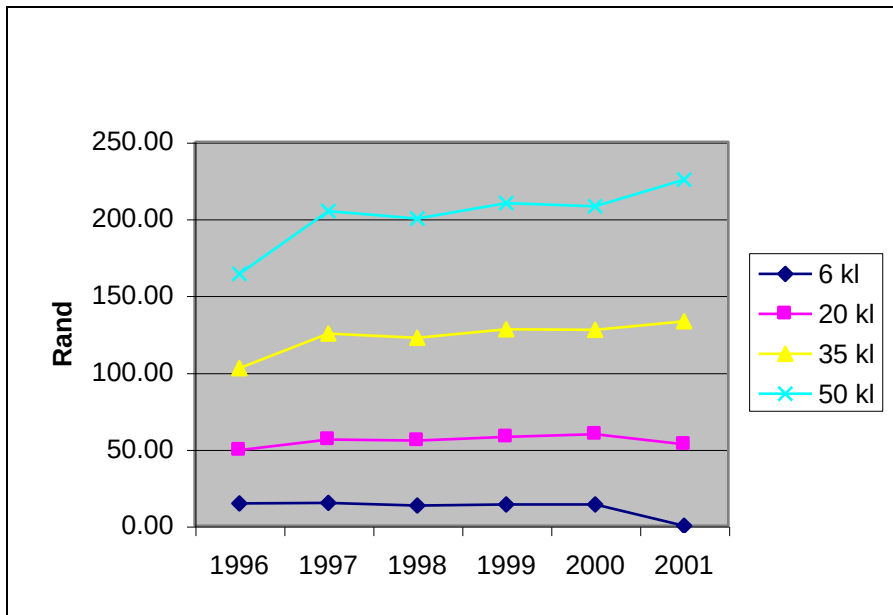
To place the changes to Johannesburg's IBT in further perspective, let us return to the PDG report (2002). Figure 17 and Figure 18, showing average Johannesburg water bill and block tariff trends between 1996 and 2001, display the same pattern: namely, the largest increases to Johannesburg's tariff structure *in real terms* have been levied on the highest tariff band. Increases to the second highest tariff band have been very modest, while increases to the '20 kl tariff band' have been negligible.

Figure 17: Average Johannesburg residential water bill trend, 1996-2001



Source: Rand Water: Tariff Database Survey 3' (2002: 20)

Figure 18: Average Johannesburg block tariff trend, 1996-2001



Source: Rand Water: Tariff Database Survey 3' (2002: 20)

Johannesburg's water tariff trends over the period under review in the PDG report were consistent with those of other municipalities within the Rand Water supply area. The PDG report also draws a comparison to municipalities of the Rand Water supply area. The report found that in municipalities that supplied their own bulk water, such as Cape Town and Nelson Mandela, tariffs and bills increased "substantially", particularly for higher-consuming residents. Between 1996 and 2001, in Cape Town and Nelson Mandela, the residential price of a monthly consumption of 40 kl of water increased by 83 percent and 61 percent, respectively; in Johannesburg it increased by 38 percent. In Nelson Mandela even the price of consuming 20 kl of water per month increased by 52 percent (PDG, 2002: 20-30).

5.9 Issues implementing the free basic water allowance

5.9.1 Backyard dwellings

The free lifeline tariff does not currently take into account backyard dwellings, that is, tenants living on a site, but not in the main house, and consuming water from the same central water connection. In some instances, this could mean that only the landlord, but none of the tenants, accrues the benefit of the free lifeline tariff. JW Customer Executive Jean-Marc Lotthe (November 19, 2002, personal interview) said that this omission is not currently of consequence because most backyard dwellings are located in deemed consumption areas. In these areas, where the water bill is based on a 'deemed' monthly consumption of 20 kl, additional consumption on a particular site would have no effect on the bill.

The reason that backyard dwellings do not receive the free basic water allowance at present is, according to Lotthe, due to administrative problems; there is no database of the number of backyard shacks per site, and the logistical requirements of regularly monitoring the changing number would be sizeable. However, because JW

intends to convert deemed consumption areas into metered zones (see Section 5.10), the utility may in some areas take account of backyard dwellings and grant them the free water allowance. Lotthe provided the example of Alexandra, in which backyard dwellings are widespread.²⁴ He said that JW is reviewing plans to provide free basic water to all households, including backyard dwellings, in Alexandra. According to Lotthe, City Power is installing meters in Alexandra, including in backyard dwellings, and will therefore have accurate data on the number of households per plot. Through coordination of information with the electricity utility, said Lotthe, JW would be able to provide backyard dwelling tenants the free basic water supply and subsidised tariff bands.

In slight contrast to Lotthe, JW Executive Director Anthony Still (December 17, 2002, personal interview) said that the utility was not currently providing the free basic water allowance to backyard dwellings due to the considerable administrative obstacles posed by the exercise, and also because of financial concerns. Still also recognised the large administrative burden of registering and verifying backyard shacks. But he emphasised that setting up separate water accounts for backyard shacks would entail providing them with free basic water and with ‘subsidised’ water from the first few tariff bands. Still cited Alexandra, with several dwellings per site, as a case in point. Taking ten households on a single site as an example, Still said:

[JW] would have to give away 60 kl free, and then ten times the next band, before you were in the next band, and the same with the next band, per erf [site]. There are limits to social equity. There are limits to cross-subsidisation.

Regarding backyard dwellings, Still also cited another type of equity consideration that would have an impact on JW’s balance sheet: the likelihood that wealthier areas would also demand equal treatment with free and subsidised water for their cottages

²⁴ According to JW (n.d. (c)), Alexandra, with an estimated population of 370,000, is home to approximately 20,000 backyard dwellings.

or ‘granny flats’ and for their domestic workers’ quarters. Still said that JW was deliberating the backyard dwelling issue and would soon reach a decision. He said that the utility was under “a lot of political pressure” to grant the free basic allowance to each household. The decision would likely hinge, according to Still, on the CoJ’s decision regarding zoning and registration of houses:

The City wants to allow people to register these extra dwellings. And if people register as an extra dwelling, then we would go along with it [and provide them with the free basic water allowance]. Then it’s in the householders’ hands to register. They may not want to register, because if they register, they may be told to pay more rates.

Finally, Still said, before reaching a decision on backyard dwellings, the utility would need to calculate more accurately the estimated costs involved.

CMU Director Prem Govender (December 18, 2002, personal interview) said that backyard dwellings are illegal from CoJ’s perspective, but recognised that they pose a pressing issue because of Johannesburg’s housing shortage. Govender was dubious that it would be financially viable to implement a policy of providing all backyard dwellings with a free basic allowance of water. In the opinion of CMU Business/Tariff Analyst Christine Kere (December 18, 2002, personal interview), policy change regarding backyard dwellings will happen through grassroots pressure. Kere said that when a critical mass of landlords and tenants understand that every household is entitled to a free basic supply of water under national policy, they will organise and lobby through local government structures. She speculated that City officials may offer a compromise consisting of free basic services for every household in exchange for a limit on the number of backyard dwellings per site.

5.9.2 Flats

Applying the IBT structure to each flat in Johannesburg presents a different type of administrative problem. JW handles the billing, metering, and collection for residential buildings with flats, because they are included in the top customers for water who consume over 100 kl/month. According to Lotthe, JW possesses the approved building plans for these buildings, so it knows precisely how many flats are in each building. The utility then applies the tariff structure to the building based on the number of flats. For example, the utility would allocate a building with 100 flats 600 kl per month of free water, and would bill the remainder of its consumption according to the IBT structure. However, since there is only one main connection per building, one bill is sent to the building, and it is incumbent upon the owner or manager to ensure that the IBT structure is applied fairly to each tenant. Lotthe said that because JW has only one contractual relationship, which is with the owner of a building, application of the IBT structure to individual tenants constitutes an internal landlord-tenant issue and therefore is beyond JW's administrative scope. He said that some tenants have lodged complaints with JW that they are not receiving the free basic allowance, and in these instances the utility has provided documented evidence of the owner's receipt of the 6 kl/month per flat. With this information, the tenants may negotiate with the owner or, if necessary, take legal action to ensure that they receive the free basic allowance.

5.9.3 The free basic water allowance: is it enough?

An often asked and debated question regarding the free basic water allowance of 6 kl per month is: "is it an adequate amount for a household?" According to JW Low Income Services Manager Paul Viljoen (December 13, 2002, personal interview), JW's working assumption is that average household size is 5 to 5.5 people per household. Viljoen said that a recent study in a low-income area found that average household size was 4, and he stated assuredly that "on average, family size in low-income areas will not exceed 5.5".

Viljoen said that JW estimates that in areas with Level 1 service, where people rely on communal standpipes for water, average consumption per household is as low as 3 kl per month. However, Viljoen conceded that the reduced accessibility of the water due to the distances between households and taps is a major factor in minimising consumption. Higher levels of service (yard standpipes and in-house taps) result in a dramatic rise in consumption. But JW does not have reliable statistics on consumption in low-income areas for these higher levels of service.

Taking the average household size to be 5.5, the free basic water allowance would allow an average consumption of 36 lcd. According to a JW public education poster entitled ‘How to use your 6000 litres of Free Essential Water’, the monthly free basic water allowance will allow a household:

a) with waterborne sewage:

- 5 (bucket) body washes per day
- 8 flushes of the toilet per day
- 2 kettles of water per day
- 1 sinkfull of dishes per day
- 1 clothes wash every second day

b) without waterborne sewage

- 3 (bucket) body washes per day
- 1 small bath per day
- 2 kettles of water per day
- 1 sinkfull of dishes per day
- 1 clothes wash every second day

Patrick Bond (2002c: 174) states emphatically that 6 kl per month is not a sufficient water supply for South Africa's most poor and vulnerable, particularly people living with HIV/AIDS who require increased access to water because of the need for much higher levels of hygiene. Bond *et al.* (2002d: 239) also maintain that the free basic water allowance is insufficient for larger, poorer households. They propose the "simple and cost-effective annual exercise" of adding a single additional municipal record for such households which would entitle them to double the amount of water and other basic services. Responding to this proposal, Viljoen said that it would be feasible, given the information technology at the City's disposal, to add an additional municipal record to large, low-income households in order to help ensure an adequate free basic supply of water. He cautioned, however, that some wealthier residents, arguing for 'universal equity', might demand similar treatment in their suburbs. This would make it a costlier exercise. Still, Viljoen said that it would be possible to make an argument for applying the 'additional municipal record' exercise to only low-income geographical areas.

JW Customer Executive Jean-Marc Lotthe (December 17, 2002, personal interview), however, cautioned that the additional-municipal-record exercise would be difficult to maintain because not only does the City lack reliable demographic statistics, but also because the number of individuals in a household is a constantly changing variable. Regarding the question of whether 6 kl is a sufficient quantity for a household, Lotthe said that in most cases it is sufficient; where it is insufficient, the heavily subsidised first tariff bands ensure that exceeding 6 kl is not prohibitively expensive (see Section 5.11).

CMU Business/Tariff Analyst Christine Kere (December 18, 2002, personal interview) said that the free basic water allowance is a good starting point towards helping ensure that all residents have an adequate supply of water. She said that CoJ must conduct further research regarding its adequacy, especially in light of the City's social responsibilities, including to such groups as persons with HIV/AIDS,

pensioners, and the unemployed. CMU Director Prem Govender (December 18, 2002, personal interview) said that because the free basic water policy stems from the national level, it is important that the national government review the adequacy of the 6 kl a month. However, he said, because local government is at the “coal-face” of service delivery, CoJ will initiate a review of the free basic water allowance.

The CoJ and JW officials acknowledged that they have so far made no provision for increased access to water by people with HIV/AIDS. Govender, however, said that CoJ had taken note of Bond’s critique on the issue, and he recognised that people suffering from HIV/AIDS do indeed require increased water usage. He said that the CMU would ensure that the issue of HIV/AIDS is taken into consideration in JW’s business planning process, and would be sure:

...to look at the issue of HIV/AIDS and how they address these issues. For example, what programs could they put in place that allow people with HIV/AIDS greater access to water.... JW must have an HIV/AIDS policy and strategy in place.

Govender cautioned that any strategy to provide extra water for HIV/AIDS sufferers would need to be financially viable and administratively workable.

5.10 Deemed consumption

JW classifies Soweto, Alexandra, Ivory Park, and Orange Farm as ‘deemed consumption’ areas. Residents in these areas have no water meters and are billed a flat rate based upon a ‘deemed’, or assumed, consumption of 20 kl per month. This amount of water currently costs the residents approximately R57 a month, with an additional charge for sanitation (See Section 5.11). JW bills around two-fifths of all Johannesburg households on a deemed consumption basis—that is, approximately 180,000 out of a total customer base of 435,000 (JW, 2002: 161).

Actual consumption in these areas, however, far exceeds deemed consumption. JW categorises this discrepancy, which is over 70 percent in three of the four deemed consumption areas, as both internal unaccounted for water (UFW) losses²⁵ and over-consumption. JW attributes this over-consumption to three factors:

1. Under-estimation of actual domestic consumption.
2. Leaks on internal plumbing installations: taps, toilets, geysers, etc.
3. Waste: for example, unattended taps left open (JW, 2002: 157).

According to JW, the deemed consumption tariff does not discourage internal leaks and waste, whereas an enforced metering and billing system would encourage stricter self-regulation²⁶. Of the deemed consumption areas, JW has prioritised action in Soweto, an area representing 30 percent of the volumes purchased from Rand Water, where ‘UFW/over-consumption’ is in the order of 75 percent (JW, 2002: 157-162).

In addition, according to Customer Executive Jean-Marc Lotthe (November 19, 2002, personal interview), payment levels in deemed consumption areas are around 20 percent. These very low payment levels combined with ‘deemed consumers’ using far more water than what they are billed for add up to a major financial problem for JW. According to Lotthe, in Soweto:

...the average consumption per stand is 80 kl per month, and we bill them for 20kl. And from this 20 kl that we bill, we only collect 20 percent. We think we should meter so people pay according to their consumption....What we would like is to have the principle of ‘you have to pay for what you consume’ accepted even if it’s not at cost. Then if the financial situation improves slightly, we can [make slight adjustments to the tariff]. (Jean-Marc Lotthe, November 19, 2002, personal interview)

²⁵ JW’s UFW rate is 42 percent, while the international benchmark norm is 14 percent. JW lists other types of UFW losses, including physical losses (overflow on reservoirs and pipe bursts and leaks) and commercial losses (over-registration of bulk metering, under-registration of customers’ metering, illegal connections, and billing errors) (JW, 2002: 157) (CoJ, 2002e: 52).

²⁶ UFW in metered areas is 20-25 percent, which JW considers acceptable (JW, 2002: 162).

Richard Payne of 3P Consulting summed up JW's quandary by noting that the deemed consumption areas represent approximately "one-third of water use, but only one-hundredth of the revenue stream". Lotthe emphasised that the utility does not intend to squeeze money out of the poor in order to make a profit. He said that the issue in low-income areas is more one of water conservation to reduce wastage and losses, especially considering the fact that low-income areas represent a relatively small proportion of total billing to water customers. And Lotthe returned to the issue of Soweto to stress his point:

Billing in low-income areas is only 10 percent of our overall billing. If we collect 100 percent in high and middle income areas, and nothing in low income areas, we still collect 90 percent of revenue billed. We don't expect by metering the low-income areas to make more money. The issue is to encourage them to pay, because with deemed consumption they have no incentive to save. With metering you pay according to your consumption; if it's less than six [kl/month], it's free; if it's up to 14, it's still very low....Again, low income is 10 percent of revenue billed. Soweto is a big part of that, say 9 percent of revenue billed. But Soweto consumes one-third of the water we purchase from Rand Water. So the issue is not to charge them more, but rather to make them conserve more water. And they will conserve only if they pay. If they don't pay, then they don't have any incentive to conserve. (Jean-Marc Lotthe, November 19, 2002, personal interview)

Lotthe said that JW will propose to CoJ that, when metering is introduced to deemed consumption areas, these areas should be subject to a special, lower tariff. With the special tariff, households in these areas would incur a water bill of R35 for the consumption of 20 kl of water; without the special tariff, the bill would be double at R70. Lotthe said that another reason for proposing the specially subsidised tariff would be to ease residents into a practice of paying while reducing the likelihood of a political backlash were the full current tariff to be imposed.

JW CFO Heleen Kulyk (February 3, 2003, personal interview) added that JW could devote to its capital budget the money the utility could save from bringing consumption in line with billing in deemed consumption areas.

5.11 Low-income affordability

To assist in assessing the affordability of water for low-income households, the PDG guidelines from Section 4.3.2 are reproduced again in Table 19, highlighting the desirable billing levels for water and sanitation only.

Table 19: PDG guidelines for water and sanitation affordability

Income	800	1,500	2,500	3,500
<i>Water</i>	16	35	50	60
Sanitation	6	14	20	30
Water and sanitation as % of total income²⁷	2.75%	3.3%	2.8%	2.6%

Source: District Services Model, PDG (1999), cited in PDG (2002: 30)

The water and sanitation bill for a resident with a full level of service in one of the deemed consumption areas like Soweto is currently R89.90: R52.90 for water and R37 for sanitation (Wanda, 2002: 4). Comparing this figure with Table 19, we can see that this bill is extremely high for a household classified as ‘low-income’, and would be better suited to a middle-income household earning R3,500 a month. This would indicate a high level of unaffordability for low-income residents. When combined with other municipal bills, particularly electricity, the unaffordability

²⁷ The original PDG document calculates “water as % of total income”. This has been adjusted to include sanitation as well. In the opinion of this researcher, the model needs adjustment to rectify the fact that it suggests a lower proportion of income devoted to water and sanitation for South Africans earning R3500 than for those earning R1500.

factor for low-income households would likely increase²⁸. And due to CoJ's credit control policy (see Section 5.14), non-payment of one service would ultimately result in the disconnection of all municipal services.²⁹

Responding to charges of unaffordability, JW Customer Executive Jean-Marc Lotthe (November 19, 2002, personal interview) said affordability in deemed consumption areas is not currently of major concern because most low-income customers do not pay their bills. And regarding those who are metered, exceed the free basic water allowance, and do pay their bills, he maintained that the water bill would be affordable since the price of 10 kl of water is currently R9.96. Combined with the R37 sanitation charge, however, even this low volume of metered consumption would be unaffordable for a low-income household.

CMU Director Prem Govender (December 18, 2002, personal interview) echoed Lotthe's opinion that affordability for water is not currently a major concern because of the high level of non-payment among low-income residents. He warned that this would change with the introduction of metering and stricter credit control (December 18, 2002, personal interview):

Lower income communities are not aware [of the price of water] because of deemed consumption. We have deemed consumption and on top of that a low payment rate. Nobody cares. When we start metering and they pay according to what they use, then we'll probably hear them complain.

However, Lotthe said that the impact of metering and stricter credit control on low-income residents is likely to be mitigated by two factors: the poorest residents, with service Levels 1 and 2, would likely not be charged at all for water; and those with

²⁸ For an analysis of the struggle for a more affordable electricity supply in Johannesburg, see Bond, Fiil-Flynn, & Greenberg (2002e: 301-354).

full service levels in what are now deemed consumption areas would likely benefit from a specially reduced water tariff (see Sections 5.10 and 5.12). Also, JW's plans to install flow-limiting devices in 'indigent' customers' households would guarantee them a free basic water supply of 6 kl per month (see Section 5.20.3).

JW officials highlighted that the tariff structure included a considerable degree of cross-subsidy to make water more affordable to the city's poor. Lotthe said that the current IBT structure is heavily slanted in favour of cross-subsidising lower-income consumers who use smaller volumes, as follows:

- First tariff band (0-6 kl): no charge
- Second tariff band (6-10 kl): R2.49/kl, approximately equal to the unit cost of bulk water purchased from Rand Water.
- Third tariff band (11-15 kl): R4.46/kl, just under JW's unit cost.

Lotthe said that it would not be financially sustainable for JW to increase the subsidies on the lower bands of the utility's IBT. From a political perspective, Govender (December 18, 2002, personal interview) said that it would be extremely difficult to charge larger volume, wealthier consumers a proportionally higher tariff for purposes of cross-subsidisation. Even the present degree of internal cross-subsidy, according to JW Executive Director Anthony Still (December 17, 2002, personal interview), is not financially sustainable:

One-third of Johannesburg pays for two-thirds of the people. [Residents of] Soweto [don't] pay, on the whole. They get a full [level of] service and they're not properly metered. But basically they ignore their bill. Another one-third live in informal settlements in and around Johannesburg, and they get their services for free. They're not the greatest services in town, but they get them for free. So who's paying? It's the people in the northern suburbs, on the whole. So in terms of cross-subsidy and

²⁹ In researching the issue of affordability, it was striking that the CMU, which is responsible for reviewing Johannesburg's utilities' tariffs, did not have information on average municipal bills for a basket of municipal services.

equity considerations, a lot is already happening. But what's happening is not sustainable.

5.11.1 Connection fees

Many residents' accessibility to the water supply system is severely restricted by the high fees charged for new connections. The fee is based on the size of connections, and an average-sized household connection of 20 mm costs almost R4000.³⁰ This fee must be paid in a lump sum, which is beyond the reach of low-income households and even middle-income households. This connection fee, according to Vinny Naidoo, JW's Project Manager: Customer Development, "is too high and an obstacle to people connecting as consumers, and it leads people to make illegal connections" (October 3, 2002, personal interview). Naidoo said he was reviewing the tariffs for new connections and investigating short-term debt arrangements to allow residents to connect to the system without having to make an unrealistically large lump-sum payment.

According to Customer Executive Jean-Marc Lotthe, the new connection tariffs, which JW will propose to the Council in July, will be solely based on cost, with no mark up. "We don't want to make business with the connection," Lotthe said, "but we think we should encourage people to connect." If approved, the average-sized household connection will drop significantly to approximately R1000. In cases where new connections are made as part of site and service schemes, according to Paul Viljoen, JW Low-Income Services Manager (December 13, 2002, personal interview), the cost of connections is much lower (around R 500), due, in part, to economies of scale. Moreover, these costs are covered by the provincial housing subsidy.

³⁰ A new 20mm connection costs 3,218.40, plus R450 VAT, plus an additional R308.94, amounting to a total of R3,977.34 (Wanda, 2002: 13).

5.12 Low-income services

5.12.1 Service levels

While CoJ has mandated JW to provide water and sanitation services to low-income communities, the utility, particularly the Low-Income Services Department in consultation with the Customer Services Department, independently determines the levels of service (Paul Viljoen, December 13, 2002, personal interview).

Judging by JW's most recent assessment of low-income services, there is a high level of sub-standard service in Johannesburg. JW (2002: 63) divides low-income services into those provided to low-income units and those provided to informal settlements. Low-income units are mostly located in Soweto and other historically disadvantaged areas. They generally receive a full level of service (Level 3): in-house water connections with water-borne sanitation connected to the sewerage system.

According to JW (2002: 66), water services in informal settlements are as follows:

- Communal standpipes: 109,794 units (65 percent).
- Water tankers: 33,483 units (20 percent).
- Yard standpipes: 24,511 units (14 percent).
- Boreholes: 2,247 units (1 percent).
- No water: 690 units (0.4 percent).

And sanitation services are as follows (JW, 2002: 68):

- (Unimproved) pit latrines: 87,596 units (52 percent).
- Chemical toilets: 77,019 units (45 percent).
- Communal flush toilets: 3,409 units (2 percent).
- Ablution blocks: 2,131 units (1 percent).
- No sewer: 570 units (0.3 percent).

These figures show that 27,000 households in Johannesburg's informal settlements have sub-standard water supply, even in terms of MIIF standards, while practically all 171,000 households have sub-standard sanitation. A very small minority, with no water and sanitation services whatsoever, are at very high risk of water-borne disease. Furthermore, JW (2002: 69) recognises that the unimproved pit latrines currently in use "represent a significant environmental and health risk, as there is no control to protect groundwater or to control flies". For areas where there is no risk of groundwater pollution (that is, in areas with a low water table), the utility proposes VIPs as an "intermediate and possibly permanent solution to address this problem".

5.12.2 Sanitation

Sanitation levels are clearly linked to water provision levels. JW's Level 1 of service, a temporary solution geared towards informal settlement residents who are slated for eventual relocation, stipulates communal standpipes and VIPs. Since these residents currently do not have on-site running water, a water-borne sanitation option is impossible.

Paul Viljoen, JW Low-Income Services Manager (December 13, 2002, personal interview), said that JW is well aware of the risks associated with bacterial seepage from pit latrines, including VIPs. He also acknowledged the health risks associated with 'gray water' in places where there is no sanitation system into which residents can dispose of waste products from cooking and bathing. Viljoen noted, for example, the health hazards presented by fats and oils that attract flies which, in turn, can spread disease. He said, however, that JW does not currently have an adequate solution for 'gray water' problems. Furthermore, Viljoen said, the cost of vacuum sucking the VIPs is high at a price of approximately R400. Residents would need to incur this cost every five years.

5.12.3 Upgrading and relocation – proposed tariff schedule

Plans for informal settlements include relocation (at least 8 percent) and formalisation and upgrading in-situ (JW, 2002: 70). Responsibility for upgrading informal settlement service levels are divided as follows:

- JW – 33 percent.
- National government projects (namely Alexandra presidential project) – 19 percent.
- City of Johannesburg – 41 percent.

The research was unable to ascertain, however, the degree of co-ordination that exists between these various institutions and projects. JW's plans (2002: 74) include providing a basic level of water and sanitation (VIPs and communal standpipes) to those informal settlements earmarked for relocation. These services are to be a temporary measure while the Gauteng Housing Department prepares its plans to relocate these communities to site-and-service projects.

JW is also formulating a differentiated tariff structure that will continue to provide free water for not only those residents with Level 1 service, but for those who will be provided with (unmetered) Level 2 service, as well. Because Level 2 service will necessitate an individual water connection, JW will be able to easily upgrade a household to Level 3. Households that reckon that they can afford to pay for Level 3, which renders metered in-house water and water-borne sanitation, would sign a contract with JW (Jean-Marc Lotthe, December 17, 2002).

Where services will be upgraded in informal settlements in-situ, JW plans to provide a minimum of Level 2 water and sanitation service. JW's (2002: 79) action plan for upgrading of all residents' services is scheduled to take 15 years. Due to rural-urban migration, however, JW recognises that there will still be residents in informal settlements with only basic services beyond that time-frame (Paul Viljoen, December 13, 2002, personal interview). Govender also cautioned that meeting CoJ's service

level objectives will to a large extent depend on the City's financial health and its ability to finance its capital budgets.

As noted in Section 5.5, JW's capital budget is projected to decline by 49 percent over the medium term. The impact of these budget cuts on low-income services, according to Viljoen (January 16, 2003, personal correspondence), is that "there will be less funds available and that the roll-out of services to the low-income areas will take longer to complete".

3P Consulting Managing Director Richard Payne (December 23, 2002, personal interview), who acts in an advisory capacity to CMU, said that the City must consider residents' inability to pay and unwillingness to pay in any capital investment to upgrade services. He said that whenever CoJ upgrades residents to Level 3 (full service of water and sanitation), residents will inevitably consume more water; if these residents do not pay, the City will be culpable in perpetuating its problems of UFW and bad debt. Moreover, Payne noted that a feedback loop exists between the City's revenue collection and JW's capital schemes, including those aimed at increased access and service for the poor:

The success of JW's capital plans will largely hinge on the City's revenue collection. If it does not increase, the City will continue to cut capital budgets, which will hinder JW's efforts to roll out services to the poor and its asset replacement schemes.

JW Executive Director Anthony Still (December 17, 2002, personal interview) said that the utility's plan to provide basic services and to upgrade residents to service Levels 2 and 3 should not have a negative impact on the utility's finances. He said that the plan could even reduce the utility's costs because it is currently expensive to provide water through tankers and sanitation through chemical toilets.

5.12.4 The Stretford Extension 4 pre-paid pilot project

At the time of this research, JW was ready to embark upon a pilot project in an informal settlement to investigate the use of pre-paid water meters and a condominial sewerage system³¹. The site of the pilot project is Stretford Extension 4, near Orange Farm, an area with a wide incidence of unauthorised yard standpipe water connections. Until the project's implementation, there was no water-borne sanitation in Stretford. In addition to a high level of non-payment, JW believed that Stretford Extension 4 was an appropriate area for the pilot project because of a limited and unreliable postal system which makes billing difficult. Before instituting the project, JW negotiated buy-in from local stakeholders, such as community leaders and ward councilors (Vinny Naidoo, October 3, 2002, personal interview).

According to a JW information sheet on Stretford Extension 4 (JW, n.d. (b)), the utility is investing R5 million in the pilot project. The total costs for the various infrastructure needs amount to R3,700 per stand, of which JW has committed itself to subsidise R3,600. Therefore, JW expects that Stretford residents will only be charged a nominal connection fee of R100 for the improved services.

Use of the pre-paid meters is with a smart card, onto which residents load credit purchased at local businesses who act as distribution agents for JW. An LED display shows the resident how much credit is left on the card. The meters are programmed to discharge 6 kl a month free of charge, which guarantees that households receive the free basic allowance. JW is initially programming the meters to discharge water at the users' discretion, rather than discharging a maximum amount of 200 litres per day.

³¹ Condominial sewers are water-borne and shallow (half a metre below ground) and are therefore much cheaper in terms of capital investment. However, they require regular maintenance necessitating extensive community involvement and public education of residents regarding care and use of the system. Residents in Stretford Extension 4 have hitherto used pit latrines for sanitation (Vinny Naidoo, October 3, 2002, personal interview).

According to Customer Executive Jean-Marc Lotthe, initiation of the pilot project was delayed from an earlier date until December 1, 2002. Lotthe said the reason for the delay was that JW wanted to ensure that the newly installed condominal sewer system was up and running before implementing a system that would enforce payment from customers:

We linked one with the other because we felt that people should start paying, but they should see an improvement in the delivery of services. It's very difficult to say, "You have poor service, but now you have to pay for it." We should improve service first. (Jean-Marc Lotthe, November 19, 2002, personal interview)

5.13 Commercial and industrial customers in Johannesburg

In FY 2002/03, commercial and industrial businesses in Johannesburg paid a fixed rate of R7.09/kl, regardless of volume of water consumed. These businesses do not receive a free monthly allowance of 6 kl of water. Water prices for commercial and industrial customers in Johannesburg are relatively high compared with major cities elsewhere in South Africa. A comparative table of 2001/2 water and sanitation prices showed that industrial and commercial consumers' bills were two to five times higher than in Cape Town, Mogale City Durban, and Tshwane (Wanda, 2002: 19).

CoJ (2002e: 51) underlines a pressing need for more accurate information on water use by industries:

Water intensive industries have never favoured Johannesburg as an investment location. Johannesburg Water has cited a dearth of data and information on the breakdown of industrial water users as a key constraint to tariff setting for the sector. This means that data collection regarding wet versus dry industries, price sensitivity

to water tariffs and total percentage cost of water to final production cost are key variables that need to be determined, especially in light of industry water consumption being viewed as a cash cow to cross subsidise free water programmes.

According to Customer Executive Jean-Marc Lotthe (November 19, 2002, personal interview), the water bill for big industrial customers is “nothing”. He said that, according to a customer satisfaction survey by JW, although 90 percent of industrial customers complained that water prices were too expensive, they also reported that their water bills were not significant in terms of their overall costs. Lotthe said that the water bill for industrial and commercial consumers is a relatively small proportion of their municipal bills, particularly when compared to electricity costs. But he said that while water prices for industrial customers are not high enough to actually cause a business to relocate, their relative expense compared to other metropolises could possibly deter water-intensive industries from locating in Johannesburg. In fact, this may already have occurred. According to Executive Director Anthony Still (personal interview, December 17, 2002), water-intensive industries have not situated themselves in Johannesburg, but rather near the coastal area where water prices are cheaper, and where they are not required to treat their effluent to the same stringent standards. Still concluded that the impact on industry and commerce is not a major factor in JW’s water-pricing decisions.

Nevertheless, a 2002 survey of Johannesburg industries conducted on behalf of JW indicated that, on the whole, this sector is well aware of water prices and how they affect their cost structures. Almost one-fifth of respondents said that charges for water supply were either unacceptable or totally unacceptable. Furthermore, over 30 percent of respondents reported that water costs were over 5 percent of their input costs (Market Intelligence Resource Group, n.d.).

5.14 Credit control and disconnections

As CoJ takes an increasingly hard line on credit control, tariffs will figure more prominently on Johannesburg residents' radar screens. The City is responsible for billing and revenue collection for 90 percent of water customers. CMU Director Prem Govender (December 18, 2002, personal interview) said that CoJ's future policy will be that if people do not pay their bills, they will be limited to the free basic water allowance of 6 kl a month.

'Valencia', a customer agent at Jo'burg Connect, CoJ's call centre, revealed that non-payment of bills for one municipal service will result in the disconnection of that particular service. But continued non-payment for that service will result in disconnection of all services. According to Valencia:

If you don't pay your electricity bill, we'll disconnect electricity. Then if you continue to not pay your electricity bill, we'll disconnect your water, too.

According to JW Customer Executive Jean-Marc Lotthe (November 19, 2002, personal interview), the utility regularly disconnects its top customers due to non-payment of water services bills. Lotthe said that JW has predominantly disconnected buildings with flats in Johannesburg's "inner city" due to non-payment by the buildings' owners. In the vast majority of these cases of disconnection, according to Lotthe, the buildings' owners were unable to collect payment for water bills from tenants. In these cases, the landlords often request JW to cut off the water in their buildings to avoid facing the debt of large unpaid water bills. Lotthe said that there had been very few cases in which landlords collected payment for the water bills from tenants, but then pocketed the money and failed to pay their JW account. Lotthe acknowledged that, in these cases, disconnection was unfair to tenants but said that JW had no special policy to deal with such circumstances. He suggested that a possible solution would be for tenants to organise themselves into a collective and

sign an individual contract with JW, but that this had never occurred (December 17, 2002, personal interview).

5.15 Water demand management in Johannesburg

As already noted, Johannesburg is a metropolitan anomaly being a major city without proximity to a viable water source. And, as discussed in Sections 4.3.8 and 5.2, construction of its most recent water source, LHWP, had wide-ranging environmental and economic implications for villagers in Lesotho and residents in Johannesburg. Still, there is talk of building the second phase of LHWP. However, a November, 2000 World Commission on Dams report on LHWP (cited in Bond 2002c: 161) recommended that “a priority should be to improve existing systems before building new supply, [and] that demand-side options should be given the same significance as supply options”. Water demand management, one would assume, would be a priority for Johannesburg’s managers.

But CoJ does not appear to have a cohesive policy regarding demand management to promote water conservation, either out of financial or environmental concerns. Regarding this issue, the line of thinking by JW Executive Director Anthony Still (personal interview, December 17, 2002) appeared somewhat contradictory. On the one hand, Still decried the high prices wrought by the LHWP and warned of a “quantum leap” in water prices should the second phase of LHWP be built. He said that the current rising demand for water would make construction of the second phase likely and that the only way to prevent it would be through demand management. This, he said, JW is carrying out through attempts to reduce UFW, particularly in Soweto. On the other hand, Still said that LHWP has served more as an “insurance policy”, and that claims of potential water shortages are exaggerated:

The truth is there's not really a shortage of water....People will say that until now we haven't really needed Lesotho Highlands [Water Project]. It's water we wouldn't have had to use. We've paid for an insurance policy....There's too much hype about having to conserve water. Eighty percent of the water we use here goes back into our sewers. From there it goes back into [Johannesburg's local] rivers. It goes into the water treatment plant. From there it goes back into the rivers, and it either goes to the Hartebeersport Dam or it goes to the Vaal [Dam]. Only what goes into the ground or gets drunk doesn't. It's a closed water system to a large extent.

Furthermore, Still said that there is no JW policy to encourage water conservation through the tariff structure. He asserted that it was not viable, economically or politically, to charge large-volume, wealthier consumers even higher prices in order to reduce demand and encourage conservation. JW Customer Executive Jean-Marc Lotthe (December 17, 2002, personal interview) echoed these sentiments. He said that because Johannesburg's price for the highest-consuming tariff band (R7.09/kl) is already high relative to other South African cities, it would be difficult to justify raising it further. Furthermore, he said, JW's assumption is that commercial and industrial enterprises try as hard as possible not to make excessive use of resource inputs such as water in order to keep their costs as low as possible. Lotthe stressed that JW considers most water wastage to occur in low-income areas.

CMU Business/Tariff Analyst Christine Kere (December 18, 2002, personal interview) said that the lack of an independent national regulatory body for water played a role in creating less incentive for demand management. Reduced demand on the user end, Kere said, would lead to reduced purchase of bulk water from Rand Water and, in turn, DWAF. A reduction of sales would increase these institutions' unit costs, which they then would pass through to JW, and JW would pass through to Johannesburg's residents. This, in effect, would create a no-win situation for Johannesburg residents. Wastage of water leads to higher bulk water purchases,

costs, and consumer prices; less wastage would lead to lower bulk water purchases, which would also result in higher consumer prices.

Addressing these concerns, Rand Water Chairman Phiroshaw Camay (January 10, 2003) said that, due to increased demand, there is no basis for tying a potential reduction of UFW in Johannesburg to higher unit costs and prices:

Consumption is going up. Rand Water can show quite clearly that consumption has gone up by about 10 percent [between FY 2001/02 and FY 2002/03] across the areas that we supply. That means that there are more people coming in and more inhabitants using [water] and greater development taking place. So the simplistic argument that [CoJ] would put forward—that should they take care of the unaccounted for water their costs will go up—is false.

Camay added that Rand Water expects that the annual 10 percent demand increase to continue for the foreseeable future, not only due to in-migration and development, but also due to the upgrading of residents to higher levels of service—water-borne sewerage and in-house connections—that lead to higher consumption. Despite this projected demand increase, Camay said that it would be unlikely that the second phase of LHWP would be built because Rand Water is confident “that there is an ample supply of water”.

But Still said that there is a “50-50” chance that the second phase of LHWP will be built, not only due to increased demand but also due to “vested interests” in DWAF and elsewhere:

Lesotho Highlands 2 is likely if they think we’re going to run out of water. It depends on what happens over the next few years. At the moment Lesotho Highlands 2 is put off in the capital programme until around 2025. But it’s been brought forward to 2017. If they have to build it, they have to make the actual call ten years prior to that. The reason for going ahead is if they think the demand for

water is growing sufficiently here to warrant building it. Remember, there's also all sorts of vested interests. Every single engineering firm in town would like to build it. Half DWAF would love to build it, because they've got big-dam-building people and works teams who are into creating their own work. The only thing that will prevent it being done is if water-demand management works sufficiently to throttle demand. Now we in Joburg must do a lot on that, mainly in terms of unaccounted for water, mainly in Soweto. But there are compensatory factors. Rand Water is selling a lot more to Rustenburg, and it's opening up big expansion there for platinum mines. They're taking a lot of water. So what Rand Water may save with us in time, they'll use somewhere else. Is Lesotho Highlands 2 likely? I'd say at this point it's 50-50. But in two years' time, it will be much closer to the call on that decision. And they'll be looking at the data over the next few years to make that decision in 2005 or 2006. That's decision time.

5.16 Price elasticity of demand in Johannesburg

JW Customer Executive Jean-Marc Lotthe (November 19, 2002, personal interview) said that the utility and the City lacked information on the price elasticity of demand of water in Johannesburg. He added that the utility's assumption is that the price elasticity of demand is low because "water is cheap", meaning that the water bill is a relatively small proportion of the monthly bill, compared to electricity and telephone charges. He said that those consuming larger volumes of water—wealthier customers, for the most part—would not notice the effect of price increases because they could easily absorb the resulting increase to their monthly bills. Therefore, water price increases would be unlikely to reduce consumption by high-water-consuming residences and commercial and industrial consumers. An additional reason that the utility assumes a low price elasticity of demand, according to Lotthe, is that it is very difficult to reduce water consumption because it is a basic necessity, used for drinking, cooking, and cleaning. Lotthe emphasised that his assumptions are not based upon scientific studies.

5.17 Marginal cost

According to JW executives, marginal cost pricing is not currently a factor in determining the tariff structure. However, they provided different reasons for this. According to CFO Heleen Kulyk (November 14, 2002, personal interview), even if JW wished to factor marginal cost into its pricing structure, the utility does not currently have the necessary information to do so. According to Customer Executive Jean-Marc Lotthe (November 19, 2002, personal interview), marginal cost is not a factor because the cost of provision does not fluctuate significantly according to volume or customer category. He partly explained this ‘flat’ marginal cost curve by the cost structure of water, which is driven by fixed not variable costs, namely, the bulk water purchased from Rand Water. Lotthe said that JW’s cost of water provision is the same for all customers: low- and high-consumption residences, and commercial and industrial consumers. He explained that this is contrary to the cost of provision of electricity in Johannesburg, where domestic provision is costlier than industrial provision, and the electricity tariff schedule reflects this differential cost by charging residences more per unit of consumption than industries. By the same token, according to Lotthe, the relatively lower water charges for lower-consuming domestic consumers do not reflect cost. He emphasised that “there is no economic motivation to have a separate tariff for residential consumers and for industrial and commercial consumers. It’s all about subsidisation”.

Furthermore, Lotthe said that it would be contrary to JW’s pricing philosophy to generate profit surpluses by charging low-income customers at cost:

I don’t think the point is to make money in these [low-income] areas. It’s more important to recover less than cost, but to recover it, rather than charging at cost and not recovering [the amount billed]. (Jean-Marc Lotthe, November 19, 2002)

According to Lotthe, charging low-income residents at cost would also create a problem in terms of revenue collection and political acceptability. He cited the protests in Soweto and militant action by the Soweto Electricity Crisis Committee against electricity tariff hikes, and said that JW has tried to avoid a similar situation regarding water.

JW Executive Director Anthony Still (December 17, 2002, personal interview) said that in some ways a marginal cost pricing system would be preferable to the current one based on IBTs. According to Still, marginal cost pricing, combined with targeted subsidies—for example, rebates—would constitute a more transparent system with the incidence of subsidies made clearer than in the present system. He said, however, that it would be impossible to implement such a system in the medium term because it would need a welfare system to support it, which South Africa does not have.

5.18 Management contract

On April 1, 2001, JW signed a five-year contract with an operating consortium, JOWAM, comprising Ondeo Services, France, part of the Suez-Lyonnaise des Eaux group, and two of its subsidiaries, Northumbrian Water Group, UK, and WSSA – RSA. The contractor brought to the utility an external management team of 13 professionals who have been placed in key management positions. Their role is to help find solutions to JW's central operational problems³², and to mentor an internal team to take over their positions. As part of the city's contract with the management consortium, JOWAM has assumed some of the operational risk under a

³² The major operational problems facing JW listed by the City (2001: 155), include: inadequacy of delivery in certain informal areas; a high level of UFW; metering, billing and collection; lack of data for effective management and monitoring; a high level of non-payment; poor customer interface and customer relationship management; and organisational capacity to address these challenges (CoJ, 2001b: 155).

performance-based contract. Two of the twelve external managers will remain with JW at the end of the five-year period (JW, 2002: 12).

JOWAM's remuneration by JW is based on a two-tier scheme comprising a fixed fee (no more than R20 million throughout the five-year contract) and incentive compensation (City of Johannesburg, 2001a). The incentive compensation is divided into Parts A and B. Part A compensation is neither to exceed R20 million over the term of the contract, nor R4 million for any particular year, and is based on JOWAM's performance ratings in five areas³³. Part B compensation is based on an incentive formula. The formula is designed to increase the incentive compensation according to increased profits weighted against other factors, including tariff increases (City of Johannesburg, 2000). Importantly, this means that the formula factors out the impact of increased profit due to tariff increases, and that JOWAM cannot increase its remuneration by raising water tariffs.

5.19 Inflation rate factor

Due largely to bulk water price increases by Rand Water consistently above the local government inflation targets set by the National Treasury, JW has deemed keeping tariff increases within these limits financially unfeasible (Heleen Kulyk, November 14, 2002, personal interview). Prem Govender (December 18, 2002, personal interview) concurred that national government's CPI caps on local government were unrealistic:

At the end of the day, the politicians will maintain largely an inflation-based tariff increase. From our side, the inflation-based increase is just not sustainable. In fact, I must qualify 'inflation-based increase', which is the National Treasury's idea of an

inflation-based increase. We're facing a 10-14 percent [CPI] increase right now, compared to National Treasury's value of 6.9 percent. If you look at global changes and their impact on us, from a fuel point of view, from a purchase point of view, [water companies] are purchasing at a higher cost and are expected to increase prices at a lower level. And that's what the National Treasury is asking us to abide by.

At the time of this research, the governmental cap for increasing basic service tariffs for the 2003 fiscal year was marked at 10 percent, even though inflation was hovering around 12 percent (Christine Kere, December 18, 2002, personal interview).

5.20 Planned developments and future trends

5.20.1 FY 2003/04 tariff increases

For reasons cited in Section 5.19, according to JW and CoJ officials, Johannesburg residents can expect higher tariff increases in FY 2003/04 than in FY 2002/03.

5.20.2 Metering of deemed consumption areas

JW Customer Executive Jean-Marc Lothe (November 19, 2002, personal interview) said that in 2003, JW intends to propose that CoJ institute one major change to its tariff schedule: the metering of what are currently deemed consumption areas. As mentioned in Section 5.10, metering is part of JW's plans to stem financial losses due to the high incidence of UFW in deemed consumption areas. Lothe said that, assuming CoJ approves the plans and obtains financing, JW will implement separate trial metering schemes in each of the four deemed consumption areas: Ivory Park,

³³ The five areas are human resources development, decreased wastewater spillage and overflows, improved customer service, implementation of the Annual Capital Investment Program, and improved facilities maintenance.

Soweto, Alexandra, and Orange Farm. The plans, according to Lotthe, are as follows:

- Soweto: reduction of water pressure, fixing leaks, and installation of pre-paid meters.
- Ivory Park: installation of conventional meters.
- Orange Farm: The Stretford Extension 4 pre-paid meter pilot project (see Section 5.12.4).
- Alexandra: Coordination with City Power to perform remote reading of pre-paid meters via an online server. According to Lotthe, City Power is investing considerable sums to install the infrastructure.

5.20.3 Pre-paid meters and flow-limitation devices

Pre-paid meters and flow-limitation devices could become more ubiquitous in CoJ, depending on the outcome of JW's pilot projects. As described by PDG (2001: 4), flow-limitation devices allow for simultaneous credit control and delivery of the free basic water allowance:

A recent innovation has been the introduction of flow limitation devices to full pressure consumers. These restrict the flow of water to a household to a set amount (typically 200 l) per day. If a consumer falls into arrears they are offered three options. They can either pay the arrears; agree on payment terms to pay the arrears over a period; or agree to have a flow limiter installed. If they have the flow limiter installed monthly charges from then on are nil, as the amount of water supplied will be limited to 6kl per month. The consumer can be reconnected to an unlimited supply after all debt and a reconnection charge has been paid to the Council.

Pre-paid meters can similarly be programmed to deliver only the free basic water allowance. Lotthe said that through the utility's four trial projects mentioned in Section 5.20.2, JW will be able to implement the most suitable metering programs.

5.20.4 Disconnection of low-income households

According to JW's proposed credit control policy (JW, n.d.(d)), customers residing in an area which JW defines as 'indigent', that is, an area in which a socio-economic survey indicates that more than 60 percent of all households would qualify for registration as indigent customers, will not be subject to a disconnection process. Rather, the utility will restrict customers who are in arrears in this area to the free basic water supply of 6 kl per month.

5.20.5 Volumetric pricing for sewerage

Another likely significant change in the water and sanitation tariff structure, according to JW Executive Director Anthony Still (December 17, personal interview), will be the introduction of volumetric pricing for sewerage. Charges for sewerage are currently based upon property size. Volumetric pricing will mean that sewerage prices will be based on the amount of water consumed. Still believes that this will be a more equitable system and will allow JW to offer 6 free kl for both water and sanitation instead of for water only, which is the CoJ's current policy.

5.20.6 Polluters' tariffs

JW is planning to propose a tariff schedule that would punish heavy polluters of Johannesburg's sewerage system. The tariffs will be based upon the content of the effluent discharged into the sewer system. The intended effect of the 'polluters' tariffs' is described as follows (Market Intelligence Research Group, no date: 3):

The idea is to encourage users to be more careful, make use of "cleaner" production methods and, if necessary, process waste water to remove the offending impurities prior to discharging it into the Johannesburg sewerage system.

5.20.7 Shared services centre

JW's budget projections could be affected by recent changes to the agreements between the City and the utility regarding revenue functions. According to JW's business plan (JW, 2002: 11), starting in May 2002, the utility would gradually assume the metering, billing and collection functions for the 90 percent of customers in CoJ's hands. This customer 'migration' process was due to be completed by the end of 2003, with JW assuming control of all revenue functions for all Johannesburg's water services customers. JW's budget projections were, in part, based on efficiency gains according to the metering, billing, and revenue collection plans that the utility would implement.

CoJ has since decided to create a "shared services centre" that will jointly handle and co-ordinate all City revenue functions. According to JW Customer Executive Jean-Marc Lotthe, the City thinks that the shared services centre:

...will be more cost effective. They agree that it's currently not satisfactory, but they say the shared services centre will be something new, professional, business oriented, delivering a service, which is not the case at the moment. So they will migrate the current [City] revenue department to the shared services centre. (Jean-Marc Lotthe, November 19, 2002, personal interview)

Due to the plans for the shared services centre, according to JW Executive Director Anthony Still (December 17, 2002, personal interview), plans for the migration of customers have been delayed. He said that this has had negative implications for projections in the Business Plan (JW, 2002: 178), which had estimated that the utility's revenue would increase more than 2 percent over and above inflation in fiscal years 2003/4 and 2004/5. Lotthe added that, because these increases are based on improved efficiency in the management of customers, unless the CoJ can make the same efficiency gains, the utility will lose the additional revenue. Lotthe was

skeptical that the CoJ would achieve the efficiency gains in the short term because the implementation plan for the shared services centre is four years long.

5.20.8 Tariff study and model

Plans for customer migration were also tied to JW undertaking a full tariff study in preparation for a major review of the tariff structure. The customer migration would have given the utility the required data on customer segmentation and consumption (JW, 2002: 155). With the delay of the customer migration plans, Lothe said, JW is revising plans for the full tariff study.

Financial stability and accurate consumer information at JW, said Lothe, will eventually allow the utility to proceed with the tariff study that would allow the utility to set tariffs according to projected demand and the capital requirements of asset replacement and maintenance. JW Executive Director Anthony Still (December 17, 2002, personal interview) said that even if, following the tariff study, the utility discovers that it is significantly under-recovering costs due to asset depreciation, it would not seek to compensate solely through tariff increases. “[JW] can’t raise the tariffs in a quantum leap,” said Still. “[JW] has to achieve sustainability out of efficiency and reducing [UFW]”.

CMU Director Prem Govender (December 18, 2002, personal interview) said that while, in his opinion, the tariff structure has enabled many residents to enjoy a high and affordable level of service, CoJ is in the process of re-evaluating it. He said that JW and the City are building a tariff model that will incorporate JW’s capital and operational budgets. 3P Consulting’s Richard Payne (December 23, 2002, personal interview), who is involved in the tariff modeling process, said that an accurate tariff model is imperative to ensure the utility’s long-term financial sustainability. Vital information for the model, Payne asserted, includes accurate statistics on water consumption per consumer category and tariff band. However, he considers the

City's statistics in this regard unreliable due to the inflexibility of its current billing system for isolating data. According to Payne, if this information is inaccurate:

...then the revenue base will be wrong. If the revenue base is wrong, then very quickly the company will not be viable. If the City sets a wrong tariff now, the chances of going back to the political domain and substantially changing the tariff base are very slim.

Moreover, Payne said, JW requires a tariff model to motivate the tariff levels and structure that the utility will need to achieve its business plan; otherwise, tariffs will continue to be largely based upon Rand Water bulk water prices and CPI.

5.20.9 The City of Johannesburg's Draft Water Services By-Laws

In November 2002, CoJ posted its Draft Water Services By-Laws on its official web site in order to solicit public comment before Council votes to pass them in 2003 (CoJ, 2002f). The draft contains a short section directly related to tariffs which would cause no change to current policy. However, it includes lengthy sections on payment, accounts, and disconnections, which CoJ no doubt intends to employ in its effort to increase its collection rate.

5.20.10 Increased grassroots pressure

With stricter credit control measures, but at the same time capital budget cuts that will impact negatively on water supply plans to low-income areas, it is likely that Johannesburg will witness increased grassroots mobilisation around water and sanitation services.

5.20.11 National and international expansion

To curb the steady trend of increasing water tariffs, CoJ is considering expanding JW's area of operations, both regionally and internationally, as part of its plans to

become “a hub for utility development and expansion on the sub continent”. According to its long-term plans, CoJ would like to ‘redimension’ its utilities and manage and market their services as an “economic good like any other good”, for:

Given that [CoJ’s] utilities are exhibiting competitive advantages as well as vast skills in their given areas of expertise, it is natural that the City should nurture and encourage them to operate at a national and international level as soon as possible. In this way they can not only contribute to GGP growth and employment in the City, but also devise alternative income streams that can be re-invested locally. (CoJ, 2002e: 86)

5.20.12 An independent national regulator

All major players interviewed as part of this study indicated the pressing need for an independent national regulator for water and sanitation services. JW and CoJ officials saw the need as stemming from what they perceive as the demand management-unit price impasse concerning water in Johannesburg and its environs (see Section 5.15). According to both Director Prem Govender and Business/Tariff Analyst Christine Kere of the CMU (December 18, 2002, personal interviews) only an independent water regulator without a financial stake in the supply line could impartially arbitrate between CoJ, Rand Water, and DWAF. According to Kere:

Bulk water is controlled by DWAF. DWAF is a regulator and at the same time is an owner. So that forms a conflict of interest. [CoJ is] supposed to get protection from DWAF as a regulator. But how can a regulator be fair with you when at the same time it’s a shareholder?

Moreover, these officials, said, an independent regulator could take a more dispassionate approach than DWAF on the need for the construction of the second phase of LHWP. In addition, JW Executive Director Anthony Still (December 17,

2002, personal interview) said that an independent regulator could help prevent JW from getting the short end of the stick on the supply chain:

The people who face the customers in terms of water prices are not Rand Water and not DWAF, but our [City] politicians. And that's what's difficult in this process. The politicians are given this cost chain, but they stand in front of the consumer. So where do they try and soften costs? They try to soften them with [JW] and ask us to absorb those price increases. And we can absorb a certain amount to an extent that we are getting more efficient. But there's limits; otherwise we start running down our operations, maintenance, and capex programmes.

Rand Water Chairman Phiroshaw Camay (January 10, 2003, personal interview) said that he is in agreement on the need for an independent national regulator:

It is not only a personal view that I express but also the view of Rand Water as well as the view of the South African Association of Water Utilities. We don't believe that DWAF can be both referee and player, and therefore we need an independent regulator.

Camay's primary reason for favouring an independent regulator differed from the ones mentioned above. His contention is that with increased privatisation of services in South Africa, "there is a need to ensure that the quantity and quality of water supply is not diminished".

CHAPTER 6: ANALYSIS AND RECOMMENDATIONS

We are now ready to answer our original research question: How is Johannesburg's water tariff structure decided?

To arrive at this point, we developed an assessment toolkit, containing the criteria we would reasonably expect decision makers to employ in designing a water tariff structure in Johannesburg. We first reviewed the academic literature concerning water tariffs. From this review we abstracted the frequently mentioned criteria which served as the basis for Toolkit A (Table 1). The review also discussed debates and controversies current in the field. We then refined our assessment criteria through a review of water tariffs in practice in developing countries, yielding Toolkit B (Table 5). Finally, we contextualised our assessment criteria through a discussion of the political, legislative, and socio-economic context of water supply and tariffs in South Africa, in general, and Johannesburg, in particular. This produced our model assessment criteria, Toolkit C (Table 10). With our model criteria in mind, we undertook an examination of Johannesburg's water tariff structure and directly related issues, detailed in Chapter 5.

We can now analyse Chapter 5's findings of the investigation into Johannesburg's water tariff structure. In our analysis we will make use of Toolkit C's model criteria. Our analysis includes conclusions and related recommendations, summarised at the end of the chapter.

Before addressing the criteria and objectives of the tariff structure, let us remind ourselves who decides Johannesburg's water tariffs. The research found that Johannesburg Water (JW), by and large, determines Johannesburg's water tariff structure through its proposals to the City of Johannesburg (CoJ), despite the fact promulgation is the prerogative of the CoJ Council. The central tariff-setting team for JW's proposal is composed of the Executive Director, the CFO, and the

Customer Executive. In formulating its tariff proposals, JW proceeds within the parameters established by the SDA.

6.1 Criteria and objectives

In this section we will apply Toolkit C to our findings in Chapter 5 to determine to what extent JW and CoJ's criteria and objectives coincide or differ from our model criteria for Johannesburg's tariff structure. Our analysis highlights challenges, both current and potential, to the realisation of objectives, and in some instances offers suggestions for ways in which these may be overcome.

6.1.1 Equity

The research found that, as expected, equity is a major concern for JW and CoJ, and that these institutions have in recent years increased the IBT's progressive tendency. The largest move in this regard came with the implementation of the national policy of providing 6 kl to every household free of charge. The manner in which JW and CoJ implemented this policy ensured a high degree of cross-subsidy and assisted a large number of metered households (those consuming up to 23 kl) to receive lower water bills. The full implication of these changes have yet to be felt due to the number of households billed for water on a deemed consumption basis. In the event of more widespread metering, the current IBT structure would likely be beneficial to the majority of metered residents as most households are currently consuming under 20 kl per month.

With its stricter credit control policy and the likely introduction of metering in deemed consumption areas, JW and CoJ will need to find a workable policy for pricing water for backyard dwellings. Were metering to be universally implemented, residents in backyard dwellings would not benefit from the IBT structure, including

the free basic water supply. This means that free and subsidised tariff bands would be quickly consumed by the several households sharing a single water connection. After that, the households would be charged above cost and even at the highest rates of R7.09/kl. As backyard dwelling residents are generally poor, this would greatly diminish the IBT's progressive tendencies. Similarly, a future policy that would include both formal registration of backyard dwellings and levying of assessment rates on these dwellings' residents would increase their financial burden. To prevent such an eventuality, CoJ's 'special cases' policy could be applied to backyard dwellings to waive assessment rates.

The research indicated that it is likely that many tenants in flats are not benefiting from the progressive IBT structure, although only a study on this particular issue could verify this assumption. For tenants to benefit, the owner or manager of every building would need to conscientiously apply the IBT structure to each flat, either based on average consumption per flat or through metering. To ensure proper application of the tariff structure in flats would also require a consumer education exercise involving owners, managers, and tenants.

Metering and stricter credit control would also bring into sharper relief the question of whether 6 kl per household per month is a sufficient amount for the free basic water supply. If JW's assumption about low-income household size is accurate, the consequent average of 36 lcd is less than half of Eberhard's recommended amount to ensure basic living standards cited in Section 3.6.1. And the high rate of HIV/AIDS in Johannesburg would appear to add a degree of urgency towards ensuring an adequate amount of affordable water for low-income households. One option for ensuring an adequate free basic water supply would be to increase the lifeline tariff band consumption amount for all residents. However, at the same time, this would increase the subsidy leakage benefiting wealthier households. A second option—Bond's 'additional household' per low-income household municipal record exercise—would better target the increased free water supply, but might be

administratively cumbersome. A third, simpler option would be to allocate more free basic water to low-income neighbourhoods, but this would also incur a certain rate of subsidy leakage and not reach all the intended beneficiaries.

6.1.2 Cost recovery

As anticipated, the decision makers cited cost recovery as a top priority objective of the tariff structure. In fact, JW executives listed cost recovery and financial sustainability as first and foremost among all objectives. It is an objective that JW has by and large achieved within the scope of its current operations.

Projected over the long term, however, it is doubtful whether JW's budget is sufficient both to maintain its current operations and achieve universal coverage of water and sanitation services. CoJ does not appear to be devoting adequate funds to JW's capital budget to finance asset maintenance and service extension and upgrading in the long run. We can say, therefore, that for JW to self-finance the implementation of a plan that would meet its mandate in a sustainable manner would likely require a revision of the tariff structure. In light of these issues, JW and CoJ are aware of the need to review the tariff structure and for this purpose are designing a tariff model. In the meantime, JW is planning to bring billing in line with consumption by scrapping the deemed consumption basis in certain areas, which the utility hopes will generate more surplus revenue through not only increased collection but also less 'over-consumption' and UFW losses (see Section 5.10).

It is indeed necessary in the current political economic environment to have a policy of cost recovery leading to self-financing and long term financial sustainability. The danger of such a policy is when this leads to excessive focus on service delivery to the existing revenue base, leaving the rollout of services to those who are unserved and under-served as a secondary consideration. The research indicated that this

may be happening to some extent in Johannesburg. Section 6.2.1 also touches on this question.

6.1.3 Marginal cost pricing

Toolkit C listed marginal cost pricing as the lowest priority of all the model criteria. Consistent with our model, there is currently no attempt by JW or CoJ to incorporate marginal cost pricing into the tariff structure. At the same time, there is recognition that to implement a marginal cost based tariff structure would first require a functioning welfare system that would distribute targeted subsidies, thereby counteracting any regressive effects of such a pricing system.

6.1.4 Affordability

The research found that CoJ and JW do not have sufficient means to gauge the affordability of water for low-income households. A starting point in determining affordability is the ability to locate a water bill within the context of the price of an average basket of municipal services. The research found no indication that either institution has conducted this exercise. The City should as soon as possible develop indicators of low-income affordability so that it can keep prices of municipal services, including water, in line with its findings.

The high fixed charges for sanitation undermine the affordability rendered by the progressive IBT structure for water. JW is aware of this serious shortcoming in its tariff structure and plans to rectify it through volumetric pricing for sanitation. JW is also aware of the unaffordable water supply connection fees and intends to reduce these charges by 75 percent. Even the R1,000 connection fee that is likely to be proposed, however, would weigh heavily on a low-income household. To encourage access to water supply, JW and CoJ could investigate sliding-scale connection fees to generate internal cross subsidies for low-income households.

The attempt by some officials to rationalise current water and sanitation bills that are most probably unaffordable for low-income residents by claiming “it’s not an issue, they don’t pay anyway”, only serves to perpetuate a vicious circle of non-payment and blame. The very reason that many of these households do not pay, as noted in Section 4.3.2, could be the unaffordable bills themselves. And blaming the poor for not paying unaffordable bills reflects poor governance and would likely deepen class divisions within the city.

6.1.5 Externalities

The research did not find a high level of awareness among JW and CoJ—either displayed by officials or in policy documents—concerning the externalities associated with water supply.

Health and LED

As mentioned above in Section 6.1.1, Johannesburg’s free basic water supply falls short of the level required to achieve improved health standards and poverty alleviation. Also of concern is the fact that the research indicated that CoJ does not consider the health risks posed to the large number of Johannesburg residents without on-site access to water and sanitation services to be an urgent matter. This approach appears to be particularly remiss in light of the high proportion of poor residents rendered more vulnerable by HIV/AIDS.

Water conservation

Our model criteria established that water conservation in Johannesburg should be a high priority. The research found, however, that CoJ and JW have established neither a pressing need for water conservation nor a clear and comprehensive demand management policy. The research identified two major areas where demand management could lead to high levels of water conservation. The first is in ‘deemed consumption’ areas, where JW is already implementing plans to reduce UFW. The

second is the group of wealthier users consuming water on a large scale: residents with large properties, industrialists, and commercial business owners. CoJ and JW could investigate increasing the tariffs for the highest residential consumption tariff band and for industrial and commercial users. JW officials Still and Lotthe expressed views that raising tariffs on large-scale users for purposes of demand management is not politically or economically feasible. But this contradicts Lotthe's view that these same users, particularly industrial and industrial businesses, do not pay much attention to their water bills and would therefore have a low price elasticity of demand. To clarify this issue, JW or CoJ should conduct a study to gauge price elasticity of demand for water in Johannesburg. Moreover, any demand management measures should be accompanied by public education campaigns aimed at water conservation.

6.1.6 Ease of implementation

Johannesburg's water tariff structure, which combines an IBT with differential charging, is not costly or administratively cumbersome to implement. Furthermore, it is an easy tariff structure to explain to residents, and JW and CoJ should make more of an effort to do so. A transparent and understood tariff structure would likely enhance prospects for realising other objectives of the tariff structure, such as cost recovery, political acceptability, and water conservation.

6.1.7 Political acceptability

Since the research concentrated largely on the perspectives of policy makers, its ability to determine political acceptability of the tariff structure is limited. Given the fact that current grassroots mobilisation around municipal services is mainly concerned with affordability and delivery to low-income communities, the degree of political acceptability or opposition could hinge on two major factors. One is the sensitivity to low-income households displayed by CoJ's credit control policy. The second is the extent to which the City is able to follow through on plans to upgrade

water and sanitation service levels for low-income residents. A policy towards low-income communities of strict credit control combined with little improvement in service delivery would be a recipe for political disaster. JW's approach in implementing its pilot project in Stretford Extension 4 indicates an awareness that improved services facilitate the successful application of a tariff structure. It remains to be seen to what extent JW and CoJ will apply this approach on a city-wide scale.

6.1.8 Industrial and commercial tariffs

The differentiated water tariff for industrial and commercial users in Johannesburg is R7.09/kl. Due to this relatively high cost of water, it is unlikely that the city will ever be a magnet for manufacturing industries requiring very large volumes of water. The research, however, gleaned contradictory findings regarding industry's and commerce's perceptions of water prices. CoJ and JW need to undertake more research to determine the price sensitivity of the city's industrial and commercial businesses to current tariffs and to potential increases. If JW Customer Executive Jean-Marc Lotthe is correct in his assumption that businesses pay no attention to their water bills, CoJ and JW should investigate raising this sector's water tariffs. This could serve as a measure to generate more internal cross-subsidies and to assist in moving towards demand management.

Plans by JW to institute polluters' tariffs should help to reduce the negative impact of heavy industries' effluent on Johannesburg's water system.

6.2 Related criteria

6.2.1 Standards and service levels

Johannesburg has the wealth to exceed national standards of service provision, including water and sanitation services. The city could and should be a national and

regional benchmark for universal coverage at a relatively high level regardless of income.

Currently an unacceptably high percentage of residents in Johannesburg have sub-standard water and sanitation service levels, even according to MIIF standards. As noted in Section 4.1.9, MIIF's basic service levels are not of a sufficiently high standard to promote adequate levels of health and to encourage LED. JW seems to recognise that MIIF standards are not adequate and is treating its Level 3 of service, communal standpipes and VIPs, as temporary emergency measures. But given the lengthy time period slated for JW's plans to upgrade residents from Level 3, together with CoJ's capital budget cuts on water and sanitation, it is likely that communal standpipes and pit latrines (improved or otherwise) will be permanent features of many Johannesburg residents' lives.

6.2.2 Credit control

Sections 4.3.3 and 5.14 reveal that CoJ is attempting to implement a 'zero-tolerance' credit control policy, including disconnecting residents' water supply. Given the constitutional requirements to guarantee water supply to all residents, CoJ should ensure that measures are in place for residents to receive an adequate amount of water even if they, or their buildings' owners, default on payment. Furthermore, it would be unfair to implement CoJ's drastic credit control policy in low-income areas where, as noted above, a basket of municipal services is likely to be unaffordable. The research indicated that JW intends to use pre-paid meters and flow limitation devices to prevent total disconnection to low-income households and to guarantee a free basic water supply. However, as already highlighted, the basic water supply does not on its own provide an amount of water sufficient for acceptable living standards.

6.2.3 Regulation

The research indicated a need for improved regulation, on both local and national levels, particularly the latter. As CMU builds its capacity, it will be able to fine-tune and capably enforce its contract with JW. Also, CMU needs to improve its knowledge of JW's and CoJ's plans regarding water services. For example, CMU needs a better understanding of JW's 15-year capital investment plan and its plans to raise service levels. In this way, CMU would better appreciate the impact of any capital budget cuts to JW, and possibly help JW negotiate with CoJ to reduce these cuts. As a CoJ department, however, CMU's ability to negotiate with CoJ could be limited.

Several officials noted the inability of DWAF to act as an impartial national regulator and said that there is an urgent need for an independent national regulator for water and sanitation services. Such a regulator, they said, would help arbitrate between the various institutions on Johannesburg's supply line: DWAF, Rand Water, JW, and CoJ. A pressing issue that would likely be facilitated by regulation is what CoJ and JW officials regard as a demand management-water pricing 'Catch 22' situation described in Sections 5.2 and 5.15. An independent regulator could help to balance the need for better demand management and low water input costs and help to forestall or prevent entirely the second phase of LHWP. An independent national regulator could also prove useful in guarding against the abrogation of national legislation; for example, the constitutional requirement to guarantee universal and adequate water supply.

6.3 Summary of analysis

Table 20 provides a summary of the analysis detailed above. It highlights the main research findings of each model criterion used to assess Johannesburg's tariff structure. It also provides a summary of the recommendations offered in Section 6.2.



High
priority



Medium
priority



Low
priority

Table 20: Summary of analysis and recommendations concerning Johannesburg's water tariff structure

Criterion	Analysis of research findings	Recommendations
Equity – IBT	• High degree of cross-subsidy • Progressive recent changes to IBT, namely implementation of free basic water supply policy	• Need workable policy for backyard dwellings • Need to ensure that IBT structure is being applied to flat tenants • Need to investigate ways of increasing free basic water supply to low-income households
Cost-recovery	• Short-term: Water operations are self-financing • JW plans to generate increased surplus revenue by scrapping deemed consumption and greatly reducing UFW	• Long-term: Likely need to revise tariff structure to recover sufficient costs for sustaining operations while maintaining and replacing assets, and extending coverage at adequate service levels • May be too much focus on existing revenue base and not enough on under-served residents
Marginal cost pricing	• No attempt to incorporate marginal cost pricing into tariff structure	• To employ marginal cost pricing, would need to first have a functioning welfare system to distribute targeted subsidies
Low-income affordability	• While water may be affordable, when combined with sanitation and other municipal bills there is a likelihood of unaffordability for low-income households • Connection fees are highly unaffordable	• CoJ needs to develop indicators of low-income affordability and keep prices in line with findings • Need to implement plans to reduce connection fees • Need to implement plans for volumetric pricing of sanitation
Externalities: Health and LED	• No clear policy tying LED and health (including HIV/AIDS) to tariff structure	• Need to prioritise positive externalities associated with water supply
Water conservation	• Current focus on reducing UFW in deemed consumption areas • No clear and comprehensive water conservation policy	• CoJ and JW should clarify the need for demand management • Should investigate encouraging conservation by large-volume users through higher prices • Need study on price elasticity of demand • Need comprehensive public

		education campaign
Ease of implementation	• Easy and affordable to implement	• Need to make tariff structure transparent to residents
Political acceptability	• Current mobilisation around affordability of services for low-income residents	• Acceptability will be facilitated by low-income sensitive credit control and improvement of service levels for low-income residents
Industrial & commercial tariffs	• High water prices in Johannesburg unlikely to attract water-intensive manufacturers • Sensitivity of existing businesses to water prices and potential increases requires further analysis	• If findings reveal low sensitivity to water prices, CoJ could raise the sector's tariffs to generate more revenue and encourage demand management • Implementation of polluters' tariff will lessen adverse environmental impact
Related: Standards and service levels	• High level of sub-standard water and sanitation services	• Urgent need to prioritise upgrading to a minimum of Service Level 2 • Need to find solution to 'gray-water' problem
Related: Credit control	• 'Zero tolerance', including disconnections	• Need to ensure water and sanitation are affordable before implementing strict credit control • Need to ensure adequate basic water supply to all residents, even those who default on payment
Related: Regulation	• Need for arbitration between DWAF, Rand Water, CoJ, and JW • DWAF cannot act as an independent regulator • CMU requires better knowledge base of JW and CoJ plans	• Need independent national water and sanitation regulator • Need adequate negotiation mechanisms between CoJ and JW to ensure that JW can and will fulfill its mandate, e.g. that it has sufficient capital funding

CHAPTER 7: CONCLUSION

To conclude our study, we can say that Johannesburg's water tariff structure fulfills our expectations—developed through reviews of water tariffs in theory and in practice, and the contextualising of water tariffs in Johannesburg—regarding certain criteria while it falls short of others.

The tariff structure's IBT is highly progressive, designed to promote equity in water consumption. However, a series of factors threaten to undermine equity objectives. These factors include: high fixed charges for sanitation, high water supply connection fees, the insufficiency of the free basic water supply, and the fact that poor, backyard dwelling tenants are currently excluded from the free basic water supply. Furthermore, hundreds of thousands of Johannesburg residents presently draw water, albeit free water, from communal standpipes and have no water-borne sanitation. The City needs to make a more concerted effort to upgrade their service levels.

JW has prioritised cost recovery and is meeting this objective in the short term. It is likely, however, that the utility will need to revise its tariff structure in order to achieve long-term financial sustainability while fulfilling its mandate. Most of CoJ's and JW's decisions regarding the water tariff structure will continue to revolve around balancing what are already their two primary objectives: equity and cost recovery. There are two major avenues that they may choose to follow. The first is a relatively short-term strategy that prioritises service delivery to those already enjoying high service levels and from whom JW and CoJ recover most of their costs. The second is a long-term strategy that boldly revises the tariff structure in order to generate enough revenue to cover and sustain the costs of raising water service levels in low-income areas to an extent that will truly contribute to poverty alleviation. Not only does the health of many residents depend on which way CoJ and JW decide to go, but so does the city's socio-economic sustainability.

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