

**INDEPENDENT EXPERT REPORT UNDER
THE FIRST FULL TARIFF REVIEW
PROCEEDINGS**

BELIZE WATER SERVICES

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EXECUTIVE SUMMARY

On December 15 2003 the Public Utilities Commission (PUC) of Belize made its “Initial Decision” on the applicable Water and Sewerage Tariffs for the First Full Tariff Period (FFTP) starting April 1, 2004 and ending March 31, 2009. In its Initial Decision, the PUC approved a Tariff Structure and Schedule of Charges consistent with a revenue increase of 15% for the FFTP.

On December 24, 2003, BWS wrote to the PUC formally objecting to the PUC’s “Initial Decision” as provided for in Section 22 of The Water and Sewerage (Tariff) Byelaws, Statutory Instrument No. 67 of 2002. BWS’ formal objection required the PUC to appoint an Independent Expert (IE) to review the proposed Schedules and Tariffs.

On the 26th January 2004, I was appointed as the IE to conduct a review of the Initial Decision and the “adviseability of amending the Tariffs and Schedules for Belize Water Services (BWS)” for the FFTP. This report sets out my conclusions.

Costs, Revenues, and Income Projections

In the course of this review, I have carefully considered the cost and income projections set out in the PUC’s Initial Decision and the BWS Business Plan. I have also taken account of updated evidence on BWS’ financial statements available at December 2003.

By comparison to the PUCs Initial Decision, I have increased the level of capital expenditure by around BZD\$3m over the FFTP to allow for water treatment upgrade schemes to be implemented at the Belmopan and Belize City Water Treatment Plants. These schemes will improve water quality, pressure and security of supply in these regions.

BWS has made considerable efficiency savings in its levels of operating expenditure since privatisation mainly through a reduction in the number of its staff and reduced overall labour costs. I have adjusted the PUCs projections of all operating costs downwards by 1% per annum over the FFTP period to reflect the scope for further real efficiency savings over the medium term whilst taking into account the need for improved levels of customer services. This adjustment reflects evidence on total factor productivity increases achieved elsewhere in the world for similar companies.

I have adjusted the PUCs projections of management and expatriate fees upwards to acknowledge the important technical and managerial skills provided by Cascal staff. However, I have also profiled a reduction in the levels of these costs over the FFTP to reflect expected skill transfer from Cascal staff to BWS staff.

I have increased slightly the PUCs projections of water demand to be consistent with the FFTP business plan where demand increases would be expected to occur through:

improvements in water quality and pressure, a decrease in numbers of illegal connections, and increases in measured consumption through the meter replacement programme.

Tariff Recommendations

In setting out my recommendations on the Water and Sewerage Tariffs and Schedules for the FFTP I have paid particular reference to the principles of “affordability, revenue adequacy, fairness and simplicity” as set out in Schedule 1, Byelaw 4 of The Water and Sewerage (Tariff) Byelaws. A summary of my recommendations are as follows:

- A Tariff Structure and Schedule of Charges consistent with a revenue increase of 17%, effective April 01, 2004.
- In each year, starting April 01 2005, the Tariff Structure and Schedule of Charges should be adjusted for inflation based on the Belize CRI Inflation Index *for the prior year* as published by the IMF.
- Within the FFTP, the Tariffs and Schedule of Charges can be amended (upwards or downwards) at the start of each year to account for the impact on BWS’ costs of the following factors outside of BWS’ control: interest costs, electricity power costs, and bad debt costs.

Performance Standards

I have determined a set of Performance Standards that are consistent with the operating and capital expenditure set out in FFTP, and that focus on customer issues associated with water quality, water pressure, water service reliability, sewage discharge, customer complaints, and customer services.

I recommend that these Performance Standards must be monitored by an independent technical auditor appointed jointly by the PUC and BWS, and that failure to meet these performance standards after a certain period and after written notice from the PUC to BWS shall constitute a basis for the PUC to issue financial penalties against BWS in the form of subsequent tariff adjustments and /or customer rebates or financial penalties.

Legislative Changes

BWS proposed a set of procedural and legislative changes that they considered were necessary to deal with issues associated with bad debtor collections. These legislative changes included the proposal to make house owners rather than tenants legally responsible for payment.

I consider that it is outside of my jurisdiction and Terms of Reference to advise on the merits of BWS’ proposed legislative changes, especially when these legislative changes have significantly wider social implications than the context of the water industry. However, I

have recommended that BWS be allowed to pass the costs associated with increases in debt recovery costs, that could not reasonably have been avoided, into the level of tariffs at the start of the subsequent year. BWS will still have the incentive to control its level of bad debts through their impact on the level of revenues.

1. INTRODUCTION

The Public Utilities Commission (PUC) of Belize is currently conducting the First Full Tariff Review (FFTR) of Belize Water Services (BWS) to determine tariffs for the 5-year period starting April 1, 2004 and ending March 31, 2009. The Water and Sewerage (Tariff) Byelaws, Statutory Instrument No. 67 of 2002 (SI), establishes the procedure for Full Tariff Reviews.

On October 31 2003, BWS submitted its Business Plan, along with its Financial Model and Tariff Basket Model to the PUC for review. On November 10, 2003 the PUC held a Public Meeting at which both the licensee and other members of the public made representations. Written submissions were also received from several members of the public.

On December 15 2003 the PUC made its "Initial Decision" as provided for in Section 19 of the SI.

On December 24, 2003, BWS wrote to the PUC formally objecting to the PUC's "Initial Decision" as provided for in Section 22 of the SI. BWS' formal objection required the PUC to appoint an Independent Expert to review the proposed Schedules and Tariffs.

On the 26th January 2004, I was appointed as the Independent Expert to conduct a review of the Initial Decision and the "adviseability of amending the Tariffs and Schedules for Belize Water Services (BWS)" for the First Full Business Plan (FFBP) period 2004 to 2009. This report sets out my conclusions.

1.1. Terms of Reference

Under my Terms of Reference, the scope of work for the review is stated as follows:

"The Independent Expert will review the Initial Decision of the PUC (including the Tariff and Schedules), the objection by the BWS and objections, if any, made by qualified "interested parties" as defined by the byelaws".

The Terms of Reference further state that this review should give due regard to the following documents: the BWS Business Plan; Financial Model; and Tariff Basket Model; the PUC's Regulatory Model; Tariff Basket Model; and the Review Report from Halcrow Water Services, the consultants utilized by the PUC in conducting the Full Tariff Review. It is also stated that the review should consider other relevant documents such as (among others) the Transitional Business Plan, transcripts of the Public Hearing, and correspondence between PUC and BWS.

It is not stated in either the Terms of Reference for this work or the SI that my review should be confined only to examining points of difference between BWS and the PUC. In my opinion, I am required to issue a written report on the advisability of amending the Schedules and Tariffs after reviewing all relevant documentation. My understanding of this

scope of work under the Terms of Reference was stated to BWS and the PUC at an early stage of the review.

I have therefore not set out with the objective of choosing between the positions taken by BWS and the PUC, or even that of finding a mutually acceptable compromise. Rather, my review has set out to advise on whether, and if so how, the Initial Decision should be amended to comprise an appropriate tariff determination that satisfies the relevant tariff setting principles set out in the legislations, as described below.

Notwithstanding my need to consider all relevant documentation, the PUC's reasoning and BWS' objections to the Initial Decision represent a useful starting point for the review.

In addition to the documents specified in the Terms of Reference and listed above I have also reviewed the following documents, among others, in forming my conclusions:

- (i) *the privatisation prospectus of February 2001 relating to the public offering of shares in Belize Water Services Limited;*
- (ii) *the set of contracts between the Government of Belize (GOB) and Belize Water Services (BWS) and Cascal BV following privatisation.*

These documents are relevant to the expectations of shareholders at the time of the privatisation and should therefore be taken into account in seeking to achieve a price determination that is fair and that provides continuing incentives for further infrastructure investment necessary to promote the long term efficient provision of water services in Belize.

1.2. Relevant Legislation

The relevant water sector legislation to be taken account of in this review is as follows:

- The Water Industry Act (No. 1 of 2001) provides for the issuance of licenses to water supply companies by the PUC.
- The Water and Sewerage (Tariff) Byelaws, Statutory Instrument No. 67 of 2002 (SI), establishes the procedure for Full Tariff Reviews.
 - The Byelaws also establish a transitional period from March 23, 2001 to March 31, 2004 and subsequent five-year Full Tariff Periods. The First Full Tariff Period (FFTP) commences on the completion of the transitional period, i.e. April 1, 2004.
 - Schedule 1, Byelaw 4 of SI 67 of 2002 demands that the principles of affordability, revenue adequacy, fairness and simplicity shall be applied to

the determination of Tariffs and the establishment of the Tariff basket for the provision of water and sewerage services.

2. MAIN ISSUES

This section deals with a number of generic issues that are related to the regulatory framework and are concerned specifically about how tariffs must be adjusted through time for factors such as inflation, unexpected changes in costs and revenues, and levels of service standards. I consider that my recommendations on this dynamic framework need to be established before further account can be taken by the PUC of the appropriate levels of tariffs to be set at April 2004.

2.1. Tariff Indexation

In their response to the Initial Decision, BWS stated that *"The potential impact of inflation on this current and subsequent tariff increases has been understated significantly in the Initial Decision"*.

I have accepted BWS' arguments that a mechanism for accounting for the impact of inflation needs to be set out in the First Full Tariff Review Proceedings (FFTRP). BWS bears the consequences of inflation through increased operating expenditure and capital costs over time and it is fair that these increased costs are reflected in the allowed tariffs.

I have determined that allowance should be made for inflation through the form of an annualised tariff indexation mechanism that is linked to Belize CRI. In deciding on the appropriate index, a number of decisions need to be made particularly as regards choice of indexation index, frequency of adjustment, date of adjustment, and whether or not there should be separate adjustment mechanisms for water and sewerage.

My report proposes that BWS should be allowed to make an adjustment to its average tariff (including water and sewerage) on an annual basis where the maximum allowance for inflation should be based on the Belize CRI Inflation Index *for the prior year* as published by the IMF. BWS must submit its proposed revised charges to the PUC for approval prior to the start of each charging year.

The first time at which the impact of inflation should be taken in account in price limits is in the price limits to be set at April 2005.¹

2.2. Uncertainties and Annual Reviews

My recommended tariff profile provides a financial framework for BWS over the next five year period.

¹ The forecasts of costs and revenues that I have used to determine my tariffs recommendations are those based on levels of prices prevailing at end year March 2004. The inflation indexation mechanism is a retrospective mechanism that adjusts actual tariffs based on the level of tariffs prevailing in the subsequent year. Therefore the first year of the inflation adjustment to tariffs should occur in April 2005.

However, given the existence of only three years of financial statements and performance data for BWS since privatisation, there are a number of uncertainties regarding BWS' projections of revenues and costs. In some cases I have adjusted BWS' projections of revenues and costs based on the supporting documentation, available data and my own judgement and experience, bearing in mind the need to provide incentives for efficiency. However, the sources of uncertainty remain and I believe it is appropriate for me to set out recommendations on a framework to deal with uncertainties between price reviews.

Under the current statutory framework, SI 67 part IV provides for an Annual Review Proceeding on the basis of "Exceptional Circumstances" where these are defined as having a material effect on the financial position of the company. A set of factors are set out in the contract between GOB, Cascal BV and BWS where it is stated that the Annual Review Proceeding will compensate the company for the cumulative effect of any change in the Company's net revenues.

In this price review I have recommended an additional mechanism to deal with current uncertainties in costs and revenues, that provides grounds for an "Annual Price Adjustment (APA)" where allowance has not already been provided for (either in full or at all) in the FFBP. These can be thought of as cost-pass through mechanisms that are designed to deal with specific items where there is considerable uncertainty regarding their future values.

I have defined the following as Notified Items for an APA. The reasons why I have classified these as Notified Items are discussed in the relevant sections (See Section 3.1.2 for electricity costs, Section 5.1.1 for Interest Costs, and Section 5.2 for Bad Debt Costs).

NI1: Bad Debt Costs;

NI2: Electricity Rate Costs;

NI3: Interest Costs.

In assessing each of these Notified Items, the focus must be on changes between expected and actual company costs that are due to factors outside of a BWS' control and that could not have been avoided by prudent management action on the part of the BWS.

I have proposed that both NI2 and NI3 are symmetric so that the Price Adjustment may reflect increases and decreases in costs relative to the level assumed in the FFTP. In the case of NI1 "Bad Debts" I have assumed that this is asymmetric such that it takes account only of unexpected increases in BWS' levels of bad debt which are outside of BWS' reasonable control and which they cannot avoid by prudent management action in debt recovery.

It should be stressed that an APA that is triggered by a Notified Item does not lead to a re-opening of the entire tariff schedule, which would likely become costly and onerous for both parties if undertaken frequently. Rather the purpose of an APA is to enable the PUC and BWS to ensure that customers tariffs take into account changes in specific sources of costs

where there is significant uncertainty regarding forecasts at the current time in setting the FFTP Business Plan.

There are a number of other areas of uncertainty in the FFTP projections that can materially impact on revenues and costs but I have decided not to list these individually as Notified Items on the basis that these are less material in terms of their impacts on tariffs, and/or are generally more likely to be symmetric. I have also given consideration to the possibility of a “Generic Notified Item” to deal with any specific issue of uncertainty but have decided against this on the grounds that this may reduce BWS’ incentives to control their costs effectively.

I consider that changes in other factors that affect revenues or costs should still be able to trigger an Annual Price Review on the basis of the existing “Exceptional Circumstances” provisions in the SI if the changes are significantly material.

The details of this framework will need to be resolved by the PUC and BWS to determine such factors as: timing of APA requests prior to each price review, information requirements for each factor, and the exact financial modelling procedures that will be used to adjust price limits for these factors.

My recommendation with respect to materiality is as follows: an annual Price Review can only be made if the net present value (NPV) of the variation in cash flows due to the Notified Item (known as the materiality amount) exceeds 5 per cent of turnover where the NPV is assessed over the period up to the next price review. A modified system of this has been used effectively in the UK to deal with issues of Notified Items in recent years.

2.3. Performance Standards and Indemnities

I have determined a set of Performance Standards that are consistent with the FFTP and specifically the capital investment programme in the FFBP, that focus on customer issues associated with water quality, water pressure, water service reliability, sewage discharge, customer complaints, and customer services. These Performance Standards are set out in Appendix C

I recommend that these Performance Standards must be monitored by an independent technical auditor appointed jointly by the PUC and BWS, and that failure to meet these performance standards after a certain period and after written notice from the PUC to BWS shall constitute a basis for the PUC to issue financial penalties against BWS in the form of subsequent tariff adjustments and /or customer rebates or financial penalties.

3. MY ASSESSMENT OF KEY INPUTS INTO THE REGULATORY MODEL

3.1.1. Capital Investment Programme

In the Initial Decision the PUC disallowed expenditure for a number of capital investment schemes included in the BWS BPRP including: (i) the Caye Caulker project; (ii) the Hattieville Pipeline project; and (iii) the Double Run Water Treatment plant upgrade. In addition, the PUC reduced BWS' proposed expenditure on the Belmopan sewerage project from \$6.5M to \$3.0M in line with the recommendations of the report by Halcrow Water Services (HWS).

In its response to the Initial Decision, BWS (p.6) stated that *"In making decisions on short term cuts in capital costs, the PUC may not be meeting their statutory obligation on affordability"*.

During the course of the review, BWS presented further cost estimates associated with the following four schemes, to be reflected in the FFTP Business Plan: Belmopan Water Treatment Plant, Belize City Water Treatment Plant, Belmopan Sewage Treatment Plant, and Belize City Sewage Treatment Plant. Details of these schemes and the cost estimates are presented in Appendix A.

My Assessment

The appropriate way to take account of proposed new capital investment schemes is to examine evidence on customers' willingness to pay for the outputs of the schemes in terms of improved levels of water quality, pressure, reliability of supply and environmental benefits. However, there is currently limited evidence in Belize of customers' willingness to pay for these outputs.

In deciding on the appropriate capital investment programme for BWS over the five year period 2004 to 2009, I have taken a pragmatic approach and taken into account the following factors:

- First, I have considered which capital schemes are necessary to meet existing levels of water quality, other levels of service (eg. pressure) and/or levels of production.
- Second, I have undertaken a financial cost benefit analysis that examines whether the longer run operational and maintenance savings from BWS' proposed capital schemes justifies the initial capital expenditure of these schemes in this FFTP.

- Third, I have considered which of the schemes would enable BWS to meet its investment obligations set out in the Investment Agreement between BWS, Cascal and the GOB signed at the time of privatisation.²
- Fourth, I have considered which of these schemes require a further time period for appropriate technical, environmental and financial evaluation.

On the basis of the evidence presented to me during the course of this review, I have concluded that both the Belmopan and Belize City WTP should be included in the FFTP on the basis of the operational financial savings associated with both of the schemes and the improved water quality levels that will result from both of these schemes. Given that there is currently uncertainty regarding whether BWS can procure additional finance from the CDB for the Belize City WTP Double Run project as an extension of its existing loan facility and also some uncertainty regarding the costs of this scheme, I have scheduled this scheme for Year 5 of the FFTP in order to allow for these uncertainties to be resolved. I have scheduled the Belmopan WTP for Year 4 of the FFTP.

Of the other two schemes, I have decided that it is appropriate to include in the FFTP Business Plan a sum of US\$0.19m expenditure for the Belmopan STP on the basis of the demonstrable environmental benefits from this scheme. However, I have not included BWS' proposed expenditure of US\$2.68m associated with the replacement of the sewerage network at Belmopan in this FFTP. Such expenditure cannot be justified given the high debt financing costs faced by BWS at this time. I have included an allowance for maintenance of the existing network in its current state.

I have also not included the proposed STP capital expenditure at Belize City in this FFTP Business Plan. Further evidence needs to be collected on the environmental benefits of this scheme.

By comparison to the PUC's Initial Decision, and the BWS BPRP, my allowance for additional capital expenditure during the course of the FFTP is as follows:

² In other circumstances, establishing that a scheme is necessary to meet a water undertaker's contractual obligations would generally be regarded as a sufficient criterion to determine whether or not the scheme should be undertaken. However, for a variety of reasons, BWS has failed to meet its contractual obligations in terms of water and sewerage quality in a number of areas since privatisation. And it has received a government waiver against these obligations in the meantime.

Table 3.1
New Capital Expenditure (BZD\$) during the FFTP Period

YEAR	4	5	6	7	8	TOTAL
PUC Initial Decision	4572.9	3526.2	2317.9	2613.6	3831.7	16862.4
BWS' BPRP	4664.4	12382.1	1929.2	3900.7	5102.7	27979.0
<i>IE Recommendations</i>	8002.5	3798.1	3072.9	3575.2	1683.5	20132.2

Given the need to implement additional water treatment schemes to improve water quality, and the operational savings associated with these schemes, I have scheduled the Belmopan WTP and the Belize City WTP for early in the review period. I have also allowed maintenance costs associated with the Belmopan STP in years 4 and 5 and maintenance costs associated with Belize City DR WTP in Year 4.

The net effect of these recommendations is to increase my recommended allowed level of capital expenditure to around BZD\$11.7m in years 4 and 5, significantly above that allowed by the PUC of around BZD\$8.1m but substantially below BWS' capital expenditure projections in the BPRP of BZD\$17.0m.

I have also scheduled the Belmopan STP for as early as possible in this review period, in year 6, in order to deliver environmental benefits as soon as possible and ensure BWS meet their statutory obligations with respect to sewage discharges. My aggregate allowed capital expenditure for years 6 to 8 is similar to the PUC's aggregate allowed capital expenditure for these years at between BZD\$8m to BZD\$9m.³

I have also allowed for capital maintenance costs associated with Belize City STP and Belmopan sewerage system in all years of the review period.

Based on the evidence presented to me during the review I consider that my allowance for maintenance costs associated with the Belmopan sewerage system, Belize City STP, and Belize City DR WTP to be at the upper end of the likely range of actual maintenance costs. I recommend that any savings BWS is able to make as a result of lower maintenance costs should be directed towards advancement of the timing of the allowed capital schemes and/or additional discretionary capital expenditure to increase levels of service in other areas.

Later in the review period, my projections of BWS' cash position show that BWS will be able to undertake further capital investments to meet water quality improvements in other areas of the country without the need to increase tariffs. I have not included specific allowance for these further capital investments in this FFTP on the basis that detailed cost estimates of

³ The difference in profiling of the capex over these years is mainly a result of my scheduling of the Belmopan STP as early as possible, for Year 6, whereas the PUC scheduled this scheme across Years 5 to 8.

water treatment schemes in areas such as Corozal, Orange Walk and Hattievilleville, and the benefits of these schemes, have not been presented to me during the course of this review.

I have however recommended (See “Indemnities and Waivers”) that BWS should determine the costs and benefits of these schemes and that the PUC should decide on the appropriate method of funding for these schemes either through an Annual Price Review or through savings that BWS has made elsewhere. I have decided against imposing an explicit dividend cap on BWS to ensure that such discretionary does occur in order to continue to provide BWS with a continuing incentive to be efficient. However, the PUC and the GOB have the option to remove the waiver or indemnity that they provide to BWS for levels of service that do not meet the standards set out in the Investment Agreement should BWS not make efforts to do so when it has the necessary financial resources.

Indemnities and Waivers

BWS have stated that they request a continuation of the ‘waiver’ from the GOB against some of the levels of service and capital expenditure set out in the *Investment Agreement* that may arise as a result of not being allowed the requisite level of capital expenditure in the tariff schedules that are set at this price review. BWS have also stated that they request an indemnity against all forms of criminal and civil prosecution that may arise as a consequence of not being allowed the requisite level of capital expenditure to meet minimum standards of service.

It is, of course, outside my jurisdiction to grant such an indemnity in my role as the IE. However, my recommendation to the PUC and the GOB is that some form of indemnity is appropriate, providing that it is not an open ended indemnity and providing that it reflects only the shortfalls in capital treatment expenditure in defined regions such as Hattievilleville, Corozal and Orange Walk that cannot be justified at this current time. In addition, my recommendation is that this indemnity be subject to the following provisions:

- (a) Within one year, BWS must provide evidence on the capital costs of new schemes that will enable BWS to meet its investment obligations under the terms of the Investment Agreement with the GOB;
- (b) Over the next two years, BWS must collect evidence on customers’ willingness to pay for improved levels of service in areas such as Corozal, Orange Walk, Hattievilleville and Dangriga where levels of water quality are below minimum WHO standards. This evidence should be presented to the PUC and the GOB;
- (c) Providing good progress is made on (a) and (b), the PUC should evaluate which quality related capital expenditures schemes are justified in terms of the costs and benefits of these schemes. Based on this information, the PUC should examine the case for the capital expenditure schemes to be funded during years 6 to 8 over the review period either through

an Annual Review of tariffs (with an appropriate adjustment to the indemnity) or through efficiency savings BWS has made in other parts of the capital expenditure programme.

(d) Subject to (a) and (b) and (c), a government indemnity continues to be appropriate providing that BWS can satisfy the PUC that it is taking the necessary steps to undertake the capital investments and improve service standards where financial resources allow.

3.1.2. Operating Costs

In its Initial Decision, the PUC stated that the “operational expenditure unit rate was high as compared to unit rates obtaining elsewhere” but did not adjust BWS’ proposed levels of operating expenditure in the BPRP.

In considering BWS’ operating costs over the FFTP period, I have paid attention to the following factors:

- I have examined BWS’ projections of individual cost items and procurement procedures in detail, and considered the scope for efficiency improvements over the FFTP period.
- I have considered the consistency of BWS’ operating cost projections with the capital expenditures and outputs in the FFTP business plan; and
- I have considered whether BWS’ operating cost projections are consistent with improved levels of service to customers over the FFTP period.

In practice, a reasonable rate of cost reduction has to be derived from objective analysis of long-term trends in *total* unit costs or total factor productivity in similar network companies. I show in this report that such trends do not vary widely and are in the region of 1% -3% (for base service levels).

Overall, after taking account of changes to specific operating costs, and of TFP trends in similar industries, my projections of BWS’ operating costs used for this tariff review are as follows:

Table 3.2
IE Recommendations on Operating Costs

Year	3	4	5	6	7	8
Materials	4795654	4836113	5111116	5246001	5373302	5504157
Staff	6426113	6215265	6108315	6033417	6010057	5947452
Other	336350	3643053	3231540	3166277	3146589	3075001
<i>Total Opex</i>	14552117	14,694,431	14450971	14445696	14529948	14526611

Source: NERA analysis.

My analysis of BWS’ operating costs is set out in Appendix B.

I have also considered during the course of this review how to deal with unexpected changes in electricity costs. Electricity Tariffs are subject to an Annual Review and a Five Year Full Tariff review. The First Full Tariff Review is scheduled for 2005. The Rate Stabilization Accounts (cost of power and hurricane) were established to increase predictability and stability of rates over a five year horizon. However, there is currently a balance of this cost to be recovered as a result of the cost of two major hurricanes.

Given that electricity costs form a significant component of BWS' costs, and given that there is potential for significant change in electricity costs outside of BWS' control, it is appropriate for BWS' tariffs to be adjusted for the difference in electricity costs at the time that they occur rather than at the next price review. With this in mind, I propose that electricity costs are also classified as a Notified Item. In assessing electricity costs against the NPV test set out in Section 2.2 above, the calculation should be based around variations in Unit Rates of electricity prices above or below the Belize CRI inflation index to make sure that there is no double counting.

3.1.3. Management Fees

The BPRP included an estimate of management fees of approximately BZD\$500K per year on average over the course of the control period. In their response to PUC's Initial Decision, BWS contest the PUC's reduction in BWS' estimates of management fees from 500K to 250K.

There is established international guidance on transfer pricing that applies to management fees. Prices of goods and services between affiliates ("transfer prices") should be based on market prices or less. Where no market exists, transfer prices should be based on cost. In a regulatory environment the requirement for cost-reflective transfer prices is particularly important because of the potential to charge inflated prices to regulated businesses, and use this as a mechanism to pass excess profits to the parent company.

The approach I have taken to assessing the management fee costs proposed by BWS is to examine the cost data provided by BWS that underpins their management fee estimate, and compare this to international benchmark labour costs for similar services. I have also taken into account the need for skill transfer from international labour to Belize local labour over time in order to achieve an efficient cost structure.

My allowance for BWS' management fees over the FFTP period is around 33% less than the BWS management fee cost submission, but approximately 17% higher than the proposed allowance by PUC. My projections of management fees used for this review are as follows:

Table 3.3
Management Fee Cost Allowance

	2005	2006	2007	2008	2009
PUC Initial Decision	250,000	250,000	250,000	250,000	250,000
BWS Cost Submission	622,405	444,778	562,840	411,060	603,529
<u>My Calculation</u>					
Non-travel Management Fees (after 25% reduction)	371,878	236,759	323,369	207,559	349,896
Travel Costs (after 50% reduction)	63,283	64,549	65,840	67,157	68,500
New Total before efficiency savings	435,162	301,309	389,210	274,716	418,397
<i>New Total (following efficiency savings)</i>	430,810	295,313	377,650	263,892	397,891

Source: NERA analysis

4. DEMAND PROJECTIONS

The following Table shows the sales volume projections presented by the PUC and BWS over the FFTP years. I have also included Year 1 to Year 3 in this Table for comparison purposes.

Table 4.1
Sales Volume Projections

Sales Volume (Mgal/Year)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
BWS' BPRP Model	1,308	1,463	1,561	1,689	1,825	1,934	1,980	2,027
PUC Model (15% increase)	1,308	1,463	1,561	1,689	1,825	1,934	1,980	2,027
Annual Growth - Initial Decision		11.85%	6.70%	8.20%	8.05%	5.97%	2.38%	2.37%

BWS' BPRP states (p.54) that: *"the key commercial drivers for the business moving forward are the growth in connections combined with the consumption per connection (CPC). These two parameters underpin the sales volumes and resultant income as well as defining growth year on year"*.

The following table shows BWS' projections of customer connections and CPC used in the BPRP and the PUC's projections used in the "Initial Decision":

Table 4.2
Customer Connections and Consumption per Connection (CPC) Projections

DESCRIPTION	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Customer Connections								
FFTP Model	35,916	37,404	38,421	39,477	40,575	41,548	42,546	43,570
PUC Model (15% increase)	35,916	37,404	38,421	39,477	40,575	41,548	42,546	43,570
Annual Growth - Initial Decision		4.14%	2.72%	2.75%	2.78%	2.40%	2.40%	2.41%
Cons. per Conn. Per Month (Kgal/conn)								
FFTP Model	3,034	3,260	3,385	3,565	3,747	3,879	3,878	3,877
PUC Model (15% increase)	3,034	3,260	3,385	3,565	3,747	3,879	3,878	3,877
Annual Growth - Initial Decision		7.45%	3.83%	5.32%	5.11%	3.52%	-0.03%	-0.03%

4.1. CPC Growth

In the BPRP, BWS noted that “the CPC in Belize is one of the lowest globally” and that “in many developing countries CPC is between 50 to 100% higher than that found in Belize”.⁴

BWS’s BPRP states that are a number of reasons why CPC in Belize is one of the lowest globally. These include the high level of Yard to Yard (YTY) connections leading to illegal connections and poor water pressure, and the under registration of meters. In addition, BWS stated that many of their customers disconnect from the water system at certain times of the year and use their own supplies from on-site storage facilities.

It follows from BWS’ assessment of the reasons why Belize CPC is comparatively low that a reduction in the number of illegal connections, an improvement to water quality and pressure, and installation of new meters, would be expected to improve CPC levels considerably. An improvement in water pressure would also be expected to lead to a reduction in the disconnection rate during certain times of the year and the use of on-site water storage facilities.

During the course of the review I expressed concern that BWS’ zero growth forecasts of CPC over the period after Year 6 did not appear to be fully internally consistent with other aspects of the business plan. Specifically, I stated that I would expect to see BWS’ projections of income and consumption to take into account of the following:

- BWS’ forecasts of CPC should take account of the expected yields associated with intensive meter replacement schemes that are projected to be focused on a number of areas over the 2004-2009 period.
- BWS’ forecasts of CPC should take account of the projected decrease in illegal connections and the impact of the decrease in numbers of illegal connections on observed CPC figures.
- BWS’ forecasts of CPC must take account of projected improvements to water quality and pressure, and be internally consistent with the FFTP operational and capital investment plan.
- BWS’ forecasts should reflect a “natural” increase in water consumption that would be expected to occur given the projected change in GDP and real income in Belize over the period.

In response to this, BWS then presented revised CPC forecasts that showed an annual increase of CPC of only 1% per annum in 2004 to 2009 period and 0% thereafter. Both of

⁴ The BWS BPRP notes that “when comparing with the TBP”, actual levels of CPC are in “deficit” by 4% in Year 1 and 3% in Year 2. BWS further note that the recovery in Year 2 was largely due to the commissioning of Double Run and improved pressures.

these assumptions cannot be easily reconciled with historical consumption data over the period 2001-2004 that shows annual CPC growth of around 7%.⁵

Overall, I am not persuaded that BWS' analysis has reflected all of these factors adequately. In deriving forecasts of CPC I have taken a long-term view. A key driving factor for CPC growth is simply growth in income. Economic and empirical literature on demand forecasting widely acknowledges a positive relationship between income and water consumption with estimates of income elasticity of demand generally in the range of 0.35 to 0.5.⁶ Based on current IMF GDP forecasts for Belize of 2.73%, an income elasticity of 0.35 to 0.5 translates into an assumed CPC growth rate of 1.0-1.4%. I have taken this range as the starting point for my projections of CPC.

Given the comparatively low levels of CPC in Belize by comparison to international levels, I would also expect to see significant increases in measured levels of CPC following improvements to water quality and pressure. In addition, reductions in illegal connections and meter replacement programmes would also be expected to translate into higher levels of CPC.

Evidence from BWS data that shows an average year on year CPC growth rate of 6.8% over the period 2001-2003 confirms the strong growths in CPC that are a reflection of the factors above. These high growth rates, however, are somewhat exceptional and cannot be expected to continue indefinitely.

Rather than use the high historical growth rates as the starting point for future growth rates I have assumed a medium term "natural" CPC growth rate of 2% per annum over the period 2004 to 2009 that reflects the base assumption of 1.0-1.4% plus a further increase in CPC to reflect improved water quality and pressure and reductions in illegal connections. In addition I have taken into account the expected benefits of the meter replacement programme in years 4 to 6 on levels of CPC. This leads to an average CPC growth rate of 2.25% per annum over the period 2004 to 2009 which is somewhat lower than the historical growth rates observed over the period 2001-2004. Over the longer term from 2009 onwards I have assumed a base level increase in CPC of 1.0% consistent with the lower end of the evidence on expected changes in CPC from income elasticity studies.

4.2. New Connections Growth

With respect to customer connections, BWS derive growth forecasts of new connections on the basis of average population growth rates over the last five years from the population

⁵ Whilst I recognise that historical growth rates do reflect "one-off" gains associated with meter replacement (MR) programmes in the March 03 to March 04 period, it is also noted that CPC increased by 6.3% over March 02 to 03 period, in a period before the MR programmes (when unbilled consumption increased from 13.2% to 14.8%).

⁶ In a comprehensive listing of estimated income elasticities by Hanemann (1998), the average income elasticity was found to be 0.52. Other lower income country based studies have derived estimates generally ranging between 0.35 and 0.50. See TWUWS (1996) "Water and Wastewater Utilities, Indicators, Second Edition"

consensus with some small adjustments to these growth rates to reflect BWS' projections of future demographical changes.⁷

During the course of this review BWS provided a report to me on new connection growth projections. This report details BWS' justification and rationale for their assumptions of lower growth forecasts of new connections for Year 4 onwards.⁸ In this report BWS highlight that they expect the growth in new connections to be significantly lower going forwards. BWS attribute this to a number of factors as follows:

- a) *“Increasing costs to BWS, individual Customers and Developers;*
- b) *Lack of strategic planning by Developers therefore how can BWS make aggressive projections based on little or no information. Furthermore, BWS has absolutely no control as to the intensity of these developments or indeed the timing of customers developing their properties;*
- c) *Discrete and geographically dispersed service areas and developments are resulting in disproportionate development and investment costs. Equally, these demographic facts place pressure on the discrete and independent assets. This results in additional investment for increasing water treatment capacity and strategic mains, thereby increasing the cost of new connections even higher than the present levels (see costs detailed in sections below).”*

BWS also highlight how “the company has to connect 4 connections for every one permanent connection. This means that the true cost of each new connection is between \$1,020 and \$14,000 depending on the location of the Customer property of which BWS has no control”. BWS present evidence to show that the number of disconnections have increased over the period 2002 to 2004 from 12806 in 2002 to 16127 in 2004.

During the course of this review, the PUC presented evidence to me to show that BWS have benefited from above average population growth in the past as a result of the shift from rural to urban areas. In addition the PUC argues that the growth in the tourism sector and hotel expansion would be likely to increase new connections even further.

In forming my views on the appropriate central forecast of new connections to include in the FFTP I took into account the following factors:

- It is clear that the high and volatile levels of reconnections and disconnections from the system makes the forecast of the number of net new connections year on year somewhat uncertain. BWS have also argued that new legislation is needed to enable

⁷ Downward adjustments are made to the San Ignacio and Belmopan growth forecasts from 4.4% and 4.9% to 3.0%.

⁸ In their report, BWS state that new connections arise through one of three types: (i) development projects some of which are government driven and funded, (ii) in-fills, or (iii) infrastructure connections. Of these types, in 2003/04, BWS state that around 1000 of the new connections were development projects funded by the GOB, and around 2800 projects were in-fills or infrastructure connections. “Report on BWS New Connection Growth Projections”, Supplied to Richard Hern by Alvan Haynes, 19/02/04

them to be able to dissuade illegal connections effectively. At the current time this legislation has not been approved;

- It would be reasonable to assume that the numbers of disconnections from the system would decrease in response to an improved level of water service standards, particularly improved pressures that would likely deter customers from using on-site storage systems to the same extent;
- Whilst there are clearly opportunities for BWS to increase its numbers of new connections, and its level of population coverage, there are uncertainties associated with the costs of these new connections and the level of funding that is available from other sources such as GOB finance and new developer finance.

My overall views on the likely level of new connections over the FFTP period is that there are good reasons to believe that the numbers of new connections that BWS can achieve may outpace the annual growth rate of 2.5% assumed by the PUC over the FFTP period. However, the costs to BWS associated with additional new connections are uncertain, and the levels of disconnections and reconnections are both volatile and uncertain, and this makes it difficult to derive a five-year view on BWS' achievable additional income from new connections to take account of in setting tariffs.

Whilst I believe that BWS' projections of new connections growth rates lie at the lower end of the plausible range, the PUC did not adjust these projections in the Initial Decision. I have therefore also accepted these projections. However, should BWS be able to achieve higher rates of growth of new connections and benefit from GOB and developer funding of the costs of these new connections, it would be appropriate for BWS to use this additional income to implement quality related capital expenditure schemes to meet the service standards set out in the Investment Agreement, where appropriate.

4.3. My Assessment of CPC and Customer Connections over the FFTP

My forecasts of Customer Connections and Consumption per Connection (CPC) are set out in Table 4.3 below. The forecasts use updated evidence on actual CPC and customer connections at December 2003. The Table shows the following:

- A year on year growth in customer connections in line with population forecasts as assumed by BWS in the BPRP.
- A year on year growth in CPC of around 3% over the FFTP period. By comparison to the Initial Decision, I have projected CPC in Year 8 of 3991. This is around 2.5% higher than assumed by the CPC in the Initial Decision.

Table 4.3
Customer Connections and Consumption per Connection Projections

DESCRIPTION	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Customer Connections						
Independent Expert Projections	38478	39536	40636	41610	42610	43635
<i>Year on Year Growth</i>		2.75%	2.78%	2.40%	2.40%	2.41%
Cons. per Conn. Per Month (Kgal/conn)						
Independent Expert Projections	3497	3554	3669	3849	3920	3991
<i>Year on Year Growth</i>		1.63%	3.24%	4.91%	1.84%	1.81%

5. FINANCING ISSUES

5.1.1. Interest and Financing Issues

The regulatory model shows that the level of interest costs are a key factor in the level of final customer tariffs. BWS inherited significant debt at privatisation equating to BZD \$43.953m. The actual level of debt shown in the BWS BPRP at March 2004 is BZD\$73,829m. In the PUC's Initial Decision, total interest costs over the FFTP are around BZD\$41m.

BWS recently secured a new loan facility equating to BZD \$22m with the Alliance Bank of Belize with a further \$4m overdraft limit. The finance is primarily secured on the assets of BWS and has an interest rate of 12%, with the overdraft having an interest rate of 12.5%.

During the review BWS stated that the restrictive covenants associated with the existing Alliance loan significantly restrict the possibilities for raising alternative finance. However, BWS stated that a possible alternative financing option to the existing Alliance loan, and to fund future capital investments, is for the GOB to take on further debt from the CDB and then to use this money to increase its lendings to BWS. BWS reported that this lending arrangement would take less time to facilitate than and that the CDB would be more willing to lend on this basis than lending directly to BWS.

My Comments

It has not been a focus of this review, nor has there been time, to examine BWS' financial structure and future financing possibilities in detail. However, the level of interest costs that BWS currently incurs and the financing restrictions that it faces represent a significant burden to both the company and its customers. In considering the issues of interest costs and financeability I have taken the following into account:

- It is an important regulatory principle that interest costs should not simply be passed through to customers at each regulatory price decision. The regulatory decision must pay regard to the prudence of the level of the existing and projected interest costs when evaluating the proposed business plan.
- A key "prudence" test that I have given regard to in my assessment of BWS' financings concerns BWS' proposed use of incremental debt finance to fund shareholder dividends. Given that the existing loan facilities available to BWS are at 12% interest costs and above, it cannot be financially justified to make use of these loan facilities simply to fund shareholder dividend payments.
- I have also given regard to the financial prudence of early repayment of the Alliance loan before any dividend payments commence. A key issue for BWS and the PUC to evaluate going forwards is whether, notwithstanding the penalties associated with

early repayment, it would still be financially prudent to repay the Alliance loan facility in lieu of other sources of debt finance.⁹

- Finally, the regulatory price decision must give regard to the high marginal cost of BWS' existing debt and overdraft facilities. Everything else equal this makes large scale capital investment schemes less attractive if there is an alternative scheme that involves continuous operational and maintenance activities without detriment to operational risk and customers' levels of service.¹⁰
- All performance targets must be conditional on the availability of new debt finance, and BWS' efficiency in procuring new sources of debt finance.

Given that interest costs represent such a significant financial burden on the company and the level of tariffs, and that there is uncertainty with respect to future interest costs over the FFTRP period, I have formed the view that changes in interest costs should be directly reflected in tariffs through the use of an Annual Price Adjustment (APA) mechanism as discussed in Section 2.2 above. The implications of this are as follows:

- First, should BWS be able to refinance and procure cheaper finance than the 12% assumed in the FFTRP (eg. through CDB or GOB finance) that this should be directly reflected in the annual update to tariffs at the next Tariff year.
- Second, should the level of interest costs assumed in the FFTRP increase, the increased interest costs will also be reflected in higher tariffs.

In making interest costs a Notified Item (over the course of this FFTRP only, to be reviewed at each price review) the PUC will need to approve BWS' financing decisions on a regular basis, before significant financing decisions have been made, and in advance of each annual re-setting of tariffs. The formal mechanisms of this arrangement will need to be set out.

5.1.2. Dividend Profile

Schedule 1 of SI 67 places an obligation on the PUC to allow BWS to recover a rate of return of 12% to be achieved over the total life of the licence, being 25 years commencing on 23 March 2001.¹¹ With reference to the regulated rate of return, the PUCs Initial Decision states:

⁹ I would also like to have undertaken a "prudency test" of BWS' existing interest costs against possible alternative sources of new debt finance, including international debt finance, but this was outside the scope of my review.

¹⁰ Whilst BWS is aware of the relatively high costs of new Alliance debt finance at 12%, it is not clear that it has fully accounted for these costs when appraising the costs and benefits of new capital schemes. Financing costs must be taken into account in a cost benefit analysis, and BWS' high interest debt costs mean that it can be financially prudent to defer large scale capital investments

¹¹ The water industry legislative framework provides for a rate of return of 12% to be respected in the tariff review proceedings, where that regulatory rate of return "is inextricably linked the implementation of the Business Plans approved by the PUC in review proceedings" and "is calculated by the receipt of dividends paid to the licensee's shareholders and any Residual Value paid or payable to the said licensee's shareholders at the end of the license period by the Government of Belize".

“The governing legislation provides for a regulated rate of return of 12%. Based on accepted practice under similar circumstances, the regulated rate of return was considered adequate by the Review Team”.

The SI does not provide any further guidance on the appropriate *profile* of dividends over the life of the license.

I understand that there is a disagreement between BWS and the PUC regarding the price profile and promised dividend payments to the shareholders of BWS set out in the share purchase contracts signed by Cascas BV and the GOB at the time of privatisation. All documents and financial models relating to the contract between the GOB and Cascas BV have not been made available to me to comment on this issue.

It is also outside my Terms of Reference for this review, and the parameters of the water industry legislation in Belize, to take explicit account of the provisions of a contract between the shareholders of BWS and the GOB in setting out my advice on the appropriate schedule of water and sewerage tariffs.

Notwithstanding my Terms of Reference, it is obviously an important issue of principle that every effort should be made to ensure that a contractual arrangement between shareholders and the GOB at privatisation should be subsequently respected in the design and interpretation of the regulatory framework. Not to do so would have serious consequences in terms of international law and also in terms of investor faith in the privatisation regime in operation all of Belize.

In my consideration of the appropriate dividend profile to be paid by BWS, I have therefore paid regard to how the relevant provisions of the contract, insofar as I am aware of these provisions, relate to the current price determination. My agreement of confidentiality prevents me from discussing any of these provisions explicitly in this document.

I have applied the following economic principles in deciding the appropriate dividend profile to be paid by BWS over the FFBP:

- First, dividend payments are constrained by issues of affordability. The level and profiles of dividend payments must take into account the impact of these dividend payments on tariff profiles. What this means in practice is that dividends may be lower in some years when costs are higher, especially capital costs.
- Second, there is a strong economic argument that the dividend profile should be smooth over time in order to provide investor faith in the regulatory framework, to provide tariff stability.
- Third, it can also be argued, in a regulatory context especially, that dividend profiles should match the improvements in the levels of service that the customers receive.

Higher (dividends and) tariffs are economically justified when matched to improvements in levels of service and quality.

I do not consider that a dividend profile that is either deliberately front loaded or back loaded is consistent with these economic principles. Backloading of dividend profiles increases shareholders' risks (since the future is more uncertain than the present) and weakens incentives to provide additional capital into the business. Affordability issues therefore need to be examined with an inter-temporal perspective. It is not acceptable to only consider the affordability issue associated with a current tariff increase but to ignore the impact of the front or back loading of dividend payments over time.

Overall, a balance needs to be struck to set a tariff profile that meets these economic objectives, and that respects the appropriate contractual arrangements. I believe that the tariff profile I set out below is consistent with the principles set out above leading to smooth increases in dividends over time.

5.2. Procedural and Legislative Changes

The BPRP proposed a set of procedural and legislative changes that they considered were necessary to deal with issues associated with bad debtor collections. In summary, I understand that BWS' key procedural and legislative change proposals are:

- BWS must be able to connect to a "property" (rather than a customer) and make the owner of the property responsible for payment;
- Penalties for illegal connections should be able to be administered by the PUC who would also act as an arbiter between BWS and its customers;
- BWS should be able to recover all reasonable costs associated with the losses in sales and costs associated with actually disconnecting the services.

BWS argued in its response to the Initial Decision that it *"has based its cost structure on the clear understanding that that these legislative changes will be mandated in law by 2004"*.

During the course of the review, BWS submitted a document that stated *"The legislative changes proposed within the FFTP are key to managing and reducing the level of bad debts within the business. BWS believes that the failure to implement these leaves the Business with no other form of recourse than to add the additional costs to the Business Plan and that until the Legislative changes required by the FFTP are implemented that it is only reasonable that the Business' costs are recovered"*.

My Assessment

I believe that it is outside the scope of my Terms of Reference to advise on the merits of BWS' proposed legislative changes, especially when these legislative changes have significantly wider social implications than the context of the water industry.

It is clear that the level of bad debts are currently a significant problem, and that there are significant costs to BWS in disconnecting the service, and in the pursuit of prosecution for non-payment.

I have taken account of BWS' costs associated with bad debt collections in two ways. First, I have used historical evidence on the level of bad debts as a basis for my tariff and schedules decision. I have not adjusted the level of bad debts downwards over the tariff review period, as might be expected if these legislative changes were enacted.

Second, in order to take account of the *costs* associated with unexpected increases in bad debts outside of BWS' control I have proposed that additional costs associated with the collection of bad debt that are in excess of the level of costs included in the BWS BPRP should be reflected by the use of a Notified Item, as explained in Section 7 above. This proposed Notified Item is limited to the additional costs associated with bad debt collections (ie. not the lost revenues).

With respect to revenues associated with bad debts, over the past two years, BWS has implemented policies to improve its billing and collection systems and must be encouraged to continue to do so. Two pivotal changes have recently been introduced by BWS to improve its level of debt collections and reduce incentives to disconnect, namely the imposition of a deposit system and a reduction in the number of days allowed for bills to be paid.

The deposit system can significantly impact on bad debts and has been used elsewhere in the world effectively to control the levels of bad debts. I also propose that BWS should implement an escalating deposit system whereby the re-connection fee that the customer is required to pay increases according to the number of times that customer has disconnected up to a maximum threshold.

The PUC's Initial Decision approved an increase in the reconnection fee from \$10.00 to \$25.00 and this should serve as an incentive for customers to not be disconnected.

I do not underestimate the difficulties faced by BWS in its billing and collection processes, and in the disconnection of illegal connections. However, my Terms of Reference require me to assess the Initial Decision given the existing legislation and I feel that BWS needs to submit further evidence to the PUC and the GOB to justify the proposed legislative change. This may involve a much more comprehensive analysis of the entire credit structure at BWS.

In addition, where BWS is asking for the structure to move away from a criminal activity to one of strict liability on the landlord, the natural assumption is that the landlord will pay. While this may be true, the PUC have argued that BWS will still be faced with the situation of the landlord not having the funds and having to pursue the landlord, and that this may not be any easier than the existing situation. The social impact of this legislative change also needs to be evaluated.

I believe that by making bad debts costs a Notified Item and by not adjusting downwards the existing levels of bad debts, I have provided a fair solution that continues to encourage BWS to reduce its levels of bad debt but compensates it for costs that could not reasonably be avoided. In the event that the level of bad debts do increase with consequent material impacts on revenues BWS has the option to apply for an Annual Review on the basis of Exceptional Circumstances.

6. MY RECOMMENDATIONS

In forming my recommendations regarding the level of tariffs for BWS over the FFTP I have taken into account of the evidence set out in the preceding sections regarding the key inputs into the regulatory model. In addition I have applied the following principles, consistent with the legislation:

- I have ensured that the conditions set out in Schedule 1 of the SI are satisfied, namely that the projections within regulatory model provide BWS with a rate of return of 12% over the whole life of the license period, where that rate of return is calculated by the receipt of dividends by the licensee's shareholders together with any residual value;
- I have considered evidence on the *affordability* of the charges levied by BWS;
- I have considered evidence on the willingness of BWS' customers to pay for improved levels of service;
- I have set out the levels and types of performance standards that will provide incentives for BWS to seek efficiency and to provide value for money to BWS customers;
- I have tried to ensue an appropriate balance between providing BWS with incentives to achieve efficiency and ensuring that BWS customers benefit from these efficiency savings in an equitable manner.

In balancing these factors there are conflicting interests and arguments. Throughout my review I have applied a transparent process to enable BWS and the PUC to express their views to me at the appropriate time.

A number of issues have arisen during the course of the review where I have formed views that are different to those of both BWS and the PUC.

The following Tables sets out the basis for my proposed recommendations as the Independent Expert (IE) with respect to the adviseability of amending the PUC's proposed schedule of tariffs:

Inputs

Table 6.1
Regulatory Model Inputs

Model	Inflation	Capex ('000)	Management Fees ('000)	Dividend Cap
<i>BWS BPRP</i>	<i>In Advance</i>	27,979.0	5000	50%
<i>Initial Decision</i>	<i>No</i>	16862.4	1250	60%
IE	Tariff Indexation	20132.2	1765	50%

Tariff and Revenues Profiles

Table 6.2
BWS and PUC Tariffs and Revenue Profiles (BZD\$'000)

	TARIFFS Y4	REVENUES					TOTAL
		4	5	6	7	8	
BWS BPRP	31.7%	30,606	33,745	35,567	36,411	37,281	173,612
PUC Initial Decision	15.0%	25668	27836	29564	30274	31002	144344
IE	17.2%	26072	27783	29891	31184	32523	147453

Closing Cash Balance

Table 6.3
Closing Cash Balance (BZD\$'000)

	4	5	6	7	8
BWS	4,569	-1,539	-1,254	503	-1,170
PUC	1935	278	1429	2781	2908
IE	2706	-114	1302	3107	6352

7. TARIFF STRUCTURE AND TARIFF STRUCTURE ADJUSTMENTS

I have recommended a tariff indexation mechanism to adjust annually for the impact of inflation. In addition to this tariff indexation mechanism, I also recommend that BWS may propose to the PUC that certain rates be revised by different percentage adjustments. In proposing different percentage adjustments, I recommend that BWS must have regard to the following:

- The impact of the proposed adjustment on the ability of low income customers to afford such changes;
- The desirability of sending economically efficient price signals to customers;
- The desirability of reducing cross-subsidies between customers or groups of customers, regions, or water and sewerage customers;

In addition to these principles, I consider that the appropriate tariff structure to be determined in the FFTRP must also pay regard to the following factors:

- The levels of income derived from the tariff structure model need to be consistent with the levels of income derived from the PUC's regulatory model;
- Account must be taken of the expected changes in average tariff over the FFTRP period as a result of movements from urban to rural areas and/or movement from water and sewerage areas to water areas. It is not appropriate simply to use historical evidence for this analysis. Account should also be taken of demographical forecasts.
- A tariff increase of 17% should not necessarily be applied equally across all consumption bands. The tariff structure should take into account of the affordability of tariff increases within each consumption class. Given the affordability issues, I consider that a lower proportionate tariff rise and/or increase in the free tranche of water may be justified to the lower consumption bands than was assumed in the Initial Decision. The PUC and BWS will need to undertake tariff basket modelling in order to consider an equitable solution here.
- As a general economic principle, cross subsidies should be removed between classes and between regions where there is not a strong affordability and/or equity argument to keep them. Continuation of a policy of large cross subsidies between large users and domestic customers, for example, risks the possibility of large users switching to cheaper own sources of water and does not provide the appropriate for domestic consumers to consume water efficiently. Regional cross subsidies can provide even greater incentives for customers to switch to alternative forms of water.

APPENDIX A. CAPITAL INVESTMENT PROGRAMME

A.1.1. Summary of PUC's Position

In its Initial Decision, the PUC made the following changes to BWS' proposed Capital Investment Programme:

- Allowed expenditure for the Belmopan Sewer Treatment Plant was reduced from \$6.5M to \$3.0M in line with the recommendations of the report by Halcrow Water Services (HWS).
- No allowed expenditure was provided for the Caye Caulker project (estimated by BWS at \$3.0m on the basis that Caye Caulker does not fall within BWS' "Defined Service Area").
- No allowed expenditure was provided for the Hattieville pipeline project or the upgrade to the Double Run treatment plant. The PUC stated that the cost/benefit analysis for these projects provided no economic justification for their retention at this time.
- The PUC 'rescheduled' \$4.5m of capital expenditure associated with the Belmopan Sewer Treatment Plant and improvement to the Belize City Sewer Treatment Plant, budgeted by BWS in Year 5, over Year 5 thru' 8.

A.1.2. Summary of BWS' Updated Position

At an early stage in the review BWS agreed to remove the Caye Caulker projected from further consideration.

During the course of the review BWS presented further cost estimates associated with the following four schemes, to be reflected in the FFBP. The text below represents a summary of the costs (and benefits) of each of the schemes. BWS' more detailed descriptions of these schemes are contained as an annex to this note.

- Double Run (Belize) Water Treatment Plant Upgrade: Upgrade to WTP at Belmopan to improve operational efficiency, improve water quality (through a reduction in Aluminium Spikes), and increase capacity.
- Belmopan Water Treatment Plant: Upgrade to WTP at Belmopan to provide additional capacity for Hurricane relief and to meet dry season demands.
- Belmopan STP: Upgrade to Belmopan STP to enable BWS to meet statutory sewage discharge requirements at Belmopan.

- Belmopan Sewerage System Network Replacement: BWS also state that the sewerage collection system requires replacement in order to ensure maintenance of service to the existing customers
- Belize City STP: BWS state that Belize City STP discharges are currently not meeting their discharge consent on a 100% basis. It is proposed to increase the hydraulic capacity and provide additional treatment capacity. This would require percolating filters combined with an inlet works to provide screening and grit removal.

A.1.3. Cost-Benefit Analysis of Proposed Capital Investments

The following Table summarises the monetary costs and benefits of each of the five schemes. I have applied a 12% discount rate to derive the NPV estimate to reflect the current marginal costs to BWS of new debt finance.

Table A.1
Financial Cost-Benefit Analysis (CBA) of New Capital Investment Schemes

	Capital Cost	Annual Net Costs ¹	NPV ²
Double Run WTP	1,073,700	-280187	-£1,376,229.70
Belize City WTP	437,380	-127101	-£668,659.23
Belmopan STP	192,900	0	£172,232.14
Belmopan Sewerage	2,679,625	-126000	£1,342,522.32
Belize City STP	1,112,600	-50000	£576,726.19

¹Includes both operational costs and maintenance costs. A minus denotes a net benefit from the scheme. ²A minus denotes a net benefit from the scheme

The Table shows that, of the five schemes, the Double Run WTP and the Belmopan WTP can be clearly justified in terms of their net financial benefits to the business. In the case of both the Belmopan WTP and the Double run WTP the net operational and maintenance savings mean that these schemes pay for themselves in 3 to 4 years meaning that over the course of the five year tariff period the schemes provides a net financial benefit to BWS to be reflected in lower customer tariffs.

Of the other schemes, both the Belmopan sewerage project and the Belize City STP project cannot be justified on a financial basis alone.¹² In both cases, the schemes do have financial benefits associated with reduced operational costs and, in maintenance costs in the case of

¹² Both projects would be financially justifiable at a discount rate of around 5% which might be an appropriate discount rate to apply in the UK or OECD countries but this discount rate does not reflect the financial costs associated with raising capital finance in Belize.

Belmopan Sewerage, but these financial benefits are far outweighed by the costs of these schemes given the 12% cost of raising new debt finance.

Table A.2
BWS Submission: Estimates of Water Treatment Plant Capital Scheme Costs

Item No	Description of Works	Unit	Qty	Installation Cost	Material Cost	Unit Cost	Sub Total Cost	Reasons	Cost Implications	Estimated savings/annum	Justification	Maint Cost/Annum (if project does not proceed)
	DOUBLE RUN TREATMENT WORKS											
Bill 1	Intake Works											
1	New Intake Pump	Unit	1	5,000	30,000	35,000	35,000	Old pump inefficient and consistently defective	Loss of revenue when old pump fails			
2	Demolish old intake	Lot	1	8,000	25,000	33,000	33,000	Dangerous condition	Additional cost of electricity through inefficiency		Based on Actual Running Cost assuming 15%	
3	Starter Panel A/T	Unit	1	4,000	20,000	24,000	24,000	Required for new pump			inefficiency ie: cost/0.3BzkWhr x pump run hours x 15%	
4	Cabling	Lot	1	2,500	4,000	6,500	10,500	Required for new pump		4,435	(30kW x 18 x 365 x 15% x 0.3)/2	
Bill Total				19,500	79,000	98,500	102,500					
Bill 2	Clarifier Plant B											
1	Lamella Plates	m2	240	40	300	340	81,600	Reduce carry-over and increase effective capacity	Loss of revenue through increased filter B/W			
2	Lamella Plates SS Support framework	Unit	1	28,000	180,000	208,000	208,000	To support the new Lamella	Political fallout through poor quality			
3	Re-locate 600mm Inlet Pipe	Unit	1	25,000	75,000	100,000	100,000	Essential for Lamella installation				
Bill Total				53,040	255,300	308,340	389,600					
Bill 3	Filters Plant B											
1	Filter Media	m3	75	100	800	900	67,500	Grain size (ES) too small for given flow rate	These filters will gradually become less			
2	0.5mm slot Nozzles	Unit	3000	12	40	52	156,000	Required for new media	effective and will ultimately require			
3	Filter Laterals	Unit	120	35	120	155	18,600	Required for new nozzles	replacement media. There is a high loss caused by			
Bill Total				147	960	1,107	242,100		the need to frequently B/W (9 hourly) -	49,144	Based on 200% additional B/W of (0.165m3 x 60 x 4 x 8 x 365) =317m3/a @Bz0.85/m3	
									A13 also high		A13 high in product >0.2mg/l	
Bill 4	Dist Pumps Plant A											

Item No	Description of Works	Unit	Qty	Installation Cost	Material Cost	Unit Cost	Sub Total Cost	Reasons	Cost Implications	Estimated savings/annum	Justification	Maint Cost/Annum (if project does not proceed)
1	New Dist Pumps	Unit	3	8,000	60,000	68,000	204,000	To replace inefficient existing on phase 'A'	Saving of power on new pumps		Based on Actual Running Cost assuming 15%	
2	Pipework and Valves	Lot	1	10,000	25,000	35,000	35,000	Assoc. With new Pumps	Saving on additional revenue by having		inefficiency ie: cost/0.3BzkWhr x pump run hours x 15%	
3	Starter Panel (3 position A/T)	Unit	1	8,000	50,000	58,000	58,000	Assoc. With new Pumps	reliable standby pumping	26,609	(180kW x 18 x 365 x 15% x 0.3)/2	
4	Cabling	Lot	1	30,000	4,500	34,500	34,500	Assoc. With new Pumps				
5	Remove Old Pumps	Lot	1	2,000	6,000	8,000	8,000	Assoc. With new Pumps			Additional Costs if Capex does not go ahead	<i>Additional Costs if Capex does not go ahead</i>
											Estimate for Media replacement	<i>Estimate for Media replacement</i>
Bill Total				58,000	145,500	203,500	339,500			200,000		200,000
Sub Total				130,687	480,760	611,447	1,073,700			280,187		200,000
	BELMOPAN WTP											
Bill 5	Clarifiers											
1	New clarifiers	Unit	2	20,000	70,000	90,000	180,000	Hurricane Relief	Increased sales	16,754	Based on Production increase of 5% / a @ 39,420m ³ @ Bz0.85/ m ³	
2	Connecting Pipework	Lot	1	6,000	25,000	31,000	31,000	Hurricane Relief	Security of supply	10,348	(70kW x 18 x 365 x 15% x 0.3)/2	
Bill Total				20,000	70,000	90,000	180,000		<i>Additional power costs and chemical costs</i>			
Bill 6	Filters											
1	New Filter Boxes	Unit	2	15,000	60,000	75,000	150,000	Hurricane Relief				
2	Filter Media	m ³	12	25	600	625	7,500	Hurricane Relief				
3	0.5mm slot Nozzles	Unit	960	3	10	13	12,480	Hurricane Relief				
4	Filter Laterals	Unit	40	20	75	95	3,800	Hurricane Relief				
5	Interconnecting Pipework	Lot	1	18,000	30,000	48,000	48,000	Hurricane Relief				
Bill Total				33,048	90,685	75,733	173,780					
Bill 7	Dist Pumps											
1	Pumps to Belmopan	Unit	2	2,000	12,000	14,000	28,000	Hurricane Relief				
2	Pumps to Teakettle	Unit	2	1,200	7,000	8,200	16,400	Hurricane Relief				
3	Starter Panel 4 x position A/T	Unit	1	2,000	6,000	8,000	8,000	0				
4	Interconnecting Pipework and Valves	Lot	1	3,000	20,000	23,000	23,000	0				<i>Additional Costs if Capex does not go ahead</i>

Item No	Description of Works	Unit	Qty	Installation Cost	Material Cost	Unit Cost	Sub Total Cost	Reasons	Cost Implications	Estimated savings/annum	Justification	Maint Cost/Annum (if project does not proceed)
5	Cabling	Lot	1	1,200	7,000	8,200	8,200	0				
<i>Bill Total</i>				<i>9,400</i>	<i>52,000</i>	<i>61,400</i>	<i>83,600</i>			<i>100000</i>	Additional Costs if Capex does not go ahead	<i>100000</i>
<i>Sub Total</i>				<i>62,448</i>	<i>212,685</i>	<i>227,133</i>	<i>437,380</i>			<i>127,101</i>		<i>100,000</i>

Table A.3
BWS Submission: Estimates of Sewage Treatment Plant Capital Scheme Costs

Item No	Description of Works	Unit	Qty	Installation Cost	Material Cost	Unit Cost	Sub Total Cost	Reasons	Cost Implications	Estimated savings/annum	Justification	Maint Cost/Annum (if project does not proceed)
Bill 8	BELMOPAN STP											
1	Trickling Filters	Unit	2	30,000	50,000	80,000	160,000	Environmentally important				
2	Interconnecting Pipework and Valves	Lot	1	8,000	20,000	28,000	28,000	Assoc. With new trickling filters				
3	Cabling	Lot	1	800	1,000	1,800	1,800	Assoc. With new trickling filters				<i>Additional Costs if Capex does not go ahead</i>
4	Motor Drive	3kW	1	600	2,500	3,100	3,100	Assoc. With new trickling filters			Additional Costs if Capex does not go ahead	
5	New Sewerage Collector (Nominal 200mm)	Feet	41225	30	35	65	2,679,625	Already badly damaged	Saving on continual maintenance	126000	Based on 5% replacement/ annum @ 60Bz/ft	126000
Bill Total				39,430	73,535	112,965	2,872,525					
Sub Total				39,430	73,535	112,965	2,872,525			126,000		126,000
Bill 9	BELIZE CITY STP											
1	Intake Works	Unit	1	8,000	40,000	48,000	48,000	Environmentally essential				
2	Screen	Unit	1	10,000	30,000	40,000	40,000	These discharges could conceivably damage the reef				
3	Comminutor	Unit	2	6,000	30,000	36,000	72,000	which is one of Belize' most salable attractions				
4	Intake Channel	Unit	1	8,000	28,000	36,000	36,000	ditto				
5	Partial Flume	Unit	1	2,000	8,000	10,000	10,000	ditto				
6	Sedimentation Basin	Unit	2	20,000	80,000	100,000	200,000	ditto				
7	Sludge Pumps	Unit	2	3,000	12,000	15,000	30,000	ditto				
8	Trickling Filters	Unit	2	45,000	100,000	145,000	290,000	ditto				
9	Interconnecting Pipework and Valves	Lot	1	16,000	40,000	56,000	56,000	ditto				
10	Sludge Drying Beds & Underdrains	Lot	1	25,000	80,000	105,000	105,000	ditto				
11	Cabling	Lot	1	3,200	4,000	7,200	7,200	ditto				
12	Discharge Chamber	Unit	1	5,000	20,000	25,000	25,000	ditto				
13	Discharge Pumps	Unit	2	3,000	15,000	18,000	36,000	ditto				
14	Motor Drive	Unit	4	600	2,500	3,100	12,400	ditto				<i>Additional Costs if Capex does not go ahead</i>
15	Starters	Unit	12	2,500	5,000	7,500	90,000	ditto				
16	C&I	Lot	1	20,000	35,000	55,000	55,000	ditto	Saving on	50000		50000

Item No	Description of Works	Unit	Qty	Installation Cost	Material Cost	Unit Cost	Sub Total Cost	Reasons	Cost Implications	Estimated savings/annum	Justification	Maint Cost/Annum (if project does not proceed)
									lagoon maintenance (if project goes ahead)			
Bill Total				177,300	529,500	706,800	1,112,600					
Sub Total				177,300	529,500	706,800	1,112,600			50,000		50,000
Grand Total				409,865	1,296,480	1,658,345	5,496,205			583,288		476,000

APPENDIX B. OPERATING COSTS AND MANAGEMENT FEES

This section sets out my assessment regarding efficient operating costs and management fees.

B.1. Operating Costs

B.1.1. Summary of the “Initial Decision” and BWS’ Position

The PUC did not adjust BWS’ projections of operating costs over the FFTP.

Given that the Initial Decision was based on only two years of financial data, I proposed that BWS should update its financial model to incorporate updated cost figures to December 2003 and then to derive its best estimates of cost projections over the FFTP. The following summarise BWS’ operating cost projections for the major categories of operating expenditure:

- *Staffing Costs:* Total staff costs are expected to increase marginally in 2004, reflecting an increase in local staff numbers from 229 to 232 in 2004. Total staff costs are then assumed to be constant in real terms thereon (with a constant real unit labour cost).
- *Material Costs:* Material costs are assumed to increase over the FFTP by 2.4% year-on-year. The major cost components include:
 - water purchase costs (40% of costs; cost driver: San Pedro water purchases)
 - water power costs (35%; cost driver: water distribution input)
 - sewerage power costs (5%; cost driver: sewerage input)
 - other variable costs (12%; cost driver: water distribution input) (12%)

Overall material costs increase because, although water distribution input declines, this is more than offset by increases in San Pedro water purchases and sewerage input. Unit prices are assumed to be constant (e.g. water purchase prices and power tariffs).

- *Other Costs:* The “other” cost category includes a diverse set of costs, such as telephone costs, security, safety equipment, and maintenance and repairs of office buildings and vehicles. These are also assumed to be constant over the period of analysis.

Table B.1
BWS' Operating Cost Performance To Date and PUC Projections (Real BZ\$)

Year	Outturn/ Estimated			Projected				
	01-02	02-03	03-04	4	5	6	7	8
Materials	4,561,810	5,139,871	5,012,046	5,090,145	5,229,852	5,402,221	5,495,136	5,592,058
Staff	7,196,660	6,564,394	6,132,000	6,208,429	6,208,429	6,208,429	6,208,429	6,208,429
Other	3,060,120	2,631,703	3,241,637	3,025,381	2,999,812	2,981,400	2,986,007	2,991,045
Opex	14,818,590	14,335,968	14,385,684	14,323,955	14,438,094	14,592,050	14,689,572	14,791,532

Source: Updated PUC Decision, Financial Model. 2003-2004 data is an estimate based on the first 9 months actual outturn. These figures exclude management fees.

B.2. My Assessment

B.2.1.1. Criteria for Assessing Opex Costs

Regulators in UK and elsewhere have used a number of approaches to setting opex efficiency targets. These can be categorised into three broad approaches:

1. Bottom-up (engineering/economic) investigations;
2. Top-down comparison of company cost or productivity levels;
3. Top-down comparisons of company cost or productivity trends

BWS has based its forecasts of costs on a bottom-up analysis of expected costs and cost drivers (e.g. modelling of power costs as a function of water distribution input).

In assessing BWS' projections of operating costs, the approach I have taken is to review individual cost items, and to base revenues on total costs adjusted for a long-term, historic total factor productivity trend that is representative of the Belizean Water Industry. I then make allowances for input price changes in Belize separately.¹³

I start with an analysis of BWS' operating cost performance to date.

B.2.1.2. BWS' operating cost performance to date

Table B.1 shows outturn BWS' opex performance for the first three years of the contract period, and PUC's forecast opex for the price control period. This demonstrates that BWS' operating costs declined by approximately 1.5% in real terms in each of the first two years of the contract.

¹³ The alternative approach is to examine real unit cost changes. However, real unit cost changes are a function of both efficiency changes and real input price changes. Real input price changes can be volatile in the medium term. Thus, extrapolating past unit costs to derive future unit costs can be misleading because of changes in input prices.

This aggregate reflects slightly rising material costs offset by falling staff costs. Staff costs have declined by approximately 7.7% over the first two years. This reflects the decrease in local staff numbers by 12% over the first two years of the concession, from 258 staff to 229.

On the other hand, material costs have increased by nearly 5% year-on-year. This is predominantly explained by an increase in water purchase and power costs related to increased “San Pedro water purchases” and increased sewerage input.

B.2.1.3. TFP in utility sectors worldwide

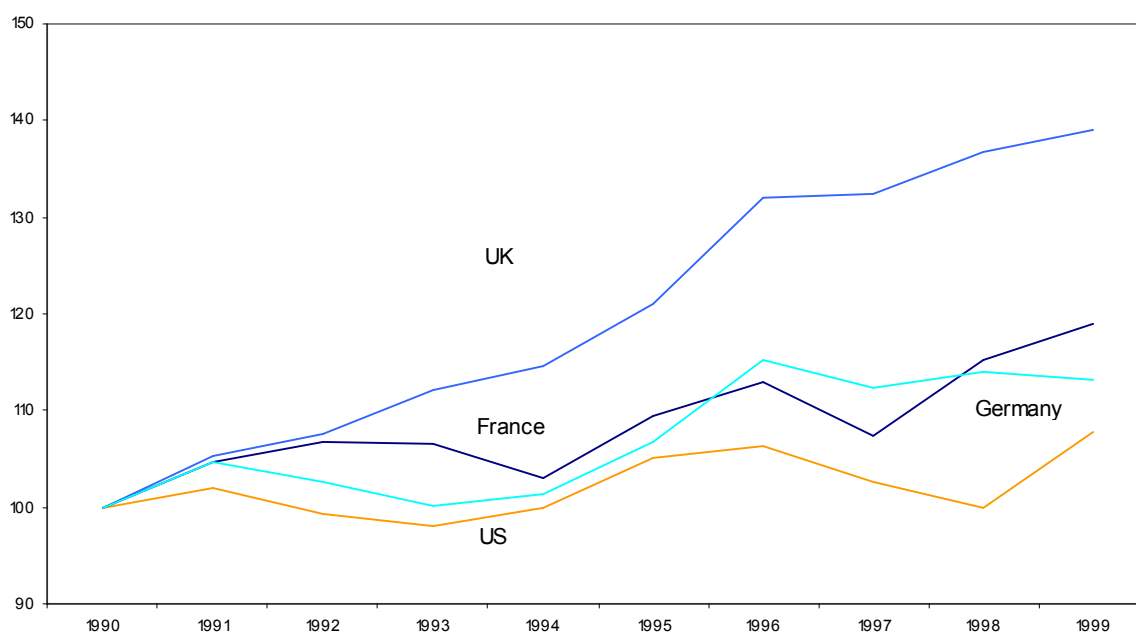
My primary approach to setting efficiency targets is to examine total factor productivity (TFP) for comparative industries worldwide.

The UK’s National Institute For Economic and Social Research (NIESR) holds a database of TFP levels for gas, electricity and water sectors combined for UK US, France and Germany. TFP is a measure of the change in total outputs relative to the change in inputs, with the inputs deflated by an input price series (i.e. input price changes are controlled for).

Using the NIESR database, I have calculated TFP growth rates for the four countries over the most recent period ten-year period, 1990-1999 (see Figure B.1). For UK, TFP growth has measured 3.7% year-on-year for the gas, electricity and water industries combined, whereas France, Germany and US have enjoyed significantly lower TFP growth of 2.0%, 1.4% and 0.8% respectively.

I have also calculated labour factor productivity growth using the same NIESR database. For all four countries, labour productivity growth is higher than TFP. The year-on-year averages over the period 1990-1999 are UK (9.0%); Germany (4.7%); France (2.9%); and, US (2%). This higher labour productivity rate is explained by factor substitution, i.e. the long-term substitution of labour for capital inputs in the provision of water services.

Figure B.1
TFP Growth, Gas, Electricity and Water



I have also examined evidence from developing countries on water companies' TFP rates of change although this evidence is generally of a lower quality than the evidence set out above.

Analysis of the change in operating expenses from the Buenos Aries concession contract shows that operating costs fell by more than 14% in real terms over the first six years of the concession contract from 1992 to 1998. It is also reported that during this time the real cost of intermediate inputs fell through improved use of chemical products and electricity contract negotiations. Analysis of TFP levels over the period 1992 to 1998 shows TFP increase by around 50% over the period. Service quality is also reported to have increased markedly after this concession¹⁴

B.3. Comparisons with BWS

My analysis of BWS' opex performance over the first three years of the contract demonstrates that operating costs have fallen by around 1.5% year-on-year. It is difficult to extrapolate these past changes to future changes because it incorporates growth and price effects. However, from a more detailed analysis it appears that labour productivity increases were offset by an increase in material costs arising from growth in distribution input.

¹⁴ See "The Buenos Aries Water Concession", Alcazar, Abdala, and Shirley, World Bank Report.

My analysis of UK utility sector TFP growth (which strips out the effects of input price changes) demonstrates that the gas, electricity and water sectors have achieved a TFP improvement of 3.7% year-on-year over the period 1990-1999. This is somewhat higher than the TFP improvements in US, Germany and France (averaging 1.4%).

For the purpose of a top-down efficiency comparison, I consider the following factors important in drawing lessons for BWS from data for international comparators:

- Form of ownership
- The regulatory and competitive environment
- The estimated level of initial efficiency
- Economies of scale
- The general economic and social environment

BWS' shares a similar regulatory structure and form of ownership with water companies in the UK. The TFP rates of change shown in Figure B.1 above therefore also captures any privatisation effect (i.e. the movement of the company towards the efficiency frontier), as well as trend growth (i.e. the movement of the efficiency frontier).¹⁵

BWS is also owned by a UK-based company which owns UK water assets. This should facilitate lesson-learning and technology transfer from the UK. There are however a number of differences, including the relative scale of the operations, as well as the general economic and social environment.

Overall, whilst there are dangers in drawing out comparisons between the situation in Belize and other situations, the analysis above demonstrates that long-term trends in *total* unit costs or TFP in water network companies have been in the region of 1% to 3% for more developed countries and are often significantly higher for less developed countries.

I propose to set a TFP rate for BWS *relative to the Belize economy as a whole* equal to 1%.¹⁶ I propose to apply this efficiency target to total operating expenditures. I believe this is a relatively conservative assumption because:

- My 1% assumption is below the TFP rate for UK water sector (measured relative to UK economy) of 2.4%. The TFP improvement in UK was achieved at the same time as substantial improvements in quality over the period following privatisation.

¹⁵ This is one reason why the UK might enjoy higher productivity over this period than other countries, i.e. TFP changes capture "privatisation effect", as well as trend growth.

¹⁶ "X" has to be measured relative to changes in economy as a whole, as RPI captures economy-wide TFP changes.

- I will apply the 1% target to opex alone. I expect operating productivity improvements to be greater than total productivity gains because of factor substitution (i.e. the replacement of labour with capital).
- BWS has achieved a greater reduction in total operating costs over the first two years of operation (despite growth in distribution input).

Finally, in setting changes in allowed operating costs, I have to make an assumption regarding the change in input prices relative to RPI. I assume that input price changes are constant in real terms. However, to allow for the potential volatility in power input prices, I propose to make electricity *input prices* (not total electricity costs) a notified item.

Taking my TFP and input price change assumptions together, I apply a 1% efficiency factor to operating costs per annum. My proposed year-on-year opex costs are set out in Table 3.2

Table B.2
IE Recommendations on Operating Costs

Year	3	4	5	6	7	8
Materials	4795654	4836113	5111116	5246001	5373302	5504157
Staff	6426113	6215265	6108315	6033417	6010057	5947452
Other	336350	3643053	3231540	3166277	3146589	3075001
<i>Total Opex</i>	14552117	14,694,431	14450971	14445696	14529948	14526611

Source: NERA analysis

B.4. Management Fees

Summary of the “Initial Decision” and the PUC’s Position

In the initial decision, the PUC reduced BWS’ management fees from 500K to 250K. The PUC was concerned that given Cascad had placed three expatriate management staff within the organisation at a cost of \$750,000, the additional management fee was excessive.

PUC has further stated that that it “*the level [of fees] proposed cannot be supported ... [because] ... the activities listed in the ‘regular support activities’ are activities that in the opinion of the PUC can be carried out by management in country [...].*”¹⁷

The PUC has also expressed the view that they are concerned that management fees could be used as a mechanism to pass through increased returns to the parent company.

Summary of BWS’ Position

The BPRP included an estimate of management fees of approximately BZ\$ 500K per year on average over the course of the control period. The BPRP did not set out a detailed justification of these costs.

However, during the course of this review, BWS has provided a list of services to be procured from Cascad over the control period, and the associated total costs and unit labour costs. The services are divided into “regular support activities” (RSA), which include activities such as financial model calibration, operational reviews, support from Cascad regarding procurement, commercial and legal negotiations, and travel costs. These costs constitute approximately 75% of total management fee costs. The remaining costs are specific activities relating to business plan activities supported by Cascad. These costs are lumpy, in accordance with discrete business plan activities (see Table B.3).

In their response to PUC’s Initial Decision, BWS contest the PUC’s reduction in BWS’ estimates management fees from 500K to 250K. BWS stated that the PUC decision was not justified. They also provide a list of operational, technical and financial services provided by Cascad to BWS over the period of the contract to date.

B.5. My Assessment

Criteria for assessing management fees

Companies should procure services externally if this is the least cost solution to delivering water services. In turn, companies should procure services from *affiliated* companies if this offers the best value for money.

¹⁷ E:mail correspondence from Dr Gilbert H Canton to Richard Hern, February 19 2004.

There is established international guidance on transfer pricing. Prices of goods and services between affiliates (“transfer prices”) should be based on market prices or less. Where no market exists, transfer prices should be based on cost. In a regulatory environment the requirement for cost-reflective transfer prices is particularly important because of the potential to charge inflated prices to regulated businesses, and use this as a mechanism to pass excess profits to the parent company.

My primary approach to assessing the management fee costs proposed by BWS’ is to examine the cost data provided by BWS that underpins their management fee estimate, and compare this to benchmark UK labour costs from national earnings survey data (since Cascal is a UK based organisation).

Analysis of BWS’ Cost Submission

BWS has provided details of the labour fee structure supporting its management fee estimate. I have compared Cascal’s unit labour fees to benchmark labour costs from the UK National Statistics real earnings survey, including an uplift to reflect non-wage labour costs and overheads.¹⁸ This comparison suggests that Cascal’s unit labour fees are approximately 25% higher than labour cost estimates from the UK National Statistics earnings data.

BWS’ management fee estimate also includes travel costs by Cascal management, as well as BWS shareholders. Travel costs constitute approximately one-quarter of the management fee over the control period (see Table B.3). I consider that the costs of travel by shareholders should be borne by shareholders rather than customers.

Table B.3
Analysis of BWS’ Management Fee Cost Submission

	4	5	6	7	8
Regular support activities	387,351	395,098	403,000	411,060	419,281
<i>Of which travel</i>	<i>126,567</i>	<i>129,098</i>	<i>131,680</i>	<i>134,314</i>	<i>137,000</i>
Business plan activities	235,054	49,680	159,840	-	184,248
Total	622,405	444,778	562,840	411,060	603,529
% Travel expenses	20%	29%	23%	33%	23%

Source: NERA analysis of BWS’ Management Cost Breakdown

My decision

My allowance for management fees is set out in Table 3.3. This is based on the following:

- I propose to reduce regular support activities by 25%, to reflect my estimate of the costs to Cascal of providing these services based on UK earnings survey data.

¹⁸ UK National Statistics (2003) “Labour Market New Earnings Survey 2003”

- I propose to exclude all shareholder travel costs. In the absence of a split between Cascad staff costs, and shareholder costs, I have reduced the travel budget by 50%.
- I have not applied a reduction in the overall person-days input by Cascad staff. However, I would expect skill transfer from Cascad to BWS over the control period, and therefore the person-days input from Cascad to reduce over the control period. I therefore propose to apply my general operating cost efficiency target to management fees, i.e. a year-on-year reduction of 1%.

My proposed allowance for management fees is set out in Table 3.3. On the basis of these assumptions, my allowance for management fees is approximately 33% less than the BWS management fee cost submission, but approximately 17% higher than the proposed allowance by PUC.

Table B.4
Management Fee Cost Allowance

	2005	2006	2007	2008	2009
BWS Cost Submission	622,405	444,778	562,840	411,060	603,529
<u>My Calculation</u>					
Non-travel Management Fees (after 25% reduction)	371,878	236,759	323,369	207,559	349,896
Travel Costs (after 50% reduction)	63,283	64,549	65,840	67,157	68,500
New Total before efficiency savings	435,162	301,309	389,210	274,716	418,397
<i>New Total (following efficiency savings)</i>	430,810	295,313	377,650	263,892	397,891

Source: NERA analysis

APPENDIX C. PERFORMANCE STANDARDS

Table 1
BWS (DRAFT) PERFORMANCE TARGETS 2004-2009

Standard	Performance Target	Deadline	Notes
Water Quality	BWS to ensure WHO water quality recommendations at water treatment works at Belize City (Double Run), Belmopan and Dangriga	Current and ongoing.	<i>New investment at Double run and Belmopan WTW upgrade will improve water quality further and increase capacity. Quality will be monitored by independent technical auditor.</i>
Water Pressure	BWS to guarantee a minimum pressure within the strategic main network for specific zones in agreement with the PUC.	September 2004 for Orange Walk, Dangriga, Corozal April 2005 for all zones.	<i>New capital investment in 2004 and 2005 scheduled for elevated water storage tanks and water pumps to improve storage and guarantee pressure. Pressures will be monitored by independent technical auditor.</i>
Water Service Reliability	BWS to provide a constant supply of uninterrupted service to customers at Belize City, Belmopan and San Pedro. BWS to provide improved security of supply at Dangriga, Corozal and Orange Walk.	December 2004 for Belize City, Belmopan, Dangriga and San Pedro..	<i>New capital investment in power generators in 2004 at Belize city (south side), Belmopan and Dangriga to improve reliability of service.</i>
Sewage Discharge	BWS to meet statutory capital investment requirements for sewage discharge at Belmopan.	April 2009	<i>Capital investment at Belmopan STP scheduled for 2004 in secondary treatment facilities.</i>
Customer Complaints	A decline in the number of justified customer complaints received.	April 2004.	<i>PUC to monitor complaints and assess reasonableness.</i>
Customer Services	PUC to meet customer performance targets for new connections installation, supply interruptions, leakage repair, customer handling and reconnection.	April 2004	<i>Investment in new billings database to improve customer services Details set out in customer code</i>

