

SUVA – NAUSORI, FIJI CASE STUDY

1. INTRODUCTION AND SUMMARY

1.1 Present Sector Performance

The problems with delivering satisfactory water supply in Fiji urban areas are primarily financial and institutional rather than technical. They reflect a need for more appropriate policies, more appropriate incentives for consumers to reduce demand to sustainable levels, and more adequate cost recovery mechanisms, without which the ability to operate and maintain water supply systems properly will be undermined and continue to place a heavy burden on the Government of Fiji (GoF).

Although the Government has through its Public Works Department been able to provide water of reasonable quality, service interruptions are becoming more and more frequent and shortages are so severe that there has been a ban on new connections. Sewage overflows are now common. The water supply and sewerage systems are being maintained at levels sufficient to ensure that they continue operating, but more needs to be done. Budgetary support for water and sanitation operations is probably unsustainable.

The financing needs of the water sector are large as water projects tend to be indivisible and capital intensive, and Fiji now has backlogs in developing, expanding and rehabilitating water and associated sewerage infrastructure. The GoF is in need of a longer term strategy for financing and developing cost recovery mechanisms in the water and wastewater sector.

The Government of Fiji (GoF) is facing the need to carry out comprehensive rehabilitation and expansion of the Suva – Nausori water supply and sanitation system to meet the growing requirements of an expanding urban population. In addition other systems are also in need of expansion and upgrading. The GoF has obtained loan funding from JIBEC to upgrade and expand the Nadi – Lautoka water supply and sewerage systems (US\$12 million), and is in discussions with the ADB about loan financing (US\$50million) to assist with the funding of the Suva – Nausori water supply and sanitation rehabilitation and expansion project.

This case study reviews the economic and financial analysis undertaken for the Suva - Nausori project, which demonstrates some of the important principles that should be adopted when developing tariff structures, providing correct pricing signals to customers, establishing good billing and collection systems, and carrying out appropriate maintenance activities to minimise water losses and ensure protection of the environment. The starting point is to develop clear financial objectives for the urban water sector and to put in place cost recovery policies and tariff structures that will ensure the long term financial sustainability of the sector.

1.2 Cost Recovery and Tariff Objectives.

Cost recovery mechanisms, especially tariffs, are the structure through which costs of water supply and wastewater costs, as well as the associated financial, environmental and social costs are recovered from users. Those cost recovery mechanisms which are most likely to be successful in providing for long term sustainability are those that have been designed on the basis of their ability to meet specific objectives that determine or significantly affect long term sustainability.

Thus, the development of tariffs as cost recovery mechanisms for water and wastewater systems in Fiji need to be designed on the basis of specific economic, financial, social, and administrative objectives. In formulating tariff methodologies and recommendations, it is generally recognized that water and wastewater tariffs should meet four key objectives, namely:

(i) Economic Efficiency. In order to ensure that charges for water and wastewater are related to economic costs, thus achieving economic and environmental efficiency of resource allocation in the water and wastewater sector. This also includes the application of demand management

techniques to achieve conservation and the polluter pays principle when charging for wastewater;

(ii) Financial Sustainability. In order to ensure that the water and/or wastewater entity has sufficient revenue to cover all its operating costs (including depreciation), any debt servicing requirements, taxation, and ideally a proportion of future capital expenditure;

(iii) Social Acceptability. In order to ensure that the poorer members of the community have access to water and wastewater services at a price, which they can afford. That is that tariffs are affordable and in line with consumers willingness to pay. For domestic customers this means that tariffs (both water and wastewater) are affordable in terms of household incomes.

(iv) Administratively Understandable. In order to ensure that any recommendations are capable of implementation in terms of metering, billing and revenue collection and that the tariffs are readily comprehensible and understandable to customers.

1.3 Existing WSD Tariff Structure.

The present WSD water and sewerage tariffs were compared with the economic tariffs calculated under the project and the ability of the existing tariffs to meet the above objectives were examined.

Economic Efficiency

The present tariff bands are so large that 60% of domestic consumption is satisfied in the first band rather than just basic needs which should be interpreted at 60 lpcd or ten cum per month. The second band to 33 cum per month is too high to provide any effective demand management role on average domestic consumption. Sewerage charges are below O&M cost recovery. Overall the tariff structure would fail the economic efficiency test.

Financial Sustainability

The existing tariff structure clearly fails the financial sustainability test as it does not generate sufficient revenues to meet O&M costs let alone provide any contribution to capital expenditure. The sector is reliant on the GoF to meet the balance of O&M costs and all capital expenditure for rehabilitation and expansion. This problem however, is made worse by the current billing and collection arrangements.

Socially Acceptable and Affordable

The existing tariff is able to meet standard affordability criteria for low income and average income households. However, because of the poor financial performance of the sector the water supply and sanitation services are failing to meet the populations social requirements for adequate safe supplies of drinking water.

Administratively Understandable

The tariff structure with three monthly meter reading and monthly billing based on estimates is confusing for customers and requires frequent adjustments and rebates. Further the current institutional structure with billing undertaken by the Water Rates Office and funds then transferred to the consolidated fund means that WSD is not directly responsible for collecting revenues to meet its own budget requirements which are met by the GoF out of the consolidated fund,

In 1998 Water Sales for WSD were estimated at F\$19.4 million and collections at F\$12.1 million. This represents a collection efficiency of 64%. Over the next three years while billings increased to F\$23.1 million for 2001, collections were only F\$13.2 million which includes arrears from previous years. Consequently at best the collection efficiency is now some 56% and accumulated arrears of outstanding bills F\$18.2 million. Collection Efficiency is higher in the Suva Nausori area but probably would not exceed 65%.

1.4 Subsidy Implications of Economic Tariffs

The overall economic cost of the proposed project 2003 to 2007 is estimated at F\$ 1.10 per cum and the Overall Masterplan, 2003 to 2022 is F\$1.34 per cum compared with the average domestic tariff of F\$ 0.48 and over all consumption of F\$ 0.56 per cum.

Firstly there is a cross subsidy of F\$ 0.09 per cum between the average financial domestic tariff when compared with the overall average financial water tariff. Further when the average domestic tariff for water and sewerage of F\$0.48 is compared with the economic costs then there is a financial subsidy of F\$ 0.62 per cum. The Commercial tariff on the other hand exceeds the economic cost of water, but nevertheless there is an overall financial subsidy of F\$ 0.35 per cum (when commercial water and wastewater tariffs are combined). The Overall average financial tariff (F\$0.56) when compared with economic costs results in a financial subsidy of F\$0.54 per cum.

If the collection efficiency is taken into account then the financial subsidy would increase. The above analysis assumes that the revenue received from the tariff is 100% collections. Assuming a collection efficiency of 65% for Suva Nausori for water supply and wastewater collections then the effective subsidy increases as the revenues from the existing tariff base declines. Thus the financial subsidy comparing the current financial tariff with the economic costs would average F\$0.69 per cum.

Thus at the present tariffs all users are receiving financial subsidies when compared with future economic costs. These tariffs encourage excessive levels of consumption and poor cost recovery thus contributing to the declining performance of the sector.

1.5 Development of Financial Projections for Urban Water Supply Sector

Financial projections for the Public Works Department, Water and Sewerage Section (WSS) were prepared to identify the ongoing Government of Fiji (GoF) funding for the sector under alternative cost recovery policies and tariff levels. In recent years the Government has met all capital costs through either direct grants or through external loans repaid by Ministry of Finance.

1.5.1 Summary of Results

Commercial sewerage charges are brought into line with cost by 2006 and connection fees are set to reflect current connection costs from 2006.

Domestic water and sewerage tariffs are increased by 25% in 2006 and again by 25% in 2008. This represents an increase in tariffs of 7% annually over the forecast period, and represents a 3% annual real increase in tariffs where domestic inflation is assumed at 4%. Such a tariff program is regarded as affordable and reasonable and would coincide with major upgrading and expansion of water supply systems in Fiji.

At the same time tariffs remain well within acceptable limits of household affordability, with charges representing 2.1% of household income in 2008. Although this is more than at present, it is likely that consumers would be willing to pay for potablewater at good pressure and 24 hours availability.

The benefit of improved billing and collection systems is F\$101 million, while tariff increases in line with service improvements result in an additional F\$193 million, resulting in an overall reduction in contributions to the sector by GoF of F294 million. In the absence of improved billing and collection procedures and the suggested increases in tariffs, the GoF would have to provide an additional F\$491 million to the sector over 10 years.

1.6 Water Sector Institutional Reform.

The GoF is committed to improved sector performance and to sector reform, which is part of the ongoing discussions with the ADB in respect of financing of the Suva - Nausori rehabilitation and expansion project. These discussions should see the creation of an autonomous agency dedicated to the provision of water and sewerage services. It would result in a more commercial approach to the management of the urban water sector, improved billing and collection procedures, clear financial objectives for the sector and improved cost recovery and sustainability with an agreed timetable of tariff increases. Without such an agency, it is likely that operations will continue to be inefficient. Water losses will continue to be high, and collections low. With inadequate funding, services delivery will continue to be problematic and the poor will continue to suffer, as they are suffering at present.

The development of a Fiji Water Board (FWB) is one of the options been reviewed by the GoF. Features of FWB's structure include the integration of all water and sewerage functions under a Chief Executive Officer, and the creation of the four major divisions of Operations, Planning and Design, Corporate Services, and Finance. This structure is close to that of a commercial entity and would lead to a more coordinated management and performance of the sector.

One way to address the skills shortages that presently exist would be to contract system operations to a private company, while keeping ownership of assets with the Government. Another would be to contract out key functions such as water loss reduction, billing and collections. The aim should be to achieve efficiency improvements as quickly as possible, and thereby to ease the burden of funding even routine operations on the Government. If this can be achieved, then the available Government funding can be directed toward rural areas where it is most needed.

2. WATER RESOURCES AND CONSUMPTION

2.1 Water Resources

2.1.1 Main Water Supply Systems

Fiji Water is divided into three regions - Central, Western and Northern Regions. Central includes Suva-Nausori, Levuka (the old capital located on island of Ovalau) and Navua. (near Pacific Harbour). Suva is supplied by surface water from Waimanu River (tributary of Rewa), and in future by Rewa River, one of Fiji's largest rivers, so raw water sources are abundant. Water is treated. Levuka is supplied by a number of small creeks that run off the slopes of an old volcano. Levuka sources are subject to pronounced wet and dry seasons, with barely enough water for existing needs. Navua is supplied by a borefield recharged by a nearby creek. There is a recently constructed water treatment plant

Western Region includes Nadi-Lautoka, Sigatoka, Rakiraki and Ba. The Nadi Lautoka system is being expanded at present through Japanese funded project that will expand transmission and distribution systems, and treatment plants at Nadi and Lautoka, and build a new water treatment plant at Lautoka. The water source is a large dam at Vaturu, constructed in 1982, together with several small creek sources at Lautoka. Water resource is not seen as a limiting factor.

Sigatoka is supplied by borefield recharged from Sigatoka River, Fiji's second largest river, plus two other small borefields. Therefore the Sigatoka raw water source is abundant, but local creeks dry up, so long transmission system is being constructed along coastal strip to mitigate against this. Treatment plant, transmission and distribution now being expanded to meet existing demand and proposed future tourist resort developments.

Rakiraki supplied by surface source, the Nakauvadra River, which experiences severe wet and dry season flows. New treatment plant is now being constructed. Ba is supplied by surface sources - creeks. New source now being constructed.

Labasa supplied by surface sources (creeks) and borefields recharged by creeks. New treatment plant constructed in year 2000 Savusavu supplied by surface sources from small creeks.

Summary main systems

In summary, the largest systems are Suva-Nausori and Nadi-Lautoka. Suva is supplied by major river Waimanu and in future Rewa river, while Nadi-Lautoka served by Vaturu Dam (on upper reaches of Nadi River), supplemented by several small creeks in Lautoka area. Sources are adequate, and water quality in these two systems generally meets WHO standards. However, Suva - Nausori system is subject to continuous breakdown and water shortages. It is in need of urgent rehabilitation to improve services and in need of expansion of water sources to better meet the need of the expanding population.

2.1.2 Water Resources Minor and Rural systems

In other smaller systems, water sources consist of surface sources such as creeks and borefields. The systems in the south-west (Sigatoka) and northern areas (Rakiraki and Ba) of Viti Levu, the island of Ovalau (Levuka) and the island of Vanua Levu (Labasa and Savusavu) experience pronounced wet and dry seasons. In these areas, flow in the small creeks reduces markedly in dry season and some creek and borefield sources dry up completely. Water quality is variable and generally does not meet WHO standards.

2.1.3 Level of UFW

In all systems, unaccounted for water (UFW) is high and varies from 35 to 52% of water production. However, PWD is taking steps to improve this situation but lack of finances to meet proper O&M and rehabilitation is hindering these efforts.

2.2 Sewerage Systems

Suva-Nausori, Pacific harbour, Nadi-Lautoka, Sigatoka, Ba and Labasa have piped sewerage systems. Suva's major treatment plant at Kinoya comprises conventional trickling filters and a new SBR activated sludge plant. Nadi also has an activated sludge plant at Navakai. Other systems use low technology waste stabilisation ponds which are well suited to Fiji's conditions with regard to climate and lack of skilled manpower in remote areas. Sewerage coverage is low. Pumping stations maintenance is a problem in most systems and sewage overflows are commonplace.

2.3 Water Supply Coverage

It is the present government's policy to upgrade urban and rural water supplies over the next 5 years. This plan should see some 80 to 90% of the country having access to a good piped water supply, which where required would be treated. This compared with 60-70% coverage at present. While this is the stated government intention, poor cost recovery and a shortage of government funding is placing this objective in jeopardy.

2.4 Water Supply Consumption

Domestic water consumption averages about 147 lpcd for urban domestic customers in Fiji and is an average 190 lpcd for Suva Nausori.

2.5 Current Status of Suva Nausori System

2.5.1 Area Served

The Greater Suva urban area includes Suva City, Lami and Nausori Towns and the adjoining peri-urban areas. The current population is approximately 270,000 and high growth has occurred in recent years, particularly in the Suva-Nausori corridor, which extends northeast from Suva either side of Kings Road. A common water supply system serves the entire area but Suva, Nausori and Lami industrial area have separate sewerage systems.

Approximately 98% of Suva's urban population are served by reticulated water supply. Suva's residents experienced severe water disruptions during 1998 and the early part of 1999. The problems have been eased to some extent by mains augmentation, however the system has little reserve capacity with regard to sources, treatment or distribution. While the WSD is undertaking a Leak Detection Program, unaccounted for water remains at levels of about 50%. This includes leakage, metering errors, and illegal connections.

Less than 45% of Suva's urban population are connected to the sewerage reticulation system. The remainder is served by septic tanks and pit latrines, which perform poorly in Suva's low permeability soils and substrata. Industrial discharges to drains, creeks and bays also occur. These discharges together with overflows from the WSD's sewerage systems are causing environmental damage and pose a potential risk to public health.

Previous masterplans were prepared for water supply and sewerage in 1984 and 1971 respectively. The sewerage plan was reviewed in 1981. However, not all recommendations from the previous masterplans have been undertaken, largely due to funding constraints.

2.5.2 Current Status of Services

Water supply and sewerage deficiencies in the Suva-Nausori area are manifest through an increasing frequency of water supply disruptions, and through increasing pollution of streams and coastal water. The existing water supply system has reached the limit of its capacity, and a restriction has been placed on large-scale housing development. The restriction is, in turn, preventing the development of low cost housing. Unavailability of sufficient quantities of water may also deter the development of industry.

Water supply disruptions are having a detrimental impact on household sanitation. Lack of water, due to low water pressure in the piped system, increases the risk of spread of diseases such as infantile diarrhea in low-income communities in the peri-urban fringe and in the villages of the Rewa Delta. In these communities water for cooking, washing, and bathing is often unavailable when it is required. Health risks will increase in localities within the water supply area if the water supply system is not upgraded. Water shortages are compounded by the amount of UFW, caused largely by leakage and water metering deficiencies. Underlying these issues is a level of urban poverty that has significantly increased during the period 2000 – 2001, because of an economic downturn and because of the urban drift of tenant farmers, who have not had their land leases renewed, from rural areas.

Sewerage systems have not been extended in step with development. About two thirds of the Suva-Nausori population of approximately 270,000 people are served by septic tanks. Suva's land is hilly and impermeable, and much septic tank effluent flows directly to streams and coastal water. Overflowing sewage from sewers – which in some localities are undersized, and are subject to blockage – and from poorly maintained sewage pumping stations also contributes significantly to water pollution. Continued environmental degradation, through water pollution, is leading to the loss of amenity and to the loss of subsistence shellfish and seafood gathering areas. Sewerage deficiencies in Suva are forcing development out into “greenfield” sites, increasing the cost of provision of services such as water supply, electric power supply, roads, and transport.

3. WATER PRICING AND FINANCING ISSUES

3.1 Introduction

This section discusses broad objectives to be followed in developing tariffs as the main cost recovery mechanism and discusses the analysis of economic costs for the Suva – Nausori Project.

3.2 Tariff Setting Objectives

Cost recovery mechanisms, especially tariffs, are the structure through which costs of water supply and wastewater costs, as well as the associated financial, environmental and social costs are recovered from users. Those cost recovery mechanisms which are most likely to be successful in providing for long term sustainability are those that have been designed on the basis of their ability to meet specific objectives that determine or significantly affect long term sustainability.

Thus, the development of tariffs as cost recovery mechanisms for water and wastewater systems in the Pacific need to be designed on the basis of specific economic, financial, social, and administrative objectives. In formulating tariff methodologies and recommendations, it is generally recognized that water and wastewater tariffs should meet four key objectives, namely:

(i) Economic Efficiency. In order to ensure that charges for water and wastewater are related to economic costs, thus achieving economic and environmental efficiency of resource allocation in the water and wastewater sector. This also includes the application of demand management techniques to achieve conservation and the polluter pays principle when charging for wastewater;

(ii) Financial Sustainability. In order to ensure that the water and/or wastewater entity has sufficient revenue to cover all its operating costs (including depreciation), any debt servicing requirements, taxation, and ideally a proportion of future capital expenditure;

(iii) Social Acceptability. In order to ensure that the poorer members of the community have access to water and wastewater services at a price, which they can afford. That is that tariffs are affordable and in line with consumers willingness to pay.

For domestic customers this means that tariffs (both water and wastewater) are affordable in terms of household incomes.

(iv) Administratively Understandable. In order to ensure that any recommendations are capable of implementation in terms of metering, billing and revenue collection and that the tariffs are readily comprehensible and understandable to customers.

These matters are discussed in detail in the Theme 6 - Financing Paper. The major points are summarised below for discussion with respect to Suva Nausori Case Study.

3.2.1 Economic Pricing Principles

It is not unusual for the above objectives to conflict and final tariff design is typically a compromise between them. The usual starting point however is to derive the tariff structure and level which would best meet the economic objectives. This involves determination of the economic cost of providing water and wastewater services. Generally this is the economic cost of the next major investment in water supply and distribution, and/or wastewater collection and treatment facilities. An approximation of the long run marginal cost (LRMC) is referred to as the Average Incremental Cost (AIC). The AIC is the ratio of the total discounted capital and operating costs incurred by the next major addition to capacity to the total discounted volume of water provided or wastewater collected and treated by this extra capacity.

Where the analysis is in economic prices and the discount rate is the Social Opportunity Cost of Capital (SOCC) then it is referred to as the Average Incremental Economic Cost (AIEC). On the other hand calculation using financial prices is referred to as the Average Incremental Financial Cost (AIFC) and is the price (average tariff) that needs to be charged on all units to achieve full cost recovery over the life of the project in financial prices.

Issues such as connection costs, can also be examined in terms of economic costs charged to individual users as the initial cost or the monthly or annual charges to connect to the water and wastewater system.

3.2.2 Financial Sustainability and Financial Objectives

In considering the financial requirements for tariffs it is important that the economic structure be maintained as far as possible as this provides the correct signal to wastewater producers. Financial objectives relate to the satisfactory financial performance and long term sustainability of the water and wastewater entities. Accordingly, water and wastewater tariffs should be set at an overall level to meet proper level of operating and maintenance costs, debt service and ideally a proportion of future capital expenditure.

3.2.3 The Social Objective - Affordability and Willingness to Pay

In considering the affordability of wastewater services it is necessary to consider this in the context of affordable tariffs not exceeding some 5 percent of household income for water supply and waste water disposal in a developing country context. The primary social objective for tariff formulation should be to ensure that all members of the community are able to afford access to clean water supply and to waste water disposal services without placing an undue burden on their expenditure.

The poorer members of the community are likely to be particularly vulnerable to high levels of water tariffs and wastewater disposal charges, which would discourage their use and result in the continuation of the use of unsatisfactory alternatives in terms of the potential health and environmental risks to the population at large. Thus tariff structures need to be designed with acceptable levels of household affordability in mind.

3.2.4 Administrative Objective - Billing and Income Collection

Tariff structure must be capable of implementation in terms of metering, billing and revenue collection. Also it is important that the tariffs are readily comprehensible and understandable to customers.

Where the collection efficiency of a billing system falls below 90% then the integrity of the billing and collection system falls into question. That is users begin to realize that there is no penalty for non-payment so that they do not pay. Other users observe this and in turn decide not to pay.

3.3 Ideal Tariff Structures.

Some form of progressive tariff structure is desirable for domestic households as this allows provision of a lifeline block of consumption to meet the basic water requirements of low income households at a price they can afford. This meets the social objective and hence contributes to poverty alleviation objectives.

The main criticism of progressive tariff structures is that there are often too many bands and the bands are too wide. This results in all or most domestic consumption in the lower bands, leading to poor financial revenues and low cost recovery and very minimal demand management leading to excessive consumption.

Ideally a tariff structure should have not more than a total of 3 or 4 tariff bands. Each band should not exceed 10 cum of consumption. After say 20 cum of consumption tariffs should be set at or above the AIFC and this charge should be the same for all classes of consumption at this level. That is, the only concessions that should be made is to provide a lifeline block to

meet basic needs of low income households in the first block of 10 cum and then to meet average households requirements in the next 10 cum block.

Were water supply and wastewater projects financed with commercial monies then there would be a requirement for such tariffs. The problems arise where grant aid results in no financial requirements to set such financial tariffs. As a result revenues are generally inadequate to even meet proper O&M as preventative maintenance is also ignored in the desire to set tariffs as low as possible to satisfy political rather than sound commercial objectives.

Often in pursuing the belief that the poor need to be protected from high tariffs with government policies that result in low tariffs, it is actually the urban poor that end up being disadvantaged as their service is likely to deteriorate first on the periurban area. Alternatively lack of funds means that the distribution system cannot be connected to bring water to periurban areas where the poor are more likely to reside. Water sources are also likely to be inadequate to supply services to such areas.

4. ANALYSIS OF SUVA - NAUSORI PROJECT

4.1 Economic Analysis of Suva - Nausori Project

The Average Incremental Economic Cost (AIEC) and Average Incremental Financial Cost (AIFC) of water supply and sewerage provide measures of the costs of producing, treating and distributing water and the collection, treatment and disposal of wastewater under the project. These may be used to determine the economic and financial tariffs required to achieve full cost recovery and the level necessary to achieve recovery of O&M costs.

In the case of water it is important that the future price is understood so that water demand on the margin can be priced accordingly to discourage waste and encourage conservation with pricing used as a demand management tool. However in the case of sewerage pricing on the margin, the objective is not to discourage use, rather the objective is to encourage use and maximise the level of cost recovery.

For Suva-Nausori systems the AIC is based on the capital and operating costs of the proposed Masterplan projects (20 years) and the estimated production of water and/or waste water over the expected 40 year life of the project components.

A comparison of AIEC with the existing financial tariff provides a measure of the extent to which the economic costs of the sub-project are recovered in the tariff and therefore, gives an estimate of the economic subsidy. However, tariff levels necessary for full cost recovery may not be realistic because of affordability and willingness to pay considerations.

The AIFC provides the level of tariff required to cover the full capital and operating and maintenance costs of the water supply and wastewater services measured in financial terms and provides a measure of the financial subsidy when compared with the existing financial tariff.

While AIEC uses the SOCC discount rate of 12 percent for present value calculation, the AIFC uses the weighted average cost of capital (WACC) as its discount rate. The WACC adopted here is 2.1%

4.2 Water Supply Masterplan and AIEC and AIFC Calculations

The AIFC and AIEC for the Water Supply and Sewerage Masterplan have been calculated to provide a measure of the cost per cum of the proposed Masterplans and to determine the basis of tariffs needed to meet full cost recovery and to meet O&M costs for watersupply and sewerage. These have then been compared with levels of affordability based on estimated household incomes from the socio-economic survey to ascertain the level of affordable tariffs.

The AIFC excludes the cost of small scale distribution that is included in the cost of purchasing a Housing Authority plot as this cost is not met by the Water and Sewerage Department (WSD) but rather is met by the consumer when purchasing a serviced building site. However, household connection and metering costs are included when calculating the AIFC as these cost are met by WSD. While a connection fee is paid by the householder of F\$22, this is not adequate to cover the actual cost of household connection and meter estimated at F\$205. In the case of calculating the AIEC, small scale distribution costs met by the Housing Authority, are included as these are costs to the economy of providing water supply.

The table below, sets out costs of water supply expressed as AIFC and AIEC per cum of water sales, at 2.1% and 12.0% discount rates respectively.

Table 1 : Summary Calculation AIFC and AIEC for Water Supply Masterplan (F\$/cum)

Total Master Plan F\$/cum	2003 - 2022		AIEC	% Total
	AIFC	% Total		
Capital	44.6	66%	94.4	83%
O&M	23.4	34%	19.8	17%
Total	68.0	100%	114.2	100%
Proposed Project F\$/cum	2003 - 2007		AIEC	% Total
	AIFC	% Total		
Capital	29.9	68%	87.2	85%
O&M	14.3	32%	14.9	15%
Total	44.2	100%	101.2	100%

As shown above, the AIFC for the Overall Masterplan is 68 cents per cum. This is the average price to be charged (before adjusting for annual inflation) for each cum sold over the next 40 years to recover the total cost of the investment in the Masterplan and system operating costs. This is made up of a capital cost element of 45 cents (66%) and an O&M element of 23 cents (34%). This is fairly typical of most water supply systems where the capital cost element usually is around 70% of the total cost.

In the case of the AIEC, which includes distribution pipeline costs, the Overall Masterplan AIEC is 114 cents with capital costs representing 94 cents (83%) and O&M costs of 20 cents (17%). The AIEC reflects the higher cost of including the distribution pipeline network (and the SOCC discount rate of 12% used in the analysis.) The distribution costs were excluded in the calculation of the AIFC, as this cost is met directly by the consumer through the purchase price of the Housing Authority sections and private sector housing developments. These sources represent 90% of all assumed new connections.

In the case of the Short Term program – Proposed ADB Project, (2003–2007) the AIFC is 44 cents compared with an AIEC of 101 cents. The AIFC is made up of a capital cost element of 30 cents (68%) and an O&M element of 14 cents (32%). These costs are less than the Overall Masterplan's AIFC and AIEC, and benefit from increased incremental water sales. This results from decreases in unaccounted for water (UFW) from an estimated 50% to 35%, as leaks are reduced as trunk and distribution pipelines are replaced, and household connections and old meters replaced. Additional water sales result from increased sales from new sources to meet suppressed demand and sales to new connections.

The issue arises as to which is the appropriate basis on which to set tariffs, in order to reflect future costs and in turn influence consumers' consumption patterns through the tariff. For the next five-year period, this may be the short term costs. While prices should be set to reflect the LRMC (Long Run Marginal Cost), the most immediate project normally is considered acceptable as the basis of the AIC calculation. However, planners and policy makers need to be aware that after 2007 marginal costs of increased water production and treatment are rising and pricing policies at this time need to take this into account if water consumers are going to meet this cost.

For tariff calculation purposes the AIFC is used in preference to the AIEC, as the AIFC reflects the financial costs that need to be recovered by the WSD. Small scale reticulation costs included in the AIEC are met by the purchasers' of Housing Authority and private developers in the building plot cost.

4.3 Sewerage Masterplan and AIEC and AIFC Calculations

The AIFC excludes the cost of reticulation pipelines and household connections that are included in the cost of purchasing a Housing Authority plot as this cost is not met by WSD. In

the case of AIEC these sewerage reticulation costs are included, as these are costs to the economy of removing wastewater. However, it is assumed that WSD is responsible for the operating and maintenance of the sewerage reticulation lines. Consequently this O&M cost is included in the AIFC calculation.

The table below sets out costs of wastewater collection, treatment and disposal expressed as AIFC and AIEC per cum of water consumption (sales) at 2.1% and 12.0% discount rates respectively.

Table 2 : Summary Calculation AIFC and AIEC for Sewerage Masterplan

Total Masterplan	2003 - 2022				
F\$/cum	AIFC	% Total	AIEC	% Total	
Capital	43.5	66%	120.4	83%	
O&M	22.7	34%	24.8	17%	
Total	66.2	100%	145.2	100%	
Proposed Project	2003 - 2007				
F\$/cum	AIFC	% Total	AIEC	% Total	
Capital	59.2	62%	161.9	82%	
O&M	37.1	38%	36.2	18%	
Total	96.4	100%	198.0	100%	

As shown above, the AIFC for the Overall Masterplan is 66 cents per cum. This is made up of a capital cost element of 44 cents (66%) and an O&M element of 22 cents (34%). In the case of the AIEC, which includes reticulation pipeline costs, the Overall Masterplan AIEC is 145 cents with capital costs representing 120 cents (83%) and O&M costs of 25 cents (17%). The AIEC reflects the higher cost of including the sewerage reticulation pipeline network and connection costs. These costs were excluded in the calculation of the AIFC, as the reticulation and connection costs are met directly by the consumer through the purchase price of the Housing Authority plot.

In the case of the Short Term project (2003 – 2007) the AIFC of 96 cents is compared with an AIEC of 198 cents per cum. These costs are higher than the Overall Masterplan AIFC and AIEC. This is because there are a number of costs that are incurred in the short term that serve the whole Masterplan period. This includes the new Kinoya outfall and expansions to the sewerage treatment plant.

Therefore, unlike the Water Supply Masterplan, where water supply is increased (in conjunction with a reduction in water losses) to meet suppressed demand and new customers, while there is an attempt in the case of the Sewerage Masterplan to accelerate the connection of backlog sections not currently connected, to better utilise excess capacity available, this connection of backlog sections in practice is assumed to be spread over the whole Masterplan period. On the other hand suppressed water demand is satisfied within the Short Term Plan, the proposed ADB project.

In theory, tariffs and pricing policies, which can influence consumer consumption patterns are related to future investment decisions. However, this is less relevant in the case of sewerage charges, where the main concern is to connect customers and achieve both public and private health and environmental benefits.

While the combined water and sewerage charge should signal to consumers the consequences of higher consumption in terms of bringing forward more expensive projects to meet demand for water supply and sewerage collection facilities and treatment, this can be achieved through a progressive water tariff and a fixed wastewater charge per cum.

Thus, for sewerage charges, as in the case of Water Supply Masterplan, the issue arises as to which is the appropriate basis on which to set tariffs, in order to reflect future costs and in turn influence consumers consumption patterns through the tariff. In our view this should be the

Overall Masterplan costs as this includes the cost of upgrading trunk mains and expanding the treatment facilities to meet the 20 year period demands.

That is, over the 20-year period increases in connections will result in a reduction in both capital and fixed operating costs per cum of wastewater collected and treated as excess capacity is more fully utilised.

For tariff calculation purposes the AIFC was used in preference to the AIEC, as these are the financial costs that need to be recovered by the WSD, whereas the reticulation network costs and household connection costs, included in the AIEC are met by the purchasers' of Housing Authority building plots.

4.4 Affordability of Full Cost Recovery Tariffs

4.4.1 Monthly Household Income and Affordability

The household survey carried out in 1999 provided the following income data which has been used to discuss cost recovery targets, tariff policy and tariff structures for WSD for water and sewage tariffs. The table below shows the amount of monthly household income that equates to 5% of household income, which is regarded as acceptable level of expenditure by a household for a good 24 hour, clean water supply, with adequate pressure and associated wastewater disposal services.

Table 3 : Distribution of Annual Household Income and Affordability (F\$)

Decile	Annual Income range	Average/year	Average/Month	5% Monthly Income
Lowest 20%	0-5200	4653	387.8	19.4
Median	13000-15600	13000	1083.3	54.2
Average		16391	1365.9	113.3

(Source: PPTA Household Survey 1999: The Pre-Appraisal Mission in February 2002 considered that the survey results were still reasonable in real terms given the expected zero per capita income growth that occurred between 1999 and 2001.)

The table shows that

- (i) the low income household in Suva and Nausori could meet user charges of F\$19 per month at an affordability level of 5% of household income;
- (ii) the median household could meet user charges of F\$54 per month; and
- (iii) the average income household could meet user charges of F\$113 per month.

In terms of affordability and willingness to pay for services, the low levels of expected GDP growth in the future (3% per annum) are not expected to see any significant increase in household incomes in the short term to pay for tariffs higher than the monthly amounts presented above. Accordingly these figures have been used to assess affordability rather than assuming higher incomes as a result of GDP growth.

4.4.2 Proposed Project - Short Term Master Plan (2003 – 2007)

Tariffs to Meet Full Cost Recovery and O&M Costs

The tariffs necessary to achieve first, full cost recovery and second, to meet operating and maintenance costs of the water and sewerage schemes in the project area were compared for the low, and median income households to assess the level of monthly income required. The results are summarised in the table below.

Table 4 : Summary Alternative Cost Recovery Levels and Affordability for Households in Suva-Nausori Area, based on Short Term Plan (2003-2007)

Income	F\$\$ / month cum/mth. Lpcpd	Average Income 1083 31.35 190	Low Income 388 14.85 90		
Sub project	F cents/cum	F\$/HH/mth.	Affordability	F\$/HH/mth.	Affordability
Water Supply					
Full Cost Recovery	44.21	13.86	1.3%	6.57	1.7%
O&M only	14.32	4.49	0.4%	2.13	0.5%
Sewerage (1)					
Full Cost Recovery	66.19	20.75	1.9%	9.83	2.5%
O&M only	22.66	7.10	0.7%	3.37	0.9%
Water & Sewerage					
Full Cost Recovery	110.41	34.61	3.2%	16.40	4.2%
O&M only	36.98	11.59	1.1%	5.49	1.4%
Water Full Cost, Sewerage O&M only	66.87	20.96	1.9%	9.93	2.6%
Current WSD Tariffs (2)					
Water		8.90	0.8%	2.27	0.6%
Sewerage		6.27	0.6%	2.97	0.8%
Total		15.17	1.4%	5.24	1.3%

Note (1) : As noted in text the AIFC used in the Overall Masterplan cost

(2) : See current WSD tariff below.

In the case of a median income household, 3.2% of household income is required to achieve full cost recovery of both water and sewerage services. This suggests that it is possible to structure tariffs to achieve full cost recovery for both water supply and sewerage for an average household within acceptable affordability limits. The recovery of O&M costs would amount to only 1.1% of average household income. This may be compared with combined water and sewerage bill at the current tariff of F\$15.17, which equates to 1.4% of household income. This leads to the conclusion that for an average household the water and wastewater bills would simply meet future system O&M costs with no effective contribution to capital cost recovery. At the present time if collection efficiency of 60% was factored in then present revenues are not able to meet O&M costs.

It is evident that a low income household would be able to meet a full cost recovery tariff for water and sewerage amounting to 4.2% of household income, which would be within the acceptable levels of household affordability. However, this would probably exceed willingness to pay where most households have access to the existing water supply system, which many consider adequate, while many households use septic tanks and therefore do not have to meet a monthly sewerage charge. The average bill for a low income household at the current tariff for water and wastewater would be F\$5.24 or 1.3% of household income. Where a low income household only had a water connection then the estimated bill of F\$2.27, would represent 0.6% of household income. At these levels household's would only contribute to O&M costs.

On the other hand, the recovery of O & M component of the AIFC by low income households would amount to only 1.4% of monthly household income. For a low income household, this may be compared with a combined sewerage and water bill of \$5.24 per month, equivalent to

1.3% of household income. However, as noted above, most low income households are likely to be only connected to the water supply, and therefore paying a monthly bill of F\$2.97, which is equivalent to 0.6% of household income. However, if present levels of collection efficiency of 60% is factored in, then present revenues are not able to meet o&M costs.

4.4.3 Overall Masterplan (2003 – 2022)

The above discussion of levels of cost recovery, compared with affordability is considered in the context of the Overall Masterplan. While we have demonstrated that the Short Term program is affordable and that tariffs could be set at levels that would achieve full cost recovery, it is also important to examine whether the ongoing Masterplan is affordable at acceptable tariff levels. Accordingly the tariffs necessary to achieve first, full cost recovery and second, to meet operating and maintenance costs of the water and sewerage Overall Masterplan are examined in the table below to assess the level of monthly income required to meet full cost recovery and to meet recovery of O&M costs for low and median income households.

Table 5 : Summary Alternative Cost Recovery Levels and Affordability for Households in Suva - Nausori Project Area, based on Overall Masterplan Costs (2003-2022)

Income	F\$\$ / month Cum/mth. lpcpd	Average 1083 31.35 190	Income	Low 388 14.85 90	Income
Sub project	F cents/cum	F\$/HH/mth.	Affordability	F\$/HH/mth.	Affordability
Water Supply					
Full Cost Recovery	68.00	21.32	2.0%	10.10	2.6%
O&M only	23.42	7.34	0.7%	3.48	0.9%
Sewerage					
Full Cost Recovery	66.19	20.75	1.9%	9.83	2.5%
O&M only	22.66	7.10	0.7%	3.37	0.9%
Water & Sewerage					
Full Cost Recovery	134.19	42.07	3.9%	19.93	5.1%
O&M only	46.08	14.45	1.3%	6.84	1.8%
Water Full Cost, Sewerage O&M only	90.66	28.42	2.6%	13.46	3.5%
Existing WSD Tariffs (1)					
Water		8.90	0.8%	2.27	0.6%
Sewerage		6.27	0.6%	2.97	0.8%
Total		15.17	1.4%	5.24	1.3%

Note (1) : See current WSD tariff below.

In the case of median income household, 3.9% of household income is required to achieve full cost recovery. This suggests that it is possible to structure tariffs to achieve full cost recovery for both water supply and sewerage for an average household within acceptable affordability limits for the whole plan period investment program.

On the other hand, the recovery of operating costs would amount to only 1.4% of average household income. This may be compared with combined water and sewerage bill at the current tariff equating to 1.4% of household income.

It is evident that for a low income household to be able to meet a full cost recovery tariff for water and sewerage would amount to 5.1% of household income which would be on the upper range of acceptable levels of household affordability. This would probably exceed willingness to pay where most households have access to the existing water supply system, which is considered adequate, while in the case of wastewater charges, many households use septic tanks and therefore do not have to meet a sewerage tariff.

On the other hand, the recovery of O & M component of the AIFC by low income households would amount to only 1.8% of monthly household income, or F\$6.84 per month. For a low income household, this may be compared with a combined sewerage and water bill of \$5.24 per month, equivalent to 1.3% of household income.

4.4.4 Implications for Tariff Design

A progressive tariff structure, with a life line block, lower than the full AIFC cost, would allow low income households to meet their basic water and wastewater requirements at a price they could afford, while tariffs in higher bands to average income households could allow full cost recovery to be achieved at affordable tariffs for an average income household.

The above discussion leads to the conclusion that the Overall Masterplan is affordable with tariffs able to be set to achieve full cost recovery within acceptable limits of household expenditure both for average income households and for low income household's water and wastewater requirements.

Accordingly as supply improves WSD should be able to increase charges to the levels proposed above. This would remove the burden from the Government of having to subsidise water and sewerage services in the Suva–Nausori area. It is generally accepted that households are prepared to pay such tariffs where they receive a good 24 hour supply of good pressure potable water and associated wastewater services.

A progressive tariff structure, with a life line block, would allow low income households to meet their basic water requirements at a price they could afford, while tariffs in higher bands to average income households could allow full cost recovery to be achieved at affordable tariffs for average income household. The ability of the existing tariff to satisfy cost recovery objectives is discussed below.

4.5 Existing WSD Fiji Water and Sewerage Tariffs

The tariff is uniform for the whole country. Although water meters are only read every three months, WSD has begun to charge customers monthly. This has led to much confusion. The socioeconomic surveys for the Suva Nausori project of both domestic and commercial customers have indicated a clear preference for meters to be read monthly and for monthly billing. Uniform tariffs across Fiji limit the opportunity for greater cost recovery on the larger urban systems where the level of service is much higher than in the smaller rural centres.

All customers are metered, but where meters are not working, customers consumption is estimated on the lowest of the last three readings.

All non-domestic customers are required to pay the flat commercial tariff. Government housing pays the domestic rate. Free usage of water by a number of institutions such as police, prisons, military forces, government buildings and hospitals no longer apply. However, churches and schools still receive a concessionary allowance, up to 227 cum per quarter free of charge and are then charged the commercial rate on the balance of consumption.

The table below sets out the current WSD charges effective from January 200. While the WSD tariff is for the country as a whole, the comments below relate to how this tariff would achieve cost recovery objectives in terms of the Suva-Nausori water supply and sewerage system and the proposed project.

Table 6 : WSD Current Water Tariff Structure

Category	Consumption Bands Cum/3 months	Consumption Bands Cum/ month	Tariff F\$ / cum	Tariff US\$ / cum (2)
Water				
(i) Domestic	1 - 50	1 - 17	0.153	0.072
	51 - 00	18 - 33	0.439	0.207
	Over 100	Over 33	0.838	0.396
(ii) Commercial	All units	All units	0.529	0.250
Sewerage				
(i) Domestic	All units	All units	0.200	0.095
(ii) Commercial	All units	All units	0.200 (1)	0.095
Average Tariffs	Water	Sewerage	Average	
	F\$ / cum	F\$ / cum	F\$ / cum	
Domestic	0.284	0.200	0.484	0.229
Commercial	0.529	0.226	0.755	0.357
Average	0.353	0.210	0.563	0.266

Note (1) : Sewerage tariff assessed for all major industries and is based on tariff of F\$ 0.200 per cum and average F\$ 0.226 per cum

Note (2) : 1US\$ = 2.116 F\$ or 1F\$ = 0.4726 US\$

4.6 Subsidy Implications of AIFC Tariffs

The overall economic cost of the proposed project 2003 to 2007 is estimated at F\$ 1.10 per cum and the Overall Masterplan to 2022 is F\$1.34 per cum compared with the average domestic tariff for 31 cum of F\$ 0.48 and over all consumption of F\$ 0.56 per cum.

Table 7 : Analysis of WSD Tariff and Subsidy Implications with AIFC Estimates

Average Tariffs	Water F\$ / cum	Sewerage F\$ / cum	Overall F\$ / cum
Domestic	0.284	0.200	0.484
Commercial	0.529	0.226	0.755
Average	0.353	0.210	0.563
AIFC	0.421	0.662	1.104
(i) Subsidy element			
Domestic	0.158	0.462	0.620
Commercial	(0.087)	0.436	0.349
Average	0.090	0.451	0.541
(ii) Subsidy element with low collection efficiency			
Domestic	0.272	0.562	0.834
Commercial	(0.003)	0.459	0.425
Average	0.186	0.501	0.687

Firstly there is a cross subsidy between the average financial domestic tariff and the commercial financial tariff when compared with the overall average financial water tariff of F\$ 0.09 per cum. Further when the average domestic tariff for water and sewerage of F\$0.48 is compared with the economic costs tariffs then there is a financial subsidy of F\$ 0.62 per cum. The Commercial tariff on the other hand exceeds the AIFC for water, but nevertheless there is an overall (commercial water and wastewater) financial subsidy of F\$ 0.35 per cum. The Overall average financial tariff (F\$.56) when compared with economic costs results in a financial subsidy of F\$0.54 per cum.

If the collection efficiency is taken into account then the financial subsidy would increase. The above analysis assumes that the revenue received from the tariff is 100% collections. Assuming a collection efficiency of 65% for Suva Nausori for water supply and wastewater

collections then the effective subsidy increases as the revenues from the existing tariff base declines. Thus the financial subsidy comparing the current financial tariff with the economic costs would average F\$0.69 per cum.

4.6.1 Comment on existing tariff structure.

Fiji Present Cost Recovery Policies and Water and Sewerage Tariffs

At the present time GoF has no defined cost recovery objectives for the water and sanitation sector. Current tariffs are unable to meet cash operating, billing, and overhead costs, especially when level of collection efficiency is taken into account. Comments on Current Tariff Structure

The ability of existing FWSD tariffs to meet objectives for tariffs is summarised below.

Economic Efficiency

The tariff structure, in the case of domestic follows a typical progressive tariff structure. Nevertheless as noted above the tariff bands are too large so that 60% of domestic consumption is satisfied in the first band rather than just basic needs which should be interpreted at 60 lpcd or say a lifeline block of 10 cum per month. The second band to 33 cum per month is too high to provide any effective demand management role on average domestic consumption. If demand can be reduced or managed the investments in the Masterplan could be deferred thus avoiding the GoF in further costly expenditure. Sewerage charges are below O&M cost recovery. Overall the tariff structure would fail the economic efficiency test.

Financial Sustainability

The existing tariff structure does not generate sufficient revenues to meet cash O&M costs. The sector is reliant on the GoF to meet the balance of O&M costs and capital expenditure for rehabilitation and expansion. This problem however, is made worse by the current billing and collection arrangements which result in only 56% of billings being collected.

Uniform tariffs across Fiji limit the opportunity for greater cost recovery on the larger urban systems where the level of service is much higher than in the smaller rural centres.

Socially Acceptable and Affordable

The existing tariff is able to meet standard affordability criteria for low income and average income households. However, because of the poor financial performance of the sector the water supply and sanitation services are failing to meet the population's social requirements for adequate safe supplies of drinking water.

Administratively Understandable

The tariff structure with three monthly meter reading and monthly billing based on estimates is confusing for customers and requires frequent adjustments and rebates. Consequently the meter reading and billing arrangements fail the test of being readily understandable to customers.

Further the current institutional structure with billing undertaken by the Water Rates Office and funds then transferred to the consolidated fund means that WSD is not directly responsible for collecting revenues to meet its own budget requirements which are met by the GoF out of the consolidated fund,

In fact the integrity of the whole billing system is declining with the collection efficiency steadily falling and now averaging 56% for the whole of Fiji. The Water Rates Office requires institutional strengthening to reverse this situation.

4.6.2 Declining Collection Efficiency

In 1998 Water Sales for WSD were estimated at F\$19.4 million and collections at F\$12.1 million. This represents a collection efficiency of 64%. Over the next three years while billings increased to F\$23.1 million for 2001, collections were only F\$13.2 million which includes arrears from previous years. Consequently at best the collection efficiency is now some 56% and accumulated arrears of outstanding bills F\$18.2 million. Collection Efficiency is higher in the Suva Nausori area but probably would not exceed 65%.

4.7 Water Supply Sector Funding

4.7.1 GoF Funding

At the present time the GoF is meeting both the balance of O&M costs not met by user charges and all the capital costs for system rehabilitation and expansion.

Funding of O&M Costs

Therefore, In terms of operating costs, tariffs (user charges) have not been at levels to meet direct cash operating expenses with the GoF meeting the shortfall. In recent years this has meant that the GoF has provided up to F\$ 14 million per annum to meet the balance of O&M costs. Information for the period 1997 to 2001 on direct O&M expenditure and revenue collected is summarised in the table below.

Table 8 : Estimated Direct O&M Expenditure by PWD on Water and Sewerage (F\$m)

Operating Costs	1997	1998	1999	2000	2001
Water	15.6	15.8	17.0	22.0	20.8
Sewerage	3.2	3.5	4.1	5.0	5.6
Total Operating Expenses	18.8	19.3	21.1	27.0	26.4
Revenues Collected	11.0	12.1	11.4	12.8	13.2
Shortfall	7.8	7.2	9.7	14.2	13.2

Funding of Capital Costs

The GoF provides some F\$ 15 – 25 million for capital expenditure both for expansion and rehabilitation in the annual budget. Until recently external assistance to finance capital construction has been limited mainly to technical assistance

External Assistance

In past, the GoF has only used external loan financing in the water sector to construct the Vaturu Dam (Nadi – Lautoka system). This was commissioned in 1982, with the loan now repaid. More recently, ongoing assistance is being provided by Japan, about US\$15 million equivalent, to upgrade – rehabilitate and expand the Nadi – Lautoka water supply and sewerage systems. The European Union is also providing assistance for the construction of a new treated sewage outfall pipeline at Suva's main sewage treatment plant at Kinoya (US\$3.8 million equivalent). The GoF is now seeking assistance from ADB for the Suva Nausori Project with the overall project cost around F\$120 -130 million with a loan in the range of 75% of F\$ 90 – F\$100 million.

5. INSTITUTIONAL ARRANGEMENTS IN THE WATER SECTOR

5.1.1 Existing Sector Organisation

Despite the reorganization initiatives of recent years, the water and sewerage sector in Fiji remains fragmented. PWD, whose management structure is regionally based, carries out all technical functions. Operational activities are headed by a Deputy Secretary (Operations), with each region responsible for public buildings and roads, as well as for water supply and sewerage. Planning and design is carried out under a Deputy Secretary (Planning and Design), quite separately from operations. Water and wastewater charges are collected through the Water Rates Office, and all revenues are paid into the Government consolidated fund.

5.1.2 Proposed Institutional Reform

The Government's current policy on public enterprise reform is contained in the Economic and Fiscal Update Supplement to the 2002 Budget Address, published in November 2001. In the case of water and sewerage services, the policy is for these services to remain in Government ownership, and to be re-organized according to the following underlying key principles:

- ?? clarity of objectives;
- ?? management autonomy and authority;
- ?? strict accountability for performance; and
- ?? an increasingly competitive environment.

A structure for a Fiji water Board has been developed in conjunction with with senior water and sewerage personnel within MWTERTS. Features of FWB's structure include the integration of all water and sewerage functions under a Chief Executive Officer, and the creation of the four major divisions of Operations, Planning and Design, Corporate Services, and Finance. This structure is close to that of a commercial entity. Nevertheless, there are skills shortages in the fields of engineering and technical operations, information technology, and accounting. Management information and credit control systems require further development. Above all, commercial management skills need to be developed. Addressing these issues will form part of future institutional strengthening in the sector.

6. FINANCIAL PROJECTIONS AND FUNDING REQUIREMENTS.

6.1 Purpose of Financial Projections for WSS

Financial projections for the Public Works Department, Water and Sewerage Section (WSS) were prepared to identify the ongoing Government of Fiji (GoF) funding for the sector under alternative cost recovery policies and tariff levels. In recent years the Government has met all capital costs through either direct grants or through external loans repaid by Ministry of Finance.

6.2 Policy on Water Supply Quality and Coverage

The use of external loan financing from Multilateral Banks and Bilateral sources now presents the opportunity to accelerate the expansion and rehabilitation of water supply assets and meet GoF policy objectives for the sector.

It is the present government's policy to upgrade urban and rural water supplies over the next 5 years. This plan should see some 80 to 90% of the country having access to a good piped water supply, which where required would be treated. This will require an improvement in cost recovery which is seen as a high priority in institutional strengthening of the sector.

Tariffs increases are examined, within acceptable levels of affordability, so that the financing burden of the GoF is reduced with more met directly by users.

6.3 Basis of Financial Projections for WSS

The basis of the financial projections investment program was the Masterplans developed for various systems throughout Fiji. These also provide the basis for PWDs annual applications for funding within the Fiji Budget system. Alternative Development Scenarios are discussed below.

6.3.1 Existing PWD Tariffs with no improvements in Billing Procedures.

This option examines the financial implications of doing nothing. This cannot be regarded as a realistic policy option. However, it does allow the impact of changes or improvements to be estimated so that the GoF can see what the implications are of the recommended institutional changes.

Support to the sector of F\$471 over the next ten years or F\$47 per annum required is likely to place further strains on government finances. On the other hand it has been demonstrated in most countries that users are willing to pay a fair charge for a good water supply. Also it can be demonstrated in Asia that those countries that have higher water tariffs generally have a better level of service and customers are satisfied. Lower tariffs increases dependence on government for funding of the sector that can not always be delivered, especially where priorities change.

6.3.2 Existing Tariffs but improvements in Billing Procedures.

Improvement in billing and collection of revenues means that all consumers would be paying for the water they use under the present tariff. This saves the GoF F\$101 million over ten years or F\$10 million per year. However support to the sector at F\$370 million is still required.

6.3.3 Tariffs Set at Affordable Levels in 2006 to meet O&M Costs and Debt Servicing.

Tariff Increase Assumptions.

Tariff increases are proposed in 2006 and 2008 to coincide with improvements in services for Nadi Lautoka and Suva Nausori systems and the commencement of debt servicing by the GoF on loans taken out to finance these investments.

Table 9 : Proposed Tariff Increases over forecast period.

Year	2002	2006	2008
Inflation factor	100	117	127
Domestic water and sewerage tariffs Increases		25.0%	25.0%
Real Increase after inflation		17.0%	8.0%
Minor Water supply systems – half (50%) the above		12.5%	12.5%
Commercial water supply, treated systems		25.0%	25.0%
Commercial water supply, minor systems		12.5%	12.5%
Commercial Sewerage Tariffs		260%	12.5%
Connection Fees– Domestic, to actual cost		F\$235	12.5%
Connection Fees – Commercial, based on actual		F\$350	12.5%

Domestic water and sewerage tariffs are increased by 25% in 2006 at the end of the governments present term, and then by 25% in 2008. This represents an increase in tariffs of 7% annually over the forecast period, and represents a 3% annual real increase in tariffs where domestic inflation is assumed at 4%. Such a tariff program is regarded as very modest and affordable and reasonable and would coincide with major upgrading and expansion of water supply systems in Fiji. (Where increases for Suva-Nausori are considered in isolation to the rest of Fiji they may have to be as high as 40% as Suva – Nausori could not take advantage of the strong cash flows from the expanded Nadi-Lautoka and Sigatoka systems which are large gravity systems with low operating costs and hence cash surpluses.)

For minor systems it is proposed that tariff increases be half those of the larger fully treated systems and otherwise maintained in line with inflation, which means over time there will be some divergence with the larger systems with treated water supplies compared with partially treated water in the minor systems.

Commercial water charges are assumed to increase at the same rate as domestic customers for both the systems with treated water and minor systems with partially treated water.

In the case of commercial sewerage charges it is proposed that they be increased to a minimum of F\$0.50, in 1999 prices from a current level of F\$ 0.226 per cum. It is recommended that these charges should be adopted from 2006. In 2006 the tariff, including inflation would need to be F\$0.58. This requires a 260% increase in 2006.

For connection fees, it is recommend that these be set in line with actual average costs from 2006. In the case of domestic connections, this is estimated at F\$205. It maybe necessary to provide payment over a two year period so that such a cost is not a burden to low income households.

6.3.4 Summary of Alternative Development Options.

The Table below sets out the salient points with regard to the three development scenarios described above.

Table 10 : Summary of Impact of Improving Collections and Tariff Increases.

Scenario	1	2	3
Description of Scenario	Status Quo	Improve Collections	Improve Collection plus tariff increases
1) Improve Collections	56% (no change)	92%	92%
2) Tariff Increases	Nil	Nil	25% (2006) 25% (2008)
Summary Government Support under each scenario. (F\$ m)			
A.) 2002 - 2005	156	132	132
B.) 2006 - 2012	315	238	45
A.+ B.) Total	471	370	177
Benefits to GoF - Savings Compared with Scenario 1. (F\$ m)			
Improve Collections	-	101	101
Increased Tariffs	-	-	193
Improve Collections plus tariffs	-	101	294

Table 11 : Affordability of Proposed tariffs

	2001	2006	2008
Domestic - Average Tariffs for Suva Nausori			
Water (F\$/cum)	0.281	0.351	0.439
Sewerage (F\$/cum)	0.198	0.248	0.278
Water and Sewerage Bill	F\$/month/HH		
Ave. HH monthly bill (31.4 cum)	15.0	18.8	22.5
Low income HH bill (4.9 cum)	7.1	8.9	10.7
Affordability- Water bill % HH Income			
Average HouseHold	1.4%	1.7%	2.1%
Low income HH	1.8%	2.3%	2.8%
(Assumes no change in incomes)			

6.3.5 Summary of Results

The results of the analysis shows, that with tariff increases in 2006 and 2008, that :

- ?? revenues would exceed direct operating costs (including billing and overheads) from 2006,
- ?? depreciation charges are covered from 2011,
- ?? debt service is met by consumers from 2006,
- ?? customers could meet 20% of capital investment costs from internal funds by 2012.
- ?? an average income household in Suva – Nausori would spend 1.7% of household income on water and sewerage charges in 2006 and 2.1% by 2012, compared with 1.4% in 2002.
- ?? A low income household in Suva – Nausori would spend 2.3% of household income on water and sewerage charges in 2006 and 2.8% by 2012, compared with 1.8% in 2002.

- ?? Charges to households in minor systems should be affordable as these have only increased at half the increases proposed for larger systems
- ?? GoF support to water and sanitation sector falls to F\$177 million compared with F\$370 under existing tariffs and F\$471 million where there is no improvement in billing systems and existing tariffs.
- ?? GoF support to O&M costs is limited to F\$30 million over 2002 to 2005 compared with F\$169 million under existing tariffs and billing arrangements over the whole forecast period, 2002 to 2012.
- ?? GoF support is not required for debt service where under no improvements in billing and no tariff increases these charges represent F\$82 million.

Overall Summary

The benefit of improved billing and collection systems is F\$101 million, while tariff increases in line with system improvements, especially in the larger Nadi – Lautoka and Suva Nausori result in an additional F\$193 million, resulting in an overall reduction in contributions to the sector by GoF of F\$294 million. In the absence of improved billing and collection procedures and the suggested increases in tariffs, the GoF would have to provide an additional F\$491 million to the sector over 10 years.

The GoF is unlikely to be able to sustain this level of investment in the sector resulting in a deterioration in water and sewerage services in the country. Improving billing and collection procedures and proposing tariff increases in line with service improvements would reduce GoF to more manageable levels. It is regarded that customers will be willing to pay higher tariffs than at present for an improved 24 hour reliable water supply.

7. PLAN OF ACTION

7.1 Proposed Institutional Reform

The Government's current policy on public enterprise reform is contained in the Economic and Fiscal Update Supplement to the 2002 Budget Address, published in November 2001. In the case of water and sewerage services, the policy is for these services to remain in Government ownership, and to be re-organized according to the following underlying key principles:

- ?? clarity of objectives;
- ?? management autonomy and authority;
- ?? strict accountability for performance; and
- ?? an increasingly competitive environment.

The development of a Fiji Water Board (FWB) is one of the options been reviewed by the GoF. Features of FWB's structure include the integration of all water and sewerage functions under a Chief Executive Officer, and the creation of the four major divisions of Operations, Planning and Design, Corporate Services, and Finance. This structure is close to that of a commercial entity and would lead to a more coordinated management and performance of the sector.

One way to address the skills shortages that presently exist would be to contract system operations to a private company, while keeping ownership of assets with the Government. Another would be to contract out key functions such as water loss reduction, billing and collections. The aim should be to achieve efficiency improvements as quickly as possible, and thereby to ease the burden of funding even routine operations on the Government. If this can be achieved, then the available Government funding can be directed toward rural areas where it is most needed.