

II. FEASIBILITY STUDY

CHAPTER H6 FINANCIAL ANALYSIS

H6.1 OVERVIEW OF FINANCIAL ANALYSIS

The projects proposed in this feasibility study are urgent schemes, which were formulated as the first stage of the sewage treatment systems in the master plan. In this section, they are evaluated from the financial point of view. After that, financial analysis, employing simulation techniques aims to establish a financial plan for the proposed projects. The analysis is based on the following preconditions.

- 1) The tariff structure approved in 1997 by COMPESA is in effect, although COMPESA is applying to revise its tariffs so as to fully recover the costs of sewage treatment services.
- 2) The proposed projects in this feasibility study are expected to have long-term financial sustainability.
- 3) The organizational restructuring for the operation and maintenance of sewage treatment services will ensure the long-term financial viability of the managing entity by ensuring full cost recovery.
- 4) The management proposed in this study will improve performance efficiency by the reduction of ground infiltration, revised commercial practices and the provision of staff incentives.
- 5) The management body is assumed to be a new organization which manages only the projects proposed in this study, although they are still under the aegis of COMPESA.
- 6) Construction work of the proposed projects is planned to start in 2002 and operations are due to start in 2007. The operations of existing plants will continue without interruption.

The financial simulation is based on a financial projection model utilizing various financial conditions and assumptions. Through this simulation, the model suggests the relation between the sewage service tariff and the financial management conditions that were adopted by this feasibility study. In order to assess the financial implications and long-term viability, critical elements of the proposed projects will be elucidated and countermeasures proposed.

The financial model follows conventional accounting principles and standards like normal commercial enterprises. The accounting for the proposed projects is treated on an accrual basis, and standard commercial procedures, which are utilized for the accounting of revenue and expense as well as fixed assets and debt obligations. The financial conditions of the

existing COMPESA's systems are put aside from the simulation model, because the JICA study team has little information about water supply and some sewage treatment systems which are out of this study.

H6.2 FINANCIAL EVALUATION

H6.2.1 Revenue from Sewage Treatment Services

The proposed projects in the feasibility study will be evaluated in the same manner as in the master plan. The financial viability is examined by means of a financial indicator - "FIRR". If viability is doubtful from the financial point of view, constraints are identified and analyzed, and some countermeasures are discussed in this analysis.

In the evaluation procedure of the feasibility study, however, there are two preconditions which differ from those of the master plan. They are: (1) the construction costs are estimated more precisely and disbursed in accordance with the scales of investment during the respective construction schedules from 2002 to 2010; (2) the sewage treatment volume after the completion of the treatment plants is assumed to increase in proportion to the investment made during piping construction schedules from 2004 to 2010.

The revenue of the proposed project accrues from payments for sewage services by new users. COMPESA lays down the sewage service tariff as a surcharge on water consumption in their service areas. Charging rates are set on the basis of the type of sewage collection system, such as conventional or condominiumal systems.

The sales amount from water supply services is calculated as a product of the unit rates settled in the tariff and the water volume consumed as mentioned in the master plan. The sales amount of sewage treatment services is based on the water sales amount. The surcharge rates to water charges are applied to users whether or not they have water meters. Applying these charging rates, the monthly financial results of water supply and sewerage services are summarized from July 1999 onwards on the basis of COMPESA's financial records. The average charging rate of sewage treatment services was calculated at R\$0.84 per m³, as analysed in the master plan. In the feasibility study, this rate will be applied to estimate the revenue from sewage treatment services.

The charged volume is calculated at 392 thousand m³/day or 68 million m³/year in 2010, the target year of the feasibility study. Then, the total revenue of the proposed projects is calculated at R\$ 57 million per year, applying the average unit rate of R\$0.84 per m³. These

figures have been broken down for each sewerage system as shown in the table below.

Revenue from Proposed Projects: 2010

Sewerage System	Annual Sewage Treatment Volume (1000 m ³ per Year)	Annual Revenue from Sewage Treatment Services (R\$ 1000 per Year)
1. Conceição	3,449	2,897
2. Janga	17,694	14,863
3. Cabanga	16,733	14,055
4. Boa Viagem	7,991	6,712
5. Cordeiro	5,386	4,524
6. Prazeres	9,452	7,939
7. Curcurana	7,221	6,066
Total	67,925	57,057

H6.2.2 Costs for Sewage Treatment

The financial construction cost of the proposed project consists of the following major items:

- (a) Main construction cost
- (b) Compensation cost
- (c) Engineering service cost
- (d) Government administration cost
- (e) Contingency cost

The main construction cost comprises (i) expansion works of sewage collection and transport facilities and sewage treatment facilities, (ii) rehabilitation works of existing facilities. The compensation cost is paid to landowners who have land expropriated for sewage treatment plants. Other costs are estimated as some proportion of the main construction cost. The details of cost estimates were described in Supporting Report G. The financial costs of the proposed project are summarized as follows.

Financial Costs of Proposed Projects

(Unit: R\$ Million)

Sewerage System	Construction	Land Acquisition	Engineering	Administration	Contingency	Total
1. Conceição	16.2	3.3	1.6	0.8	2.4	24.3
2. Janga	54.6	0.0	5.5	2.7	8.2	71.1
3. Cabanga	39.7	0.5	4.0	2.0	6.0	52.1
4. Boa Viagem	27.9	24.3	2.8	1.4	4.2	60.5
5. Cordeiro	20.8	1.4	2.1	1.0	3.1	28.5
6. Prazeres	35.0	15.0	3.5	1.7	5.2	60.5
7. Curcurana	26.4	1.0	2.6	1.3	4.0	35.3
Total	220.6	45.5	22.1	11.0	33.1	322.3

In addition, equipment for operation and maintenance is procured in the financial capital costs. They are estimated as R\$0.649 million for Conceição System, R\$0.711 million for Janga,

R\$0.711 million for Cabanga, R\$0.649 million for Boa Viagem, R\$0.649 million for Cordeiro, R\$0.649 million for Prazeres, and R\$0.649 million for Curcurana. Although these costs are not included in the systems, they are estimated as a part of investment capital. Including this equipment costs, the total investment costs (R\$336.9 million) for the respective sewerage systems are amounted as in the table below.

The operation and maintenance (O&M) cost is required annually during the economic life of the proposed projects. The O&M costs of the proposed systems were estimated at around 6% of the direct construction cost. Those of the respective sewerage systems are summarized in the table below. The total O&M amount of the systems is estimated at R\$13.2 million. The unit cost of O&M is calculated at R\$0.19 per m³ of sewer volume.

Financial Costs by Sewerage Treatment System

Sewerage System	Construction Cost (R\$ Million)	O&M Cost in 2010 (R\$ 1000 per Year)
1. Conceição	24.9	969
2. Janga	71.8	3,271
3. Cabanga	52.8	2,387
4. Boa Viagem	61.1	1,671
5. Cordeiro	29.1	1,249
6. Prazeres	61.1	2,103
7. Curcurana	35.9	1,584
Total	336.9	13,234

The construction costs are assumed to be disbursed in accordance with the construction schedule from 2002 to 2010. The disbursement of construction costs is tabulated in cash flow streams as shown in Tables H6-1 to H6-7.

H6.2.3 Financial Efficiency

Financial expenditure and revenue during the evaluation period are shown as annual streams in Tables H6-1 to H6-8. The tables also show evaluation indices. The financial evaluation indices calculated on the basis of financial expenditure and revenue during the evaluation period are summarized as follows.

Evaluation Indices

Sewerage System	FIRR	B/C ^{*1}	NPV ^{*1} (R\$ Million)
1. Conceição	3.2%	0.47	-11.3
2. Janga	10.6%	0.90	-5.6
3. Cabanga	15.0%	1.23	9.8
4. Boa Viagem	4.2%	0.46	-26.1
5. Cordeiro	6.8%	0.66	-8.4
6. Prazeres	5.2%	0.53	-23.4
7. Curcurana	7.3%	0.69	-9.7
Entire Systems	8.2%	0.73	-72.3

Note: *1 Discounted at 12%.

The evaluation indices of the entire projects are calculated at 8.2% for FIRR, 0.73 for B/C and minus R\$72 million for NPV. The latter two values are the results applying the discount rate of 12%. From the financial point of view, accordingly, the proposed project is not said to be viable, because the FIRRs are lower than the decisive factor of 12%. However, the FIRR of the entire project indicates that the projects could be manageable, if they procure financial sources with an interest rate of less than 8.2%.

If it is desired to have the FIRR of more than 12% only through a revenue increase, the charging rates for all consumers would have to be increased by 37% over present rates. The results of this counter measure case (named as Case 1) are tabulated in Table H6-9. It might not be acceptable for the beneficiaries to be charged the higher rates of sewerage treatment services in the present economic situation. In the future, however, the beneficiaries might accept the higher charge after their living conditions are improved owing to economic development.

On the other hand, it would be possible to make the projects viable if some subsidies for the investment costs were available. The analysis indicates that the projects would be made viable by the covering almost 34% of the capital investment cost with a subsidy. The results of this countermeasure case (named as Case 2) are tabulated in Table H6-10.

H6.3 FINANCIAL CONDITIONS OF COMPESA

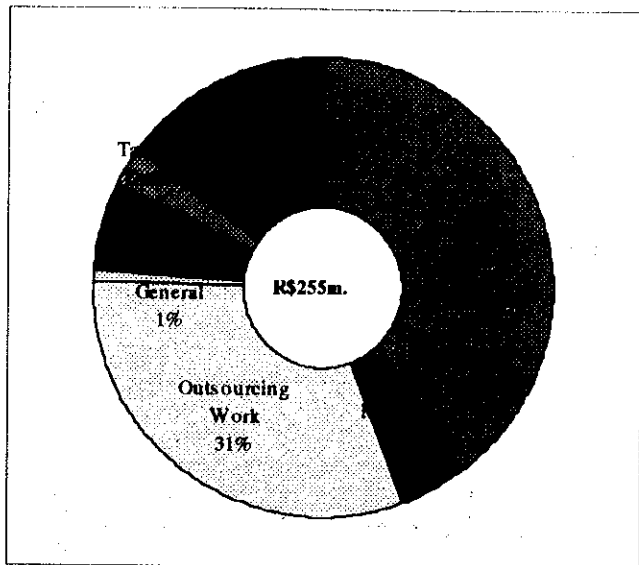
H6.3.1 Profit and Loss Table

This section gives present financial situation of COMPESA, which manages water supply and sewage sanitation services in the State of Pernambuco. According to financial statement and relative documents of COMPESA in 1999, it has 3,844 workers on average for the services of water supply and sewage sanitation services. Their services covered water supply to 1.28 million economias (consumption unit) and sewage sanitation to 0.29 million economias. At present, COMPESA is a state-owned company (so-called as mixed-economy society), more than 99% of whose share is held by the State Government.

Table H6-11 shows the profit and loss (P/L) table of COMPESA for five years from 1995 to 1999. The table shows that COMPESA recorded the largest net loss of R\$76 million in 1999. The loss accounts for 42% of the gross revenue (R\$183 million) and 30% of the operating expenses (R\$255 million). In 1999, the state suffered from serious drought calamity, so COMPESA could not perform its duties for the beneficiaries in the state. This might be the

main reason for the large deficit.

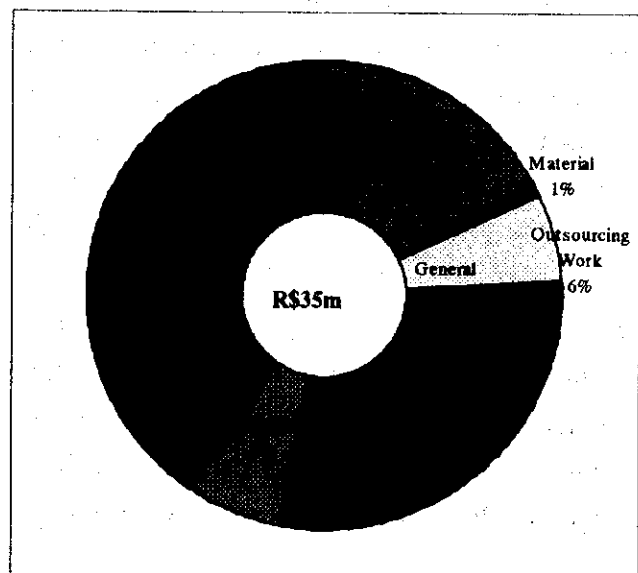
The total amount of expenses for operating and maintenance was R\$255 million in 1999. It was distributed as follows: R\$102 million for personnel expense; R\$11 million for material; R\$79 million for outsourcing works; R\$2 million for general expenses; R\$16 million for depreciation; R\$7 million for taxes and duties; and R\$38 for financial charges. The largest three expenses are (1) personnel



expense, (2) outsourcing works and (3) financial charges. They accounted for 40%, 31% and 15% of the total expense, respectively. These percentage shares are illustrated in the figure above. For reference, in Japan, the largest three expenses of public sewage treatment systems in 1992 were (1) 44% of the total expenses for financial charges, (2) 24% for depreciation and (3) 10% for personnel expenses.

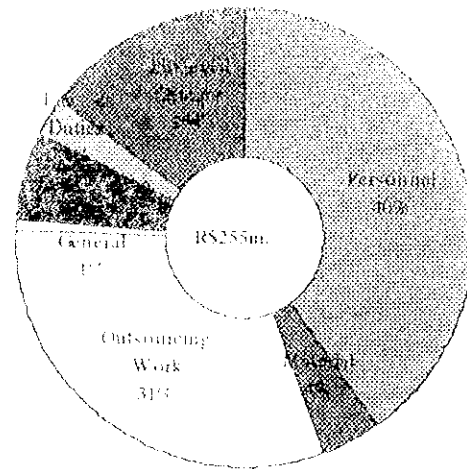
The department shares of the total expenses in 1999 are distributed as R\$178 million or 70% of the total for O&M department, R\$21 million or 8% for administrative department and R\$11 million or 4% for commercial department. The total expenses increased from 1995 to 1998, although their growth rates reduced year by year. On the contrary, they decreased 10% from the previous year in 1999. This was because the management made endeavors to cope with income decrease due to drought condition for the recent three years.

In terms of O/M costs of sewerage systems, COMPESA spent around R\$35 million in total in 1999. Of the total, about 40 % was allocated to overhead of COMPESA. These include administration costs of headquarters, indirect works, interests on loans, etc. About 60% of the total was distributed to administration of the sewerage systems (29%), personnel expenses (17%), depreciation (6%), outsourcing works (6%) and other small expenses.



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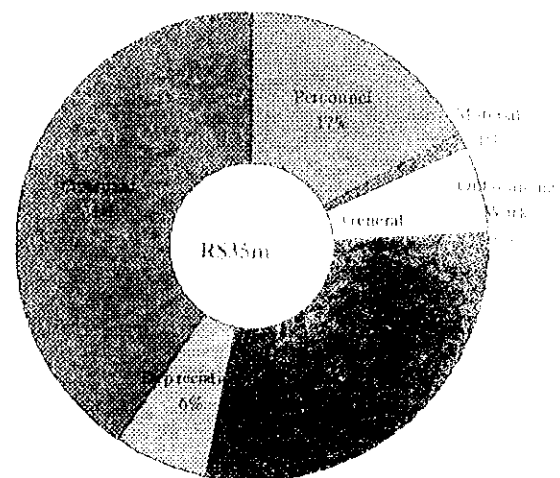
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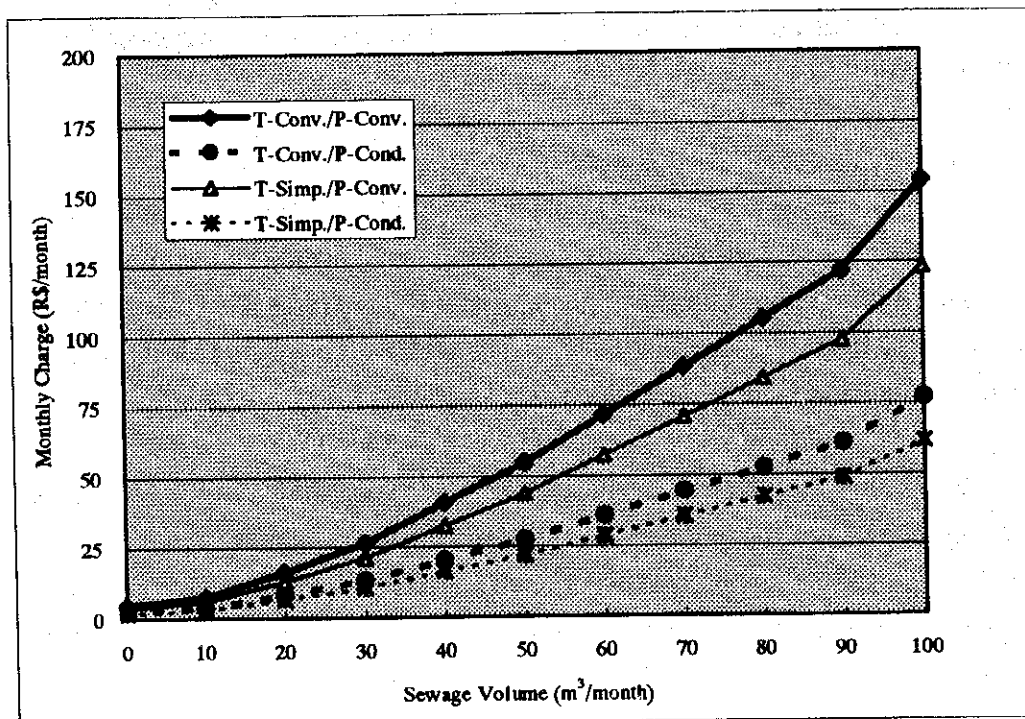
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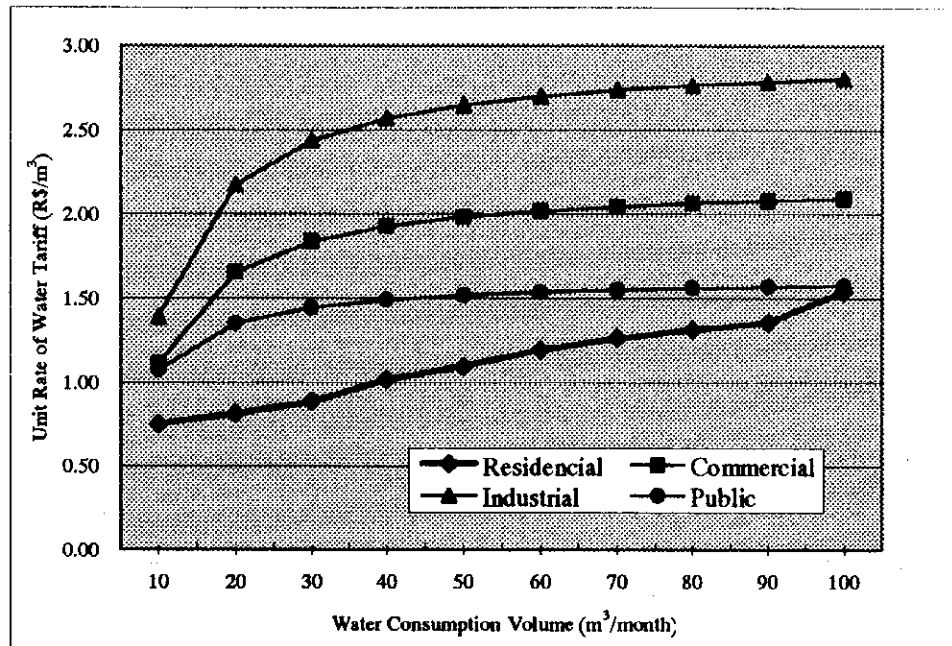
A current tariff structure of water supply and sewage treatment services is given in Table 2.7-5 in the main report. Sewage treatment service charges are set as surcharge of water supply charges. The surcharge rates are based on their sewage treatment systems and physical conditions of sewage collection pipes. Their rates range from 100% to 40%, as shown in the tariff table. The sewage treatment charges of residences can figure out as illustrated below.

Monthly Sewerage Service Charge by Treatment and Collection Systems



For example, in case of that the sewage of users is treated by COMPESA's conventional treatment systems, an average household is charged R\$11.90 per month for sewage treatment services, which is assumed to discharge 15m³ per month of sewage. In case of simplified treatment systems, it is charged R\$9.50 per month. On the other hand, if sewage is collected through condominial system, it is charged R\$5.90 per month under the COMPESA's conventional treatment systems and R\$4.70 per month under simplified treatment systems.

The water charges of the respective categories are also listed in Table 2.7-5 in the main report. The unit charges are worked out in the figure below. These rates are also applied to sewage treatment charges in the case of that users are served by COMPESA's conventional sewage treatment system and conventional sewage collection system. In case of other systems, these charges are discounted in conformity with sewage sanitation system.



Unit Rate of Water Tariff by User Category

H6.3.2 Balance Sheet

The balance sheets of COMPESA for five years from 1995 to 1999 are shown in Table H6-12. The accumulated loss was R\$334 million in 1999, as shown in the table. For the recent five years, it increased 45% more than that (R\$230 million) in 1995.

At the end of 1999, COMPESA had its fixed assets of R\$520 million of existing facilities after depreciation and R\$187 million of facilities in progress. Among the assets, sewerage systems were assessed at R\$163 million of existing facilities before depreciation and R\$23 million of facilities in progress.

At the end of 1999, COMPESA had the sales receivable of R\$136 million, which are not only uncollected charges in 1999 but also those carried forward from previous years. It accounted for 74% of the annual revenue in the same year. Although some uncollectible charges were written off as deductible accounts, lots of uncollected charges are accumulated in this account. Thus, it is not clear how big non-payment charges exist among users. Some say that non-payment charges may reach to nearly 20% of the total annual revenue. As a matter of fact, the sales receivable has increased a sizable amount (R\$12 million to R\$32 million) annually since 1995. The annual increment of the sales receivable was calculated as 15% in 1996, 8% in 1997, 7% in 1998 and 6% in 1999.

H6.3.3 Financial Management Indices

Management indicators are useful to diagnose what is wrong in the management of a firm. Indicators are calculated on the basis of financial statements of the firm. The following table shows major management indicators of COMPESA.

Indicator	1995	1996	1997	1998	1999	Reference ^{*1}
1. Annual Turnover Ratio of Working Capital	2.26	2.00	2.01	1.59	1.14	2.47
2. Current Ratio	1.37	1.34	1.38	0.96	0.47	2.79
3. Capital Adequacy Ratio	0.31	0.58	0.57	0.55	0.44	0.41
4. Fixed Ratio	290%	145%	146%	149%	184%	218%
5. Ratio of Fixed Assets to Long-term Capital	97%	96%	95%	101%	133%	93%
6. Return on Revenues	9.1%	-0.5%	0.4%	-11.1%	-41.7%	7.8%
7. Return on Assets	2.5%	-0.2%	0.2%	-3.9%	-10.7%	19.8%
8. Return on Equity	7.1%	-0.3%	0.2%	-5.8%	-19.8%	43.9%
9. Labor Productivity	2.1	2.3	2.6	2.5	1.8	4.1

Note: *1 Indicators of Waterworks in Japan, which serve large-scale towns (more than 300,000 population). The information is quoted from "Management Indicators of Waterworks Business, 1991, Japan Society of Waterworks".

*2 Labor productivity of public sewage treatment systems was reported as 10.0 in 1992.

Turnover ratio of working capital indicates how a working capital is utilized in the firm's management effectively. As shown in the table, turnover ratios of working capital of COMPESA have decreased year by year from 2.26 in 1995 to 1.14 in 1999. This is because an annual income has not been generated in excess of its operating needs. The ratios, however, seem to be worse than the Japanese reference.

A current ratio indicates potential liquidity of a firm's current assets. It is to be desired that the ratio be kept more than 1.0 in general. According to the indicators, the liquidity has been drying up year by year, i.e., its liquid funds such as cash and saving accounts decrease comparatively.

A capital adequacy ratio is a rate of equity to total of liability and capital. It indicates a financial soundness level of the firm. It is important for process industry like water supply, power, city gas, etc. The larger is the capital adequacy ratio, the better the firm can make its management circumstance. In the case of COMPESA, the ratio seems to be moderate so far.

A fixed ratio is coverage of fixed assets by equity. It is said that the ratio would be less than 100% hopefully. Even if the ratio is more than 100%, at least a ratio of fixed assets to long-term capital (a total of equity and long-term liability) should be less than 100%. In 1998 and 1999, the ratios of fixed assets to long-term capital exceeded 100%. This was mainly caused by rapid increase of accumulative deficit in 1998 and 1999. This situation would not be

improved unless the accumulative loss was canceled.

Return on revenue, return on assets and return on equity are ratios of net profit (loss) to the respective monetary items. According to the state decree No.19251 in December 1994, a return on revenue is expected to be 12% annually (Art. 54). In Japan, it is nearly 8% as shown in the table. Return on equity is useful to check dividend payout of a firm. If a firm tries to pay a dividend of 10 percent on the stocks, it must make a net profit of more than 17% on equity in consideration of local taxes (approximately 35%) on profit. However, COMPESA recorded net losses since 1996 except 1997. This is because the revenue from its sales has not increased as compared with its expenditure. COMPESA could not increase its tariff, since COMPESA was not able to supply their services because of serious drought and as a result the users had bad feeling toward tariff revision. Thus, the tariff structure may not meet the actual situation.

Labor productivity seems to be worse as compared with the Japanese case. In COMPESA, a labor cost yields total revenue of only 1.8 times of the labor cost in 1999. These figures in the table are considerably smaller than the Japanese case of 4.1 times, as shown in the table above. In sewage sanitation entities in Japan, the labor productivity was 10.0 in 1992. This means that COMPESA has too much compensation for labor force as compared with its business activities, or that COMPESA gets too small revenue against its labor costs. In addition, COMPESA spent a lot of money for outsourcing. Most of this cost is used to complement insufficiency of labor force because of workforce reduction policy. This outsourcing cost resolves itself into labor expense after all. Thus, labor productivity is the most serious issues for the management.

H6.4 FINANCIAL SIMULATION

H6.4.1 Basic Conditions of Financial Simulation

This section presents financial simulation of sewage sanitation works for the proposed projects. The financial simulation is based on information about "existing financial system of sewage treatment services" and "financial conditions for water sector". We apply an integrated financial simulation model for this analysis. This analysis will indicate the financial problems of the proposed project and fund requirement for the sewage treatment works.

In financial simulation, the revenues from the sewage treatment services and the expenditures for operation and maintenance as well as capital investment are estimated on the basis of the

whole seven sewerage systems proposed in this feasibility study. The cost estimator provided these basic estimates. Besides these financial data, the following conditions and assumptions are set-up for the simulation.

- 1) Projection period: 30 years from 2002 through 2032. The projects start in 2002. In 2007, the sewerage treatment services start and continue through 2032 during their economic life.
- 2) Prices and cost escalation: Projections of both revenues and expenditures were made without escalation to simplify and to make the simulation clearly understandable.
- 3) Currency and exchange rate: Capital costs, revenues and expenditures are evaluated in Brazilian monetary term of Real. Exchange rates of R\$1.80 to US\$ 1.00 and J¥110 per US\$1.00 are applied in this feasibility study.
- 4) Finances for Implementation: Finances for the financial plans are set as follows.

Financial Source	Amount (% of Total Amount)
	Financial Plan
1. Loan ^{*1} (International Agency)	60%
2. Local Government	
1) Capital Investment	40%
2) Other Expenses	
a. Land Acquisition	100%
b. Administration Costs	100%
c. Interests for construction period	100%

Note: *1 Terms of loan by international agency are as follows: 7.7% annual interest rate, and 20 years repayment period with 6 years (construction period) grace period.

*2 The interests during construction period are estimated to aggregate to around R\$ 35 million during six years from 2002 to 2007.

Shortage of Finance during the simulation period is assumed to be provided for by the State Government, as is the case with COMPESA at present.

- 5) Sewage treatment service tariff: The tariff is set up by COMPESA, as discussed before. This is so complicate to estimate precise revenue based on the sewage volume collected through piping network. In this simulation, thus, the charging rate applied is assumed to be R\$0.84 per m³, which was estimated in the master plan. Consequently, the revenue from sewage treatment services is calculated as a product of sewage volume collected and the average rate of R\$0.84 per m³.
- 6) Sewerage connection of users: Within service areas of sewage sanitation covered by COMPESA, every user without any exceptions connects to sewerage system after 2010. Until 2010, the number of connections is assumed to increase linearly just after the inauguration of the proposed projects.

- 7) **Revenues:** The revenues of the sewage sanitation service entity accrue from sewage service sales, as mentioned in 5) tariff. The expenses of administration charges and deficits at the beginning construction stage are assumed to be covered by the government support. In addition, the entity could get other earnings from interests on short-term deposits, if it gains a net profit through its management.
- 8) **Depreciation:** Fixed assets such as sewage treatment plant and distribution piping network are depreciated straight-line over 25 years after they are placed in service. Some machinery such as pumps and power generator are depreciated straight-line in 15 years. The engineering services are also set to be depreciated straight-line in 15 years.
- 9) **Taxes on Business:** Taxes on business of infrastructure such as sewage sanitation services in the State of Pernambuco are listed in the table below. As shown in the table, it is assumed that a municipal tax on services is not levied to the sewage sanitation services in this simulation.

	Name of Taxes	Rate (%)
1.	Corporate Social Contribution on Bill (COFINS)	3.00
2.	Corporate Social Contribution to Social Integration Program (PIS)	0.65
3.	Corporate Income Tax on Profit	25.00
4.	Corporate Social Contribution on Profit	9.00
5.	State Tax on Services and Merchandizes Transfer	Exempt
6.	Municipal Tax on Services	Exempt* 1

*Although sewage sanitation services are not exempt from this tax officially, no service entity has ever paid this tax to its Municipal Government.

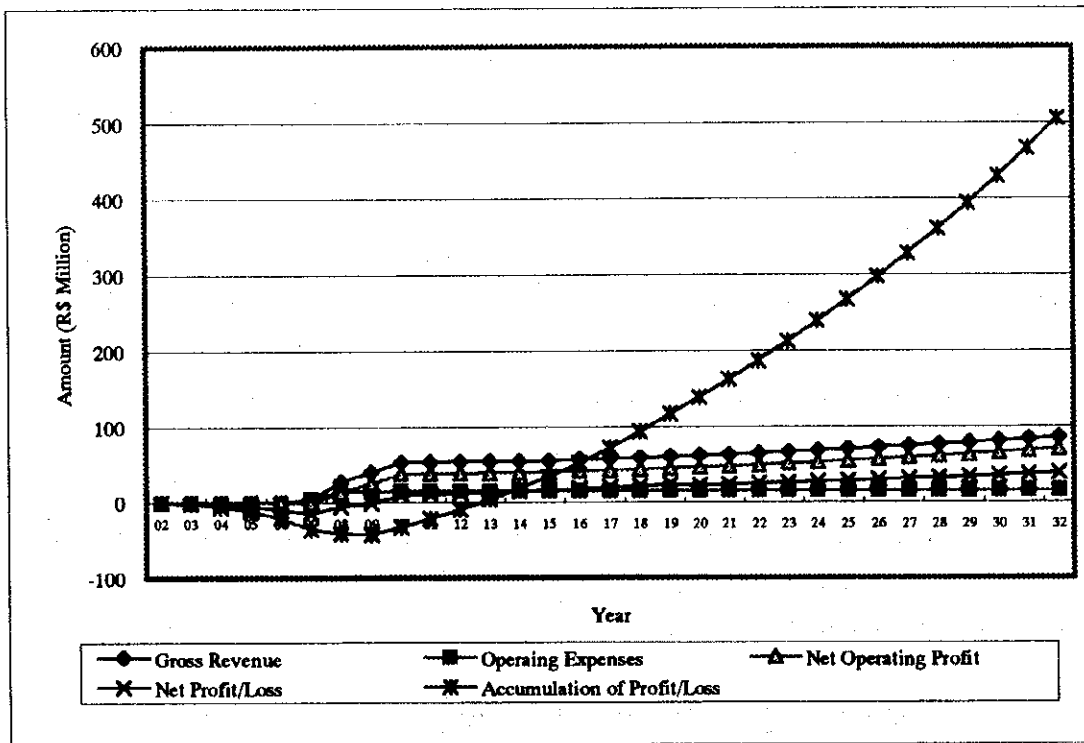
The sewage sanitation entity can carry forward its deficit. When it gets a surplus, it can offset the deficit accumulated in the previous years, although the amount for offset is 30% of the surplus annually.

- 10) **Charges to effluent discharge into rivers:** A charging system to effluent discharge is proposed under the law of "State Policy of Water Resources (Art.13 of State Law No.11416, 17th of January 1997). However, it is still under discussion and the charging system is not stipulated yet. Thus, this charge is not accounted in this simulation.

H6.4.2 Analysis of Financial Simulation

The following figure gives the results of trends of income statements in the financial simulation. The figure includes the following information: (a) revenue from sewage treatment service revenue, and interest of savings deposits; (b) expenditure on operation and maintenance; (c) net operating profit, i.e., the difference between revenue and expenditure; (d) annual net profit, i.e., net operating profit minus depreciation and interest on loans; and (e)

accumulation of profit (loss).



Results of Financial Simulation

The figure above indicates that the net loss continues until 2009, and moves towards surplus after 2010. The accumulation of losses continues until 2012 and moves into the black after 2013. The accumulated profit increases rapidly after 2013. It hopefully reaches the amount required for investing in the reconstruction of the facilities by the end of their economic life. It will aggregate to around R\$500 million by the year 2032. As can be seen in this figure, the profit and loss situation of the firm is serious for the first 9 years.

The sewerage treatment works will continue a net loss for the first nine years, although their operating results record net gains except the first year of operation, 2007. In the first year 2008 after the completion of the whole projects, the total revenue is expected to be R\$27.5 million. On the other hand, the operating expenses amount to R\$14.2 million in the same year. Then the net operating profit becomes R\$13.2 million. However, the depreciation and the interest of the loan are estimated at R\$3.4 million and R\$15.6 million respectively, so the income before tax results in a deficit of R\$5.8 million. The largest accumulated deficit aggregated to R\$42.0 million in 2009. Because of these deficits, the works require the cash loan from the local government for covering these deficits from 2007 to 2012. The maximum amount of this loan will reach to R\$28.3 million in 2009. However, the works will finish and repay all the cash loans by 2013. The detailed figures mentioned above are

tabulated in Tables H6-13 to H6-15. Table H6-13 shows profit and loss tables between 2002 and 2032. Table H6-14 shows flows of fund statements. Table H6-15 shows balance sheets.

As mentioned in the preconditions, the simulation does not consider inflation in both revenue and operation costs. In practical situation, the inflation is indispensable in actual management circumstance. Thus, the tariff increase will be necessary in consideration of increase of operation costs to cover deficit due to inflation.

CHAPTER H7 ECONOMIC EVALUATION

H7.1 OVERVIEW OF ECONOMIC EVALUATION

The methodology of economic evaluation is the same as carried out in the master plan. In the feasibility study, the respective experts estimate the costs with discretion and more precisely than those in the master plan. Then, the proposed project could be evaluated more trustworthily. In spite of that, some uncertainty still exists in the estimation. In particular, a case with long implementation period and increment of future sewage treatment demand growth has risks in terms of judgment on project viability. In this context, the sensitivity test is introduced in the certain aspects.

H7.2 ASSUMPTIONS FOR ECONOMIC EVALUATION

In the feasibility study, preconditions and assumptions for economic evaluation are almost the same as set-up in the master plan. The costs and benefits are estimated on the basis of economic values instead of market values, which were applied for financial analysis. The economic values are converted from the financial values basically applying conversion factors. For the economic evaluation, the following criteria and assumptions are applied to calculate economic values and evaluation indicators. Conversion factors and shadow wages were set up referring to those of BNB (Banco do Nordeste do Brasil) and BID (Banco Interamericano de Desenvolvimento). Schedule and evaluation period of the proposed project are set as follows. Basic conditions and assumptions are also set in the same manner as presented in the master plan.

Item	Set-up Conditions and Assumptions
(a) Base Year:	The year 2002
(b) Construction Period:	Five or six years in real terms from 2002 through 2010
(c) Economic Life and Evaluation Period:	25 years after the completion
(d) Timing of Benefits Accruing:	After the completion of the project. The matured benefit is attained in 2010. After 2010, the full capacity of the plant is utilized for the beneficiaries in the service area until 2020.
(e) Price Level:	Cost and benefit of the project are set in July 2000.
(f) Prevailing Exchange Rates:	R\$1.80 per US\$1.00 and JY110 per US\$1.00
(g) Opportunity Cost of Capital:	12% per annum
(h) Conversion Factor	Domestic materials: 0.94 Imported materials: 1.00
(i) Shadow Wage	Skilled worker: 79% of legislated wage Unskilled worker: 48% of legislated wage
(j) Value of Land for Plant	No value in economic terms

H7.3 ESTIMATE OF ECONOMIC BENEFITS

H7.3.1 Components of Quantifiable Direct Benefits

As discussed in the master plan, economic benefits are composed of the following three components as tangible direct benefits.

No.	Benefit Component	Quantification
1.	Sewage treatment saving benefits for inhabitants	Elimination of installation and O&M costs of other treatment systems and septic tanks outside the existing sewerage collection service areas
2.	Decrease of medical expenses and losses due to absence from work	Cost reduction of medical expenses for water borne diseases, and Reduction of losses from absence from work due to water borne diseases
3.	Elimination of tourism recession owing to maintenance of tourism resources	Maintaining tourist attractions and promotion of regional industries related to tourism in the RMR

In the feasibility study, the proposed projects do not cover whole territories in the respective river basin areas. Thus, the benefits of the respective components above are assumed to accrue in proportion to the population coverage of sewage sanitation services by the proposed projects in terms of components (1) and (2). In terms of components (3), an index for distribution of benefit is based on the removal rates of expected pollution loads in the respective river basins against the total reduction of pollution load in the RMR.

H7.3.2 Estimate of Economic Benefits

(1) Sewage Treatment Saving Benefits

Under without-project conditions, sewage treatment in the future is assumed to expand at the pace of the past trends. There are three major sewage treatment systems, i.e., sewerage systems managed by COMPESA, other treatment systems by individual owners and septic tank system. These compositions in the future were assumed to be the same as estimated in the master plan. As a result, the populations in the year 2010, who install any type of sewerage treatment systems, were estimated as follows.

The benefit of sewage treatment facilities saving is estimated in the same procedure as in the master plan. At the same time, the O&M costs of these systems can be eliminated under with-project conditions. The benefit is in proportion to the number of beneficiaries. The number of these beneficiaries for the respective systems proposed in the year 2010 is estimated as follows.

**Populations with Sewerage Systems in Areas
Covered by Proposed Sewerage Systems in 2010**

(Unit: 1000)

Sewerage System	With Treatment COMPESA	Other Treatment Systems	Septic Tank Systems	Total
1. Conceição	1.56	0.26	0.35	2.17
2. Janga	4.92	0.81	0.00	5.74
3. Cabanga	3.07	0.51	0.00	3.58
4. Boa Viagem	2.19	0.36	0.00	2.55
5. Cordeiro	1.91	0.32	0.00	2.23
6. Prazeres	13.55	0.68	0.47	14.71
7. Curcurana	3.46	0.57	0.40	4.44
Total	30.67	3.52	1.23	35.41

The benefit is estimated as a product of the population with sewerage treatment systems and unit costs corresponding to the respective systems. The unit costs in the master plan are applied in this feasibility study. They are R\$235 per person of capital investment and R\$12.7 per person per year of O&M in economic terms for sewerage system by COMPESA, R\$113 and R\$5.6 for other treatment system, and R\$103 and R\$5.6 for septic tank system.

(2) Medical Benefits

As in the master plan, the medical benefits in the respective sewerage systems are estimated at a reduction of medical expenses by beneficiaries and a reduction of labor opportunity losses due to illness. The former was estimated at R\$1.03 per person. The latter was estimated at R\$1.04 per person. Then, the total annual losses was R\$2.07 at market prices. This was converted to R\$1.80 per persons in economic terms applying a conversion factor. The total benefit is estimated as a product of the annual losses above and the number of population in the project area.

(3) Elimination Benefits of Tourism Recession

As in the master plan, the benefits of the entire sewerage systems were estimated at R\$182.1 million in the RMR total in 2020. The benefits for the respective sewerage systems were assumed to be distributed in proportion to the indices. The indices were based on the rates of the pollution loads reduced by the systems against the total reduction of pollution in the RMR.

(4) Estimate of Economic Benefits

The total benefits were calculated as the sum of the benefits mentioned above. Finally, the total economic benefits were estimated at R\$48.2 million in 2010. The following table shows the summary of the benefits in 2010. The details of yearly benefits are shown in Tables H7-1 to H7-8.

Total Economic Benefits in 2010

(Unit: R\$ 1000)

Sewerage System		Sewage Treatment Saving	Medical Benefits	Tourism Recession Elimination	Total
1.	Conceição	136	91	3,198	3,425
2.	Janga	492	502	11,281	12,275
3.	Cabanga	305	500	9,669	10,474
4.	Boa Viagem	218	251	4,864	5,334
5.	Cordeiro	150	178	3,502	3,831
6.	Prazeres	1,355	355	7,573	9,282
7.	Curcurana	288	226	4,877	5,391
Total		2,944	2,103	44,963	50,012

H7.4 ECONOMIC COSTS

The cost estimate of the proposed project in the feasibility study was described in Supporting Report G. This estimate, however, was enumerated in market prices, termed the “financial value”. In economic evaluation, the financial value has to be converted into economic value. The conversion factors were described in Section H7.2. The total economic cost of the proposed projects was calculated at R\$247.4 million. The costs for the respective systems are broken down in the table below.

Economic Costs per Sewerage System

(Unit: R\$ Million)

Sewerage System	Direct Cost	Compensation Cost	Engineering Services	Administration Cost	Contingency Cost	Total
1. Conceição	13.8	0.0	1.6	0.6	2.3	18.3
2. Janga	46.8	0.0	5.5	2.2	7.7	62.1
3. Cabanga	34.0	0.0	4.0	1.6	5.6	45.2
4. Boa Viagem	23.9	0.0	2.8	1.1	3.9	31.7
5. Cordeiro	17.8	0.0	2.1	0.8	2.9	23.6
6. Prazeres	30.0	0.0	3.5	1.4	4.9	39.8
7. Curcurana	22.6	0.0	2.6	1.0	3.7	30.0
Entire Systems	188.8	0.0	22.1	8.7	31.1	250.7

The investment costs are disbursed in accordance with the construction schedule. The O&M cost is required annually during the economic life of the proposed projects. The annual O&M costs were calculated at around 6% of direct construction costs, which were specifically estimated in the Supporting Report G. The total annual O&M costs of the respective systems are converted to R\$9.1 million in economic terms after the systems are fully operated.

H7.5 ECONOMIC EFFICIENCY

The economic evaluation indices calculated on the basis of economic cost and benefit during

the evaluation period are shown as annual streams in Tables H7-1 to H7-8. The indices are summarized as follows.

Evaluation Indices

Sewerage System	EIRR	B/C*1	NPV*1 (R\$ Million)
1. Conceição	12.6%	1.06	0.87
2. Janga	13.5%	1.13	6.56
3. Cabanga	15.5%	1.34	12.09
4. Boa Viagem	11.7%	0.97	-0.68
5. Cordeiro	10.9%	0.91	-1.79
6. Prazeres	14.6%	1.24	7.40
7. Curcurana	14.6%	1.25	5.07
Entire Systems	13.4%	1.13	25.50

Note: *1 Discounted at 12%.

As shown in the table above, the EIRR of the entire systems was 13.4%, so the projects proposed are viable from the economic point of view, because it is higher than the opportunity cost of capital, 12%. In particular, the five projects, i.e., Cabanga, Prazeres, Curcurana, Janga and Conceição, have favorable rates of more than 12%, so these projects are feasible and should be promoted from the economic point of view. On the other hand, the EIRRs of the two systems, i.e., Boa Viagem and Cordeiro were less than 12%. However, even the Boa Viagem System has a value approximating the opportunity cost of capital. At any rate, the EIRR of the entire projects considerably exceeds 12%, so the proposed projects could be viable economically at a whole.

Yet, the economic analyses were based on a lot of assumptions as mentioned in the respective sections. Accordingly, these indices should be considered to be a reference for project promotion. This standpoint is essential in projects for environmental purposes.

H7.6 SENSITIVITY TEST

As mentioned in Section 7.1, the sensitivity test is commenced in this section. A case with long implementation period and increment of future water demand growth has risks in terms of judgment on project viability. It is customary, therefore, to test the results of economic analysis for sensitivity to variations in certain important inputs. The test is made for the variations in $\pm 10\%$ of the cost and benefit with respect to evaluation factors of the proposed project. Then, there are nine cases under these variations. The results are given in the following table.

Results of Sensitivity Test

	Cost	Benefit	IRR (%)	B/C	NPV (R\$ Million)
1.	Original Case	-	13.2	1.1	25.5
2.	-	10% Decrease	12.2	1.0	3.0
3.	-	10% Increase	14.5	1.2	48.0
4.	10% Increase	-	12.5	1.0	9.1
5.	-	10% Decrease	11.3	0.9	-13.5
6.	-	10% Increase	13.6	1.1	31.6
7.	10% Decrease	-	14.5	1.2	41.9
8.	-	10% Decrease	13.2	1.1	19.4
9.	-	10% Increase	15.7	1.4	64.5

The cases, which the EIRR was below 12%, were the following only one condition among the nine cases, that is, 10% increase of cost and 10% decrease of benefit. While, all other cases were more than 12% of EIRR, as shown in the table above. The figure below shows the project viable range of cost and benefit variation from the original estimates. Accordingly, the estimates of cost and benefit should be reconsidered with prudence at the implementation stage.

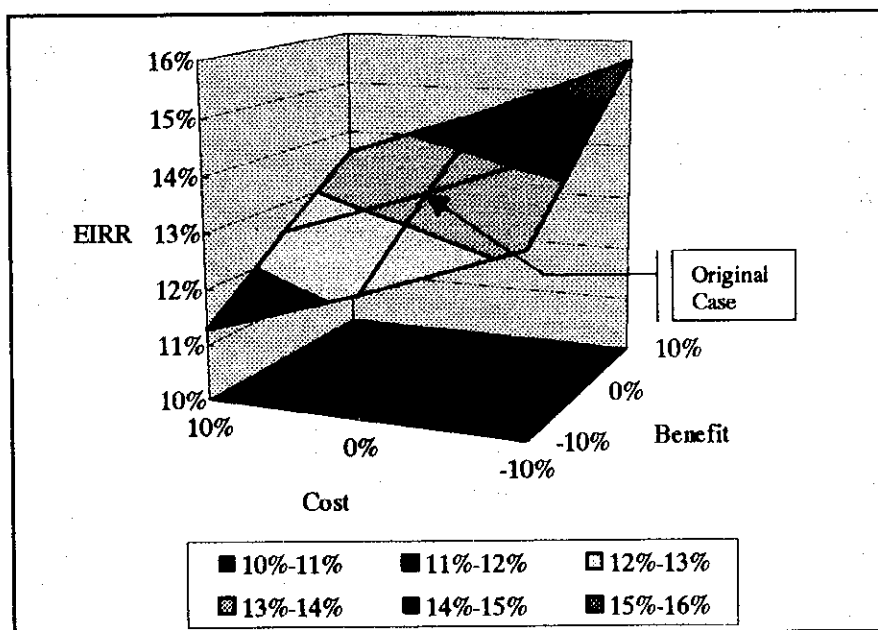


Table H2-1 Financial Expenditure and Revenue Stream for Sewerage Projects in the RMF

(Unit: R\$ Million)

Year	Expenditure			Revenue	Balance	
	Capital Investment	O&M	Total			
1	2002	23.6		23.6	0.0	-23.6
2	2003	58.1		58.1	0.0	-58.1
3	2004	58.1	0.0	58.1	0.0	-58.1
4	2005	93.3	0.0	93.3	0.0	-93.3
5	2006	110.0	0.1	110.1	0.2	-109.9
6	2007	118.7	2.6	121.2	6.9	-114.3
7	2008	108.3	6.4	114.7	17.4	-97.3
8	2009	81.1	10.9	92.0	29.4	-62.6
9	2010	41.2	15.7	57.0	42.6	-14.4
10	2011	11.1	21.5	32.7	58.3	25.6
11	2012	20.6	24.3	44.9	65.7	20.8
12	2013	24.4	25.4	49.8	68.8	19.0
13	2014	23.3	27.6	50.9	74.7	23.9
14	2015	23.0	29.6	52.6	80.1	27.5
15	2016	19.3	32.0	51.3	86.7	35.4
16	2017	21.3	34.8	56.1	94.3	38.1
17	2018	10.7	36.9	47.6	99.9	52.3
18	2019	5.6	39.6	45.2	107.1	61.9
19	2020	0.9	41.9	42.8	113.4	70.6
20	2021		41.9	41.9	120.1	78.2
21	2022		41.9	41.9	120.1	78.2
22	2023		41.9	41.9	120.1	78.2
23	2024		41.9	41.9	120.1	78.2
24	2025		41.9	41.9	120.1	78.2
25	2026		41.9	41.9	120.1	78.2
26	2027		41.9	41.9	120.1	78.2
27	2028		41.9	41.9	120.1	78.2
28	2029		41.9	41.9	120.1	78.2
29	2030		41.9	41.9	120.1	78.2
30	2031		41.9	41.9	120.1	78.2
31	2032		41.9	41.9	120.1	78.2
32	2033		41.9	41.9	120.1	78.2
33	2034		41.9	41.9	120.1	78.2
34	2035		41.9	41.9	120.1	78.2
35	2036		41.9	41.9	120.1	78.2
36	2037		41.9	41.9	120.1	78.2
37	2038		41.9	41.9	120.1	78.2
38	2039		41.9	41.9	120.1	78.2
39	2040		41.9	41.9	120.1	78.2
40	2041		41.9	41.9	120.1	78.2
41	2042		41.9	41.9	120.1	78.2
42	2043		41.9	41.9	120.1	78.2
43	2044		41.9	41.9	120.1	78.2
44	2045		41.9	41.9	120.1	78.2

Evaluation Indices

NPV: -225 Million R\$ *1
 B/C: 0.58 *1
 FIRR: 6.1%

Note: *1 Discounted at 12%

**Table H2-2 Financial Expenditure and Revenue Stream for Sewerage Projects
in Capibaribe River Basin**

(Unit: R\$ Million)

Year	Expenditure			Revenue	Balance	
	Capital Investment	O&M	Total			
1	2002	8.95		8.95	0.00	-8.95
2	2003	14.33		14.33	0.00	-14.33
3	2004	14.33	0.00	14.33	0.00	-14.33
4	2005	18.75	0.00	18.75	0.00	-18.75
5	2006	23.51	1.35	24.86	3.66	-21.20
6	2007	17.77	3.04	20.81	8.22	-12.59
7	2008	13.32	3.48	16.81	9.43	-7.38
8	2009	13.32	3.94	17.26	10.66	-6.60
9	2010	13.32	4.71	18.03	12.74	-5.29
10	2011	1.30	5.33	6.63	14.44	7.81
11	2012	6.97	5.60	12.57	15.16	2.59
12	2013	13.18	6.18	19.36	16.72	-2.64
13	2014	10.50	6.75	17.25	18.27	1.02
14	2015	16.04	7.18	23.23	19.45	-3.78
15	2016	13.63	8.31	21.94	22.49	0.55
16	2017	14.25	9.03	23.28	24.43	1.15
17	2018	4.80	10.06	14.86	27.24	12.38
18	2019	2.57	10.64	13.21	28.79	15.58
19	2020	0.00	11.42	11.42	30.90	19.48
20	2021		11.42	11.42	30.90	19.48
21	2022		11.42	11.42	30.90	19.48
22	2023		11.42	11.42	30.90	19.48
23	2024		11.42	11.42	30.90	19.48
24	2025		11.42	11.42	30.90	19.48
25	2026		11.42	11.42	30.90	19.48
26	2027		11.42	11.42	30.90	19.48
27	2028		11.42	11.42	30.90	19.48
28	2029		11.42	11.42	30.90	19.48
29	2030		11.42	11.42	30.90	19.48
30	2031		11.42	11.42	30.90	19.48
31	2032		11.42	11.42	30.90	19.48
32	2033		11.42	11.42	30.90	19.48
33	2034		11.42	11.42	30.90	19.48
34	2035		11.42	11.42	30.90	19.48
35	2036		11.42	11.42	30.90	19.48
36	2037		11.42	11.42	30.90	19.48
37	2038		11.42	11.42	30.90	19.48
38	2039		11.42	11.42	30.90	19.48
39	2040		11.42	11.42	30.90	19.48
40	2041		11.42	11.42	30.90	19.48
41	2042		11.42	11.42	30.90	19.48
42	2043		11.42	11.42	30.90	19.48
43	2044		11.42	11.42	30.90	19.48
44	2045		11.42	11.42	30.90	19.48

Evaluation Indices

NPV: -42 Million R\$ *1
 B/C: 0.68 *1
 FIRR: 6.9%

Note: *1 Discounted at 12%

**Table H2-3 Financial Expenditure and Revenue Stream for Sewerage Projects
in Beberibe River Basin**

(Unit: R\$ Million)

Year	Expenditure			Revenue	Balance	
	Capital Investment	O&M	Total			
1	2002	0.20		0.20	0.00	-0.20
2	2003	9.02		9.02	0.00	-9.02
3	2004	9.02	0.00	9.02	0.00	-9.02
4	2005	19.12	0.00	19.12	0.00	-19.12
5	2006	23.84	0.32	24.16	0.87	-23.29
6	2007	23.84	1.00	24.84	2.71	-22.13
7	2008	13.73	2.64	16.37	7.13	-9.24
8	2009	9.02	3.90	12.91	10.55	-2.37
9	2010	0.04	4.43	4.48	12.00	7.53
10	2011	3.69	4.62	8.30	12.50	4.20
11	2012	3.69	4.81	8.50	13.02	4.52
12	2013	3.69	5.01	8.70	13.56	4.86
13	2014	3.69	5.38	9.06	14.55	5.49
14	2015	0.00	5.76	5.76	15.59	9.83
15	2016	0.00	6.00	6.00	16.24	10.24
16	2017	0.00	6.25	6.25	16.91	10.66
17	2018	0.00	6.51	6.51	17.62	11.11
18	2019	0.00	6.78	6.78	18.35	11.57
19	2020	0.00	7.06	7.06	19.11	12.05
20	2021		7.06	7.06	19.11	12.05
21	2022		7.06	7.06	19.11	12.05
22	2023		7.06	7.06	19.11	12.05
23	2024		7.06	7.06	19.11	12.05
24	2025		7.06	7.06	19.11	12.05
25	2026		7.06	7.06	19.11	12.05
26	2027		7.06	7.06	19.11	12.05
27	2028		7.06	7.06	19.11	12.05
28	2029		7.06	7.06	19.11	12.05
29	2030		7.06	7.06	19.11	12.05
30	2031		7.06	7.06	19.11	12.05
31	2032		7.06	7.06	19.11	12.05
32	2033		7.06	7.06	19.11	12.05
33	2034		7.06	7.06	19.11	12.05
34	2035		7.06	7.06	19.11	12.05
35	2036		7.06	7.06	19.11	12.05
36	2037		7.06	7.06	19.11	12.05
37	2038		7.06	7.06	19.11	12.05
38	2039		7.06	7.06	19.11	12.05
39	2040		7.06	7.06	19.11	12.05
40	2041		7.06	7.06	19.11	12.05
41	2042		7.06	7.06	19.11	12.05
42	2043		7.06	7.06	19.11	12.05
43	2044		7.06	7.06	19.11	12.05
44	2045		7.06	7.06	19.11	12.05

Evaluation Indices

NPV: -27 Million R\$ *1
 B/C: 0.70 *1
 FIRR: 7.4%

Note: *1 Discounted at 12%

**Table H2-4 Financial Expenditure and Revenue Stream for Sewerage Projects
in Jabotao River Basin**

(Unit: R\$ Million)

Year	Expenditure			Revenue	Balance	
	Capital Investment	O&M	Total			
1	2002	6.25		6.25	0.00	-6.25
2	2003	19.03		19.03	0.00	-19.03
3	2004	19.03	0.00	19.03	0.00	-19.03
4	2005	22.66	0.06	22.73	0.17	-22.56
5	2006	26.24	0.52	26.76	1.40	-25.36
6	2007	26.24	1.23	27.48	3.34	-24.14
7	2008	30.38	2.11	32.49	5.72	-26.77
8	2009	21.54	3.52	25.06	9.52	-15.53
9	2010	7.46	4.23	11.69	11.44	-0.25
10	2011	4.53	4.91	9.44	13.29	3.85
11	2012	3.39	5.14	8.53	13.92	5.39
12	2013	5.96	5.39	11.35	14.58	3.24
13	2014	5.96	5.73	11.69	15.52	3.83
14	2015	3.39	6.43	9.82	17.42	7.59
15	2016	0.00	6.84	6.84	18.50	11.67
16	2017	0.00	7.16	7.16	19.38	12.22
17	2018	0.00	7.50	7.50	20.30	12.80
18	2019	0.00	7.86	7.86	21.27	13.41
19	2020	0.00	8.23	8.23	22.28	14.04
20	2021		8.23	8.23	22.28	14.04
21	2022		8.23	8.23	22.28	14.04
22	2023		8.23	8.23	22.28	14.04
23	2024		8.23	8.23	22.28	14.04
24	2025		8.23	8.23	22.28	14.04
25	2026		8.23	8.23	22.28	14.04
26	2027		8.23	8.23	22.28	14.04
27	2028		8.23	8.23	22.28	14.04
28	2029		8.23	8.23	22.28	14.04
29	2030		8.23	8.23	22.28	14.04
30	2031		8.23	8.23	22.28	14.04
31	2032		8.23	8.23	22.28	14.04
32	2033		8.23	8.23	22.28	14.04
33	2034		8.23	8.23	22.28	14.04
34	2035		8.23	8.23	22.28	14.04
35	2036		8.23	8.23	22.28	14.04
36	2037		8.23	8.23	22.28	14.04
37	2038		8.23	8.23	22.28	14.04
38	2039		8.23	8.23	22.28	14.04
39	2040		8.23	8.23	22.28	14.04
40	2041		8.23	8.23	22.28	14.04
41	2042		8.23	8.23	22.28	14.04
42	2043		8.23	8.23	22.28	14.04
43	2044		8.23	8.23	22.28	14.04
44	2045		8.23	8.23	22.28	14.04

Evaluation Indices

NPV: -66 Million R\$ *1
 B/C: 0.51 *1
 FIRR: 4.7%

Note: *1 Discounted at 12%

**Table H2-5 Financial Expenditure and Revenue Stream for Sewerage Projects
in Tejipto River Basin**

(Unit: R\$ Million)

Year	Expenditure			Revenue	Balance	
	Capital Investment	O&M	Total			
1	2002	5.46		5.46	0.00	-5.46
2	2003	8.05		8.05	0.00	-8.05
3	2004	8.05	0.00	8.05	0.00	-8.05
4	2005	20.53	0.00	20.53	0.00	-20.53
5	2006	24.16	0.20	24.36	0.54	-23.82
6	2007	25.91	0.62	26.53	1.68	-24.85
7	2008	25.91	1.54	27.46	4.18	-23.28
8	2009	12.36	2.56	14.93	6.94	-7.99
9	2010	6.98	4.05	11.03	10.95	-0.07
10	2011	0.26	4.47	4.73	12.10	7.37
11	2012	1.36	4.64	6.00	12.56	6.56
12	2013	0.16	5.00	5.16	13.53	8.37
13	2014	0.00	5.33	5.33	14.43	9.10
14	2015	0.75	5.54	6.29	14.98	8.69
15	2016	1.43	5.75	7.17	15.55	8.38
16	2017	0.67	6.07	6.74	16.43	9.68
17	2018	0.00	6.38	6.38	17.26	10.88
18	2019	0.00	6.62	6.62	17.92	11.30
19	2020	0.00	6.87	6.87	18.60	11.73
20	2021		6.87	6.87	18.60	11.73
21	2022		6.87	6.87	18.60	11.73
22	2023		6.87	6.87	18.60	11.73
23	2024		6.87	6.87	18.60	11.73
24	2025		6.87	6.87	18.60	11.73
25	2026		6.87	6.87	18.60	11.73
26	2027		6.87	6.87	18.60	11.73
27	2028		6.87	6.87	18.60	11.73
28	2029		6.87	6.87	18.60	11.73
29	2030		6.87	6.87	18.60	11.73
30	2031		6.87	6.87	18.60	11.73
31	2032		6.87	6.87	18.60	11.73
32	2033		6.87	6.87	18.60	11.73
33	2034		6.87	6.87	18.60	11.73
34	2035		6.87	6.87	18.60	11.73
35	2036		6.87	6.87	18.60	11.73
36	2037		6.87	6.87	18.60	11.73
37	2038		6.87	6.87	18.60	11.73
38	2039		6.87	6.87	18.60	11.73
39	2040		6.87	6.87	18.60	11.73
40	2041		6.87	6.87	18.60	11.73
41	2042		6.87	6.87	18.60	11.73
42	2043		6.87	6.87	18.60	11.73
43	2044		6.87	6.87	18.60	11.73
44	2045		6.87	6.87	18.60	11.73

Evaluation Indices

NPV: -41 Million R\$ *1
 B/C: 0.58 *1
 FIRR: 5.8%

Note: *1 Discounted at 12%

**Table H2-6 Financial Expenditure and Revenue Stream for Sewerage Projects
in Timbo River Basin**

(Unit: R\$ Million)

Year	Expenditure			Revenue	Balance	
	Capital Investment	O&M	Total			
1	2002	1.74		1.74	0.00	-1.74
2	2003	7.67		7.67	0.00	-7.67
3	2004	7.67	0.00	7.67	0.00	-7.67
4	2005	12.27	0.00	12.27	0.00	-12.27
5	2006	12.27	0.17	12.44	0.46	-11.98
6	2007	14.28	0.55	14.83	1.49	-13.34
7	2008	14.28	1.09	15.37	2.95	-12.42
8	2009	14.28	1.82	16.10	4.93	-11.17
9	2010	7.67	2.99	10.66	8.10	-2.56
10	2011	0.21	3.48	3.69	9.43	5.73
11	2012	0.89	3.76	4.65	10.19	5.53
12	2013	0.00	4.13	4.13	11.17	7.04
13	2014	0.00	4.46	4.46	12.06	7.61
14	2015	0.00	4.82	4.82	13.04	8.22
15	2016	0.00	5.20	5.20	14.08	8.88
16	2017	0.00	5.62	5.62	15.22	9.60
17	2018	0.00	6.08	6.08	16.44	10.37
18	2019	0.00	6.56	6.56	17.77	11.20
19	2020	0.00	7.09	7.09	19.20	12.10
20	2021		7.09	7.09	19.20	12.10
21	2022		7.09	7.09	19.20	12.10
22	2023		7.09	7.09	19.20	12.10
23	2024		7.09	7.09	19.20	12.10
24	2025		7.09	7.09	19.20	12.10
25	2026		7.09	7.09	19.20	12.10
26	2027		7.09	7.09	19.20	12.10
27	2028		7.09	7.09	19.20	12.10
28	2029		7.09	7.09	19.20	12.10
29	2030		7.09	7.09	19.20	12.10
30	2031		7.09	7.09	19.20	12.10
31	2032		7.09	7.09	19.20	12.10
32	2033		7.09	7.09	19.20	12.10
33	2034		7.09	7.09	19.20	12.10
34	2035		7.09	7.09	19.20	12.10
35	2036		7.09	7.09	19.20	12.10
36	2037		7.09	7.09	19.20	12.10
37	2038		7.09	7.09	19.20	12.10
38	2039		7.09	7.09	19.20	12.10
39	2040		7.09	7.09	19.20	12.10
40	2041		7.09	7.09	19.20	12.10
41	2042		7.09	7.09	19.20	12.10
42	2043		7.09	7.09	19.20	12.10
43	2044		7.09	7.09	19.20	12.10
44	2045		7.09	7.09	19.20	12.10

Evaluation Indices

NPV: -18 Million R\$ *1
 B/C: 0.74 *1
 FIRR: 8.3%

Note: *1 Discounted at 12%

**Table H2-7 Financial Expenditure and Revenue Stream for Sewerage Projects
in Other River Basins**

(Unit: R\$ Million)

Year	Expenditure			Revenue	Balance	
	Capital Investment	O&M	Total			
1	2002	0.96		0.96	0.00	-0.96
2	2003	0.00		0.00	0.00	0.00
3	2004	0.00	0.00	0.00	0.00	0.00
4	2005	0.00	0.00	0.00	0.00	0.00
5	2006	0.00	0.00	0.00	0.00	0.00
6	2007	10.63	0.00	10.63	0.00	-10.63
7	2008	10.63	0.00	10.63	0.00	-10.63
8	2009	10.63	0.00	10.63	0.00	-10.63
9	2010	5.78	1.13	6.91	3.07	-3.84
10	2011	1.12	1.46	2.57	3.94	1.36
11	2012	4.28	1.47	5.76	3.99	-1.77
12	2013	1.42	1.92	3.34	5.19	1.85
13	2014	3.11	1.94	5.05	5.26	0.20
14	2015	2.83	2.29	5.11	6.19	1.07
15	2016	4.19	2.74	6.94	7.42	0.48
16	2017	6.38	2.78	9.16	7.51	-1.64
17	2018	5.86	3.05	8.91	8.25	-0.65
18	2019	3.07	3.44	6.50	9.30	2.80
19	2020	0.88	3.69	4.57	10.00	5.43
20	2021		3.69	3.69	10.13	6.44
21	2022		3.69	3.69	10.13	6.44
22	2023		3.69	3.69	10.13	6.44
23	2024		3.69	3.69	10.13	6.44
24	2025		3.69	3.69	10.13	6.44
25	2026		3.69	3.69	10.13	6.44
26	2027		3.69	3.69	10.13	6.44
27	2028		3.69	3.69	10.13	6.44
28	2029		3.69	3.69	10.13	6.44
29	2030		3.69	3.69	10.13	6.44
30	2031		3.69	3.69	10.13	6.44
31	2032		3.69	3.69	10.13	6.44
32	2033		3.69	3.69	10.13	6.44
33	2034		3.69	3.69	10.13	6.44
34	2035		3.69	3.69	10.13	6.44
35	2036		3.69	3.69	10.13	6.44
36	2037		3.69	3.69	10.13	6.44
37	2038		3.69	3.69	10.13	6.44
38	2039		3.69	3.69	10.13	6.44
39	2040		3.69	3.69	10.13	6.44
40	2041		3.69	3.69	10.13	6.44
41	2042		3.69	3.69	10.13	6.44
42	2043		3.69	3.69	10.13	6.44
43	2044		3.69	3.69	10.13	6.44
44	2045		3.69	3.69	10.13	6.44

Evaluation Indices

NPV: -9 Million R\$ *1
 B/C: 0.71 *1
 FIRR: 7.2%

Note: *1 Discounted at 12%

**Table H2-8 Financial Expenditure and Revenue Stream for Sewerage Projects in the RMF
Case 1: Increasing Tariffs by 73%**

(Unit: R\$ Million)

Year	Expenditure			Revenue	Balance	
	Capital Investment	O&M	Total			
1	2002	23.6		23.6	0.0	-23.6
2	2003	58.1		58.1	0.0	-58.1
3	2004	58.1	0.0	58.1	0.0	-58.1
4	2005	93.3	0.0	93.3	0.0	-93.3
5	2006	110.0	0.1	110.1	0.3	-109.8
6	2007	118.7	2.6	121.2	12.0	-109.3
7	2008	108.3	6.4	114.7	30.2	-84.5
8	2009	81.1	10.9	92.0	50.9	-41.1
9	2010	41.2	15.7	57.0	73.7	16.7
10	2011	11.1	21.5	32.7	100.9	68.2
11	2012	20.6	24.3	44.9	113.7	68.8
12	2013	24.4	25.4	49.8	119.1	69.2
13	2014	23.3	27.6	50.9	129.3	78.4
14	2015	23.0	29.6	52.6	138.6	85.9
15	2016	19.3	32.0	51.3	149.9	98.6
16	2017	21.3	34.8	56.1	163.1	107.0
17	2018	10.7	36.9	47.6	172.8	125.3
18	2019	5.6	39.6	45.2	185.3	140.1
19	2020	0.9	41.9	42.8	196.2	153.4
20	2021		41.9	41.9	207.7	165.8
21	2022		41.9	41.9	207.7	165.8
22	2023		41.9	41.9	207.7	165.8
23	2024		41.9	41.9	207.7	165.8
24	2025		41.9	41.9	207.7	165.8
25	2026		41.9	41.9	207.7	165.8
26	2027		41.9	41.9	207.7	165.8
27	2028		41.9	41.9	207.7	165.8
28	2029		41.9	41.9	207.7	165.8
29	2030		41.9	41.9	207.7	165.8
30	2031		41.9	41.9	207.7	165.8
31	2032		41.9	41.9	207.7	165.8
32	2033		41.9	41.9	207.7	165.8
33	2034		41.9	41.9	207.7	165.8
34	2035		41.9	41.9	207.7	165.8
35	2036		41.9	41.9	207.7	165.8
36	2037		41.9	41.9	207.7	165.8
37	2038		41.9	41.9	207.7	165.8
38	2039		41.9	41.9	207.7	165.8
39	2040		41.9	41.9	207.7	165.8
40	2041		41.9	41.9	207.7	165.8
41	2042		41.9	41.9	207.7	165.8
42	2043		41.9	41.9	207.7	165.8
43	2044		41.9	41.9	207.7	165.8
44	2045		41.9	41.9	207.7	165.8

Evaluation Indices

NPV: 1 Million R\$ *1
 B/C: 1.00 *1
 FIRR: 12.0%

Note: *1 Discounted at 12%

*2 Unit rate of sewage treatment services is raised by approximately 73%

**Table H2-9 Financial Expenditure and Revenue Stream for Sewerage Projects in the RMF
Case 2: 53% of Investment Cost Subsidized**

(Unit: R\$ Million)

Year	Expenditure			Revenue	Balance	
	Capital Investment	O&M	Total			
1	2002	11.1		11.1	0.0	-11.1
2	2003	27.3		27.3	0.0	-27.3
3	2004	27.3	0.0	27.3	0.0	-27.3
4	2005	43.9	0.0	43.9	0.0	-43.9
5	2006	51.7	0.1	51.8	0.2	-51.6
6	2007	55.8	2.6	58.3	6.9	-51.4
7	2008	50.9	6.4	57.3	17.4	-39.9
8	2009	38.1	10.9	49.0	29.4	-19.6
9	2010	19.4	15.7	35.1	42.6	7.5
10	2011	5.2	21.5	26.8	58.3	31.5
11	2012	9.7	24.3	33.9	65.7	31.8
12	2013	11.5	25.4	36.9	68.8	31.9
13	2014	10.9	27.6	38.5	74.7	36.2
14	2015	10.8	29.6	40.4	80.1	39.7
15	2016	9.0	32.0	41.1	86.7	45.6
16	2017	10.0	34.8	44.9	94.3	49.4
17	2018	5.0	36.9	41.9	99.9	58.0
18	2019	2.7	39.6	42.2	107.1	64.9
19	2020	0.4	41.9	42.3	113.4	71.1
20	2021		41.9	41.9	120.1	78.2
21	2022		41.9	41.9	120.1	78.2
22	2023		41.9	41.9	120.1	78.2
23	2024		41.9	41.9	120.1	78.2
24	2025		41.9	41.9	120.1	78.2
25	2026		41.9	41.9	120.1	78.2
26	2027		41.9	41.9	120.1	78.2
27	2028		41.9	41.9	120.1	78.2
28	2029		41.9	41.9	120.1	78.2
29	2030		41.9	41.9	120.1	78.2
30	2031		41.9	41.9	120.1	78.2
31	2032		41.9	41.9	120.1	78.2
32	2033		41.9	41.9	120.1	78.2
33	2034		41.9	41.9	120.1	78.2
34	2035		41.9	41.9	120.1	78.2
35	2036		41.9	41.9	120.1	78.2
36	2037		41.9	41.9	120.1	78.2
37	2038		41.9	41.9	120.1	78.2
38	2039		41.9	41.9	120.1	78.2
39	2040		41.9	41.9	120.1	78.2
40	2041		41.9	41.9	120.1	78.2
41	2042		41.9	41.9	120.1	78.2
42	2043		41.9	41.9	120.1	78.2
43	2044		41.9	41.9	120.1	78.2
44	2045		41.9	41.9	120.1	78.2

Evaluation Indices

NPV: -1 Million R\$ *1
 B/C: 1.00 *1
 FIRR: 12.0%

Note: *1 Discounted at 12%

*2 Approximately 53% of capital investment cost is subsidized.

Table H3-1 Growth Trend of Sewage Treatment Service Beneficiaries: 1994-1999

		(Unit: Number of Connection: Ligacao)					
Code	Name of Management Unit	1994	1995	1996	1997	1998	1999
1	068 Igarassu	201	203	202	209	213	213
2	096 Olinda	24,474	24,671	24,674	25,605	25,862	26,667
3	107 Paulista	8,832	8,882	8,975	234	235	235
4	165 Abreu e Lima	291	296	299	306	307	309
5	169 Navarro	10	10	10	10	10	10
6	170 Paratibe	662	709	661	703	700	702
7	172 Paraia da Conceicao	474	471	470	504	502	508
8	179 Janga	3,588	3,259	3,223	3,803	3,797	3,778
9	219 Jardim Paulista	4,213	4,314	4,222	4,467	4,485	4,537
10	224 Tabajara	1	1	1	2	0	0
11	274 Maranguape I	0	0	0	12,002	8,884	8,936
12	323 Parque Res. Artur Lundgren	6,576	6,547	6,494	6,785	6,772	6,775
13	338 Conj. Residencial Caetes	5,174	5,221	5,108	5,407	5,415	5,432
14	339 Cabanga	27,230	28,020	28,508	30,781	31,343	31,960
15	340 Dois Irmaos	16,476	16,566	16,412	17,643	18,053	18,690
16	342 Jangadinha	13,065	13,063	13,205	13,346	13,607	13,669
17	344 Maranguape II	3,032	3,003	2,916	3,423	3,429	3,445
18	347 Aurora	32,183	32,682	33,250	34,413	36,088	36,457
19	360 Alto do Ceu	6,985	7,049	7,111	7,250	7,205	7,371
20	733 Ibura	5,284	5,309	5,304	5,517	5,553	5,568
21	734 Peixinhos	3,208	3,206	3,193	3,304	3,858	3,906
22	735 Jenipapo	1,152	1,158	1,115	1,499	3,393	3,229
23	743 Fernando de Noronha	0	32	58	188	182	166
24	029 Cabo	203	196	195	219	201	199
25	079 Jaboatao	1,897	1,865	1,896	1,944	1,880	1,880
26	137 Sao Lourenco da Mata	2,276	2,300	2,289	2,408	2,428	2,430
27	166 *****	498	513	0	0	0	0
28	341 Prazeres	10,070	10,076	10,091	10,210	10,951	11,436
29	766 Camaragibe	0	0	516	547	546	541
	Total	178,055	179,622	180,398	192,729	195,899	199,049
	Growth Rate (% per annum)		0.9	0.4	6.8	1.6	1.6
	Growth Rate (Average % per annum between 1994 and 1999)						2.3

Source: Records of Operation and Maintenance 1994-1999, COMPESA

Table H3-2 Growth Projection of Sewage Treatment Service Beneficiaries: 1996-2020

	1996	2000	2003	2010	2020
1. Urban Population in RMR (Unit: 1000)	2,935	3,062	3,149	3,361	3,660
2. Population Served by COMPESA (Unit: 1000)	722	789	843	986	1,232
3. Population with Sewerage Treatment (Unit: 1000)					
a. With Treatment by COMPESA	640	700	748	874	1,092
b. By Other Treatment Systems	106	116	124	145	181
c. With Septic Tank	936	937	938	930	877
d. Total Population	1,682	1,752	1,809	1,949	2,150
4. Population without Sewerage Services (Unit: 1000)	1,254	1,310	1,340	1,412	1,510
5. Percentage (%)					
a. With Treatment by COMPESA	22	23	24	26	30
b. By Independent System	4	4	4	4	5
c. With Septic Tank	32	31	30	28	24
d. Population with Treatment	57	57	57	58	59
e. Population without Treatment	43	43	43	42	41
6. Increment of Population with Sewerage Treatment (Unit: 1000)					
a. With Treatment by COMPESA	-	-	-	126	218
b. By Independent System	-	-	-	21	36
c. With Septic Tank	-	-	-	-	-
d. Total Population	-	-	-	147	254

Table H3-3 Population Distribution by River Basin: 2003-2020

Municipality / River Basin	Projected Population			Population with Above Average Income		
	2003	2010	2020	2003	2010	2020
I. Population by Municipality (Unit: 1000)						
1. Abreu e Lima	75	78	81	36	37	38
2. Araçoiaba	12	13	15	11	12	14
3. Cabo de Santo Agostinho	142	160	187	73	83	97
4. Camaragibe	126	142	164	54	61	71
5. Igarassu	81	99	130	75	92	121
6. Ipojuca	37	45	56	18	21	26
7. Itamaracá	14	18	25	11	14	20
8. Itapissuma	19	22	26	17	20	24
9. Jaboatão dos Guararapes	506	554	617	374	409	455
10. Moreno	33	33	34	16	16	16
11. Olinda	359	367	378	169	173	178
12. Paulista	261	293	337	118	132	152
13. Recife	1,396	1,444	1,506	721	746	777
14. São Lourenço da Mata	86	95	107	42	45	51
Total	3,148	3,361	3,661	1,735	1,861	2,041
II. Population by River Basin (Unit: 1000)						
1. Capibaribe River Basin	706	746	796	389	413	444
2. Beberibe River Basin	597	616	645	329	341	359
3. Jaboatão River Basin	548	601	666	302	333	372
4. Tejipio River Basin	515	536	565	284	297	315
5. Timbo River Basin	414	442	482	228	245	269
6. Other River Basins	368	420	506	203	233	282
Total	3,148	3,361	3,661	1,735	1,861	2,041
III. Population with Sewage Treatment by River Basin (Unit: 1000)						
	With Treatment by COMPESA			By Other Treatment Systems		
1. Capibaribe River Basin	168	194	238	28	32	39
2. Beberibe River Basin	142	160	192	24	27	32
3. Jaboatão River Basin	130	156	199	22	26	33
4. Tejipio River Basin	122	140	169	20	23	28
5. Timbo River Basin	98	115	144	16	19	24
6. Other River Basins	87	109	151	14	18	25
Total	748	874	1,092	124	145	181
				By Septic Tank*1		
1. Capibaribe River Basin				210	206	191
2. Beberibe River Basin				178	170	154
3. Jaboatão River Basin				163	166	160
4. Tejipio River Basin				153	148	135
5. Timbo River Basin				123	122	116
6. Other River Basins				110	116	121
Total				938	930	877

Note: *1 Every house which will not be served by COMPESA or other treatment systems has to install a septic tank under the state law No.7269, June 1981. However, low income people are assumed not to install such tanks at present. 10% of low income people are assumed to be served by COMPESA.

Table H3-4 Costs of Other Sewage Treatment Systems

Item	Unit	Amount
1. Number of Residents	Persons	657
2. Water Consumption	Liters per Capita per day	110
3. Effluent Coefficient		0.8
4. Specification of Sewerage System		
a. Septic Tank	m ³	76
b. Delivery Pipe	m	343
5. Construction Costs	R\$	79,020
a. Delivery Piping	R\$	23,685
b. Sand Filtration Box	R\$	12,173
c. Septic Tank	R\$	11,249
d. Anaerobic Filter	R\$	9,969
e. Drying Bed	R\$	9,170
f. Connection to Sewer System	R\$	7,214
g. Preparatory Work	R\$	5,559
6. Operation and Maintenance Cost	Percentage of Construction Cost	5.0
7. Unit Rates of Independent Sewerage System		
a. Unit Construction Cost	R\$ per Capita	120
b. Unit O/M Cost	R\$ per Capita per Year	6.00

Source: Projeto Basico do Sistema de Esgotamento Sanitario da Cidade do Moreno - PE Bairros: Joao Paulo II e Cohab Vol. I/ii, May 1999, Companhia Pernambucana de Saneamento Compesa

Table H3-5 Household Medical Expenses and Losses due to Illness

Item	Applied Figure	Remark
1. Water Borne Diseases in the RMR		
(1) Incidence of Water borne Diseases (per 100,000 Population)		Refer to Section D4.7 in Supporting Report I
	1998	1999
a. All Diseases	917.00	624.00
b. Water Borne Diseases	48.20	79.02
(2) Age Distribution for Water Borne Diseases (Number of Cases between '95 and '98 in Recife Municipality)		Refer to Section D4.7 in Supporting Report I
	Cholera	Diarrhea
a. Up to 10 Years Old	38	178
b. 10 Years Old and Over	79	304
Total	117	482
(3) Average Household Size	4.0	Refer to Section D2.1 in Supporting Report I
2. Economic Information of Medical Treatment		
(1) Morbidity Rate of Patients Who Stopped Doing Their Usual Activities (% of Household Member in Month)	2%	Quoted from "Water Supply Project in Cambodia, 1999", Conducted by JICA
(2) Mean Number of Days for Which They Stopped Doing Their Usual Activities (Days on Average)	6	Quoted from the same reference above
(3) Average Annual Expenditure for Medical Treatment (R\$ per Household)	50	Based on the Data in Table D3-3 and Inflation Rate (10% per year)
3. Annual Losses due to Water Borne Diseases		
(1) Medical Expenses for Water Borne Diseases		
a. Rate of Water Borne Diseases to All Diseases	8.3%	Calculated from Data 1. (1) Above.
b. Average Annual Expenditure for Medical Treatment of Water Borne Diseases (R\$ per HH)	4.14	= R\$50 x 8.3%
c. Average Annual Expenditure for Medical Treatment of Water Borne Diseases (R\$ per Person)	1.03	
(2) Losses through Absence from Work due to Illness		
a. Average Monthly Income per Person (R\$)	526	Refer to Sec. D2.1 in Supporting Report D.
b. Losses through Absence from Work due to Water Borne Diseases (R\$ per Household)	4.14	Applied Inflation Rate of 10%. = 4.0 Pers. x 2% x 64% x (R\$526 / 30 Day) x 6 Days
c. Average Losses through Absence from Work due to Water Borne Diseases (R\$ per Person)	1.04	
(3) Annual Losses due to Water borne Diseases (R\$ per Capita per Year)	2.07	= 1.03 + 1.04
(4) Annual Losses Caused by Lack of Sewerage Services (R\$ per Capita per Year)	1.80	Assumed at 87% of annual losses (3) *1

Note: *1 People without water supply and sewerage services in urban areas were estimated at 9.9% and 66.2% respectively, as mentioned in Section D4.5 in Supporting Report D. Applying these rates, the weighed rate of people without sewerage services was calculated at 87%. This rate was applied as a cause for water borne diseases due to insufficiency of sewerage services.

Table H3-6 Economic Losses of Tourism Revenue due to Environment Pollution: 2000 to 2021

I. Information on Tourists*1 (Unit: 1000)	1995	1996	1997	1998
1. Tourists to PE State	-	-	-	1,757
2. Tourists to RMR	-	-	-	1,142
a. Foreign Tourists	-	-	-	78
b. Domestic Tourists	-	-	-	1,064
c. Tourists Staying in Hotels	331	347	431	456
II. Estimates of Tourists (Unit: 1000)	1998	2000	2010	2020
1. Tourists Staying in Hotels *2	456	552	1,012	1,472
2. Tourists in RMR				
a. Foreign Tourists *3	78	113	367	766
b. Domestic Tourists	1,064	1,269	2,167	2,920
c. Total	1,142	1,382	2,534	3,685
3. Tourists for Sightseeing to RMR *4				
a. Foreign Tourists	-	64	209	436
b. Domestic Tourists	-	355	607	817
c. Total	-	420	816	1,254
4. Estimated Number of Tourists after Environmental Pollution *5				
a. Foreign Tourists	-	40	130	271
b. Domestic Tourists	-	220	376	507
c. Total	-	260	506	777
5. Estimated Number of Tourists after Sanitation Problems *6				
a. Foreign Tourists	-	34	111	233
b. Domestic Tourists	-	189	323	436
c. Total	-	224	435	669
III. Economic Losses of Tourism Revenues due to Sanitation Problems (Unit: US\$ Million)				
1. Decrease of Tourism Revenues due to Sanitation Problems at 1998 market prices *7				
a. Foreign Tourists	-	19.1	62.1	129.5
b. Domestic Tourists	-	54.1	92.4	124.5
c. Total	-	73.2	154.4	254.0
2. Decrease of Value Added of Tourism Revenues due to Sanitation Problems at 1998 market prices				
a. Value in US\$ Million *8	-	41.9	88.5	145.5
b. Value in R\$ Million *9	-	50.8	107.1	176.1

Source: (1) Tourism in Pernambuco: Selected Indicators, 1999, Secretariat of Economic Development, Tourism and Sports

(2) Sintese do Plano Estrategico de Desenvolvimento do Turismo em Pernambuco, 1999, Secretaria de Desenvolvimento Economico, Turismo e Esports

(3) Pesquisa do Inventorio da Oferta Turistica de Pernambuco, 1999, EMPETUR

Note: *1 Data from the sources above.

*2 Regression line applied based on the trend of tourists staying in hotels in the line 1-(2)-c.

*3 The number of foreign tourists was assumed to grow at double the rate of domestic tourists, referring to the source (2).

*4 Ratios of 57% of foreign and 28% of domestic tourists were for sightseeing in the RMR. Refer to Section D-

*5 62% of tourists complained about public cleanliness in towns. Refer to Section D4.4 in Supporting Report I

*6 86% of public cleanliness problems were assumed to be caused by sanitation problems, referring to the following investment program of PRODETUR II (Source (1))

Infrastructure Works	Investment (US\$ Million)	(%)
Basic Sanitation	46.68	86
Solid Residues	2.13	4
Environmental Protection	5.76	11
Total	54.57	100

*7 Average length of staying and average daily spending were set up as follows, referring to Section D4.4 in

	Stay (days)	Spending (US\$/day)	Supporting Report D.
Foreign Tourist	10.8	51.4	
Domestic Tourist	8.6	33.2	

*8 Value added rate of tourism industry was 57.3%, referring to Source (1).

*9 Exchange rate: R\$ 1.21 per US\$ in 1998.

Table H3-7 Reduction of Pollution Load owing to Proposed Projects

(Unit: kg/day)

Year	Total	River Basin					
		Capibaribe	Beberibe	Jaboatão	Tejipio	Timbo	Other Rivers
Pollution Load Under Without-Project Condition							
2003	109.0	24.5	20.7	19.0	17.8	14.3	12.7
2004	109.8	24.6	20.7	19.2	17.9	14.4	12.9
2005	110.4	24.7	20.7	19.4	17.9	14.5	13.1
2006	111.1	24.8	20.8	19.6	18.0	14.6	13.4
2007	111.8	24.9	20.8	19.8	18.0	14.7	13.6
2008	112.5	25.0	20.8	20.0	18.1	14.8	13.8
2009	113.2	25.2	20.9	20.2	18.1	14.9	14.0
2010	113.8	25.3	20.9	20.4	18.2	15.0	14.2
2011	114.4	25.3	20.9	20.5	18.2	15.0	14.4
2012	115.0	25.4	20.9	20.6	18.2	15.1	14.7
2013	115.5	25.5	20.9	20.8	18.3	15.2	14.9
2014	116.1	25.6	20.9	20.9	18.3	15.3	15.1
2015	116.6	25.6	21.0	21.0	18.3	15.3	15.3
2016	117.1	25.7	21.0	21.2	18.3	15.4	15.5
2017	117.7	25.8	21.0	21.3	18.4	15.5	15.8
2018	118.2	25.8	21.0	21.4	18.4	15.6	16.0
2019	118.8	25.9	21.0	21.6	18.4	15.6	16.2
2020	119.3	26.0	21.0	21.7	18.4	15.7	16.5
Pollution Load Under With-Project Condition							
2003	109.0	24.5	20.7	19.0	17.8	14.3	12.7
2004	109.8	24.6	20.7	19.2	17.9	14.4	12.9
2005	110.3	24.7	20.7	19.3	17.9	14.5	13.1
2006	107.4	22.7	20.3	19.0	17.9	14.1	13.4
2007	98.2	19.0	18.3	17.7	17.2	12.5	13.6
2008	83.4	16.7	13.2	14.9	15.2	9.7	13.6
2009	67.1	15.3	8.5	10.6	12.4	6.6	13.7
2010	50.8	13.5	5.4	5.8	8.7	3.6	13.7
2011	50.3	13.3	5.3	5.8	8.6	3.7	13.6
2012	49.6	12.9	5.2	5.8	8.5	3.7	13.5
2013	48.7	12.4	5.1	5.7	8.4	3.7	13.4
2014	47.8	11.9	5.0	5.6	8.2	3.8	13.2
2015	46.8	11.4	4.9	5.5	8.1	3.8	13.0
2016	45.6	10.8	4.8	5.5	7.9	3.9	12.8
2017	44.4	10.2	4.7	5.4	7.8	3.9	12.5
2018	43.1	9.6	4.6	5.3	7.6	3.9	12.1
2019	41.8	9.0	4.5	5.2	7.5	4.0	11.7
2020	40.3	8.3	4.4	5.1	7.3	4.0	11.2
Reduction of Pollution Load Owing to Proposed Projects							
2003	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2006	3.7	2.1	0.5	0.5	0.1	0.5	0.0
2007	13.6	5.9	2.5	2.1	0.9	2.2	0.0
2008	29.1	8.3	7.6	5.0	2.9	5.0	0.2
2009	46.1	9.9	12.3	9.5	5.7	8.3	0.3
2010	63.0	11.8	15.5	14.5	9.4	11.3	0.5
2011	64.1	12.1	15.6	14.7	9.6	11.4	0.8
2012	65.3	12.5	15.7	14.9	9.7	11.4	1.1
2013	66.8	13.1	15.8	15.1	9.9	11.4	1.5
2014	68.3	13.7	15.9	15.3	10.1	11.5	1.9
2015	69.8	14.2	16.1	15.5	10.2	11.5	2.3
2016	71.5	14.9	16.2	15.7	10.4	11.6	2.8
2017	73.3	15.6	16.3	15.9	10.6	11.6	3.3
2018	75.1	16.2	16.4	16.1	10.7	11.6	3.9
2019	77.0	16.9	16.5	16.4	10.9	11.7	4.6
2020	78.9	17.6	16.7	16.6	11.1	11.7	5.3

Table H3-8 Economic Cost and Benefit Stream for Sewerage Projects in RMR

(Unit: R\$ Million)

Year	Cost			Benefit			Total	Balance
	Capital Investment	O&M	Total	Treatment Saving	Medical Issues	Tourism Recession		
1	2002	0.0		0.0			0.0	0.0
2	2003	54.5					0.0	-54.5
3	2004	54.5	0.0	54.5	0.0	0.0	0.0	-54.5
4	2005	87.5	0.1	87.6	0.0	0.0	0.3	-87.3
5	2006	103.2	2.4	105.6	0.9	0.5	9.5	-94.6
6	2007	111.3	6.1	117.3	4.6	1.4	25.0	-86.5
7	2008	101.5	10.2	111.7	11.0	2.4	44.5	-53.8
8	2009	76.1	14.8	90.9	16.1	3.4	67.1	-4.3
9	2010	38.6	20.3	58.9	20.8	4.4	90.4	56.6
10	2011	6.6	22.8	29.4	4.7	4.8	101.3	81.3
11	2012	19.3	23.9	43.2	5.0	4.8	106.4	73.0
12	2013	22.9	26.0	48.8	5.5	5.0	114.4	76.0
13	2014	21.8	27.8	49.6	5.8	5.2	122.9	84.2
14	2015	21.6	30.1	51.7	6.2	5.4	132.9	92.8
15	2016	18.1	32.7	50.8	6.7	5.7	143.5	105.0
16	2017	20.0	34.7	54.7	6.8	5.7	152.3	110.2
17	2018	10.0	37.2	47.2	7.2	5.9	162.9	128.8
18	2019	5.3	39.4	44.7	7.5	6.1	172.0	140.9
19	2020	0.8	41.7	42.5	7.9	6.2	182.0	153.6
20	2021		41.7	41.7	0.4	6.2	182.1	188.7
21	2022		41.7	41.7	0.4	6.2	182.1	188.7
22	2023		41.7	41.7	0.4	6.2	182.1	188.7
23	2024		41.7	41.7	0.4	6.2	182.1	188.7
24	2025		41.7	41.7	0.4	6.2	182.1	188.7
25	2026		41.7	41.7	0.4	6.2	182.1	188.7
26	2027		41.7	41.7	0.4	6.2	182.1	188.7
27	2028		41.7	41.7	0.4	6.2	182.1	188.7
28	2029		41.7	41.7	0.4	6.2	182.1	188.7
29	2030		41.7	41.7	0.4	6.2	182.1	188.7
30	2031		41.7	41.7	0.4	6.2	182.1	188.7
31	2032		41.7	41.7	0.4	6.2	182.1	188.7
32	2033		41.7	41.7	0.4	6.2	182.1	188.7
33	2034		41.7	41.7	0.4	6.2	182.1	188.7
34	2035		41.7	41.7	0.4	6.2	182.1	188.7
35	2036		41.7	41.7	0.4	6.2	182.1	188.7
36	2037		41.7	41.7	0.4	6.2	182.1	188.7
37	2038		41.7	41.7	0.4	6.2	182.1	188.7
38	2039		41.7	41.7	0.4	6.2	182.1	188.7
39	2040		41.7	41.7	0.4	6.2	182.1	188.7
40	2041		41.7	41.7	0.4	6.2	182.1	188.7
41	2042		41.7	41.7	0.4	6.2	182.1	188.7
42	2043		41.7	41.7	0.4	6.2	182.1	188.7
43	2044		41.7	41.7	0.4	6.2	182.1	188.7
44	2045		41.7	41.7	0.4	6.2	182.1	188.7

Evaluation Indices
 NPV: 90 Million R\$ *1
 B/C: 1.18 *1
 EIRR: 14.4%

Note: *1 Discounted at 12%

Table H3-9 Economic Cost and Benefit Stream for Sewerage Projects in Capibaribe River Basin

(Unit: R\$ Million)

Year	Cost			Benefit			Total	Balance
	Capital Investment	O&M	Total	Treatment Saving	Medical Issues	Tourism Recession		
1	2002	0.00		0.00			0.00	0.00
2	2003	13.43					0.00	-13.43
3	2004	13.43	0.00	13.43	0.00	0.00	0.00	-13.43
4	2005	17.58	0.00	17.58	0.00	0.00	0.00	-17.58
5	2006	22.04	1.27	23.31	0.28	0.10	1.41	-21.53
6	2007	16.67	2.85	19.52	1.37	0.30	4.54	-13.31
7	2008	12.49	3.27	15.77	2.41	0.76	12.38	-0.22
8	2009	12.49	3.70	16.19	2.49	1.08	18.94	6.31
9	2010	12.49	4.43	16.92	3.07	1.19	22.30	9.64
10	2011	0.00	5.01	5.01	1.23	1.20	23.43	20.85
11	2012	6.54	5.26	11.80	1.41	1.21	24.63	15.45
12	2013	12.36	5.81	18.17	1.52	1.21	25.89	10.46
13	2014	9.85	6.34	16.19	1.62	1.26	28.03	14.71
14	2015	15.04	6.75	21.80	1.69	1.30	30.32	11.51
15	2016	12.78	7.81	20.59	1.80	1.31	31.86	14.38
16	2017	13.36	8.49	21.85	1.79	1.32	33.49	14.75
17	2018	4.50	9.46	13.96	1.85	1.33	35.20	24.42
18	2019	2.41	10.00	12.41	1.84	1.34	36.99	27.76
19	2020	0.00	10.73	10.73	1.89	1.35	38.88	31.39
20	2021		10.73	10.73	0.10	1.35	38.88	29.59
21	2022		10.73	10.73	0.10	1.35	38.88	29.59
22	2023		10.73	10.73	0.10	1.35	38.88	29.59
23	2024		10.73	10.73	0.10	1.35	38.88	29.59
24	2025		10.73	10.73	0.10	1.35	38.88	29.59
25	2026		10.73	10.73	0.10	1.35	38.88	29.59
26	2027		10.73	10.73	0.10	1.35	38.88	29.59
27	2028		10.73	10.73	0.10	1.35	38.88	29.59
28	2029		10.73	10.73	0.10	1.35	38.88	29.59
29	2030		10.73	10.73	0.10	1.35	38.88	29.59
30	2031		10.73	10.73	0.10	1.35	38.88	29.59
31	2032		10.73	10.73	0.10	1.35	38.88	29.59
32	2033		10.73	10.73	0.10	1.35	38.88	29.59
33	2034		10.73	10.73	0.10	1.35	38.88	29.59
34	2035		10.73	10.73	0.10	1.35	38.88	29.59
35	2036		10.73	10.73	0.10	1.35	38.88	29.59
36	2037		10.73	10.73	0.10	1.35	38.88	29.59
37	2038		10.73	10.73	0.10	1.35	38.88	29.59
38	2039		10.73	10.73	0.10	1.35	38.88	29.59
39	2040		10.73	10.73	0.10	1.35	38.88	29.59
40	2041		10.73	10.73	0.10	1.35	38.88	29.59
41	2042		10.73	10.73	0.10	1.35	38.88	29.59
42	2043		10.73	10.73	0.10	1.35	38.88	29.59
43	2044		10.73	10.73	0.10	1.35	38.88	29.59
44	2045		10.73	10.73	0.10	1.35	38.88	29.59

Evaluation Indices
 NPV: 18 Million R\$ *1
 B/C: 1.16 *1
 EIRR: 14.4%

Note: *1 Discounted at 12%

Table H3-10 Economic Cost and Benefit Stream for Sewerage Projects in Beberibe River Basin

(Unit: R\$ Million)

Year	Cost			Benefit			Total	Balance
	Capital Investment	O&M	Total	Treatment Saving	Medical Issues	Tourism Recession		
1	2002	0.00		0.00			0.00	0.00
2	2003	8.46					0.00	-8.46
3	2004	8.46	0.00	8.46	0.00	0.00	0.00	-8.46
4	2005	17.93	0.00	17.93	0.00	0.00	0.00	-17.93
5	2006	22.35	0.30	22.65	0.30	0.24	4.43	-17.68
6	2007	22.35	0.94	23.29	1.58	0.52	10.22	-10.98
7	2008	12.88	2.48	15.35	3.85	0.57	12.04	1.10
8	2009	8.46	3.66	12.12	3.82	0.61	13.96	6.27
9	2010	0.00	4.17	4.17	3.03	0.70	17.13	16.69
10	2011	3.46	4.34	7.80	0.58	0.76	19.43	12.97
11	2012	3.46	4.52	7.98	0.59	0.76	20.42	13.80
12	2013	3.46	4.71	8.17	0.63	0.80	22.55	15.83
13	2014	3.46	5.05	8.51	0.67	0.84	24.67	17.68
14	2015	0.00	5.42	5.42	0.70	0.86	26.29	22.43
15	2016	0.00	5.64	5.64	0.78	0.95	30.43	26.52
16	2017	0.00	5.87	5.87	0.82	0.98	33.10	29.04
17	2018	0.00	6.12	6.12	0.89	1.05	36.94	32.76
18	2019	0.00	6.37	6.37	0.92	1.06	39.09	34.69
19	2020	0.00	6.64	6.64	0.95	1.09	42.00	37.40
20	2021		6.64	6.64	0.05	1.09	42.00	36.50
21	2022		6.64	6.64	0.05	1.09	42.00	36.50
22	2023		6.64	6.64	0.05	1.09	42.00	36.50
23	2024		6.64	6.64	0.05	1.09	42.00	36.50
24	2025		6.64	6.64	0.05	1.09	42.00	36.50
25	2026		6.64	6.64	0.05	1.09	42.00	36.50
26	2027		6.64	6.64	0.05	1.09	42.00	36.50
27	2028		6.64	6.64	0.05	1.09	42.00	36.50
28	2029		6.64	6.64	0.05	1.09	42.00	36.50
29	2030		6.64	6.64	0.05	1.09	42.00	36.50
30	2031		6.64	6.64	0.05	1.09	42.00	36.50
31	2032		6.64	6.64	0.05	1.09	42.00	36.50
32	2033		6.64	6.64	0.05	1.09	42.00	36.50
33	2034		6.64	6.64	0.05	1.09	42.00	36.50
34	2035		6.64	6.64	0.05	1.09	42.00	36.50
35	2036		6.64	6.64	0.05	1.09	42.00	36.50
36	2037		6.64	6.64	0.05	1.09	42.00	36.50
37	2038		6.64	6.64	0.05	1.09	42.00	36.50
38	2039		6.64	6.64	0.05	1.09	42.00	36.50
39	2040		6.64	6.64	0.05	1.09	42.00	36.50
40	2041		6.64	6.64	0.05	1.09	42.00	36.50
41	2042		6.64	6.64	0.05	1.09	42.00	36.50
42	2043		6.64	6.64	0.05	1.09	42.00	36.50
43	2044		6.64	6.64	0.05	1.09	42.00	36.50
44	2045		6.64	6.64	0.05	1.09	42.00	36.50
Evaluation Indices		NPV:	47 Million R\$ *1					
		B/C:	1.56 *1					
		EIRR:	18.9%					

Note: *1 Discounted at 12%

Table H3-11 Economic Cost and Benefit Stream for Sewerage Projects in Jaboatao River Basin

(Unit: R\$ Million)

Year	Cost			Benefit			Total	Balance
	Capital Investment	O&M	Total	Treatment Saving	Medical Issues	Tourism Recession		
1	2002	0.00		0.00			0.00	0.00
2	2003	17.84					0.00	-17.84
3	2004	17.84	0.00	17.84	0.00	0.00	0.00	-17.84
4	2005	21.25	0.06	21.31	0.01	0.01	0.25	-21.03
5	2006	24.61	0.49	25.10	0.18	0.12	2.15	-22.65
6	2007	24.61	1.16	25.77	0.80	0.27	5.26	-19.45
7	2008	28.49	1.99	30.47	2.07	0.44	9.28	-18.69
8	2009	20.20	3.31	23.50	4.66	0.71	15.87	-2.25
9	2010	7.00	3.97	10.97	5.80	0.83	19.62	15.29
10	2011	3.18	4.62	7.79	0.96	0.93	22.87	16.98
11	2012	3.18	4.84	8.01	1.01	0.94	24.04	17.98
12	2013	5.59	5.07	10.65	1.04	0.95	25.27	16.60
13	2014	5.59	5.39	10.98	1.08	0.97	26.97	18.05
14	2015	3.18	6.05	9.22	1.20	1.06	30.38	23.41
15	2016	0.00	6.43	6.43	1.22	1.08	32.39	28.26
16	2017	0.00	6.73	6.73	1.24	1.09	34.04	29.64
17	2018	0.00	7.05	7.05	1.26	1.10	35.78	31.09
18	2019	0.00	7.39	7.39	1.29	1.12	37.60	40.00
19	2020	0.00	7.74	7.74	1.31	1.13	39.52	41.96
20	2021		7.74	7.74	0.07	1.13	39.52	40.71
21	2022		7.74	7.74	0.07	1.13	39.52	40.71
22	2023		7.74	7.74	0.07	1.13	39.52	40.71
23	2024		7.74	7.74	0.07	1.13	39.52	40.71
24	2025		7.74	7.74	0.07	1.13	39.52	40.71
25	2026		7.74	7.74	0.07	1.13	39.52	40.71
26	2027		7.74	7.74	0.07	1.13	39.52	40.71
27	2028		7.74	7.74	0.07	1.13	39.52	40.71
28	2029		7.74	7.74	0.07	1.13	39.52	40.71
29	2030		7.74	7.74	0.07	1.13	39.52	40.71
30	2031		7.74	7.74	0.07	1.13	39.52	40.71
31	2032		7.74	7.74	0.07	1.13	39.52	40.71
32	2033		7.74	7.74	0.07	1.13	39.52	40.71
33	2034		7.74	7.74	0.07	1.13	39.52	40.71
34	2035		7.74	7.74	0.07	1.13	39.52	40.71
35	2036		7.74	7.74	0.07	1.13	39.52	40.71
36	2037		7.74	7.74	0.07	1.13	39.52	40.71
37	2038		7.74	7.74	0.07	1.13	39.52	40.71
38	2039		7.74	7.74	0.07	1.13	39.52	40.71
39	2040		7.74	7.74	0.07	1.13	39.52	40.71
40	2041		7.74	7.74	0.07	1.13	39.52	40.71
41	2042		7.74	7.74	0.07	1.13	39.52	40.71
42	2043		7.74	7.74	0.07	1.13	39.52	40.71
43	2044		7.74	7.74	0.07	1.13	39.52	40.71
44	2045		7.74	7.74	0.07	1.13	39.52	40.71

Evaluation Indices NPV: 10 Million R\$ *1
 B/C: 1.08 *1
 EIRR: 13.0%

Note: *1 Discounted at 12%

Table H3-12 Economic Cost and Benefit Stream for Sewerage Projects in Tejipio River Basin

(Unit: R\$ Million)

Year	Cost			Benefit			Total	Balance
	Capital Investment	O&M	Total	Treatment Saving	Medical Issues	Tourism Recession		
1	2002	0.00		0.00			0.00	0.00
2	2003	7.55					0.00	-7.55
3	2004	7.55	0.00	7.55	0.00	0.00	0.00	-7.55
4	2005	19.25	0.00	19.25	0.00	0.00	0.00	-19.25
5	2006	22.65	0.19	22.84	0.04	0.04	0.65	-22.19
6	2007	24.30	0.58	24.88	0.22	0.13	1.83	-22.70
7	2008	24.30	1.45	25.75	1.09	0.32	4.73	-19.61
8	2009	11.59	2.41	14.00	2.34	0.51	8.15	-3.01
9	2010	6.55	3.80	10.35	4.46	0.78	13.36	8.25
10	2011	0.00	4.20	4.20	0.70	0.83	14.94	16.48
11	2012	1.28	4.36	5.64	0.74	0.83	15.71	17.28
12	2013	0.15	4.70	4.85	0.79	0.87	17.13	18.79
13	2014	0.00	5.01	5.01	0.82	0.90	18.51	20.23
14	2015	0.71	5.20	5.91	0.83	0.90	19.45	21.18
15	2016	1.34	5.40	6.74	0.84	0.91	20.44	22.19
16	2017	0.63	5.71	6.34	0.87	0.93	21.87	23.67
17	2018	0.00	6.00	6.00	0.90	0.95	23.27	25.11
18	2019	0.00	6.22	6.22	0.91	0.95	24.45	26.31
19	2020	0.00	6.46	6.46	0.92	0.96	25.70	27.58
20	2021		6.46	6.46	0.05	0.96	25.70	26.70
21	2022		6.46	6.46	0.05	0.96	25.70	26.70
22	2023		6.46	6.46	0.05	0.96	25.70	26.70
23	2024		6.46	6.46	0.05	0.96	25.70	26.70
24	2025		6.46	6.46	0.05	0.96	25.70	26.70
25	2026		6.46	6.46	0.05	0.96	25.70	26.70
26	2027		6.46	6.46	0.05	0.96	25.70	26.70
27	2028		6.46	6.46	0.05	0.96	25.70	26.70
28	2029		6.46	6.46	0.05	0.96	25.70	26.70
29	2030		6.46	6.46	0.05	0.96	25.70	26.70
30	2031		6.46	6.46	0.05	0.96	25.70	26.70
31	2032		6.46	6.46	0.05	0.96	25.70	26.70
32	2033		6.46	6.46	0.05	0.96	25.70	26.70
33	2034		6.46	6.46	0.05	0.96	25.70	26.70
34	2035		6.46	6.46	0.05	0.96	25.70	26.70
35	2036		6.46	6.46	0.05	0.96	25.70	26.70
36	2037		6.46	6.46	0.05	0.96	25.70	26.70
37	2038		6.46	6.46	0.05	0.96	25.70	26.70
38	2039		6.46	6.46	0.05	0.96	25.70	26.70
39	2040		6.46	6.46	0.05	0.96	25.70	26.70
40	2041		6.46	6.46	0.05	0.96	25.70	26.70
41	2042		6.46	6.46	0.05	0.96	25.70	26.70
42	2043		6.46	6.46	0.05	0.96	25.70	26.70
43	2044		6.46	6.46	0.05	0.96	25.70	26.70
44	2035		6.46	6.46	0.05	0.96	25.70	26.70

Evaluation Indices
 NPV: -5 Million R\$ *1
 B/C: 0.94 *1
 EIRR: 11.2%

Note: *1 Discounted at 12%

Table H3-13 Economic Cost and Benefit Stream for Sewerage Projects in Timbo River Basin

(Unit: R\$ Million)

Year	Cost			Benefit			Total	Balance
	Capital Investment	O&M	Total	Treatment Saving	Medical Issues	Tourism Recession		
1	2002	0.00		0.00			0.00	0.00
2	2003	7.19					0.00	-7.19
3	2004	7.19	0.00	7.19	0.00	0.00	0.00	-7.19
4	2005	11.50	0.00	11.50	0.00	0.00	0.00	-11.50
5	2006	11.50	0.16	11.66	0.08	0.05	0.96	-10.57
6	2007	13.39	0.52	13.91	0.58	0.15	3.10	-10.07
7	2008	13.39	1.03	14.42	1.61	0.29	6.12	-6.40
8	2009	13.39	1.71	15.10	2.76	0.45	10.19	-1.71
9	2010	7.19	2.81	10.00	4.02	0.68	16.69	11.39
10	2011	0.00	3.27	3.27	0.68	0.74	18.91	17.06
11	2012	0.83	3.54	4.37	0.70	0.75	19.87	16.95
12	2013	0.00	3.88	3.88	0.73	0.77	21.19	18.80
13	2014	0.00	4.19	4.19	0.74	0.77	22.27	19.59
14	2015	0.00	4.53	4.53	0.76	0.78	23.40	20.42
15	2016	0.00	4.89	4.89	0.78	0.79	24.60	21.27
16	2017	0.00	5.29	5.29	0.79	0.79	25.85	22.16
17	2018	0.00	5.71	5.71	0.81	0.80	27.17	23.07
18	2019	0.00	6.17	6.17	0.83	0.81	28.56	24.03
19	2020	0.00	6.67	6.67	0.85	0.82	30.02	25.01
20	2021		6.67	6.67	0.04	0.82	30.02	24.21
21	2022		6.67	6.67	0.04	0.82	30.02	24.21
22	2023		6.67	6.67	0.04	0.82	30.02	24.21
23	2024		6.67	6.67	0.04	0.82	30.02	24.21
24	2025		6.67	6.67	0.04	0.82	30.02	24.21
25	2026		6.67	6.67	0.04	0.82	30.02	24.21
26	2027		6.67	6.67	0.04	0.82	30.02	24.21
27	2028		6.67	6.67	0.04	0.82	30.02	24.21
28	2029		6.67	6.67	0.04	0.82	30.02	24.21
29	2030		6.67	6.67	0.04	0.82	30.02	24.21
30	2031		6.67	6.67	0.04	0.82	30.02	24.21
31	2032		6.67	6.67	0.04	0.82	30.02	24.21
32	2033		6.67	6.67	0.04	0.82	30.02	24.21
33	2034		6.67	6.67	0.04	0.82	30.02	24.21
34	2035		6.67	6.67	0.04	0.82	30.02	24.21
35	2036		6.67	6.67	0.04	0.82	30.02	24.21
36	2037		6.67	6.67	0.04	0.82	30.02	24.21
37	2038		6.67	6.67	0.04	0.82	30.02	24.21
38	2039		6.67	6.67	0.04	0.82	30.02	24.21
39	2040		6.67	6.67	0.04	0.82	30.02	24.21
40	2041		6.67	6.67	0.04	0.82	30.02	24.21
41	2042		6.67	6.67	0.04	0.82	30.02	24.21
42	2043		6.67	6.67	0.04	0.82	30.02	24.21
43	2044		6.67	6.67	0.04	0.82	30.02	24.21
44	2045		6.67	6.67	0.04	0.82	30.02	24.21
Evaluation Indices		NPV:	34 Million R\$ *1					
		B/C:	1.54 *1					
		EIRR:	18.7%					

Note: *1 Discounted at 12%

Table H3-14 Economic Cost and Benefit Stream for Sewerage Projects in Other River Basins

(Unit: R\$ Million)

Year	Cost			Benefit			Total	Balance
	Capital Investment	O&M	Total	Treatment Saving	Medical Issues	Tourism Recession		
1	2002	0.00		0.00			0.00	0.00
2	2003	0.00		0.00			0.00	0.00
3	2004	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	2005	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	2006	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	2007	9.96	0.00	9.96	0.00	0.00	0.00	-9.96
7	2008	9.96	0.00	9.96	0.00	0.00	0.00	-9.96
8	2009	9.96	0.00	9.96	0.00	0.00	0.00	-9.96
9	2010	5.42	1.07	6.48	0.37	0.24	1.25	-4.62
10	2011	0.00	1.37	1.37	0.54	0.32	1.66	1.15
11	2012	4.02	1.39	5.40	0.57	0.32	1.75	-2.77
12	2013	1.34	1.80	3.14	0.77	0.42	2.36	0.41
13	2014	2.92	1.83	4.74	0.81	0.43	2.48	-1.02
14	2015	2.65	2.15	4.80	0.99	0.51	3.03	-0.27
15	2016	3.93	2.58	6.51	1.24	0.61	3.77	-0.88
16	2017	5.98	2.61	8.59	1.31	0.62	3.96	-2.69
17	2018	5.49	2.87	8.36	1.51	0.69	4.52	-1.64
18	2019	2.88	3.23	6.11	1.77	0.78	5.28	1.73
19	2020	0.82	3.47	4.30	1.99	0.84	5.90	4.43
20	2021		3.47	3.47	0.10	0.84	5.98	3.45
21	2022		3.47	3.47	0.10	0.84	5.98	3.45
22	2023		3.47	3.47	0.10	0.84	5.98	3.45
23	2024		3.47	3.47	0.10	0.84	5.98	3.45
24	2025		3.47	3.47	0.10	0.84	5.98	3.45
25	2026		3.47	3.47	0.10	0.84	5.98	3.45
26	2027		3.47	3.47	0.10	0.84	5.98	3.45
27	2028		3.47	3.47	0.10	0.84	5.98	3.45
28	2029		3.47	3.47	0.10	0.84	5.98	3.45
29	2030		3.47	3.47	0.10	0.84	5.98	3.45
30	2031		3.47	3.47	0.10	0.84	5.98	3.45
31	2032		3.47	3.47	0.10	0.84	5.98	3.45
32	2033		3.47	3.47	0.10	0.84	5.98	3.45
33	2034		3.47	3.47	0.10	0.84	5.98	3.45
34	2035		3.47	3.47	0.10	0.84	5.98	3.45
35	2036		3.47	3.47	0.10	0.84	5.98	3.45
36	2037		3.47	3.47	0.10	0.84	5.98	3.45
37	2038		3.47	3.47	0.10	0.84	5.98	3.45
38	2039		3.47	3.47	0.10	0.84	5.98	3.45
39	2040		3.47	3.47	0.10	0.84	5.98	3.45
40	2041		3.47	3.47	0.10	0.84	5.98	3.45
41	2042		3.47	3.47	0.10	0.84	5.98	3.45
42	2043		3.47	3.47	0.10	0.84	5.98	3.45
43	2044		3.47	3.47	0.10	0.84	5.98	3.45
44	2045		3.47	3.47	0.10	0.84	5.98	3.45

Evaluation Indices
 NPV: -13 Million R\$ *1
 B/C: 0.56 *1
 EIRR: 3.7%

Note: *1 Discounted at 12%

Table H5-1 Project Evaluation by River Basin

River Basin	Pollution Load (BOD kg/day)	Basic Conditions				Urgency		Technical Evaluation		Economic Evaluation		Financial Evaluation		Social Environmental Impact		Evaluation as a whole	
	Percentage (%) of the total load	Area (ha)	Population In 2020	Reduction of Pollution Load (BOD kg/day) by Master Plan	Construction cost (1000 R\$)	Based on the total pollution loads in the basin		Based on the reduced amount of BOD kg/day and		Based on the value of EIRR for the river basin		Based on the value of FIRR for the river basin		Based on Served population (Served population in poverty area)			
Capibaribe	43,839 (22.2 %)	9,265	790,709	41,815	161,999	Very large	A	Very large	A	14.4%	A	6.9%	A	757,620 (185,568)	A	Very effective	A
Beberibe	34,209 (17.4 %)	4,586	640,041	29,814	94,099	Large	B +	Large	B +	18.9%	A	7.4%	A	622,150 (332,152)	A	Very Effective	A
Jaboatão	35,139 (17.8 %)	5,445	650,726	35,139	149,743	Very large	A	Very large	A	13.0%	A	4.7%	B	650,726 (187,095)	A	Very effective	A
Tejipio	30,366 (15.4 %)	4,629	561,128	29,366	104,871	Large	B	Large	B	11.2%	B	5.8%	A	542,596 (179,475)	A	Effective	B +
Timbo	25,874 (13.1 %)	5,077	478,766	24,088	71,209	Large	B	Large	B	18.7%	A	8.3%	A	445,679 (Non)	C	Effective	B
Other six river basins	27,681 (14.0 %)	7,423	51,259	14,786	53,599	Less	C	Small	C	3.7%	C	7.2%	A	273,831 (902)	C	Less effective	C
Whole Basins (M/P)	197,108 (100 %)	36,425	3,633,960	178,438	634,520	Very large	A	Very large	A	14.4%	A	6.1%	A	3,292,602 (885,192)	A	Very effective	A

	A	B	C
Technical evaluation	Above 10,000kg/day	10,000~5,000 kg/day	Below 5,000 kg/
Economic evaluation	Above 12%	12% - 10%	Below 10%
Financial evaluation	Above 5%	5% - 2%	Below 2%
Social environmental evaluation	Very high	High	Low

Table H6-1 Financial Expenditure and Revenue Stream of Conceição System

(Unit: R\$1000)

Year	Expenditure			Revenue	Balance	
	Capital Investment	O&M	Total			
1	2002	3,342	0	3,342	0	-3,342
2	2003	2,293	0	2,293	0	-2,293
3	2004	4,501	0	4,501	0	-4,501
4	2005	8,168	0	8,168	0	-8,168
5	2006	6,617	0	6,617	0	-6,617
6	2007		969	969	595	-374
7	2008		969	969	1,210	241
8	2009		969	969	1,846	877
9	2010		969	969	2,502	1,533
10	2011		969	969	2,539	1,570
11	2012		969	969	2,577	1,608
12	2013		969	969	2,615	1,646
13	2014		969	969	2,653	1,684
14	2015		969	969	2,693	1,724
15	2016		969	969	2,732	1,763
16	2017		969	969	2,773	1,804
17	2018		969	969	2,814	1,845
18	2019		969	969	2,855	1,886
19	2020		969	969	2,897	1,928
20	2021		969	969	2,897	1,928
21	2022		969	969	2,897	1,928
22	2023		969	969	2,897	1,928
23	2024		969	969	2,897	1,928
24	2025		969	969	2,897	1,928
25	2026		969	969	2,897	1,928
26	2027		969	969	2,897	1,928
27	2028		969	969	2,897	1,928
28	2029		969	969	2,897	1,928
29	2030		969	969	2,897	1,928
30	2031		969	969	2,897	1,928

Evaluation Indices

NPV: -11,322 Million R\$ *1

B/C: 0.47 *1

FIRR: 3.2%

Note: *1 Discounted at 12%

Table H6-2 Financial Expenditure and Revenue Stream of Janga System

(Unit: R\$1000)

Year	Expenditure			Revenue	Balance	
	Capital Investment	O&M	Total			
1	2002	5,397	0	5,397	0	-5,397
2	2003	1,845	0	1,845	0	-1,845
3	2004	10,837	0	10,837	0	-10,837
4	2005	19,374	0	19,374	0	-19,374
5	2006	19,374	0	19,374	0	-19,374
6	2007	14,963	0	14,963	0	-14,963
7	2008		3,271	3,271	7,485	4,214
8	2009		3,271	3,271	10,599	7,328
9	2010		3,271	3,271	13,688	10,417
10	2011		3,271	3,271	13,801	10,530
11	2012		3,271	3,271	13,915	10,644
12	2013		3,271	3,271	14,030	10,759
13	2014		3,271	3,271	14,146	10,875
14	2015		3,271	3,271	14,263	10,992
15	2016		3,271	3,271	14,381	11,110
16	2017		3,271	3,271	14,500	11,229
17	2018		3,271	3,271	14,620	11,349
18	2019		3,271	3,271	14,741	11,470
19	2020		3,271	3,271	14,863	11,592
20	2021		3,271	3,271	14,863	11,592
21	2022		3,271	3,271	14,863	11,592
22	2023		3,271	3,271	14,863	11,592
23	2024		3,271	3,271	14,863	11,592
24	2025		3,271	3,271	14,863	11,592
25	2026		3,271	3,271	14,863	11,592
26	2027		3,271	3,271	14,863	11,592
27	2028		3,271	3,271	14,863	11,592
28	2029		3,271	3,271	14,863	11,592
29	2030		3,271	3,271	14,863	11,592
30	2031		3,271	3,271	14,863	11,592
31	2032		3,271	3,271	14,863	11,592

Evaluation Indices

NPV: -5,625 Million R\$ *1
 B/C: 0.90 *1
 FIRR: 10.6%

Note: *1 Discounted at 12%

Table H6-3 Financial Expenditure and Revenue Stream of Cabanga System

(Unit: R\$1000)

Year	Expenditure			Revenue	Balance	
	Capital Investment	O&M	Total			
1	2002	4,147	0	4,147	0	-4,147
2	2003	1,564	0	1,564	0	-1,564
3	2004	9,029	0	9,029	0	-9,029
4	2005	9,029	0	9,029	0	-9,029
5	2006	16,387	0	16,387	0	-16,387
6	2007	12,683	0	12,683	0	-12,683
7	2008		2,387	2,387	9,598	7,211
8	2009		2,387	2,387	11,599	9,212
9	2010		2,387	2,387	13,596	11,209
10	2011		2,387	2,387	13,641	11,254
11	2012		2,387	2,387	13,686	11,299
12	2013		2,387	2,387	13,732	11,345
13	2014		2,387	2,387	13,778	11,391
14	2015		2,387	2,387	13,824	11,437
15	2016		2,387	2,387	13,870	11,483
16	2017		2,387	2,387	13,916	11,529
17	2018		2,387	2,387	13,962	11,575
18	2019		2,387	2,387	14,009	11,622
19	2020		2,387	2,387	14,055	11,668
20	2021		2,387	2,387	14,055	11,668
21	2022		2,387	2,387	14,055	11,668
22	2023		2,387	2,387	14,055	11,668
23	2024		2,387	2,387	14,055	11,668
24	2025		2,387	2,387	14,055	11,668
25	2026		2,387	2,387	14,055	11,668
26	2027		2,387	2,387	14,055	11,668
27	2028		2,387	2,387	14,055	11,668
28	2029		2,387	2,387	14,055	11,668
29	2030		2,387	2,387	14,055	11,668
30	2031		2,387	2,387	14,055	11,668
31	2032		2,387	2,387	14,055	11,668

Evaluation Indices

NPV: 9,842 Million R\$ *1

B/C: 1.23 *1

FIRR: 15.0%

Note: *1 Discounted at 12%

Table H6-4 Financial Expenditure and Revenue Stream of Boa Viagem System

(Unit: R\$1000)

Year	Expenditure			Revenue	Balance	
	Capital Investment	O&M	Total			
1	2002	14,868	0	14,868	0	-14,868
2	2003	13,055	0	13,055	0	-13,055
3	2004	5,532	0	5,532	0	-5,532
4	2005	9,890	0	9,890	0	-9,890
5	2006	9,890	0	9,890	0	-9,890
6	2007	7,924	0	7,924	0	-7,924
7	2008		1,671	1,671	2,094	423
8	2009		1,671	1,671	4,216	2,545
9	2010		1,671	1,671	6,365	4,694
10	2011		1,671	1,671	6,399	4,728
11	2012		1,671	1,671	6,433	4,762
12	2013		1,671	1,671	6,467	4,796
13	2014		1,671	1,671	6,501	4,830
14	2015		1,671	1,671	6,536	4,865
15	2016		1,671	1,671	6,571	4,900
16	2017		1,671	1,671	6,606	4,935
17	2018		1,671	1,671	6,641	4,970
18	2019		1,671	1,671	6,677	5,006
19	2020		1,671	1,671	6,712	5,041
20	2021		1,671	1,671	6,712	5,041
21	2022		1,671	1,671	6,712	5,041
22	2023		1,671	1,671	6,712	5,041
23	2024		1,671	1,671	6,712	5,041
24	2025		1,671	1,671	6,712	5,041
25	2026		1,671	1,671	6,712	5,041
26	2027		1,671	1,671	6,712	5,041
27	2028		1,671	1,671	6,712	5,041
28	2029		1,671	1,671	6,712	5,041
29	2030		1,671	1,671	6,712	5,041
30	2031		1,671	1,671	6,712	5,041
31	2032		1,671	1,671	6,712	5,041

Evaluation Indices

NPV: -27,111 Million R\$ *1
 B/C: 0.46 *1
 FIRR: 4.2%

Note: *1 Discounted at 12%

Table H6-5 Financial Expenditure and Revenue Stream of Cordeiro System

(Unit: R\$1000)

Year	Expenditure			Revenue	Balance	
	Capital Investment	O&M	Total			
1	2002	2,898	0	2,898	0	-2,898
2	2003	1,546	0	1,546	0	-1,546
3	2004	5,803	0	5,803	0	-5,803
4	2005	10,531	0	10,531	0	-10,531
5	2006	8,343	0	8,343	0	-8,343
6	2007		1,249	1,249	1,075	-174
7	2008		1,249	1,249	2,162	913
8	2009		1,249	1,249	3,260	2,011
9	2010		1,249	1,249	4,370	3,121
10	2011		1,249	1,249	4,385	3,136
11	2012		1,249	1,249	4,400	3,151
12	2013		1,249	1,249	4,416	3,167
13	2014		1,249	1,249	4,431	3,182
14	2015		1,249	1,249	4,446	3,197
15	2016		1,249	1,249	4,462	3,213
16	2017		1,249	1,249	4,477	3,228
17	2018		1,249	1,249	4,493	3,244
18	2019		1,249	1,249	4,508	3,259
19	2020		1,249	1,249	4,524	3,275
20	2021		1,249	1,249	4,524	3,275
21	2022		1,249	1,249	4,524	3,275
22	2023		1,249	1,249	4,524	3,275
23	2024		1,249	1,249	4,524	3,275
24	2025		1,249	1,249	4,524	3,275
25	2026		1,249	1,249	4,524	3,275
26	2027		1,249	1,249	4,524	3,275
27	2028		1,249	1,249	4,524	3,275
28	2029		1,249	1,249	4,524	3,275
29	2030		1,249	1,249	4,524	3,275
30	2031		1,249	1,249	4,524	3,275

Evaluation Indices

NPV: -8,353 Million R\$ *1

B/C: 0.66 *1

FIRR: 6.8%

Note: *1 Discounted at 12%

Table H6-6 Financial Expenditure and Revenue Stream of Prazeres System

(Unit: R\$1000)

Year	Expenditure			Revenue	Balance	
	Capital Investment	O&M	Total			
1	2002	10,941	0	10,941	0	-10,941
2	2003	8,666	0	8,666	0	-8,666
3	2004	6,941	0	6,941	0	-6,941
4	2005	12,410	0	12,410	0	-12,410
5	2006	12,410	0	12,410	0	-12,410
6	2007	9,778	0	9,778	0	-9,778
7	2008		2,103	2,103	2,316	213
8	2009		2,103	2,103	4,694	2,591
9	2010		2,103	2,103	7,135	5,032
10	2011		2,103	2,103	7,212	5,109
11	2012		2,103	2,103	7,289	5,186
12	2013		2,103	2,103	7,368	5,265
13	2014		2,103	2,103	7,447	5,344
14	2015		2,103	2,103	7,527	5,424
15	2016		2,103	2,103	7,607	5,504
16	2017		2,103	2,103	7,689	5,586
17	2018		2,103	2,103	7,772	5,669
18	2019		2,103	2,103	7,855	5,752
19	2020		2,103	2,103	7,939	5,836
20	2021		2,103	2,103	7,939	5,836
21	2022		2,103	2,103	7,939	5,836
22	2023		2,103	2,103	7,939	5,836
23	2024		2,103	2,103	7,939	5,836
24	2025		2,103	2,103	7,939	5,836
25	2026		2,103	2,103	7,939	5,836
26	2027		2,103	2,103	7,939	5,836
27	2028		2,103	2,103	7,939	5,836
28	2029		2,103	2,103	7,939	5,836
29	2030		2,103	2,103	7,939	5,836
30	2031		2,103	2,103	7,939	5,836
31	2032		2,103	2,103	7,939	5,836

Evaluation Indices

NPV: -23,356 Million R\$ *1
 B/C: 0.53 *1
 FIRR: 5.2%

Note: *1 Discounted at 12%

Table H6-7 Financial Expenditure and Revenue Stream of Curcurana System

(Unit: R\$1000)

Year	Expenditure			Revenue	Balance	
	Capital Investment	O&M	Total			
1	2002	3,280	0	3,280	0	-3,280
2	2003	1,566	0	1,566	0	-1,566
3	2004	7,353	0	7,353	0	-7,353
4	2005	13,345	0	13,345	0	-13,345
5	2006	10,399	0	10,399	0	-10,399
6	2007		1,584	1,584	1,293	-291
7	2008		1,584	1,584	2,621	1,037
8	2009		1,584	1,584	3,985	2,401
9	2010		1,584	1,584	5,384	3,800
10	2011		1,584	1,584	5,449	3,865
11	2012		1,584	1,584	5,514	3,930
12	2013		1,584	1,584	5,580	3,996
13	2014		1,584	1,584	5,647	4,063
14	2015		1,584	1,584	5,715	4,131
15	2016		1,584	1,584	5,783	4,199
16	2017		1,584	1,584	5,853	4,269
17	2018		1,584	1,584	5,923	4,339
18	2019		1,584	1,584	5,994	4,410
19	2020		1,584	1,584	6,066	4,482
20	2021		1,584	1,584	6,066	4,482
21	2022		1,584	1,584	6,066	4,482
22	2023		1,584	1,584	6,066	4,482
23	2024		1,584	1,584	6,066	4,482
24	2025		1,584	1,584	6,066	4,482
25	2026		1,584	1,584	6,066	4,482
26	2027		1,584	1,584	6,066	4,482
27	2028		1,584	1,584	6,066	4,482
28	2029		1,584	1,584	6,066	4,482
29	2030		1,584	1,584	6,066	4,482
30	2031		1,584	1,584	6,066	4,482

Evaluation Indices

NPV: -9,675 Million R\$ *1
 B/C: 0.69 *1
 FIRR: 7.3%

Note: *1 Discounted at 12%

Table H6-8 Financial Expenditure and Revenue Stream for 7 Systems Proposed

(Unit: R\$1000)

Year	Expenditure			Revenue	Balance	
	Capital Investment	O&M	Total			
1	2002	44,873	0	44,873	0	-44,873
2	2003	30,536	0	30,536	0	-30,536
3	2004	49,996	0	49,996	0	-49,996
4	2005	82,747	0	82,747	0	-82,747
5	2006	83,420	0	83,420	0	-83,420
6	2007	45,348	3,802	49,150	2,964	-46,187
7	2008		13,234	13,234	27,487	14,253
8	2009		13,234	13,234	40,198	26,964
9	2010		13,234	13,234	53,040	39,806
10	2011		13,234	13,234	53,425	40,191
11	2012		13,234	13,234	53,814	40,580
12	2013		13,234	13,234	54,207	40,973
13	2014		13,234	13,234	54,603	41,369
14	2015		13,234	13,234	55,003	41,769
15	2016		13,234	13,234	55,406	42,172
16	2017		13,234	13,234	55,813	42,579
17	2018		13,234	13,234	56,224	42,990
18	2019		13,234	13,234	56,639	43,405
19	2020		13,234	13,234	57,057	43,823
20	2021		13,234	13,234	57,057	43,823
21	2022		13,234	13,234	57,057	43,823
22	2023		13,234	13,234	57,057	43,823
23	2024		13,234	13,234	57,057	43,823
24	2025		13,234	13,234	57,057	43,823
25	2026		13,234	13,234	57,057	43,823
26	2027		13,234	13,234	57,057	43,823
27	2028		13,234	13,234	57,057	43,823
28	2029		13,234	13,234	57,057	43,823
29	2030		13,234	13,234	57,057	43,823
30	2031		13,234	13,234	57,057	43,823
31	2032		13,234	13,234	57,057	43,823

Evaluation Indices

NPV: -75,312 Million R\$ *1
 B/C: 0.73 *1
 FIRR: 8.2%

Note: *1 Discounted at 12%

**Table H6-9 Financial Expenditure and Revenue Stream for 7 Systems Proposed
Case 1: Increasing Tariffs by 36%**

(Unit: R\$1000)

Year	Expenditure			Revenue	Balance	
	Capital Investment	O&M	Total			
1	2002	44,873	0	44,873	0	-44,873
2	2003	30,536	0	30,536	0	-30,536
3	2004	49,996	0	49,996	0	-49,996
4	2005	82,747	0	82,747	0	-82,747
5	2006	83,420	0	83,420	0	-83,420
6	2007	45,348	3,802	49,150	4,060	-45,090
7	2008		13,234	13,234	37,657	24,423
8	2009		13,234	13,234	55,072	41,838
9	2010		13,234	13,234	72,664	59,430
10	2011		13,234	13,234	73,193	59,959
11	2012		13,234	13,234	73,726	60,492
12	2013		13,234	13,234	74,264	61,030
13	2014		13,234	13,234	74,807	61,573
14	2015		13,234	13,234	75,354	62,120
15	2016		13,234	13,234	75,907	62,673
16	2017		13,234	13,234	76,464	63,230
17	2018		13,234	13,234	77,027	63,793
18	2019		13,234	13,234	77,595	64,361
19	2020		13,234	13,234	78,168	64,934
20	2021		13,234	13,234	78,168	64,934
21	2022		13,234	13,234	78,168	64,934
22	2023		13,234	13,234	78,168	64,934
23	2024		13,234	13,234	78,168	64,934
24	2025		13,234	13,234	78,168	64,934
25	2026		13,234	13,234	78,168	64,934
26	2027		13,234	13,234	78,168	64,934
27	2028		13,234	13,234	78,168	64,934
28	2029		13,234	13,234	78,168	64,934
29	2030		13,234	13,234	78,168	64,934
30	2031		13,234	13,234	78,168	64,934
31	2032		13,234	13,234	78,168	64,934

Evaluation Indices

NPV: -537 Million R\$ *1
B/C: 1.00 *1
FIRR: 12.0%

Note: *1 Discounted at 12%

*2 Unit rate of sewage treatment services is raised by approximately 37%

**Table H6-10 Financial Expenditure and Revenue Stream for 7 Systems Proposed
Case 2: 33% of Investment Cost Subsidized**

(Unit: R\$1000)

Year	Expenditure			Revenue	Balance	
	Capital Investment	O&M	Total			
1	2002	29,616	0	29,616	0	-29,616
2	2003	20,154	0	20,154	0	-20,154
3	2004	32,998	0	32,998	0	-32,998
4	2005	54,613	0	54,613	0	-54,613
5	2006	55,057	0	55,057	0	-55,057
6	2007	29,930	3,802	33,732	2,964	-30,768
7	2008		13,234	13,234	27,487	14,253
8	2009		13,234	13,234	40,198	26,964
9	2010		13,234	13,234	53,040	39,806
10	2011		13,234	13,234	53,425	40,191
11	2012		13,234	13,234	53,814	40,580
12	2013		13,234	13,234	54,207	40,973
13	2014		13,234	13,234	54,603	41,369
14	2015		13,234	13,234	55,003	41,769
15	2016		13,234	13,234	55,406	42,172
16	2017		13,234	13,234	55,813	42,579
17	2018		13,234	13,234	56,224	42,990
18	2019		13,234	13,234	56,639	43,405
19	2020		13,234	13,234	57,057	43,823
20	2021		13,234	13,234	57,057	43,823
21	2022		13,234	13,234	57,057	43,823
22	2023		13,234	13,234	57,057	43,823
23	2024		13,234	13,234	57,057	43,823
24	2025		13,234	13,234	57,057	43,823
25	2026		13,234	13,234	57,057	43,823
26	2027		13,234	13,234	57,057	43,823
27	2028		13,234	13,234	57,057	43,823
28	2029		13,234	13,234	57,057	43,823
29	2030		13,234	13,234	57,057	43,823
30	2031		13,234	13,234	57,057	43,823
31	2032		13,234	13,234	57,057	43,823

Evaluation Indices

NPV: 472 Million R\$ *1
 B/C: 1.00 *1
 FIRR: 12.0%

Note: *1 Discounted at 12%

*2 Approximately 34% of capital investment cost is subsidized.

Table H6-11 Profit and Loss Table of COMPESA: 1995 to 1999

Item	(Unit: R\$ Million)				
	1995	1996	1997	1998	1999
1. Operating Revenue	155.5	207.8	254.1	242.9	183.0
(1) Water Supply Services	-	169.0	209.4	198.9	143.6
(2) Sewage Sanitation Services	-	38.8	44.7	44.0	39.3
2. Expenses of Direct Divisional Costs	107.4	137.1	148.4	190.7	178.0
(1) Expenses of O&M	107.4	137.1	148.4	190.7	178.0
1) Staff	48.1	56.7	56.6	73.9	81.1
2) Material	10.8	14.6	13.3	19.2	10.1
3) Outsourcing Work	38.9	54.6	67.4	83.0	73.6
4) General	0.8	1.2	1.0	1.2	0.8
5) Depreciation, Provisions and Amortization	8.7	9.9	10.0	13.3	12.4
3. Gross Balance	48.1	70.7	105.7	52.3	5.0
4. Expenses of Indirect Divisional Costs	41.7	74.5	109.1	83.6	77.1
(1) Expenses of Commercial Dept.	6.3	12.4	28.3	19.2	11.1
1) Staff	2.9	8.6	10.3	5.0	5.7
2) Material	0.0	0.0	0.1	0.1	0.1
3) Outsourcing Work	0.5	0.4	0.6	0.9	3.9
4) General	2.0	3.1	3.2	3.4	0.8
5) Depreciation, Provisions and Amortization	0.9	0.4	14.2	9.7	0.7
(2) Expenses of Administrative Dept.	31.8	36.0	43.1	32.6	20.8
1) Staff	22.7	26.6	32.6	19.3	15.6
2) Material	0.6	0.0	0.8	0.6	0.4
3) Outsourcing Work	5.4	5.5	6.1	8.9	1.7
4) General	0.5	1.1	0.9	1.1	0.3
5) Depreciation, Provisions and Amortization	2.6	2.9	2.6	2.6	2.7
(3) Expenses of Taxes	0.3	0.8	1.0	9.3	7.0
(4) Financial Charges	3.3	25.3	36.6	22.6	38.2
4. Operating Balance	6.4	-3.8	-3.4	-31.4	-72.1
5. Non-operational Balance	16.3	2.7	4.4	4.4	-4.2
(1) Non-operation Revenue	20.0	10.8	15.0	16.7	9.1
1) Financial Revenue	16.7	0.4	0.3	0.2	0.3
2) Other Revenues	3.4	10.4	14.7	16.5	8.8
(2) Non-Operational Expenditure	3.8	8.1	10.6	12.3	13.0
6. Current Balance	22.7	-1.1	1.0	-27.0	-76.2
7. Reconciliation	-8.5	-	-	-	-
8. Net Profit(Loss) of Period	14.1	-1.1	1.0	-27.0	-76.2

Source: (1) PQA, Documento Estrategico de Investimentos, 1999, SEPLANDES
 (2) Balance Patrimonial em 31 de dezembro e 30 de novembro de 1998
 (3) Balance Patrimonial em 31 de dezembro e 30 de novembro de 1999

Table H6-12 Balance Sheet of COMPESA: 1995-1999

Item	(Unit: R\$ Million)				
	1995	1996	1997	1998	1999
I. Assets	641.50	698.45	744.56	841.26	871.40
1. Current Assets	68.77	104.08	126.62	152.55	160.62
(1) Liquid Account	4.24	5.54	6.36	3.77	4.35
1) Cash	0.82	0.62	1.10	0.95	0.61
2) Saving Deposit	0.76	1.71	3.35	1.09	0.69
3) Linked Bank Deposit	2.44	1.69	1.84	1.71	1.25
4) Term Deposit	0.22	1.52	0.07	0.01	1.80
(2) Other Short-term Assets	64.31	98.28	119.96	148.44	155.87
1) Sales Receivable	55.26	87.18	107.70	124.41	136.20
2) Credits Receivable	3.05	5.42	6.95	9.55	10.76
3) Prepaid Accounts	1.72	1.53	-	8.82	0.16
4) Stock for Maintenance	3.38	3.77	4.80	5.30	4.64
5) Prepaid Expenses	0.90	0.39	0.50	0.36	4.11
(3) Other Accounts	0.22	0.26	0.30	0.34	0.40
2. Fixed Assets	572.73	594.37	617.94	688.71	710.78
(1) Investment	0.42	0.43	0.43	3.64	3.64
(2) Physical Fixed Assets	353.28	345.24	336.93	514.85	520.01
1) Water Supply Facilities	318.87	320.55	322.16	499.57	516.12
2) Sewerage Facilities	147.08	147.10	147.16	159.42	162.63
3) General Properties	46.09	47.55	49.48	53.13	54.08
4) Depreciation	158.77	169.95	181.86	197.26	212.83
(3) Works in Progress	213.22	244.51	278.28	169.83	187.07
1) Water Supply Facilities	196.51	222.34	251.10	147.08	163.70
2) Sewerage Facilities	15.14	20.38	25.32	22.24	22.85
3) General Properties	1.56	1.79	1.86	0.51	0.51
(4) Deferred Assets	5.82	4.19	2.30	0.38	0.07
1) Amortizable Expenses	10.03	10.04	9.80	9.95	9.95
2) Accumulated Amortizations	4.21	5.84	7.50	9.57	9.88
II. Liability and Capital	641.50	698.45	744.66	841.26	871.43
1. Short-term Liability	50.34	77.74	91.43	158.57	338.97
(1) Accounts Payable	24.15	56.65	67.89	136.89	307.40
(2) Provisions	23.95	20.91	22.91	17.30	23.85
(3) Interest Payable	0.00	0.00	0.00	1.25	1.08
(4) Loan Amortizations	2.15	0.06	0.07	0.13	2.35
(5) Other Liabilities	0.09	0.12	0.57	3.00	4.28
2. Long-term Debt	393.51	212.20	229.89	221.06	146.71
(1) Accounts Payable (Electricity Charges)	102.58	136.00	152.15	156.94	22.78
(2) Credits for Capital Increase	270.53	75.14	73.98	26.47	78.21
(3) Provisions	18.98	-	-	-	-
(4) Outstandings of Loans	1.43	1.07	3.75	37.65	45.71
1) Internal Loans	3.58	1.07	3.82	-	-
2) Repayment of Loan	2.15	-	0.07	-	-
3. Capital	197.65	408.51	423.34	461.63	385.75
(1) Capital Stock	348.49	636.08	652.65	716.16	719.04
1) Capital Underwritten	348.49	636.08	652.65	716.16	719.04
(2) Capital Reserves	79.47	3.85	1.10	2.87	0.36
(3) Surplus/Loss Accumulated	-230.31	-231.41	-230.41	-257.40	-333.64

Source: (1) PQA, Documento Estrategico de Investimentos, Sept. 1999, SEPLANDES
(2) Balance Patrimonial em 31 de dezembro e 30 de novembro de 1998
(3) Balance Patrimonial em 31 de dezembro e 30 de novembro de 1999

Table H6-13 Profit and Loss Tables: 2002-2032 (1/3)

(Unit: US\$ 1000)

Item	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Revenues											
1 Sewage Service Charge	0	0	0	0	0	2,964	27,487	40,198	53,040	53,425	53,814
2 Less: Discounts	-	-	-	-	-	-	-	-	-	-	-
3 Interest on Deposits	-	-	-	-	-	-	-	-	-	-	-
4 Penalties & Fines	-	-	-	-	-	-	-	-	-	-	-
5 Gross Revenue	0	0	0	0	0	2,964	27,487	40,198	53,040	53,425	53,814
Operating Expenses											
Water Supply & Distribution											
6 Personnel Cost	0	0	0	0	0	3,193	10,184	10,184	10,184	10,184	10,184
7 Electric Power Cost	0	0	0	0	0	293	1,785	1,785	1,785	1,785	1,785
8 Chemical Material Cost	0	0	0	0	0	74	381	381	381	381	381
9 Sub-total of O/M Costs	0	0	0	0	0	3,560	12,350	12,350	12,350	12,350	12,350
10 Repairing Cost	0	0	0	0	0	242	884	884	884	884	884
11 Corporate Social Contribution (Taxes)	0	0	0	0	0	108	1,003	1,467	1,936	1,950	1,964
12 Total of Operating Expenses	0	0	0	0	0	3,910	14,237	14,701	15,170	15,184	15,198
13 Net Operating Profit	0	0	0	0	0	-947	13,249	25,497	37,870	38,241	38,616
14 Depreciation	0	0	0	0	0	0	3,464	11,987	11,987	11,987	11,987
15 Interest	0	2,073	3,484	5,794	9,617	13,471	15,566	14,368	13,171	11,974	10,776
16 Subtotal	0	2,073	3,484	5,794	9,617	13,471	19,030	26,355	25,158	23,960	22,763
17 Income before Taxes	0	-2,073	-3,484	-5,794	-9,617	-14,417	-5,781	-858	12,712	14,281	15,853
18 Income Taxes	0	0	0	0	0	0	0	0	3,025	3,399	3,773
19 Net Profit (/Loss)	0	-2,073	-3,484	-5,794	-9,617	-14,417	-5,781	-858	9,687	10,882	12,080
20 Accumulation of Profit (/Loss)	0	-2,073	-5,557	-11,351	-20,967	-35,385	-41,165	-42,023	-32,336	-21,454	-9,374

Table H6-13 Profit and Loss Tables: 2002-2032 (2/3)

(Unit: US\$ 1000)

Item	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Revenues											
1 Sewage Service Charge	54,207	54,603	55,003	55,406	55,813	56,224	56,639	57,057	57,057	57,057	57,057
2 Less: Discounts	-	-	-	-	-	-	-	-	-	-	-
3 Interest on Deposits	-	-	-	1,318	2,035	2,840	3,736	4,727	5,647	7,415	9,241
4 Penalties & Fines	-	-	-	-	-	-	-	-	-	-	-
5 Gross Revenue	54,207	54,603	55,003	56,725	57,849	59,064	60,375	61,784	62,704	64,472	66,298
Operating Expenses											
Water Supply & Distribution											
6 Personnel Cost	10,184	10,184	10,184	10,184	10,184	10,184	10,184	10,184	10,184	10,184	10,184
7 Electric Power Cost	1,785	1,785	1,785	1,785	1,785	1,785	1,785	1,785	1,785	1,785	1,785
8 Chemical Material Cost	381	381	381	381	381	381	381	381	381	381	381
9 Sub-total of O/M Costs	12,350	12,350	12,350	12,350	12,350	12,350	12,350	12,350	12,350	12,350	12,350
10 Repairing Cost	884	884	884	884	884	884	884	884	884	884	884
11 Corporate Social Contribution (Taxes)	1,979	1,993	2,008	2,022	2,037	2,052	2,067	2,083	2,083	2,083	2,083
12 Total of Operating Expenses	15,213	15,227	15,242	15,256	15,271	15,286	15,301	15,317	15,317	15,317	15,317
13 Net Operating Profit	38,995	39,376	39,761	41,468	42,577	43,778	45,073	46,467	47,388	49,155	50,981
14 Depreciation	11,987	11,987	11,987	11,987	11,987	11,987	11,987	11,987	11,987	11,987	11,987
15 Interest	9,579	8,382	7,184	5,987	4,789	3,592	2,395	1,197	0	0	0
16 Subtotal	21,566	20,368	19,171	17,973	16,776	15,579	14,381	13,184	11,987	11,987	11,987
17 Income before Taxes	17,429	19,008	20,591	23,495	25,801	28,199	30,692	33,283	35,401	37,169	38,994
18 Income Taxes	4,148	4,524	4,901	5,592	6,141	6,711	7,305	11,307	12,036	12,637	13,258
19 Net Profit (/Loss)	13,281	14,484	15,690	17,903	19,661	21,488	23,387	21,976	23,365	24,531	25,736
20 Accumulation of Profit (/Loss)	3,907	18,391	34,081	51,984	71,645	93,133	116,520	138,495	161,860	186,391	212,128

Table H6-13 Profit and Loss Tables: 2002-2032 (3/3)

		(Unit: US\$ 1000)								
Item	2024	2025	2026	2027	2028	2029	2030	2031	2032	
Revenues										
1	Sewage Service Charge	57,057	57,057	57,057	57,057	57,057	57,057	57,057	57,057	57,057
2	Less: Discounts	-	-	-	-	-	-	-	-	-
3	Interest on Deposits	11,127	13,076	15,088	17,167	19,315	21,534	23,825	26,193	28,638
4	Penalties & Fines	-	-	-	-	-	-	-	-	-
5	Gross Revenue	68,184	70,132	72,145	74,224	76,372	78,590	80,882	83,250	85,695
Operating Expenses										
Water Supply & Distribution										
6	Personnel Cost	10,184	10,184	10,184	10,184	10,184	10,184	10,184	10,184	10,184
7	Electric Power Cost	1,785	1,785	1,785	1,785	1,785	1,785	1,785	1,785	1,785
8	Chemical Material Cost	381	381	381	381	381	381	381	381	381
9	Sub-total of O/M Costs	12,350	12,350	12,350	12,350	12,350	12,350	12,350	12,350	12,350
10	Repairing Cost	884	884	884	884	884	884	884	884	884
11	Corporate Social Contribution (Taxes)	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083	2,083
12	Total of Operating Expenses	15,317	15,317	15,317	15,317	15,317	15,317	15,317	15,317	15,317
13	Net Operating Profit	52,867	54,816	56,828	58,907	61,055	63,274	65,566	67,933	70,379
14	Depreciation	11,987	11,987	11,987	11,987	11,987	11,987	11,987	11,987	11,987
15	Interest	0	0	0	0	0	0	0	0	0
16	Subtotal	11,987	11,987	11,987	11,987	11,987	11,987	11,987	11,987	11,987
17	Income before Taxes	40,881	42,829	44,842	46,921	49,069	51,287	53,579	55,946	58,392
18	Income Taxes	13,899	14,562	15,246	15,953	16,683	17,438	18,217	19,022	19,853
19	Net Profit (/Loss)	26,981	28,267	29,596	30,968	32,385	33,849	35,362	36,925	38,539
20	Accumulation of Profit (/Loss)	239,109	267,376	296,972	327,939	360,325	394,174	429,536	466,461	504,999

Table H6-14 Flow of Funds Statements: 2002-2032 (1/3)

(Unit: US\$ 1000)

Item	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Internal Cash Generation											
21	0	0	0	0	0	-947	9,785	13,510	22,858	22,856	22,857
22	0	0	0	0	0	0	3,464	11,987	11,987	11,987	11,987
23	0	0	0	0	0	-947	13,249	25,497	34,844	34,842	34,843
24	0	0	0	0	0	0	652	2,373	2,450	2,528	2,531
25	0	0	0	0	0	-947	13,901	27,870	37,294	37,371	37,374
26	Debt Service										
27	0	2,073	3,484	5,794	9,617	13,471	15,566	14,368	13,171	11,974	10,776
28	0	0	0	0	0	0	15,550	15,550	15,550	15,550	15,550
29	0	0	0	0	0	0	2,345	23,768	28,267	22,222	14,906
30	0	2,073	3,484	5,794	9,617	13,471	33,461	53,687	56,988	49,746	41,232
31	0	-2,073	-3,484	-5,794	-9,617	-14,417	-19,560	-25,817	-19,694	-12,375	-3,859
Capital Investment Requirements											
32	20,167	5,830	48,053	80,804	81,476	44,038	-	-	-	-	-
33	-	-	-	-	-	747	1,836	-	-	-	-
34	22,763	22,763	-	-	-	-	-	-	-	-	-
35	1,943	1,943	1,943	1,943	1,943	1,311	-	-	-	-	-
36	44,873	30,536	49,996	82,747	83,420	46,096	1,836	0	0	0	0
37	0	0	0	0	0	652	2,373	2,450	2,528	2,531	2,533
38	-44,873	-32,610	-53,480	-88,541	-93,036	-61,165	-23,768	-28,267	-22,222	-14,906	-6,392
Funds from Loans & Grants											
39	-	-	-	-	-	-	-	-	-	-	-
40	26,924	18,322	29,998	49,648	50,052	27,209	-	-	-	-	-
41	17,949	12,215	19,999	33,099	33,368	18,139	-	-	-	-	-
42	0	2,073	3,484	5,794	9,617	13,471	-	-	-	-	-
43	44,873	32,610	53,480	88,541	93,036	58,819	0	0	0	0	0
44	0	0	0	0	0	-2,346	-23,768	-28,267	-22,222	-14,906	-6,392
45	0	0	0	0	0	2,345	23,768	28,267	22,222	14,906	6,392
46	44,873	32,610	53,480	88,541	93,036	61,164	23,768	28,267	22,222	14,906	6,392
47	0	0	0	0	0	0	0	0	0	0	0
If Cash Surplus:											
48	0	0	0	0	0	0	0	0	0	0	0
If Cash Deficit:											
49	0	0	0	0	0	0	0	0	0	0	0
50	-	-	-	-	-	-	-	-	-	-	-
51	0	0	0	0	0	0	0	0	0	0	0

Table H6-14 Flow of Funds Statements: 2002-2032 (2/3)

(Unit: US\$ 1000)

Item	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	
Internal Cash Generation												
21	Net Income before Interest Charges	22,860	22,866	22,874	23,890	24,450	25,080	25,782	23,173	23,365	24,531	25,736
22	Add: Depreciation Exp.	11,987	11,987	11,987	11,987	11,987	11,987	11,987	11,987	11,987	11,987	11,987
23	Operating Cash Flow	34,846	34,852	34,861	35,877	36,437	37,066	37,769	35,160	35,351	36,518	37,723
24	Add: Beginning Cash Position	2,533	2,535	2,538	2,540	2,543	2,545	2,548	2,550	2,553	2,553	2,553
25	Cash before Debt Service	37,380	37,388	37,399	38,417	38,979	39,612	40,316	37,710	37,904	39,071	40,276
26	Debt Service											
27	Interest Charges	9,579	8,382	7,184	5,987	4,789	3,592	2,395	1,197	0	0	0
28	Principal Repayments	15,550	15,550	15,550	15,550	15,550	15,550	15,550	15,550	0	0	0
29	Cash Loan Repayment to Government	6,392	0	0	0	0	0	0	0	0	0	0
30	Total Debt Service	31,521	23,932	22,734	21,537	20,340	19,142	17,945	16,748	0	0	0
31	Cash after Debt Service	5,859	13,456	14,664	16,880	18,640	20,469	22,371	20,962	37,904	39,071	40,276
Capital Investment Requirements												
32	Capital Investment for Projects	-	-	-	-	-	-	-	-	-	-	-
33	Stock of Spares	-	-	-	-	-	-	-	-	-	-	-
34	Land Acquisition	-	-	-	-	-	-	-	-	-	-	-
35	Administration	-	-	-	-	-	-	-	-	-	-	-
36	Annual Capital Investment	0	0	0	0	0	0	0	0	0	0	0
37	Add: Cash Ending Balance	2,535	2,538	2,540	2,543	2,545	2,548	2,550	2,553	2,553	2,553	2,553
38	Financing Requirement	3,323	10,918	12,124	14,337	16,095	17,922	19,821	18,410	35,351	36,518	37,723
Funds from Loans & Grants												
39	Grants of Foreign Country	-	-	-	-	-	-	-	-	-	-	-
40	Loans of International Agency	-	-	-	-	-	-	-	-	-	-	-
41	Grants of Government	-	-	-	-	-	-	-	-	-	-	-
42	Grants for Interest during Construction	-	-	-	-	-	-	-	-	-	-	-
43	Sub-total of Funds	0	0	0	0	0	0	0	0	0	0	0
44	Cash Surplus (Deficit)	3,323	10,918	12,124	14,337	16,095	17,922	19,821	18,410	35,351	36,518	37,723
45	Cash Loan from Government	0	0	0	0	0	0	0	0	0	0	0
46	Total of Funds	0	0	0	0	0	0	0	0	0	0	0
47	Final Cash Surplus (Deficit)	3,323	10,918	12,124	14,337	16,095	17,922	19,821	18,410	35,351	36,518	37,723
If Cash Surplus:												
48	Purchase /(Sell) Deposits	3,323	10,918	12,124	14,337	16,095	17,922	19,821	18,410	35,351	36,518	37,723
If Cash Deficit:												
49	Sale of Deposits	0	0	0	0	0	0	0	0	0	0	0
50	Additional Equity Needed	-	-	-	-	-	-	-	-	-	-	-
51	Total Cash Raised	3,323	14,242	26,366	40,703	56,797	74,719	94,540	112,950	148,301	184,819	222,542

Table H6-14 Flow of Funds Statements: 2002-2032 (3/3)

(Unit: US\$ 1000)

Item	2024	2025	2026	2027	2028	2029	2030	2031	2032
Internal Cash Generation									
21 Net Income before Interest Charges	26,981	28,267	29,596	30,968	32,385	33,849	35,362	36,925	38,539
22 Add: Depreciation Exp.	11,987	11,987	11,987	11,987	11,987	11,987	11,987	11,987	11,987
23 Operating Cash Flow	38,968	40,254	41,582	42,954	44,372	45,836	47,349	48,911	50,525
24 Add: Beginning Cash Position	2,553	2,553	2,553	2,553	2,553	2,553	2,553	2,553	2,553
25 Cash before Debt Service	41,521	42,807	44,135	45,507	46,925	48,389	49,902	51,464	53,078
Debt Service									
26 Interest Charges	0	0	0	0	0	0	0	0	0
27 Principal Repayments	0	0	0	0	0	0	0	0	0
28 Cash Loan Repayment to Government	0	0	0	0	0	0	0	0	0
29 Total Debt Service	0	0	0	0	0	0	0	0	0
30 Cash after Debt Service	41,521	42,807	44,135	45,507	46,925	48,389	49,902	51,464	53,078
Capital Investment Requirements									
31 Capital Investment for Projects	-	-	-	-	-	-	-	-	-
32 Stock of Spares	-	-	-	-	-	-	-	-	-
33 Land Acquisition	-	-	-	-	-	-	-	-	-
34 Administration	-	-	-	-	-	-	-	-	-
35 Annual Capital Investment	0	0	0	0	0	0	0	0	0
36 Add: Cash Ending Balance	2,553	2,553	2,553	2,553	2,553	2,553	2,553	2,553	2,553
37 Financing Requirement	38,968	40,254	41,582	42,954	44,372	45,836	47,349	48,911	50,525
Funds from Loans & Grants									
38 Grants of Foreign Country	-	-	-	-	-	-	-	-	-
39 Loans of International Agency	-	-	-	-	-	-	-	-	-
40 Grants of Government	-	-	-	-	-	-	-	-	-
41 Grants for Interest during Construction	-	-	-	-	-	-	-	-	-
42 Sub-total of Funds	0	0	0	0	0	0	0	0	0
43 Cash Surplus (Deficit)	38,968	40,254	41,582	42,954	44,372	45,836	47,349	48,911	50,525
44 Cash Loan from Government	0	0	0	0	0	0	0	0	0
45 Total of Funds	0	0	0	0	0	0	0	0	0
46 Final Cash Surplus (Deficit)	38,968	40,254	41,582	42,954	44,372	45,836	47,349	48,911	50,525
If Cash Surplus:									
47 Purchase (/Sell) Deposits	38,968	40,254	41,582	42,954	44,372	45,836	47,349	48,911	50,525
If Cash Deficit:									
48 Sale of Deposits	0	0	0	0	0	0	0	0	0
49 Additional Equity Needed	-	-	-	-	-	-	-	-	-
50 Total Cash Raised	261,510	301,764	343,346	386,300	430,672	476,508	523,857	572,768	623,294

Table H6-15 Balance Sheets: 2002-2032 (1/3)

(Unit: US\$ 1000)

Item	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
ASSETS											
Fixed Assets											
52 Land	22,763	45,525	45,525	45,525	45,525	45,525	45,525	45,525	45,525	45,525	45,525
53 Plants in Service*1	0	0	0	0	0	104,945	291,395	287,931	275,944	263,958	251,971
54 Less: Depreciation	-	-	-	-	-	-	3,464	11,987	11,987	11,987	11,987
55 Net Fixed Assets	22,763	45,525	45,525	45,525	45,525	150,470	333,456	321,469	309,483	297,496	285,509
56 Work in Process	22,110	29,884	79,880	162,627	246,047	186,450	-	-	-	-	-
57 Total Fixed Assets	44,873	75,409	125,405	208,152	291,572	336,920	333,456	321,469	309,483	297,496	285,509
Current Assets											
58 Cash	0	0	0	0	0	652	2,373	2,450	2,528	2,531	2,533
59 Short-Term Deposits	0	0	0	0	0	0	0	0	0	0	0
60 Accounts Receivable (Net)	0	0	0	0	0	593	5,497	8,040	10,608	10,685	10,763
61 Inventories of Spares	-	-	-	-	-	747	2,583	2,583	2,583	2,583	2,583
62 Total Current Assets	0	0	0	0	0	1,992	10,453	13,073	15,719	15,799	15,879
63 Total Assets	44,873	75,410	125,406	208,153	291,572	338,912	343,909	334,542	325,202	313,295	301,388
LIABILITIES & NET WORTH											
Equity											
64 Grants	17,949	30,164	50,162	83,261	116,629	134,768	134,768	134,768	134,768	134,768	134,768
65 Grants for Interest during Construction	0	2,073	5,557	11,351	20,967	34,438	34,438	34,438	34,438	34,438	34,438
66 Retained Earnings	0	-2,073	-5,557	-11,351	-20,967	-35,385	-41,165	-42,023	-32,336	-21,454	-9,374
67 Total Net Worth	17,949	30,164	50,162	83,261	116,629	133,822	128,041	127,183	136,870	147,752	159,832
Borrowings											
68 Loans of International Agency	26,924	45,245	75,243	124,891	174,943	202,152	202,152	186,602	171,052	155,502	139,952
69 Other Loans	-	-	-	-	-	-	-	-	-	-	-
70 Other Credits	-	-	-	-	-	-	-	-	-	-	-
71 Less: Current Portion of Debt	0	0	0	0	0	0	15,550	15,550	15,550	15,550	15,550
72 Total Borrowings	26,924	45,245	75,243	124,891	174,943	202,152	186,602	171,052	155,502	139,952	124,401
Current Liabilities											
73 Accounts Payables	#REF!	#REF!	#REF!	#REF!	#REF!	593	7,843	31,808	38,875	32,907	25,669
74 Cash Loan of Government	0	0	0	0	0	2,345	23,768	28,267	22,222	14,906	6,392
75 Notes Payable	-	-	-	-	-	-	-	-	-	-	-
76 Less: Cash Loan Repayment to Government	#REF!	#REF!	#REF!	#REF!	#REF!	0	2,345	23,768	28,267	22,222	14,906
77 Total Current Liabilities	#REF!	#REF!	#REF!	#REF!	#REF!	2,938	29,266	36,307	32,830	25,591	17,155
78 Total Liabilities and Net Worth	#REF!	#REF!	#REF!	#REF!	#REF!	338,912	343,909	334,542	325,202	313,294	301,388

Table H6-15 Balance Sheets: 2002-2032 (2/3)

(Unit: US\$ 1000)

Item	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
ASSETS											
Fixed Assets											
52 Land	45,525	45,525	45,525	45,525	45,525	45,525	45,525	45,525	45,525	45,525	45,525
53 Plants in Service*1	239,984	227,998	216,011	204,024	192,038	180,051	168,064	156,078	144,091	132,105	120,118
54 Less: Depreciation	11,987	11,987	11,987	11,987	11,987	11,987	11,987	11,987	11,987	11,987	11,987
55 Net Fixed Assets	273,523	261,536	249,549	237,563	225,576	213,589	201,603	189,616	177,630	165,643	153,656
56 Work in Process	-	-	-	-	-	-	-	-	-	-	-
57 Total Fixed Assets	273,523	261,536	249,549	237,563	225,576	213,589	201,603	189,616	177,630	165,643	153,656
Current Assets											
58 Cash	2,535	2,538	2,540	2,543	2,545	2,548	2,550	2,553	2,553	2,553	2,553
59 Short-Term Deposits	3,323	14,242	26,366	40,703	56,797	74,719	94,540	112,950	148,301	184,819	222,542
60 Accounts Receivable (Net)	10,841	10,921	11,001	11,081	11,163	11,245	11,328	11,411	11,411	11,411	11,411
61 Inventories of Spares	2,583	2,583	2,583	2,583	2,583	2,583	2,583	2,583	2,583	2,583	2,583
62 Total Current Assets	19,283	30,283	42,490	56,910	73,088	91,095	111,001	129,497	164,849	201,366	239,089
63 Total Assets	292,806	291,819	292,039	294,473	298,665	304,684	312,604	319,113	342,478	367,009	392,746
LIABILITIES & NET WORTH											
Equity											
64 Grants	134,768	134,768	134,768	134,768	134,768	134,768	134,768	134,768	134,768	134,768	134,768
65 Grants for Interest during Construction	34,438	34,438	34,438	34,438	34,438	34,438	34,438	34,438	34,438	34,438	34,438
66 Retained Earnings	3,907	18,391	34,081	51,984	71,645	93,133	116,520	138,495	161,860	186,391	212,128
67 Total Net Worth	173,113	187,597	203,287	221,190	240,851	262,339	285,726	307,702	331,066	355,598	381,334
Borrowings											
68 Loans of International Agency	124,401	108,851	93,301	77,751	62,201	46,651	31,100	15,550	0	0	0
69 Other Loans	-	-	-	-	-	-	-	-	-	-	-
70 Other Credits	-	-	-	-	-	-	-	-	-	-	-
71 Less: Current Portion of Debt	15,550	15,550	15,550	15,550	15,550	15,550	15,550	15,550	0	0	0
72 Total Borrowings	108,851	93,301	77,751	62,201	46,651	31,100	15,550	0	0	0	0
Current Liabilities											
73 Accounts Payables	17,233	10,921	11,001	11,081	11,163	11,245	11,328	11,411	11,411	11,411	11,411
74 Cash Loan of Government	0	0	0	0	0	0	0	0	0	0	0
75 Notes Payable	-	-	-	-	-	-	-	-	-	-	-
76 Less: Cash Loan Repayment to Government	6,392	0	0	0	0	0	0	0	0	0	0
77 Total Current Liabilities	10,841	10,921	11,001	11,081	11,163	11,245	11,328	11,411	11,411	11,411	11,411
78 Total Liabilities and Net Worth	292,806	291,819	292,039	294,472	298,664	304,684	312,604	319,113	342,478	367,009	392,745

Table H6-15 Balance Sheets: 2002-2032 (3/3)

(Unit: US\$ 1000)

Item	2024	2025	2026	2027	2028	2029	2030	2031	2032
ASSETS									
Fixed Assets									
52 Land	45,525	45,525	45,525	45,525	45,525	45,525	45,525	45,525	45,525
53 Plants in Service*1	108,131	96,145	84,158	72,171	60,185	48,198	36,211	24,225	12,238
54 Less: Depreciation	11,987	11,987	11,987	11,987	11,987	11,987	11,987	11,987	11,987
55 Net Fixed Assets	141,670	129,683	117,696	105,710	93,723	81,736	69,750	57,763	45,776
56 Work in Process	-	-	-	-	-	-	-	-	-
57 Total Fixed Assets	141,670	129,683	117,696	105,710	93,723	81,736	69,750	57,763	45,776
Current Assets									
58 Cash	2,553	2,553	2,553	2,553	2,553	2,553	2,553	2,553	2,553
59 Short-Term Deposits	261,510	301,764	343,346	386,300	430,672	476,508	523,857	572,768	623,294
60 Accounts Receivable (Net)	11,411	11,411	11,411	11,411	11,411	11,411	11,411	11,411	11,411
61 Inventories of Spares	2,583	2,583	2,583	2,583	2,583	2,583	2,583	2,583	2,583
62 Total Current Assets	278,057	318,311	359,893	402,848	447,220	493,056	540,404	589,316	639,841
63 Total Assets	419,727	447,994	477,590	508,557	540,942	574,792	610,154	647,079	685,617
LIABILITIES & NET WORTH									
Equity									
64 Grants	134,768	134,768	134,768	134,768	134,768	134,768	134,768	134,768	134,768
65 Grants for Interest during Construction	34,438	34,438	34,438	34,438	34,438	34,438	34,438	34,438	34,438
66 Retained Earnings	239,109	267,376	296,972	327,939	360,325	394,174	429,536	466,461	504,999
67 Total Net Worth	408,315	436,582	466,178	497,145	529,531	563,380	598,742	635,667	674,206
Borrowings									
68 Loans of International Agency	0	0	0	0	0	0	0	0	0
69 Other Loans	-	-	-	-	-	-	-	-	-
70 Other Credits	-	-	-	-	-	-	-	-	-
71 Less: Current Portion of Debt	0	0	0	0	0	0	0	0	0
72 Total Borrowings	0	0	0	0	0	0	0	0	0
Current Liabilities									
73 Accounts Payables	11,411	11,411	11,411	11,411	11,411	11,411	11,411	11,411	11,411
74 Cash Loan of Government	0	0	0	0	0	0	0	0	0
75 Notes Payable	-	-	-	-	-	-	-	-	-
76 Less: Cash Loan Repayment to Government	0	0	0	0	0	0	0	0	0
77 Total Current Liabilities	11,411	11,411	11,411	11,411	11,411	11,411	11,411	11,411	11,411
78 Total Liabilities and Net Worth	419,726	447,994	477,589	508,557	540,942	574,792	610,154	647,078	685,617

Table H7-1 Economic Cost and Benefit Stream of Conceição System

(Unit: R\$1000)

Year	Cost			Benefit			Total	Balance	
	Capital Investment	O&M	Total	Treatment Saving	Medical Issues	Tourism Recession			
1	2002	1,631	0	1,631	0	0	0	-1,631	
2	2003	582	0	582	0	0	0	-582	
3	2004	3,910	0	3,910	0	0	0	-3,910	
4	2005	7,049	0	7,049	0	0	0	-7,049	
5	2006	5,775	0	5,775	0	0	0	-5,775	
6	2007		603	603	109	87	639	835	232
7	2008		603	603	118	88	1,377	1,583	980
8	2009		603	603	127	90	2,226	2,442	1,839
9	2010		603	603	136	91	3,198	3,425	2,822
10	2011		603	603	132	93	3,361	3,585	2,982
11	2012		603	603	140	94	3,532	3,767	3,164
12	2013		603	603	149	95	3,712	3,957	3,354
13	2014		603	603	158	97	3,902	4,157	3,554
14	2015		603	603	168	98	4,101	4,367	3,764
15	2016		603	603	177	100	4,310	4,587	3,984
16	2017		603	603	187	101	4,530	4,818	4,216
17	2018		603	603	198	103	4,761	5,061	4,458
18	2019		603	603	208	104	5,004	5,316	4,713
19	2020		603	603	219	106	5,259	5,584	4,981
20	2021		603	603	219	106	5,259	5,584	4,981
21	2022		603	603	219	106	5,259	5,584	4,981
22	2023		603	603	219	106	5,259	5,584	4,981
23	2024		603	603	219	106	5,259	5,584	4,981
24	2025		603	603	219	106	5,259	5,584	4,981
25	2026		603	603	219	106	5,259	5,584	4,981
26	2027		603	603	219	106	5,259	5,584	4,981
27	2028		603	603	219	106	5,259	5,584	4,981
28	2029		603	603	219	106	5,259	5,584	4,981
29	2030		603	603	219	106	5,259	5,584	4,981
30	2031		603	603	219	106	5,259	5,584	4,981

Evaluation Indices NPV: 867 Million R\$ *1
 B/C: 1.06 *1
 EIRR: 12.6%

Note: *1 Discounted at 12%

Table H7-2 Economic Cost and Benefit Stream of Janga System

(Unit: R\$1000)

Year	Cost			Benefit			Total	Balance	
	Capital Investment	O&M	Total	Treatment Saving	Medical Issues	Tourism Recession			
1	2002	5,195	0	5,195	0	0	0	-5,195	
2	2003	1,644	0	1,644	0	0	0	-1,644	
3	2004	9,430	0	9,430	0	0	0	-9,430	
4	2005	16,738	0	16,738	0	0	0	-16,738	
5	2006	16,738	0	16,738	0	0	0	-16,738	
6	2007	13,021	0	13,021	0	0	0	-13,021	
7	2008		2,383	2,383	429	493	3,239	4,160	1,777
8	2009		2,383	2,383	460	497	6,980	7,937	5,554
9	2010		2,383	2,383	492	502	11,281	12,275	9,892
10	2011		2,383	2,383	527	506	11,856	12,890	10,507
11	2012		2,383	2,383	561	510	12,461	13,532	11,149
12	2013		2,383	2,383	595	515	13,097	14,207	11,824
13	2014		2,383	2,383	631	519	13,765	14,915	12,532
14	2015		2,383	2,383	667	523	14,467	15,657	13,274
15	2016		2,383	2,383	703	528	15,205	16,437	14,053
16	2017		2,383	2,383	741	532	15,981	17,254	14,871
17	2018		2,383	2,383	780	537	16,796	18,113	15,730
18	2019		2,383	2,383	819	541	17,653	19,013	16,630
19	2020		2,383	2,383	859	546	18,554	19,959	17,576
20	2021		2,383	2,383	859	546	18,554	19,959	17,576
21	2022		2,383	2,383	859	546	18,554	19,959	17,576
22	2023		2,383	2,383	859	546	18,554	19,959	17,576
23	2024		2,383	2,383	859	546	18,554	19,959	17,576
24	2025		2,383	2,383	859	546	18,554	19,959	17,576
25	2026		2,383	2,383	859	546	18,554	19,959	17,576
26	2027		2,383	2,383	859	546	18,554	19,959	17,576
27	2028		2,383	2,383	859	546	18,554	19,959	17,576
28	2029		2,383	2,383	859	546	18,554	19,959	17,576
29	2030		2,383	2,383	859	546	18,554	19,959	17,576
30	2031		2,383	2,383	859	546	18,554	19,959	17,576
31	2032		2,383	2,383	859	546	18,554	19,959	17,576

Evaluation Indices NPV: 6,561 Million R\$ *1
 B/C: 1.13 *1
 EIRR: 13.5%

Note: *1 Discounted at 12%

Table H7-3 Economic Cost and Benefit Stream of Cabanga System

(Unit: R\$1000)

Year	Cost			Benefit			Total	Balance	
	Capital Investment	O&M	Total	Treatment Saving	Medical Issues	Tourism Recession			
1	2002	3,778	0	3,778	0	0	0	-3,778	
2	2003	1,195	0	1,195	0	0	0	-1,195	
3	2004	7,841	0	7,841	0	0	0	-7,841	
4	2005	7,841	0	7,841	0	0	0	-7,841	
5	2006	14,139	0	14,139	0	0	0	-14,139	
6	2007	11,028	0	11,028	0	0	0	-11,028	
7	2008		1,721	1,721	270	499	2,776	3,545	1,824
8	2009		1,721	1,721	287	500	5,983	6,769	5,048
9	2010		1,721	1,721	305	500	9,669	10,474	8,753
10	2011		1,721	1,721	404	502	10,163	11,068	9,347
11	2012		1,721	1,721	429	504	10,681	11,613	9,892
12	2013		1,721	1,721	454	506	11,226	12,185	10,464
13	2014		1,721	1,721	480	507	11,799	12,786	11,064
14	2015		1,721	1,721	506	509	12,401	13,416	11,694
15	2016		1,721	1,721	532	511	13,033	14,077	12,356
16	2017		1,721	1,721	559	513	13,698	14,771	13,050
17	2018		1,721	1,721	587	515	14,397	15,499	13,778
18	2019		1,721	1,721	615	517	15,132	16,264	14,542
19	2020		1,721	1,721	643	519	15,904	17,066	15,345
20	2021		1,721	1,721	643	519	15,904	17,066	15,345
21	2022		1,721	1,721	643	519	15,904	17,066	15,345
22	2023		1,721	1,721	643	519	15,904	17,066	15,345
23	2024		1,721	1,721	643	519	15,904	17,066	15,345
24	2025		1,721	1,721	643	519	15,904	17,066	15,345
25	2026		1,721	1,721	643	519	15,904	17,066	15,345
26	2027		1,721	1,721	643	519	15,904	17,066	15,345
27	2028		1,721	1,721	643	519	15,904	17,066	15,345
28	2029		1,721	1,721	643	519	15,904	17,066	15,345
29	2030		1,721	1,721	643	519	15,904	17,066	15,345
30	2031		1,721	1,721	643	519	15,904	17,066	15,345
31	2032		1,721	1,721	643	519	15,904	17,066	15,345

Evaluation Indices NPV: 12,090 Million R\$ *1
 B/C: 1.34 *1
 EIRR: 15.5%

Note: *1 Discounted at 12%

Table H7-4 Economic Cost and Benefit Stream of Boa Viagem System

(Unit: R\$1000)

Year	Cost			Benefit			Total	Balance
	Capital Investment	O&M	Total	Treatment Saving	Medical Issues	Tourism Recession		
1	2002	2,652	0	2,652	0	0	0	-2,652
2	2003	839	0	839	0	0	0	-839
3	2004	4,814	0	4,814	0	0	0	-4,814
4	2005	8,545	0	8,545	0	0	0	-8,545
5	2006	8,545	0	8,545	0	0	0	-8,545
6	2007	6,916	0	6,916	0	0	0	-6,916
7	2008		1,125	1,125	191	248	1,397	710
8	2009		1,125	1,125	205	250	3,010	2,338
9	2010		1,125	1,125	218	251	4,864	4,208
10	2011		1,125	1,125	230	253	5,112	4,470
11	2012		1,125	1,125	245	254	5,373	4,746
12	2013		1,125	1,125	259	256	5,647	5,036
13	2014		1,125	1,125	274	257	5,935	5,341
14	2015		1,125	1,125	289	258	6,238	5,660
15	2016		1,125	1,125	304	260	6,556	5,995
16	2017		1,125	1,125	319	261	6,891	6,346
17	2018		1,125	1,125	335	263	7,242	6,715
18	2019		1,125	1,125	351	264	7,612	7,102
19	2020		1,125	1,125	368	266	8,000	7,508
20	2021		1,125	1,125	368	266	8,000	7,508
21	2022		1,125	1,125	368	266	8,000	7,508
22	2023		1,125	1,125	368	266	8,000	7,508
23	2024		1,125	1,125	368	266	8,000	7,508
24	2025		1,125	1,125	368	266	8,000	7,508
25	2026		1,125	1,125	368	266	8,000	7,508
26	2027		1,125	1,125	368	266	8,000	7,508
27	2028		1,125	1,125	368	266	8,000	7,508
28	2029		1,125	1,125	368	266	8,000	7,508
29	2030		1,125	1,125	368	266	8,000	7,508
30	2031		1,125	1,125	368	266	8,000	7,508
31	2032		1,125	1,125	368	266	8,000	7,508

Evaluation Indices NPV: -680 Million R\$ *1
 B/C: 0.97 *1
 EIRR: 11.7%

Note: *1 Discounted at 12%

Table H7-5 Economic Cost and Benefit Stream of Cordeiro System

(Unit: R\$1000)

Year	Cost			Benefit			Total	Balance	
	Capital Investment	O&M	Total	Treatment Saving	Medical Issues	Tourism Recession			
1	2002	2,103	0	2,103	0	0	0	-2,103	
2	2003	751	0	751	0	0	0	-751	
3	2004	5,041	0	5,041	0	0	0	-5,041	
4	2005	9,088	0	9,088	0	0	0	-9,088	
5	2006	7,270	0	7,270	0	0	0	-7,270	
6	2007		835	835	124	175	700	999	165
7	2008		835	835	133	176	1,508	1,817	982
8	2009		835	835	141	177	2,438	2,757	1,922
9	2010		835	835	150	178	3,502	3,831	2,996
10	2011		835	835	155	179	3,681	4,015	3,180
11	2012		835	835	164	179	3,869	4,212	3,377
12	2013		835	835	173	180	4,066	4,419	3,584
13	2014		835	835	182	181	4,274	4,637	3,802
14	2015		835	835	191	181	4,492	4,865	4,030
15	2016		835	835	201	182	4,721	5,104	4,269
16	2017		835	835	211	183	4,962	5,355	4,520
17	2018		835	835	220	183	5,215	5,619	4,784
18	2019		835	835	230	184	5,481	5,896	5,061
19	2020		835	835	241	185	5,761	6,186	5,351
20	2021		835	835	241	185	5,761	6,186	5,351
21	2022		835	835	241	185	5,761	6,186	5,351
22	2023		835	835	241	185	5,761	6,186	5,351
23	2024		835	835	241	185	5,761	6,186	5,351
24	2025		835	835	241	185	5,761	6,186	5,351
25	2026		835	835	241	185	5,761	6,186	5,351
26	2027		835	835	241	185	5,761	6,186	5,351
27	2028		835	835	241	185	5,761	6,186	5,351
28	2029		835	835	241	185	5,761	6,186	5,351
29	2030		835	835	241	185	5,761	6,186	5,351
30	2031		835	835	241	185	5,761	6,186	5,351

Evaluation Indices NPV: -1,787 Million R\$ *1
 B/C: 0.91 *1
 EIRR: 10.9%

Note: *1 Discounted at 12%

Table H7-6 Economic Cost and Benefit Stream of Prazeres System

(Unit: R\$1000)

Year	Cost			Benefit			Total	Balance	
	Capital Investment	O&M	Total	Treatment Saving	Medical Issues	Tourism Recession			
1	2002	3,328	0	3,328	0	0	0	-3,328	
2	2003	1,053	0	1,053	0	0	0	-1,053	
3	2004	6,040	0	6,040	0	0	0	-6,040	
4	2005	10,721	0	10,721	0	0	0	-10,721	
5	2006	10,721	0	10,721	0	0	0	-10,721	
6	2007	8,523	0	8,523	0	0	0	-8,523	
7	2008		1,428	1,428	1,086	346	2,174	3,606	2,178
8	2009		1,428	1,428	1,216	350	4,685	6,252	4,823
9	2010		1,428	1,428	1,355	355	7,573	9,282	7,854
10	2011		1,428	1,428	406	359	7,959	8,724	7,295
11	2012		1,428	1,428	421	363	8,365	9,148	7,720
12	2013		1,428	1,428	435	366	8,792	9,593	8,165
13	2014		1,428	1,428	450	370	9,240	10,061	8,632
14	2015		1,428	1,428	465	374	9,712	10,551	9,123
15	2016		1,428	1,428	480	378	10,207	11,066	9,638
16	2017		1,428	1,428	496	382	10,728	11,606	10,178
17	2018		1,428	1,428	512	387	11,275	12,173	10,745
18	2019		1,428	1,428	527	391	11,850	12,768	11,340
19	2020		1,428	1,428	543	395	12,455	13,393	11,965
20	2021		1,428	1,428	543	395	12,455	13,393	11,965
21	2022		1,428	1,428	543	395	12,455	13,393	11,965
22	2023		1,428	1,428	543	395	12,455	13,393	11,965
23	2024		1,428	1,428	543	395	12,455	13,393	11,965
24	2025		1,428	1,428	543	395	12,455	13,393	11,965
25	2026		1,428	1,428	543	395	12,455	13,393	11,965
26	2027		1,428	1,428	543	395	12,455	13,393	11,965
27	2028		1,428	1,428	543	395	12,455	13,393	11,965
28	2029		1,428	1,428	543	395	12,455	13,393	11,965
29	2030		1,428	1,428	543	395	12,455	13,393	11,965
30	2031		1,428	1,428	543	395	12,455	13,393	11,965
31	2032		1,428	1,428	543	395	12,455	13,393	11,965

Evaluation Indices NPV: 7,404 Million R\$ *1
 B/C: 1.24 *1
 EIRR: 14.6%

Note: *1 Discounted at 12%

Table H7-7 Economic Cost and Benefit Stream of Curcurana System

(Unit: R\$1000)

Year	Cost			Benefit			Total	Balance	
	Capital Investment	O&M	Total	Treatment Saving	Medical Issues	Tourism Recession			
1	2002	2,665	0	2,665	0	0	0	-2,665	
2	2003	751	0	751	0	0	0	-751	
3	2004	5,041	0	5,041	0	0	0	-5,041	
4	2005	9,088	0	9,088	0	0	0	-9,088	
5	2006	7,270	0	7,270	0	0	0	-7,270	
6	2007		835	835	233	217	975	1,425	590
7	2008		835	835	251	220	2,100	2,571	1,736
8	2009		835	835	269	223	3,394	3,887	3,052
9	2010		835	835	288	226	4,877	5,391	4,556
10	2011		835	835	289	229	5,125	5,643	4,808
11	2012		835	835	307	231	5,387	5,925	5,090
12	2013		835	835	326	234	5,662	6,222	5,387
13	2014		835	835	345	237	5,951	6,533	5,698
14	2015		835	835	365	240	6,254	6,859	6,024
15	2016		835	835	385	242	6,573	7,201	6,366
16	2017		835	835	406	245	6,909	7,560	6,725
17	2018		835	835	428	248	7,261	7,937	7,102
18	2019		835	835	450	251	7,631	8,332	7,497
19	2020		835	835	472	254	8,021	8,747	7,912
20	2021		835	835	472	254	8,021	8,747	7,912
21	2022		835	835	472	254	8,021	8,747	7,912
22	2023		835	835	472	254	8,021	8,747	7,912
23	2024		835	835	472	254	8,021	8,747	7,912
24	2025		835	835	472	254	8,021	8,747	7,912
25	2026		835	835	472	254	8,021	8,747	7,912
26	2027		835	835	472	254	8,021	8,747	7,912
27	2028		835	835	472	254	8,021	8,747	7,912
28	2029		835	835	472	254	8,021	8,747	7,912
29	2030		835	835	472	254	8,021	8,747	7,912
30	2031		835	835	472	254	8,021	8,747	7,912

Evaluation Indices
 NPV: 5,069 Million R\$ *1
 B/C: 1.25 *1
 EIRR: 14.6%

Note: *1 Discounted at 12%

Table H7-8 Economic Cost and Benefit Stream of 7 Systems Proposed

(Unit: R\$1000)

Year	Cost			Benefit			Total	Balance	
	Capital Investment	O&M	Total	Treatment Saving	Medical Issues	Tourism Recession			
1	2002	21,352	0	21,352	0	0	0	-21,352	
2	2003	7,016	0	7,016	0	0	0	-7,016	
3	2004	43,463	0	43,463	0	0	0	-43,463	
4	2005	71,497	0	71,497	0	0	0	-71,497	
5	2006	72,237	0	72,237	0	0	0	-72,237	
6	2007	39,489	2,472	41,961	467	479	2,314	3,259	-38,701
7	2008		9,131	9,131	2,478	2,070	14,571	19,119	9,989
8	2009		9,131	9,131	2,706	2,087	28,715	33,508	24,377
9	2010		9,131	9,131	2,945	2,103	44,963	50,012	40,881
10	2011		9,131	9,131	2,143	2,119	47,257	51,520	42,389
11	2012		9,131	9,131	2,266	2,135	49,668	54,070	44,939
12	2013		9,131	9,131	2,392	2,152	52,202	56,746	47,615
13	2014		9,131	9,131	2,520	2,168	54,866	59,553	50,423
14	2015		9,131	9,131	2,650	2,185	57,665	62,500	53,369
15	2016		9,131	9,131	2,784	2,201	60,607	65,592	56,461
16	2017		9,131	9,131	2,920	2,218	63,699	68,837	59,706
17	2018		9,131	9,131	3,059	2,235	66,949	72,243	63,112
18	2019		9,131	9,131	3,201	2,252	70,364	75,817	66,686
19	2020		9,131	9,131	3,345	2,270	73,954	79,569	70,438
20	2021		9,131	9,131	3,345	2,270	73,954	79,569	70,438
21	2022		9,131	9,131	3,345	2,270	73,954	79,569	70,438
22	2023		9,131	9,131	3,345	2,270	73,954	79,569	70,438
23	2024		9,131	9,131	3,345	2,270	73,954	79,569	70,438
24	2025		9,131	9,131	3,345	2,270	73,954	79,569	70,438
25	2026		9,131	9,131	3,345	2,270	73,954	79,569	70,438
26	2027		9,131	9,131	3,345	2,270	73,954	79,569	70,438
27	2028		9,131	9,131	3,345	2,270	73,954	79,569	70,438
28	2029		9,131	9,131	3,345	2,270	73,954	79,569	70,438
29	2030		9,131	9,131	3,345	2,270	73,954	79,569	70,438
30	2031		9,131	9,131	3,345	2,270	73,954	79,569	70,438
31	2032		9,131	9,131	3,345	2,270	73,954	79,569	70,438

Evaluation Indices NPV: 25,499 Million R\$ *1
 B/C: 1.13 *1
 EIRR: 13.4%

Note: *1 Discounted at 12%

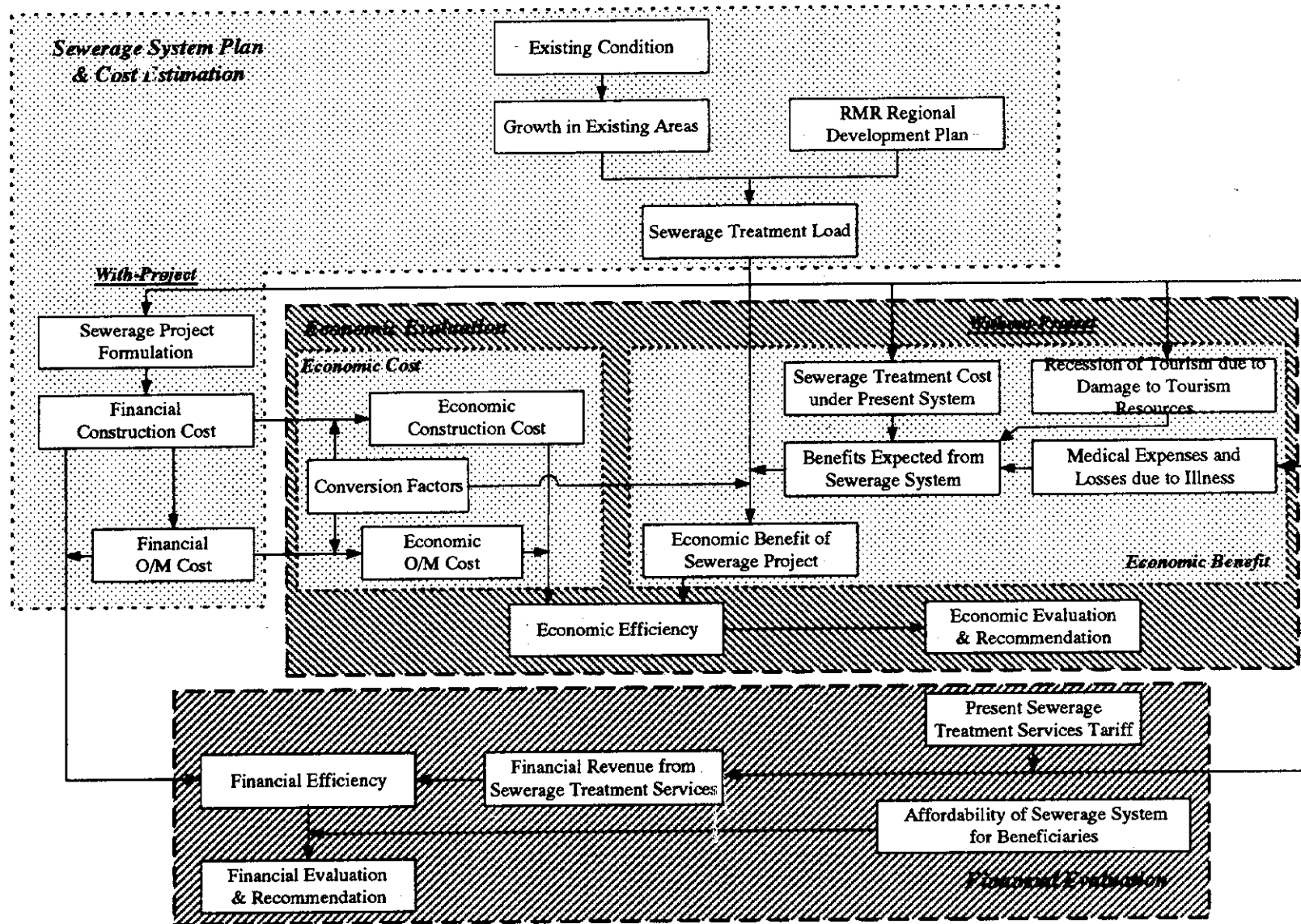


Fig. H3 - 1 Evaluation Procedure of Sewerage Projects

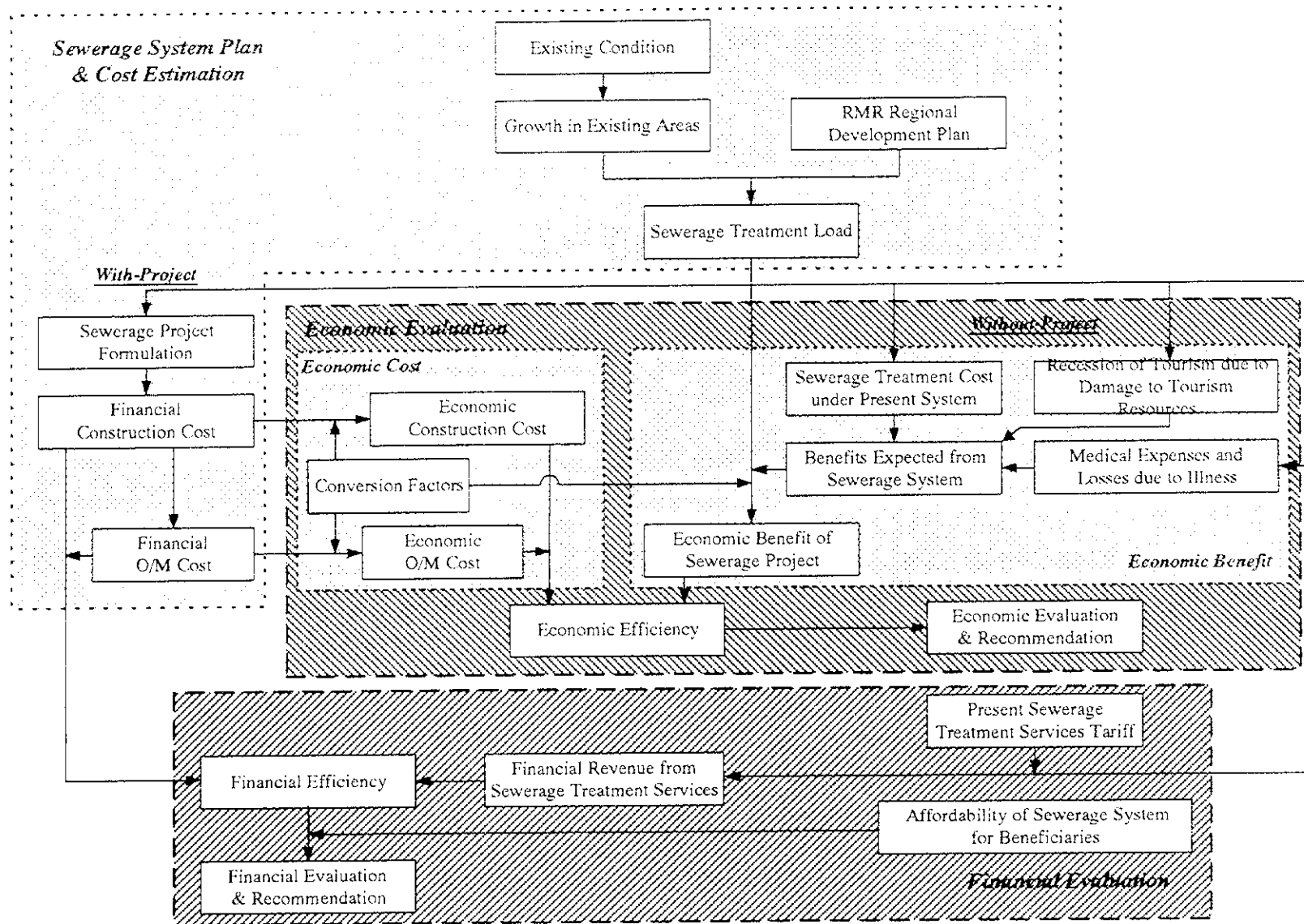


Fig. H3 - 1 Evaluation Procedure of Sewerage Projects

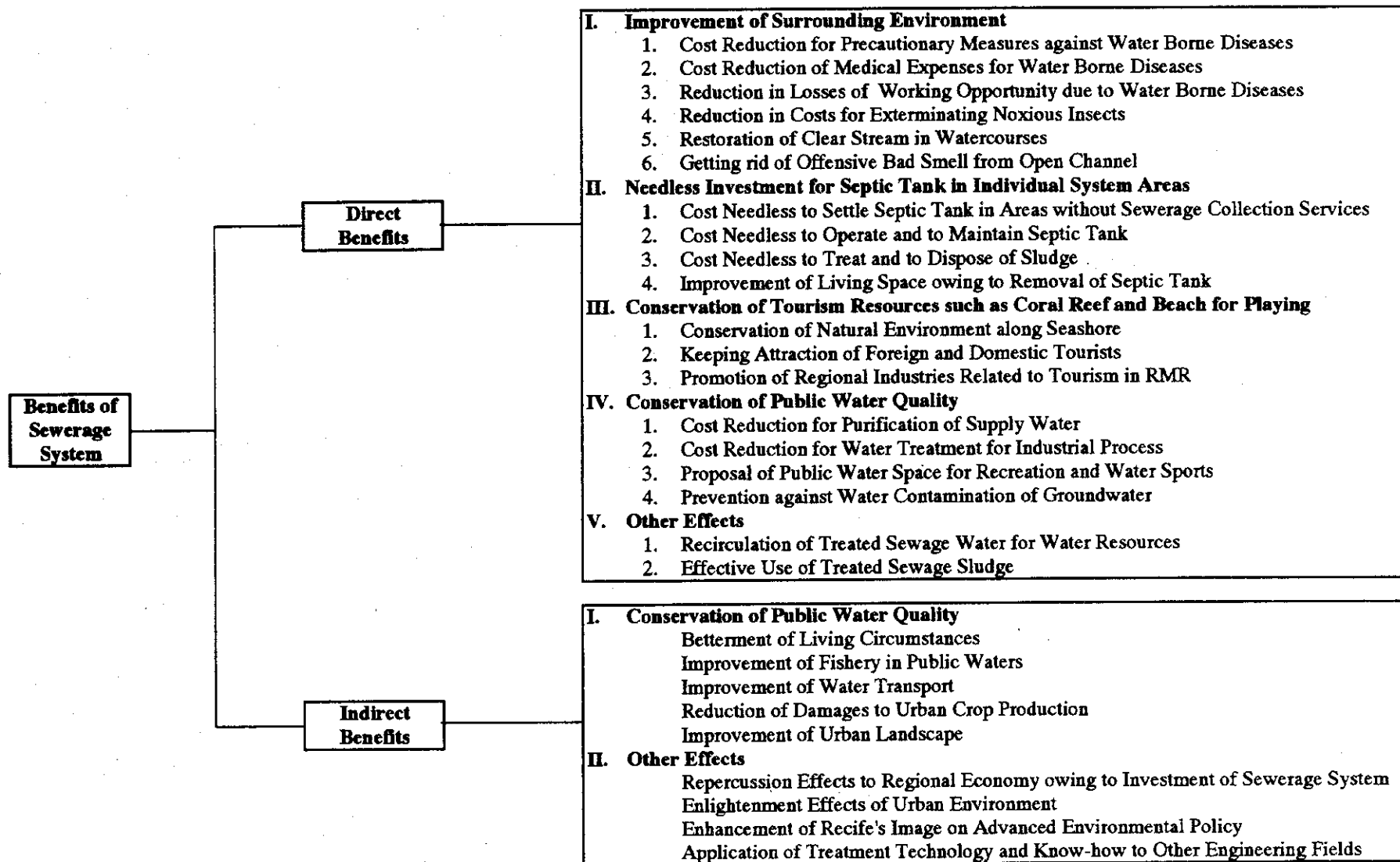


Fig. H3 - 2 Benefit Structure of Sewerage Treatment System in RMR

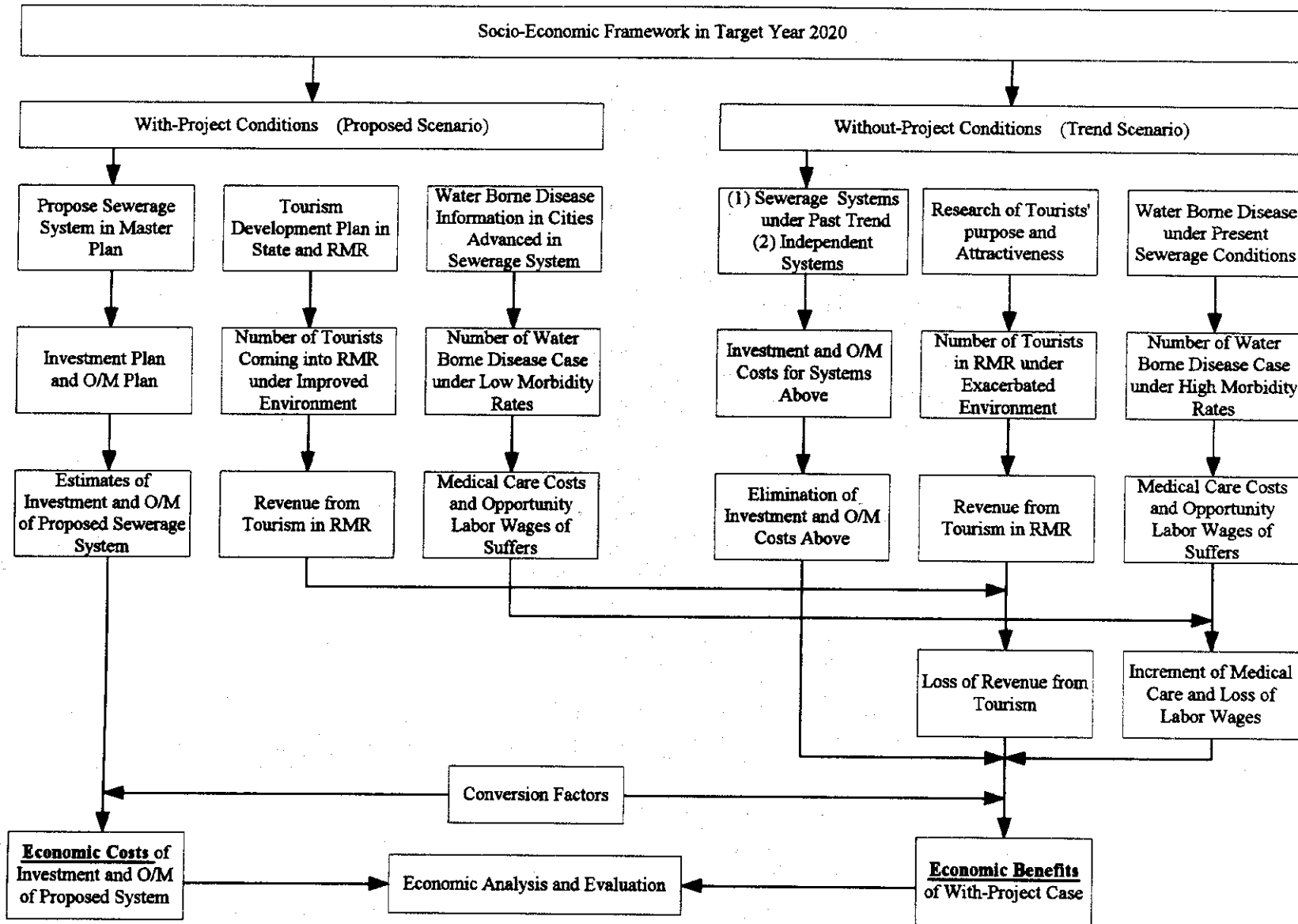


Fig. H3 - 3 Flow Diagram of Economic Analysis and Evaluation