

**FINANCIAL INSTITUTIONS
REFORM AND EXPANSION PROJECT**

Debt Market / Infrastructure Component

**A RAPID APPRAISAL FRAMEWORK
TO ASSESS COMMERCIAL VIABILITY
OF URBAN ENVIRONMENTAL
INFRASTRUCTURE PROJECTS**

(Draft)

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A RAPID APPRAISAL FRAMEWORK TO ASSESS COMMERCIAL VIABILITY OF URBAN ENVIRONMENTAL INFRASTRUCTURE PROJECTS

Traditionally urban environmental infrastructure like water, sewerage and solid waste management has been considered as a public service to be provided by the local governments and related state or metro level statutory authorities. Financing of these services has largely been through budgetary allocations. This method has limited the scope for investments in this sector and has often produced inefficiencies and a lack of commitment to introduce appropriate user charges for these services. With the recently initiated financial reforms in India, there is tremendous scope for enhancing the investments in this sector by tapping the rapidly expanding capital markets, especially for debt funds. This, however, would require considerable efforts as the market perception of high risk and low returns from investments in this sector needs to be changed by successfully developing and implementing commercially viable projects for urban environmental infrastructure.

In this perspective, commercially viable projects would essentially be those which would be able to raise resources from the capital markets largely on a project recourse basis. They would, therefore, need to address three important concerns, namely, an acceptable institutional arrangement for raising market resources and service delivery, a clear risk assessment and mitigation framework and a market rate of return on investments.

In India, initial project development in a commercial format has taken place in other infrastructure sectors like power, surface transport and airports. As a result, these experiences have created an interest among many state and local governments to explore the possibility of developing urban environmental infrastructure projects in a commercial format. There is thus an urgent need to assess the suitability of available project proposals for development along commercial lines. This paper suggests a rapid appraisal framework to assist in this task. In view of the lack of experience in developing these projects in a commercial format, the role of the appraiser would be to also assist in developing the project. The framework is thus cast in this mould. It can be adapted for use by different actors including, state governments, statutory authorities, local authorities, financial intermediaries, other private sector sponsors or facilitators as well as potential lenders. The framework helps to review a specific project proposal to decide whether it is worth devoting further efforts and resources for detailed feasibility studies and commercial structuring of projects.

The rapid appraisal framework focuses on three important and interrelated aspects, which are discussed below. It is essential to stress that the appraisal will require considerable judgement

based on the results of analysis as well as discussions with appropriate authorities and user groups. It is quite likely that the initial appraisal may suggest potential for commercial viability, but may also require further review of some of the components. The overall process of appraisal is illustrated in Figure 1. The framework is based on the assumption that initial project development incorporating project costs and a preliminary market assessment has already been done. It can be used for any urban environmental infrastructure including water supply, sewerage, solid waste management and large scale area development projects. Some of the detailed analysis has been worked out for water supply services at this stage. Further development for sewerage, solid waste management and area development projects is underway

A. ACCEPTABLE INSTITUTIONAL ARRANGEMENTS:

The first important dimension for commercially viable projects relates to the need for an appropriate and acceptable institutional arrangement. Two aspects of the institutional options are important, first the options regarding the main agency/firm which mobilizes resources from the capital market, and the second, the institutional arrangements for project development, implementation, service delivery, price-setting, billing and cost recovery. Here, the possibility of corporatization of service delivery, including private participation to enhance efficiency and ensure greater fiscal autonomy, become important.

Institutional Options for Accessing Capital Markets:

A general review of the possible institutional arrangements for accessing capital markets for urban infrastructure suggests the following four models which essentially focus on which agency or firm mobilizes resources from the capital market. The basic features of these models are illustrated in Table 1. It is worth highlighting that corporatizing or participation of the private sector to enhance efficiency is possible under all of these arrangements.

i. Independent Project Entity (IPE) which is set up under the Companies Act, becomes the main borrower of market funds. It also manages project implementation and later service delivery, mostly through a BOO/BOOT operator. Main stakeholders in the project, including government agencies, private developers/promoters and other financial institutions, can take an equity stake in this company. Further debt is then mobilized by the IPE, thus making it an off-balance sheet activity for the promoters. Debt is largely mobilized on a project recourse basis with a complex contract framework which assesses and allocates the risks to appropriate actors.

ii. Financial Intermediary (FI): A second alternative is where a financial intermediary borrows from the market on the strength of its infrastructure loan assets to the Statutory

Functional Authorities (SFA) or municipalities. The quality of underlying assets will be of importance in determining the cost of funds for the intermediary. The financial intermediary may be either a separately set up private infrastructure bank or an existing national level governmental agency such as HUDCO. These are also can be financial intermediaries for infrastructure at the state level such as Kerala Urban Finance Corporation, Gujarat Municipal Finance Board, recently set up Karnataka Urban Infrastructure corporation or the Tamilnadu Municipal Fund which was set up under the TUDP and its conversion to a financial institution is under consideration at present.

iii. Statutory Functional Authorities (SFAs): In this model, state or metro level statutory authorities like the Water and Sewerage Boards or Housing Boards issue debt which is then lent to municipal authorities or used directly for projects. The service operations may be managed by the latter or by the SFA depending on the local practice. It will still be necessary to have a good credit assessment and market acceptance of these authorities for real market borrowing to occur.

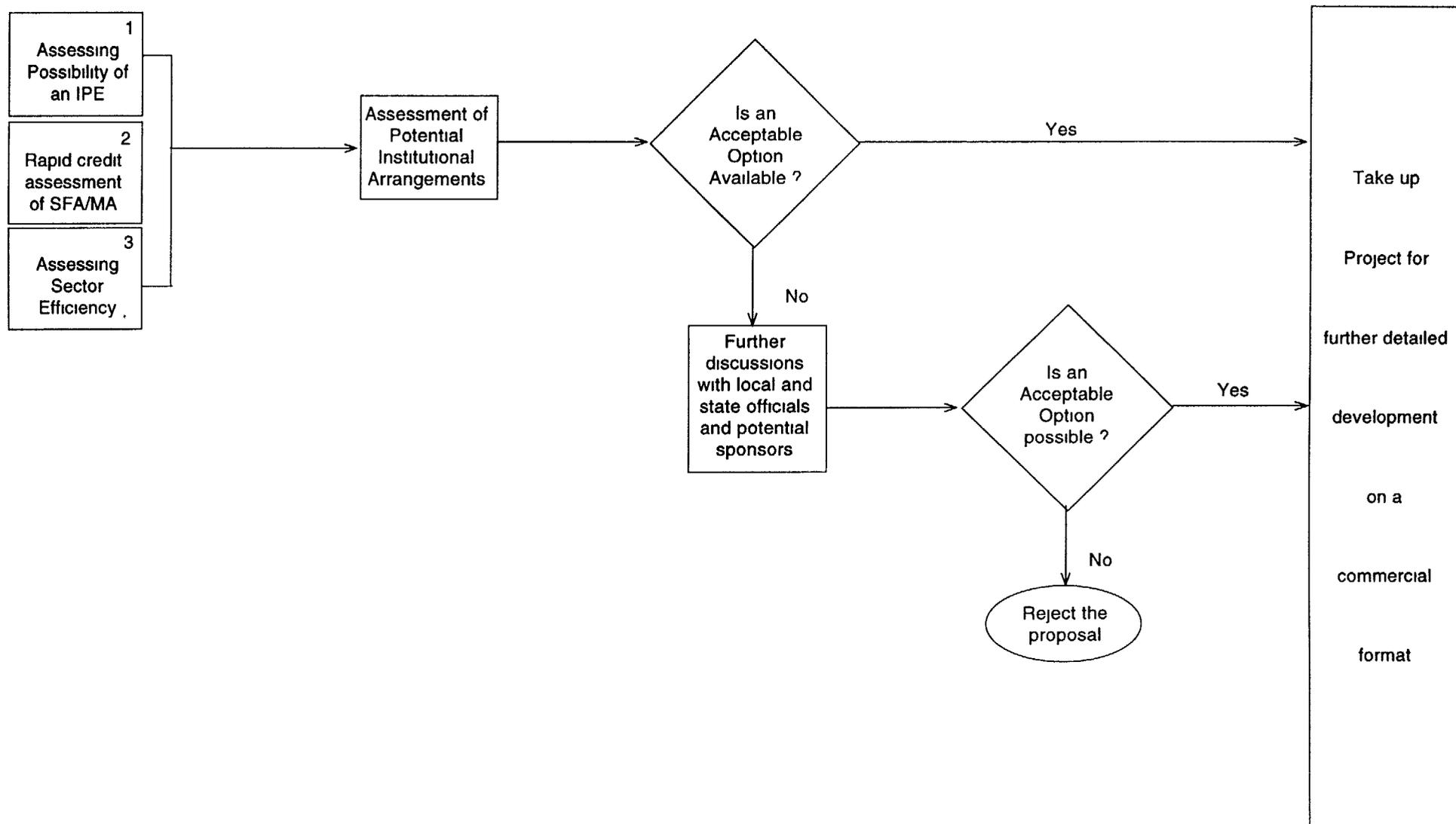
iv. Municipal Authorities (MA): In the forth alternative, the municipal authority borrows directly from the market. While in the spirit of the recent 74th CAA this would be most appropriate, the constraints related to their past market image, lack of fiscal autonomy and other legislative constraints to borrowing would limit the use of this alternative and therefore need to be addressed. Thus, the two important concerns here would be a the need for high credit assessment of the MA and the willingness of the state government to permit the borrowing.

Assessing the Alternatives: It is likely that the initial project proposal for urban infrastructure does not contain any specific proposal for institutional arrangements for resource mobilization, as most financing in the past has been through budgetary allocations only. The rapid appraisal, therefore, needs to assess whether any of the four models suggested in Table 1 are feasible for developing a commercially viable project using the criteria suggested in Table 2 for each model. Atleast, three of these require a rapid credit assessment of SFAs and/or MAs. A framework for rapid credit assessment is illustrated in Annex 1. In case more than one arrangement seems feasible, it would be necessary to choose the more appropriate one based on criteria like size and complexity of the project, possibility of improving on credit assessment and possibility of credit enhancements or other incentives. This would also necessitate discussions with the main stakeholders. On the other hand, if none of these seem suitable, further discussions can be held with the appropriate agencies to review the constraints. It is likely that a modified version of the above models may also emerge as more suitable. In case no suitable option emerges the project would be rejected for further development in a commercial format.

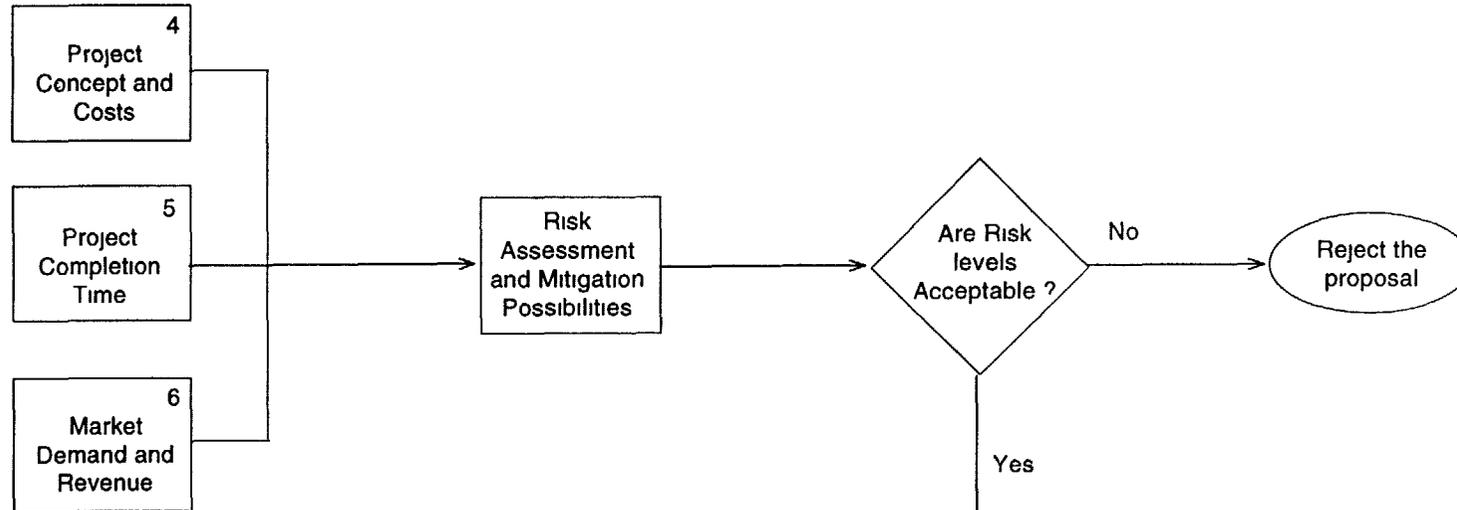
Figure 1
A RAPID APPRAISAL FRAMEWORK TO ASSESS COMMERCIAL VIABILITY OF URBAN ENVIRONMENTAL INFRASTRUCTURE PROJECTS

Studies	Initial Appraisal	Reassessment	Selection
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A. ASSESSING INSTITUTIONAL ARRANGEMENTS .



B RISK ASSESSMENT AND MITIGATION POSSIBILITIES



C. ANALYSIS OF RETURNS AND INVESTMENTS

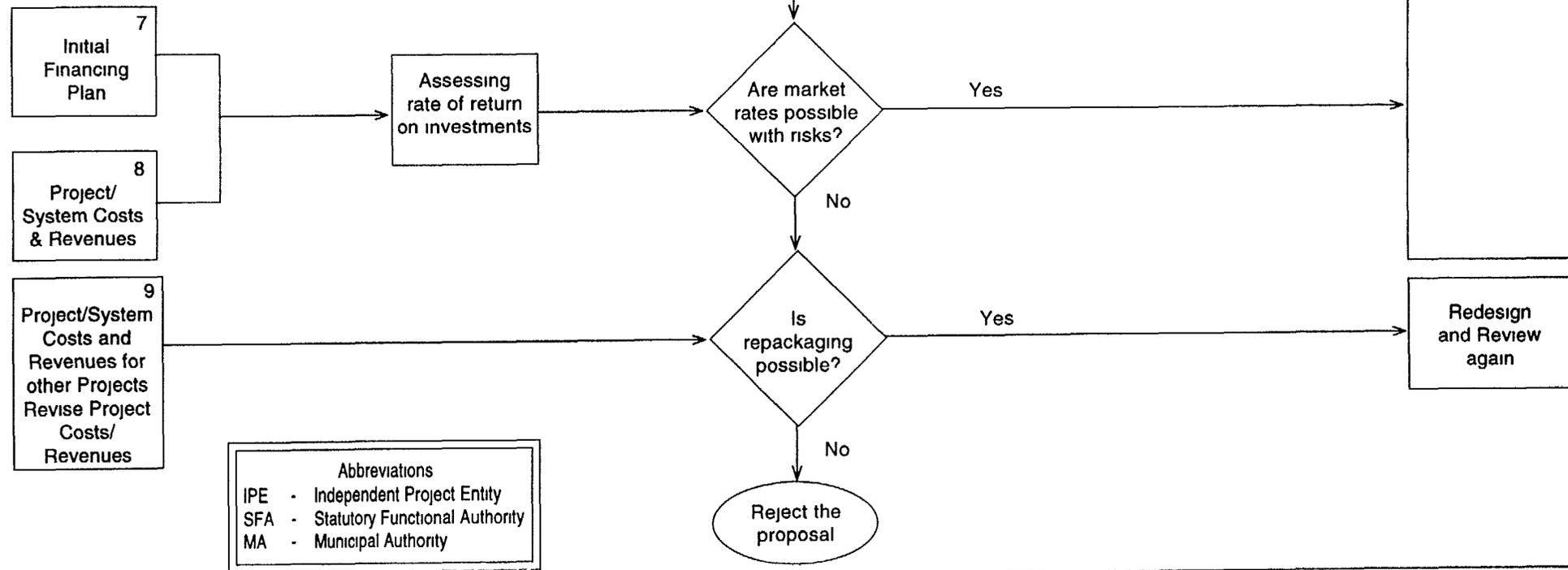
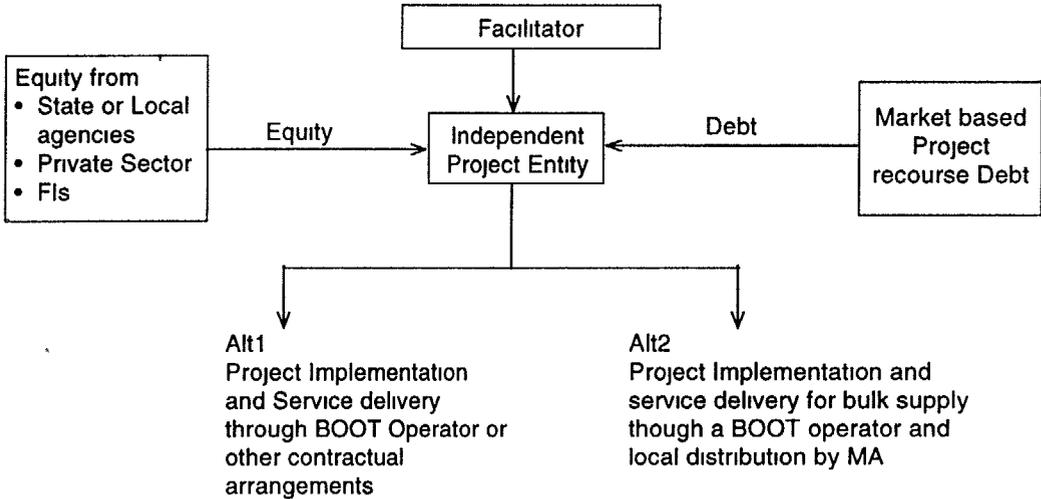
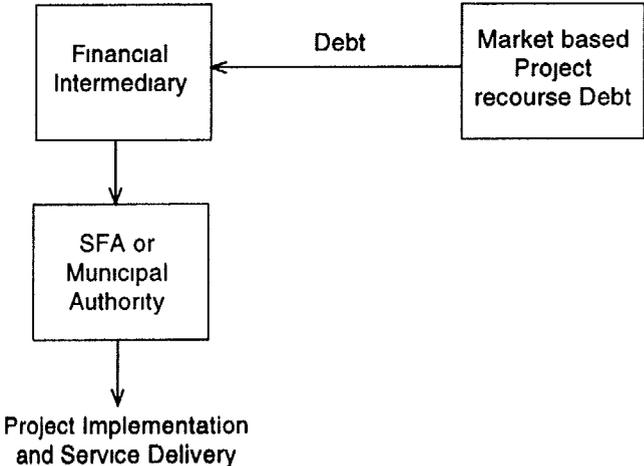


Figure 2

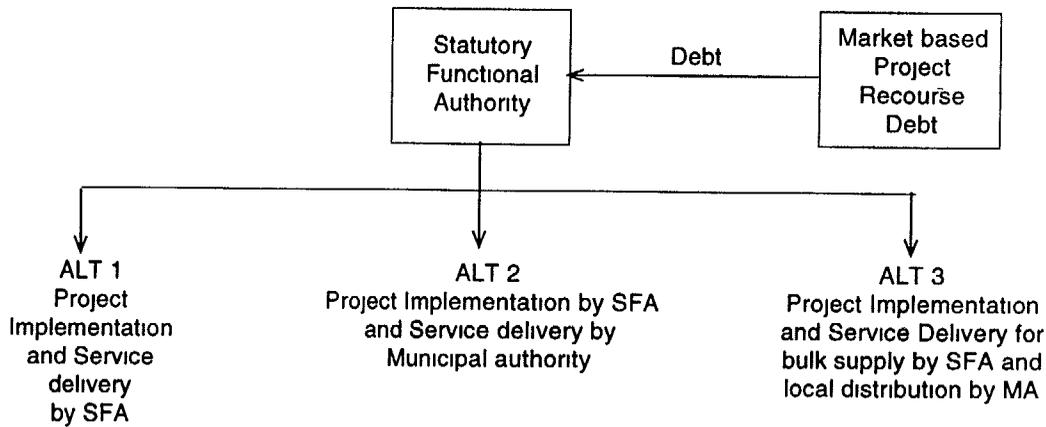
ALTERNATIVE INSTITUTIONAL ARRANGEMENTS FOR FINANCING URBAN ENVIRONMENTAL INFRASTRUCTURE THROUGH CAPITAL MARKETS

Model	Description	Issues Concerns
1 INDEPENDENT PROJECT ENTITY	 <pre> graph TD Facilitator[Facilitator] --> IPE[Independent Project Entity] Equity[Equity from State or Local agencies, Private Sector, FIs] --> IPE Debt[Debt from Market based Project recourse Debt] --> IPE IPE --> Alt1[Alt1: Project Implementation and Service delivery through BOOT Operator or other contractual arrangements] IPE --> Alt2[Alt2: Project Implementation and service delivery for bulk supply through a BOOT operator and local distribution by MA] </pre>	<ul style="list-style-type: none"> • Credit assessment gets linked to the strength of sponsors • Participation of all stakeholders potentially feasible • Role of municipal authority needs to be defined
2 FINANCIAL INTERMEDIARY AS BORROWERS	 <pre> graph TD Debt[Debt from Market based Project recourse Debt] --> FI[Financial Intermediary] FI --> SFA[SFA or Municipal Authority] SFA --> PISD[Project Implementation and Service Delivery] </pre>	<ul style="list-style-type: none"> • Poor market image of the municipal authorities and SFAs may still remain a constraint • State permissions and policy framework remain important • Credit rating / assessment will benefit if financial intermediary has a strong balance sheet

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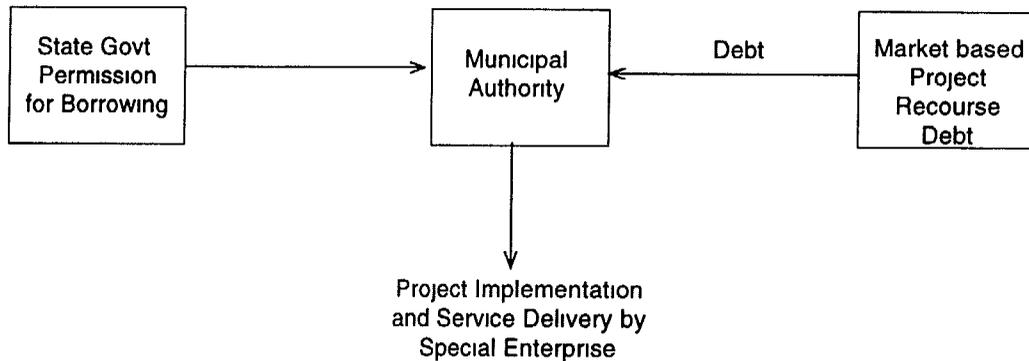
Model	Description	Issues Potentials and Concerns
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3. STATUTORY FUNCTIONAL AUTHORITIES (SFA) AS BORROWERS OR CREDIT CONDUITS



- Poor market image of SFAs may be a constraint
- Role of municipal authority may become secondary
- May be easier to link to state level policy framework

4. DIRECT BORROWING BY MUNICIPAL AUTHORITY (MA)



- Poor market image of the municipal authorities
- State government policy framework essential for granting permissions to municipal authorities to borrow
- A separate budget/enterprise for the service would be helpful

✓

Table 1
Alternative Institutional Arrangements for Commercially Structured UEIPs

Type of Arrangement	Description	Main Features Constraints and Potentials
Independent Project Entity (IPE)	Project Company set up under existing company legislation to develop proposal, manage contractors for implementation and operation, mobilize and repay debt	<ul style="list-style-type: none"> .Credit assessment linked to the strength of the sponsors .Participation of all stakeholders possible .Role of municipal authority in the IPE needs to be defined
Statutory Functional/ Authority (SFA)	Statutory functional (or financial) authority to develop and implement projects, mobilize and repay debt. (Based on the prevailing practice the O&M and cost recovery may vest with the local authority)	<ul style="list-style-type: none"> .Credit assessment likely to be poor and restructuring for efficiency improvements likely to be difficult in the short run .Role of municipal authority may become secondary
Financial Intermediary (FI)	Financial intermediary lends to either the SFA or municipal authority for the project and itself mobilizes resources from the market through project linked bonds from the market	<ul style="list-style-type: none"> .Credit assessment linked to the strength of the financial intermediary .Strength of underlying borrowers remains important
Municipal Authority (MA)	Municipal authority to develop and implement projects, operate and maintain, do cost recovery and mobilize and repay debt	<ul style="list-style-type: none"> .State government permission necessary for borrowing .Under current Securities Controls (regulation) rules, local authorities may not be able to list their securities on stock exchanges. Only private placement of securities possible .Credit assessment may be poor and restructuring for efficiency improvements likely to be difficult in the short run

Table 2
Criteria for Rapid Appraisal of Alternative Institutional Arrangements

Type of Arrangement (Agency raising project linked debt)	Criteria for Assessment and Appraisal
Independent Project Entity (IPE)	<ul style="list-style-type: none"> . Possibility of getting strong project sponsors to contribute equity to and participate in IPE . State and local government willingness to support IPE . Review of state legislation to check whether IPE arrangement is permitted for UEIPs . Need to develop appropriate regulatory and performance monitoring system . Ability to manage project implementation and operations
Statutory Functional Authority (SFA)	<ul style="list-style-type: none"> . Rapid credit assessment of SFA . Ability of the SFA to mobilize equity and subordinated debt as necessary . In case of service delivery and cost recovery by the local authority, its rapid credit assessment for collection of receivables . Ability of the SFA/MA to manage project implementation and operations
Financial Intermediary (FI)	<ul style="list-style-type: none"> . Rapid credit assessment of SFA and/or municipal authority . Ability of the SFA and/or municipal authority to mobilize equity and subordinated debt as necessary . Ability of the SFA/MA to manage project implementation and operations
Municipal Authority (MA)	<ul style="list-style-type: none"> . Rapid credit assessment of municipal authority . Ability of the municipal authority to mobilize equity and subordinated debt as necessary . Ability of the MA to manage project implementation and operations

Institutional Options for Service Delivery:

A wide variety of institutional arrangements exist for provision of urban environmental services in the country. It is almost impossible, and also inappropriate, to suggest a specific institutional arrangement as being the most appropriate one, as this depends on the local context to a great extent. However, international experience suggests that corporatization of services will help to enhance efficiency and ensure adequate fiscal autonomy to operate services on a commercial basis. In such arrangements, however, adequate regulatory arrangements are essential for performance monitoring and ensuring basic minimum service levels for all.

Based on available information, six potential alternative institutional arrangements have been identified and are discussed below. It needs to be emphasized that for a given service, it may be possible to combine more than one option by appropriate *unbundling* of the service. Two types of unbundling are possible. Vertical unbundling helps to separate different components of a service. For example, for solid waste, primary and secondary collection and disposal of waste may be effectively separated. Similarly, for water, depending on the local contexts, it may be advisable to separate out the arrangements for bulk supply and local distribution. Even within local distribution or collection, further horizontal unbundling may be possible across different zones in and outside the city. For example, the main utility may provide bulk water supply to local managements for distribution. For solid waste, local collection may be contracted to community groups, secondary collection to private contractors and waste disposal to a private firm on a BOOT basis.

i. Municipal Enterprise: In many states in the country and certainly in the spirit of the 74th Constitution Amendment Act, urban environmental infrastructure would be the responsibility of the municipal authority. However, in many cases, it may not have adequate technical capacity. Further, local political pressures may also make it difficult to introduce appropriate tariff levels to ensure commercial viability. One way of resolving the inefficiency problem would be to form a separate enterprise for the service whose ownership may still be retained by the municipal authority. Such project revenue authorities are common in US cities which use the municipal bonds to raise capital finance. The advantage of this form is that the enterprise has management and fiscal autonomy in the operation of the particular service. However, municipal control is possible for capital financing and performance monitoring. Such an authority can further contract out appropriate components of services through *unbundling*.

ii. Statutory Functional Authority: In many states in India, statutory authorities have been set up for water and sanitation services. In some states like Kerala, the state level authority takes

on the entire responsibility for water, including source development and local distribution as well as pricing, billing and cost recovery. In other cases, the statutory authority develops and implements capital projects and hands them over to the local authority for operation and maintenance. Alternatively, bulk water supply is handled by these agencies with local distribution being a responsibility of the municipal authority. It would be possible to use any of these arrangements, if they satisfy the appraisal criteria suggested below. It would also be useful to explore the possibility of using any of the following forms by appropriate *unbundling* of the particular service

iii. Management or Service Contracts: Under this arrangement, either of the above authorities contract with a private firm or community group to provide some component of the given service. In India, these arrangements have become common for services related to primary and secondary solid waste collection, maintenance of public parks and roads, etc. It would also be possible to use service contracts for components of water and sanitation systems as well as for billing and cost recovery. Such contracts, if competitively bid, can help reduce service costs and enhance user satisfaction.

iv. Concessions (BOO/BOOT): Under this arrangement, a public authority competitively negotiates a long term contract with a private company to undertake full responsibility for making the necessary capital investments for construction and rehabilitation of facilities and for carrying out the operation, maintenance, billing and cost recovery. Under BOOT arrangement, the system is turned back to the public authority at the end of the concession period. These arrangements tend to require complex contractual arrangements for which only limited experience is available globally. However, they help to considerably enhance service efficiency and effectiveness. The decision to choose this arrangement would have to be based on the efficiency of the current service authorities and the capacity to develop the BOOT mechanism.

v. Community Provision: At smaller community levels, user participation and control can help to greatly enhance the effectiveness and efficiency of the service. Such groups can be organized by the local residents as well as by businesses.

Assessing the Alternatives: The two important criteria for assessing the proposed institutional arrangements for service delivery include i) efficiency in service provision¹ and ii) fiscal

¹ For urban environmental infrastructure such information is not available readily. It becomes a high priority to document comparative performance and develop appropriate norms for each of the important services like water, sanitation and solid waste

autonomy and willingness to levy commercial prices for the given service. The assessment will have to be based on the past achievements of the agency and the proposed changes in case of new arrangements. Criteria for assessing institutional efficiency for water services in Annex 1 While it may not be necessary to reject a proposal on the basis of proposed institutional arrangements for service delivery, its effects will be captured in relation to the risks associated with project costs, implementation and revenue mobilization potential. This is discussed further in the next section.

B. RISK ASSESSMENT AND MITIGATION POSSIBILITIES

One of the main constraints in accessing capital markets for UEIPs is that the market perception of the risks in this sector is likely to be very high. This is especially true for risks during the development and construction stage. However, even in the post completion stage, risks related to the market and the ability of the relevant authority to ensure timely revenue flows to service the debt may persist. It is thus essential to assess the potential risks and the proposed risk management strategy through proper allocation and mitigation.

The overall set of possible risks for infrastructure projects is very large. However, for UEIPs, at the initial rapid appraisal stage three important risks need to be considered. Table 3 highlights these and the corresponding possible mitigation measures based on available evidence from local and international experiences. The assessment of these risks has to be from the perspective of potential lenders/financiers as their perception of risks will determine the availability and costs of capital market resources. The three important risks relate to. a). the project concept and costs; b). project completion time and resulting cost overruns, and, c). delays in debt servicing because of shortfalls in revenue due to an overestimation of market demand, an inability to revise tariffs or poor collection performance. These would depend on the proposed institutional arrangements for service delivery. Annex 2 gives detailed criteria which may be used to assess these risks.

Based on the risk assessment and possibility of a mitigation strategy, it would be useful to assess the likely probability and magnitude of risks which may still persist. While these may be considered acceptable, it would be useful to assess the impact of these risks on the rate of return on project investments, as suggested in the next section. In case some of the risks seem

management This would also provide guidelines for agencies to monitor and enhance their efficiency

too high and difficult to alleviate or mitigate, the project may be rejected for development on a commercial format. It may be emphasized that it is important to create a favourable market image for this sector at this stage. It would thus not be advisable to develop highly risky projects with unproven technology or demand at this stage.

Table 3
Risk Analysis for Rapid Appraisal of UEIPs for Commercial Viability

Type of Risk	Risk Assessment, Allocation or Mitigation Measures
Project Concept and Costs	<ul style="list-style-type: none"> .Review similar projects in the region .Use thumbrule cost norms for comparison .Review of recently completed tenders for similar works in the region .Necessary permissions for raw water, effluent or solid waste disposal etc. taken?
Project Completion period	<ul style="list-style-type: none"> .Check on the status of site possession for infrastructure works .Review the delays in past projects of the same (or similar) agencies .Experience and management capacity of IPE/SFA/MA for project implementation and management through separate contractors or BOO/BOOT framework .Assessment of proposed contract framework for construction phase .Insurance arrangements, if any
Market/ Demand (Revenues)	<ul style="list-style-type: none"> .Verify demand forecasts based on trends, consumption practices and discussions with major user groups Whether agreements for market access have been made .Take or pay contracts with bulk consumers or structured debt obligation (SDO) possibilities .Verify whether essential permissions for (immediate and over time) tariff revisions taken .In case of poor credit assessment of borrowing agencies whether alternative guarantees or SDOs to ensure timely debt servicing are possible.

Assessing Additional Project Potentials While risk assessment generally focuses on likely problems, in some situations it may also be necessary to assess additional alternatives for achieving commercial viability. For example, the rapid market assessment may suggest that higher prices are possible for some user groups or new measures like advanced registration charges or land based measures may be introduced. Alternatively, the costs may be reduced by using more decentralized options or by more appropriate service standards. This aspect may become crucial for project development as the existing tariff structures in most cases will simply not be sufficient to ensure commercial rates of return.

C. ANALYSIS OF RATE OF RETURN ON PROJECT INVESTMENTS

For accessing resources from the market, it is imperative that the returns from these investments are adequate to match the market expectations in relation to the perceived risks of the project and the sector. It is likely that initial projects will require higher returns due to the likely market perception of high default spreads. Over time, if the market image of the urban infrastructure improves, it will be possible to reduce the default spread requirements. It is also likely that default spreads can be reduced by appropriate structuring of debt obligations. This would require details of large and reliable consumers with an assured rate of return that will service the debt instruments.²

The rapid appraisal of UEIPs would require fairly reliable estimates of project costs and revenues over a period of 15 to 20 years. Based on these, and a broad financing pattern amongst equity and different types and sources of debt, it is possible to generate separate estimates of the rate of return on equity as well as on total investments. Sensitivity analysis to assess the impact of potential risks, such as an increase in project costs due to underestimation or delays in implementation, inadequate collection of receivables, lower than predicted demand, etc., as well as further project potentials like additional revenues or reduced project costs, needs to be also incorporated. Tables 4 and 5 illustrates the type of analysis required for this assessment.

² For example, at least two state governments have used such structured debt obligations (SDOs) in recent years for core sector investments. In these, reliable revenue streams with adequate debt service coverage are escrowed with a final performance guarantee by the state government. Rajasthan Industrial Investment Corporation was able to raise Rs. 250 crores through 7 year bonds at a coupon rate of 14.5 percent under such an arrangement. The issue was rated at investment grade and ICICI served as the trustees to the issue (Business India).

Table 4
RAPID APPRAISAL OF PROJECT RATES OF RETURN
 (All monetary values are in Rs Lakhs)

Base Case

Item	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1 Total Project Cost	1655	3510	3720	4929	5225	0	0	0	0	0	0	0	0	0	0	0
2 Operation and Maintenance	0	0	0	0	0	1552	1704	1880	2064	2272	2496	2736	2992	3280	3584	3928
3 Debt Servicing of Outstanding Loans for Existing System	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4 Operating Revenue	0	0	0	0	0	8112	10432	11648	12712	13816	15008	16264	17560	18944	20440	22056
5 Other Revenue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Total Revenue</i>	0	0	0	0	0	8112	10432	11648	12712	13816	15008	16264	17560	18944	20440	22056
6 Net Cash Flows (before Servicing Debt)	-1655	-3510	-3720	-4929	-5225	6560	8728	9768	10648	11544	12512	13528	14568	15664	16856	18128
7 Debt Servicing for Debt 1	0	0	0	0	0	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390
8 Debt Servicing for Debt 2	0	0	0	0	0	1015	1015	1015	1015	1015	1015	1015	1015	1015	1015	1015
9 Debt Service Coverage Ratio	0 00	0 00	0 00	0 00	0 00	2 73	3 63	4 06	4 43	4 80	5 20	5 62	6 06	6 51	7 01	7 54
10 Debt Service Reserve	0	0	0	0	0	1203	0	0	0	0	0	0	0	0	0	0
11 Depreciation	0	0	0	0	0	0	200	214	229	245	262	281	300	321	344	368
12 Other Requirements	0	0	0	0	0	0	100	107	114	123	131	140	150	161	172	184
13 Net Project Cash Flow	-1655	-3510	-3720	-4929	-5225	2952	6023	7042	7899	8771	9714	10702	11713	12777	13935	15171

FINANCING PLAN

	<u>Amount</u>	<u>As a % of Cost</u>			
14 Equity Component	5712	30 00			
15 Debt Component	<u>Amount</u>		<u>Interest Rate</u>	<u>Repayment Period</u>	<u>Starting Year for Repayment</u>
a Debt 1	6664	35 00	18 00	12	2000
b Debt 2	6664	35 00	15 00	30	2000
16 Total (Equity+Debt)	19039	100 00			
17 Discount Rate for Present Value Analysis in %		15 00	Average Cost of Debt	16 5	
18 Internal Rate of Return on Total Investments				33 06	
19 Internal Rate of Return on Equity				28 00	
19 Debt Servicing Coverage Ratio				6 57	
20 Net Present Value of Item 13				25203	

Note The bold items have to be given as inputs

Table 5
RAPID APPRAISAL OF PROJECT RATES OF RETURN
 (All monetary values are in Rs Lakhs)

Summary Table

a Sensitivity Analysis for Project Alternatives

Alternatives for Project Alternatives	Total Project Cost	Financing Plan			Performance Indicators			
		Equity	Debt 1	Debt 2	IRR on Total Investments in %	IRR on Equity in %	Debt Service Coverage Ratio at specified discount rate	NPV at specified discount rate
1 Base Case	19039	5712	6664	6664	33.06	28.00	6.57	25203
2 Staggered Industrial Demand	19039	5712	6664	6664	27.85	23.08	5.48	17509
3 Staggered Industrial Demand and Sanitation	38254	11476	13389	13389	18.69	13.40	2.44	-5082
4 Base Case and Sanitation	38254	11476	13389	13389	21.71	15.31	2.98	913

b Sensitivity Analysis for Financing Alternatives

Alternatives for Financing Plans	Total Project Cost	Financing Plan			Performance Indicators			
		Equity	Debt 1	Debt 2	IRR on Total Investments in %	IRR on Equity in %	Debt Service Coverage Ratio at specified discount rate	NPV at specified discount rate
1 Base Case								
2								
3								
4								

A simple financial analysis model has been developed to assist in this analysis. The first part of this enables an assessment of key performance indicators (rate of return on equity and investments, debt service coverage ratio, and net present value) based on the project costs and revenues and initial financing plan. Sensitivity analysis permits a comparative assessment of impacts of up to four alternative scenarios in relation to the base case, both for project scenarios and financing plan related alternatives.

The second part of the model is sector specific and has been developed for the water sector with a possibility of including sewerage services. It enables a more detailed analysis of water quantities and tariff plans. The three alternatives for tariff revisions enable an assessment of aggregate revision in prices requires to ensure a defined market rate of return, an annual tariff revision plan and the impact of more detailed tariff setting for different user categories. The model is kept flexible to incorporate a variety of charges and cost recovery mechanisms. The detailed approach is given Annex 3

The project acceptance is obvious when the market rate of return is possible after a risk related sensitivity analysis. In case of rates which are marginally lower, it would be worth exploring the possibility of combining the project with other more remunerative ones. Similarly, it would be useful to explore the possibilities of other innovative cost recovery mechanisms like land management, capacity allocations, linkage fees, etc. The entire package may be then reviewed again for commercial viability.

Annex 1

AGENCY ASSESSMENT

The first part of the institutional assessment requires two specific aspects related to i) credit assessment of statutory functional authorities or municipal authorities and ii) assessing agency efficiency for the project sector. Approaches for such assessments have not been adequately developed so far since past financing and agency structures have not demanded efficiency concerns. However, with the changing financial patterns and the increasing emphasis on public-private partnerships, these become important. The following section suggests a rapid assessment approach for agencies regarding these two aspects.

A. Credit Assessment:

The credit assessment of SFAs and MAs focuses on their ability to meet the overall obligations for timely servicing (principal and interest) of debt instruments. While the debt is envisaged to be on a project recourse basis, an overall credit assessment of the authority is necessary for two purposes. First, it relates to the possibility of an SFA or MA diverting project operating revenues to general agency requirements. On the other hand, in case of inadequate operating surplus from project sector accounts in some years, it is necessary to assess the ability of the agency to provide short term backstop assistance to the project or enterprise/account to make timely payments for debt servicing. Lastly, it should also help to assess the capacity of the agencies to meet project equity requirements and mobilization of additional debt.

This necessitates a general assessment of the agency in relation to its past debt management performance, past fiscal capacity (potential and realized) and the potential revenue surplus over the next five years or so after meeting its committed revenue expenses and debt servicing. It also requires a qualitative probe into the procedures used for decision making on important financial decisions. The final assessment rests on a balanced opinion based on experience, judgement, as well as results of well informed and impartial analysis of critical dimensions.

The notion of credit assessment of SFAs and MAs is new, because, their past borrowing has largely been with government guarantees. To this extent, the credit assessment must also incorporate the potential of restructuring or performance improvements within a short time period, before the envisaged date for the issue of project linked debt instruments. Ideally, if project development resources permit, it would be useful to get a recognized credit rating agency

to do a credit assessment and suggest means for enhancing it in the short term. Alternatively, the appraiser can follow the rapid credit assessment approach suggested below.

The revenue raising ability of an SFA or an MA is the result of many complex and interdependent variables. At this stage, the rapid appraisal focuses on the following two main dimensions. Within each, both qualitative assessment and analysis of the indicators suggested below needs to be carried out. The quantitative analysis needs to be carried out for past 3 to 5 years

1. **Debt Management**, assesses the authority's performance on past resource mobilization, utilization and debt servicing.

Qualitative Assessment:

- i. How does the SFA/MA decide on its resource mobilization strategy? Are at least five yearly plans made for evolving such a strategy?
- ii. Does the SFA/MA use reasonable forecasting methods to assess and prioritize different requirements? Does the SFA/MA use the type of ratios suggested below in making capital investment decisions?
- iii. Have there been delays in loan repayments in the past? Have, in any case, payments (principal and interest) been overdue for more than 9 months? What were the reasons?
- iv. How have the short-term liquidity problems in initial years and delays in loan repayments been managed? (For example, through bank overdrafts, borrowing from other municipal funds)
- v. What has been the extent of loans/borrowing approved by the state government in relation to the permissions sought by the SFA/MA? What are the reasons for this?
- vi. What are the state legislative and other regulations on the total borrowing which can be done by SFAs/MAs? How much remaining borrowing potential does the agency have in relation to these?

Performance Indicators:

- | | | |
|------|-----------------------|--|
| i | Debt Mobilization: | Ratio of total external debt mobilized to total owned funds used for capital expenditure |
| ii | Debt-Equity Ratio: | Ratio of outstanding debt to total owned funds |
| iii. | Debt Servicing Ratio: | Debt servicing as a % of total revenue expenditure |

- iv. Debt Serv Coverage Ratio: Operating surpluses (before debt servicing and depreciation) as a multiple of total debt servicing requirements on all outstanding debt
- v. Debt Serv Performance: Annual delays in debt servicing as a percent of total debt servicing requirements
- vi. Capacity for Project debt: Ratio of proposed project debt to total debt mobilized in last five years

2. **General Fiscal Capacity**, addresses the issue of agency capacity to meet the requirements which may arise due to unforeseen shortfalls in sectoral revenues leading to delays in debt servicing.

Qualitative Assessment:

- i. What are the procedures for prioritizing expenditure across different sectors or projects/areas?
- ii. What procedures will be necessary for allocating general revenues of the SFA/MA for meeting short term revenue needs in case of delays in debt servicing for project linked bond instruments ? What procedures will be necessary to allocate general or sectoral surpluses to equity of sectoral projects? Would it be possible to fund a debt service reserve fund from the general revenues of the authority ?
- iii. Has the agency made five year projections for income and expenditure? Has this been assessed in relation to the expected project costs and revenues? How reliable are these projections?
- iv. Does the SFA/MA maintain an inventory of its assets (physical as well financial) ?
- v. Is there a possibility of project surplus being accessed for other expenditure before meeting project related debt servicing requirements?
- vi. What efforts have been made in the last three years to enhance the collection efficiency for tax and other receivables? Have any innovative cost recovery mechanisms been introduced successfully in the past three years?

Performance Indicators:

- i. Own resources: Share of own resources as a % of total revenue income.
- ii. Elasticity of own resources. Buoyancy of own resources with respect to total revenues.
- iii. Revenue surpluses: Revenue surplus generated after meeting all operating

- expenses and existing debt servicing as a % of total revenue income for the past three years and next five years.
- iv Tax Coll. Effi.: Ratio of actual collection to total demand

B. Agency - Sector Efficiency:

The second part of institutional assessment focuses on measuring sectoral efficiency. The following efficiency criteria are suggested for the water supply sector. Unfortunately norms for different efficiency parameters are not readily available. Further research needs to be undertaken to identify and develop sector norms for different urban environmental infrastructure.

Efficiency Criteria:

Water Supply:

(Analysis needs to be done for the last 3 to 5 years)

1. Costs per unit water produced (Rs/Kl)
2. O&M costs for source and transmission per unit water produced (Rs/Kl)
3. O&M costs for distribution per unit water supplied (Rs/Kl)
4. Salary costs per unit water produced (Rs/Kl)
5. Share of salary costs in total costs (%)
6. Billing and cost recovery costs per connection (Rs/conn)
7. Share of Unaccounted for Water (%)
8. Costs per unit water billed (Rs/Kl)
9. Connections served per Employee

Annex 2

PROJECT RISK ASSESSMENT

Urban infrastructure projects are likely to have a wide variety of risks associated with them. However, at the stage of initial rapid assessment for commercial viability, three risks are identified which are likely to affect project costs and revenue streams. The important concerns of each of these and the type of indicators which may be used for assessment are discussed in the following section.

A. Risks Related to Project Concept and Costs:

At the stage of initial assessment it is essential to assess the reliability of the main project concept in terms of feasibility within a reasonable period and the cost estimates suggested for main project components

Qualitative Assessment:

- i Does the project propose technologies which have been used successfully in the region or does it propose using technologies which are new to the region or have not had a reasonable period of usage to be deemed successful ?
- ii How have the project costs been estimated? Were known/reputed agencies involved in project formulation?
- iii Have necessary permissions been taken (or well in progress) for access to raw water, effluent or solid waste disposal?

Assessment Indicators:

- i. For each main component of the service in question, compare with available cost norms, as suggested below for water supply

Table A2.1
Cost Assessment for Water Supply Projects

Component	Unit	Total Quantity	Total Cost	Proposed Cost/unit	Norm Cost/unit
SOURCE and TRANSMISSION					
Land acquisition					
Intake works					
Treatment plant					
Service reservoir					
Pumping machinery					
Pump house					
Rising main					
Total		Mld			
DISTRIBUTION					
Storage reservoir					
Pumping machinery					
Pump house					
Distribution network					
Zone 1					
Zone 2					
Zone 3					
Zone 4					
Zone 5					
Total					
OTHERS					
Total		Mld			

B. Project Completion Period:

One of the riskiest phases in the life of an infrastructure project is the construction period. It is thus necessary to assess the risks associated with this for the proposed project. The likely

project delays also need to be identified.

Qualitative Assessment:

- i. Have the land acquisition procedures for the sites required for project facilities been initiated and are they expected to be over before the estimated date for project initiation?
- ii. Does the agency which is expected to manage the project construction have the requisite experience ? What had been the past experience with similar projects ?
- iii. How well has the project contract framework been thought out to avoid time delays?
- iv. What has been the general experience of this or similar agencies in the region with respect to completion delays for similar projects?
- v. Has the project finance during the construction phase been arranged? Is this likely to cause delays?

Assessment Indicators:

1. Ave proj period: Average time taken for similar projects in the past
- ii. Ave proj delays: Average time overruns in similar projects in the past
- iii. Cost overruns: Average cost overruns due to time delays for similar projects in the past

C. Project Revenue Risks:

In a project recourse lending one of the main risks relates to the reliability of projected revenue streams. While this would be based on a variety of interrelated factors, two aspects are important for risk assessment. The first relates to reliability of demand assessment and the second to sectoral revenue management.

1. **Demand Assessment**, includes past trends in consumption, economic profiles, consumption practices and price elasticity of demand.

Qualitative Assessment:

1. Have the user categories been carefully identified and their ability and willingness to pay assessed before determining a tariff structure?
- ii Has the growth in non domestic units and connections been linked to the local economy?
- iii Has the demographic growth been estimated properly for forecasting the domestic

connections and consumption?

- iv. Has adequate provision been made for the likely time lags in domestic and non domestic users actually taking connections and the level of consumption? This would be especially relevant when significant tariff increases are proposed and alternative water sources like private underground sources or private water markets exist at competitive rates.

Assessment Indicators:

- i. Consumption forecasts: Annual increase in consumption for each category compared to past trends (% increase in KI/conn)
 - ii. Domestic Coverage: Domestic connections as a proportion of total households over time (%)
 - iii. Non domestic coverage: Non domestic connections by type as a proportion of total units of each type over time (%)
 - iv. Domestic Tariffs: Monthly water bills as a proportion of monthly household income for different domestic user groups (%)
 - v. Non-domestic Tariffs: Ratio of proposed non-domestic tariffs (Rs/KL) to prevailing costs (Rs/KL) of alternative sources.
2. **Sectoral Revenue Management**, including authority and exercise of powers of price setting, revisions, billing and cost recovery management and actual cost recovery performance.

Qualitative Assessment:

- i. Are the prices (user charges) for the given services determined in relation to total system costs for the service and market assessment for the service ?
- ii. How are the prices/charges revised ? How much autonomy does the SFA/MA have in determining and revising the tariffs ?
- iii. How often have the prices been revised and what were the considerations used for the revisions ?
- iv. Is it possible to introduce the notion of annual indexation of tariffs?
- v. What is the staff allocation and utilization for billing and cost recovery? Is any systematic analysis of receivables done for operational management ? Are any performance incentives available for improving the collection efficiency ? Are any penalties or sanctions initiated to induce compliance with revenue payments? Have any efforts been made to involve private firms to assist in billing and cost recovery ?

- vi. Are the accounts for the given service maintained separately for proper cost measurement and price setting ?

Performance Indicators:

- | | | |
|------|-----------------------------|---|
| i. | Cost coverage ratios: | Ratio of total operating revenues to total costs including O&M, debt servicing and depreciation |
| ii. | Average price revision: | Average annual revision in tariffs (Rupees per unit quantity) over the past five years |
| iii. | Approval of price revision: | Ratio of price revision approved to proposed revisions |
| iv. | Collection performance: | Actual revenue collection as a % of total current demand and arrears |
| v. | Bad delays: | Outstanding payments of more than 9 months overdue as a proportion of total annual demand |

Annex 3

Rate of Return Analysis for UEIPs

The rate of return analysis for UEIPs has been developed for two approaches incorporating a greater degree of refinement. The first is a general approach where the analysis helps to assess the project performance on key indicators using a reliable stream of project costs and revenues. In the second approach, the required aggregate tariff revisions are assessed in relation to the cost of funds in the market and past tariff levels. This helps to assess the feasibility of tariff revisions which may be required and the need for exploring new cost recovery mechanisms or repackaging.

The model also provides for sensitivity analysis to assess the impact of different alternatives on key performance parameters. The model is kept flexible to enable the user to identify and develop different scenarios for sensitivity analysis. These two approaches are developed as a computer simulation model using spread sheet software

Sub-Model 1: General Rate of Return Analysis

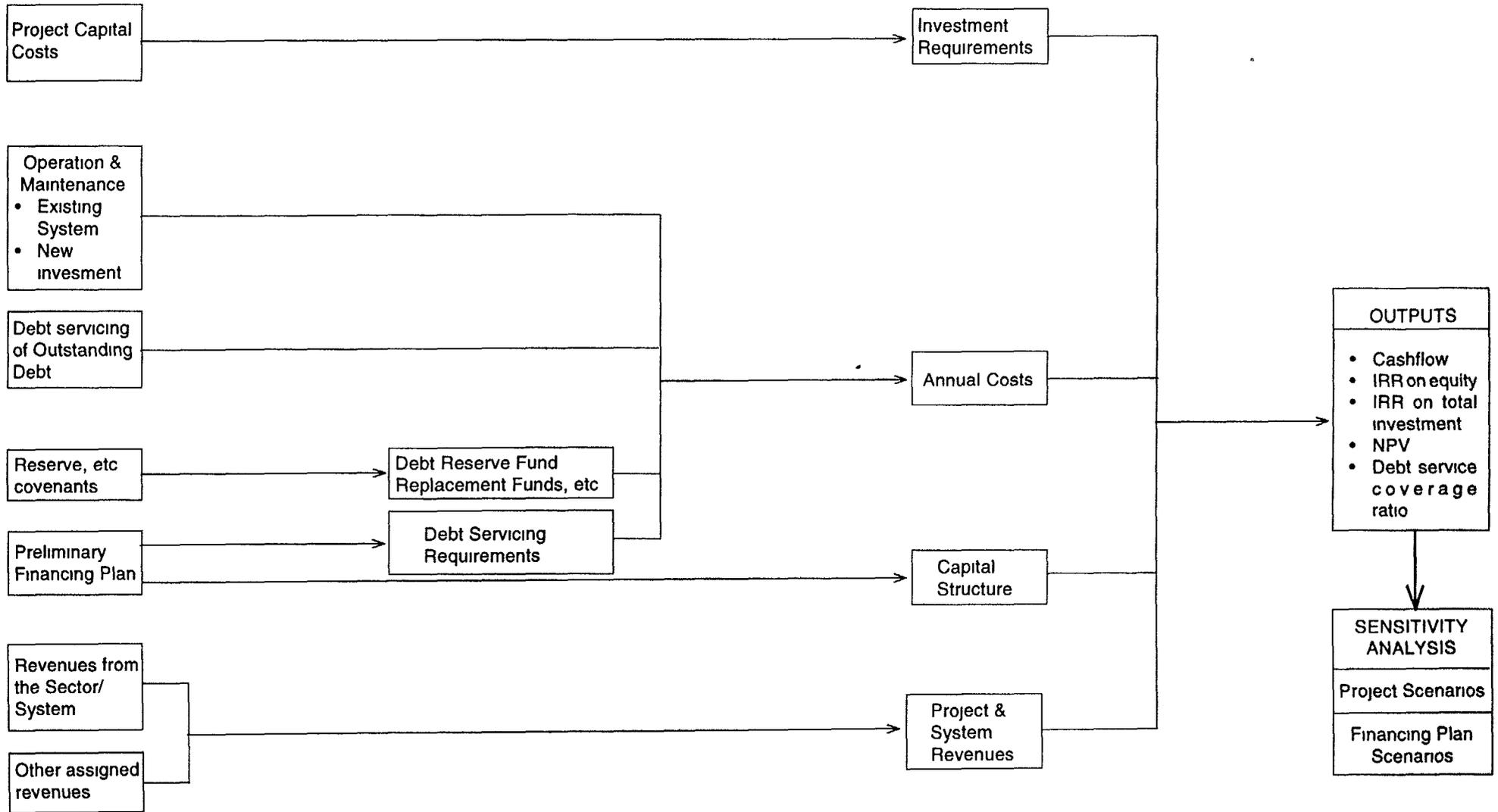
This sub-model enables a simple rate of return analysis based on project and system costs, revenues and a preliminary financing plan. Table A3.1 illustrates the inputs (bold characters in this table indicate inputs) and outputs of this model. As it is kept general, it can be used for any urban environmental infrastructure project. Its effective use will be dependent on the quality of information related to the stream of project costs and revenues. The approach of this model is presented in figure 3.

Inputs :

Inputs need to be either collected from project reports or have to be developed in consultation with the particular agency.

1. **Starting Year** . This is the beginning year of analysis which may also be the starting year of project implementation. The time frame provided in the model is for 30 years.
2. **Total Project Costs** : These are capital costs of the project over the implementation period which consist of base costs, physical contingencies, price escalation, design, engineering and supervision charges and interest during construction. User will have to input total project costs over time based on either reported values or detailed analysis done outside the model These values are at current prices.

Figure 3
FINANCIAL MODEL FOR GENERAL PROJECT VIABILITY ANALYSIS



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3. Operation and Maintenance . This includes the costs of operation and maintenance for both the existing service system as well as the new system being developed as a part of the project. These values are at current prices and need to be linked to the expected consumption/demand over the time.
4. Debt Servicing on Outstanding Loans for Existing System : This represents debt servicing obligations of the agency towards the loans taken for creation/maintenance of the existing service system.
5. Operating Revenues : This indicates revenues from charges/taxes related to the service for both existing and the new service system.
6. Other Revenues : This indicates revenues other than those from charges/taxes which can be used for project.
7. Debt Service Reserve : This line item indicates the provision for debt service reserve similar to that of power projects escrow accounts where part of operating revenues are kept aside for meeting the debt service obligations in case of revenue shortfalls. The amount of this reserve requirement should be based on the risk and credit assessment. It is a one time requirement with the facility of replenishment in case of withdrawal. For example, in the case of a BOT project for water in Indonesia, the amount of debt service reserve is kept equal to 6 months' of debt servicing obligations.
8. Depreciation : This represents the depreciation of assets. Depreciation needs to be worked out separately for existing assets and the equity portion of the project. In the case of existing assets, it may be taken as a fixed percentage of the total value of these assets. On the other hand, for a new project, depreciation needs to be calculated only on the equity portion of the project since debt servicing captures the debt portion.
9. Other Requirements : This may include provision for tax (corporate income tax) liabilities in the case of an independent project entity as well as specific reserves to meet other contingencies such as wage revisions, etc.
10. Financing Plan : This indicates the likely financing plan envisaged. The main inputs of this plan are,
 - i. Equity as a % of Project Cost : Equity amount as a percentage of total project costs needs to be indicated. This could either be from the agency's own funds or from stakeholders in the case of IPE. In case of an SFA or MA as the implementing agency, the equity amount represents the portion of capital costs which is met from their own funds.
 - ii. Debt: Provision is made for two types of debt. These may be from financial institutions, government and/or direct borrowing from the capital market. The user needs to indicate debt as a percentage of project cost, rate of interest,

repayment period and starting year for repayment for each type of debt. Debt servicing requirements are calculated on a equated annual payment basis. Even in case of instruments maturing after a longer period, the capital recovery portion is assumed to be kept in a special reserve as per the usual practices related to sinking funds.

- iii. Discount Rate : This is used to discount the future stream of costs and revenues. This may be based on either opportunity cost of capital or average cost of debt which is indicated in table A3.1.
11. Sensitivity Analysis of Project Scenarios : Model provides for three sets of scenarios to enable the user to analyse the impact of changes in project variables on key performance parameters. These three scenarios are compared to the base case. The financing plan in each scenario remains the same as that of base case. However, the scenarios may be for different situations such as: delayed project implementation schedule; over estimation of demand (revenue overestimation); cost overruns, and, repackaging of the project (combining of additional projects with base case and/or deleting some of the components of base case). In each of these three scenarios, the user needs to indicate the title for each scenario and change accordingly the corresponding inputs such as, total projects costs, operation and maintenance, operating revenues, debt service reserve, replacement fund and other requirements.
12. Sensitivity Analysis for Financing Plan Alternatives : The second set of sensitivity analysis enables the user to analyse the impact of different financing plan alternatives, keeping the project details constant. The inputs related to financing plan like share of equity and debt, cost and terms of debt, etc., may be varied in each scenario.

Outputs :

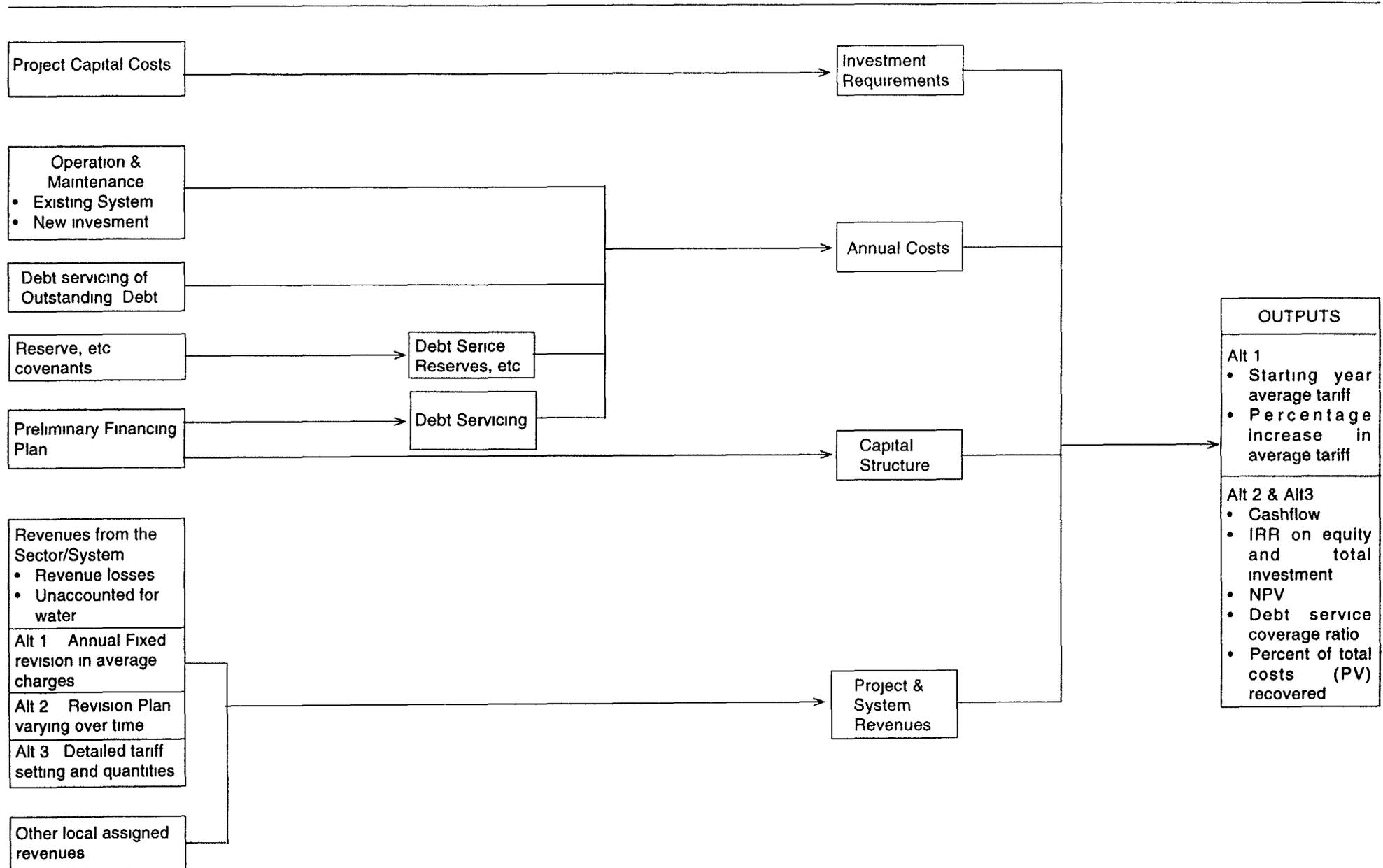
1. Annual Debt Service Coverage Ratio : This is calculated as a ratio of revenue surplus (item number 6 in table A3.1 - available after meeting operating and maintenance costs as well as debt servicing of outstanding loans for existing system) to debt servicing obligations for the project (summation of item numbers 7 and 8). It is calculated for each year of the project and indicates the likely debt servicing capacity of the project over the time frame of project analysis.
2. Net Project Cash Flow : This indicates the likely net cash flow of the project for each year of the project analysis. It is the net revenue after meeting the operating and maintenance, debt servicing (both project and existing system), debt service reserve requirements, depreciation and other requirements. See item number 13 of the table A3.2

3. Internal Rate of Return on Investments : This is an important indicator in rate of return analysis. It corresponds to total investments and to the time frame of the project analysis. It indicates the overall returns of the project
4. Internal Rate of Return on Equity : This indicates the likely returns on equity after meeting debt servicing requirements (for both project and existing system), debt service reserve, depreciation and other requirements.
5. Debt Service Coverage Ratio : Indicates the debt coverage ratio at the project level as against output 1 which is over time. It is the ratio of the present value of net cash flow before servicing debt (item number 6, excluding the net surplus during project implementation period) to the present value of debt servicing requirements (item numbers 7 and 8 of table A3.1). The specified discount rate is used for the present value analysis.
6. Net Present Value : It is the present value of net project cash flow (item number 13 of table A3.1).
7. Sensitivity Analysis : Outputs 1 to 6 are repeated for each of the three scenarios (which are discussed in the inputs section). Also, a summary table consisting of a comparative analysis of four scenarios with the base case is presented. This summary table consists of total project costs, equity, debt, internal rate of return on total investments, internal rate of return on equity, debt servicing coverage ratio and net present value for each of the three scenarios and for base case.

Sub-Model 2 : Sector Specific Rate of Return Analysis

This sub-model produces a sector specific rate of return analysis. It has been developed for water supply (with a possibility of including sanitation also) in the first stage. The analysis is based on detailed costs, consumption, preliminary financing plan, and tariff revision plans. Table A3.2 illustrates the inputs (bold characters in this table indicate inputs) and outputs of this model. Using this sub-model, the required aggregate tariff revisions can be assessed in relation to the cost of funds in the market and past tariff levels. It helps to assess the feasibility of tariff revisions which may be required and the need for exploring new cost recovery mechanisms or repackaging. Impact of more detailed tariff revisions enables the user to assess the project viability in relation to exploring new tariff or cost recovery measures. The approach of this model is presented in figure 4.

Figure 4
FINANCIAL MODEL FOR WATER PROJECT VIABILITY ANALYSIS



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Inputs :

1. **Project Costs** : The main inputs related to project costs are,
 - i. **Year of Base Costs** : The year corresponding to prices used for estimation of base costs
 - ii. **Base Costs** : Base costs need to be given for different components of the project. These components may include source development, transmission, treatment and distribution network. This analysis also facilitates bundling/packaging of different services such as water supply and sanitation and water supply and land development.
 - iii. **Price escalation to starting year** : This is the percentage per annum for escalating the base costs to the starting year of project implementation.
 - iv. **Physical Contingency** : This needs to be given as a percentage of base cost.
 - v. **Price escalation during Construction Period** : This needs to be presented as a percentage per annum. It corresponds to starting year base costs and physical contingencies.
 - vi. **Design, Engineering and Supervision Charges** : It needs to be given as a percentage of the escalated cost.
 - vii. **Interest During Construction** : This needs to be given as a percentage per annum and applicable on the total of above mentioned costs. It is capitalised in the project costs.
2. **Starting Year of Project** : This is the starting year of project implementation or analysis.
3. **Phasing** : This is the phasing of the project over time. The values are in percentage distribution of project work over time.
4. **Operation and Maintenance** : These costs need to be given separately for the existing service system and for the new system.
5. **Debt Servicing of Outstanding Loans for Existing System** : This is the debt servicing requirements of the existing service system.
6. **Depreciation** : This is the depreciation of existing assets as well as new assets created as a part of the project. For calculating depreciation of new assets, the equity part of the project should be considered, since the debt servicing already includes a capital recovery portion as a part of the principal repayment. Depreciation should also represent the replacement of equipment which is cyclic in nature.
7. **Debt Service Reserve** : This line item indicates the provision for debt service reserve where part of operating revenues are kept aside for meeting debt service obligations in case of revenue shortfalls. The amount of this reserve requirement should be based on the risk and credit assessment. It is a one time requirement with the facility of replenishment

in the case of withdrawal. For example, in the case of a BOT project for water in Indonesia, the debt service reserve amount is kept equal to 6 months' of debt servicing obligations.

8. **Other Requirements** : This may include provision for tax (corporate income tax) liabilities in the case of independent project entity as well as specific reserves to meet other contingencies such as wage revisions, etc.
9. **Future Consumption** : (In Million Litres per Day (MLD) over time). This is the billable supply excluding water losses and water supplied for public use and free connections. This needs to be given separately for the existing service system and for the new system.
10. **Unaccounted for Water** : This must be given as a percentage of total production. This may include water leakages in transmission, treatment, distribution and supply to public uses as well as free connections.
11. **Financing Plan** . This indicates the likely financing plan envisaged. The main inputs of this plan are,
 - i. **Equity as a % of Project Cost** : The equity amount as a percentage of total project costs needs to be indicated. This can come from either the agency's own funds or stakeholders in the case of IPE.
 - ii. **Expected Returns on Equity** : This needs to be provided as the expected return on equity per year in percentage
 - ii. **Debt**: Provision is made for two types of debt. These may be from financial institutions, government and/or direct borrowing from the capital market. The user needs to indicate debt as a percentage of project cost, rate of interest, repayment period and starting year for repayment for each of debt. The debt servicing requirements are calculated on an equated annual payment basis. Even in case of instruments maturing after a longer period, the capital recovery portion is assumed to be kept in a special reserve as per the usual practices related to sinking funds.
12. **Discount Rate** : This is used to discount the future stream of costs and revenues. This may be based on either opportunity cost of capital or average cost of debt which is in this table.
13. **Past Production** : In Million Litres per Day during last five years.
14. **Past Unaccounted for Water** : This needs to be given as a percentage of water produced during the last five years.
15. **Past Revenue** : This is the revenue from the water sector during last five years. It is used to estimate the average revenue per kilo litre from the water sector during the last five years.
16. **Past Revenue Losses** : This needs to be given as a percentage of total revenue demand

during last five years

17. Expected Revenue Losses : This indicates the likely revenue losses in the future. It needs to be given as a percentage of total revenue demand for each year of the analysis period.
14. Tariff Revision : There are three alternatives for tariff related analysis

Alternative 1 :

- i. Average Cost and Annual Fixed Revision : The starting year tariff setting is based on the average cost of the service system during the analysis period (costs include project and O&M costs, debt servicing requirements) and a fixed annual revision of the average price. The input is fixed price revision in percentage per annum

Alternative 2 .

- ii. Aggregate Tariff Revision Plan : Based on average revenue in the past and an aggregate tariff revision plan over time. Input is percentage revision per annum for each year of the plan period.

Alternative 3 :

- iii. Detailed Tariff Setting : This alternative facilitates setting charges for different user groups. The inputs of this alternative are,
 - a. Tariff Categories and Charges : Labels for different user groups or tariff categories as well as charges across these groups over time need to be indicated. There are fifteen possible tariff categories such as: water charges across user groups such as domestic metered and unmetered; commercial; industrial; connection charges across user groups, and, other taxes such as water and sanitation tax based on value of property. For each category, corresponding charges/taxes need to be given over time.
 - b. Quantities : Annual quantities/taxable units for different tariff categories over time are the inputs. The quantities correspond to the above tariff categories. For example, in the case of water charges, the quantities are water consumption in Kilo litres per annum. Similarly, for connection charges, number of new connections and for water tax based on property tax total rateable value in rupees are the inputs. Illustrative list of tariff categories are presented below.

Illustrative List of Tariff Categories

Category	Unit of Charge	Unit of Quantity
- User charge for domestic metered (can also be by consumption blocks)	Rs/KL	KL/Annum
- User Charge for domestic unmetered	Rs/Year/Connection	Total Connections in a year
- User charge for commercial (can also be by consumption blocks)	Rs/KL	KL/Annum
- User charge for other non-domestic (can also be by consumption blocks)	Rs/KL	KL/Annum
- Bulk Supply to Local Authority	Rs/KL	KL/Annum
- Connection charge for domestic	Rs/Connection	No.of new Connections
- Connection charge for non-domestic	Rs/Connection	No.of new Connections
- Sanitation Charge	Rs/Year/Connection	Total Connections
- Sewerage Connection Charge	Rs/Connection	New Connections
- Water Tax based on Property	as a % of Average Rateable Value	Total Rateable Value
- Development Charge	Rs/Conn/Year	Connections

Outputs :

1. Total Project Costs : This is calculated on the basis of inputs related to starting year base costs, physical contingencies, price escalation, design, engineering and supervision charges, interest rates during construction and phasing of the project
2. Total Production : (In Million Litres per Day over time). This is estimated based on future likely consumption and unaccounted for water. It is done separately for existing and new service systems.
3. Average Annual Revision (Past) : This reflects the average revision that was undertaken during last five years. It is expressed as a percentage per annum.
4. Average Incremental Cost (Rs/KL) : This is also known as marginal cost which is the cost of producing an additional unit of service. It represents average cost of the *new* service system during the analysis period. It is the ratio of the present value of total costs of the *new* service system and the present value of consumption based on *new* service system.
5. *Alternative 1* :
 - i. Starting Year Average Tariff : This indicates the required starting year tariff in Rs per Kilo Litre to meet the required rate of return on debt and equity.
 - ii. Percentage Increase in Tariff Required : This is the increase in the average tariff required during starting year as compared to the previous year's tariff. This needs to be compared with the annual average increase in the tariff (above mentioned output item no.3) that has been carried out during the last five years.
 - iii. Charges Over Time : This indicates the proposed charges over time in Rs per Kilo Litre based on above mentioned starting year tariff and fixed annual price revision.

Alternative 2 :

- iii. Percentage Cost Recovered : This indicates the average cost recovered as a percentage of costs for the *aggregate tariff revision plan*. It is the ratio of present value of total costs and present value of total revenues (which are based on the aggregate tariff revision plan) over the plan period. The average cost of debt and expected returns on equity is used as a discount rate for the present value analysis
- iv. Charges Over Time : This indicates the proposed charges in Rs per Kilo Litre over as per the aggregate tariff revision plan.
- v. Internal Rate of Return on Total Investments : This is a important indicator in rate

of return analysis. The rate of return corresponds to total investments and to time frame of project analysis. It indicates the overall returns of the project during the project period for the tariffs in alternative 2.

- vi. Internal Rate of Return on Equity : This indicates the likely returns on equity after meeting operating and maintenance costs, debt servicing requirements, debt service reserve, depreciation and other requirements. The revenue from service system is based on tariffs in alternative 2
- vii. Debt Service Coverage Ratio : Indicates the debt coverage capability of the project. It is the ratio of the present value of the net cash flow before servicing debt to the present value of debt servicing requirements. The discount rate specified in inputs is used for the present value analysis.
- viii. Net Present Value: This is the present value of net project cash flow (cash flow after meeting the operating and maintenance costs, debt service requirements, debt service reserve, depreciation and other requirements).

Alternative 3

- ix. Percentage Cost Recovered . This indicates the average cost recovered as a percentage of costs for detailed tariff setting. It is the ratio of the present value of total costs and the present value of total revenues (which are based on detailed tariff setting) over the plan period. The average cost of debt and expected returns on equity is used as a discount rate for the present value analysis.
- x. Internal Rate of Return on Total Investments : This is an important indicator in rate of return analysis. The rate of return corresponds to total investments and to the time frame of project analysis. This indicates the overall returns of the project during project period for the tariffs in alternative 3.
- xi. Internal Rate of Return on Equity : This indicates the likely returns on equity after meeting operating and maintenance costs, debt servicing requirements, debt service reserve, depreciation and other requirements. The revenue from the service system is based on tariffs in alternative 3.
- xii. Debt Service Coverage Ratio : Indicates the debt coverage capability of project. It is the ratio of the present value of net cash flow before servicing debt to the present value of debt servicing requirements. The discount rate specified in inputs is used for the present value analysis.
- xiii. Net Present Value: This is the present value of net project cash flow (cash flow after meeting the operating and maintenance costs, debt service requirements, debt service reserve, depreciation and other requirements).

Table A3 1

RAPID APPRAISAL OF PROJECT RATES OF RETURN

Base Case

(All monetary values are in Rs Lakhs)

Item	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1 Total Project Cost	1655	3510	3720	4929	5225	0	0	0	0	0	0	0	0	0	0	0
2 Operation and Maintenance	0	0	0	0	0	1552	1704	1880	2064	2272	2496	2736	2992	3280	3584	3928
3 Debt Servicing of Outstanding Loans for Existing System	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4 Operating Revenue	0	0	0	0	0	8112	10432	11648	12712	13816	15008	16264	17560	18944	20440	22056
5 Other Revenue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Revenue	0	0	0	0	0	8112	10432	11648	12712	13816	15008	16264	17560	18944	20440	22056
6 Net Cash Flows (before Servicing Debt)	-1655	-3510	-3720	-4929	-5225	6560	8728	9768	10648	11544	12512	13528	14568	15664	16856	18128
7 Debt Servicing for Debt 1	0	0	0	0	0	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390
8 Debt Servicing for Debt 2	0	0	0	0	0	1015	1015	1015	1015	1015	1015	1015	1015	1015	1015	1015
9 Debt Service Coverage Ratio	0 00	0 00	0 00	0 00	0 00	2 73	3 63	4 06	4 43	4 80	5 20	5 62	6 06	6 51	7 01	7 54
10 Debt Service Reserve	0	0	0	0	0	1203	0	0	0	0	0	0	0	0	0	0
11 Depreciation	0	0	0	0	0	0	200	214	229	245	262	281	300	321	344	368
12 Other Requirements	0	0	0	0	0	0	100	107	114	123	131	140	150	161	172	184
13 Net Project Cash Flow	-1655	-3510	-3720	-4929	-5225	2952	6023	7042	7899	8771	9714	10702	11713	12777	13935	15171
FINANCING PLAN																
	<u>Amount</u>	<u>As a %</u>														
		<u>of Cost</u>														
14 Equity Component	5712	30 00														
15 Debt Component	<u>Amount</u>		<u>Interest</u>	<u>Repayment</u>	<u>Starting Year</u>											
a Debt 1	6664	35 00	<u>Rate</u>	<u>Period</u>	<u>for Repayment</u>											
b Debt 2	6664	35 00	18 00	12	2000											
16 Total (Equity+Debt)	19039	100 00	15 00	30	2000											
17 Discount Rate for Present Value Analysis in %			15 00	Average Cost of Debt	16 5											
18 Internal Rate of Return on Total Investments						33 06										
19 Internal Rate of Return on Equity						28 00										
19 Debt Servicing Coverage Ratio						6 57										
20 Net Present Value of Item 13						25203										

Note The bold items have to be given as inputs

Table A3 1 (Continued)

RAPID APPRAISAL OF PROJECT RATES OF RETURN

(All monetary values are in Rs Lakhs)

Scenario 1

Staggered Industrial Demand

Item	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1 Total Project Cost	1655	3510	3720	4929	5225	0	0	0	0	0	0	0	0	0	0	0
2 Operation and Maintenance	0	0	0	0	0	824	1088	1288	1520	1784	2072	2352	2664	3016	3416	3864
3 Debt Servicing of Outstanding Loans for Existing System	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4 Operating Revenue	0	0	0	0	0	4000	5928	7280	8656	10152	11832	13392	15088	16992	19136	21544
5 Other Revenue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Total Revenue</i>	0	0	0	0	0	4000	5928	7280	8656	10152	11832	13392	15088	16992	19136	21544
6 Net Cash Flows (before Servicing Debt)	-1655	-3510	-3720	-4929	-5225	3176	4840	5992	7136	8368	9760	11040	12424	13976	15720	17680
7 Debt Servicing for Debt 1	0	0	0	0	0	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390	1390
8 Debt Servicing for Debt 2	0	0	0	0	0	1015	1015	1015	1015	1015	1015	1015	1015	1015	1015	1015
9 Debt Service Coverage Ratio	0 00	0 00	0 00	0 00	0 00	1 32	2 01	2 49	2 97	3 48	4 06	4 59	5 17	5 81	6 54	7 35
10 Debt Service Reserve	0	0	0	0	0	600	650	0	0	0	0	0	0	0	0	0
11 Depreciation	0	0	0	0	0	100	200	214	229	245	262	281	300	321	344	368
12 Other Requirements	0	0	0	0	0	50	100	107	114	123	131	140	150	161	172	184
13 Net Project Cash Flow	-1655	-3510	-3720	-4929	-5225	21	1485	3266	4387	5595	6962	8214	9569	11089	12799	14723
FINANCING PLAN																
14 Equity Component	<u>Amount</u>	<u>As a %</u>														
	5712	30 00														
15 Debt Component	<u>Amount</u>		<u>Interest</u>	<u>Repayment</u>	<u>Starting Year</u>											
			<u>Rate</u>	<u>Period</u>	<u>for Repayment</u>											
a Debt 1	6664	35 00	18 00	12	2000											
b Debt 2	6664	35 00	15 00	30	2000											
16 Total (Equity+Debt)	19039	100 00														
17 Discount Rate for Present Value Analysis in %		15 00	Average Cost of Debt		16 5											
18 Internal Rate of Return on Total Investments						27 85										
19 Internal Rate of Return on Equity						23 08										
20 Debt Servicing Coverage Ratio						5 48										
21 Net Present Value of Item 13						17509										

Table A3 1 (Continued)

RAPID APPRAISAL OF PROJECT RATES OF RETURN

Scenario 2

Staggered Industrial Demand and Sanitation

(All monetary values are in Rs Lakhs)

Item	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1 Total Project Cost	2039	4663	9484	10693	11374	0	0	0	0	0	0	0	0	0	0	0
2 Operation and Maintenance	0	0	0	0	0	1593	1910	2168	2462	2791	3160	3505	3898	4337	4829	5376
3 Debt Servicing of Outstanding Loans for Existing System	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4 Operating Revenue	0	0	0	0	0	4000	5928	7280	8656	10152	11832	13392	15088	16992	19136	21544
5 Other Revenue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Revenue	0	0	0	0	0	4000	5928	7280	8656	10152	11832	13392	15088	16992	19136	21544
6 Net Cash Flows (before Servicing Debt)	-2039	-4663	-9484	-10693	-11374	2407	4018	5112	6194	7361	8682	9887	11190	12655	14307	16168
7 Debt Servicing for Debt 1	0	0	0	0	0	2793	2793	2793	2793	2793	2793	2793	2793	2793	2793	2793
8 Debt Servicing for Debt 2	0	0	0	0	0	2039	2039	2039	2039	2039	2039	2039	2039	2039	2039	2039
9 Debt Service Coverage Ratio	0 00	0 00	0 00	0 00	0 00	0 50	0 83	1 06	1 28	1 52	1 80	2 05	2 32	2 62	2 96	3 35
10 Debt Service Reserve	0	0	0	0	0	0	0	200	1200	1000	0	0	0	0	0	0
11 Depreciation	0	0	0	0	0	0	0	0	100	300	321	343	368	393	421	450
12 Other Requirements	0	0	0	0	0	0	0	0	50	200	214	229	245	262	281	300
13 Net Project Cash Flow	-2039	-4663	-9484	-10693	-11374	-2425	-815	80	12	1028	3315	4482	5745	7168	8773	10585

FINANCING PLAN

	<u>Amount</u>	<u>As a %</u>			
		<u>of Cost</u>			
14 Equity Component	11476	30 00			
15 Debt Component	<u>Amount</u>		<u>Interest</u>	<u>Repayment</u>	<u>Starting Year</u>
a Debt 1	13389	35 00	<u>Rate</u>	<u>Period</u>	<u>for Repayment</u>
b Debt 2	13389	35 00	18 00	12	2000
			15 00	30	2000
16 Total (Equity+Debt)	38254	100 00			
17 Discount Rate for Present Value Analysis in %			15 00	Average Cost of Debt	16 5
18 Internal Rate of Return on Total Investments					18 69
19 Internal Rate of Return on Equity					13 40
20 Debt Servicing Coverage Ratio					2 44
21 Net Present Value of Item 13					-5082

Table A3 1 (Continued)

RAPID APPRAISAL OF PROJECT RATES OF RETURN

(All monetary values are in Rs Lakhs)

Scenario 3

Base Case and Sanitation

Item	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1 Total Project Cost	2039	4663	9484	10693	11374	0	0	0	0	0	0	0	0	0	0	0
2 Operation and Maintenance	0	0	0	0	0	2321	2526	2780	3006	3279	3574	3889	4226	4601	4997	5440
3 Debt Servicing of Outstanding Loans for Existing System	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4 Operating Revenue	0	0	0	0	0	8112	10432	11648	12712	13816	15008	16264	17560	18944	20440	22068
5 Other Revenue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Revenue	0	0	0	0	0	8112	10432	11648	12712	13816	15008	16264	17560	18944	20440	22068
6 Net Cash Flows (before Servicing Debt)	-2039	-4663	-9484	-10693	-11374	5791	7906	8888	9706	10537	11434	12375	13334	14343	15443	16616
7 Debt Servicing for Debt 1	0	0	0	0	0	2793	2793	2793	2793	2793	2793	2793	2793	2793	2793	2793
8 Debt Servicing for Debt 2	0	0	0	0	0	2039	2039	2039	2039	2039	2039	2039	2039	2039	2039	2039
9 Debt Service Coverage Ratio	0.00	0.00	0.00	0.00	0.00	1.20	1.64	1.84	2.01	2.18	2.37	2.56	2.76	2.97	3.20	3.44
10 Debt Service Reserve	0	0	0	0	0	600	1800	0	0	0	0	0	0	0	0	0
11 Depreciation	0	0	0	0	0	200	400	428	458	490	524	561	600	642	687	735
12 Other Requirements	0	0	0	0	0	100	200	214	229	245	262	281	300	321	344	368
13 Net Project Cash Flow	-2039	-4663	-9484	-10693	-11374	59	673	3414	4187	4969	5815	6701	7601	8548	9580	10681
FINANCING PLAN																
	<u>Amount</u>	<u>As a %</u>														
		<u>of Cost</u>														
14 Equity Component	11476	30.00														
15 Debt Component	<u>Amount</u>		<u>Interest</u>	<u>Repayment</u>	<u>Starting Year</u>											
			<u>Rate</u>	<u>Period</u>	<u>for Repayment</u>											
a Debt 1	13389	35.00	18.00	12	2000											
b Debt 2	13389	35.00	15.00	30	2000											
16 Total (Equity+Debt)	38254	100.00														
17 Discount Rate for Present Value Analysis in %			15.00	Average Cost of Debt	16.5											
18 Internal Rate of Return on Total Investments						21.71										
19 Internal Rate of Return on Equity						15.31										
20 Debt Servicing Coverage Ratio						2.98										
21 Net Present Value of Item 13						913										

Table A3 1 (Continued)

RAPID APPRAISAL OF PROJECT RATES OF RETURN

(All monetary values are in Rs Lakhs)

Summary Table

a Sensitivity Analysis for Project Alternatives

Alternatives for Project Variables	Total Project Cost	Financing Plan			Performance Indicators			
		Equity	Debt 1	Debt 2	IRR on Total Investments in %	IRR on Equity in %	Debt Service Coverage Ratio at specified discount rate	NPV at specified discount rate
1 Base Case	19039	5712	6664	6664	33.06	28.00	6.57	25203
2 Staggered Industrial Demand	19039	5712	6664	6664	27.85	23.08	5.48	17509
3 Staggered Industrial Demand and Sanitation	38254	11476	13389	13389	18.69	13.40	2.44	-5082
4 Base Case and Sanitation	38254	11476	13389	13389	21.71	15.31	2.98	913

b Sensitivity Analysis for Financing Alternatives

Alternatives for Financing Plans	Total Project Cost	Financing Plan			Performance Indicators			
		Equity	Debt 1	Debt 2	IRR on Total Investments in %	IRR on Equity in %	Debt Service Coverage Ratio at specified discount rate	NPV at specified discount rate
1 Base Case								
2								
3								
4								

Table A3 2
RAPID APPRAISAL OF WATER SUPPLY PROJECTS

(All monetary values are in Rs Lakhs)

1 Project Costs															
a	Base Costs	1993	Prices												
	Main Components				Costs										
	Source				1856										
	Transmission				4856										
	Feeder + Distribution				3216										
	Others				0										
	Component 5				0										
	Component 6				0										
	Component 7				0										
	Component 8				0										
	Total				9928										
b	Price Escalation to Starting Year	10 00		% per annum	2085										
c	Physical Contingency	8 00		% of base cost	961										
d	Price Escalation during construction	6 00		% per annum	1947										
e	Design, Engineering and Supervision	10 00		% of escalated cost	1492										
f	Interest during Construction	16 00		% per annum	2626										
	Total Project Costs				19039										
Item	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	
2 Phasing															
a	Phasing - % distribution of work	10 0	20 0	20 0	25 0	25 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	
b	Base Costs over time	1201	2403	2403	3003	3003	0	0	0	0	0	0	0	0	
c	Physical Contingencies	96	192	192	240	240	0	0	0	0	0	0	0	0	
d	Price Escalation during Construction	0	156	321	620	851	0	0	0	0	0	0	0	0	
e	Design, Engineering and Supervision	130	275	292	386	409	0	0	0	0	0	0	0	0	
f	Interest during Construction	228	484	513	680	721	0	0	0	0	0	0	0	0	
	Total Capital Cost	1655	3510	3720	4929	5225	0	0	0	0	0	0	0	0	
3 Operation and Maintenance															
a	on Existing System	433	458	486	515	546	579	614	650	689	731	775	821	870	922
b	on New System	0	0	0	0	0	800	1056	1248	1464	1704	1976	2232	2520	2840
c	Total O&M	433	458	486	515	546	1379	1670	1898	2153	2435	2751	3053	3390	3762
4	Debt Servicing of Outstanding Loans for Existing System	450	360	288	230	184	147	0							

Table A3 2 (Continued)

Item	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
5 Depreciation *	150	150	150	150	150	250	265	281	298	316	335	355	376	398
6 Servicing of Equity and Debt														
a Equity	0	0	0	0	0	1154	1154	1154	1154	1154	1154	1154	1154	1154
b Debt 1	0	0	0	0	0	1390	1390	1390	1390	1390	1390	1390	1390	1390
c Debt 2	0	0	0	0	0	1015	1015	1015	1015	1015	1015	1015	1015	1015
7 Debt Service Reserve	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 Other Requirements	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9 Total Consumption in MLD														
a Existing System	156	155.7	155.7	155.7	155.7	155.7	155.7	155.7	155.7	155.7	155.7	155.7	155.7	155.7
b New System	0	0	0	0	0	51	63	70	77	83	90	95	101	106
c Total Billable Supply	156	156	156	156	156	207	219	225	233	239	246	251	257	261
10 Unaccounted for Water (%)	10.00													
11 Total Production in MLD														
a Existing System	173	173	173	173	173	173	173	173	173	173	173	173	173	173
b New System	0	0	0	0	0	57	70	77	85	92	100	106	112	117
c Total Production	173	173	173	173	173	230	243	250	258	265	273	279	285	290
12 Expected Revenue Losses (Future)	30.00	29.50	29.00	28.50	28.00	27.50	27.00	26.50	26.00	25.50	25.00	24.50	24.00	23.50
13 Financing Plan	<u>Amount as</u>	<u>Amount</u>	<u>Expected</u>											
	<u>a % of cost</u>		<u>Return</u>											
a Equity	30.00	5712	20.00											
b Debt Component		<u>Amount</u>	<u>Interest</u>											
			<u>Rate</u>											
i Debt 1	35.00	6664	18.00				12		2000					
ii Debt 2	35.00	6664	15.00				30		2000					
14 Discount Rate for Present Value Analysis in %			15.00				Average Cost of Debt		16.5					
15 Past Performance	1990	1991	1992	1993	1994									
a Past Production (MLD)	173	173	173	173	173									
b Past Unaccounted for Water (%)	10.00	10.00	10.00	10.00	10.00									
c Past revenue	1137	1273	1426	1469	1513									
d Past Revenue Losses	30.00	30.00	30.00	30.00	30.00									
16 Average Effective Charge during Previous Year (Rs/KL)			2.66				Average Annual Revision in % per annum (Based on last five years)				7.50			
17 Average Incremental Cost of Project in Rs/KL			9.10											

Table A3 2 (Continued)

Item	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	
18 Alternative 1 Average Cost and Fixed Annu:															
a	Annual Revision of Tariff in Percentage per Annum		7 00												
b	Starting Year Tariff Required in Rs/KL		1995	2 93	Percentage increase r				10 18						
c	Charges Over Time	2 93	3 14	3 36	3 59	3 84	4 11	4 40	4 71	5 04	5 39	5 77	6 17	6 60	7 07
19 Alternative 2 Aggregate Tariff Revision Plan:															
a	Tariff Revision Plan (in percentage per annum over previous year charge)		15 00	0 00	15 00	0 00	15 00	0 00	15 00	0 00	15 00	0 00	15 00	0 00	15 00
b	Percentage Cost Recovered		99 04												
c	Charges over Time (Rs/KL)		3 06	3 06	3 52	3 52	4 05	4 05	4 66	4 66	5 35	5 35	6 16	6 16	7 08
d	Internal Rate of Return on Total Investments		13 36		Internal Rate of Return				6 14						
e	Debt Service Coverage Ratio		1 13		Net Present Value of I				8497						

Table A3.2 (Continued)

Item		1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	
20	Alternative 3 - Detailed Tariff Setting															
a	Tariff Category	Unit	Charges (For unmetered connections, charge is in Rs per connection per annum, For metered supply, charge is in Rs per Kilo Litre)													
i	Domestic Metered	Rs/KL	2.0	2.1	2.3	2.5	2.6	2.8	3.0	3.2	3.4	3.7	3.9	4.2	4.5	4.8
ii	Domestic Unmetered	Rs/Conn	300.0	321.0	343.5	367.5	393.2	420.8	450.2	481.7	515.5	551.5	590.1	631.5	675.7	723.0
iii	Commercial	Rs/KL	6.0	6.4	6.9	7.4	7.9	8.4	9.0	9.6	10.3	11.0	11.8	12.6	13.5	14.5
iv	Industrial	Rs/KL	12.0	12.8	13.7	14.7	15.7	16.8	18.0	19.3	20.6	22.1	23.6	25.3	27.0	28.9
v	Institutional	Rs/KL	3.0	3.2	3.4	3.7	3.9	4.2	4.5	4.8	5.2	5.5	5.9	6.3	6.8	7.2
vi	C Charge - Domestic	Rs/Conn	750.0	802.5	858.7	918.8	983.1	1051.9	1125.5	1204.3	1288.6	1378.8	1475.4	1578.6	1689.1	1807.4
vii	C Charge - Others	Rs/Conn	2500.0	2675.0	2862.3	3062.6	3277.0	3506.4	3751.8	4014.5	4295.5	4596.1	4917.9	5262.1	5630.5	6024.6
viii	Category 8		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ix	Category 9		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
x	Category 10		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
xi	Category 11		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
xii	Category 12		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
xiii	Category 13		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
xiv	Category 14		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
xv	Category 15		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
b	Quantities	Unit	Quantities (For unmetered connections, quantities are number of connections and for metered supply, quantities are consumption in Kilo Litres per Annum)													
i	Domestic Metered	KL/Annum	182500	182500	182500	182500	182500	558450	1215450	1543950	2135250	2463750	3120750	3777750	4106250	4763250
ii	Domestic Unmetered	Connection	123000	125460	127969	130529	133139	150802	162310	166933	168602	170288	171991	173711	175448	177203
iii	Commercial	KL/Annum	182500	182500	182500	182500	182500	3580650	3688070	3798712	3912673	4030053	4150955	4275483	4403748	4535860
iv	Industrial	KL/Annum	7300000	7300000	7300000	7300000	7300000	12581550	16753500	18855900	23027850	25130250	26378550	27692550	29105100	30550500
v	Institutional	KL/Annum	1460000	1489200	1518984	1549364	1580351	3317850	3367618	3418132	3469404	3521445	3574267	3627881	3682299	3737533
vi	C Charge Domestic	Rs/Conn	0	2460	2509	2559	2611	17663	11508	4623	1669	1686	1703	1720	1737	1754
vii	C Charge Others	Rs/Conn	0	0	0	0	0	600	612	624	637	649	662	676	689	703
viii	Category 8		0	0	0	0	0	0	0	0	0	0	0	0	0	0
ix	Category 9		0	0	0	0	0	0	0	0	0	0	0	0	0	0
x	Category 10		0	0	0	0	0	0	0	0	0	0	0	0	0	0
xi	Category 11		0	0	0	0	0	0	0	0	0	0	0	0	0	0
xii	Category 12		0	0	0	0	0	0	0	0	0	0	0	0	0	0
xiii	Category 13		0	0	0	0	0	0	0	0	0	0	0	0	0	0
xiv	Category 14		0	0	0	0	0	0	0	0	0	0	0	0	0	0
xv	Category 15		0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table A3 2 (Continued)

Item	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
c Revenues	Revenues (In Rupees Lakhs)													
i Current Demand	1303	1423	1533	1651	1779	3416	4421	5099	6321	7266	8123	9082	10148	11345
ii Revenue Losses (%)	30 00	29 50	29 00	28 50	28 00	27 50	27 00	26 50	26 00	25 50	25 00	24 50	24 00	23 50
iii Arrears	391	535	600	642	678	1126	1497	1748	2098	2388	2628	2869	3124	3400
iv Revenue Collections	912	1279	1468	1609	1743	2968	4049	4848	5971	6976	7883	8841	9893	11069
v Percentage Cost Recovered	133 04													
d CASH FLOW ANALYSIS														
i Net Cash Flows (before Servicing Debt)	1776	3199	-3176	-4215	-4363	1191	2114	2669	3520	4226	4798	5433	6127	6908
ii Debt Service Coverage Ratio	0 00	0 00	0 00	0 00	0 00	0 50	0 88	1 11	1 46	1 76	1 99	2 26	2 55	2 87
iii Net Project Cash Flow	1776	-3199	-3176	-4215	-4363	-1214	291	264	1115	1821	2393	3028	3722	4503
iv Internal Rate of Return on Total Investments			20 09											
v Internal Rate of Return on Equity			15 27											
vi Debt Servicing Coverage Ratio			2 58											
vii Net Present Value of Item 20 d iii			414											

Note * Depreciation is on existing physical assets and equit

Formats for Quantitative Information from Agencies
(all monetary values need to be given in Rs Lakhs)

Item	Year 1	Year 2	Year 3	Year 4	Year 5
I AGENCY LEVEL INFORMATION					
A. <u>Budget Reports</u>					
1 Opening Balance					
2. Revenue Income					
a Revenue from Own Sources (Property Tax, Octroi, User Charges and Fees)					
b Revenue from Other Sources (Grants, Contributions, other)					
<i>Total Revenue Income</i>					
3 Capital Income					
a Loan Receipts					
b Other					
<i>Total Capital Income</i>					
4 Revenue Expenditure					
a General Administration					
b Debt Servicing					
c Other					
<i>Total Revenue Expenditure</i>					
5 Capital Expenditure					
a Owned Funds used for Capital Expenditure					
b Loans					
c Grants					
<i>Total Capital Expenditure</i>					
6 Surplus/Deficit					
a Total Revenue Surplus/Deficit					
b Total Capital Revenue Surplus/Deficit					
<i>Total Surplus/Deficit</i>					
B. <u>Debt Management</u>					
a Current Debt Servicing Requirements					
b Dues in Debt Servicing from Previous Year					
<i>Total Debt Servicing Requirements for Current Year</i>					
c Debt Servicing Done during Current Year					
d Overdues in Current Year					
e Overdues Which are Morethan 9 months old					
C. <u>Tax Collections</u>					
f Current Tax (not including project service) Demand					
g Arrears (not including project service)					
h Tax collections					

Formats for Quantitative Information from Agencies
 (Continued)

Item	Year 1	Year 2	Year 3	Year 4	Year 5
II. Project Service Related Information - Water Supply					
A. <u>Financial - Budget Reports</u>					
1. Opening Balance of Service					
2. Revenue Income from Service					
a	Revenue from Charges/Taxes				
b	Other Income				
	<i>Total Revenue Income</i>				
3. Revenue Expenditure of Service					
a	Establishment Related				
b	Debt Servicing				
c	O&M Costs for Source, Transmission and Treatment				
d	O&M Costs for Distribution				
e	Billing and Cost Recovery Costs				
f	Other				
	<i>Total Revenue Expenditure</i>				
4. Surplus/Deficit					
B. <u>City Level Information</u>					
a. Income Distribution Pattern					
Year of Information _____					
	Household Monthly Income (Rs/Month)	Total No of Households	Estimated % of HHs with Water Connection		
1	_____	_____	_____	_____	_____
2	_____	_____	_____	_____	_____
3	_____	_____	_____	_____	_____
4	_____	_____	_____	_____	_____
5	_____	_____	_____	_____	_____
	Total	_____	_____	_____	_____
b. Growth in Domestic/Non-Domestic Units					
i	No. of Households in City/Agency's Jurisdiction				
ii	No of Non-Domestic Units in City/Agency's Jurisdiction				
	Commercial Units				
	Industrial Units				
	Institutional Units				
	Others				
	<i>Total Non-Domestic Units</i>				

Formats for Quantitative Information from Agencies
(Continued)

Item	Year 1	Year 2	Year 3	Year 4	Year 5
------	--------	--------	--------	--------	--------

C Supply Related

- a No of Employees
- d No of Domestic Connections
- c No of Non-Domestic Connections
 - i Commercial Connections
 - ii Industrial Connections
 - iii Institutional Connections
 - iv Others
- Total Non-Domestic Units*
- d Production in Million Litres per Day
- e Unaccounted Water in %
- f Consumption in KL per Connection per Day
 (Details by size of connection or price
 block as applicable)
 - i Domestic Users
 - ii Commercial Users
 - iii Industrial Users
 - iv Institutional Users
 - v Other Users

D Tariffs and Cost Recovery

- a Past Trends in Tariff

Tariff Category	Type of Charge	Unit for Rate	Rate					
			Year 1	Year 2	Year 3	Year 4	Year 5	
1 _____								
2 _____								
3 _____								
4 _____								
5 _____								
6 _____								
7 _____								
8 _____								
9 _____								
10 _____								
11 _____								
12 _____								
13 _____								
14 _____								
15 _____								

Formats for Quantitative Information from Agencies
(Continued)

b Tariff Revisions Proposed in the Past

Tariff Category	Proposed Tariff Rates				
	Year 1	Year 2	Year 3	Year 4	Year 5
1 _____					
2 _____					
3 _____					
4 _____					
5 _____					
6 _____					
7 _____					
8 _____					
9 _____					
10 _____					
11 _____					
12 _____					
13 _____					
14 _____					
15 _____					

c Tariff Revisions Approved in the Past

Tariff Category	Approved Tariff Rates				
	Year 1	Year 2	Year 3	Year 4	Year 5
1 _____					
2 _____					
3 _____					
4 _____					
5 _____					
6 _____					
7 _____					
8 _____					
9 _____					
10 _____					
11 _____					
12 _____					
13 _____					
14 _____					
15 _____					

E Revenue Collections	Year 1	Year 2	Year 3	Year 4	Year 5
a Current Revenue Demand					
b Arrears					
c Revenue Collections					
d Outstanding Payments by Taxpayers/ Consumers which are morethan 9 months overdue					

Formats for Quantitative Information on Projects fr

(Continued)

Item	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30
2 Phasing % distribution of work														
3 Operation and Maintenance														
a on Existing System														
b on New System														
4 Debt Servicing of Outstanding Loans for Existing System														
5 Depreciation														
7 Other Requirements														
8 Total Consumption in MLD														
a Existing System														
b New System														
9 Unaccounted for Water (%)														
10 Expected Revenue Losses in %														
11 Financing Plan	<u>Amount as</u>		<u>Expected</u>											
a Equity	<u>a % of cost</u>		<u>Return</u>											
b Debt Component			<u>Interest</u>	<u>Repayment</u>	<u>Starting Year</u>									
I Debt 1			<u>Rate</u>	<u>Period</u>	<u>for Repayment</u>									
II Debt 2														

12 Tariff Categories and Charges Over Time

Tariff Category	Unit	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16
Charges (For unmetered connections, charge is in Rs per connection per annum, For metered supply, charge is in Rs per Kilo Litre))																	
I																	
ii																	
iii																	
iv																	
v																	
vi																	
vii																	
viii																	
ix																	
x																	
xi																	
xii																	
xiii																	
xiv																	
xv																	
Tariff Category		Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30		
Charges (For unmetered connections, charge is in Rs per connection per ani																	
I																	
ii																	
iii																	
iv																	
v																	
vi																	
vii																	
viii																	
ix																	
x																	
xi																	
xii																	
xiii																	
xiv																	
xv																	

Formats for Quantitative Information on Projects fr

(Continued)

13	Tariff Category (Categories are same as above)	Unit	Quantities															
			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16
I																		
II																		
III																		
IV																		
V																		
VI																		
VII																		
VIII																		
IX																		
X																		
XI																		
XII																		
XIII																		
XIV																		
XV																		
14	Tariff Category (Categories are same as above)	Unit	Quantities															
			Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30		
IV																		
V																		
VI																		
VII																		
VIII																		
IX																		
X																		
XI																		
XII																		
XIII																		
XIV																		
XV																		