

Project Notes

Pre-Feasibility Analysis of Urban Environmental Infrastructure Projects *A FIRE(D) Project Tool*

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As cities in India turn to capital markets as a new source of financing for urban environmental infrastructure projects, the need to structure projects in a commercially viable format has become apparent. This requires attention to three issues: a market rate of return on investments, an acceptable institutional arrangement for raising market resources and delivering services, and a clear risk assessment and mitigation framework. The FIRE(D) Project has developed a series of tools to assist cities in developing urban environmental infrastructure projects from this perspective. This Project Note focuses on Project Pre-Feasibility Analysis which may be used to assess whether a project presents adequate potential for devoting resources to commercial structuring.

Tapping the Capital Markets

Urban environmental services such as water supply, sewerage and solid waste management have traditionally been considered public goods to be provided by local governments and related state or metropolitan authorities. Financing has largely been through budgetary allocations. With recently initiated financial reforms in India, however, there is tremendous scope for enhancing the investments in this sector by tapping the rapidly expanding capital markets, especially for debt funds. This, however, cannot be done easily; the perception of this sector as high risk and low return must be changed by successfully developing and implementing commercially viable projects for urban environmental infrastructure.

From this perspective, commercially viable projects are those able to raise resources from

the capital markets largely on the basis of revenue streams from specific service-linked user charges and other dedicated sources. They would need to address, therefore, three important concerns, namely, a market rate of return on investments, an acceptable institutional arrangement for raising market resources and delivering services, and a clear risk assessment and mitigation framework.

Project Pre-Feasibility Analysis focuses on aspects which are critical to commercial viability; thus, it does not discuss technology choices and service standards. It must be realized that project development in a commercial format is a very resource-intensive exercise. It is, thus, essential to assess whether a given project presents adequate potential for devoting such resources to commercial structuring.

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Two stages of analysis have been designed. Stage I Pre-Feasibility Analysis suggests basic financial analysis of the given project and overall service system. Stage II Analysis focuses on institutional arrangements for project financing and implementation and project risk, and also includes a more detailed financial analysis based on different institutional arrangement options. If the basic fundamentals appear strong enough and necessary tariff revisions seem feasible in view of the past pricing practices, local political opinion, quick sensitivity analysis and a rapid market assessment, then it is advisable to pursue the project further. Based on the Stage I Pre-Feasibility Report, a service authority may approach a financial intermediary or state government for permission to borrow.

Stage I Analysis

Stage I Analysis focuses on financial performance of the given service sector in light of new investments. In most cases, investment in environmental infrastructure augments the capacities or coverage of the existing system. It is necessary, therefore, to review returns on investments in relation to the entire sector or system, rather than limiting it to the given project. For example, an investment may be made to augment water capacity and increase the distribution network, but it may neither be possible nor appropriate to delineate the returns as a separate stream. Thus, while determining the returns on this new investment, it would be essential to assess the net returns on the total system.

Definition of this system will depend on the institutional arrangement which is being envisaged for the specific environmental service. For example, in water and sewerage, the system may include a department within a municipal authority, a state level board and an independent project company set up to supply bulk water to other authorities or user groups. A clear delineation of this system and its rationale must be set out in the beginning.

Financial Analysis

The financial analysis suggested in Volume I is

based on a six step process, with a special emphasis on tariffs due to the fact that in most Indian cities, tariff levels are very low and do not cover even operation and maintenance costs. The six steps are as follows.

1) Estimation of New Investments Required: The basic project concept must be developed, shaped by an evaluation of user preferences for the service. This is followed by a preliminary financing plan and a breakdown of project costs.

2) Consumption Forecasts: Identification of user groups and estimation of demand, i.e. connections or service sites, should be followed by an estimation of service or supply level. Finally, system inefficiencies or linkages must be estimated to produce a forecast of total consumption.

3) System Annual Costs: This estimate must take into account costs of both the existing system and the new system created through investment. Specific line items include operation and maintenance; debt servicing of outstanding loans; debt servicing for the new project; other requirements such as taxes and unanticipated major repairs; and depreciation of both existing and new assets.

4) Initial Average Tariff Analysis: This focuses on the required or proposed changes in tariffs necessary to ensure a specified level of performance. The most important indicators in this regard are the internal rate of return, return on equity and debt service coverage ratio.

5) Detailed Tariff Analysis and Additional Revenue Measures: If the initial analysis does not produce feasible tariff levels and revisions, a more detailed analysis may be required, including identification of innovative new revenue sources and possible dedication of other revenue sources. Detailed tariff analysis should be based on the dual considerations of what the market will bear for middle and upper income user groups, and affordable lifeline rates for lower income user groups.

6) Sensitivity Analysis: Within the context of a high risk market perception, it is useful to assess the sensitivity of financial performance to project-related risks. Evaluation factors may include in-

creased project costs, delays in project implementation and decreased project revenues.

The FIRE Financial Analysis Model

The FIRE Financial Analysis Model (FIRE-FAM) has been developed as a tool for conducting proper financial analysis of project, sector or system costs and revenues, and is included in Stage I. It is also available as a standard spreadsheet software package. This analysis model can be used by service agencies, for project development at a pre-feasibility stage, or by potential lenders or financial intermediaries to conduct a rapid project appraisal. The model addresses each of the six areas discussed above and is more suited to water supply and sanitation projects.

Stage II Analysis

Stage II Analysis prescribes a detailed examination of the institutional arrangement associated with project financing and implementation, an assessment of project risk, and a more detailed financial analysis based on these factors.

Institutional Arrangements

Two aspects of institutional arrangements are important: 1) the main agency or firm that mobilizes resources from the capital market; and 2) 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. Four institutional options are presented: an independent project entity; a national or state level financial intermediary; a state level statutory functional authority; or a municipal authority.

A framework for conducting a rapid assessment of the implementing institutions' creditworthiness and efficiency in the given sector, both quantitative and qualitative, is included in Stage II. In a case where more than one arrangement appears to be feasible, the size and complexity of the project should then be considered, as well as opportunities for improving a credit assessment in the short run, or enhancing credit in other ways.

Discussions with stakeholders should also be held at this point.

A wide variety of institutional arrangements exist for service delivery, and these depend to a great extent on local context. Options include a municipal enterprise, statutory functional authority, management or service contract or concession through a Build-Operate-Transfer (BOT) arrangement or community provision. The criteria suggested for choosing a mix of service delivery options include efficiency in service provision, fiscal autonomy and willingness to levy commercial prices for the given service. Past practices in this regard must also be taken into consideration. Institutional service delivery options may also be developed through *unbundling* of the service. For example, components of a service such as solid waste collection, transport and disposal may be separated, or by sub-dividing services by geographical zones.

Project Risk

One of the main constraints in accessing capital markets for urban environmental infrastructure projects is that the market perception of the risks in this sector is very high. This is especially true for risks during the development and construction stage. In the post completion stage, as well, 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 propose a risk management strategy through proper allocation and mitigation. The perspective of potential lenders or financiers will determine the cost and availability of capital market resources, and risk assessment should be conducted from the perspective of this group. A favorable market image must be projected at this stage; unproven technologies or uncertain demand should be avoided.

At the pre-feasibility stage, risks need to be assessed in terms of the project concept and costs; project completion time and related cost overruns; and 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. It is important to note that these factors depend upon the institu-

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tional arrangements for service delivery. Indicators which may be used for project risk assessment focus on the quantitative and qualitative aspects of project costs and revenues, demand assessment, impact on environmental quality, and the economic base or potential of the municipality.

Financial Analysis

The final step of Stage II Analysis consists of a financial analysis similar to that of Stage I, but with specific emphasis on assessment of the institutional options under consideration. The nature of analysis for an independent project entity, for example, must be recast in a commercial accounting framework with at least five year forecasts for the company. Similarly, a more detailed analysis in relation to the risk assessment should also be conducted. Tariff analysis, both initial and detailed, must be conducted in relation to both political commitment and a rapid market assessment of demand for the service. Stage II provides a framework for a Rapid Market Demand Assessment which focuses on the services themselves, preferences of different user groups, ability and willingness to pay for these services, and guidelines for tariff setting.

Report Formats

Recommended report formats for Stage I and Stage II have been developed, along with a format for quantitative information to be submitted to a financial institution for each stage of analysis. The analysis frameworks may be used by service agencies such as municipal and urban development authorities, state and metro water and sewerage boards, industrial development corporations, or new independent companies proposed for specific projects.

*This **Project Note** is based on "Pre-Feasibility Analysis and Report Formats Volume 1: Stage I- Financial Analysis", and "Pre-Feasibility Analysis and Report Formats Volume 2: Stage II Comprehensive Pre-Feasibility Analysis" written by Dr. Meera Mehta and V. Satyanarayana.*

Indo-US Financial Institutions Reform and Expansion Project - Debt Market Component FIRE(D)

The objective of the Indo-US Financial Institutions Reform and Expansion (FIRE) Project, funded by the U.S. Agency for International Development (USAID), is to support the Government of India in its efforts to strengthen domestic capital markets to enable them to serve as efficient source of development finance. The Debt Market/Infrastructure Component (FIRE-D) pursues this goal through the development and financing of commercially viable urban environmental infrastructure projects; by channeling USAID Housing Guaranty funds to selected demonstration cities and states; and through policy advocacy, management support, technical assistance, training and research.

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