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MINISTRY OF URBAN DEVELOPMENT
GOVERNMENT OF INDIA



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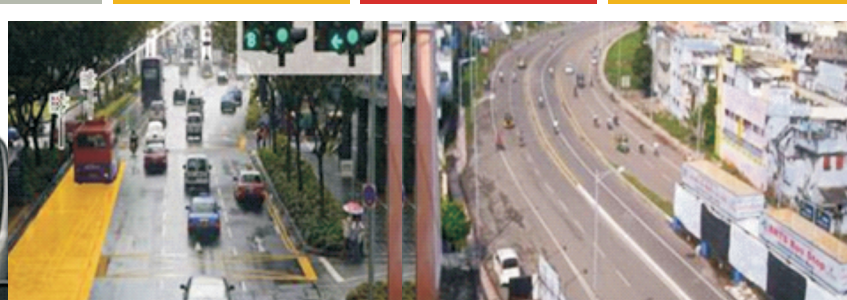
Development of Toolkits under the “Sustainable Urban Transport Project”



Toolkit on Finance and Financial Analysis

www.moud.gov.in

December 2013





www.iutindia.org

The Institute of Urban Transport (India) is a premier professional non-profit making organization under the purview of the Ministry of Urban Development, Government of India (MoUD). The National Urban Transport Policy (NUTP), 2006 has empowered IUT to serve as a National Level Facility for continuous advice and guidance on the principles of sustainable urban transport. The objective of the Institute is to promote, encourage and coordinate the state of the art of urban transport including planning, development, operation, education, research and management at the national level.

The Institute has been nominated as the project monitoring unit for Component 1A of the SUTP. IUT is responsible for overseeing the preparation of the training modules, subject toolkits and conduct of training of 1000 city officials in urban transport.



The Ministry of Urban Development (MoUD), Government of India (GoI) has initiated the Sustainable Urban Transport Project (SUTP) with support of Global Environment Facility (GEF) and the World Bank to foster a long-term partnership between GoI and state/local governments in the implementation of a greener environment under the ambit of the NUTP. The aim of the project is to achieve a paradigm shift in India's urban transport systems in favor of sustainable development. The MoUD is the nodal agency for the implementation of the project, to be implemented over a four-year period starting from May, 2010 to 30 November 2014. Project cost is Rs. 14,161.55 Million. The project's development objective (PDO) is to promote environmentally sustainable urban transport in India and to improve the usage of environment-friendly transport modes through demonstration projects in selected cities.



The Centre of Excellence in Urban Transport, CEPT University (CEPT-CoE), established in 2009 is an initiative of the Ministry of Urban Development (MoUD), Government of India

and is supported by the Ahmedabad Municipal Corporation. CEPT-CoE has been envisaged as a resource centre for dealing with issues in urban transport planning and management. It has a mandate to cover three aspects of capacity building in urban transport - human resource development, knowledge management and technical assistance & advisory.

The Centre has been providing technical assistance to the MoUD on urban bus specifications and has been contributing to numerous national committees, working groups and government led missions / projects related to urban development and urban transport in varying capacities.

Acknowledgement

The Centre of Excellence Urban Transport CEPT University expresses its sincere thanks to the Ministry of Urban Development (MoUD), Government of India, for awarding the work of preparation of toolkit on “Finance and Financial Analysis” being prepared under Sustainable Urban Transport Project (SUTP) jointly initiated with the support of Global Environment Facility (GEF), United Nations Development Programme (UNDP) and World Bank.

Sincere thanks to Dr Sudhir Krishna, Secretary, MoUD, for his guidance to the study team. The invaluable direction and advice provided to the study team by Shri. S.K. Lohia, Officer on Special Duty (Urban Transport) & Ex-Officio Joint Secretary, MoUD is appreciated and acknowledged.

Special thanks are due to Mr. B I Singal, Director General, Institute of Urban Transport (IUT), India and Ms. Kanika Kalra, Urban Transport Expert, IUT, for their continued advice and support throughout this endeavour.

The Centre of Excellence in Urban Transport, CEPT University wish to express their sincere thanks to Dr. Sandeep Garg, Program Specialist, UNDP, for his valuable suggestions and support during the course of the preparation of this toolkit.

We also would like to thank Mr. I C Sharma, National Project Manager, GEF-SUTP; the PMC members and all the members of the Technical Monitoring and Advisory Committee (TMAC) for their suggestions and advice.

We also acknowledge the inputs provided by the inputs provided by the toolkit reviewer – Dr. Ramachandran, Former Secretary, MOUD, Government of India, Mr. Holger Dalkmann, Director EMBARQ Program, Dr. K Rajivan, former Senior Urban Finance Specialist, Cities Alliance and Mr. AK Swaminathan, former Senior Urban Transport Specialist, The World Bank.

Finally, we would like to thank the following individuals for their contributions and making this document a valuable resource:

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Preface

Government of India has initiated the Sustainable Urban Transport Project (SUTP) with support from Global Environment Facility (GEF), World Bank and UNDP. The primary objective of SUTP is to facilitate urban transport infrastructure in a sustainable environment and under the ambit of National Urban Transport Policy (NUTP).

Component 1A of GEF-SUTP project aims at capacity building amongst practitioners in the field of sustainable urban transport. The objective of the initiative is to create an enabling institutional framework for sustainable urban transport in India. This is to be accomplished by enhancing the capacity of policymakers, planners, researchers, executive agencies, service providers, managers and other professionals involved in urban transport to plan, implement, operate and manage sustainable urban transport.

To achieve the objectives of Component 1A, as part of the program 5 sub-components have been identified which include the following:

- Sub-Component 1 – Institutional capacity development, focusing on strengthening of Institute of Urban transport (IUT)
- Sub-Component 2 – Individual capacity development
- Sub-Component 3 – Preparation of manuals and toolkits
- Sub-Component 4 – Promotion, awareness and dissemination of information to expand and enhance the impact of GEF-SUTP
- Sub-Component 5 – Technical assistance to cities to address emerging issues encountered during project implementation.

Sub-Component 3 aims at providing step by step guidance to cities and other concerned authorities to enable them to plan and implement projects related to urban transport and also facilitate public decision makers and transport planners/ engineers in overseeing urban transport projects. It will include briefly the concept behind the subject of the tool kit, applicable planning standards and norms (most up to-date version to be used) and reference to a code of practice where necessary. The toolkits are as follows:



1. Land Use Transport Integration and Density of Urban Growth
2. Urban Travel Demand Modelling
3. Transport Demand Management
4. ITS for Traffic Management System
5. Public Transport Accessibility
6. Urban Road Safety & Safety Audits
7. Planning, Design and Evaluation of Urban Traffic systems
8. Finance and Financial Analysis
9. Environmental Analysis/SEA & SIA
10. Social Impact Assessment and R & R plan

The present toolkit would deal with the subject of **“Finance and Financial Analysis of Urban Transport Projects”**. The aim of this toolkit is to provide a systematic guide covering the aspects/steps of economic and financial/commercial viability analysis of the project which in turn assists the decision makers in following, with specific objectives as follows:

- Helping in the decision whether project accrues required socio economic benefits and thereafter;
- Developing a step by step process for choosing appropriate project financing options.

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List of Abbreviations

ADB	: Asian Development Bank
AMC	: Ahmadabad Municipal Corporation
BEST	: Bombay Electricity and Suburban Transport
BOOT	: Build Own Operate and Transfer
BOQ	: Bill of Quantities
BOT	: Build Operate and Transfer
BOOT	: Build Own Operate and Transfer
BRTS	: Bus Rapid Transit System
CEPT	: Centre for Environment Planning and Technology
CMP	: City Mobility Plan
CMRL	: Chennai Metro Rail Limited
CTTS	: Comprehensive Traffic and Transportation Study
DAMEPL	: Delhi Airport Metro Express Private Limited
DBFOT	: Design Build Finance Operate and Transfer
DDA	: Delhi Development Authority
DE	: Debt Equity
DEA	: Department of Economic Affairs
DIMTS	: Delhi Integrated Multi modal Transport Services
DMRC	: Delhi Metro Rail Corporation
DS	: Debt Servicing
DSCR	: Debt Service Coverage Ratio
EIRR	: Economic Internal Rate of Return
EPC	: Engineering Procurement Contract
FIRR	: Financial Internal Rate of Return
FOP	: Financial Operating Plan
FRBM	: Fiscal Regulation and Budget Management
GNTCD	: Government of National Capital Territory Delhi
GOI	: Government of India
GoTN	: Government of Tamil Nadu
GoUP	: Government of Uttar Pradesh



GSDP	: Gross State Domestic Product
IDFC	: Infrastructure development Finance Corporation
IL&FS	: Infrastructure Leasing and Financial Services
IP	: Interest Payment
IRR	: Internal Rate of Return
ISBT	: Inter State Bus Terminal
IT	: Information Technology
JICA	: Japanese International Cooperation Agency
JV	: Joint Venture
KSRTC	: Karnataka State Road Transport Corporation
LA	: Local Authority
MMRDA	: Mumbai Metropolitan region Development Authority
MoU	: Memorandum of Understanding
MoUD	: Ministry of Urban Development
NCRPB	: National Capital region Planning Board
NHAI	: National Highway Authority of India
NPV	: Net Present Value
NTBCL	: Noida Toll Bridge Company Limited
O&M	: Operation and Maintenance
PPP	: Public Private Partnership
PR	: Principal Repayment
PSU	: Public Sector Undertaking
RBI	: Reserve Bank of India
Rs	: Rupees (Indian Rupee)
SD	: Subordinate Debt
SPV	: Special Purpose Vehicle
TDR	: Transfer of Development Rights
TE	: Total Expenditure
TFC	: Twelfth Finance Commission
ThFC	: Thirteenth Finance Commission
TNUIFSL	: Tamil Nadu Urban Infrastructure Financial Services Limited
TOL	: Total Outstanding Liabilities
TR	: Total Revenue
TPS	: Town Planning Scheme
ULB	: Urban Local Body
VGf	: Viability Gap Funding
VOC	: Vehicle Operating Cost
1 Crore	: 10 Million
1 Lakh	: 100,000

Executive Summary

The fast pace of urbanization has fuelled the demand for urban mobility and hence triggering large number of planning and implementation projects in urban transport at city level in India. However, given their capital intensive nature, financing of such projects become a key challenge. This toolkit attempts to provide steps for choosing and developing appropriate financing options through assessment of financial viability of the project including, inter alia capturing the socio economic benefits that arise from the same.

Objective of the toolkit

The objective of this toolkit is to provide a systematic guide covering the aspects/steps of economic and financial/commercial viability analysis of the project which in turn assists the decision makers;

- (i) In deciding whether project accrues required socio economic benefits and thereafter;
- (ii) In choosing appropriate project financing option.

Attempts have been made to achieve objectives of toolkit through developing a framework for Project Economic and Financial Analysis. Generally Financial and Economic Analysis of the project are undertaken with different perspectives and hence key differences have been have been conceptualised. Economic Analysis measures the benefits to the society against the social cost of the project while Financial Analysis estimates the financial return/profit accruing to the project entity/ its owners. It is possible that Project which is financially attractive may be economically unviable and vice versa.

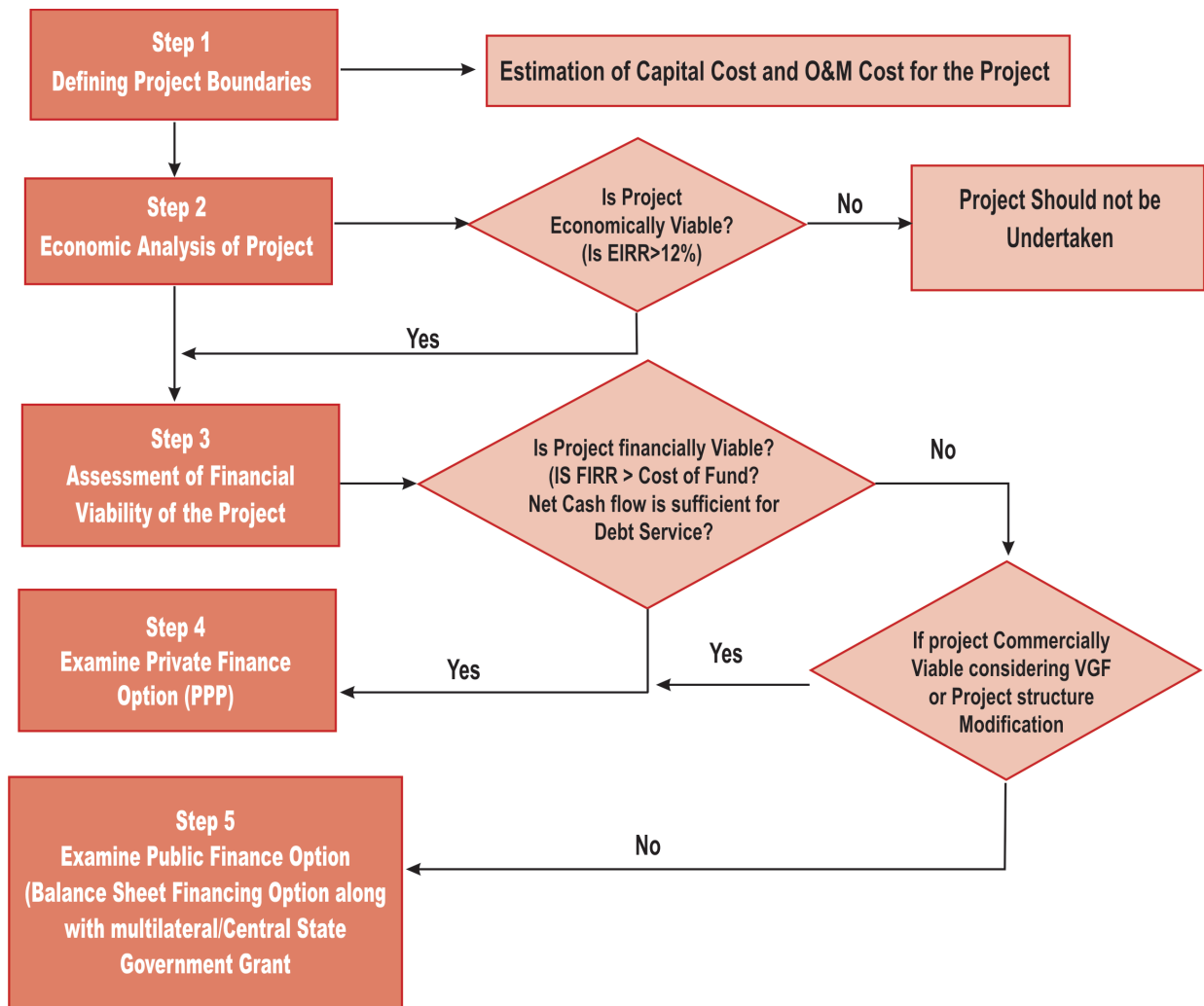


Point of Comparison Economic Analysis Financial Analysis

Point of Comparison	Economic Analysis	Financial Analysis
Point of View	Public, Society	Private, Project sponsoring Entity
Objective	Maximising Public Benefits	Maximising Benefits to Private / Project Sponsoring Entity
Types of Effect	All benefits and costs to society (including external costs)	All receipts and outlays that affects the financial return from the project.
Taxes, Subsidies and Interest payment	Excluded	Included
Prices used in valuation	Real Prices	Actual domestic market prices/current prices
Evaluation Parameters	Economic IRR, Economic NPV, Benefit Cost Ratio.	Financial IRR, Financial NPV, Debt Service Coverage Ratio

Project Economic and Financial Analysis Framework

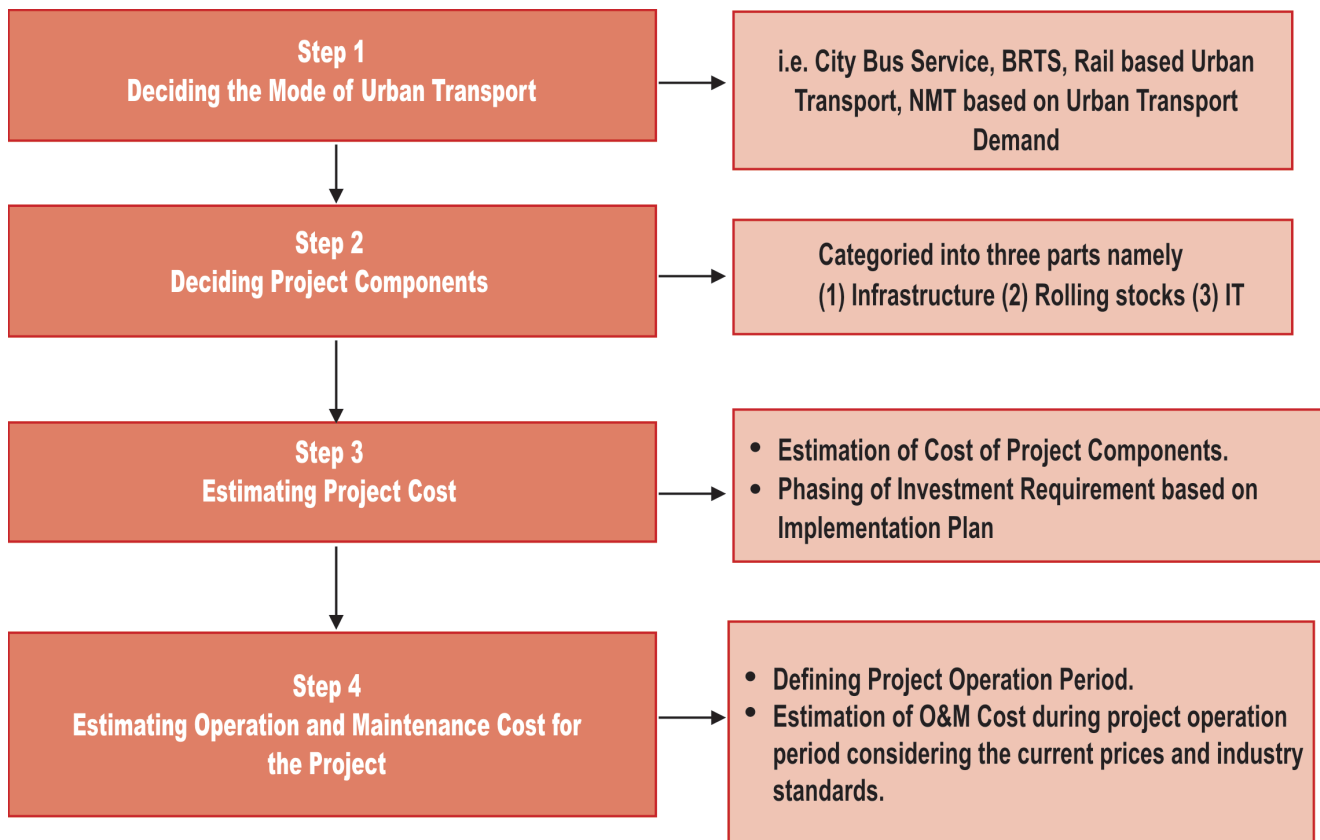
In order to achieve toolkit objectives , this toolkit puts forward a framework for analysis of urban transportation projects covering aspects and steps involved in economic and financial/commercial viability assessment, evaluation of financing options and nature of the implementation arrangement suitable to project. The framework steps for Project Economic and Financial analysis are provided below.



Each of the steps of Project Economic and Financial Analysis framework are summarised below.

Step 1: Defining project boundaries

The economic or financial returns are measured based on the quantum of investment involved in the project components. Toolkit elaborates the steps involved in estimating the project investment requirements and also discusses the steps for estimating the operation and maintenance cost. Summary is presented in figure below.



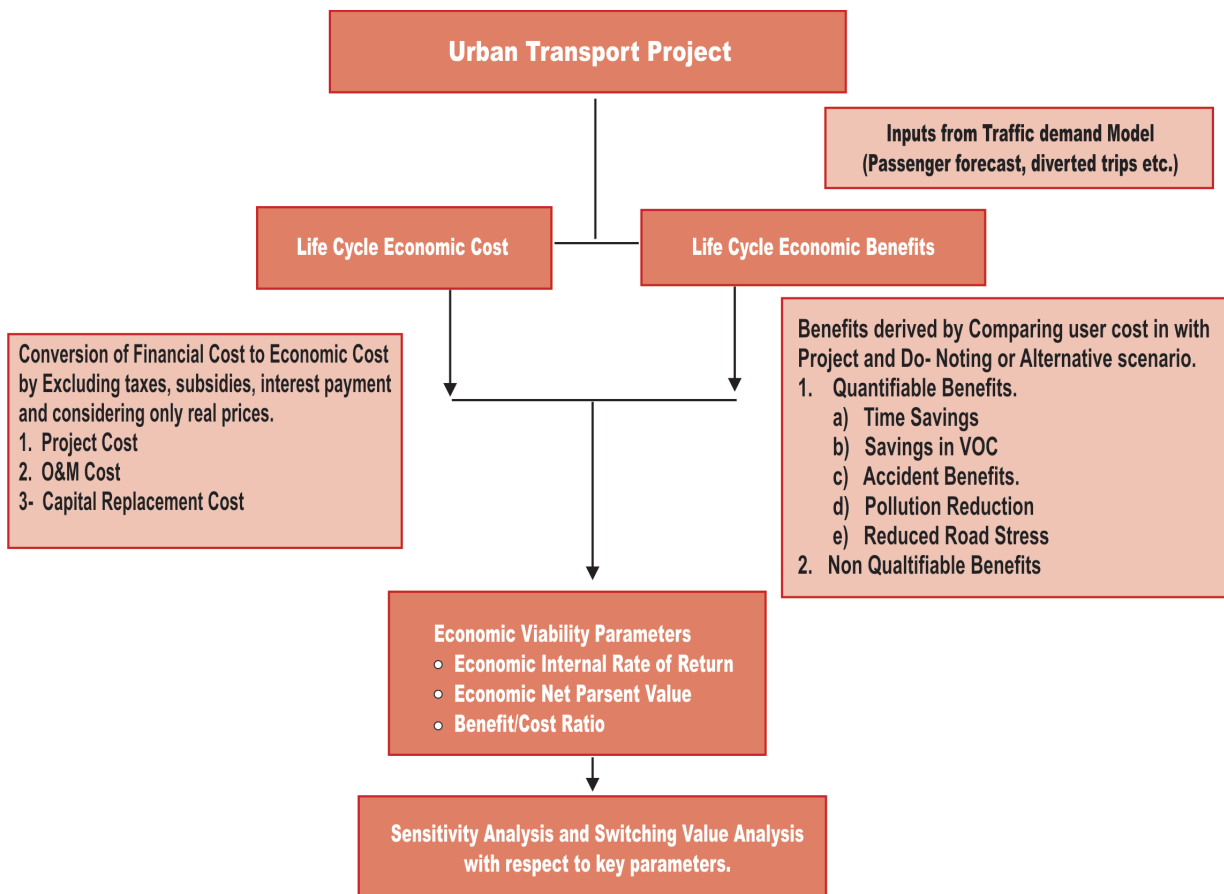
As specified in figure above, the components of an Urban Transport project can be categorised broadly into three categories (1) Infrastructure (2) Rolling stocks (2) Information Technology. It can be populated based on Urban Transport project chosen and Project Cost is estimated based on the chosen urban transport project and project components thereof. Project cost can be categorised in to capital cost of project components, Land Acquisition and R&R costs, taxes and duties, contingencies and financing costs.

Step 2: Economic analysis

Economic analysis of the urban transport project is undertaken with an objective to evaluate the contribution of the proposed Urban Transport Project to social objectives and to the region’s economy. It captures all the project related expenditure flow (i.e. life cycle cost); and all benefits likely to accrue to the society (irrespective of the investor) during a pre-defined analysis period. The framework for Project Economic Analysis is presented in figure below.



Figure 1: Steps in carrying out Economic Analysis



The outcome of economic returns, sensitivity tests and switching value analysis could be interpreted as follows.

No.	Parameters	Interpretation / Decision Criteria
1	Outcome of project analysis and sensitivity analysis in terms of EIRR, ENPV and Benefit to Cost Ratio.	<ul style="list-style-type: none"> Outcome of EIRR is compared with social opportunity cost of capital. Generally in developing countries Social Cost of Capital is considered as 12%. If EIRR is above this 12%, ENPV is a positive value and Benefit to Cost ratio is more than 1 then <i>the project is considered economically viable.</i>
2	Outcome of Switching value analysis	Quantum of change in parameters determines the economic viability of a project. If such changes are considerably higher, then the project is economically robust.



Upon arriving at outcome and deciding the interpretation of Economic Analysis for Urban Transport Project, the following further actions could be undertaken.

(1) Financial Analysis of the Project should be undertaken if;

- ✓ Project is evaluated to be economically viable.
- ✓ Even if Project is not evaluated to be economically viable but in case of strategic important cases in which the qualitative (Unquantifiable) social benefits are very high, it can be considered for recommendation.

(2) Alternative Projects should be considered or modification in proposed project should be considered if Project is evaluated for economic viability.

Step 3: Financial Viability Assessment

The Financial analysis of Urban Transport projects is generally carried out to assess (i) financial viability and (ii) operational sustainability of the project. The outcome of financial analysis forms the basis for undertaking an appropriate financing method through either project recourse financing or Public Finance through balance sheet based financing.

Steps involved in financial viability assessment are summarised in table below. Detailed calculation steps are presented in toolkit.

No	Steps	Details
1	Determination of Project Horizon	Project Horizon comprising of Construction Period and Operation Period of the Project. The costs and income/revenue associated with the sub projects should be estimated during the project Horizon period.
2	Determination of Project Cost including financing cost	The key components of project are decided based on the transport Mode chosen and based on which project cost is estimated. It includes capital costs, Land acquisition, R&R , Financing costs (i.e IDC) and asset replacement cost. Details summarised in step 1 of Economic AND Financial Framework.
3	Phasing of Investment	Phasing of investment/capital cost is to be done based on project implementation plan.
4	Determination of O&M Cost	As per details summarised in step 1 of Economic and Financial Analysis framework.
5	Determination of Income/Revenue	Demand is highly price elastic as observed world over in urban transport systems. Therefore, tariffs are an important determinant of demand. Due



		to social/political considerations, tariffs that are set are usually insufficient for meeting the operation cost thus revenue framework should capture the value from the benefits that accrue to different users								
		<table border="1"> <thead> <tr> <th style="background-color: #c00000; color: white;">Nature of the Benefits</th> <th style="background-color: #c00000; color: white;">Value Capture/Revenue generating sources (Summary)</th> </tr> </thead> <tbody> <tr> <td>Direct</td> <td> <ul style="list-style-type: none"> • Fare Box/Toll • Advertising • License Fees from station assets </td> </tr> <tr> <td>Proximate Mode and Indirect modes</td> <td> <ul style="list-style-type: none"> • Transit Oriented Development (TOD)/Real Estate Development. • Premium from Higher Floor Space Index (FSI) • Betterment Charges/ levy. • Additional Property tax • Carbon Credit • Congestion Charges </td> </tr> <tr> <td></td> <td>Of above betterment levy, additional property tax and congestion pricing could be used as corpus to the revolving Mass Rapid Transit Fund (MRTF) which could be used to fund project development and O&M.</td> </tr> </tbody> </table>	Nature of the Benefits	Value Capture/Revenue generating sources (Summary)	Direct	<ul style="list-style-type: none"> • Fare Box/Toll • Advertising • License Fees from station assets 	Proximate Mode and Indirect modes	<ul style="list-style-type: none"> • Transit Oriented Development (TOD)/Real Estate Development. • Premium from Higher Floor Space Index (FSI) • Betterment Charges/ levy. • Additional Property tax • Carbon Credit • Congestion Charges 		Of above betterment levy, additional property tax and congestion pricing could be used as corpus to the revolving Mass Rapid Transit Fund (MRTF) which could be used to fund project development and O&M.
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	Of above betterment levy, additional property tax and congestion pricing could be used as corpus to the revolving Mass Rapid Transit Fund (MRTF) which could be used to fund project development and O&M.									
		Toolkit also provides various case studies of revenue generation through direct/indirect value capture.								
6	Deciding Quantum of Debt	Equity contribution and quantum of debt is decided based on estimation of Financial Operation Plan and balance sheet analysis as specified in ATTACHMENT 4 of toolkit								
7	Estimation of cash flow	The costs and revenue streams associated with the project for Project Horizon period is estimated based on steps above. Based on this, the project free cash flow is estimated.								
8	Determining Outcome	<p>Steps for arriving at outcome are summarised below.</p> <table border="1"> <thead> <tr> <th style="background-color: #c00000; color: white;">Parameters</th> <th style="background-color: #c00000; color: white;">Steps for calculation</th> </tr> </thead> <tbody> <tr> <td>Calculation of weighted average cost of capital as a benchmark to assess return</td> <td> <ul style="list-style-type: none"> • WACC is expressed as the weighted average for required rate of return for equity and debt. • For Government Agency the social cost of its own fund or grant is considered as 12% whereas actual cost of debt is considered for calculation of WACC. </td> </tr> </tbody> </table>	Parameters	Steps for calculation	Calculation of weighted average cost of capital as a benchmark to assess return	<ul style="list-style-type: none"> • WACC is expressed as the weighted average for required rate of return for equity and debt. • For Government Agency the social cost of its own fund or grant is considered as 12% whereas actual cost of debt is considered for calculation of WACC. 				
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		<ul style="list-style-type: none"> The cost of Debt is perceived to be higher for private sector as compared to Government agency.
	<p>Calculation of Financial IRR and NPV</p>	<p>Overall financial viability of the project is measured through Financial IRR and NPV.</p> <p><i>i. Financial IRR:</i> Financial IRR is calculated based on free cash flow stream. Financial IRR indicates the return on investment.</p> <p><i>ii. Net Present Value (NPV):</i> Discounted Cash Flow technique is used to estimate the NPV. As per Govt. agencies point of view, Discount rate used for above calculation should be social discount rate (i.e. 12% social cost of capital or (G-sec) rate). However, WACC can be adopted as discount rate as per private sector point of view.</p>
	<p>Calculation of Debt Service Coverage Ratio (DSCR)</p>	<ul style="list-style-type: none"> The Debt Service Coverage Ratio (DSCR) gives an indication of the capacity to repay the debt incurred for the project from operating surpluses. It is calculated as ratio of net cash flow to Principal and interest payment of debt. This ratio should be above 1.15, although lenders may insist on much higher DSCR for additional comfort. Cash reserves and other separate provisions may have to be made to ensure that the DSCR does not fall below the minimum.
	<p>Sensitivity Analysis</p>	<p>The range of sensitivity can be in the range of 10 to 15% of the critical factors such as (a) Cost overruns due to delay or other factors (b) Increase in Maintenance Cost (c) Reduction in traffic in case of toll road (c) Reduction in overall revenue from the project (d) Combination of reduction in revenue and increase in cost. Outcome in terms of parameters as specified above should be calculated under each of sensitivity test.</p>



9	Interpretation of Outcome	<p>The subproject is evaluated to be financially viable if (1) FIRR is higher than WACC (2) NPV is positive and (3) DSCR is higher than 1.15.</p> <p>Even if a project is not commercially viable but operating ratio is higher than 1.0 then project is considered to be sustainable.</p>
10	Way Forward/Decision	<ul style="list-style-type: none"> • If sub project is evaluated to be financially viable then Private finance option could (PPP Option) be explored. • Even if project is evaluated commercially unviable then Viability Gap Funding Scheme (VGF) of Central Government is examined. The commercial viability of the project is assessed further under this scheme¹. If Project is evaluated to be commercially viable then Private Finance Option shall be undertaken /explored. • Project is evaluated to be commercially unviable in standalone as well as under VGF scheme then public finance option could be explored. • If project is evaluated to be financially unviable under standalone basis and under VGF scheme but it is found sufficiently operationally sustainable and viable then mix of Private and Public Finance option could be explored. • Project is evaluated to be commercially unviable in standalone as well as under VGF scheme and also sufficiently operationally unviable as well as unsustainable then Public finance option could be explored.

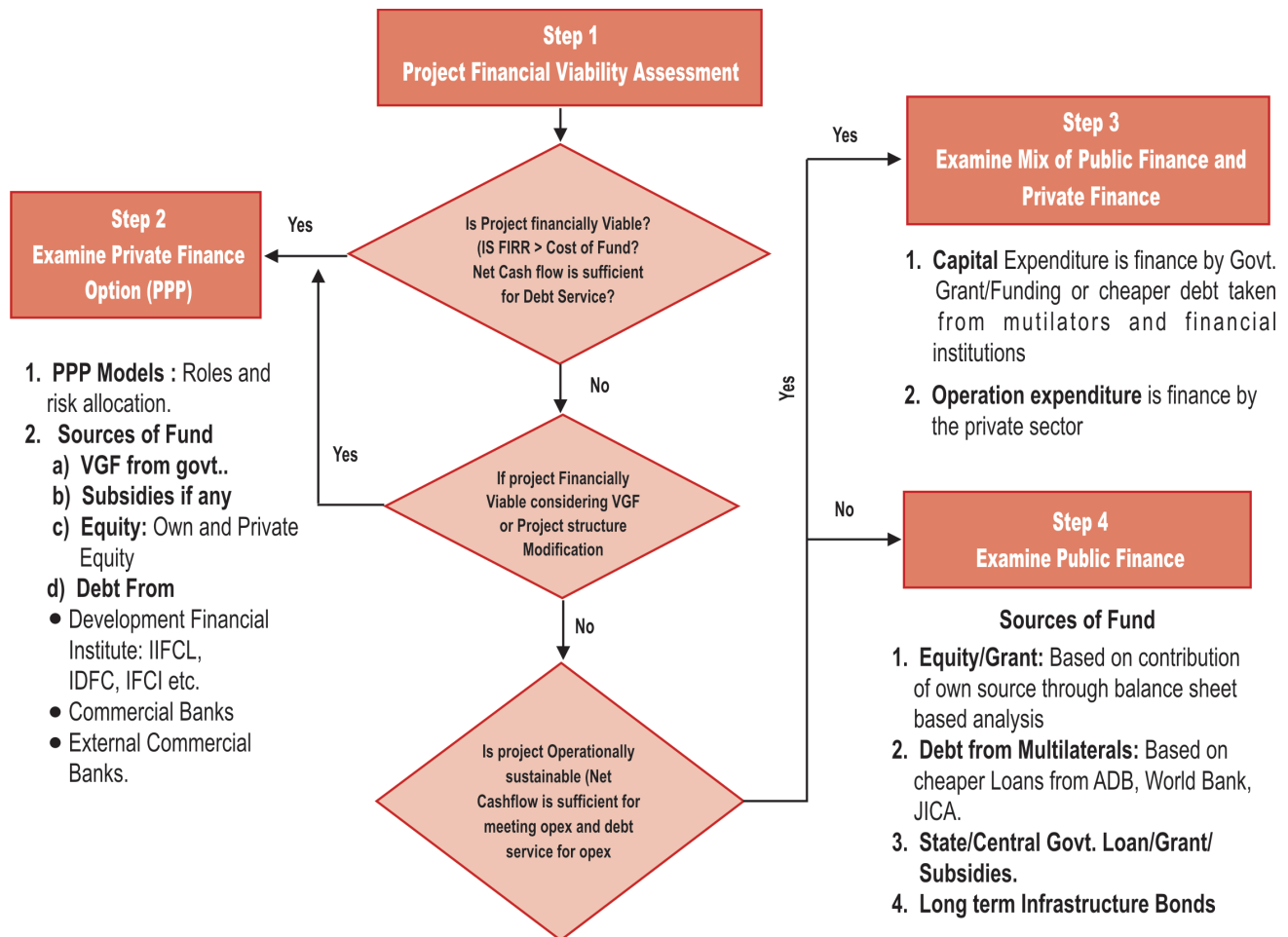
Step 4 & 5: Examining Financing Options

The financing decision depends on nature of the returns on the Investment and its attractiveness to PPP option, resources available from the ULB, State and Central Government and other sources.

¹The overall share of the VGF is capped at 40% of the project cost as per Government policy in this regard which stipulates 20% funding by Government of India and 20% from State Government/Sponsoring Govt. Agency.



Figure 2: Steps involved in assessing the financing options



Examining Private finance option

Private Sector Finance can be obtained by selecting the project implementation model on Public Private Partnership (PPP) basis. The selection of an appropriate project implementation model depends on commercial viability/ return on investment.

Private Sector Models imply that PPP models where full projects are implemented by the private sector and the capital and operation expenditure is recovered either through right to revenue streams or through annuity payments by the Government.

Possibilities of Private Sector Participation in the project would be evaluated taking the following PPP formats into account



No.	Outcome of the Financial Viability	Suitable PPP Model	Roles and Responsibilities
1	Project is evaluated commercially viable based on project revenue stream and cash flow. <i>(Strong Revenue Model with Possibility of Investment recovery)</i>	Built Operate and Transfer (BOT)	<ul style="list-style-type: none"> Entire project cost and O&M Costs as against the right of revenue during the concession period. ULB/State/Central Govt. assumes project monitoring and supervision responsibility.
2	Project is commercially unviable on standalone basis but Viable considering VGF . <i>(Investment recovery is possible to a large extent but not fully)</i>	Viability Gap Funding (VGF) Model <i>(The overall share of VGF in the Project cost would be capped at 40% as per Govt. Policy in this regard which stipulates 20% funding by the central Govt. and remaining 20% from State Govt. /ULB / Sponsoring agency.)</i>	<ul style="list-style-type: none"> Entire project cost and O&M Costs as against the right of revenue during the concession period and capital grants in terms of VGF during Project construction. The concessionaire would ask for VGF in this case which would be the bidding variable.
Following PPP Models could be explored if project is evaluated to be unviable for both options of BOT and VGF.			
3	Project is evaluated to be commercially unviable for both options of BOT and VGF and project Investment is higher and budgetary allocation is limited	Grant During Operation	The private player would bear 100% of project cost and collect the revenue as well. The ULB/State Govt. /Central Govt. would provide an equal amount of revenue shortfall grant every year for the entire concession period to maintain adequate returns of the concessionaire. The grant quoted per year would be the bidding variable.
4		Annuity Model	The private player would bear the entire project cost and implement the project. The revenue would be collected by the Public Sector. The concessionaire would ask for fixed annuity amount to be paid in equal annual instalments over the entire concession period. The annuity amount would be the bidding variable.



Urban Transport project being capital intensive in nature requires long term finance. There are various means of long term funding available to private sector for infrastructure projects in India. The prime sources of long term funds are described in the toolkit and summarized below.

1. *Capital Grants in terms of Viability Gap Funding (VGF) from Government.*
2. *Subsidies in terms of grant during operation or annuity.*
3. *Equity from own source:* This constitutes the risk capital for the project. Depending upon the project structure, equity could be contributed by the private party player. Normally equity contribution from Private players varies from 20% to 30% in infrastructure projects based on its balance sheet based analysis.
4. *Debt :* Debt has to be repaid from project revenues or other sources and also carries an interest payment obligation. Lenders may typically require escrowing of revenues from income sources to ensure periodic payment. There are various options for raising debt for a project. These include loans from ;
 - Development Financial Institute such as IIFCL, IDFC, IFCI etc.
 - Commercial Banks and NBFC in India
 - External Commercial Borrowings
 - Long Term Infrastructure Bonds.
 - Private equity
 - Long term Infrastructure Bond to be issued by Private Player.
 - Urban Transport Fund

Examining Mix of Public and Private Finance option

This model implies a mix of public and private sector model where project is partially implemented by the Public sector and the private sector. This model can be explored when a Project is evaluated to be financially unviable for both options of BOT and VGF however limited investment recovery is possible. The capital expenditure with respect to civil construction is incurred by the Public sector where as investment with respect to rolling stocks and operation expenditure is made by the private sector. Under this model private sector is provided with right to revenue or availing regular annuity payment by the public sector through which private sector recovered its investment and O&M cost.



No.	Outcome of the Financial Viability	Variants of Mix of Public and Private Sector Model	Roles and Responsibilities
1	Project is evaluated to be financially unviable for both options of BOT and VGF however limited investment recovery is possible.	Revenue Share Model	<ul style="list-style-type: none"> • In this Model Public sector would bear the cost of civil infrastructure where as private sector would invest in rolling stocks, ITS and O&M as against the rights of revenue. • The Private sector would share fix amount of revenue every year with public sector and thus proportion of revenue share would be bidding variable.
2	Project is evaluated to be financially unviable for both options of BOT and VGF however limited investment recovery is also not possible through project revenue stream.	Annuity for investment recovery for rolling stocks /ITS investments	<ul style="list-style-type: none"> • In this Model Public sector would bear the cost of civil infrastructure where as private sector would invest in rolling stocks, ITS and O&M against the regular annuity income. The Public sector would retain the rights of project revenue. • Bidding variables could be lowest annuity amount quoted.

Examining public finance option

Public finance options should be explored if projects bring higher socio economic benefits but are commercially evaluated to be unviable and do not fit into Private Financing through PPP option or mix of Public and Private finance Option. Under this model ULB/State/Central Government could form an SPV to develop, operate and maintain the Urban Transport project. Funding under this model is availed through own sources, state and central Government funding, loans on concessional rates from multilateral agencies such as ADB, World Bank, JICA etc. and through the municipal bonds. All funding sources available to public sector are elaborated in toolkit and summarised as follows.

1. *Equity/ own source:* Depending upon the availability of fund from own sources based on a balance sheet analysis, the quantum of equity contribution from own sources should be decided. The balance sheet based analysis comprises the preparation of Financial Operating Plan and the Capital Investment Plan and could help in determining the following:
 - a) Quantum of equity contribution from own sources for the project;
 - b) Determination of whether ULB/Project Authority could meet project maintenance expense through its own fund; and



- c) Determining the Quantum of Debt servicing capability.

Steps for preparation of FOP are also summarized in this toolkit and placed as ATTACHMENT 4 for ready reference.

2. *Capital Grants / Equity from State / Central Government:* Grants from central and state governments (including **JNNURM**) are also important sources of funds. DPR needs to be prepared for availing such grant.
3. *Debt:* The Quantum of debt could be decided based on debt servicing capacity. The balance sheet based analysis as specified in **ATTACHMENT 4** of toolkit could be undertaken to determine the quantum of debt. The various options for raising debt for the project include followings.
 - a) Loans from Multilateral Financial Institutions such as ADB, World Bank, JICA etc.
 - b) Issuance of Bonds.
 - c) Interest free loans from State/Central Government.
4. *Mass Rapid Transit Fund:* A dedicated Mass Rapid Transit Fund (MRTF) could be created to fund development and operation of the Urban Transport project. The corpus of fund can be collected from following sources.
 - a) Sale of Extra FSI
 - b) Betterment Charges
 - c) Cess on Property Tax
 - d) Cess on Building Use Permission
 - e) Cess on vehicle registration:
 - f) Cess on VAT

Risk Analysis Framework for Urban Transport Project

Given the Capital Intensive nature of an Urban Transport Project, risks associated with the project and its subsequent mitigation assumes importance as it impacts the outcome of Economic and Financial Viability of the Urban Transport Project. It also affects the sustainability of the project. Thus a Risk analysis framework comprising identification of risks, likely impact and its mitigation measures are provided in **ATTACHMENT 3** and summarized in figure below.



Project Lifecycle	Risks Associated with each Phase	Mitigation Measures
Project Inception Phase	<ul style="list-style-type: none"> ● Planning Risks ● Approval Risks ● Financial Closure 	<ul style="list-style-type: none"> ● Proper feasibility study and institutional due diligence. ● Ensuring coordination between different Govt. departments in obtaining approvals. ● Making project bankable by making revenue stream stronger
Development Phase	<ul style="list-style-type: none"> ● Design Risks ● Cost Over Run ● Time Over Run ● Change of Law ● Foreign Exchange Risks 	<ul style="list-style-type: none"> ● Institutional due diligence for feasibility study and cost estimation. ● Planning and coordination for all clearances, market linked incentive for land acquisition, progress supervision through PMC ● Assessment and due diligence of regulatory environment and sensitivity analysis with respect to change in law. ● Sensitize financials to currency risks and Hedging with supplier of financial institutions.
Operations Phase	<ul style="list-style-type: none"> ● Demand/Revenue Risks ● Technology Risks ● Consumable cost overrun Risks ● Performance Risks ● Force Majeure Risks ● Dispute Resolution Risks 	<ul style="list-style-type: none"> ● Institutional due diligence for traffic estimation. ● Provide quality services, efforts in branding and making services delivery affordable and competitive. ● Fare Policy with mechanism for fare revision, discouraging para transit, mechanism to capture value from indirect beneficiaries. ● Use of Proven technology with Clear output specifications. ● Monitoring and Supervision of predetermined Service Levels. ● Inventory control mechanisms and long term supply tie ups for consumables, Obtaining Insurance, risk sharing and Transparent Dispute resolution mechanism



Chapter 1:

Introduction

Investments in Urban Transport Projects bring enormous socio economic benefits to the society. It ensures smooth and efficient movement of people there by enhancing productivity. It improves the quality of life of urban residents, contributes to reduction of vehicular pollution and deterioration in air quality and thereby its negative impact on health.

The fast pace of urbanization has fuelled the demand for 'urban mobility' and hence triggering large number of planning and implementation projects in urban transport at city level in India. However, given their capital intensive nature, financing of such projects become a key challenge. This toolkit attempts to provide steps for choosing and developing appropriate financing options through assessment of financial viability of the project including, inter alia capturing the socio economic benefits that arise from the same.

1.1 Need for this toolkit

1. India is urbanizing and poses enormous challenges in terms of intra city mobility

As per the 2011 Population Census of India, 31% of India's population lives in urban areas. This is a smaller share when compared to other large developing countries such as China (45%), Indonesia (44%), Mexico (78%) and Brazil (87%). However, the sheer size of population base is large therefore, has a significant bearing on the overall development trends.

As per the census of 2001, there were 5161 towns and cities in India. This number went up to a staggering 7935 in 2011. The number of large cities is high (53) and they account for a major share of urban population (43%). Urban Transport problems tend to assume greater significance as city size increases.

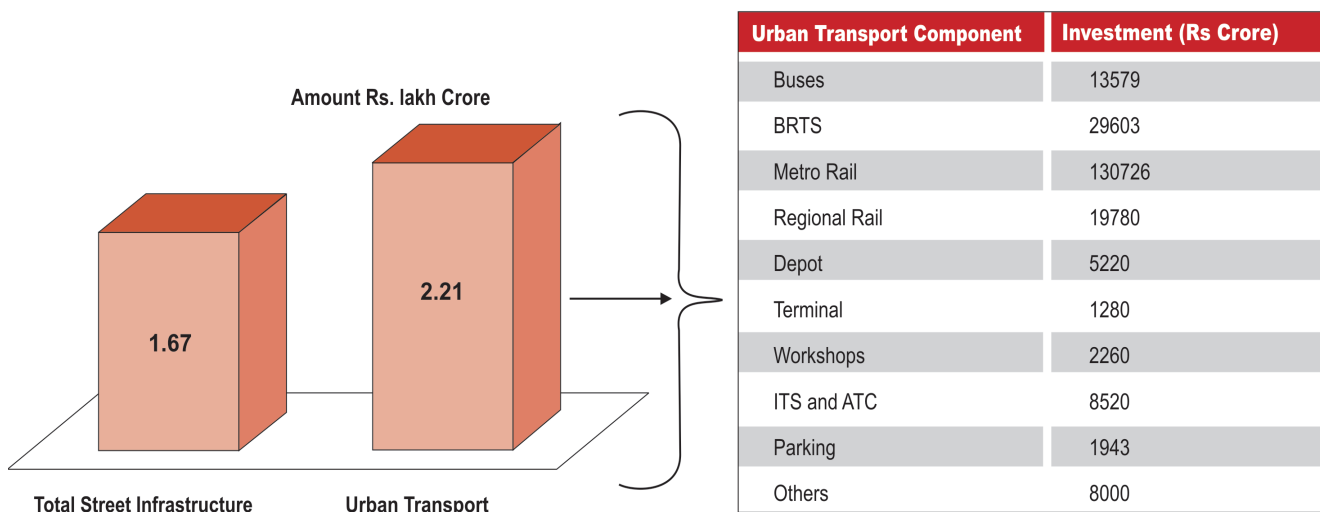
2. Urban transport – a key to sustainability of rapidly growing cities

Today urban sector generate about 60% of the GDP. Urban transport supply in adequate quality and quantity, determine the efficiency of functioning of urban areas and define the future economic growth trajectories. Similarly, by influencing the level of travel and the mode choices of the people and goods, it can be a major contributor to solve urban environment, health and climate change issues.



However, the situation does not appear favourable. As the twelfth five year plan document notes, “the present scene of urban transport across India is categorized by sprawling cities; declining share of public transport and non-motorised transport; focus on supply side yet with low investments; sheer neglect of pedestrians, cyclists and public transport users; and increased motorization leading to pollution and high road fatalities/injuries”. Such a scenario is neither desirable nor sustainable and needs to be proactively dealt with. To address this issue, the working group of 12th Five year plan recommended implementation of different urban transport projects catering to the urban areas demand and needs.

Figure 1.1: Investment Requirement for Urban Transport during 12th Five Year Plan



Source: Recommendations of working group on urban transport for the 12th Five Year plan.

To meet the urban mobility demand, an investment of Rs 2.21 lakh crore is envisaged during 12th five year plan in the urban transport sector.

3. Urban transport investment gaps are large but public sector resources are limited

As mentioned above, the investment requirements are large. The High powered expert committee, constituted by the Ministry of Urban Development, Government of India estimates total investment requirements on Indian urban infrastructure and services by 2031 to be in the order of Rs. 39 Lakh Crores¹.

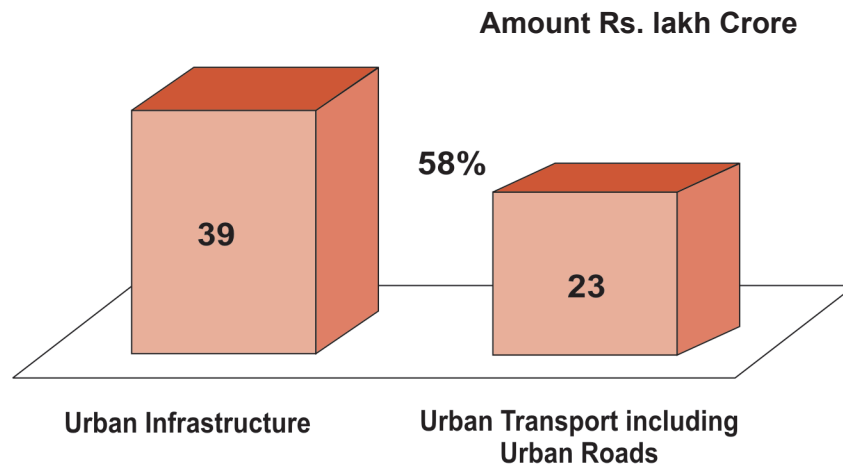
Of these about 58% are estimated to be in urban transport. While the resource requirements are large and widening, the availability of funds is limited in all size class cities. In big cities the requirements are large as they

¹ Source: Recommendations of working group on urban transport for the 12th Five Year plan.



have to invest in high capital intensive projects to cater to growing mobility needs thus creating a gap between demand and supply. On the other hand, smaller cities are resource constrained as their ability to mobilize resources itself is limited.

Figure 1.2: Investment Requirement by 2031 in Urban Transport



Source: HPEC Report on Urban Infrastructure and Services

4. Twin strategies– find alternate sources of financing and prudent capital investment choice – a way forward

In view of the above, it is necessary that financial planning for urban transportation projects is carried out in a prudent and rational manner. For this, a systematic economic and financial analysis framework is required to be put in place. Such assessments should form the basis for urban transportation planning leading to better project selection, inbuilt mechanism to face risks and finally sustainable urban transportation systems. Further, timely access to finance is critical for ensuring timely completion of the project. Project planning therefore, is crucial and requires understanding of the processes and requirements of financing and safeguards. All these are critical for the financial closure of the projects. Thus a systematic guide covering the economic and financial analysis framework and processes needs to be put in place which further helps in decision making (for the planners, designers, city officials and financial experts).

1.2 Objectives of this toolkit

The objective of this toolkit is to provide a systematic guide covering the aspects/steps of economic and financial/commercial viability analysis of the project which in turn assists the decision makers in following;



- (i) In deciding whether project accrues required socio economic benefits and thereafter;
- (ii) In choosing appropriate project financing option.

To achieve the above objective, this toolkit puts forward a framework for analysis of urban transportation projects covering aspects and steps involved in economic and financial/commercial viability assessment, evaluation of financing options and nature of the implementation arrangement suitable to project.

1.3 Target groups for the toolkit

This toolkit will be useful to:

- I. Government officials involved in decision-making;
- II. Local Authority/ Authorities involved in planning and implementation of projects; and
- III. Consultants/ institutions supporting project design or advising the government on transactions.

1.4 Project economic and financial analysis framework

As discussed above, attempt has been made to achieve objectives of toolkit through developing a framework for Project Economic and Financial Analysis. Generally Financial and Economic Analysis of the project are undertaken with different perspectives and hence key differences between the Economic and financial analysis needs to be conceptualised. Economic Analysis measures the benefits to the society against the social cost of the project while Financial Analysis estimates the financial return/profit accruing to the project entity/ its owners. It is possible that Project which is financially attractive may be economically unviable and vice versa. For example, a steel project in a tribal forest may be financially very attractive due to the presence of iron ore mines there, but economically not so since the environmental destruction mitigation cost (of growing trees at alternative locations etc. may be too high. The comparison between Economic Analysis and Financial Analysis is provided in table below.

Table 1.1: Comparison of Economic and Financial Analysis

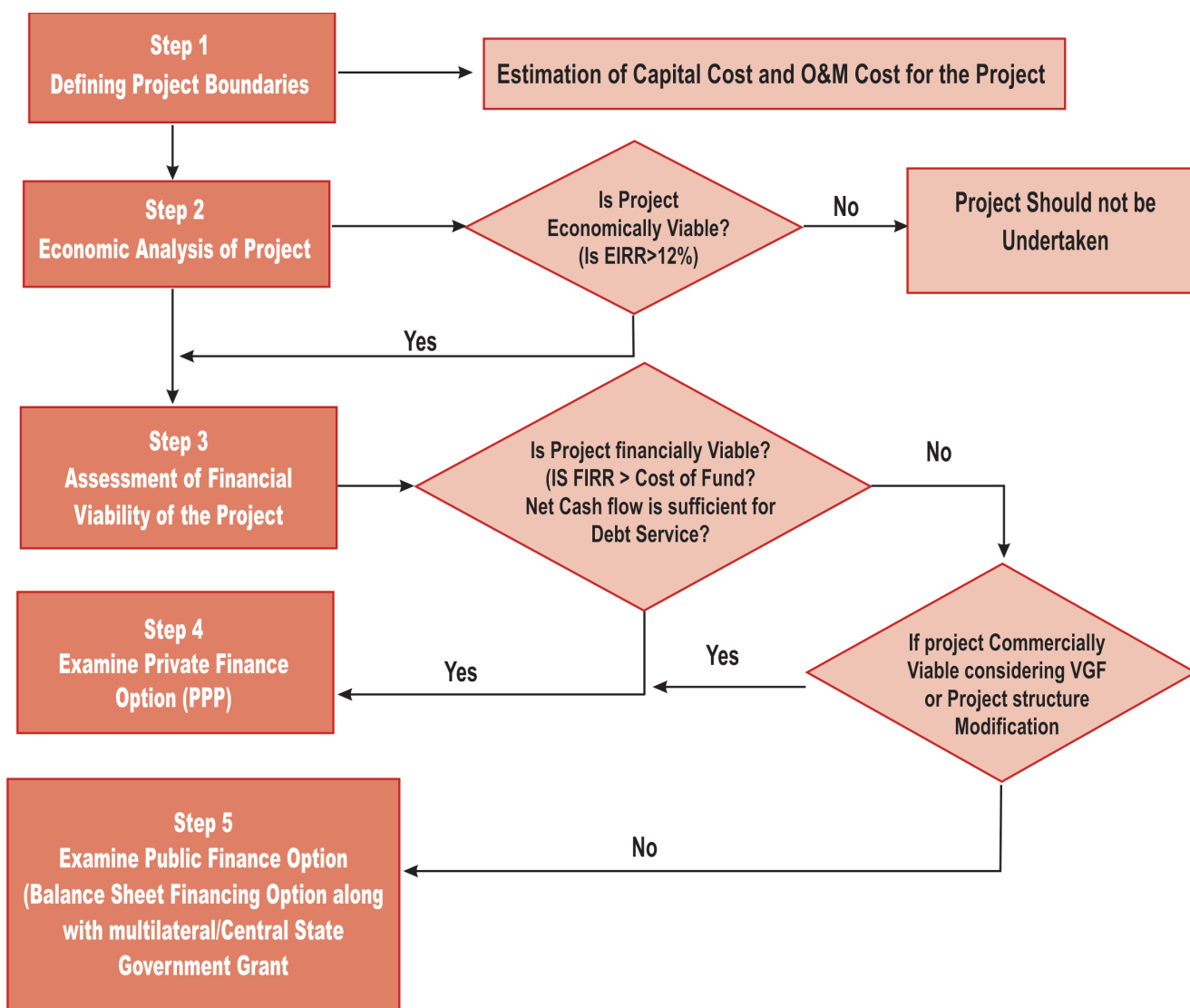
Point of Comparison	Economic Analysis	Financial Analysis
Point of View	Public, Society	Private, Project sponsoring Entity
Objective	Maximising Public Benefits	Maximising Benefits to Private / Project Sponsoring Entity
Types of Effect	All benefits and costs to society (including external costs)	All receipts and outlays that affects the financial return from the project.
Taxes, Subsidies and Interest payment	Excluded	Included
Prices used in valuation.	Real Prices	Actual domestic market prices/current prices
Evaluation Parameters	Economic IRR, Economic NPV, Benefit Cost Ratio.	Financial IRR, Financial NPV, Debt Service Coverage Ratio



Detailed definitions and terms used in economic analysis and financial Analysis are specified in Attachment 1.

The framework steps for Project Economic and Financial analysis are provided below.

Figure 1.3: Framework for Project Economic and Financial Analysis



All above steps are structured into five sections. The toolkit proceeds with the discussion on each of the sections.

The main sections of this toolkit deals with the Economic and Financial Analysis and financing options for the entire project cycle of an Urban Transport Project. The steps for similar analysis for subprojects are provided in **ATTACHMENT 2** of this toolkit.

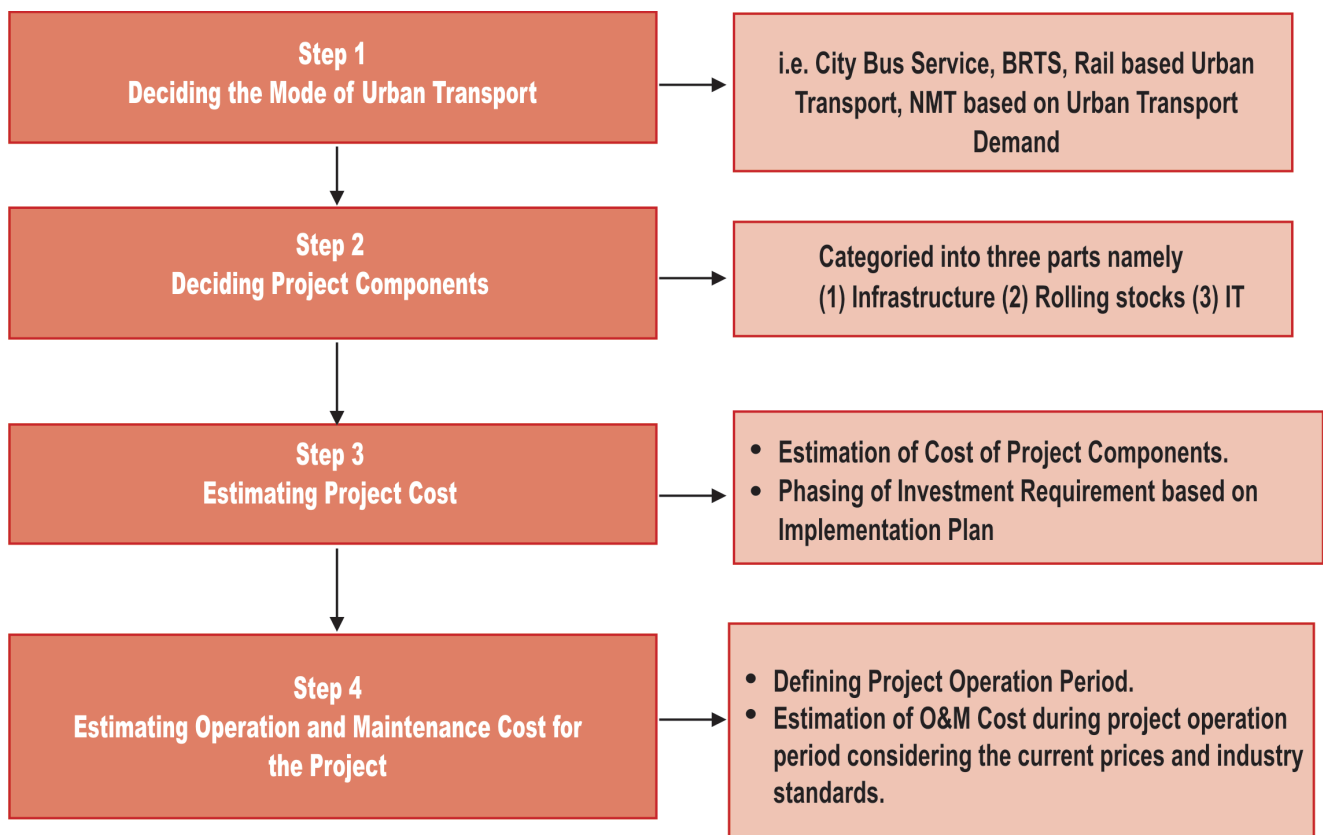


Chapter 2:

Defining Project Boundaries

The economic or financial returns are measured based on the quantum of investment involved in the project components. Thus defining project boundaries is an important part for undertaking economic and financial analysis of any project. This section elaborates the steps involved in estimating the project investment requirements and also discusses the steps for estimating the operation and maintenance cost. The pictorial representations of steps involved are given below.

Figure 2.1: Defining Project Boundaries





2.1 Step 1 Deciding mode of urban transport

The Transport mode is chosen based on detailed Traffic Demand estimation. The process of choosing a transport mode is described in the toolkit on “*Urban Transport Planning and Traffic Demand Modelling*”. Based on the most suitable transport mode chosen, the project components are decided. The following table elaborates some of the components of urban transport project based on Transport Mode.

2.2 Step 2 Deciding project components

The components of an Urban Transport project can be categorised broadly into three categories (1) Infrastructure (2) Rolling stocks (3) Information Technology. All three categories can be populated based on the mode of transport chosen.

Table 2.1: Comparison of Economic and Financial Analysis

Transport Mode	Component		
	Infrastructure	Rolling Stocks	Information Technology
Regular City Bus System	<ul style="list-style-type: none"> • City Bus Stations • Depot/Parking Bays • Urban Roads/Bridges/ Foot Over Bridge. • Control Centre • Signals at Junctions 	Buses	<ul style="list-style-type: none"> • Bus PIS • Tracking and Monitoring/ scheduling through Control Centre. • Ticketing. • Accounting
BRT Based City Bus System	<ul style="list-style-type: none"> • BRT Road Corridor/ Bridges. • BRT Bus Stations. • Depot/Parking Bays. • Signals at Junctions. • Control Centre 	BRT Buses	<ul style="list-style-type: none"> • Information and display at Buses and Bus Stations • Tracking and Monitoring/ scheduling through Control Centre • Ticketing • Web based PIS • Accounting
Rail based Urban Transport Projects such as Metro/Mono Rail/Sub Urban Rail etc.	<ul style="list-style-type: none"> • Traction and Power Supply • Track (<i>Elevated / Underground / at grade</i>) • Stations (Underground /Elevated) • Depot/Parking • Signalling and Telecom • Control Centre 	Coaches and Locomotives	<ul style="list-style-type: none"> • Information and display at Coached and Stations • Tracking and Monitoring/ scheduling through Control Centre • Ticketing • Web based PIS • Accounting
Non-Motorised Transport (NMT)	<ul style="list-style-type: none"> • Segregated Cycle Track. • Footpath • Parking for Non-Motorized Vehicles 	Bicycle and Cycle Rickshaw.	



Project Cost is estimated based on the chosen transport mode and project components thereof. Next sections specify the steps involved in deciding the Project Cost.

2.3 Step 3 Estimating of project cost

The cost of the key components of the project is estimated as follows.

Table 2.2: Cost Estimation of Urban Transport Project

Cost Category	Investment Category	Cost of Components
(a) Capital Cost	Infrastructure	<ul style="list-style-type: none"> Cost of Civil Works for following components based on estimation of detailed Bills of Quantities. <ul style="list-style-type: none"> Roads: Formation and widening, Grade Separators Bridge etc. Parking, Terminals and Depots Stations Control Centre Cycle track Footpath Signals and telecommunications systems, Traction and Power Supply and laying of Tracks in case of rail based UT Project.
	Transport	<ul style="list-style-type: none"> Cost of Rolling stocks/Modes of transport such as <ul style="list-style-type: none"> Bus- Regular/BRT Coaches and Locomotives for Rail or variants of rail such as MRTS/ LRT/Trams/Suburban Rail Ropeways and Funiculars
	Information Technology	<ul style="list-style-type: none"> Cost of Hardware and Software for followings <ul style="list-style-type: none"> Information and display Tracking and Monitoring/ scheduling Ticketing Accounting
(b) Land Acquisition Cost	Land	<ul style="list-style-type: none"> Cost of Land acquired to develop required Infrastructure.
(c) R&R Cost	R&R	<ul style="list-style-type: none"> Rehabilitation and Resettlement Cost
(d) Taxes and Duties		<ul style="list-style-type: none"> Taxes and Duties levied by Govt. such as Custom, excise etc.
(e) Physical / Price Contingencies		<ul style="list-style-type: none"> Generally it is estimated @ 5% to 10% of the cost of above components
(f) Financing Cost		<ul style="list-style-type: none"> Financing charges/Interest during construction period
(e) Any other cost that can be categorised as capital		
Total of above (a+b+c+d+e)		



2.3.1 Phasing of project cost/investment

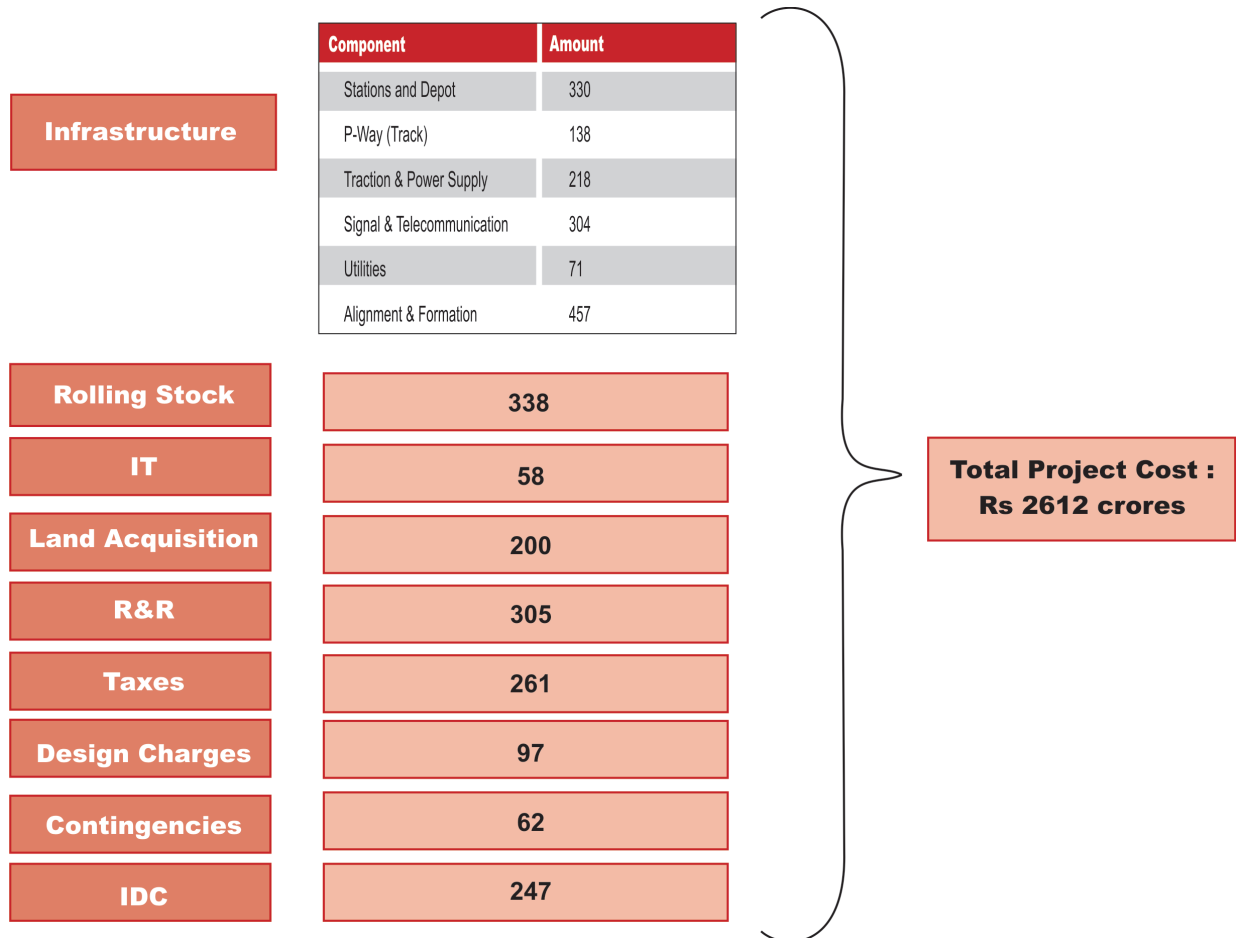
The phasing of investment/capital cost is to be done based on project implementation plan. Illustration is provided in table below.

Table 2.3: Investment Phasing

Particulars	Years of Construction		
	Year 1	Year 2	Year 3
Phasing of Expenditure ² (A)	20% of subproject cost	40-45% of subproject cost	40-35% of subproject cost
Amount spent every year (B)	Project Cost * Year 1 of (A)	Project Cost * Year 2 of (A)	Project Cost * Year 3 of (A)
Fund Draw down (*)			
Grant, if any	30% of eligible grant amount	40% of eligible grant amount	30% of eligible grant amount
Loan	30% of eligible loan	40% of eligible loan amount	30% of eligible loan amount
Own Contribution	30% of the amount to be brought in by the borrower	40% of the amount to be brought in by the borrower	30% of the amount to be brought in by the borrower
<i>(*) This is an illustrative schedule and the actual disbursements of sub loan and grant will be made on the actual progress of work.</i>			



Box 2.1: Capital Cost of Hyderabad Metro Corridor -3 (Nagole- Shilparaman) (Length 23 km)
(Amount Rs crore)

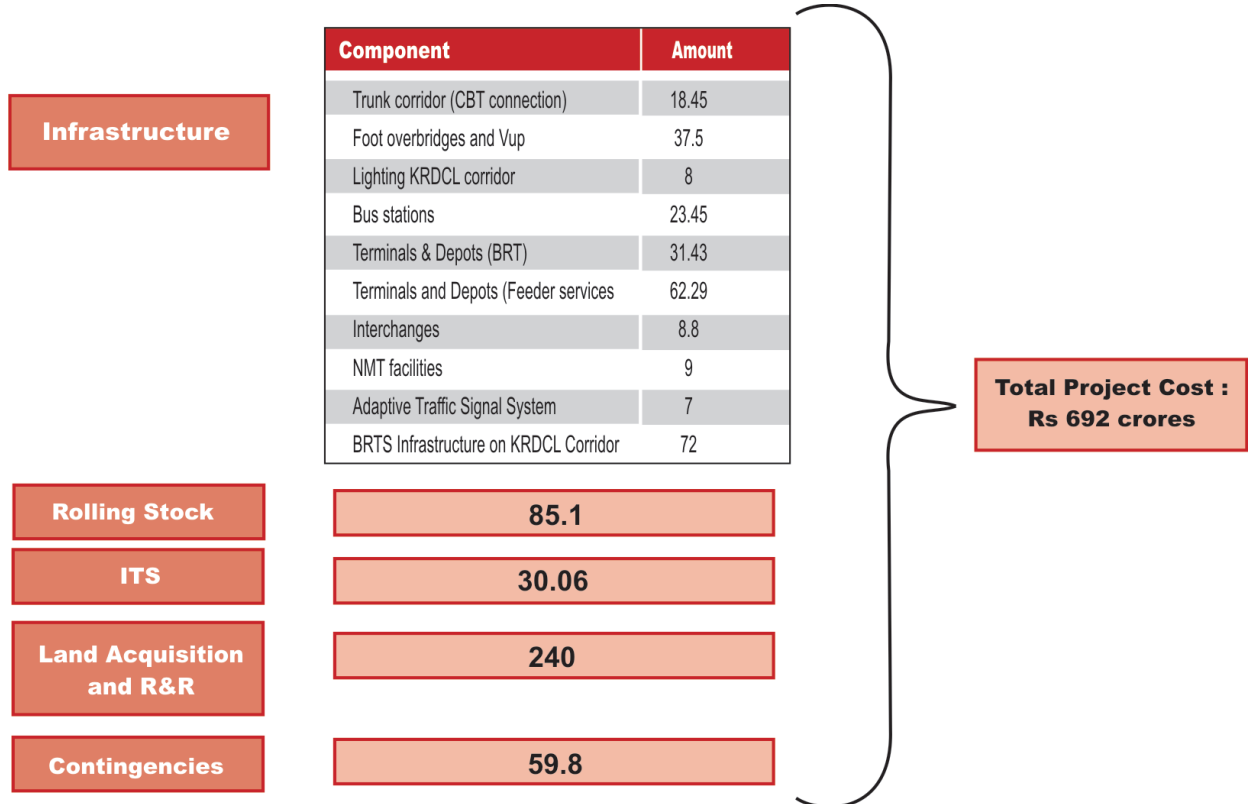


Source: DPR of Hyderabad Metro

² Phasing of expenditure means the amount scheduled to be spent for the project during the years of construction



Box 2.2: Capital Cost of Hubli Dharwad BRTS Project



Source: DFR of Hubli Dharwad BRTS

2.4 Step 4 Estimation of operation and maintenance cost for project

Upon estimating the project components and project cost thereof, the O&M cost for the project are estimated for project operation period. The steps involved for estimating component wise O&M Cost is specified below.

Step 1: Defining Project Operation Period

Generally, the operation period of project operation period considered 20 to 30 years depending upon the transport mode chosen.

Step 2: Estimating O&M Cost during the Project Operation Period.

Generally current prices are considered for estimating the O&M during the forecast years. The cost category of each component specified in table below could be escalated with the rate of average indices (*i.e. Wholesale price Index or Consumer price index published by office of the Economic Advisor to Government of India*) during the operation period in order to arrive at current prices. The following table specifies the calculation steps for estimating the O&M cost.



Table 2.4: Estimation of O&M Cost for Project

O&M Cost Category	Calculation Steps
Maintenance Cost	
Maintenance of Infrastructure	<ul style="list-style-type: none"> • Annual Maintenance cost based on detailed estimates or for an initial analysis at 1-3% of capital cost. • Periodic Maintenance cost usually at the interval of 5 years based on detailed estimates or for an initial analysis at 3% to 5% of capital cost. • Annual and Periodic maintenance are escalated at a rate of average WPI of all commodities during last five years.
Transport	Repair and Maintenance cost of rolling stocks based on industry standards during the operational years.
Information Technology	Annual repair and maintenance cost for installed hardware and software based on industry standards during the operational years.
Operation Cost	
Salary Cost	<p>Salary cost based on Industry practice and Government Regulations</p> <ul style="list-style-type: none"> • Salary of Admin staff • Driver’s salary in case of Bus or Rail based Urban Transport System • Salary of Ticketing staff (either toll or fare collections from users) • Above Salary cost are escalated at a rate of average CPI for respective regions during last five years.
Consumables	<ul style="list-style-type: none"> • Cost of consumables such as fuel/energy expense required for daily rolling stock operation. • Consumable such as Spare parts, machine tools etc. • Consumption requirement for each consumable category derived based on operational plan and industry standards. • Office of Economic Advisor, GOI publishes the data for WPI for each consumable category such as fuel, spare, machine tools etc. Thus prices of each category of consumable are escalated at average WPI of respective consumable category.
Admin Cost	<ul style="list-style-type: none"> • Apart from salary it comprises, MIS reports for performance monitoring, paper, printing, office electricity and communication charges etc. based on scale of operation. • Above costs are escalated at a rate of average WPI of all commodities during last five years.



Chapter 3:

Economic Analysis

Since urban transport projects are capital intensive in nature, they must contribute to increase in social benefits. Many a time financial viability remains elusive and thus such projects are justified through social cost benefit analysis/economic analysis. Thus, economic analysis of the urban transport project is undertaken with an objective to evaluate the contribution of the proposed Urban Transport Project to social objectives and to the region's economy. The social contribution of the project is measured through economic analysis (cost benefit analysis) of the project.

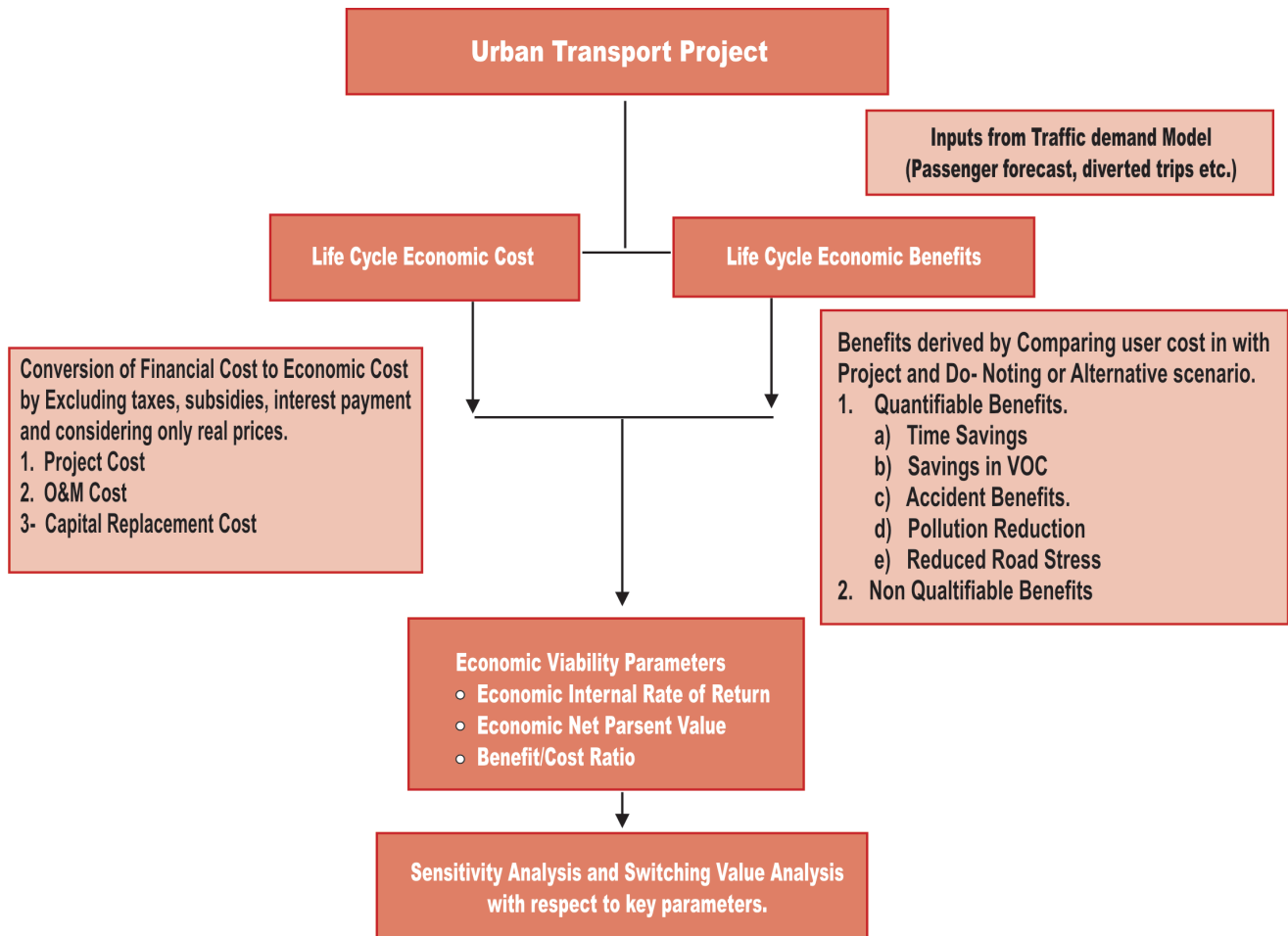
Economic analysis captures all the project related expenditure flow (life cycle cost); and all benefits likely to accrue to the society (irrespective of the investor) during a pre-defined analysis period. The project benefits have been estimated through comparison of costs arising out of "with project" and "without project" scenario. This cost benefit flow is used to arrive at annual benefits and subsequently to estimate the (i) Economic Internal Rate of return (EIRR) (ii) Economic Net Present Value (ENPV) (iii) Benefit – Cost Ratio. ***Detailed definitions and terms used in economic analysis are specified in ATTACHMENT 1.***

3.1 Economic analysis framework

The pictorial representation of framework for Economic analysis is provided below.



Figure 3.1: Framework for Economic Analysis



3.2 Steps for economic analysis

There are 7 steps in economic analysis as described below. An example for conducting the economic analysis for an urban transport project (Flyover with At Grade intersection) is provided in ATTACHMENT 9.

3.2.1 Step 1: Define Project Horizon

Project Horizon comprises construction and operation Period of the Project. During the project Horizon, the cost and benefits associated with project have been estimated. Generally, the construction period of 2 to 5 years is taken into account depending on the urban transport mode chosen. While the normal project operation period considered is around 20 to 30 years.



3.2.2 Step 2: Develop Alternative Scenarios

This involves development of Alternative Project scenarios OR base case to which comparison with the project that is undertaken is to be made. For example, economic cost and benefits of undertaking Metro project (“With Project”) is compared with the base case i.e “Without Project” or Do Nothing scenario or alternative project of undertaking BRTS projects in order to arrive at incremental costs and benefits.

3.2.3 Step 3: Determine Economic Cost of the Project

The steps involved in determining the Economic Cost of the project is specified below.

Table 3.1: Steps for estimating Economic Cost of Project

Step No.	Steps	Calculation Steps
A	Determination of Financial Cost of the Project	Financial cost of project is estimated through the estimation of the component of Transport Mode chosen. Detailed steps are elaborated in Section II of this Toolkit.
B	Determination of Economic Cost of the Project	<p>The economic costs of capital works and annual operation and maintenance costs are calculated from the financial cost estimates based on:</p> <ul style="list-style-type: none"> (i) Price contingencies/price escalations are excluded but physical contingencies are included because they represent real consumption of resources; (ii) Import duties and taxes are excluded because they represent transfer payments. For this the shadow exchange rate factor is used; <ol style="list-style-type: none"> 1. The existence of unemployment and under-employment for unskilled workers within the Indian economy means that the opportunity cost of unskilled labour can be considered to be lower than its wage rate – a conversion factor of 0.5 of the market wage rate for agricultural casual labour is used to estimate the shadow wage rate;



		<p>2. The market wage rate for skilled labour and the acquisition cost of land are considered to represent opportunity costs, as both factors are in demand (in the absence of detailed analysis, a conversion factor of 0.9 can be applied to the financial cost to arrive at the economic cost).</p> <p>(iii) Sunk costs – These are the costs which are already committed or irretrievably made. It does not have any prospective benefit cost analysis. Thus it is excluded.</p> <p>(iv) Interest payment, principal payment and interest during construction period are excluded– these are financial costs and hence are not included as part of economic costs.</p> <p>In practice financial prices have been converted to economic prices (or shadow prices) by applying a factor of 0.9 as per standard practice (<i>as adopted by Mutitators</i>) in order to remove all the distortions in prices relating to labour wages, capital market, transfer payments, taxes.</p>
<p>C</p>	<p>Determination of Lifecycle Cost</p>	<p>a. Develop life cycle cost during the analysis period by converting the financial cost of following to Economic Cost.</p> <ul style="list-style-type: none"> i. Capital cost ii. Maintenance cost (Details of the estimation steps are specified in section II of this toolkit) . iii. Capital replacement cost <p><i>Only real prices shall be considered in determining economic cost. Thus current prices needs to be converted into real prices by removing the price escalation and there by applying the 0.9 factor to maintenance cost.</i></p>



3.2.4 Step 4: Estimation of Project Benefits

Year wise Project benefits are estimated during the project operation period. The “With project” scenario is compared with the option of “Without project scenario” to determine the incremental economic benefits. The project benefits are divided into quantifiable and non-quantifiable benefits. Following Table indicates the benefits accrue to the society due to project.

Quantifiable Economic Benefits accrue to Society

The following quantifiable benefits accrue to the society owing to implementation of Urban Transport Project.

1. Time Savings
2. Savings in Vehicle Operating Cost
3. Accident Reduction Benefits
4. Pollution Reduction Benefits
5. Savings due to Reduced Road stress

1. Time Savings

Urban Transport Project significantly contributes in modal shift owing to higher speeds and comfort to passengers. This leads to time savings of passenger travelling on Urban Transport Project due to the following:

- Time Savings due to Higher Speed of Urban Transport Project as compared to do nothing or alternative scenario.
- Congestion reduction due to modal shift leads to fewer vehicles on roads. This also contributes to time savings of passengers travelling on other modes.
- The Formula for calculation of time savings is presented below.

Passenger Time Savings = Time Savings of Modal Shift passenger + Time savings of passenger travelling on Other Mode.

Time Savings of Modal Shift Passengers = (Time spent by Modal shift Passengers on Urban Transport Project - Time spent by Modal Shift diverted passenger on alternate transport mode in do nothing/alternative scenario) X Value of Passenger time.

Time Savings of Modal Shift Passengers = (Time spent by Passengers Travelling on other mode in With Project Scenario - Time spent by passengers travelling on other mode in do nothing/alternative scenario) X Value of Passenger time.



The steps involved in calculation of time savings are presented below.

Steps 1: Estimation of Time Savings in terms of passenger hours

- (i) Mode wise Passenger trips are estimated based on traffic demand studies during project horizon period.
- (ii) Mode wise Modal shift passenger's trips are also estimated based on traffic demand studies.
- (iii) Calculate the time of travel for each vehicle type including modal shift of passengers along the project corridor in each direction both for 'without' and 'with' project scenarios.
- (iv) By working out the difference, the time savings for each transport mode (i.e. bus, two-wheeler, four-wheeler etc.) from daily to annual is estimated.

Step 2: Estimation of Value of Time

1. Passengers trips are divided into working and nonworking trips based on traffic demand studies/surveys
2. The value of time for working trips is valued in relation to either the specific wage of the workers involved if such information is available or national per capita income/regional per capita income where the project is implemented. These are converted into hourly wages/per capita income.
3. The value of time for Non-working trips is calculated based on rule of thumb. Simple where adult passenger non-working time at 30% of household income per capita and a child's non-working time at 15% of household income per capita.
4. Using the unit rates, estimate the annual time savings for the project operation period.

2. Savings in Vehicle Operating Cost (VOC)

Savings in Vehicle Operating Cost arises owing to followings;

- Absence of vehicles of modal shift Passengers.
- Smoother operations of passenger trips of other mode vehicles owing to congestion reduction.

VOC is a function of speed, road roughness, carriageway, width/capacity, rise and fall per unit. VOCs is calculated from the sum of distance related (i.e. fuel, tyre, maintenance, labour, oil consumption cost) and time related VOCs (i.e. opportunity cost of capital, depreciation cost).

Savings in VOC is based on Road User Cost Study (RUCS) being carried out by the Central Road Research Institute (CRRI) OR other national institute and values as accepted by the Indian Road Congress (IRC). Other source includes HDM-4 based results.

Unit VOC value for each vehicle type specified in RUCS study or other study as specified above shall be used to arrive at the Vehicle Operating cost under both with and without project option. The difference of cost in with and without project can be taken in to calculate savings in Vehicle Operating Cost.



3. Accident Reduction Benefits

The reduction in traffic volumes on road owing to modal shift to Urban Transport Project is expected to reduce the accidents on the project corridor owing to following:

- Lower number of Vehicles on roads Due to reduction of vehicles of modal shift passengers.
- Lower accidents from vehicles due to decongested roads / other modes.

Further reduction in accidents will also lead to savings from damages to vehicle and savings towards medical, insurance expense, administrative expense on police and the intangible psychosomatic cost of pain to personal involved in the accidents. This also leads to savings on account of reduction of productivity to the economy by the personnel involved in the accident.

The steps involved in estimating the accidents benefits are specified below.

Step 1: Projection of accidents in with and without project scenario

- (i) Collection of past accident data along the project corridor, for the development of a reasonably accurate accident prediction model.
- (ii) Developing a reasonably accurate accident prediction model is relevant for the project under consideration based on past data as specified above (i). This model could allow an examination of the relationships between traffic volume, vehicle speed, design standards, terrain, no motorized traffic, and accidents. Based on this relationship, probability of accidents in without project scenario can also be estimated.
- (iii) The accidents will have varying degrees of severity and the projections must be disaggregated to reflect this. A common distinction is between fatalities, serious injury, slight injury, and damage only where no injuries are involved.
- (iv) A prediction model may not be detailed enough to distinguish between these and if it is not then past trends on the respective share of accidents in the various categories can be applied.

Step 2: Estimation of unit cost of accidents.

An accident cost can be classified in following three categories and calculation steps for each category is specified in table below.

**Table 3.2:** Classification of Accident Cost

Cost Category	Details	Calculation Steps
Direct Cost	Medical treatment cost, property damage, vehicle damage, and administrative costs like legal, police and insurance fees.	Direct costs are relatively straightforward in that they require basic data like average length of hospital stay and average cost per patient day, and average damage and administrative cost, with the average relating to whatever the accident categories are used in the prediction model. Average medical treatment costs must distinguish between in-patient care allowing for average length of stay (for serious injuries) and out-patient costs including average number of visits and average associated costs.
Indirect Costs	Loss of future earnings for the individuals affected which can also be considered as loss to economy.	Indirect costs are normally estimated as earnings foregone over the period the individual cannot work due to the accident; with fatalities this is lifetime earnings. Normally for simplicity, earnings foregone will be based on national average wages
Welfare Cost	Changes to the quality of life, covering both death and illness.	



Box 3.1: Accident Prediction Model by CRRI and Dr. L.R. Kadiali

The Road User Cost Study (RUCS) (CRRI, 1982) later updated by Dr. L. R. Kadiyali et. al. in association with the Loss Prevention Association of India provides estimates of the cost of various accidents on road and also establish a relationship exist between traffic levels and accidents. This study found following relationships exist between the number of vehicles affected and the number of persons killed and injured in road accidents.

1. **No of person Killed in Road Accidents:** $Y_1 = 49.43 * X + 750.42$, Where: X= No of Vehicles affected in Lakh, Y1= number of persons killed in road accidents in a particular year, R square= 0.89.
2. **No of person injured in Road Accidents:** $Y_2 = 257.04 * X + 3181.41$, Where: X= No of Vehicles affected in Lakh, Y2= number of persons injured in road accidents in a particular year, R square= 0.90.
3. **Damage of Vehicles :** $Y = 143.63 * X + 3345$, Where : X= No of Vehicles on the road , Y= damage to the vehicle in a particular year, R square= 0.90

This study also provides estimates of accident costs. Components like gross loss of future output due to death/major injury, medical treatment expenses, legal expenses, and administrative expenses on police, insurance companies and the intangible psychosomatic cost of pain were included in the estimation during this study. In the case of buses and other public vehicles, the loss due to lay off period and unproductive wages paid to the crew are also included. The costs (at 2004 prices) under different heads are provided in the table below.

Particular	Accident Cost (Rs)
Cost of fatal accident (person killed)	437342
Cost of major accident (person Injured)	64256
Cost of damage to Two wheelers	2286
Cost of damage to Car	9763
Cost of damage to buses in road accidents	32818

Source: RUCS by Central Road Research Institute and Dr. L. R. Kadiyali et. al. in association with the Loss Prevention Association of India.

4. Pollution Reduction Benefits

Urban Transport Projects significantly contribute in pollution reduction and are thus a pre requisite for sustainable development. The Urban transport projects leads to modal shift and hence fewer vehicle on road. This leads to reduction in the use of fuel. Thus absence of Green House Gas emission (GHG) from the vehicles of modal shift passengers' and lower emission due to decongested roads contributes in reduction in GHG emission in the region.



The effects of air pollution arising from particulate matter and other chemicals, such as nitrogen oxides and sulphur dioxide, will vary with factors like location, population in the areas affected, the prevailing wind direction, as well as the nature of the transport activity and the height of the emission source. There exist several methodologies for air pollution modelling. United Nation Framework Convention for Climate Change (UNFCCC) has developed several methodologies for different type of urban transport projects (i.e. rail, bus, roads etc.). Such methodologies could be used to estimate the emission reduction due to project. Apart from UNFCCC developed methodologies, other methodologies in which emission standards are linked with saved distance of vehicle run of modal shift vehicles. An estimate of the pollution reduction by a vehicle in this context could be obtained by multiplying the distance saved by the relevant emission coefficient for different pollutants for each category of vehicle. The emission coefficients for different vehicles as per the Euro II/ Euro III norms whichever is applicable as per Government regulation is used.

Costing these pollutants in terms of health damage costs, using the cost-of-illness, human capital, and stated preference survey approaches is difficult. Thus general approach is to use price of CO₂ in energy exchange for quantifying such benefits.

5. Reduced Road Stress

This benefit arises due to a reduced need for road maintenance owing to reduced traffic on account of modal shift. There is reduction in Road maintenance cost based on IRC/MORTHS guideline.

Non Quantifiable Economic Benefits to Society

The following table specifies the Non quantifiable benefits that accrue to society owing to implementation of an Urban Transport Project.

Table 3.3: Non Quantifiable Economic Benefits

No.	Project Benefits	Rationale
1	Benefits to City Image	It would improve city image attracting higher investments and businesses thereby resulting in economic growth and development.
2	Economic Impetus to micro region	Better and faster accessibility due to modal shift in traffic and decongested roads. Potential due enhancing labour pool and skill availability with multiplier benefits.
3	Overall increased mobility	Better quality of life to citizens, particularly to daily commuters, women, students, elderly and disabled.
4	Better urban planning	Use of planning tools such as integration of land use with transport resulting in better planning and up gradation of influence area.



3.2.5 Step 5: Arriving at an Outcome

The steps to arrive at outcome are specified below.

- (i) **Estimation of Economic Cost and Benefits stream:** As specified in step 3 and step 4 above the costs and benefits streams associated with the project for Project Horizon period is estimated.
- (ii) **Calculation of parameters such as EIRR, ENPV and Benefit to Cost Ratio**
 - a. **Economic IRR (EIRR):** Based on net benefits Stream (Economic Benefits- Economic cost), Economic IRR is calculated.
 - b. **ENPV and Benefit Cost Ratio:** Discounted Cash Flow technique is used to estimate the ENPV and Benefit Cost Ratio. Discount rate used for above calculation should be social discount rate (i.e. 12% social cost of capital or (Government security i.e. G-Sec) rate).
- (iii) **Sensitivity Analysis:** The range of sensitivity can be in the range of 10 to 15% of the critical factors such as (a) Cost overruns due to delay or other factors (b) Increase in Maintenance Cost (c) Reduction in Ridership (c) Reduction in benefits (d) Combination of reduction in benefits and increase in cost.
- (iv) **Switching Value Analysis:** Switching values analysis of different parameters are carried out to identify quantum of change in parameters which causes the project to become economically unviable (i.e. Value of different parameters that will cause EIRR to be below discount rate meaning NPV negative).

3.2.6 Step 6: Interpretation of Outcome

The interpretation of results is specified in the table below.

Table 3.4: Interpretation of outcome of Economic Analysis

No.	Parameters	Interpretation / Decision Criteria
1	Outcome of project analysis and sensitivity analysis in terms of EIRR, ENPV and Benefit to Cost Ratio.	<ul style="list-style-type: none"> • Outcome of EIRR is compared with social opportunity cost of capital. Generally in developing countries Social Cost of Capital is considered as 12%. • If EIRR is above this 12%, ENPV is a positive value and Benefit to Cost ratio is more than 1 then <i>the project is considered economically viable.</i>
2	Outcome of Switching value analysis	Quantum of change in parameters determines the economic viability of a project. If such changes are considerably higher, then the project is economically robust.



3.2.7 Step 7: Way Forward

Upon arriving at outcome and deciding the interpretation of Economic Analysis for Urban Transport Project, the following further actions could be undertaken.

(1) Financial Analysis of the Project should be undertaken if;

- ✓ Project is evaluated to be economically viable as per step 6 above.
- ✓ Even if Project is not evaluated to be economically viable but in case of strategic important cases in which the qualitative (Unquantifiable) social benefits are very high, it can be considered for recommendation.

(2) Alternative Projects should be considered or modification in proposed project should be considered if Project is evaluated for economic viability.



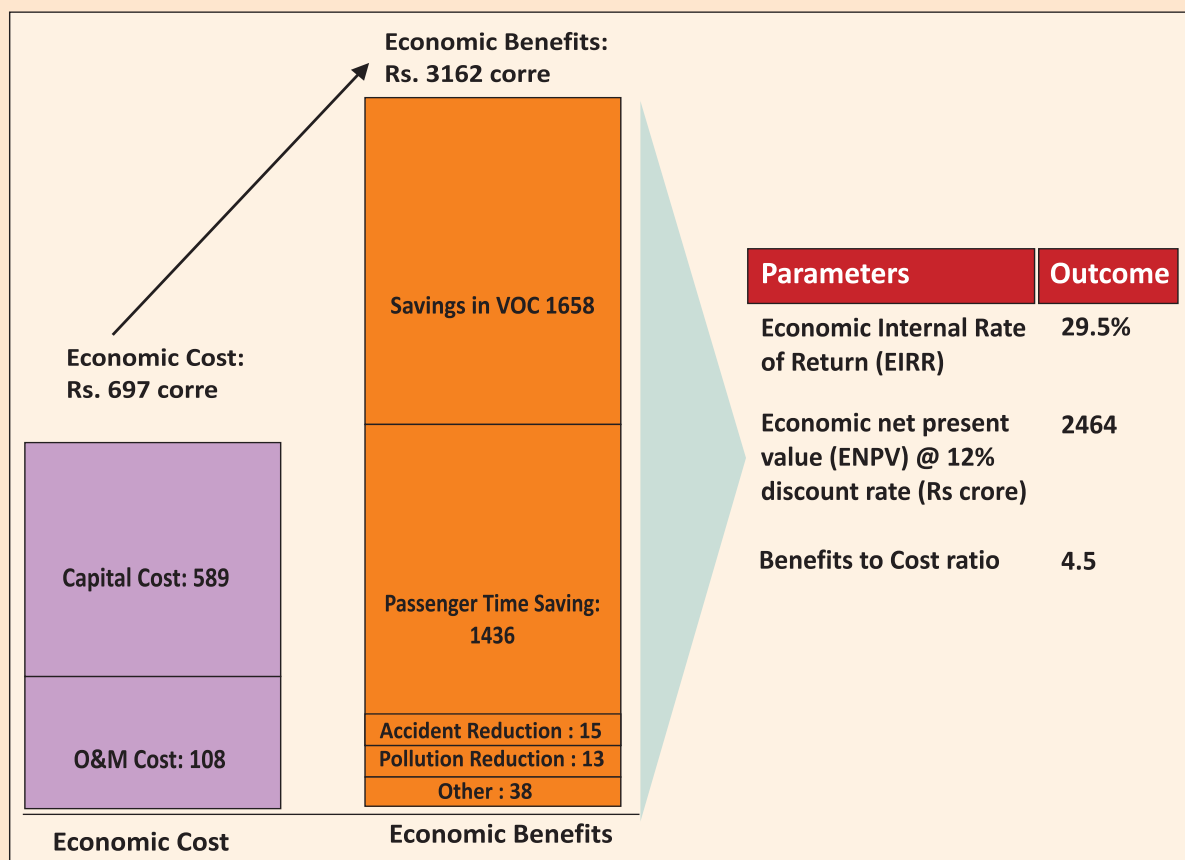
Box 3.2: Economic Analysis of Hubli Dharwad BRTS Project

The BRTS project has been proposed between Hubli and Dharwad city in Karnataka to improve the comfort and benefit of road user and encourage the public transport in the corridor. The proposed project would be four lane BRT spanning across 22 km. In order to determine the Economic benefits of proposed BRTS Project, following two alternatives have been compared.

Option	Description
Base Situation	Four lane facility without BRT
BRT Project	Four lane facilities upgraded to four lane mixed traffic facility plus 4 lane BRTS.

The annual streams of project costs and benefit have been compared over the analysis period of 30 years to estimate the net cost/ benefit and to calculate the economic viability of the project in terms of EIRR.

The Economic Internal Rate of Return (EIRR) for the project was then arrived at using the Discounted Cash Flow technique to the net benefit stream at economic prices. The stream of benefits and costs were discounted at 12% discount rate as per standard practice for social projects to calculate their Net Present Value. The outcome in present value terms is presented below.



Above Figures is not to the scale.

It can be observed that Project evaluated to be economically viable as EIRR is more than double than the social opportunity cost of capital i.e. 12%.



Sensitivity Analysis undertaken for Hubli Dharwad BRTS with respect to different parameters is specified in table below.

Sensitivity Analysis

Sensitivity Parameters	Economic IRR
Increase in Project Cost and Incremental O&M cost by 25%.	26.0%
Reduction in Ridership in BRT alternatives by 25% in years post 2020.	24.9%
Combined scenario of reduction in traffic by 25% and Increase in fuel cost by 25% under both with and without BRT alternatives.	23.8%
Reduction in Benefits by 25%.	25.2%
Combined effect of Increase in Cost by 25% and reduction in Benefits by 25%.	22.18%

It is seen from the above table that under the different sensitivity tests, EIRR is determined to be more than 20% indicating that the project is robust.

Further Switching values analysis for different parameters have been carried out (i.e Value of different parameters that will cause EIRR to be below discount rate meaning NPV negative). The switching values are presented in table below:

Switching Values

Parameters	Switching Values
Increase in Construction Cost and Incremental O&M cost	354% from base
Total Benefit Reduction	78% reduction from base
Reduction in VOC benefits	148% reduction from base
Reduction in Time benefits	172% reduction from base
Combined effect of Increase in Cost and reduction in Benefits	64% from base

Above table indicates that project is robust with respect to variation in project cost and project benefits and ***Project is Economically Viable***

Source: Detailed Feasibility Report (DFR) for Hubli Dharwad BRTS Project



Box 3.3: Economic Analysis of Mexico BRTS Project

In order to improve the Bus based urban transport services in Mexico Metropolitan region, the City Government implemented 34 km high speed Bus Rapid Transit System (BRTS) in two Phases. The BRT operation was started in 2005. This case study summarised the economic costs and benefits of 19.4 km of Phase-2 of the Project. The phase -2 project was implemented on the Insurgentes avenue between the terminals Indios Verdes in the north and Dr. Galvez in the south in Mexico Metropolitan Region. Key components and features of the project is summarised below.

1. **Dedicated exclusive Bus Corridor:** Dedicated and exclusive Bus Lane of 19.4 km for BRT service.
2. **BRT Stations and Terminal:** 34 intermediate stations including the “*Glorieta Insurgentes*” terminal.
3. **Buses:** 80 diesel-fuelled articulated buses, (including 10% as reserve, for regulation and maintenance) replacing the current fleet of around 350 buses and minibuses.

In order to determine the Economic benefits of the BRTS Project, the following two alternatives have been compared.

Option	Description
Base Situation	<ul style="list-style-type: none"> • The without the project scenario considers the actual situation on the Insurgentes Avenue, on the same stretch as the project. • The 250,900 passengers depending on public transportation on Insurgentes are currently traveling with 356 micro- and other buses. • Their average speed amounts to 17.4 km per hour due to congestion and inefficient provision of service. • The investment foreseen without the project is the annual renovation of 10% of the fleet.
BRT Project	<ul style="list-style-type: none"> • The project considers a situation in which a BRT corridor of a length of 19.3 km is implemented on the Insurgentes avenue between the terminals Indios Verdes in the north and Dr. Galvez in the south. • The demand on the corridor amounts to 250,900 passengers. The service will be supplied on an exclusive BRT lane by 80 articulated buses, thereby replacing the 356 buses currently running on this stretch of Insurgentes. • The expected speed on the exclusive bus lanes is 21.2 km per hour with 2 minutes intervals between stops in the north and less than 3 minutes in the south. Each bus has the capacity to transport 160 passengers at a time. There will be a daily service between 5 and 11 pm and a night service between 11 pm and 5 am.

The annual streams of project costs and benefit have been compared over the analysis period of 14 years to estimate the net cost/ benefit and to calculate the economic viability of the project in terms of EIRR in order to coincide with the Carbon finance framework.

The Economic Internal Rate of Return (EIRR) for the project has then been arrived at using Discounted Cash Flow technique to the net benefit stream at economic prices. Stream of benefits and costs are discounted at 12% discount rate as per standard practice for social projects to calculate their Net Present Value. The outcome in present value terms are presented below.



Outcomes

Item	Description	Outcome
Economic Project Cost	<ul style="list-style-type: none"> Investment cost of the Corridor and Bus Stations. Articulated Bus Costs. Scrapping cost of current fleet. 	Project cost of USD 43.65 Million.
Project Benefits		
(a) Time Savings	<ul style="list-style-type: none"> Estimation on time savings based on comparison of travel time by vehicles in with Project and Base case. Value of time derived based minimum salary per day converted into hourly salary. 	Time savings of USD 228.87 million
(b) O&M cost savings	<ul style="list-style-type: none"> Estimation of cost savings based on comparison of cost of O&M of vehicles in Base case and with project case. 	O&M costs savings of USD 164.19 million
(c) Environment Benefits (Pollution Reduction)	<ul style="list-style-type: none"> Reduction of pollutants such as CH₄, CO₂, N₂O, PM₁₀. Reduction Due to burning of less fuel by efficient Bus System and reduction in congestion. 	Savings of USD 11.26 million.
Total Project Net Benefits		Total Net benefits of USD 389.32 million.

Note: Above outcome is aggregate of 14 years period.

Outcome of Economic Analysis is presented in table below.

Parameter	Outcome
EIRR	72%
ENPV	USD 149 million
Benefits to Cost Ratio	6

It can be observed that the project is economically viable.

Source: Project Appraisal Document, World Bank

Chapter 4:

Financial Viability

The Financial analysis of Urban Transport projects is generally carried out to assess (i) financial viability and (ii) operational sustainability of the project. The outcome of financial analysis forms the basis for undertaking an appropriate financing method through either project recourse financing or Public Finance through balance sheet based financing. This section elaborates project financial analysis with greater emphasis on possible revenue generation sources.

Detailed definitions and terms used in Financial Viability Analysis are specified in ATTACHMENT 1.

4.1 Steps of project financial viability analysis

The steps involved in Project Financial Analysis are specified below.

The example for conducting the Project Financial Analysis for development of Karur toll bridge and Anand Vihar Terminal are provided in ATTACHMENT 9 and ATTACHMENT 6 respectively.

Step 1: Determination of Project Horizon

The Project Horizon comprises of the construction and operation period of the project. During the project horizon, the costs and revenues associated with the project have been estimated. Generally construction period of 2 to 5 years is considered depending on the mode of urban transport chosen and the likely implementation period. Similarly, the project operation period could be considered 20 to 30 years.

Step 2: Determination of project costs (Including financing costs)

The key components of project are decided based on the transport Mode chosen. The details of Project Cost calculation is specified in Chapter 2 of this Toolkit.



Step 3: Phasing of investment

The phasing of investment/capital cost is to be carried out based on the project implementation plan. The illustration for phasing of project investment is provided in section II of this Toolkit.

Step 4: Determination of operation and maintenance cost during project operation

The Steps involved in estimation of the Operation and Maintenance costs are elaborated in Chapter 2 of this Toolkit.

Step 5: Determination of Income/Revenue

An Urban transport system should be sustainable in order to reap its intended benefits. Sustainability (meaning sufficiently meeting the operation cost from own operating revenue such as fare/advertisement) ensures quality of services and greater modal shift. The sustainability principle should not compromise the principle of affordability. Demand is highly price elastic as observed world over in urban transport systems. Therefore, tariffs are an important determinant of demand. Due to social/political considerations, tariffs that are set are usually insufficient for meeting the operation cost. This advocates the need for considering a comprehensive framework which captures benefits that accrue to different users. As discussed in economic analysis section, urban transit projects lead to a number of benefits to the users of the system. The benefits are both direct and indirect in nature. Direct benefits include availability of transit services, opportunities for advertising at transit stations and along the corridor and opportunities to provide products/services through kiosks/outlets at stations. Indirect benefits arise from association with the project through proximity or through significant positive externalities. The following table shows the nature of benefit based on which value capture possibilities could be explored.

Table 4.1: Nature of Benefits and Value Capture Possibilities

Nature of the Benefits	Example
Direct	<ul style="list-style-type: none"> Fare Box/Toll Advertising License Fees from station assets
Proximate	<ul style="list-style-type: none"> Increase in business next to stations Real Estate Development Rights arising from ToD. Rise in property value around stations
Indirect	<ul style="list-style-type: none"> Economic Development on the corridor Less congestion for road users Improvement in air quality Availability of more public space Reduction in use of fossil fuels









It can be seen in the above table that direct benefits play a major role in revenue generation while indirect benefits are relatively difficult to capture. This is so since indirect benefits follow from non-excludability (meaning it is difficult to exclude those who do not pay from receiving the benefits). Based on value capture possibilities as discussed above, revenue generation can be estimated as follows.

a) Estimating Revenue through direct modes of value capture such as fares Licensing and advertisement revenue

Box 4.1: Advertisement at Ahmedabad BRTS Stations and Corridor

Revenue Source	Details																					
Fare Box Revenue /Toll Income	<p>Predictably revenue from direct benefits would depend considerably on fare levels and volumes of passengers. The ability to recover operations cost from fares would depend considerably on following.</p> <ul style="list-style-type: none"> • Fare/ Tariff and its periodic revision (<i>Fare/ Tariff setting methods are described elaborately in different toolkit on Fare Fixation</i>). • Competing modes of transport. • Quality and coverage of network. • Population density of covered areas. • Presence of feeder network. • Last mile coverage. <p>Nevertheless, fare collection is expected to remain a primary source of income in line with urban transit systems worldwide as seen from the following exhibit which shows the proportion of fare and non-fare revenue in total revenue in some major metro rails systems in the world.</p> <p>Figure 4-1 Fare and Non Fare Revenue across key World Metros (2007)</p> <p>(Figures in percentage %)</p> <table border="1"> <caption>Data for Figure 4-1: Fare and Non-Fare Revenue across key World Metros (2007)</caption> <thead> <tr> <th>City</th> <th>Fare Rev (%)</th> <th>Non-Fare Rev (%)</th> </tr> </thead> <tbody> <tr> <td>New York</td> <td>70</td> <td>30</td> </tr> <tr> <td>Washington</td> <td>77</td> <td>23</td> </tr> <tr> <td>Hong Kong</td> <td>80</td> <td>20</td> </tr> <tr> <td>London</td> <td>83</td> <td>17</td> </tr> <tr> <td>Bangkok</td> <td>88</td> <td>12</td> </tr> <tr> <td>Singapore</td> <td>89</td> <td>11</td> </tr> </tbody> </table> <p>Source: PWC</p> <p>Thus key inputs required for estimating fare box revenue is as follows:</p> <ul style="list-style-type: none"> • Fare/Tariff/user charges as fixed by the council/Authority for users/passengers. • Tariff/fare revision mechanism as fixed by the Authority/Local Government. • Determination of rate of growth of Base (passenger/Traffic and divertible traffic in case of a toll facility or buses in case of terminal) 	City	Fare Rev (%)	Non-Fare Rev (%)	New York	70	30	Washington	77	23	Hong Kong	80	20	London	83	17	Bangkok	88	12	Singapore	89	11
City	Fare Rev (%)	Non-Fare Rev (%)																				
New York	70	30																				
Washington	77	23																				
Hong Kong	80	20																				
London	83	17																				
Bangkok	88	12																				
Singapore	89	11																				



Revenue Source	Details
Advertisement Revenue	<p>Stations (Bus Stations/Metro Stations), Rolling stocks (Bus. Rail coaches etc), Corridor (BRT/Metro/ Toll Road) could be excellent means for advertisement. Thus these can be used to capture advertisement revenue. The Input required for estimating Advertisement revenue includes the following.</p> <ul style="list-style-type: none"> • Estimating advertisement space on stations, rolling stock and corridor (Bus/Metro/Toll Road). • Rates for similar advertisement space in other locations as benchmarks with appropriate adjustments: <ul style="list-style-type: none"> ○ Bill Boards and Hoardings rents in proximity. ○ Railway Stations/Bus Stations rents. • Estimate of total revenue from this route over horizon period would be prepared with appropriate escalation rates. <p style="text-align: center;">Box 4-1 Advertisement at Ahmedabad BRTS Stations and Corridor</p> <p>The Ahmedabad Janmarg Limited has provided Advertisement rights at predefined places/elements on BRTS Bus Stations and BRT Corridor through competitive biddings as against payment for upfront license fees for two years. The Advertisement Income was Rs 1 crore during 2011-12 as per audited result. The pictorial representation of few elements on Bus Stations and BRT corridor are specified below.</p> <p style="text-align: center;">Advertisement Elements at BRT Bus Stations</p> <div style="display: flex; justify-content: space-around;">    </div> <p style="text-align: center;">Advertisement Elements at BRT Corridor</p> <div style="display: flex; justify-content: space-around;">    </div>
License Fess	<p>A number of business activities could be raised due to Urban Transport projects. These projects provide captive traffic in terms of passengers. Thus Revenue can be collected through license fees by providing a commercial space at Metro stations/Bus Stations/Toll booth.</p> <ul style="list-style-type: none"> • Licenses for food stalls, book stores, ATMs etc.



Revenue source	Details
	<ul style="list-style-type: none"> • Rent from shops for other specific purposes. • Development and Management of Parking areas around Stations. <p>The Input requires for estimating License Fee revenue includes followings.</p> <ul style="list-style-type: none"> • Estimating Space and locations for book stores, ATMs etc. • Determining rental rates/License Fee based on rates at other/similar locations as benchmark with appropriate adjustments. • Estimating total revenue during the horizon/analysis period with appropriate escalation rates.

b) Exploring methods through Proximate Mode and indirect modes of value capture such as real estate development / ToD, Additional FSI, Additional property tax, Betterment levy, TDR, carbon credit etc.

Revenue Source	Details
Transit Oriented Development (TOD)/ Real Estate Development	<p>In order to promote Transit Oriented Development (TOD), the development of property along the corridor or at nodes is generally undertaken by acquisition of land in advance. Such a development contributes to a compact city and regional development. Commuters travel from home to workplaces through an integrated transit system (mix of main and feeder transportation systems). It reduces the travel demand in other parts of the city as the origin and destinations are located on the same transport corridor. It results into a dense city/region/corridor which is a better proposition as far as urban planning is concerned.</p> <p>Such Real estate development as part of TOD has the potential to fund capital expenditure. The rights to develop property at certain points along the corridor and at stations can be bundled with the project. However, it depends on the availability of Government Land. Assessment of such potential would be based on following:</p> <ul style="list-style-type: none"> • Availability of Government Land. • Demand Supply for commercial real estate near stations. • Possibilities of overall policy emphasis on Transit Oriented Development. • Development of support infrastructure like access to stations, feeder systems etc. • Forecast for absorption rate based on • Extrapolation of historical trend (Baseline growth) for absorption and price • Adjusting growth moment upwards for demand /price triggers



	<ul style="list-style-type: none"> • Estimating revenue based on forecast of prevailing capital and rental values for real estate with appropriate escalation rates.
<p>Higher FloorSpace Index (FSI)</p>	<p>Higher FSI could be allowed in the project influence area which incentivizes real estate development. Charges could be levied for the permission of Additional FSI in addition to the Building use permissions. However detailed analysis with respects to availability of water supply and parking infrastructure is required prior to such permission in order to ensure meeting of higher demand due to such development. Estimating revenue from higher FSI requires following inputs.· Delineation of Project Influence area/zone.</p> <ul style="list-style-type: none"> • Demand of Commercial space • Estimating Rates of additional FSI • Forecast of Demand/Consumption of additional FSI in project influence zone. <p>This is covered under the TOD if development of TOD is allowed for UrbanTransport Project.</p>
<p>Betterment Charges/ levy</p>	<p>Urban transport projects could lead to increase the property/land prices in project proximity area. Thus local government could capture these benefits from charging one time betterment charges or additional property tax from the properties situated in project influence area/zone. One time betterment charge could be levied to the property situated in project proximity area. This could generate upfront resources from project beneficiaries to fund part capital expenditure. This charge could also be applicable to the properties that come up in the future. This Instrument is an alternative to additional property tax.</p>
<p>Additional Property Tax</p>	<p>As specified above, local government could capture increase in land/property value/ ease in transportation through charging additional property tax to the properties situated in project influence area. However, tax administration of local/ city government in terms collection and coverage should be strong enough to generate revenue.</p>
<p>Carbon Credit</p>	<p>Public Transport System has the potential of reducing vehicle plying on the roads. This is because it provides a viable alternative to private vehicles. This further reduces the congestion and hence reduces the Green House Gas emission. Urban transport projects significantly contribute to reduction in Carbon emissions. Under the Clean Development Mechanism (CDM) framework, developing countries can earn carbon credits for adoption of carbon abatement projects which can be further used by the developed countries for offsetting carbon emission.</p> <p>The United Nations Framework Convention for Climate Change (UNFCCC) has developed methodologies for Rail based and Bus Based Urban Transport projects. These methodologies can be used to estimate the reduction in carbon emissions. This can be converted into monetary terms by applying the unit rate of CER.</p>



	<p>Box 4.2: Carbon Credit for Delhi Metro Project</p> <p>The Delhi Metro Project has helped to reduce pollution levels in the Delhi city by 6.3 lakh tons every year and thus helping in reducing global warming. It has been certified by the UNFCCC as the First Metro Rail and Rail based system in the world which will get carbon Credits for reducing Green House Gas Emissions and helping in reducing global warming.</p> <p>The UNFCCC administered Clean Development Mechanism (CDM) under the Kyoto Protocol has certified that the DMRC has reduced Emissions and thus earned carbon credits worth about Rs.47 crore annually for the next seven years and with the increase in number of passengers, this figure shall increase.</p> <p>Source : DMTC</p> <p>Box 4.3: Carbon Credit for BRTS Project in Bagota</p> <p>TransMilenio, Bogota, Colombia is the first BRT project to be successfully registered under CDM for carbon credits. Credit is available for projects which have a clear plan to reduce existing public transport capacities either through scrapping, permit restrictions, economic instruments or other means and replacing them by a BRT system. Transmilenio will generate credits from the following source:</p> <ul style="list-style-type: none"> • Improved fuel-use efficiency. • Use of new and larger buses and scrapping of old buses. • Mode switching due to the availability of a more efficient and attractive public transport system. <p>Source : pwc</p>
<p>Congestion Pricing</p>	<p>In order to increase the utilization of efficient urban transport system and decrease the excessive use of private vehicles that increase congestion, the system of congestion charges can be levied. It reflects the short run marginal cost of using private vehicles. It is generally imposed into entry of the Business districts and based on the time of day. Conceptually, it charges a price for each trip that causes congestion for entry into congested parts of the city. It also provides price difference between use of private vehicles and public transport and hence causes behaviour changes for use of public transport.</p> <p>Box 4.4: Congestion Pricing in Singapore</p> <p>Singapore introduced an Area Licensing Scheme for charging vehicles entering downtown in 1975. This scheme was changed to an Electronic Road Pricing (ERP) system involving toll for each trip to certain parts of the city. Each vehicle is fitted with an In-Vehicle Unit (IU) with a cash card fitting in the IU. The appropriate toll is deducted from the cash card when the vehicle passes through the ERP zone in the city.</p>



Of above betterment levy, additional property tax and congestion pricing could be used as corpus to the revolving Mass Rapid Transit Fund (MRTF) which could be used to fund project development and O&M. The details are specified in financing option.

The MoUD, GoI also issued a note for innovative financing methods for Mass Rapid Transit System (ATTACHMENT 11). A majority of financing methods are covered above.

Step 6: Deciding Quantum of Debt

Typically most infrastructure projects are financed with 70-80% of their cost met through debt sources such as loans from financial institutions, multilaterals, bonds, pooled finance, etc. This would help the ULB/Govt Agency to undertake more infrastructure projects by leveraging its own resources to the maximum possible extent. The remaining amount is financed through equity contributions. It is to be noted that the equity contribution and quantum of debt is decided based on estimation of project cash flow, Financial Operation Plan, balance sheet analysis and priority of capital investment plan of the ULB/Government Agency. The steps involved in preparation of Financial Operating Plan and the Capital Investment plan are specified in ATTACHMENT 4.

Step 7: Estimation of Cash Flow

As specified in the steps above, the costs and revenue streams associated with the project for Project Horizon period is estimated. Based on this, the project free cash flow is estimated. Illustration of cash flow is provided in the table below.

Table 4.2: Illustration of Cash Flow

Year ending March 31	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Project cost incl. IDC	461	947	0	0	0	0	0	0	0	0	0	0
Normal capital expenditure	0	0	0	0	0	0	73	0	0	0	0	118
PBIDT + Written off exp.-taxes	0	52	232	259	291	332	380	438	508	593	699	672
Net cash flow	-461	-895	232	259	291	332	307	438	508	593	699	554
Internal rate of return	20%											

(Rs.Lacs)

Note: PBIDT- Profit Before interest, depreciation and tax (Revenue-O&M)

Step 8: Arriving at Outcome

The steps to arrive at outcome have been specified below.

- (i) **Calculation of weighted average cost of capital as indicated in the definition as a benchmark to assess return**
 - WACC is expressed as the weighted average for required rate of return for equity and debt. The detailed definition and formula for calculation is provided in the definition section in ATTACHMENT 1.



- For Government Agency, the social cost of its own fund or grant is considered as 12% whereas the actual cost of debt is considered for calculation of WACC. The cost of debt for Govt. agency is considered lower as Govt. Agencies may obtain funds with lower interest cost from Multilaterals or through issuance of bonds.
- Private sector generally considers cost of equity as 16% to 18%. The cost of Debt is perceived to be higher for private sector.

(ii) **Calculation of parameters such as IRR, NPV and DSCR**

a. **Financial IRR (FIRR) and NPV**

This is a measure of the overall financial viability of the project. It also measures the extent to which the project can bear the Capital expenditure. Detailed discussion is specified in ATTACHMENT 1.

- Financial IRR:** Based on net free cash flow Stream for Project Horizon Period as estimated in step above, Financial IRR is calculated. Financial IRR indicates the return on investment. Financial IRR should be higher than cost of capital i.e WACC. Such projects shall be considered financially viable.
 - Net Present Value (NPV):** Discounted Cash Flow technique is used to estimate the NPV. As per Govt. agencies point of view, Discount rate used for above calculation should be social discount rate (i.e. 12% social cost of capital or (G-sec) rate). However, WACC can be adopted as the discount rate as per private sector point of view. Positive NPV provides indication that revenue generated from the project over project horizon period is higher than the cost incurred o project.
- b. **Debt Service Coverage Ratio (DSCR):** The Debt Service Coverage Ratio (DSCR) gives an indication of the capacity to repay the debt incurred for the project from operating surpluses. It is calculated as ratio of net cash flow to Principal and interest payment of debt. This ratio should be above 1.15, although the lenders may insist on much higher DSCR for additional comfort. Cash reserves and other separate provisions may have to be made to ensure that the DSCR does not fall below the minimum.
- c. **Operating Ratio:** This is a measure of the extent to which recurring revenues from the project are sufficient to meet recurring expenses. Operating surplus, defined as excess of operating revenues over operating expenses shows whether the project is self- sufficient.

(iii) **Sensitivity Analysis:**

The range of sensitivity can be in the range of 10 to 15% of the critical factors such as (a) Cost overruns due to delay or other factors (b) Increase in Maintenance Cost (c) Reduction in Ridership (c) Reduction in overall revenue from the project (d) Combination of reduction in revenue and increase in cost. Outcomes in terms of parameters as specified above should be calculated under each of sensitivity test.



Step 9 : Interpretation of Outcome and Decision Criteria

The Interpretation of result is specified in table below.

Table 4.3: Interpretation of Outcome of Financial Viability Analysis and Decision Criteria

No.	Parameters	Interpretation / Decision Criteria
1	Outcome of project analysis and sensitivity analysis in terms of IRR, NPV and DSCR.	The Project is evaluated to be commercially viable if (1) FIRR is higher than WACC (2) NPV is positive and (3) DSCR is higher than 1.15.
2	Operating Ratio	Even if a project is not commercially viable but operating ratio is higher than 1.0 then project is considered to be sustainable.

Step 10 : Way Forward

Based on outcome of the Project Commercial Viability Analysis following **financing options** could be examined.

Table 4.4: Outcome of Financial Viability and Suitable Financing Options

No.	Outcome of the Financial Viability	Financing Options
1	<ul style="list-style-type: none"> If Project is evaluated financially viable then Private Finance option (PPP) shall be examined /undertaken. Even if project is evaluated financially unviable then Viability Gap Funding Scheme (VGF) of Central Government is examined. The financial viability of the project is assessed further under this scheme³. If Project is evaluated to be financially viable then Private Finance Option shall be undertaken/explored. 	Examining Private Finance Option (PPP)
2	<ul style="list-style-type: none"> If project is evaluated to be financially unviable under standalone basis and under VGF scheme but it is found sufficiently operationally sustainable and viable⁴. 	Examining Mix of Public and Private sector finance option
3	<ul style="list-style-type: none"> Project is evaluated to be commercially unviable in standalone as well as under VGF scheme. Project is evaluated to be sufficiently operationally unviable as well as unsustainable. 	Examining Public Sector Financing Option (Examine Balance Financing sheet based finance option along with multilateral/ Central State Government Grant)

³ The overall share of the VGF is capped at 40% of the project cost as per Government policy in this regard which stipulates 20% funding by Government of India and 20% from State Government/Sponsoring Govt. Agency.

⁴ Under this, Capital expenditure is finance by Govt Grant/funding or cheaper debt taken from multilaterals and financial institutions and operation expenditure is finance by the private sector. Details are specified in financing Options.



The next section provides steps for examining project financing options.

Given the Capital Intensive nature of an Urban Transport Project, risks associated with the project and its subsequent mitigation assumes importance as it impacts the outcome of Economic and Financial Viability of the Urban Transport Project. A Risk analysis framework is provided in **ATTACHMENT 3**.

The table below shows Economic IRR and Financial IRR of Different Urban Transport Projects.

Box 4.5: Economic IRR and Financial IRR of Different Urban Transport Projects

Sr No.	Project Name	FIRR	EIRR	Project Cost (Rs crore)
BRT Based City Bus System				
1	Ahmedabad BRTS	2.72%	49.8% (Ph I) 45.3% (Ph II)	493 (Ph I) 488 (Ph II)
2	Hubli- Dharwad BRTS	8.06%	29.5%	692
3	Colombo BRTS	NA	24%	-
4	Transmilenio, Bogota, Ph I and II (BRTS Project)	-	24%	USD 1133 m*
5	Megabus, Pereira (BRTS Projects)	-	45%	USD 211 m*
6	Mio, Cali (BRTS Project)	-	15%	USD 194 m*
7	Mexico BRT	-	72%	USD 46.37 m*
Rail based Urban Transport Projects				
8	Mumbai Urban Transport Project	-	17%	4311
9	Alwar –Delhi Rail based Rapid Rail Transport System	10%	21.8%	25150
10	Delhi Metro Phase-1 and Phase-II	na	23.88%	14432
11	Chennai Metro	3.20% without taxes	16.22%	14700
12	Hyderabad Metro- All three Corridors	NA	25.60%	9696
13	Ahmedabad Metro	4.64%	26.95%	4295
14	Pune Metro	1.93%	18.04%	9534
15	Jaipur Metro	1.27%	18.70%	7531
16	Bangalore Metro	8.20%	22.30%	8158
Individual Sub Projects (i.e. Multimodal Transport Terminal, Bus Terminal, Urban Roads etc)				
17	Anand Vihar Multimodal Transport Terminal	10.78%	17.7%	201.6
18	Bus Terminal at Gaziabad	10.4%	13.85%	50.7
18	Toll Bridge Karur City	20.69%	12.6%	15.26
19	City Bypass, Madurai	20.7%	18%	34.5
20	Noida Toll Bridge	20%	-	408
21	Flyover at Mohan Nagar Junction, Gaziabad	-	32.58%	64.1

Source: Project DPRs of respective projects except in case of RRTS, Mumbai Urban Transport Project and Eastern DFC. PAD in case of Mumbai Urban Transport Project and Eastern DFC



Chapter 5:

Financing Options

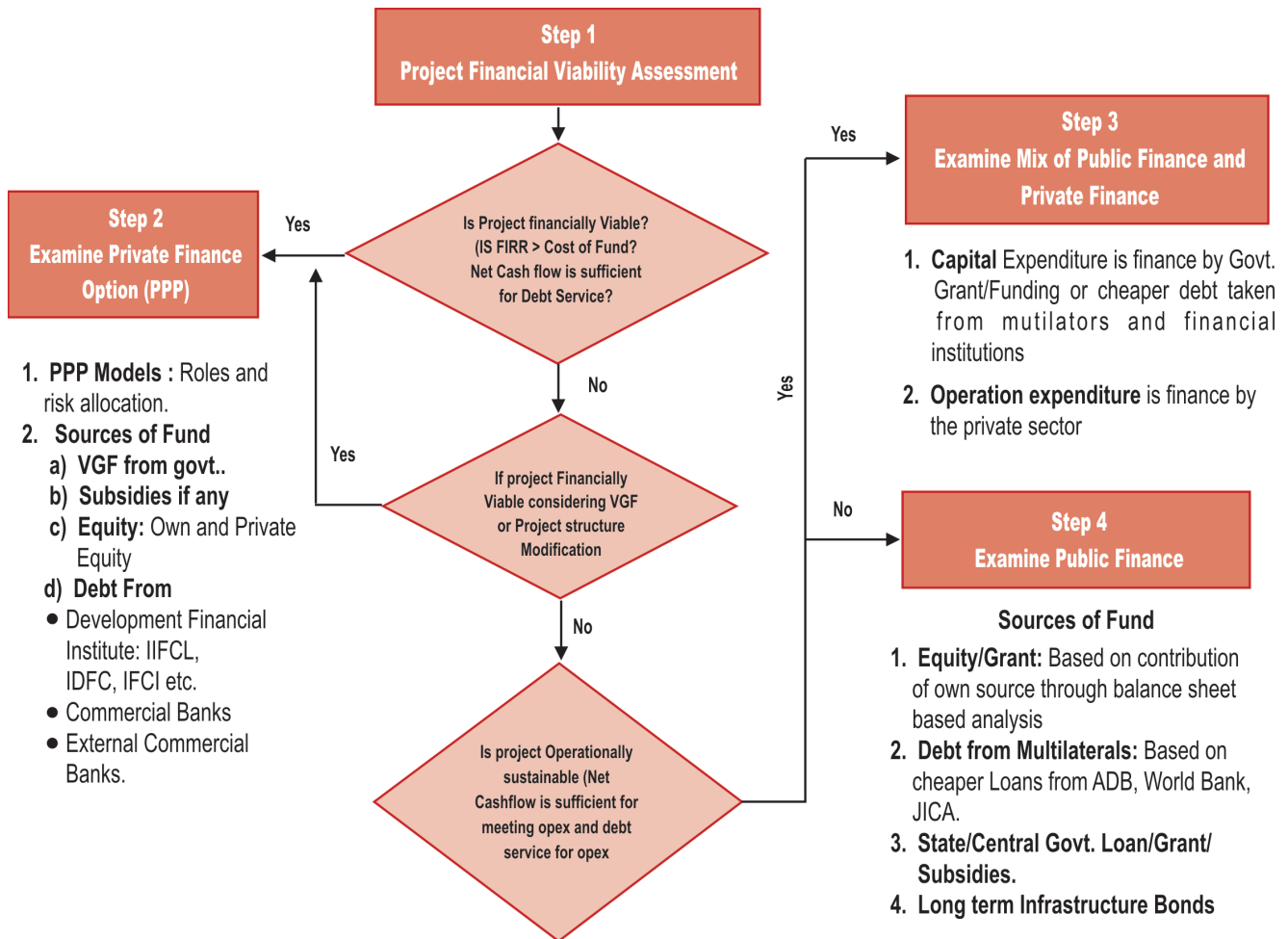
As specified in the way forward step of financial viability in the last chapter, the financing decision depends on nature of the returns on the Investment and its attractiveness to PPP option, resources available from the ULB, State and Central Government and other sources. Poor investment returns from the urban transport project keeps private sector away from participation whereas paucity of budgetary allocation and limited multilateral finance pose a tough challenge to the Sponsoring Government Agency in terms of garnering the required resources for the project implementation. Under such a situation, financing a project becomes an issue. Thus various options for financing the project are explored. Further to the above, financing source of many urban transport projects are also analysed and specified in **ATTACHMENT 5** as overview of cases studied. This section specifies the steps involved in identifying suitable financing options.

5.1 Steps for financing options

The pictorial representation of financing option steps are specified in figure below.



Figure 5.1: Pictorial Representation of Financing Options



Of the above, steps 1: Project Financial / Commercial Viability Assessment are elaborated in previous section IV of this Toolkit. Remaining steps are elaborated further as follows.

5.2 Examining private finance option

Private Sector Finance can be obtained by selecting the project implementation model on Public Private Partnership (PPP) basis. The selection of an appropriate project implementation model depends on commercial viability/return on investment.

5.2.1 Selection of PPP Model

Private Sector Models imply that PPP models where full projects are implemented by the private sector and the capital and operation expenditure is recovered either through right to revenue streams or through annuity payments by the Government.



Possibilities of Private Sector Participation in the project would be evaluated taking the following PPP formats into account. Possible models are shown in Table 5.1.

Table 5.1: Selection of PPP Model

No.	Outcome of the Financial Viability	Suitable PPP Model	Allocation of Roles and Responsibilities
1	<p><i>Project is evaluated commercially viable</i> based on project revenue stream and cash flow. <i>(Strong Revenue Model with Investment recovery)</i></p>	<p>Built Operate and Transfer (BOT)</p>	<ul style="list-style-type: none"> Entire project cost borne by the private player. Land required for the project is acquired by the ULB/State/Central Government Agency. O&M cost borne by the Private Player whereas ULB/State/Central Govt. assumes project monitoring and supervision responsibility. Right of revenue (Fare/TOD etc.) income granted to private player during the concession period. Concession Period/Premium/Revenue share could be the bidding variable.
2	<p>Project is commercially unviable on standalone basis but <i>Viable considering VGF.</i> <i>(Investment recovery is possible to a large extent but not fully)</i></p>	<p>Viability Gap Funding (VGF) Model <i>(The overall share of VGF in the Project cost would be capped at 40% as per Govt. Policy in this regard which stipulates 20% funding by the central Govt. and remaining 20% from State Govt. /ULB / Sponsoring agency.)</i></p>	<ul style="list-style-type: none"> Entire project cost borne by the private player. Land required for the project acquired by the ULB/State/Central Government Agency. The concessionaire would ask for VGF in this case which would be the bidding variable. The quantum of financial support to be provided under this scheme shall be in the form of a capital grant at the stage of project construction O&M cost borne by the Private Player whereas ULB/State/Central Govt. assumes project monitoring and supervision responsibility.



No.	Outcome of the Financial Viability	Suitable PPP Model	Allocation of Roles and Responsibilities
			<ul style="list-style-type: none"> Right of revenue (Fare/TOD etc.) income is granted to private player during the concession period.
Following PPP Models could be explored if project is evaluated to be unviable for both options of BOT and VGF.			
3	Project is evaluated to be commercially unviable for both options of BOT and VGF and project Investment is higher and budgetary allocation is limited	Grant During Operation	The private player would bear 100% of project cost and collect the revenue as well. The ULB/State Govt. /Central Govt. would provide an equal amount of revenue shortfall grant every year for the entire concession period to maintain adequate returns of the concessionaire. The grant quoted per year would be the bidding variable.
4		Annuity Model	The private player would bear the entire project cost and implement the project. The revenue would be collected by the Public Sector. The concessionaire would ask for fixed annuity amount to be paid in equal annual instalments over the entire concession period. The annuity amount would be the bidding variable.

5.2.2 Sources of Fund

Urban Transport project being capital intensive in nature requires long term finance. Thus long term funds available for the private sector need to be explored to select the suitable PPP model. There are various means of long term funding available for infrastructure projects in India. The prime sources of long term funds are given in Table below.



Table 5.2: Sources of Fund for Private Finance Option

No.	Source of Fund for Private Player	Details
1	Capital Grants in terms of Viability Gap Funding (VGF) from Government	<ul style="list-style-type: none"> • The Viability Gap Funding (VGF) scheme provides financial support in the form of capital grant for PPP projects in various infrastructure sectors in India. The scheme is intended to support the infrastructure projects which are commercially unviable but have high economic benefit. • This scheme is applicable to the infrastructure projects to be developed under the PPP route. Support under this scheme would be available only for infrastructure projects where private sector developers are selected through a process of open competitive bidding only. • The quantum of financial support to be provided under this scheme shall be in the form of a capital grant at the stage of project construction. The amount of VGF shall be equivalent to the lowest bid for capital subsidy, but subject to a maximum of 20% of the total project cost. In case the sponsoring Ministry/ULB/ State Government/ statutory entity propose to provide any assistance over and above the given VGF, it shall be restricted to a further 20% of the total project cost. Thus up to 40% of VGF could be availed under this scheme.
2	Subsidies if any	<p>As specified in PPP models above, subsidies can be in the form of;</p> <ol style="list-style-type: none"> 1. Grant During Operation: Necessary to obtain required return on investment in terms of revenue short fall grant on annual basis. 2. Annuity: Necessary to obtain required return on investment in terms of annuity grant on annual basis.
3	Equity	<p>This constitutes the risk capital for the project. Depending upon the project structure, equity could be contributed by the private party player and ULB/State Government/ Central Government. Normally equity contribution from Private players varies from 20% to 30% in infrastructure projects based on its balance sheet based analysis.</p>
4	Debt	<p>Debt has to be repaid from project revenues or other sources and also carries an interest payment obligation. There are various options for raising debt for a project. These include loans from;</p> <ol style="list-style-type: none"> a) Development Financial Institute b) Commercial Banks in India c) External Commercial Borrowings d) Long Term Infrastructure Bonds. <p>The important point to note is that there will be outflow of periodic interest</p>



No.	Source of Fund for Private Player	Details								
		and repayment of debt after an initial moratorium. Lenders may typically require escrowing of revenues from income sources to ensure periodic payment.								
(a)	<i>Development Financial Institute</i>	<p>The following Development Financial Institutions provide long terms fund to Infrastructure Projects in India.</p> <table border="1" data-bbox="509 583 1443 1562"> <thead> <tr> <th data-bbox="509 583 760 615">Institute</th> <th data-bbox="760 583 1443 615">Details</th> </tr> </thead> <tbody> <tr> <td data-bbox="509 615 760 919">India Infrastructure Finance Company Ltd. (IIFCL)</td> <td data-bbox="760 615 1443 919"> <ul style="list-style-type: none"> Wholly owned SPV of Govt of India, established to finance commercially viable infrastructure projects in India. Provides long-term loan, refinancing, and takeout financing. Eligibility of projects: transportation (Road, Railways, Ports and Airports), power, urban infrastructure, Energy and Gas, Industrial Infrastructure and Tourism related project. </td> </tr> <tr> <td data-bbox="509 919 760 1360">IDFC</td> <td data-bbox="760 919 1443 1360"> <ul style="list-style-type: none"> IDFC was founded in 1997 jointly by other leading financial institutions of India and the Government of India. It provides Senior debt finance, Mezzanine finance and also provides equity in infrastructure projects initiated by the public and private sector. IDFC provides customised solutions for financing including takeout financing, sub ordinate debt, project equity and proprietary equity. It follows a system of risk weighed PLRs benchmarked broadly with its financing costs. IDFC's financing costs broadly follow the market rates. </td> </tr> <tr> <td data-bbox="509 1360 760 1562">IFCI</td> <td data-bbox="760 1360 1443 1562"> <ul style="list-style-type: none"> IFCI provides Long-term Loans (more than eight years to upto 15 years) - Project Finance for new industrial/infrastructure projects, Takeout Finance, acquisition financing, Securitization of debt. The railway and urban project are included as targeted infrastructure sectors for IFCI. </td> </tr> </tbody> </table>	Institute	Details	India Infrastructure Finance Company Ltd. (IIFCL)	<ul style="list-style-type: none"> Wholly owned SPV of Govt of India, established to finance commercially viable infrastructure projects in India. Provides long-term loan, refinancing, and takeout financing. Eligibility of projects: transportation (Road, Railways, Ports and Airports), power, urban infrastructure, Energy and Gas, Industrial Infrastructure and Tourism related project. 	IDFC	<ul style="list-style-type: none"> IDFC was founded in 1997 jointly by other leading financial institutions of India and the Government of India. It provides Senior debt finance, Mezzanine finance and also provides equity in infrastructure projects initiated by the public and private sector. IDFC provides customised solutions for financing including takeout financing, sub ordinate debt, project equity and proprietary equity. It follows a system of risk weighed PLRs benchmarked broadly with its financing costs. IDFC's financing costs broadly follow the market rates. 	IFCI	<ul style="list-style-type: none"> IFCI provides Long-term Loans (more than eight years to upto 15 years) - Project Finance for new industrial/infrastructure projects, Takeout Finance, acquisition financing, Securitization of debt. The railway and urban project are included as targeted infrastructure sectors for IFCI.
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(b)	<i>Commercial Banks and NBFC in India</i>	<p>Lending from Commercial Banks/NBFCs</p> <p>Many large scale infrastructure projects in India are financed by banks through loan syndications as lead bank either not capable to finance the entire debt amount or want to avoid huge exposure to single project. Loans from the Commercial Banks may not be for longer term. The banks charges syndication and processing charges along with the interest rates.</p> <p>Lending from the specific Institutions eligible issuance of long term tax free Infrastructure Bonds</p>								



No.	Source of Fund for Private Player	Details
		<p>Further to enhance credit facilities to infrastructure sector , Govt. of India has allowed specific institutions as specified below to raise corpus for infrastructure financing through issuance of long term tax free infrastructure bonds vide its notification no. 48/2010[F.No.149/84/2010-SO (TPL)], dated 9-7-2010.</p> <ol style="list-style-type: none"> 1. Industrial Finance Corporation of India 2. Life Insurance Corporation of India 3. Infrastructure Development Finance Company Limited 4. NBFC classified as an Infrastructure Finance Company by the RBI <p>The corpus collected from the bond can be used in the form of loans, other form of debt, quasi equity and equity in the infrastructure projects. The yield of such bonds should not exceed the yield on Government security within the same maturity period.</p>
(c)	<i>External Commercial Borrowings (ECB)</i>	<p>ECB is regulated by RBI and funds for the infrastructure project could be availed generally through automatic route through eligible lenders such as multilaterals, International Banks and regional financial institutions, export credit agencies, international capital markets, foreign equity holders. Ceiling of ECB amount is USD 500 million. This is subject change based on policy changes by RBI. Cost of ECB is generally 6 months LIBOR + 3% to 5% interest rates. The RBI master circular no. 9/2011-12 dated, July 1, 2011 on ECB and Trade Credits is the present governing document for ECB.</p>
5	Private Equity	<ul style="list-style-type: none"> • Private Equity (Venture Capital) firms in India are regulated by SEBI through “Regulations for Venture Capital in 1996” and SEBI Foreign Venture Capital Investors Regulations, 2000. • Infrastructure sector in India is observing equity participation from various private equity firms owing to large scale and promising returns. In 2011, the road sector attracted PE worth of USD 407 million. • The generic terms and conditions for any private equity placement depend on potency of business model to generate higher returns from the alternative and less risky investment venues for a PE firm. PE could be costlier in terms of other means of finance because of 1) increased interference of PE firms in management decisions 2) higher exit cost, and 3) pressure of high performance business.
6	Other Sources	<p>Other sources include:</p> <ul style="list-style-type: none"> • Long term Infrastructure Bond to be issued by Private Player. • Revolving fund from the Mass Rapid Transit fund as discussed in the revenue section.


Box 5.1: PPP Models in Urban Transport in India and Financing Mechanism

Projects	PPP Model	Private Player	Project cost	VGf	Revenue Share (pa)	Means of Finance	
			Rs. Crore			Equity	Debt
Hyderabad Metro	VGf Model	L&T Metro Rail (Hyderabad) Ltd.	16378	1458 (9% Total Project Cost)	Nil	21% (Rs. 3440 Crore)	70% (Rs. 11480 Crore)
Mumbai Metro - VAG Corridor	VGf Model	Mumbai Metro One Pvt. Ltd. – Joint Venture of Reliance Energy Ltd and Viola Transport of France	2356	650 (28% of the Total Project Cost)	Nil	22% (Rs.513 Crore)	50% (Rs. 1194 Crore)

5.3 Examining mix of public and private finance option

This model implies a mix of public and private sector model where project is partially implemented by the Public sector and the private sector. This model can be explored when a Project is evaluated to be financially unviable for both options of BOT and VGf however limited investment recovery is possible. The capital expenditure with respect to civil construction is incurred by the Public sector where as investment with respect to rolling stocks and operation expenditure is made by the private sector. Under this model private sector is provided with right to revenue or availing regular annuity payment by the public sector through which private sector recovered its investment.

Variants of this model recognize the private sector efficiency and Possibilities of Private Sector Participation in the project would be evaluated taking the following models into account. Possible models are given in Table 16.



Table 5.3: Selection of Mix of Public and Private Sector Models

No.	Outcome of the Financial Viability	Variants of Mix of Public and Private Sector Model	Allocation of Roles and Responsibilities
1	Project is evaluated to be financially unviable for both options of BOT and VGF however limited investment recovery is possible.	Revenue Share Model	<ul style="list-style-type: none"> • The public sector/ULB/State Govt/Central Government would bear the cost of land acquisition, civil construction cost such as Corridor, Bus Stations depot and railway alignment formation (in case of rail based UT Project) and R&R etc. • The Private sector player would invest in rolling stock and technology installation such as ITMS etc (Bus Based UT Project) and Traction and E&M additionally in rail based Urban Transport Project. • The Private sector would also operate and maintain the entire project. Rights of revenue are granted to private players. • Under this model the Private sector would share fix amount of revenue every year with the ULB/State Government/Central Government. • The bidding variable would be a proportion of revenue share.
2	Project is evaluated to be financially unviable for both options of BOT and VGF however limited investment recovery is also not possible through project revenue stream.	Annuity for investment recovery for rolling stocks /ITS investments	<ul style="list-style-type: none"> • The public sector/ULB/State Government/Central Government would bear the cost of land acquisition, civil construction cost such as Corridor, Bus Stations depot and railway alignment formation (in case of rail based UT Project) and R&R etc. • The Private sector player would invest in rolling stock and technology installation such as ITMS etc (Bus Based UT Project) and Traction and E&M additionally in rail based Urban Transport Project. • The Private sector would also operate and maintain the entire project. • Rights of project revenue are with public sector where as regular annuity payment could be made to private sector by the public sector which makes possible investment recovery to private sector. • Bidding variables could be lowest annuity amount quoted.



Box 5.2: Mix of Public Sector and Private Sector Models in Urban Transport in India and Financing Mechanism

Delhi Metro Airport Express Link (Revenue Share Model)

The table below shows a mix of Public Sector and financing mechanism for the Delhi Metro Airport Express Link Project.

Projects	PPP Model	Private Player	Project cost	Revenue Share (pa)	Means of Finance	
			Rs. Crore		Equity	Debt
Delhi Metro Airport Express Link	Revenue Share Model	JV of Reliance Infrastructure Limited of India and Construcciones y Auxiliar De Ferrocarriles (CAF) of Spain	Total Project Cost = Rs. 5700 crore. Cost for the concessionaire: Rs. 2800 Crore ⁶	Approx. Rs. 51 Crore pa and 1% to 5% share in gross revenue ⁷	30%	70% ⁸ 17.25 years Term loan by consortium of 8 banks lead by Axis bank

Ahmedabad BRTS (Janmarg) Phase -1

The civil infrastructure (i.e. bus stations, control centre, BRT corridor and depot) and ITS parts of the Phase 1 of Ahmedabad BRTS Project have been financed by the Public Sector under JNNURM scheme of Govt. of India with contribution of Govt. of India (35%), Government of Gujarat (15%) and Ahmedabad Municipal Corporation (50%). Whereas investment towards rolling stocks (i.e. Buses) have been made by the Private sector. Private sector assumed responsibilities of investment, operation and maintenance of Buses under the supervision of the Ahmedabad Janmarg Limited (AJL) which is a fully owned SPV of Ahmedabad Municipal Corporation created for O&M of Ahmedabad BRTS Project. Payment to the Private sector has been made based on kilometre operated and rate for kilometre quoted by it.

5.4 Examining public finance option

Public finance options should be explored if projects bring higher socio economic benefits but are commercially evaluated to be unviable and do not fit into Private Financing through PPP option. Under this model ULB/State/Central Government could form an SPV to develop, operate and maintain the Urban Transport project. Funding under this model is availed through own sources, state and central Government funding, loans on concessional rates from multilateral agencies such as ADB, World Bank, JICA etc. and through the municipal bonds. All funding options are summarised below.

⁶ DMRC Website

⁷ World Bank PPI update note 39. September 2010

⁸ World Bank PPI update note 39. September 2010



Table 5.4: Sources of Fund for Public Finance Option

No.	Source of Fund for Public Finance Option	Details
	<p>Own Source/ Equity from ULB</p>	<p>This constitutes the risk capital for the project. Depending upon the availability of fund from own sources based on a balance sheet analysis, the quantum of equity contribution from own sources should be decided. The balance sheet based analysis comprises the preparation of Financial Operating Plan and the Capital Investment Plan. The balance sheet based analysis could help in determining the following:</p> <ul style="list-style-type: none"> a) Quantum of equity contribution from own sources for the project; b) Determination of whether ULB/Project Authority could meet project maintenance expense through its own fund; and c) Determining the Quantum of Debt servicing capability. <p>Steps involved in preparation of both Financial Operating plan and capital investment plan are specified in separate toolkits prepared by the MOUD for preparation of City Development Plan under JNNURM Scheme in detail. Steps for preparation of FOP are also summarized in this toolkit and placed as ATTACHMENT 4 for ready reference.</p>
	<p>Capital Grants / Equity from State / Central Government</p>	<ul style="list-style-type: none"> • Grants from central and state governments (including JNNURM) are also important sources of funds, especially for the Urban Transport projects that may not generate required investment returns given its higher capital intensive nature. • To obtain the fund under JNNURM scheme of Government of India, detailed project reports for proposed urban transport project need to be prepared. DPR also involves the economic and financial analysis sections along with other sections. Steps as specified in section III and IV may be followed for Economic and Financial Analysis. <p>Box 5.3: Financing Mechanism for Ahmedabad BRTS Project</p> <div style="border: 1px solid black; padding: 5px;"> <p>Ahmedabad BRTS Project is financed under JNNURM scheme of Govt. of India with contribution of Govt. of India (35%), Government of Gujarat (15%) and Ahmedabad Municipal Corporation (50%).</p> <p>The Ahmedabad Municipal Corporation (AMC) formed a SPV called Ahmedabad Janmarg Limited (AJL) (100% subsidiary of AMC) to operate and maintain the project. AMC assumed responsibilities of undertaking civil construction through involving private sector contractors, suppliers whereas AJL is responsible for implementation and O&M of operational infrastructure such Bus operation, Intelligent Transit Management System</p> </div>



No.	Source of Fund for Public Finance Option	Details								
		<p>(ITMS) etc. through use of private sector partners and Service providers where by some part of risks are shared. Above discussed arrangement is shown in figure below.</p> <p>Figure 5-2 Financing of Ahmedabad BRTS Project</p> <p>Ahmedabad BRTS Project</p> <table border="1"> <thead> <tr> <th>Project Phases</th> <th>Capital Cost</th> </tr> </thead> <tbody> <tr> <td>Phase 1</td> <td>Rs 493 crore</td> </tr> <tr> <td>Phase 2</td> <td>Rs 488 crore</td> </tr> <tr> <td>Total</td> <td>Rs 981 crore</td> </tr> </tbody> </table> <p>Source: Respective DPR of Phase 1 and Phase 2</p> <p>Funding Sources AND ITS Contribution to Project Cost</p> <ul style="list-style-type: none"> Govt of India under JNNURM Scheme of MOUd: 35% Gujarat Government: 15% Ahmedabad Municipal Corporation (AMC): 50% <p>Ahmedabad Janmarg Limited is a fully owned subsidiary of AMC. Revenue (Fare/Ad revenue) and O&M of Project flow from Janmarg Limited to AMC.</p>	Project Phases	Capital Cost	Phase 1	Rs 493 crore	Phase 2	Rs 488 crore	Total	Rs 981 crore
Project Phases	Capital Cost									
Phase 1	Rs 493 crore									
Phase 2	Rs 488 crore									
Total	Rs 981 crore									
	<p>Debts</p>	<p>As specified in Private Finance section, Debt has to be repaid from project revenues or other sources and also carries an interest payment obligation. Thus Quantum of debt could be decided based on debt servicing capacity. The balance sheet based analysis as specified in ATTACHMENT 4 could be undertaken to determine the quantum of debt.</p> <p>The various options for raising debt for the project include followings.</p> <ol style="list-style-type: none"> Loans from Multilateral Financial Institutions such as ADB, World Bank, JICA etc. Issuance of Bonds. Interest free loans from State/Central Government. <p>It is to be noted that in some cases repayment of the funds does not depend on the project revenue and lenders do not carry any project risk as their</p>								



No.	Source of Fund for Public Finance Option	Details
		<p>investments are backed by government guarantees. Debt instrument or institutions from which debt is taken could be decided based on analysis of competitive financial charges (interest rates and charges) levied by them.</p>
(a)	<p>Loans from Multilateral Financial Institutions such as ADB, World Bank, JICA etc.</p>	<p>Funding from Multilateral banks such as the World Bank, the Asian Development Bank and the JICA in long term and cheaper as compared to domestic financial market and hence suits for the Urban Transport project. However such multilaterals only provide funds to the Government and Para-statal agencies only. Additional hedging cost of foreign exchange and government guarantee fees are applicable in addition to the interest rates.</p> <p>It is to be noted that loans from JICA are considered the cheapest among all multilaterals. Lending rates of JICA varies from 1.4% to 1.8% in various infrastructure projects in India. JICA has provided loan at 1.8% for DMRC phase II. The repayment period is 30 years, including grace period of 10 years. The above is specified for understanding, however actual interest rates and hedging cost subject to changes of respective credit policies of multilaterals.</p> <p>The ULBs/ Project sponsoring Agencies needs to compare and evaluate the cheaper source of loan.</p>
(b)	<p>Bonds issuance by ULB/ Public sector project sponsoring agency.</p>	<p>The ULBs could fund large infrastructure investment through issuance of municipal Bonds as compared to staggered investment that ULB must make based on operating income. Normally Financially robust ULB with strong balance sheet can directly access the capital market for issuance of bonds.</p> <p>Municipal bonds are of two types (1) General Obligation bonds deriving faith from issuing authority and its utility for projects which do not have or very limited revenue stream (2) Revenue bonds which are tied to specified sources of revenue from the facilities or services that they finance. However, investor's reluctance has been observed given a limited track record and a poor market image of local governments in India. To address the credit quality of proposed bond/debt instruments, Structured Debt Obligations (SDO) can be introduced. It earmarks specific tax and/or non-tax sources of the local government/Sponsoring agency for debt servicing and it is monitored by the independent trustee. The SDO generally enhances the rating of a debt instrument as compared to the stand-alone creditworthiness of the issuer, leading to easier access to the capital markets and less costly financing.</p> <p>Box 5.4: Example of bonds issuance by ULB/Private sector project sponsoring agencies</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p style="text-align: center;">Municipal Bonds issued by Ahmedabad Municipal Corporation to fund Water supply Project</p> <p>Ahmedabad Municipal corporation issued bonds worth Rs 100 crore to partially finance a Rs. 439 crore water supply and sewerage project in year 1998. It was the first Municipal bond issued in India without a state guarantee.</p> </div>



No.	Source of Fund for Public Finance Option	Details
		<p>As groundwork prior to the issuance of the bond, AMC undertook reforms in tax collection, accounting system and financial management.</p> <p>AMC undertook SDO modification to its bond financing structure and hence it received an improved rating of AA (SO), and 75% of the issue was successfully placed with a dozen financial institutions, while the other 25% was reserved for the public. In the end, the bond was 10% oversubscribed.</p> <p style="text-align: center;">NHAI Bonds</p> <p>The National Highway development Authority of India (NHAI) has issued short term bonds of Rs. 1900 crore for National Highway Development Program (NHDP). The bonds are exempted from Income Tax under Section 54ec of the Income Tax Act. The average maturity period is 3 years.</p> <p>The size of Bonds issue depends on the aggregate net income of the ULB.</p> <p>It is to be noted that Smaller/ medium sized ULBs could tap capital market by coming together via aggregation of their balance sheet under <i>the pooled finance mechanism</i>. MoUD has also published separate toolkit for pooled finance mechanism.</p>
(c)	Interest free loans from State/ Central Govt.	Based on the socio economic benefits that urban transport projects are envisaged to provide, State and Central Government provides interest free loans to ULB/project sponsoring authority in terms of subordinate debt apart from the equity/grant contribution.
	Mass Rapid Transit Fund	<p>A dedicated Mass Rapid Transit Fund (MRTF) could be created to fund development and operation of the Urban Transport project. The corpus of fund can be collected from following sources.</p> <ul style="list-style-type: none"> 5.4.1 Sale of Extra FSI 5.4.2 Betterment Charges 5.4.3 Cess on Property Tax 5.4.4 Cess on Building Use Permission 5.4.5 Cess on vehicle registration: 5.4.6 Cess on VAT <p>Of above, instruments (1) to (4) could be applicable to project influence area in the city where (5) and (6) could be applicable to city where project is being implemented. Above instruments are described in revenue section of Financial Viability.</p>



Box 5.5: Public Finance in Urban Transport in India

Many Urban Transport Projects are proposed and implemented through Government SPV. Under this model, an SPV has been created with equity contribution from the state and central government. This SPV would promote/implement the project as owner. The assets and liabilities of the project would be displayed on the balance sheet of this SPV. The SPV may in turn use private sector partners, contractors, supplies and service providers for constructing and managing parts of the system. Some of these arrangements could be in the form of PPP whereby some part of the risks and revenues are shared. Following are the possible sources of fund if the project is implemented by the SPV.

The following exhibit describes the financing strategies observed in the Metro projects proposed and implemented by Govt. SPVs.

Sources of fund in the metro projects by Government SPV

Project	Length (Km)	Status	Total Project Cost Crore Rs.	Funding Source		
				Govt. Equity	Multilateral Debt	Other Sources
Kolkata Metro (N-S Corridor)	16.5	Operational	NA			
Kolkata Metro (Extension of N-S corridor)	8.7	Operational	NA	100%	Nil	Nil
Kolkata Metro (E-W corridor)	13.74	Under Implementation	4676	55%	45% (JICA-ODA)	Nil
Delhi Metro (Phase 1)	65.1	Operational	NA	30%	60% (JICA-ODA)	10% Sub debt by GOI
Delhi Metro (Phase 2)	82.11	Operational		44% (Equity capital, Internal Accruals, Property Development)	46% (JICA-ODA)	10% Sub debt by GOI
Chennai Metro	45	Under Implementation	14600	30% (15% GOI and GOTN each)	59% (JICA-ODA)	11% Sub debt by GOI and GOTN
Bangalore Metro	41.7	Under Implementation	8156	30% (15% GOI and GOKN each)	45% (JICA-ODA)	25% Sub debt by GOI and GOKN

Source: DMRC DPR, various sources

NA: Not Available

GOTN: Govt. of Tamil Nadu

GOKN :Govt. of Karnataka

JICA: Japan International Cooperation Agency

GOI: Govt. of India

It can be seen that financing of majority of the projects described above has been met through Overseas Development Assistance from JICA and subordinate debt from Central or State Governments. Subordinate debt is a mechanism generally exercised to waive off taxes on project goods or Govt. land cost.





Attachments

Attachments





Attachment 1: Definition of Key Terms

KEY Definitions FOR ECONOMIC ANALYSIS

Economic Analysis: 'A systematic approach to determining the socio-economic impacts of any programme or project in terms of benefits accrued to the public/society and costs incurred due to use of scarce natural and other resources under the given assumptions and constraints'.

Benefit Cost Ratio (BCR): A BCR is the ratio of the benefits of a project or proposal, expressed in monetary terms, relative to its costs, also expressed in monetary terms. All benefits and costs should be expressed in discounted present values.

Economic Net Present Value (ENPV): The cost and the benefits of the individual years are discounted to the present value and compared across various alternatives. The Net Present

Value (*NPV*) at the base year can be written as:

$$NPV = \sum_{i=0}^n \left(\frac{B_i - C_i}{(1 + r)^n} \right)$$

where,

B_i is the benefit of the *i*th year,

C_i is the cost of the *i*th year and

n is the number of years.

Economic Internal Rate of Return (EIRR) is that discount rate, for which the NPV value is zero. This can be obtained by setting the value of NPV in Equation (below) as zero, and solving (by trial and error) for the value of *r*. If the rate of return thus calculated is more than the market interest, then the project is adjudged to be acceptable.

First Year Rate of Return: The rate of return can be calculated over a single period, or expressed as an average over multiple periods of time.

Sensitivity Analysis: This is particularly concerned with factors, and combinations of factors, that may lead to unfavorable consequences. Shows to what extent the viability of a project is influenced by variations in major quantifiable variables. It tries to estimate the effect on achieving project objectives if certain assumptions do not, or only partly, materialize.

Risk Analysis: Considers the probability that changes in major quantifiable variables will actually occur. It assesses the actual risk that certain assumptions do not, or only partly, occur.

Switching Value: The switching value (SV) is, by definition, the reciprocal of the sensitivity indicator. The percentage change in a variable or combination of variables to reduce the IRR to the cut-off rate (=discount rate).



$$SV = \frac{(100 \times IRRb - d)}{(IRRb - IRR1)} \times \frac{(Xb - X1)}{Xb}$$

where:

- Xb** - value of variable in the base case
- X1** - value of the variable in the sensitivity test
- IRRb** - value of IRR in the base case
- IRR1** – value of the variable in the sensitivity test
- d** - Discount rate

Distribution Analysis (to analyze whether the project are distributed to all income classes: This impact of the project is determined by evaluating the expected distribution of net economic benefits to different groups such as consumers and suppliers, including labour and the government.

KEY DEFINITIONS FOR FINANCIAL ANALYSIS

Financial Internal Rate of Return (FIRR): “FIRR is a discount rate at which the present value of a series of investments is equal to the present value of the returns on those investments. In other words, it is the interest rate that makes net present value of all cash flow equal to zero. The IRR for a project is the discount rate that makes the NPV zero. All independent projects with an IRR greater than Weighted Average Cost of Capital (WACC) should be accepted for further screening and ranking. When choosing among mutually exclusive projects, the project with the highest IRR should be selected (as long as the IRR is greater than the WACC).

$$0 = \sum_{t=0} \frac{CF_t}{(1 + IRR)^t} = CF_0 + \sum_{t=1} \frac{CF_t}{1 + (IRR)^t}$$

Weighted Average Cost of Capital (WACC): WACC is essentially the weighted average cost of components of a feasible financing package that will allow the project to be undertaken. For the sake of simplicity, we will assume that the project in question is financed only through debt and equity.

- i. In such a case the WACC can be expressed as the weighted average of the required rate of return for equity (re), and the required rate of return for debt, (rd).
- ii. $WACC = (1 - @)re + @(1 - T)rd$
- iii. Where T represents the marginal income tax rate on the projects income. The above equation reduces the task of estimating the WACC to a calculation of the cost of debt and the cost of equity and an appropriate weighing of these component costs
- iv. Note that the WACC is expressed as an after tax rate of return.
- v. Because the returns to equity investors are paid after corporate taxes, re is also an after-corporate-tax rate of return (to equity).



- vi. The return to debt, r_d , is a pre-tax rate of return; it must be multiplied by $(1 - T)$ to convert it to an after tax basis.

Present Value of Money: The value of money accruable in future, as on date is called the present value of money. Decisions on capital subprojects are taken based on the present value. If the net present value of a project is positive, the project should be reviewed in greater detail. If the NPV is negative, perhaps the project should be dropped or the project should be reconfigured to a more acceptable design. Three properties of the net present value of an income stream include:

- i. Higher income amounts make the net present value higher. Lower income amounts make the net present value lower.
- ii. If profits come sooner, the net present value is higher. If profits come later, the net present value is lower.
- iii. Changing the discount rate changes the net present value. For an investment with the common pattern of having costs early and profits later, a higher discount rate makes the net present value smaller.

Net Present Value: The NPV of a capital investment project is the present value of all of the after tax cash flows (CF) connected with the project – all its costs and revenues, now and in the future:

$$NPV = CF_0 + \frac{CF_1}{(1+r)} + \frac{CF_2}{(1+r)^2} + \dots + \frac{CF_n}{(1+r)^n}$$

The decision rule to follow when applying NPV is: **Undertake the capital investment project if the NPV is positive.**

Discount rate (r) which is used in financial calculations is usually chosen to be equal to the Cost of Capital. The Cost of Capital, in financial market equilibrium, will be the same as the Market Rate of Return on the financial asset mixture the firm uses to finance capital investment. Some adjustment may be made to the discount rate to take account of risks associated with uncertain cash flows, with other developments.

Debt-to-Equity ratio (D/E) is a financial ratio indicating the relative proportion of shareholders' equity and debt used to finance a company's assets. Closely related to leveraging, the ratio is also known as Risk, Gearing or Leverage.

Debt Service Coverage Ratio (DSCR), also known as "debt coverage ratio," (DCR) is the ratio of cash available for debt servicing to interest, principal and lease payments. It is a popular benchmark used in the measurement of an entity's (person or corporation) ability to produce enough cash to cover its debt (including lease) payments. The higher this ratio is, the easier it is to obtain a loan. The phrase is also used in commercial banking and may be expressed as a minimum ratio that is acceptable to a lender; it may be a loan condition or covenant. Breaching a DSCR covenant can, in some circumstances, be an act of default.



Policy Variables FOR ECONOMIC ANALYSIS

Selection of Discount Rate: a number of complex factors including the future availability of finance and the various opportunities of its use governs the selection of discount factor. The attitude of the society towards present consumption as against savings for future is an important factor.

- As a thumb rule, 12% is recommended and followed by all national bodies (Planning Commission and Indian Roads Congress) and international funding organizations (Asian Development Bank, World Bank etc.).
- If any rate other than 12% discount rate selected for analysis, it will require substantial evidence to support investments.

Selection of Analysis Period: Normally selection of analysis period is dictated by the 'design life' of the project in addition to its gestation period, investment size. In case of selecting a lesser period to the design life, 'salvage value' for the remaining life need to be included in the analysis. However as 'life cycle cost' with 'salvage value' are being considered in the economic analysis, differences in the analysis period will not be the major issue.

- Normally 15-20 years is recommended for urban transport and highway projects (SP 30, IRC, 1993). However, in exceptional cases, by considering the complexity of project components with different design life and huge investment size, certain urban infrastructure projects, up to 30 years are considered for analysis.
- With the above background, it is recommended to follow 20 years analysis period with appropriate life cycle costing and appropriate salvage value for urban transport projects.

Decision Criteria:

- Economic Internal Rate of Return (EIRR) : => 12% (Discount Rate)
- Economic Net Present Value (ENPV) : Should be positive



Attachment 2: Financial Analysis and Financing for Sub Projects

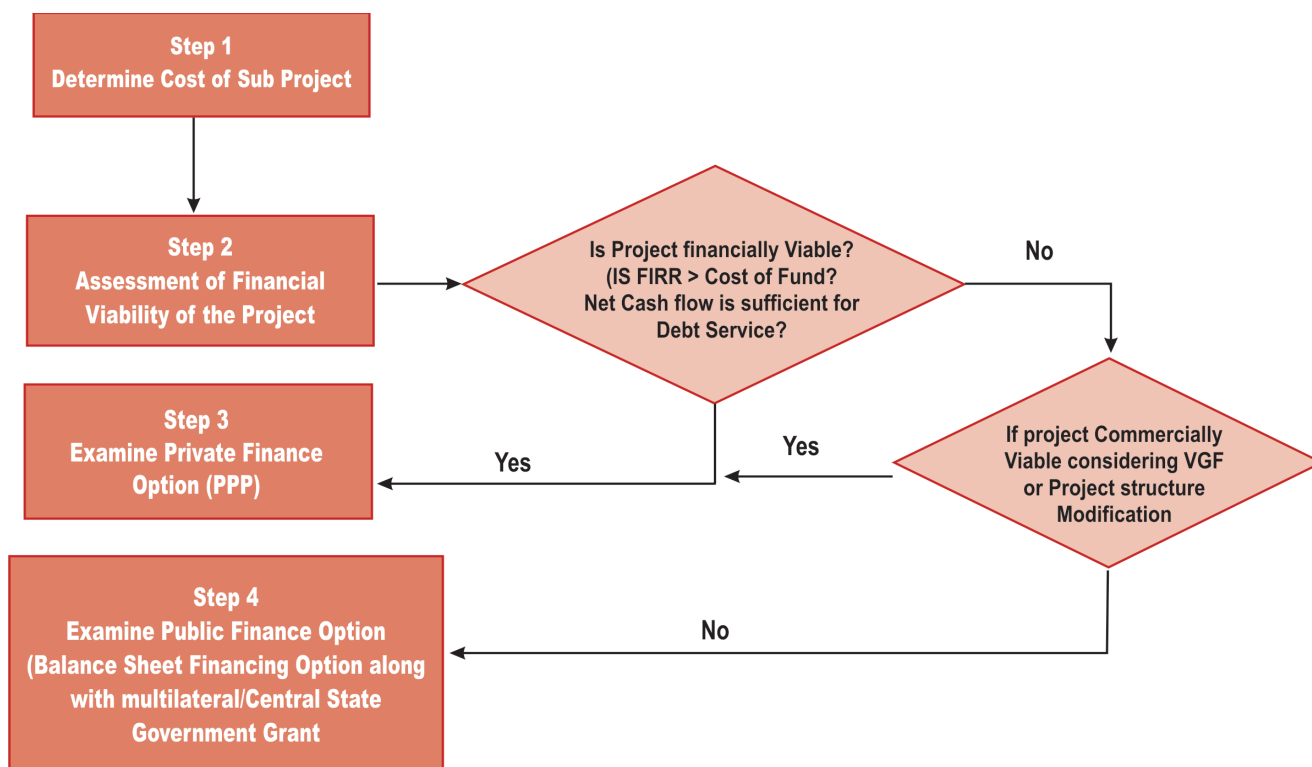
This toolkit deals with the Financial Analysis and Financing for the Urban Transport System/Project as a whole. Many a time need for undertaking individual components of Urban Transport Project on standalone basis arises. Such components could be followings.

- Urban/City Roads/Bridges
- Bus Depot
- Terminal
- Parking facilities for mixed lane traffic.
- Signals at Junctions
- Bus/Rolling stocks
- Information Technology components (i.e Bus PIS, Tracking etc).

This section elaborates the steps involved in Financial Analysis and Financing options for standalone sub projects specified above.

FINANCIAL ANALYSIS FRAMEWORK FOR SUB PROJECT

Similar framework as specified in **chapter 1** is to be followed. Pictorial representation is specified below.





STEP 1: DETERMINE COST OF SUB PROJECT

The cost of sub project determined as follows.

Sub Projects	Cost Determination
Urban Road Bridges	<ol style="list-style-type: none"> 1. Cost of Civil Works <ul style="list-style-type: none"> ▪ Sizing based on demand estimation (number of vehicles). ▪ Cost of Civil Works based on estimation of detailed Bills of Quantities. 2. Land Acquisition Cost if facilities such as Depot/Parking and/or urban road/bridge alignment are planned on non-government land. 3. R&R cost if any.
Bus Depot	
Parking Facilities	
Terminal	
Bus/Rolling stocks	<ul style="list-style-type: none"> ▪ Number of Buses based on passenger demand estimation. ▪ Price per Bus based on market rates.
Signals at Junctions	<ul style="list-style-type: none"> ▪ Quantities depend on number of existing and planned junctions for future.
IT Component (Bus PIS, Tracking etc.)	<ul style="list-style-type: none"> ▪ Hardware, software Quantities depends on number of Buses. ▪ Market rates for such hardware and software could be applied to quantities.

Followings shall also be added to cost determined as above.

- **Taxes and Duties:** Cost of Taxes and Duties levied by Govt. such as Custom, excise etc.
- **Physical / Price Contingencies:** Generally it is estimated @ 5% to 10% of the cost of above components.
- **Financing Cost:** Financing charges/Interest during construction period.

The cost arrived as above shall be phased based on predefined implementation period.

STEP 2: FINANCIAL ANALYSIS OF SUB PROJECT

The Financial analysis of subject projects is carried out to assess financial viability of the project which further forms basis for undertaking financing method through either project recourse financing or balance sheet based financing. The steps of financial viability assessment are provided below.



No	Steps	Details										
1	Determination of Project Horizon	<ul style="list-style-type: none"> The costs and income/revenue associated with the sub projects should be estimated during the project Horizon period. Project Horizon comprising of Construction Period and Operation Period of the Project. Construction period of one to three years where as operation period of 20 to 30 years should be taken into calculation. 										
2	Determination of Project Cost including financing cost	Detailed methodology for estimation of financial cost of sub project is specified in point B (step 1 Determination of project cost) .										
3	Phasing of Investment	Phasing of investment/capital cost is to be done based on project implementation plan.										
4	Determination of O&M Cost	<p>Generally current prices are considered for estimating the O&M during the forecast years. The cost category of each component specified in table below could be escalated with the rate of average indices (i.e Wholesale price Index or Consumer price index published by office of the Economic Advisor to Government of India) during the operation period in order to arrive at current prices. The following table specifies the calculation steps for estimating O&M cost. .</p> <table border="1"> <thead> <tr> <th>Name of Sub Project</th> <th>Details of O&M Estimation</th> </tr> </thead> <tbody> <tr> <td>Urban Road/Bridge</td> <td> <ul style="list-style-type: none"> Annual Maintenance cost based on detailed estimates or for an initial analysis at 1-3% of capital cost. </td> </tr> <tr> <td>Parking Facilities</td> <td rowspan="3"> <ul style="list-style-type: none"> Periodic Maintenance cost usually at the interval of 5 years based on detailed estimates or for an initial analysis at 3% to 5% of capital cost. Annual and Periodic maintenance are escalated at a rate of average WPI of all commodity during last five years. </td> </tr> <tr> <td>Depot</td> </tr> <tr> <td>Terminal</td> </tr> <tr> <td>Bus</td> <td> <p>Repair and Maintenance Cost</p> <ul style="list-style-type: none"> Repair and Maintenance cost of rolling stocks based on industry standards for forecast years. <p>Cost of Consumables</p> <ul style="list-style-type: none"> Cost of consumables such as fuel/energy expense required for daily rolling stock operation and Spare parts, machine tools etc. Consumption requirement for each consumable category derived based on operational plan and industry standards. Office of Economic Advisor, GOI publishes the data for WPI for each consumable category such as fuel, spare, machine tools etc. Thus prices of each category of consumable are escalated at average WPI of respective consumable category. <p>Salary Cost</p> <ul style="list-style-type: none"> Salary Cost: Admin salary, driver’s salary, salary of ticketing staff. Above Salary cost are escalated at a rate of average CPI for respective regions during last five years. <p>Admin Cost</p> <ul style="list-style-type: none"> Apart from salary it comprises, MIS reports for performance monitoring, paper, printing, office electricity and communication charges etc based on scale of operation. </td> </tr> </tbody> </table>	Name of Sub Project	Details of O&M Estimation	Urban Road/Bridge	<ul style="list-style-type: none"> Annual Maintenance cost based on detailed estimates or for an initial analysis at 1-3% of capital cost. 	Parking Facilities	<ul style="list-style-type: none"> Periodic Maintenance cost usually at the interval of 5 years based on detailed estimates or for an initial analysis at 3% to 5% of capital cost. Annual and Periodic maintenance are escalated at a rate of average WPI of all commodity during last five years. 	Depot	Terminal	Bus	<p>Repair and Maintenance Cost</p> <ul style="list-style-type: none"> Repair and Maintenance cost of rolling stocks based on industry standards for forecast years. <p>Cost of Consumables</p> <ul style="list-style-type: none"> Cost of consumables such as fuel/energy expense required for daily rolling stock operation and Spare parts, machine tools etc. Consumption requirement for each consumable category derived based on operational plan and industry standards. Office of Economic Advisor, GOI publishes the data for WPI for each consumable category such as fuel, spare, machine tools etc. Thus prices of each category of consumable are escalated at average WPI of respective consumable category. <p>Salary Cost</p> <ul style="list-style-type: none"> Salary Cost: Admin salary, driver’s salary, salary of ticketing staff. Above Salary cost are escalated at a rate of average CPI for respective regions during last five years. <p>Admin Cost</p> <ul style="list-style-type: none"> Apart from salary it comprises, MIS reports for performance monitoring, paper, printing, office electricity and communication charges etc based on scale of operation.
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			<ul style="list-style-type: none"> Above costs are escalated at a rate of average WPI of all commodities during last five years. 																
		Signals at Junctions	<ul style="list-style-type: none"> Annual repair and maintenance cost for installed hardware and software based on industry standards. 																
		ITS Components	<ul style="list-style-type: none"> Admin Cost: MIS reports for performance monitoring, printing, office electricity and communication charges etc based on scale of operation and industry standards. It is escalated at a rate of average WPI of all commodities during last five years. 																
5	Determination of Income/Revenue	Possible revenue sources for each sub project are specified in table below.																	
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6	Deciding Quantum of Debt	Typically most infrastructure projects are financed with 70-80% of the cost met through debt sources such as loans from financial institutions, multilaterals, bonds and pooled finance etc and central/state govt grants .This would help the ULB/Govt Agency to undertake more infrastructure projects by leveraging its own resources to the maximum extent. The remaining amount is financed through equity contributions. Equity contribution and quantum of debt is decided based on estimation of Financial Operation Plan and balance sheet analysis as specified in ATTACHMENT 4 .																	
7	Estimation of cash flow	The costs and revenue streams associated with the project for Project Horizon period is estimated based on steps above. Based on this, the project free cash flow is estimated. The illustration with this regards is provided in Section IV step no 7 .																	
8	Determining Outcome	Steps for arriving at outcome are specified below.																	
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		<p>average cost of capital as a benchmark to assess return</p>	<p>required rate of return for equity and debt.</p> <ul style="list-style-type: none"> For Government Agency the social cost of its own fund or grant is considered as 12% whereas actual cost of debt is considered for calculation of WACC. The cost of debt for Govt. agency is considered lower as Govt. Agency may obtain fund with lower interest cost from Multilaterals or through issuance of bond. Private sector generally considers cost of equity as 16% to 18%. The cost of Debt is perceived to be higher for private sector.
		<p>Calculation of Financial IRR and NPV</p>	<p>Overall financial viability of the project is measured through Financial IRR and NPV. It also measures the extent to which the project can bear the Capital expenditure.</p> <p>i. Financial IRR: Based on net free cash flow Stream for Project Horizon Period as estimated in step above, Financial IRR is calculated. Financial IRR indicates the return on investment. Financial IRR should be higher than cost of capital i.e. WACC. Such projects shall be considered financially viable.</p> <p>ii. Net Present Value (NPV): Discounted Cash Flow technique is used to estimate the NPV. As per Govt. agencies point of view, Discount rate used for above calculation should be social discount rate (i.e. 12% social cost of capital or (G-sec) rate). However, WACC can be adopted as discount rate as per private sector point of view. Positive NPV provides indication that revenue generated from the project over project horizon period is higher than the cost incurred on project.</p>
		<p>Calculation of Debt Service Coverage Ratio (DSCR)</p>	<ul style="list-style-type: none"> The Debt Service Coverage Ratio (DSCR) gives an indication of the capacity to repay the debt incurred for the project from operating surpluses. It is calculated as ratio of net cash flow to Principal and interest payment of debt. This ratio should be above 1.15, although lenders may insist on much higher DSCR for additional comfort. Cash reserves and other separate provisions may have to be made to ensure that the DSCR does not fall below the minimum.
		<p>Sensitivity Analysis</p>	<p>The range of sensitivity can be in the range of 10 to 15% of the critical factors such as (a) Cost overruns due to delay or other factors(b) Increase in Maintenance Cost (c) Reduction in traffic in case of toll road (c) Reduction in overall revenue from the project (d) Combination of reduction in revenue and increase in cost. Outcome in terms of parameters as specified above should be calculated under each of sensitivity test.</p>



9	Interpretation of Outcome	The subproject is evaluated to be financially viable if (1) FIRR is higher than WACC (2) NPV is positive and (3) DSCR is higher than 1.15.
10	Way Forward	<ul style="list-style-type: none"> • If sub project is evaluated to be financially viable then Private finance option could (PPP Option) be explored. • Even if project is evaluated commercially unviable then Viability Gap Funding Scheme (VGF) of Central Government is examined. The commercial viability of the project is assessed further under this scheme . If Project is evaluated to be commercially viable then Private Finance Option shall be undertaken /explored. • Project is evaluated to be commercially unviable in standalone as well as under VGF scheme then public finance option could be explored.

STEP 3: FINANCING OPTION

The decision of financing depends on nature of the returns on the Investment and its attractiveness to PPP option as determined based on financial viability of the project, resources available from ULB, State and Central Government and other sources. All possible financing options are specified in **Chapter 5** of this toolkit shall be explored. The Balance sheet based financing option is elaborated in Attachment 4.

AUDA –Sardar Patel Ring Road

Phase I - Public Financing
Project Cost of Phase I- Rs. 230 crore excluding the cost of the land acquisition
Means of Finance
 AUDA's internal funds (Rs 130 crore)
 Term loans from consortium of six nationalized banks. (Rs 100 crore)

Land Acquisition
 57 km through mechanism of TPS,
 Balance 19 km acquired under the Land Acquisition Act at a cost of Rs 3.2 crore

Phase II - Project Structuring on PPP

- Conceived as BOT project as the land acquisition risk was minimized due to ROW availability
- Existing two lane road allowed collection of toll prior to work commencement on phase II, thus allowing the project to begin to pay for itself.
- High traffic numbers allowed structuring of the project in a unique manner where the cost of Phase I was recovered.

Phase III - Land based financing
 Funding for Phase II can be raised as above through mechanism of (i) TPS by selling of the saleable plots for residential / commercial / industrial uses and /or (ii) from the sale of payment FSI.

• Project Cost and Means of Finance
• Cost of Phase III in Crores
 • Cost of six laning - 600
 • Cost of 8 fly overs/bridges - 400
 • Cost of service lanes 250
• Project Cost - 950

• Means of Finance
 • Total area of saleable plots 798 ha.
 • @ Rs. 15000 per Sq.mts.
• From Saleable plots 11970 Cr.
• Sale of payment FSI @ 25% of permissible FSI
 • Average Rs. 60 Cr. generated by AUDA per annum and Rs. 140 Cr. generated by AMC per annum- Total FSI per annum-200 Cr.

• ⁹ The overall share of the VGF is capped at 40% of the project cost as per Government policy in this regard which stipulates 20% funding by Government of India and 20% from State Government/Sponsoring Govt. Agency.



Attachment 3: Risk Analysis Framework for Urban Transport Project

Economic and financial analysis of infrastructure investment is also necessary from a risk management perspective. The risks associated with the Urban Transport project needs to be identified and appropriate mitigation measures should be adopted as it adversely impacts outcome of the Economic and Financial Viability Analysis.

The risks associated with project development and operation phases needs to be identified. The phases in project include (1) Inception Phase (2) Development Phase and (3) Operation Phase. An indicative set of risks associated with a project along with the likely impact and mitigation measures are presented in table below.

Risk	Description	Likely Impact	Possible Mitigation Measures
Inception Phase			
Planning Risk	The risk that project corridor/routes are identified incorrectly and sizing of Stations in terms of capacities inadequate/higher than required capacities planned.	<ul style="list-style-type: none"> The project may not provide likely socio economic benefits to the society. Reduced demand adversely affecting profitability 	Proper feasibility study and institutional due diligence.
Approval Risks / Commencement Risks	<ul style="list-style-type: none"> The risks that Project Authority could not obtain required approvals and land for the commencement. Approvals may include environment and statutory clearance such as state carriage permits and any other approval required for commencement. Land could not be acquired owing to inherent resistance or inadequate valuation incentives 	<ul style="list-style-type: none"> Delay in Project commencement. 	<ul style="list-style-type: none"> Proactive and consistence efforts through coordination between different Govt departments in obtaining approvals. Stakeholder management through market driven valuation/ incentive to private land owner.
Financial Closure Risk	The risk that finance could not be tied up or difficulties in raising debt for the project owing to less attractive revenue stream (i.e fare income and other revenue sources)	<ul style="list-style-type: none"> Delay in Project commencement. Additional funding cost. 	<ul style="list-style-type: none"> Making project bankable by making revenue stream stronger. This may be achieved through capturing the value from indirect beneficiaries of the project. Possible instruments are described in revenue section of Financial Viability Analysis section VI of this toolkit.



Risk	Description	Likely Impact	Possible Mitigation Measures
Development Phase			
Design Risks	The risk that the project will not be able to meet the performance and quality standards specified.	<ul style="list-style-type: none"> • Additional cost. • Redesigning • Delay in completion 	Proper feasibility study and institutional due diligence.
Cost Over Run	The risk that cost of the project exceeds the budget/estimates owing to delay in procurement, in faulty estimates or due to delay in implementation or scope creep.	<ul style="list-style-type: none"> • Adversely affect investment recovery/ financial returns. • Constraint to allocate resources to other social projects. 	<ul style="list-style-type: none"> • Institutional due diligence during cost estimation stage. • Periodic Reviews by lender/ engineer. • Provision for contingencies/ standby debt for financing overruns • Efficient Procurement Planning.
Time Over Run	The risk that actual completion period of the project exceeds the planned completion period owing to Delay in obtaining approvals, financial closure, land acquisition, improper stakeholder management, scope creep, utility shifting, etc.	<ul style="list-style-type: none"> • Cost increases. • Adversely affect investment recovery/ financial returns. 	<ul style="list-style-type: none"> • Planning and coordination for all clearances. • Making project bankable. • Market linked incentives for land acquisition. • Provision for scope creep • Appointment of PMC for supervision and monitoring of project progress.
Change of Law	<ul style="list-style-type: none"> • The risk that the legal framework which affects the project will be affected. • For example Government/Court issue directives to convert the diesel Buses to CNG when Project Implementing agency is in the verge of commissioning. OR • Directives for lower emission standards and due to which Rolling stock availability is limited. 	<ul style="list-style-type: none"> • Additional cost of compliance with new regulation. • Delay in implementation. • Adversely affect investment recovery/ financial returns. • Adversely affect project sustainability. 	<ul style="list-style-type: none"> • Sensitivity to assess robustness of project to anticipated changes in law. • Assessment and due diligence of regulatory environment.
Foreign Exchange Risk	<ul style="list-style-type: none"> • The risk that cost of import component increase beyond estimation due to currency fluctuation. 	<ul style="list-style-type: none"> • Increased Cost 	<ul style="list-style-type: none"> • Sensitize financials to currency risks. • Hedging with supplier or financial institutions.
Operation Phase			
Demand Risk	The risk that the demand for the Project may not actually translate when the project is implemented owing to overestimation of traffic or improper route/corridor planning.	<ul style="list-style-type: none"> • Reduce Revenue resulting into losses. This adversely affecting investment recovery and project sustainability. 	<ul style="list-style-type: none"> • Proper feasibility study and institutional due diligence. • Regular review to provide quality services, efforts in branding. • Efforts for making services delivery affordable and competitive.



Risk	Description	Likely Impact	Possible Mitigation Measures
Technology Risks	<p>The risk arising due to the technology (for the project components such as Rolling stock or ITMS or corridor/traction etc.) used in Urban Transport system is unreliable/untested/of poor quality.</p>	<ul style="list-style-type: none"> • Daily operation adversely affected. • Increased O&M cost and thus adversely affecting project sustainability. • Unreliable services affecting demand and leads to growth of personnel vehicles. 	<ul style="list-style-type: none"> • Use of Proven technology. • Clear output specifications. • Independent engineers report. • Guarantees by technology provider.
Revenue Risks	<p>The Risks that revenue of the project may be realising to amount envisaged during the project inception stage owing to following reasons.</p> <ul style="list-style-type: none"> • Inadequate regulatory mechanism for fare revision. • Inadequate fare policy. • Higher competition from Informal sector such as para transit. • Lower demand from real estate based income stream. • Resistance in mechanism to capture value from indirect beneficiaries as specified in Project financial Viability section IV of this toolkit. 	<ul style="list-style-type: none"> • Reduced Revenue resulting into losses. This adversely affecting investment recovery and project sustainability. 	<ul style="list-style-type: none"> • Introducing Fare Policy with mechanism for fare revision. • Stakeholder management in introducing mechanism to capture value from indirect beneficiaries. • Discouraging Para transit. • Introducing congestion charges.
Operating Risks	<p>The Risks that day to day operation is adversely affected owing to followings.</p> <ul style="list-style-type: none"> • Poor maintenance and driving standards owing to inadequate regulations or inadequate enforcement of rules and regulations. • Inefficient Operating practices/ Poor operation planning /scheduling 	<ul style="list-style-type: none"> • Lower Demand due to higher breakdowns due to poor maintenance, Irregular Frequencies. • Lower demand leads to growth in personnel vehicles and affecting suitability and profitability. • Increased in Pollution levels and congestion. 	<ul style="list-style-type: none"> • Preparing maintenance guideline, safety manual and operating plan. • Adequate monitoring / Supervision and enforcement of rules and regulations.
Consumable cost over run	<p>The risks that cost of spares and consumables such as fuel etc. increases beyond the estimates. Or increased cost due to spares/material not supplied in time.</p>	<ul style="list-style-type: none"> • Adversely affecting investment recovery and project sustainability. 	<ul style="list-style-type: none"> • Institutional due diligence for consumable cost estimates. • Inventory control mechanisms and long term supply tie ups.



Risk	Description	Likely Impact	Possible Mitigation Measures
Performance Risk	The risk that the private operator will not be able to adhere to the performance and quality standards that have been defined	<ul style="list-style-type: none"> Poor Services reduces demand. Reduced demand leads to losses and affecting profitability. 	<ul style="list-style-type: none"> Preparing performance parameters and service levels. Adequate monitoring / supervision and enforcement of rules and regulations.
Force Majeure Risk	An unanticipated act such as natural disaster, unnatural disasters like strikes/riots leading to damage to project assets, earthquake or flood etc. that delays or destroys the assets of the project, Change in law, expropriation, revoking license/permits, Civil disturbances/war	<ul style="list-style-type: none"> Additional Costs Reduced Revenue/ Losses. 	<ul style="list-style-type: none"> Obtaining Insurance to the extent possible. Provision for reserves. Appropriate Risk sharing mechanism between private and public player.
Dispute between parties	Non-compliance of contract provisions	<ul style="list-style-type: none"> Delay in service delivery. 	Establishment of contract management framework and formalization of responsibilities Dispute resolution mechanism Appropriate regulatory arrangements Termination of contract



Attachment 4: Balance sheet Based Analysis

The Balance sheet based analysis for a ULB/Project Authority is carried out to determine availability of fund from own source. This could help in determining (a) quantum of equity contribution from own sources for the project (b) Determination of whether ULB/Project Authority could meet project maintenance expense through its own fund and (c) Determining the Quantum of Debt servicing capability. This will help in determining the sustainability of the Project through own source when project returns are inadequate.

The analysis with regards to municipal finance comprises mainly preparation of Financial Operating Plan and Capital Investment Plan. Steps involved in preparation of both Financial Operating plan (FOP) and Capital Investment Plan (CIP) are specified in separate Toolkit published by MOUD for preparation of City Development Plan under JNNURM Scheme in detail. Steps for preparation of FOP and CIP are summarised hereunder.

No	Steps	Analysis Required
1	Situation Analysis/ Assessment of actual municipal accounts	<p>Actual municipal accounts for last five years shall be assessed with respect to followings.</p> <ul style="list-style-type: none"> • Revenue account comprise record of operating income and expense <ul style="list-style-type: none"> ○ Analysis involves : Revenue income by source, performance in terms of revenue collection and periodic revisions to the base and rates for user charges and municipal tax, non-tax revenues, revenue grants , Revenue expenditure trend comprising Admin, Establishment, Repair and Maintenance of fixed asset , Interest expense etc. ○ Above could be used in understanding the pattern of Revenue surplus/deficit for last five years. • Capital account comprises records of source and use of capital fund of Urban Local Bodies. <ul style="list-style-type: none"> ○ Analysis involves: Sources of capital income (i.e own source and Govt grants etc), Capital expenditure for improvement of delivery of civic services. ○ Above could be used in understanding the pattern of capital surplus/deficit for last five years. • Analysis of Revenue account and Capital account could be used to arrive at the Net Surplus/Deficit. • Efficiency parameters align with followings is evaluated in order to better understand the efficiency of ULB in different discipline. <ul style="list-style-type: none"> a) Resource Mobilisation (per capita revenue income, capital income and income from own sources, Growth in income from own sources, share of revenue from own sources to total revenue etc.). b) Expenditure Management (Per capita revenue and capital expense, growth in revenue and capital expenditure, share of establishment and O&M to the expenditures). c) Liability Management (O/S debt to own sources, Deb service coverage ratio, Share of debt service to the expenditures etc.) d) Operation management (operating ratio, tax coverage and collection efficiency, capital utilisation ratio etc).



No	Steps	Analysis Required
		<p>Above aspects present an overview of the performance of the ULB/ local bodies with respect to expenditures and presents areas of revenue enhancement potential.</p> <ul style="list-style-type: none"> Trend analysis: The past trends are also analyzed with respect to above parameters in order to look at the behaviour of each item of income and expenditure and to make adjustment in the forecast for items that are significant. The above analyses should be carried out for past five years, primarily to capture at least one cycle of revision to the rates as enshrined in the local acts. An average of the trend will be the basis for projections. Normally in the balance sheets of ULBs, there are possibilities that there will be an abnormal increase or decrease in an income or expenditure due to unforeseen income or expenditure. In such cases, the year where abnormality occurs should be left out for the purpose of calculating the average. This is also true with revenues as transfer from the State the revenue assignments and grants are not regular.
2	Assessment of gaps and needs in civic services	<ol style="list-style-type: none"> The service levels of basic services such as water supply, solid waste, street lights, sewerage, Urban Transport etc. are assessed and compared with the sectoral service levels published by the Government. Based on above, the gaps and the development needs and priorities are identified in the form of sector strategies. This should also include stakeholder priorities. Sector strategies would also involve identification of sectoral projects. All such projects could be undertaken to improve/meet service levels defined or fixed by Govt. Authorities.
3	Assessment of Capital Investment Needs and Sources of Finance.	<p>A. Prioritising of Projects</p> <ol style="list-style-type: none"> Step 2 above helps in generating list of projects that could be undertaken. Prioritizing of projects is carried out based on (i) stakeholder discussion and (ii) Assessment of urgent need of improvements in service levels is needed. <p>B. Assessment of Capital Cost of the Projects and Phasing of Investments</p> <ol style="list-style-type: none"> Capital cost of the each prioritised project is estimated. Phasing of Capital Investment is to be carried out. <p>C. Assessment of O&M cost for the prioritized project</p> <ol style="list-style-type: none"> Assessment for the O&M cost of prioritized projects could be carried out for next five years.
4	Financial forecast – through a financial operating plan	<p>A. Projections based on assessment of actual accounts of ULB. For existing level of services</p> <p>Based on assessment of actual and trend analysis as specified in step 1, the projections of revenue and expenditure for existing level of services is carried out.</p> <ol style="list-style-type: none"> Projection of yearly revenue (for both capital and revenue account) under various heads and alternative assumptions. This also includes finding the alternative source of revenue/ Reforms goals for improving Coverage and collection for tax and not tax revenue;



No	Steps	Analysis Required
		<p>b. Projection of expenditure (for both capital and revenue account) for existing levels of services;</p> <p>c. Estimation of annual debt servicing burden.</p> <p>B. Projections of Capital Investment need and O&M Phasing for capital expenditure and O&M is to be projected as specified in step no 3.</p> <p>a. Estimation of capital expenditure for providing infrastructure at different service levels as specified in step 3.</p> <p>b. Estimation of additional O & M cost due to the new investments as specified in step no 3.</p> <p>C. Identification of source of finance for required Capital expenditure for projects specified in step B above.</p> <p>a) Assessment of Capital Grants available for sectoral projects from Central and State Governments under specific schemes (e.g. JNNURM etc.).</p> <p>b) Assessment of any soft loans available from State or Central Government.</p> <p>c) Contribution from Own source/Equity: Quantum of Contribution of equity can be decided based on assessment of funds available from own sources.</p> <p>d) Debt from Commercial Banks, Mutilators, issuance of Bonds etc. Quantum of debt could be decided based on debt servicing capacity from own sources. Also comparison of Interest rates and other charges levied by different institutions shall be carried out and institutions offering best competitive rates shall be decided.</p> <p>D. Projection of surplus/deficit and debt services capacity</p> <p>a) Projection of revenue surplus/deficit based on point A above.</p> <p>b) Projection of Capita account surplus/deficit based on points A, B and C above.</p> <p>c) Projection of Total Surplus/Deficit (i.e. Total Revenue- Total Expenditure).</p> <p>d) Projection of ratio of O&M of Capital account to Total Revenue surplus</p> <p>e) Projection of Debt Servicing capacity ((Total debt + Interest)/Total Revenue Income)</p> <p>E. Scenario analysis</p> <p>This financial analysis indicates the capacity of the entity to sustain investments by way of borrowing as well as additional O&M. Typical iteration of the financial and operating plan is for following four scenarios shall be carried out and parameters as specified in step D above could be estimated</p> <p>a) No investments and no revenue revision to taxes and rates</p> <p>b) Full investment and no revision to taxes and rates</p> <p>c) Full investments and increased revision to rates and taxes</p> <p>d) Sustainable investment and increased revision to rates and taxes.</p>
5	Interpretations of Outcome of Point D and E of step 4	<p>a) TE/TR (Total Expenditure/Total Income) should be less than 1.</p> <p>b) DS/TR (Debt-Service/Total Revenue Income) should be less than or equal to 30% of revenue income.</p> <p>c) Ratio of O&M of Capital account to Total Revenue surplus is more than 1.</p> <p>Balance sheet based funding is desirable in above outcome. Considering the above outcome Quantum of debt and contribution from own sources could be decided.</p>



Attachment 5: Overview of Case Studies

Toll Bridge	City By-Pass	Multi Modal Transport Terminal	Metro Rail	Toll Bridge	Metro Rail Airport Link Delhi	MTR – Hong Kong Metro
Karur Municipality	Madurai Corporation	Govt. of National Capital Territory New Delhi	Government of Tamil Nadu and Government of India	NOIDA (UP) -GNTCD	Termini New Delhi station- Dwarka Sector 21 -DMRC	Mass Transit Railway (MTR) Corporation
Features						
<ul style="list-style-type: none"> Bridge Length- 700 m. 2.46 m clearance¹⁰ Width-17.70 m Carriageway- 13.60mt. Spans 25 	<ul style="list-style-type: none"> Length- 27.2 kms between Kanyakumari Road and Melur Road (2 lane); 2 Railway Over Bridges (ROB) High level bridge across the Vaigai River. 	<ul style="list-style-type: none"> Connectivity to Rail and Metro Rail Stations; Space for proposed real estate; Passenger amenities Infrastructure facilities such as power, water, sewer etc. Operational facilities Storm water drainage system. 	<ul style="list-style-type: none"> Distance- 45 kms Standard Gauge (1435mm) Corridor-1 Airport to Washermentpet 23.085 km Corridor-2 Fort - Anna Nagar- Ring road- St. Thomas Mount 21.96 kms 	<ul style="list-style-type: none"> Length- 552.5 m 8 lanes with a capacity of 222,000 vehicles per day. 	<ul style="list-style-type: none"> 6 Stations Daily ridership ~20,000 Character At-grade, underground, and elevated Rolling stock CAF Line length 22.7 km Track gauge standard gauge Electrification 25 kV, 50 Hz AC through overhead catenary Operating speed 132 km/h 	210 km rail- 155 stations, 86 railway stations and 69 light rail stops.
Type of Project						
Toll Bridge	City Bypass	Transport Terminal	Metro Railway System	Toll Bridge	Metro railway	Metro Railway
Implementation Arrangements						
BOT	Local Body- Toll collection auctioned	JV Managed design and implementation	Chennai Metro Rail Corporation, an SPV formed for implementation ¹¹	DBFOT	Concession- Operation Owner Delhi Airport Metro Express Pvt. Ltd. Operator(s) Reliance Infrastructure and CAF	JV between Govt. and Shareholding Public
Concession Period						
14 Years	Annual leasing of toll collection	Lease of retail space.	Lease of commercial space.	30 years or 20% return on ¹² investments, whichever is earlier	30 years	Rail Transport Policy of Govt. of Hong Kong
Planning						
ULB and TNUIFSL	Madurai Corporation and TNUIFSL	GNTCD	CMRL	NTBCL	DMRC	MTR Corp.
Design						
BoT Operator	Highways Department	DIMTS- A Joint venture between GNTCD and IDFC- Through consultants	CMRL	NTBCL	DMRC	MTR Corp.
Implementation						

¹⁰ between the maximum flood level at site and bottom of the deck

¹¹ With equal equity from government of India and state government

¹² Net of taxes

Toll Bridge	City By-Pass	Multi Modal Transport Terminal	Metro Rail	Toll Bridge	Metro Rail Airport Link Delhi	MTR – Hong Kong Metro
BoT Operator	Highways Department as deposit work from Madurai Corporation	DIMTS- A Joint venture between GNTCD and IDFC	CMRL	NTBCL- EPC contract Mitsui Marubeni Corp. Japan	DMRC- Infrastructure and Concessionaire-rolling stock	MTR Corp. Kowloon-Canton Railway Corporation (KCRC) is operated by MTRC under a 50-year service concession
Asset Management						
BoT Operator	Madurai Corporation	Private Operator (to be procured)	CMRL	Inter toll Management Services, BV Netherlands Supply of equipment's O &M and Toll collection.	Concessionaire	MTR Corp. supported by Manufacturers' Asset Management units.
Project Cost Rs Crore						
15.26	34.50	201.6	14700	408	5750	HK \$ 80 b
Results of Economic Analysis						
12.6%	18%	13.2 %	16.22 % (project justified on the basis of EIRR)			
FIRR %						
20.69 % for a minimum of 14 years concession ¹³ Tariff revision at 8% per annum. Payback period 4.76 yrs	20.7%, Payback 5.5 years.	10.78	Without taxes is 3.20% and with central taxes is 2.69%,	Minimum of 20% return on investments ¹⁴ .	Low	
Major benefits						
Savings in time of around 30 minutes; Distance of 12 Kms.	35% traffic will not enter city-ease of congestion. 40% reduction in travel time.	Improved service levels- better parking/ throughput	Improved travel time, congestion benefits	Savings in time and Distance.	Travel time to Airport from Delhi	Travel time reduction, ease in congestion on roads.
Debt Equity						
Promoters' contribution- 34% Debt-equity ratio- 1:1.90 Average DSCR- 2.13	90% Debt	Debt- 1350 Own fund- 666 Ratio-1:2.03	1.40:1 Equity/Subordinate Debt – Rs 6100crs (GOI/GOTN) Loan – Rs 8500 crs (JICA/Financial Institution)	Debt : 286 Equity: 122 1:2.3	0.53 : 1 Equity – Rs 850 crs (Reliance/CAF) Delhi Metro Rail (Equity/Quasi Equity)– Rs 2900 crs (Civil works) Loan – Rs 2000 crs	Diversify risks through mix of fixed and floating rate debt, Foreign currency debt, Balanced spread of loan maturities and use of different Types of instruments.
Can own Sources Fund the projects						
No	No	No	No	No	No	Not initially.
Sources of funding						
Equity and Debt	Loans from Tamil Nadu Urban Development Fund The loan from TNUDF	GNTCD Equity and Loan from NCRPB	<ul style="list-style-type: none"> Equity by Gol 2203.00 Equity by GoTN 2203.00 SD by Gol 1469.00 SD by GoTN 220.00 	Equity and Debt in the form of Deep Discount Bonds, backed out takeout	DMRC funded Rs 2900 crores (by executing civil works, etc.) Concessionaire Rs 2850 crores)	Public Sector Funding replaced by shareholders equity later

¹³ The base for the bid was the concession period, assuming at least a 20% return on investments.

¹⁴ In the event of a shortfall NTBCL also had the rights to develop land acquired as part of the project



Toll Bridge	City By-Pass	Multi Modal Transport Terminal	Metro Rail	Toll Bridge	Metro Rail Airport Link Delhi	MTR – Hong Kong Metro
	was substituted by a Market borrowing on completion of construction 15.		<ul style="list-style-type: none"> • JBIC loan @ 1.30% p.a./ • market borrowing @12% p.a. 8590.00 	financing by IDFC and IL&FS		
Terms of financing						
Cost of capital 16.23% 15-20 years	Cost of capital 16.23%, 15-20 years	15 Years, 9.5% ROI	<ul style="list-style-type: none"> • JBIC loan @ 1.30% p.a./ • market borrowing @12% p.a 	16% per annum ¹⁶		
Does the Act/ concession provide for powers to levy and vary?						
As the Act had no provision of levy of toll by Local Authorities, enabling provision was by way of Ordinance.	By virtue of provision under the ordinance,	Yes.	Yes The Revenue for Chennai metro mainly consists of fare box collection and other incomes from property development, advertisement, parking etc. Estimated income to CMRL from property development is Rs.248 crores.	The concession includes revision of toll an annual basis decided by the Fare Review committee. Fare increase based on consumer price index for non manual workers.	Concession fee paid to DMRC.	Full rights to set fares and develop property on land owned by it along the right of way and at stations and terminals
results of financial analysis						
The financial operating Plan ¹⁷ incorporating the proposed projects and toll indicated sustainability of the proposed investments..	The financial operating Plans ¹⁸ incorporating the proposed projects and toll indicated sustainability of the proposed investments..	The projects viability is dependent on real Estate than parking revenues. Real estate income: 54% Hotel income: 25% Parking and advertisement charges: 21%	The projects justification is on economic parameters than financial given the service nature of this facility.			
Key factors in deciding on Self financing versus loan or alternate forms of financing or implementation						
However, the local authority was of the opinion that if the project could be self financing then the option would be to implement on a	It was decided to implement the project by the local authority.		Source availability; Legal provisions; Financial Viability			

¹⁵ Madurai issued a Bond for Rs 29 Crores to substitute costly loan from TNUDF

¹⁶ Term Loans from institutions –Rs.235.8 Cr; Deep Discount Bonds Rs 50 Cr. Issued by NTBCL.

¹⁷ A medium term forecast of municipal finances assuming revenue enhancement and impact of proposed investments in terms of debt and O&M under alternate revenue performance assessment. This systems of assessment and decision making has been in vogue in Tamil Nadu since 1988- launched as part of requirements to access the Municipal Urban Development Fund (Presently TNUDF) under the Tamil Nadu Urban Development Project I

¹⁸ A medium term forecast of municipal finances assuming revenue enhancement and impact of proposed investments in terms of debt and O&M under alternate revenue performance assessment. This systems of assessment and decision making has been in vogue in Tamil Nadu since 1988- launched as part of requirements to access the Municipal Urban Development Fund (Presently TNUDF) under the Tamil Nadu Urban Development Project I



Toll Bridge	City By-Pass	Multi Modal Transport Terminal	Metro Rail	Toll Bridge	Metro Rail Airport Link Delhi	MTR – Hong Kong Metro
private participation mode than burden the local authority as they could finance other service needs based on available Resources						
Government Sources: Is it in the form of grants / Equity-? In case of grants,						
Grants were made available to finance resettlement of a School and a few households			Equity and subordinate debt.			
Capital / Revenue grant, or both						
Capital Grant			Capital			
In case of equity, Form of equity:- Cash/ Land (the value of which will be the equity) / Formation of SPV with Govt. equity?						
			Cash and Land			In the form of land development rights over key Govt land and development rights over ROW.
In case of loans, (Government / Multilateral loans)						
		ADB line through NCRPB	JICA loans		India Infrastructure Finance Company (IIFC) (UK) ¹⁹ .	
Guarantees by Govt., if any, and quantum - Govt. order for issuing guarantees for multilateral loans						
	Gol Guaranteed line of credit to TNUDF	Not applicable, Guaranteed by Gol	Gol Guaranteed			
Security in the event of default.						
Step in rights to lenders	State Finance Commission Transfers	State Guarantee	GOI/GoTN Guarantees	Step in rights to lenders		
Source of routing funds - involvement of Government departments / Financial Institutions						
			Agreement between CMRL and DMRC; Gol / GoTN - JBIC			
Agreement on Mode of implementation / Procurement / Loan agreement with donor agency						
Existing Urban fund is the source	Existing Urban fund is the source	Existing facility (NCRPB) is the source				No such fund is known to have aided MTR

¹⁹ The company signed the loan agreement with the lenders which include lead manager Axis Bank, IIFC (UK), Bank of India, Canara bank, Central Bank of India, Andhra Bank, Allahabad Bank, Dena Bank, Punjab & Sind Bank and Uco Bank.



Attachment 6: Case Study of Anand Vihar Bus Terminal

APPRAISAL NOTE	1
STATE	NATIONAL CAPITAL TERRITORY OF DELHI
PROJECT	REDEVELOPMENT OF MULTI MODAL TRANSIT CENTRE (MMTC) AT ANAND VIHAR
AGENCY	DEPARTMENT OF TRANSPORT, DELHI AND DELHI INTEGRATED MULTI MODAL TRANSIT SYSTEM (DIMTS)
SAFEGUARDS CATEGORY	
ENVIRONMENT	ADB B, NCRPB E2, in line with the Draft ESMS of NCRPB.
SOCIAL	S-2 in line with the Draft ESMS of NCRPB.

Overview: This appraisal has been carried out based on review of DPR provided by the DIMTS, discussions with their officials and site visits. This appraisal is based on the requirements of NCRPB in its current form and the requirements as part of the proposed ADB project. This includes an Environmental Examination and Social Safeguards review. The social surveys as required for preparation of Short/ Full resettlement plans (as per Safeguards) are in progress and will be submitted to NCRPB. The other submissions in terms of Initial Environmental Examination will also be presented to NCRPB²⁰.

Review of the DPR was of the view that design and technical standards largely comply with the existing requirement. The Traffic forecast has also been reviewed. These primarily related to the sizing of the facilities, pavement related issues, basis of cost, procurement arrangements and traffic related queries. On the Financial side, the basis for the demand and sizing of facilities has been a market study by DIMTS and the risks factored as part of the current analysis is linked more on realization than assessment of the need for a facility, as there has been considerable review and discussions at the highest level of the concept. The point of the appraisal team is that while the addition of hotel and limited real estate makes it a cost recovery project, given the associated risks, this could be treated as a service project as additions such as the hotel will be on private participation basis.

The recommendations are conditional and the modifications suggested as well as additional documentation will need to be provided by the agency to the NCRPB.

A. General Characters

1. Rationale for subproject (Demand analysis, quantified beneficiaries etc);

To de-congest the Delhi road network, and to provide an integrated transit solution, Government of NCT of Delhi has decided to provide ISBT on the outskirts of Delhi with a range of modes (local bus, metro, railways, auto

²⁰ NCRPB- Appraisal Notes



rickshaws, etc.) connecting these with rest of the Delhi. At present an Interstate bus terminal (ISBT) is functioning at Anand Vihar, which is focusing on the requirement of interstate bus traffic and associated transport needs. The local buses also operate from the terminal providing access to the ISBT from various parts of the city. There is a need for improving the transport infrastructure to keep pace with the rapid development and to achieve this goal, Government of NCT of Delhi has proposed to develop/redevelop/upgrade Inter State Bus Terminals (ISBTs) in Delhi and the same is also to act as Multi Modal Transit Center (MMTC). It is proposed to upgrade the ISBT at Anand Vihar to a MMTC as it provides an ideal location with Anand Vihar metro rail station and Anand Vihar railway station located next to each other. A proper integration of all four modes of public transport which is servicing from Anand Vihar viz. Interstate bus, Local bus, Rail and Delhi Metro is essential to achieve objective to have an integrated multi-modal network of mass transit systems.

The MMTC planned at Anand Vihar will facilitate seamless integration of the inter-city and intra city transit options in the area and largely benefit inter modal transfer by transit passengers with reduced transfer times and improved comfort. This will also have significant impact on the utilization of transit services as transfer between local bus to metro rail and interstate bus/train services become very convenient. The metro station is under construction and will be operational in 2010. Also the Anand Vihar railway terminal will become a main boarding/ alighting station for trains towards ---. These two developments will have major impact on the transfers from/to local buses at Anand Vihar and a convenient transfer will have a positive impact on the utilization of the mode combination thus reducing personal modes for access to the metro and train services. Also this will have a positive effect on the metro rail ridership thus further reducing the traffic on the road. The single ticket scheme being developed for bus and metro rail use will further help in this aspect. The passengers will also benefit from the pedestrian friendly design for the MMTC which will improve the safety of passengers and improved environmental comfort. The proposed MMTC will thus provide significant community benefits and will have a positive impact on the transport movement in the area.

2. Project Technical Aspects

Scope and components

The development of Anand Vihar ISBT into a Multi Model Transit Centre (MMTC) will involve the following:

- Redevelop the existing ISBT as Multi Modal Transit Centre (MMTC).
- Facilitate an effective multi-modal changeover by integrating the existing ISBT with the Anand Vihar Gate Metro station and Railway Station.
- Provide a state-of-the-art Multi Modal Transit Centre that is user friendly, catering to varied passengers' comfort, pedestrian-friendly, ecologically sustainable, handicapped-friendly, and aided with facilities as per best international practices.



Broad project components are set out below.

<p>Inter-State Bus Terminal (State and Private)</p> <ul style="list-style-type: none"> • Bus Bays • Boarding / Aligning Platforms • Washing/Workshops • Booking / Ticketing Counters <p>Local Bus Terminal</p> <ul style="list-style-type: none"> • Bus Bays • Boarding / Aligning Platforms <p>Administration/ Terminal Office</p> <ul style="list-style-type: none"> • ISBT Administration • CCTV Security Room • Maintenance Office • Office For DTC and Roadways <p>Other Offices</p> <ul style="list-style-type: none"> • DTTDC, Tour Operators <p>Hotel</p>	<p>Pedestrian Connectivity with</p> <ul style="list-style-type: none"> • Metro • Railway station <p>Connectivity</p> <ul style="list-style-type: none"> • Airport • Railway station <p>Passengers Facilities</p> <ul style="list-style-type: none"> • Dormitories • Waiting Hall • Toilet • Cloak Room • Restaurant/ Cafeteria <p>Parking Facility</p> <ul style="list-style-type: none"> • Auto, taxi, rickshaw, etc. • Personal Vehicles
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3. Technical description and analysis;

The plan for MMTC is developed considering the basic requirement of MMTC such as conflict free traffic circulation, easy pedestrian movement, minimum disturbance to the operation of the present ISBT, facilities for passengers and crews, park and drop facilities, energy efficient and environment friendly design etc. Various component of the concept plan is discussed briefly in following sub sections.

Design Standards and specification followed in the DPR report have been taken from the Time Saver Standards Space Requirement and Neufert Architect’s Data handbook. Indian Standard specification is followed for the design of various structural elements. Design also considered special requirement of seismic zone.

Demand Assessment: The demand for bus ways, pedestrian facilities and parking were estimated based on detailed traffic surveys at the terminal and projected requirements. The provision made for these based on estimated demand are 34 bus bays for local buses, 127 bus bays for inter city buses (30 for alighting and 97 for boarding), 46 bus bays for layover of intercity buses and 473 car parking spaces. A summary of the traffic study and foot-falls for Anand Vihar MMTC is given below:



S. No:	Service Provider	Number of Trips (as Given)	Observed on April 13, 2008	Observed on April 15, 2008
Interstate buses				
1	UP Roadways	750	893	967
2	Uttarakhand	110	78	81
3	DTC (Interstate)	90	55	62
4	Punjab	-	0	1
5	Other Pvt	-	6	7
Total Intercity Buses		950	1032	1118
Local Buses				
6	DTC (Local)	500	668	698
7	Pvt (on permit of STA)	1000	755	888
8	Pvt (Garh route, on permit of STA)	35	10	11
Total Intercity buses		1535	1433	1597
Total Buses		2485	2465	2715

Occupancy of buses:

The vehicle data observed at various ISBTs has been analyzed for average occupancy of buses. The following table summarizes the average occupancies observed at the Anand Vihar ISBT and estimates of footfalls. This footfall is the basis for design of retail space in the MMTC.

Particulars	Occupancy	Number of buses	Foot-fall
Anand Vihar	17.4	2715	94279

Commercial Space: Based on the above, the project includes development of commercial and office spaces which will be leased out and generate revenue for the operation of MMTC. The space to be developed include 3500 sq.ft of kiosk area, 58,000 sq. ft of retail area and 107,600 sq.ft of office space.

Layout Plan: Layout plan effectively utilizes the available space and located the main ISBT building with bus parking bays located on southern side of the plot which gives the best connectivity from the ISBT to Metro station and Anand Vihar Railway Station. The commercial site earmarked for ISBT Hotel is segregated from the MMTC and provided separate entry. Auto and Taxi stands are provided on the main road with separate entry.

Traffic Circulation: Traffic circulation of the ISBT designed with conflict free unidirectional movement. Separate entry is provided for Railway station, city buses and interstate buses on the left side of the layout. Exit for all is provided on the right side and hence avoiding the entry and exit conflict and ensure smooth flow of traffic inside.

Separate parking space for taxi and auto is provided with unidirectional circulation. The suggested circulation ensures searching the all the parking lots in single circulation.



Grade separated U turn movement facilities are planned on main road on both ends of the MMTC and this will ensure smooth exit and entry of vehicles. The construction of this grade separated U turn facilities is not included as part of MMTC development program but is planned to be constructed by Delhi PWD. Construction of this facility on time needs to be ensured for the smooth functioning of the MMTC.

Pedestrian Network: Integrated pedestrian network is designed to ensure safe and efficient movement of pedestrian. The proposed pedestrian network includes foot over bridges, escalators, lift etc.

Land Distribution: Area statement of Anand Vihar development is given in Table below:

	Description	Unit	Detail
A	Land for ISBT owned by Transport Dept of GNCTD	Hectare	10.2
B	Land area under Metro	Hectare	1
C	Balance are for ISBT (A-B)	Hectare	9.2
D	Ground Coverage 25% of (C) AS per DDA Notification	Hectare	2.273
E	Permissible (FAR = 100)	SqM	92000
F	FAR for ISBT including operational Structures 70% of D	SqM	64400
G	FAR for Hotel 30% of D	SqM	27600
Proposed Covered Area Statement for ISBT			
1	Basement	Sq.M	54241.3
2	Floors (Ground and I to 8)	SqM	34787
3	Achieved Ground Coverage (10515.321/64400*100) Excluding basement	%	16.33
4	Achieved FAR (34787/64400*100)	%	54
5	Total Covered Area including Basement and MUMTY	SqM	89455.64 (138.9%)

Road Geometry and Cross section: The entry and exit to terminal is provided from Gazipur – Dilshad Garden Road which is a divided road. Grade separated U-turn facilities are planned for both end of the MMTC. However the construction of this arrangement is not included in the MMTC contract. The turning radius provided varies from 15m to 42m and width of the of the circulation area between the bays ranges from 18 to 20m. The geometry provided satisfies the minimum turning radius for buses.

Viability and sustainability: The project is designed as a public facility cum commercial venture to generate sufficient revenues to recover the investment and sustain the operation and maintenance in the long run. Efficient operation and timely maintenance is essential for achieving the long term objective. The project is designed to generate revenue through payments from the Hotel provision and substantial rental income. The organizational set up is that of a public-private partnership that will ensure efficient operation and management of the MMTC and is supported by revenue stream to ensure long term sustainability.



4. Sub-project selection criteria:

The proposed project is an important component of the integrated multi-modal network of mass transit system being developed by the GNTCD to meet the growing travel demand and is identified as one of the priority projects. This fits within the overall transport integration and development priority of Delhi. The economic and financial analysis has indicated that the project is justified in social cost benefit analysis and financially sustainable. Thus the sub project meets all the criteria of a priority transit investment.

5. Cost estimates and financing plan;

Rs in million

	Base cost			Cost including Contingency		
	2010	2011	Total	2010	2011	Total
I. Investment Costs						
1. Civil Works						
Civil Works	198.29	793.17	991.46	218.12	872.48	1090.60
Additional Civil Works	27.81	111.24	139.05	30.59	122.37	152.96
Plumbing Work	9.24	36.98	46.22	10.17	40.67	50.84
Development of Site	6.81	27.25	34.06	7.50	29.97	37.47
Subtotal Civil Works	242.15	988.64	1,210.79	266.38	1065.49	1331.87
2. Electrical Works						
Electrical Works at site	31.20	124.78	155.98	34.32	137.26	171.58
Sub-station	11.68	46.72	58.40	12.85	51.39	64.24
HVAC Works	17.00	68.00	85.00	18.70	74.80	93.50
Subtotal Electrical Works	59.88	239.50	299.38	65.87	263.45	329.32
3. Others						
Fire Fighting	7.67	30.65	38.32	8.43	33.72	42.15
Elevators and Escalators	11.86	47.45	59.31	13.05	52.19	65.24
Miscellaneous inc S. Steel Works,	10.00	40.00	50.00	11.00	44.00	55.00
Subtotal Others	29.53	118.10	147.63	32.48	129.91	162.39
4. Design & Construction mgt						
	23.20	92.80	116.00	25.52	102.08	127.60
Total (excluding IDC)	354.76	1419.04	1773.80	390.25	1560.93	1951.18

6. Environmental assessment

There are no major environmental concerns in this project. The project location is not ecologically sensitive. There are no irreversible construction-related environmental impacts.

- i. The MMTTC at Anand Vihar requires clearance under the Environmental Protection Act, 1986 from the Delhi Pollution Control Committee.



- ii. Clearance for removal of limited number of trees will also be required from the state forest department.

According to the Draft ESMS prepared for NCRPB, this project is categorized under the E2 category. As this project is being proposed for funding under the ADB line of credit, their environmental requirements have to be met. As there are no major environmental concerns and only limited, reversible environmental impacts, this will be classified as a Category B project.

The ADB requirements for a Category B project include the preparation of the Initial Environmental Examination (IEE) report and an Environmental Management Plan (EMP). These two documents are expected to be completed by end-November 2009. When the EMP is ready, the project proponent / IA should be advised to include the EMP as a part of the bid / contract documents in order to manage the construction-related environmental impacts.

NCRPB needs to advise the project proponent / IA that they should (i) obtain the forest clearance prior to project commencement, (ii) include the EMP as a part of the bid / contract documents and (iii) implement the EMP during the construction & operational phases. These should be included as specific loan conditions. The clearance process is underway and is to be completed by November 15, 2009. Once NCRPB's ESMS is established, the procedures for monitoring and reporting on this project will have to be followed.

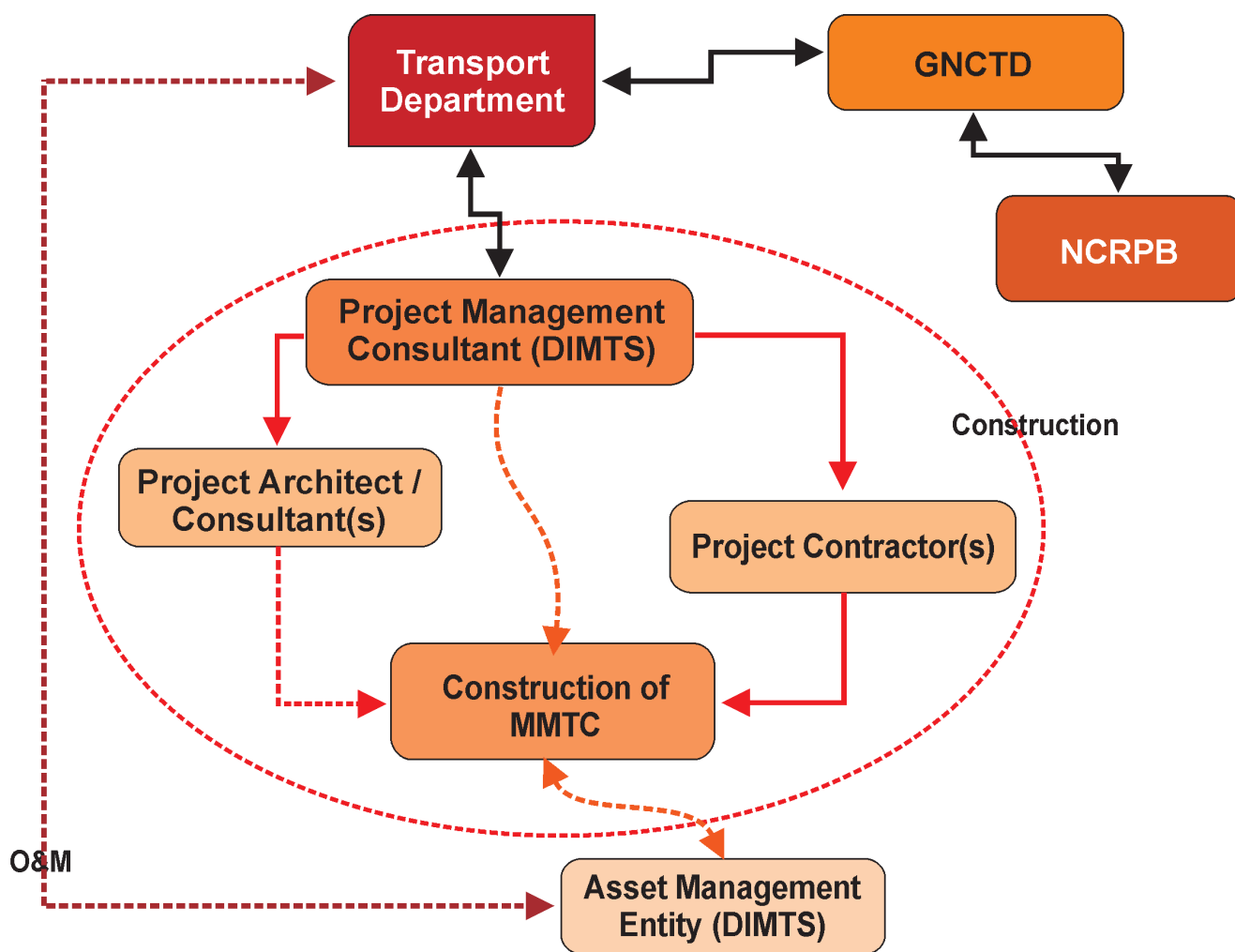
7. Social

Consultations, census survey and socio-economic survey with the vendors and public call facility (PCF) operators have been completed. Overall there are vendors and PCF booths in the ISBT premises who are likely to face disruption to their business during construction. The construction will be carried out in phases to avoid disruption to business. The temporary arrangements proposed during construction period will ensure that all vendors and PCF booth operators will be able to continue their business activity for the remaining license period.

B. Institutional

Institutional: The facility is owned by Government of National Capital Territory of Delhi (GNCTD) and the responsibility of terminals is with the Transport Department. The GNTCD (transport department) has an MoU with IDFC to support them in planning, design, implementation of transport related interventions through an entity (joint venture) called DIMTS. DIMTS is the transaction adviser to GNTCD.

Implementation structure: The proposed structure for implementation of the project is as follows:



Revenue sharing agreement of GNCTD with DIMTS: After deducting a notional 120 % of O&M costs (i.e. providing additional buffer of 20% over estimated (O&M costs) from the revenue (excluding income from hotel franchisee), 40% of the resulting balance is paid to AME as additional payment.

8. Project Operation and Maintenance

A public-private partnership model is established for the operation and maintenance of the MMTC. The Asset Management Entity responsible for the project operation and maintenance will be DIMTS, a Special Purpose Vehicle (SPV) set up by Government of National Capital Territory of Delhi (GNCTD) with equal equity participation from Infrastructure Development Finance Company (IDFC). DIMTS has the specific mandate to plan, prepare, design and implement projects related to development of a multi-modal transportation network including operation and maintenance of such assets and allied activities.

With regard to Anand Vihar MMTC, it is expected that DIMTS (as the Asset Management Entity or AME) would be responsible for



- (1) Establishing efficient operation and maintenance practices for infrastructure created under this project.
- (2) Undertaking asset management measures to preserve the life of the assets created under this project including
 - a. Operation of the transport area of the MMTC and
 - b. Maintenance and management of all other facilities created under this project.

The project is designed with a revenue stream sufficient to meet the operation and maintenance costs and an entity to oversee the operation and maintenance that will ensure sustainability of the proposed project in providing the desired service at the desired level of service. The contract for O&M has not been signed and will need to reflect the performance criteria.

C. Project Economics

An economic analysis of the proposed MMTC at Anand Vihar has been undertaken to determine its economic viability.

The major economic benefits comprise

- (i) incremental revenues from bus terminal operation,
- (ii) incremental revenues from shops and office space rentals,
- (iii) incremental revenues from advertising space rentals,
- (iv) incremental revenues from parking provision,
- (v) time savings for passengers,
- (vi) improved circulation with well-maintained roads compared to deteriorated roads at present, and
- (vii) Additional employment.

Other benefits are envisaged to accrue but have not been quantified. These include transit passenger satisfaction with significant environmental improvement; environment and health benefits due to reduced emissions; reduce the personal mode of traffic, to a certain extent, in and around Anand Vihar with more people using local buses to access metro rail than personal modes or auto rickshaw; improved ridership on Metrorail with better connectivity etc.

Based on the above considerations, the economic cost and benefit streams over the analysis period have been worked out. A 25 year analysis period has been used. To be acceptable for implementation, the proposed investments have to result in an EIRR of at least equal to the opportunity cost of capital, which is set at 10 percent considering loan terms of NCRPB. NPV's are calculated using opportunity cost of capital as the discount rate. The results of economic analysis for the project Anand Vihar MMTC are summarized in Table below.



Project	Net Present Value (NPV) (Million INR)	Net Present Value by Cost Ratio	Internal Rate of Return (EIRR) (%)
Anand Vihar MMTC	399.9	0.25	13.2

The economic analysis indicates a robust economic rate of return which is the acceptable rate of return of 12%.

The cost and benefit estimates involve uncertainties. Sensitivity analysis has been carried out by changing cost and benefit estimates. The results of the sensitivity analysis are given in Table below. The results indicate that with significant adverse variation in benefits, the rate of return falls below 10%. The analysis does include the value of the overall environmental improvement and the wider impact of an integrated urban multi-modal terminal due to the difficulty in quantifying the benefits but is considered to be large enough to compensate for any adverse variation in benefit estimates included and thus the proposed MMTC at Anand Vihar is justified in social cost benefit terms.

Project	Scenario				
	Base case	Cost increase by 15%	Benefit decrease by 15%	Cost increase by 15% & Benefit decrease by 15%	Construction delayed by one year
	EIRR (%)	EIRR (%)	EIRR (%)	EIRR (%)	EIRR (%)
Anand Vihar MMTC	13.2	11.4	9.8	8.2	12.4

D. Project Financial Analysis

- I. The estimated project cost of the proposed redevelopment of Anand Vihar MMTC is as below:

Particulars	Amount (Rs in mn)
Civil works	991.46
Additional Civil Works	139.05
Plumbing works	46.22
Electrical works	155.98



Particulars	Amount (Rs in mn)
Sub-station	58.40
Fire Fighting	38.32
HVAC works	85.00
Development site	34.06
Elevators & Escalators	59.31
Miscellaneous incl. Steel Works, strutting/shoring/dewatering etc.	50.00
Total construction cost	1657.80
Design & Construction management	116.00
Contingency @10%	177.38
Total Construction Cost	1951.18
Interest during Construction	65.34
Total Project Cost	2016.52

- II. **Construction Schedule:** The construction activity has been envisaged over a period of fifteen months. Construction is tentatively assumed to commence in January 2010 and the redeveloped structure is scheduled to start operating from April, 2011. The table below gives the capex programme.

Particulars	Deadline
Project start date	January 01, 2010
Construction Start	January 01, 2010
Construction Period	15
Construction End	March 31, 2011
Commencement of Operations	April 1, 2011
Capex phasing - Year 1 (3 months)	20%
Capex phasing - Year 2 (12 months)	80%

- III. **The assumptions relating to means of finance for the project are described below:**

Equity: GNCTD is expected to invest equity of Rs 340 million. GNCTD is also expected to provide a grant equal to upfront payment received from bidding out of hotel. This is expected to amount to Rs 285 million, being an upfront amount of Rs 190 million and the first year's contribution of Rs 95 million.

Lenders: The balance amount is expected to be borrowed from NCRPB and other lenders.



The total debt expected to be raised is Rs 1350.28 million. The indicative details of the debt are given below:

Total project cost	:	2016.52
Debt	:	1350.28
Own funds	:	666.24
D:E ratio	:	2.03:1
Loan period	:	15 years*
Moratorium	:	2 years
Repayment period	:	13 years
Rate of Interest	:	9.5% p.a.

Each drawdown has its own repayment schedule

IV. Basic Assumptions relating to revenue and costs:

- 1 **Real estate income:** The rental income from lease of kiosks, retail and office space forms the bulk of the revenue contributing about 54% of the total revenues.
- 2 **Hotel income:** The expected income from franchise of hotel is expected to contribute 25% of the total revenues.
- 3 **Bus fees, car parking charges and advertisement charges:** The revenue from these activities contributes the balance of 21% of the total revenues.
- 4 **Depreciation:** Depreciation at the appropriate rates have been taken for analysis.
- 5 **Tax:** As the assets would be in the books of accounts of the Delhi Government, no income tax is applicable.
- 6 **O&M expenditure** has been assumed at about 10% of revenues (excluding income from hotel)
- 7 DIMTS is expected to be appointed as the Asset Manager of the project after commencement of operations, and is also expected to be paid 40% of operating surplus (based on an agreed formula for calculating the same), with the Delhi government retaining the balance to meet other expenses
- 8 Financials for the period FY 2010 to FY 2025 has been analysed for evaluation.
- 9 A summary of certain critical assumptions for the Base Case of the financial model is given below:



Particulars	Asset created	Tariff	Year on Year increase in tariff
Kiosk area created	3500 sq ft	Rs 250 per sq ft per month	7%
Retail area created	58000 sq ft	Rs 165 per sq ft per month	7%
Office area created	107600 sq ft	Rs 50 per sq ft per month	7%
Interstate bus avg. daily traffic	2,000 nos.	Rs 50 per entry	5%
Local bus avg daily traffic	1,500 nos.	Rs 35 per entry	5%
Total number of parking spaces (85% occupancy)	473 Nos	Rs 30 per day	5%
% of parking demand diverted to night parking	5%	Of Normal parking	5%
Advertising revenue per year		Rs 12 million	10%
<i>Hotel Annuity Inputs</i>			
Valuation of Hotel		Rs 950 million	
Upfront payment from Hotel developer		Rs 190 million	
Annuity payment from Hotel developer		Rs 79.4 million	10%
Hotel Concession Period		33 years	
No of days for which daily revenue is calculated / year	300		
O&M Expenses O&M expenses (per annum) as % of Revenue (First year)		9.64%	7%

V. Observations:

- 1 Substantial reliance has been placed on income from hotel and real estate (contributing 79% of revenue). Consequently, any impact of economic downturn leading to reduction in such income would greatly affect the viability of the project.
- 2 Also, a sum of Rs 285 million has been taken as inflow from the hotel developer (initial premium of Rs 190 million and first year's contribution of Rs 95 million) for funding the capital expenditure. Any delay or reduction in these amounts would impact the funds availability for the project. Government of Delhi would need to meet any shortfall in the funds availability if required.
- 3 DIMTS is expected to be appointed as the Asset Manager and is expected to be paid a fees linked to operating surplus, prior to debt service. Any shortfall in cash flows for meeting debt service due to such payment to DIMTS is to be made up by the Delhi Government



- 4 The base case of the project financials shows a cumulative cash surplus only in the year 2018 and consequently, any shortfall in meeting various commitments would need to be met by the Delhi Government.

VI. Sensitivity analysis:

A sensitivity analysis of the Base case and various other sensitivities is given below:

Sensitivities		Project Cost	Project FIRR (%)
Base Case	(1)	2016.52	10.78
Project Cost Increase 10%	(2)	2223.83	8.29
Rental income from real estate – Less by 10%	(3)	2016.52	9.77
Hotel income – Less by 50%	(4)	2022.96	4.77
Hotel income gets postponed by 1 year	(5)	2029.40	9.16
Combined impact (2) + (3) + (5)		2236.71	5.84

A review of the sensitivity analysis indicates that

- 1 With the Project FIRR being only 10.78% p.a., the project economics is extremely sensitive to any variation in project cost and revenues.
- 2 While individual sensitivity analysis enumerated above shows the impact of each scenario separately, a combination of increase in project cost by 10%, decrease in rental income by 10% and a postponement of hotel income by one year has a major impact on the project financials leading to a reduction in FIRR from 10.78% p.a. (in Base Case) to 5.84% p.a.
- 3 In view of the above, it is essential that NCRPB takes the Guarantee of Government of Delhi as additional security apart from the security of assets created. This would provide additional comfort to NCRPB that the project would be able to meet its debt service obligations, irrespective of the performance of the project.

The Implementation Schedule: The DPR provides limited information on the implementation schedule, which should consist of:

Aspects	Details
Status of administrative and technical sanction and other statutory approvals	Anand Vihar has required approvals from Delhi Government
Issue of advertising for bidding	To be included as part of the procurement plan
Finalization of tender	To be included as part of the procurement plan
Site clearance and site development	Schedule to be included in the implementation schedule
Procurement	Based on discussions, To be included as part of the procurement plan



E. Factoring Risks

a) Risk and Uncertainties

Risk	Risk Level	Mitigation Measure
Project Completion Risk	Moderate	<ul style="list-style-type: none"> ▪ Implementation Schedule and Procurement Plan ▪ Budgetary provision for counterpart contribution ▪ Obtain necessary clearances for utility shifting priori to release ▪ Short Resettlement Plan based management of project affected persons ▪ Support in supervision and management of project from project development facility ▪ Contractor Selection based on ICB procedures
Revenue Risk		
Hotel income	High	<ul style="list-style-type: none"> ▪ Require Guarantee of Government of Delhi for debt servicing
Income from rentals – Retail space, offices	High	<ul style="list-style-type: none"> ▪ Require Guarantee of Government of Delhi for debt servicing
Increase in O&M expenses	Low	<ul style="list-style-type: none"> ▪ Increase in tariff
Technology	Low	<ul style="list-style-type: none"> ▪ Traditional



PROFIT AND LOSS ACCOUNT

Rs. Million

Particulars	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Revenue Income	51.86	325.48	355.02	383.4	414.2	447.5	483.5	522.5	564.7	610.5	660.1	713.8	772.0	835.1	903.5	977.6
Interest Income on Cash Balance																
Total Income	51.86	325.48	355.02	383.4	414.2	447.5	483.5	522.5	564.7	610.5	660.1	713.8	772.0	835.1	903.5	977.6
Total O&M Exp.	17.86	17.38	204.86	219.6	235.4	252.3	270.4	289.9	310.8	333.1	357.2	382.9	410.5	440.2	472.0	506.1
PBDIT	34.00	308.09	150.16	163.9	178.8	195.2	213.1	232.6	254.0	277.4	302.9	330.9	361.5	394.9	431.5	471.5
Interest on Debt	-	-	128.20	123.2	113.3	103.5	93.6	83.7	73.9	64.0	54.1	44.3	34.4	24.5	14.7	4.9
Interest on Working Capital	0.99	3.93	3.21	3.4	3.7	4.0	4.3	4.6	4.9	5.3	5.7	6.2	6.7	7.2	7.8	8.4
Fixed Assets Depreciation	-	-	76.22	76.2	76.2	76.2	76.2	76.2	76.2	76.2	76.2	76.2	76.2	76.2	76.2	76.2
PBT	33.00	304.16	(57.47)	39.0	14.4	11.5	39.0	68.1	99.0	131.8	166.8	204.2	244.2	286.9	332.8	382.0
Less: Income Tax payable																
Less: Deferred Tax																
PAT	33.00	304.16	(57.47)	39.0	14.4	11.5	39.0	68.1	99.0	131.8	166.8	204.2	244.2	286.9	332.8	382.0

BALANCE SHEET

Particulars	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Own funds	373.00	677.16	619.69	580.7	566.3	577.8	616.8	684.9	783.8	915.7	1,082.5	1,286.7	1,530.9	1,817.8	2,150.6	2,532.6
Market Borrowing																
Institutional Borrowings	20.23	1,350.28	1,348.73	1,244.9	1,141.0	1,037.1	933.3	829.4	725.5	621.7	517.8	413.9	310.0	206.2	102.3	-
Working Capital Borrowing	8.27	32.77	26.72	28.7	30.8	33.1	35.5	38.2	41.2	44.4	47.9	51.6	55.7	60.2	65.1	70.4
Total Current liability	0.37	1.43	13.14	14.1	15.0	16.1	17.2	18.4	19.7	21.1	22.6	24.2	25.8	27.7	29.6	31.7
Deferred Tax Liability																
Total Liability	401.87	2,061.65	2,008.28	1,868.3	1,753.1	1,664.1	1,602.8	1,570.9	1,570.3	1,602.8	1,670.7	1,776.4	1,922.5	2,111.9	2,347.6	2,634.7
Gross Fixed Assets	390.48	2,016.52	2,016.52	2,016.5	2,016.5	2,016.5	2,016.5	2,016.5	2,016.5	2,016.5	2,016.5	2,016.5	2,016.5	2,016.5	2,016.5	2,016.5
Less: Acc. Depreciation	-	-	76.22	152.4	228.7	304.9	381.1	457.3	533.6	609.8	686.0	762.2	838.5	914.7	990.9	1,067.1
Net Block	390.48	2,016.52	1,940.30	1,864.1	1,787.8	1,711.6	1,635.4	1,559.2	1,482.9	1,406.7	1,330.5	1,254.3	1,178.1	1,101.8	1,025.6	949.4
Cash	-	-	19.22	48.1	90.8	107.7	97.2	57.7	12.7	115.8	253.8	429.2	644.3	902.1	1,205.7	1,559.8
Min. Cash Balance	5.00	5.00	5.00	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Cash in Bank & Reserve A/c	5.00	5.00	24.22	43.1	85.8	102.7	92.2	52.7	17.7	120.8	258.8	434.2	649.3	907.1	1,210.7	1,564.8
Accounts Receivables	6.39	40.13	43.77	47.3	51.1	55.2	59.6	64.4	69.6	75.3	81.4	88.0	95.2	103.0	111.4	120.5
Total Assets	401.87	2,061.65	2,008.28	1,868.3	1,753.1	1,664.1	1,602.8	1,570.9	1,570.3	1,602.8	1,670.7	1,776.4	1,922.5	2,111.9	2,347.6	2,634.7



Attachment 7: Case Study of Noida Toll Bridge

NTBCL is a company set up to construct and operate the Delhi Noida Toll Bridge on a build, own, operate and transfer (BOOT) basis. The Delhi Noida Toll Bridge is a tolled facility connecting Noida to South Delhi across the Yamuna River.

On 12 November 1997, the Company, NOIDA and IL&FS entered into a Concession Agreement granting the Company the right to construct operate and maintain the Delhi Noida Toll Bridge. The Concession Agreement provides that the Concession shall last until such time as the Company has recovered the total cost of the project (“Total Project Cost”) and returns each year of 20% of the Total Project Cost (the “Returns”). Concession period was fixed for an initial period of 30 years.

The Delhi Noida Toll Bridge (commonly known as the DND Flyway) is an eight-lane bridge which measures approximately 552.5 meters in length across the Yamuna River and includes the approach roads on the South Delhi and Noida ends. The project to construct the Delhi Noida Toll Bridge was completed in 25 months, four months ahead of schedule and within budgeted costs. As part of the project, NTBCL also constructed a flyover at the Ashram crossing in New Delhi and also the Mayur Vihar Link, a new link to the Delhi Noida Toll Bridge from Mayur Vihar subsequently.

The Delhi Noida Toll Bridge became operational in February 2001, four months ahead of the scheduled date and within budgeted costs.

The total project cost of Rs 408 crores was financed by Equity of Rs 122 crores and Debt of Rs 286 crores. The debt component comprised as follows:

Term Loan from Banks	-	Rs 176 crores,
Loan from World Bank	-	Rs 60 crores
Deep Discount Bonds (DDB)	-	Rs 50 crores.

Project finance was arranged on a project recourse basis with minimal credit enhancement. The project debt was structured on a long term back ended basis to suit project cash flow profile.

A public issue of DDBs was made in 1999. The DDBs had a face of Rs 5000 and maturity value of Rs 45000, payable in 2015, giving an effective yield of 18% pa. The DDBs were also backed by a take-out arrangement by IDFC and ILFS at periods earlier than the maturity date.

The average cost of debt contracted by NTBCL was about 15% whereas interest rates in the market reduced substantially. In order to take advantage of reduced interest rates and also due to project cash flow revision due to shortfall in commercial vehicle and two wheeler traffic and also due to lower realization per vehicle, NTBCL decided to go in for a debt restructuring, which was approved by the High Court of Allahabad in October 2005. NTBCL also entered into a scheme of arrangement with the DDB holders in 2005. Consequently, the average cost of debt of NTBCL was reduced to about 8.5% pa from 15% pa.



With a view to reduce debt and also to finance the construction of the Mayur Vihar link, NTBCL issued Global Depository Receipts (GDR) in the UK capital market equivalent to about Rs 200 crores in 2006.

Subsequent to the restructuring, NTBCL has been performing well and has been meeting its financial commitments.

Summary: In case of NTBCL, the project was commissioned in February 2001, four months ahead of schedule and was completed within project cost. However, this completion of the project in advance could not help the project much as other factors resulted in the company having to restructure its debt.

Traffic risk: Compared to the projections, the commercial vehicle and two wheeler traffic on the bridge were much below expectations. Also, the average realization per vehicle was also lower than expected due to promotional discounts and reduced commercial traffic.

Interest rate risk: The historical high interest rates at which NTBCL had contracted with the lenders could not be supported due to reduced revenues consequent to reduced commercial traffic.

Debt Restructuring: Due to the above factors, NTBCL had to complete a comprehensive debt restructuring comprising of reduced interest rates, elongated principal repayment terms, etc. With a view to compensate lenders for their loss of interest, NTBCL had to issue Zero Coupon Bonds.

Fresh capital issue: NTBCL also had to raise fresh capital in the form of GDR in the London Equity market in order to repay a portion of its debt and also for fresh capital expenditure.

NTBCL is continuing its operations under the Debt Restructuring package even today and needs to take approval of its lenders in case it has to pay dividend to shareholders.

This case demonstrates the need to address revenue risk (being a combination of traffic risk and toll rate risk) and also management of interest rate risk on a long term basis. While the company had structured the repayment of its loan on a back ended basis based on cash flows, it did not prove sufficient due to inadequate revenues to support the same.



Attachment 8: Refinancing of Madurai Inner Ring Road

The Madurai Inner Ring Road (MIRR) is a 27.2 km 2 lane road inaugurated in 2000. The project cost was jointly financed by a loan of Rs 30.50 crores from Tamil Nadu Urban Development Fund (TNUDF) and a grant of Rs 13 crores from Government of Tamil Nadu (GOTN). Tolls accruing from the road were allocated to meet debt service with GOTN agreeing to meet any shortfall in the same. The interest on TNUDF loan was 15.5% pa.

After operating the road for one year after completion of construction, the Madurai Corporation realized that while the yield on 10 year Government securities had fallen to about 10% pa. Consequently, it was decided to take advantage of the reduction in interest rates raising fresh loan at a lower interest rate and repaying the costlier TNUDF loan with the proceeds. The Corporation could also get the benefit of a lower interest rate as the construction risk on the project was over and only operational risk remains which can be assessed based on the traffic movement on the road.

In 2001, Madurai Corporation issued Non Convertible Redeemable Bonds of 12.25% pa Coupon rate aggregating Rs 30 crores. The Maturity period of the Bonds was 15 years and repayment was in 30 equal half yearly installments. The Bonds were expected to be serviced through an escrow account opened for deposit of toll collections and any shortfall in the escrow account for debt service would be made good by the GOTN. The bonds were privately placed with a mix of Banks and Public Sector companies. The savings to Madurai Corporation due to the reduction of interest was about Rs 1 crore per annum.

This case provides a clear example of some of the risks involved in implementing projects and how the same can be taken advantage of by the Utility.

In any project, construction risk is a key risk factor which can lead to substantial increase in project cost due to time delays and cost increases. In view of the construction risk in any project, the interest rate for financing the project would be much higher than when the project is operational. Once the project cost construction is completed and the project cost increase does not vitiate the viability of the project, the cost of borrowing can be reduced as the construction risk has been eliminated. This reduction can either be achieved through renegotiation of interest rate with the same lenders or the loan can be refinanced through new lenders.

In the case of MIRR, as TNUDF (the original lender) was not in a position to reduce interest rates, the loan was refinanced through a Structured Bond issue at a reduced interest rate.

While MIRR provides an example of how elimination of a key risk like the construction risk can be taken advantage of, every project provides opportunities for risk analysis and risk mitigation which can be used to structure the project to the benefit of the Utility. The other feature of this project includes use of ex-servicemen to collect toll.



Attachment 9: Example Economic Analysis of Flyover Project

Economic Analysis Stages	Construction of a Flyover at a At Grade Junction	References
A. Project	Construction of a Flyover at a At grade Junction where presently signal control is there. Flyover is for the heavy traffic direction, leaving others to be regulated at grade by signal.	
B, Analysis Model	Excel based model to be developed	
C. Alternatives		
Without Project	No flyover and the junction traffic will experience the congested condition with more waiting time.	
With Project	Construction of flyover and the major through traffic will be allowed to cross without time delay. Other traffic will be regulated through signal with less delay time.	
D. Analysis Period		
Base Year (Year in which analysis is carried out to take decision. E.g.: 2013)	Planning – 2013	
Construction period (2014 to 2015)	Construction period (2014 = 60%; 2015 = 40%)	
Project opening for operation (2016)	Project opening for operation (2016)	
Operation Period (2016 – 2035) (for 20 years)	Operation Period (2016 – 2035) (for 20 years)	
End of the analysis period (2035)	End of the analysis period (2035)	



Economic Analysis Stages	Construction of a Flyover at a At Grade Junction	References																								
F. Project Cost and Scheduling																										
Conversion of Economic Cost from Financial Cost	<p>Project Cost Rs 20 Crores. This financial cost need to be converted into Economic Cost by applying (i) SWRF = shadow wage rate factor for labour components; (ii) SERF = shadow exchange rate factor foreign cost components ; and (iii) SCF = standard conversion factor for other components to reflect tax and grant components. In case of adequate data not available, a thump rule factor of 0.9 can be applied to the the financial cost to arrive the Economic Cost. Hence the Economic Cost = Rs 20 Cr x 0.9 = Rs 18 Crore.</p>																									
Construction Cost	2014 = Rs 18 Cr x 60% = Rs. 10.8 Cr; 2015 = Rs 18 Cr x 40% = Rs. 7.2 Cr;																									
O&M Cost	Say 1% of asset value annually from 2016 to 2035 (Rs. 18 Cr x 1% = Rs 0.18 Cr / Year)																									
F. Project Benefits	<p>Savings in Travel Time: (i) Calculate the delay time for each direction both for 'without' and 'with' project scenarios. (ii) By working out the difference, we can estimate the time savings for each direction for peak hour to daily to annual. (iii) Estimate the time value for different vehicle users using available guidelines from IRC / RUCS Studies etc. (iv) using the unit rates, estimate the annual time savings for the full operation period (2016-2035).</p>	<table border="1"> <thead> <tr> <th>Vehicle Type</th> <th>Time Value (Rs/passngr-Hr) - 2013</th> <th>VOC (Rs/Veh-km) -2013</th> </tr> </thead> <tbody> <tr> <td>2-Wheel</td> <td>36.7</td> <td>1.96</td> </tr> <tr> <td>3-Wheel</td> <td>50.35</td> <td>5.58</td> </tr> <tr> <td>Car</td> <td>73.07</td> <td>5.71</td> </tr> <tr> <td>Bus</td> <td>44.94</td> <td>22.96</td> </tr> <tr> <td>Mini Bus</td> <td>44.94</td> <td>11.48</td> </tr> <tr> <td>Truck</td> <td>44.94</td> <td>20.72</td> </tr> <tr> <td>LCV</td> <td>44.94</td> <td>15.37</td> </tr> </tbody> </table>	Vehicle Type	Time Value (Rs/passngr-Hr) - 2013	VOC (Rs/Veh-km) -2013	2-Wheel	36.7	1.96	3-Wheel	50.35	5.58	Car	73.07	5.71	Bus	44.94	22.96	Mini Bus	44.94	11.48	Truck	44.94	20.72	LCV	44.94	15.37
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Economic Analysis Stages	Construction of a Flyover at a At Grade Junction	References																																																																				
<p>F. Project Benefits (continued)</p>	<p>Savings in Accident Cost: (i) collect accident details with category details (ii) estimate the accident reduction after the project implementation. (iii) Estimate the unit cost for different accident categories for the current year using available guidelines from IRC / RUCS Studies etc. (iv) using the unit rates, estimate the annual accident cost savings for the full operation period (2016-2035).</p>	<p>Table 8.13: Details of Accident Cost (2012)</p> <table border="1"> <tbody> <tr> <td colspan="2">A. Direct economic costs of lost output</td> </tr> <tr> <td>Average Age of Accident Victims (Yrs)**</td> <td>30</td> </tr> <tr> <td>Retirement Age (Yrs)</td> <td>58</td> </tr> <tr> <td>Years of Service left</td> <td>29</td> </tr> <tr> <td>Average Annual Earnings (Rs.)</td> <td>72,409</td> </tr> <tr> <td>NPV of future earnings @12%</td> <td>13,15,339</td> </tr> <tr> <td colspan="2">B. Medical cost</td> </tr> <tr> <td>Average medical cost (Rs.)</td> <td>22382</td> </tr> <tr> <td>Total medical cost in fatal accident (Rs.)</td> <td>22382</td> </tr> <tr> <td colspan="2">C. Vehicle repair cost</td> </tr> <tr> <td>Average cost of vehicle repair in fatal accident (Rs.)</td> <td>20032</td> </tr> <tr> <td colspan="2">D Human capital (pain, grief, and suffering)</td> </tr> <tr> <td>20% of lost output (Rs.)</td> <td>2,63,068</td> </tr> <tr> <td colspan="2">E. Administration Cost</td> </tr> <tr> <td>0.2% of (B+C) (Rs.)</td> <td>85</td> </tr> <tr> <td>Total (Rs. million)</td> <td>1.60</td> </tr> <tr> <td colspan="2">Cost of serious injuries on Road Safety Corridor</td> </tr> <tr> <td>Average Serious Injury Recovery Days</td> <td>90</td> </tr> <tr> <td>Average daily wage rate (Rs.)</td> <td>241</td> </tr> <tr> <td>A. Average lost earnings due to serious injury (Rs.)</td> <td>21,723</td> </tr> <tr> <td>B. Average medical cost (Rs.)</td> <td>5,596</td> </tr> <tr> <td>C. Vehicle repair cost (Rs.)</td> <td>5,008</td> </tr> <tr> <td>D Human capital @ 50% of lost output</td> <td>10,861</td> </tr> <tr> <td>E. Administration cost (4% of B+C)</td> <td>424.14</td> </tr> <tr> <td>Total (Rs. million)</td> <td>0.04</td> </tr> <tr> <td colspan="2">Cost of minor injuries on Road Safety Corridor</td> </tr> <tr> <td>Average Minor Injury Recovery Days</td> <td>5</td> </tr> <tr> <td>Average daily wage rate (Rs.)</td> <td>241</td> </tr> <tr> <td>A. Average lost earnings due to minor injury (Rs.)</td> <td>1,207</td> </tr> <tr> <td>B. Average medical cost (Rs.)</td> <td>1,119</td> </tr> <tr> <td>C. Vehicle repair cost (Rs.)</td> <td>1,002</td> </tr> <tr> <td>D Human capital @ 30% of lost output</td> <td>362</td> </tr> <tr> <td>E. Administration cost (1.4% of B+C)</td> <td>296.90</td> </tr> <tr> <td>Total (Rs. million)</td> <td>0.004</td> </tr> </tbody> </table>	A. Direct economic costs of lost output		Average Age of Accident Victims (Yrs)**	30	Retirement Age (Yrs)	58	Years of Service left	29	Average Annual Earnings (Rs.)	72,409	NPV of future earnings @12%	13,15,339	B. Medical cost		Average medical cost (Rs.)	22382	Total medical cost in fatal accident (Rs.)	22382	C. Vehicle repair cost		Average cost of vehicle repair in fatal accident (Rs.)	20032	D Human capital (pain, grief, and suffering)		20% of lost output (Rs.)	2,63,068	E. Administration Cost		0.2% of (B+C) (Rs.)	85	Total (Rs. million)	1.60	Cost of serious injuries on Road Safety Corridor		Average Serious Injury Recovery Days	90	Average daily wage rate (Rs.)	241	A. Average lost earnings due to serious injury (Rs.)	21,723	B. Average medical cost (Rs.)	5,596	C. Vehicle repair cost (Rs.)	5,008	D Human capital @ 50% of lost output	10,861	E. Administration cost (4% of B+C)	424.14	Total (Rs. million)	0.04	Cost of minor injuries on Road Safety Corridor		Average Minor Injury Recovery Days	5	Average daily wage rate (Rs.)	241	A. Average lost earnings due to minor injury (Rs.)	1,207	B. Average medical cost (Rs.)	1,119	C. Vehicle repair cost (Rs.)	1,002	D Human capital @ 30% of lost output	362	E. Administration cost (1.4% of B+C)	296.90	Total (Rs. million)	0.004
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Economic Analysis Stages	Construction of a Flyover at a At Grade Junction	References																																																																																																																																												
<p>G. Economic Analysis & Results</p>	<p>Develop cost ,benefit and net benefit flow for the analysis period ; (ii) Calculate economic feasibility criteria like EIRR and ENPV</p>	<table border="1"> <thead> <tr> <th colspan="4">Table : Economic Analysis</th> <th>(Rs Cr)</th> </tr> <tr> <th>Year</th> <th>Construct ion Cost</th> <th>O&M Cost</th> <th>Savings in Travel Time</th> <th>Net Benefit</th> </tr> </thead> <tbody> <tr><td>2013</td><td>0</td><td></td><td></td><td>0.00</td></tr> <tr><td>2014</td><td>10.8</td><td></td><td></td><td>-10.80</td></tr> <tr><td>2015</td><td>7.2</td><td></td><td></td><td>-7.20</td></tr> <tr><td>2016</td><td></td><td>0.18</td><td>4.00</td><td>3.82</td></tr> <tr><td>2017</td><td></td><td>0.18</td><td>4.12</td><td>3.94</td></tr> <tr><td>2018</td><td></td><td>0.18</td><td>4.24</td><td>4.06</td></tr> <tr><td>2019</td><td></td><td>0.18</td><td>4.37</td><td>4.19</td></tr> <tr><td>2020</td><td></td><td>0.18</td><td>4.50</td><td>4.32</td></tr> <tr><td>2021</td><td></td><td>0.18</td><td>4.64</td><td>4.46</td></tr> <tr><td>2022</td><td></td><td>0.18</td><td>4.78</td><td>4.60</td></tr> <tr><td>2023</td><td></td><td>0.18</td><td>4.92</td><td>4.74</td></tr> <tr><td>2024</td><td></td><td>0.18</td><td>5.07</td><td>4.89</td></tr> <tr><td>2025</td><td></td><td>0.18</td><td>5.22</td><td>5.04</td></tr> <tr><td>2026</td><td></td><td>0.18</td><td>5.38</td><td>5.20</td></tr> <tr><td>2027</td><td></td><td>0.18</td><td>5.54</td><td>5.36</td></tr> <tr><td>2028</td><td></td><td>0.18</td><td>5.70</td><td>5.52</td></tr> <tr><td>2029</td><td></td><td>0.18</td><td>5.87</td><td>5.69</td></tr> <tr><td>2030</td><td></td><td>0.18</td><td>6.05</td><td>5.87</td></tr> <tr><td>2031</td><td></td><td>0.18</td><td>6.23</td><td>6.05</td></tr> <tr><td>2032</td><td></td><td>0.18</td><td>6.42</td><td>6.24</td></tr> <tr><td>2033</td><td></td><td>0.18</td><td>6.61</td><td>6.43</td></tr> <tr><td>2034</td><td></td><td>0.18</td><td>6.81</td><td>6.63</td></tr> <tr><td>2035</td><td></td><td>0.18</td><td>7.01</td><td>6.83</td></tr> <tr> <td>Total</td> <td>18.00</td> <td>3.60</td> <td>107.48</td> <td>85.88</td> </tr> <tr> <td>ENPV RS Cr. @ 12% Discoun</td> <td>13.73</td> <td>1.34</td> <td>36.12</td> <td>11.02</td> </tr> <tr> <td>Rate EIRR %</td> <td></td> <td></td> <td></td> <td>21.2%</td> </tr> </tbody> </table>	Table : Economic Analysis				(Rs Cr)	Year	Construct ion Cost	O&M Cost	Savings in Travel Time	Net Benefit	2013	0			0.00	2014	10.8			-10.80	2015	7.2			-7.20	2016		0.18	4.00	3.82	2017		0.18	4.12	3.94	2018		0.18	4.24	4.06	2019		0.18	4.37	4.19	2020		0.18	4.50	4.32	2021		0.18	4.64	4.46	2022		0.18	4.78	4.60	2023		0.18	4.92	4.74	2024		0.18	5.07	4.89	2025		0.18	5.22	5.04	2026		0.18	5.38	5.20	2027		0.18	5.54	5.36	2028		0.18	5.70	5.52	2029		0.18	5.87	5.69	2030		0.18	6.05	5.87	2031		0.18	6.23	6.05	2032		0.18	6.42	6.24	2033		0.18	6.61	6.43	2034		0.18	6.81	6.63	2035		0.18	7.01	6.83	Total	18.00	3.60	107.48	85.88	ENPV RS Cr. @ 12% Discoun	13.73	1.34	36.12	11.02	Rate EIRR %				21.2%
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<p>G. Interpretation of Results</p>	<p>Consider economic opportunity cost as 12 % (Thumb rule); (ii) If EIRR is above this 12% and ENPV is a positive value, then the project is viable</p>	<p>EIRR of the project is higher than 21.2%. Thus project is economically viable and it should be undertaken</p>																																																																																																																																												



Attachment 10: Example – Project Financial Analysis of Karur Toll

Bridge

Recourse to revenues generated by subproject. First step is to prepare a cash flow of the subproject on a standalone²¹ basis for a period equivalent to the number of years for sub loan repayment, or the life of the asset whichever is higher. In order to do analysis of subproject recourse financing, the following factors need to be looked into:

- i. **Subproject cost.** The subproject cost will include price and physical contingencies. A break-up of base cost²², contingencies and other charges should be highlighted, as illustrated below for the Karur Toll Bridge project.

COST OF PROJECT		
(Rs. lacs)		
CAPITAL COST		
Basis Excavation charges	65	Lump sum
Lump sum RCC items	876	Unit rate
Footpath, wearing course, bearings etc	103	Lump sum and unit rate
Approaches	104	Lump sum
Toll plazas	7	Lump sum and unit rate
Road furniture, decorative pillar boards, lane markings, kerb painting	24	Lump sum
Electrical and lighting work	32	Lump sum
Soil investigation charges, temporary approach roads, design charges etc.	49.4	Lump sum
	1260	
Provision for contingencies (8%)	101	
Preliminary and pre-operative expenses	106	
Interest during construction (TNUDF and HUDCO)	59	
TOTAL PROJECT COST	1526	

²¹ Standalone means existence of a cash flow that is exclusively available for the project that does not require bringing in other revenues from any other source such as the balance sheet.

²² Base Cost – cost excluding contingencies and supervision charges; precisely it relates to only the cost of works of the project



- ii. **Means of Finance.** The funding pattern of a subproject has an impact on the viability. Means of Finance is the summary of the possible source of funding available for a sub project, like loans, grants, user contributions, etc. An illustration of Karur toll bridge is given below.

MEANS OF FINANCING

(Rs. Lacs.)

Equity share capital	145	
Preference share capital	381	
		526
Term loans		
- From TNUDF	100	
- From HUDCO	900	
		1000
TOTAL		1526
Promoters' contribution		34.5%
Debt-equity ratio		1.90

- iii. **Draw down of funds.** Draw down means the amount to be withdrawn by the borrower both of sub loan and grants for financing subproject construction. DPR provides details on schedule of physical implementation that should form the basis for draw down. Based on the physical implementation schedule, the borrower shall prepare a draw down schedule which will chart out the period and amount of the sub loan that will probably be drawn down through the implementation period of the subproject. A sample format of a financial draw down schedule is given for an understanding assuming a construction period of three years, (as Karur toll bridge was constructed in an year and hence no draw down has been prepared).

Particulars	Years of Construction		
	Year 1	Year 2	Year 3
Phasing of Expenditure ²³ (A)	30% of subproject cost	40% of subproject cost	30% of subproject cost
Amount spent every year (B)	Project Cost * Year 1 of (A)	Project Cost * Year 2 of (A)	Project Cost * Year 3 of (A)
Draw down (*)			
Grant, if any	30% of eligible grant amount	40% of eligible grant amount	30% of eligible grant amount
Sub loan	30% of eligible sub loan	40% of eligible sub loan amount	30% of eligible sub loan amount
Own Contribution	30% of the amount to be brought in by the borrower	40% of the amount to be brought in by the borrower	30% of the amount to be brought in by the borrower

(*) This is a tentative schedule and the actual disbursements of sub loan and grant will be made on the actual progress of work.

²³ Phasing of expenditure means the amount scheduled to be spent for the project during the years of construction



iv. Estimate of income and expenditure. While estimating income, any revenue generated by the subproject should be taken as income, like monthly user charges, fees, or periodical deposits, etc. For estimating the user charges the following data will be required:

- a. Are there any additional beneficiaries apart from the existing beneficiaries?
- b. Number of such beneficiaries of the subproject;
- c. Income levels of such beneficiaries;
- d. Tariff/user charges fixed by the council;
- e. Is the tariff charged for both the existing and the additional beneficiaries?; and, f. Income per annum by way of this revenue to the subproject.

SINGLE TIME USERS

TRAFFIC VOLUME COUNT (in 1996-97)

Nos./day		Growth factor	
Buses	30		3.00%
LCVs	360		3.00%
Cars	530		3.00%
Trucks	150		3.00%
BASE TOLL RATES			
		Toll/vehicle	Growth factor
Buses	30		8.00%
LCVs	25		8.00%
Cars	10		8.00%
Trucks	30		8.00%



NUMBER OF VEHICLES PER MONTH											
Year ending March 31 (Quarter year)	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Buses	33	34	35	36	37	38	39	40	42	43	44
LCVs	393	405	417	430	443	456	470	484	498	513	529
Cars	579	597	614	633	652	671	692	712	734	756	778
Trucks	164	169	174	179	184	190	196	202	208	214	220

GROWTH IN TOLL RATES											
Buses	32	35	38	41	44	48	51	56	60	65	70
LCVs	27	29	31	34	37	40	43	46	50	54	58
Cars	11	12	13	14	15	16	17	19	20	22	23
Trucks	32	35	38	41	44	48	51	56	60	65	70

PROJECTED TOLL REVENUES FOR SINGLE TIME USERS											
Buses	1	4	5	5	6	7	7	8	9	10	11
LCVs	10	43	48	53	59	66	73	82	91	101	112
Cars	6	25	28	31	35	39	43	48	54	60	66
Trucks	5	22	24	27	30	33	37	41	45	51	56
TOTAL	21	94	105	117	130	145	161	179	199	221	246

MONTHLY PASS USERS**TRAFFIC VOLUME COUNT (in 1996-97)**

	Nos./month	Growth factor	
Buses		225	3.00%
LCVs		225	3.00%
Cars		225	3.00%
Trucks		60	3.00%

BASE TOLL RATES

	Toll/vehicle	Growth factor
Buses	1800	8.00%
LCVs	1050	8.00%
Cars	300	8.00%
Trucks	1350	8.00%

NUMBER OF VEHICLES PER MONTH											
Year ending March 31 (Quarter year)	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Buses	246	253	261	269	277	285	294	302	311	321	330
LCVs	246	253	261	269	277	285	294	302	311	321	330
Cars	246	253	261	269	277	285	294	302	311	321	330
Trucks	66	68	70	72	74	76	78	81	83	86	88

GROWTH IN TOLL RATES											
Buses	1944	2100	2267	2449	2645	2856	3085	3332	3598	3886	4197
LCVs	1134	1225	1323	1429	1543	1666	1800	1943	2099	2267	2448
Cars	324	350	378	408	441	476	514	555	600	648	699
Trucks	1458	1575	1701	1837	1984	2142	2314	2499	2699	2915	3148

PROJECTED TOLL REVENUES FOR MONTHLY TIME USERS											
Buses	14	64	71	79	88	98	109	121	134	150	166
LCVs	8	37	41	46	51	57	63	71	78	87	97
Cars	2	11	12	13	15	16	18	20	22	25	28
Trucks	3	13	14	16	18	20	22	24	27	30	33
TOTAL	28	124	138	154	171	191	212	236	262	292	325



**MULTIPLE PASS USERS
TRAFFIC VOLUME COUNT (in 1996-97)**

Nos./day		Growth factor									
Buses	75	3.00%									
LCVs	85	3.00%									
Cars	85	3.00%									
Trucks	20	3.00%									
BASE TOLL RATES											
Toll/vehicle		Growth factor									
Buses	60	8.00%									
LCVs	35	8.00%									
Cars	15	8.00%									
Trucks	45	8.00%									
NUMBER OF VEHICLES PER DAY											
Year ending March 31	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
(Quarter year)											
Buses	82	84	87	90	92	95	98	101	104	107	110
LCVs	93	96	99	101	105	108	111	114	118	121	125
Cars	93	96	99	101	105	108	111	114	118	121	125
Trucks	22	23	23	24	25	25	26	27	28	29	29
GROWTH IN TOLL RATES											
Buses	65	70	76	82	88	95	103	111	120	130	140
LCVs	38	41	44	48	51	56	60	65	70	76	82
Cars	16	17	19	20	22	24	26	28	30	32	35
Trucks	49	52	57	61	66	71	77	83	90	97	105
PROJECTED TOLL REVENUES FOR MULTIPLE PASS USERS											
Buses	5	22	24	27	30	33	37	41	45	51	56
LCVs	3	14	16	18	20	22	24	27	30	33	37
Cars	1	6	7	8	8	9	10	12	13	14	16
Trucks	1	4	5	5	6	7	7	8	9	10	11
TOTAL	10	46	51	57	64	71	79	88	97	108	121
TOTAL REVENUES (Rs. lacs)	60	265	295	328	365	406	451	502	559	621	691

Expenditure

Expenditure normally consists of O&M cost of the subproject and the debt service obligations of the subproject. Details of O&M can be obtained from the DPR, and should be cross-checked for its adequacy. An escalation equivalent to the inflation rates prevailing in the country should be used for projecting the cash flow.

With respect to the debt service, the actual debt to be serviced by the ULBs/ Statutory Board/ Department for the subproject has to be taken for projections. Accordingly, annuities (explained below) can be worked out for the repayment period. For doing this, one has to be clear on the tenure of the sub loan, grace period, rate of interest and the repayment period.



Annuity and how to calculate it: Annuity is an equalized stream of cash flows (principal and interest payment by the borrowers) over a period of time. The formula for calculating annuity is:

$$Annuity = P \frac{r(1+r)^n}{(1+r)^n - 1}$$

Where, p = su loan amount; r = rate of interest; n = no. of years

This can be simplified by using excel function in the computer which is @ PMT (rate, no. of years repayment, - (sub loan).

Calculation of loans and repayment schedules as prepared for the Karur Toll Bridge is given below-

	(Rs. lacs)	
Terms of loan from TNUDF		
Amount	100	
Interest rate	0.19	pa
Tenor of loan	10	years
Principal moratorium	1	years
Frequency of payment	Half yearly	
Type of repayment		
Terms of loan from others		
Amount – HUDCO	900	
Interest rate	0.155	pa
Tenor of loan	9.5	years
Principal moratorium	1	years
Frequency of payment	Half yearly	
Type of repayment	Reducing Balance	

TNUDF Loan Semi-annual annuity due 12

Half year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Opening balance	100	98	95	92	89	86	82	78	74	69	64	58	52	45	38	30	21	11
Interest payable	10	9	9	9	8	8	8	7	7	7	6	6	5	4	4	3	2	1
Repayment	2	3	3	3	3	4	4	4	5	5	6	6	7	7	8	9	10	11
Closing balance	98	95	92	89	86	82	78	74	69	64	58	52	45	38	30	21	11	0

Loan from Others

Half year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Opening balance	90	84	79	74	68	63	58	52	47	42	37	31	26	21	15	10	5	
Interest payable	70	66	62	57	53	49	45	41	37	33	29	25	21	16	12	8	4	0
Repayment	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	0
Closing balance	84	79	74	68	63	58	52	47	42	37	31	26	21	15	10	5	0	0

CONSOLIDATED OUTFLOW FOR EACH YEAR

Year	1	2	3	4	5	6	7	8	9
Interest		154	137	119	101	83	65	46	27
Principal repayment		111	112	113	114	116	118	120	123
		265	248	232	216	199	183	166	150
									81



Cash Flow / Funds flow Projections

Based on the calculations above, a projection for the number of years of repayment, or the life of the asset whichever is higher, will need to be calculated.

Cash Balances in Cash Flow Projections. Opening balance of cash will be nil in the first year as the subproject will have just started implementation and from there on the closing balance of the previous year will be the opening balance. For example, the closing balance of 1st year will be the opening balance of 2nd year and so on. Surplus and closing balance can be determined as follows:

- i. Surplus is the excess of income over expenditure for each year (income minus expenditure); and
- ii. Closing balance of cash is the sum of opening balance and surplus of that year (opening balance + surplus).

Funds flow statement. Funds flow statement includes the incremental funds that flow into the project by way of equity, loans and current liabilities; and incremental outflows through incremental project cost spent, and other current liabilities, depreciation, etc. This statement helps in understanding the movement of funds in the project. The following is the funds flow statement pertaining to Karur Toll Bridge.

While preparation of cash flow statement is imperative to do a project appraisal, once a project is finalized, it is important to do a funds flow statement, to understand the working efficiency of a project.



PROJECTED FUND FLOW STATEMENT

Year ending March 31	1999	2000	2000	2000	2001	2002	2003	2004	2005	2006	2007	2008
		(3 quart)	(last quart)									
SOURCES												
Inc. in equity share capital	145	0	0	0	0	0	0	0	0	0	0	0
Inc. in preference share capital	381	0	0	0	0	0	0	0	0	0	0	0
Transfer to Reserves and surplus	0	0	0	0	0	0	15	51	56	95	184	266
Inc. in unsecured loans from promoters	0	0	0	39	0	0	0	0	0	0	0	0
Inc. in long term loans	0	1000	0	0	0	0	0	0	0	0	0	0
Depreciation	0	0	37	147	147	147	147	147	154	154	154	154
Written of expenses	0	0	3	11	11	11	11	11	11	11	11	11
Inc. in sundry creditors	0	0	2	6	2	2	2	2	2	2	2	2
Inc in provisions for dividends	0	0	0	0	0	0	0	23	76	113	113	135
Dec in cash and bank balance	0	5	0	0	0	0	0	0	0	0	0	0
TOTAL	526	1005	41	203	159	174	233	299	375	464	568	6
APPLICATIONS												
Capital cost	461	1006	0	0	0	0	0	0	0	0	0	0
(after appropriating cont.&IDC)												
Preliminary and pre-op expenses	74	32	0	0	0	0	0	0	0	0	0	0
Normal capital expenditure	0	0	0	0	0	0	0	0	73	0	0	0
Dec. in provisions for dividend	0	0	0	0	0	0	0	0	23	76	113	113
Principal repayment	0	0	0	111	112	113	114	116	118	118	120	123
Inc. in current assets	0	0	4	13	4	4	4	4	4	4	4	4
Inc. in investments	0	0	0	0	0	34	90	85	175	225	326	
Inc in cash and bank balance	5	0	11	0	8	23	25	0	2	1	2	
Inc. in accumulated losses	0	0	26	80	35	0	0	0	0	0	0	0
TOTAL	541	1038	41	203	159	174	233	301	375	464	568	6



Interpretations on Feasibility. As described in the introductory section of financial appraisal, infrastructure subprojects can be judged based on their cash flows. The subproject is said to be viable if it has a positive cash flow. It will said to be unviable if the cash flow is not positive. Financial feasibility can be supported on the basis of couple of other parameters. These are (i) Debt Service Coverage Ratio (DSCR), and (ii) the Internal Rate of Return (IRR). These are discussed below:

DSCR of Karur Toll Bridge is given below-

COMPUTATION OF DSCR											
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
PBIDT + Written off exp.	52	232	259	291	332	380	438	508	593	699	672
Interest	39	154	137	119	101	83	65	46	27	7	0
Principal repayment/(1-T)	☒	111	112	113	114	116	118	120	123	74	0
Debt service coverage	1.35	0.87	1.04	1.25	1.54	1.91	2.39	3.05	3.95	8.66	na
Average DSCR	2.13										

The normal accepted DSCR by Financial Institutions is 1.25. However, for infrastructure subprojects the accepted norm could be even 1.10. DSCR provides comfort for financial institutions to ensure consistent repayments of sub loan.

The NPV calculation of Karur Toll bridge is given below-

COMPUTATION OF NPV												(Rs.lacs)
Year ending March 31	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Project cost excl. IDC	461	947	0	0	0	0	0	0	0	0	0	0
Normal capital expenditure	0	0	0	0	0	0	73	0	0	0	0	118
PBIDT + Written off exp.- taxes	0	52	232	259	291	332	380	438	508	593	699	672
Net cash flow	-461	-895	232	259	291	332	307	438	508	593	699	554
Discount rate			18.00									
Discount factor	1.00	0.85	0.72	0.61	0.52	0.44	0.37	0.31	0.27	0.23	0.19	0.16
Discount cash flow	460.99	758.25	166.45	7	8	3	7	5	5	5	0	89.62
Net present value			143.1									

An illustration of IRR calculation done for the Karur toll project is given below.

COMPUTATION OF IRR												Rs.lacs)
Year ending March 31	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Project cost excl. IDC	461	947	0	0	0	0	0	0	0	0	0	0
Normal capital expenditure	0	0	0	0	0	0	73	0	0	0	0	118
PBIDT + Written off exp.- taxes	0	52	232	259	291	332	380	438	508	593	699	672
Net cash flow	-461	-895	232	259	291	332	307	438	508	593	699	554
Internal rate of return %			20.43									



An important question, however, is: with the given IRR, how do we decide that subproject is viable or unviable? The basic criterion for viability check with respect to IRR is that the IRR should be greater than the cost of funds / cost of capital.

Cost of funds or capital. Theoretically, cost of capital is the term used to refer to the weighted average of the cost of the debt and equity. In other words, the term cost of capital refers to the minimum rate of return that a firm must earn on its investments so as to keep the value of the firm intact. Hence, if IRR is said to be higher than the cost of funds, the subproject is said to be viable. An illustration for calculation of IRR for Karur toll project has been reproduced for your benefit.

COMPUTATION OF COST OF CAPITAL	Amount	Weight	Cost (%)
Equity share capital	145	0.09	0.30
Preference share capital	381	0.25	0.12
Term loan from TNUDF	100	0.07	0.19
Term loan from Others	900	0.59	0.155
TOTAL	1526	1	
COST OF CAPITAL			16.23%

Feasibility: A financial institution does the above, while dealing with sub projects generating revenues on its own like a toll project, or project involving other fee structures. The DSCR and IRR of the project should be analyzed to arrive at the feasibility of the sub project, based on the parameters given above.

Since many of the transportation subprojects are demand based and involve cost and time saving to the user, thereby increasing the economic impact, even if IRR is not greater than the cost of capital, the subproject can be taken up if the economic impact or the EIRR is higher.



Attachment 11: GOI note on innovative financing of mass rapid transit system (MRTS) projects – (rail / road based)

No. K-14011/8/2012-MRTS: Ministry of Urban Development

Subject: Note on Innovative Financing of Mass Rapid Transit System (MRTS) Projects – (Rail / Road Based).

1. Mass rapid transit system projects are capital intensive and require long tenure lending at a very reasonable rate in order to be sustainable. The Metro Rail Projects specially are highly capital intensive. Furthermore, being social sector projects, it is not possible to increase the fares beyond a point and accordingly fare box revenue alone cannot make these projects financially viable. However, in spite of all these challenges, these projects have to be taken up on high demand corridors in various cities with a population of one million plus, with rail based MRTS projects in three million plus in the 12th Five Year Plan itself. Rail Based MRTS projects are also to be planned for two million plus cities.
2. A study of global experience in Urban Rail Transit provisioning shows that Public Private Partnerships (PPP) in Metro Rail Projects has not been very successful. As brought out in the Report of the Working Group on Urban Transport for the 12th Five Year Plan, the analysis of Metro Rail systems in 132 cities in the world provides a comprehensive understanding of the ownership structure and use of PPP in Metro Rail development. In 113 cities having Metro Rails, 88% have been developed and are being operated in Public Sector mode whereas in only 12% cities some form of Public Private Partnership exists. In fact outside India, no city anywhere in the world (except the failed experiment of STAR and PUTRA metro rail in Kuala Lumpur in Malaysia) has attempted provisioning of Metro rail in full city on PPP in last few decades. Even the new Metro Rail projects, which have been developed, are largely being taken up on public sector mode rather than PPP, even though PPP has been an important financing mechanism of the other modes of transport. Even in road based MRTS projects like Bus Rapid Transit System, the infrastructure has been developed in the public sector globally whereas the bus operations and maintenance as well as fare collection has been done on PPP.
3. Financing of such highly capital intensive projects only through Gross Budgetary support, so that they can be taken up on public sector mode rather than PPP, is not possible considering the financial constraints and other pressing demands of both Govt. of India and State Govts concerned. As such, the only way out is to resort to innovative financing mechanism using land as a resource as well as other dedicated levies/taxes as envisaged in the National Urban Transport Policy, 2006 and create a dedicated Urban transport fund at State level and Central Govt. level from such sources. The National Urban Transport Policy further mentions that the support from Govt of India would be contingent upon the States to tap these innovative financing mechanisms.
4. MRTS projects whether Rail based or Bus based, are high capacity mass rapid transit systems and are amenable to “Transit Oriented Development” as well as densification along the MRTS corridor through additional FAR. Furthermore it is also important to have as many people, who are potential users



of MRTS, to live within walking distance of MRTS stations so as not only to reduce the overall travel demand but also to improve the sustainability of MRTS project. In addition, there is a huge spurt in the prices of property (sale as well as rental) especially along the MRTS corridor in the catchment area (which may be defined as maximum 10 min walking distance from the station). Presently, all these benefits go primarily to the private parties even though the same is caused only on account of Government investment. As such, there is a strong case for the Government to en-cash the increased property value (sale/rental) in the catchment area of MRTS corridor as well as the increased FAR along the MRTS corridor which can be used to not only part fund the project cost but also for providing interest subsidy to make available the loans, to the SPV implementing the project, on a very concessional rate so as to maintain its debt service coverage ratio (DSCR) of more than 1.15 each year. In fact the surplus, if any from the dedicated urban transport fund, can be leveraged further for raising funds from the domestic market for taking up other urban transport projects.

5. Govt of India has been advocating these ideas since long. However it the Government of Karnataka which has for the first time in the country, while sanctioning Phase-II of Bangalore Metro (72.095 kms at a total completion cost of Rs.26,405 crore), has decided the following innovative financing methods for resource mobilization through cess/TDR-

- a) Levy of Cess and Surcharge under Section 18A of the Karnataka Town and Country Planning Act at 5% of the market value of land or/and building in future Developments, to be credited to Metro Infrastructure Fund and to be shared by BMRCL, BWSSB and BDA at 65%, 20% and 15% respectively.
- b)
 - i) To extend the benefit of 4 FAR for all properties lying within a distance of 500 mtrs. from the Metro alignment.
 - ii) To levy a cess of 10% in respect of residential buildings and 20% in respect of commercial buildings on the additional FAR granted, in respect of Phase-1 and Phase-2 of the Metro Rail Project and share the same among BMRCL, BBMP, BWSSB and BDA in the ratio of 60%, 20%, 10% and 10% respectively.
 - iii) To allow BMRCL to issue TDRs in lieu of compensation for acquisition of land for Metro Rail Project.
 - iv) To review the current TDR Scheme so as to make it bring in additional revenue and at the same time, attractive for the TDR Acquirer."

The yield through additional FAR of 4 and levy of cess of 10% in residential buildings and 20% in respect of commercial buildings on the additional FAR granted is estimated to be Rs.432 crore in five years. Cess of 5% of the market value of land or/and buildings in future developments is expected to yield Rs.1250 crore in five years @ Rs.250 crore per annum.

6. Even while sanctioning a Phase-III of Delhi Metro, the Government of India has decided as follows:

"The GNCTD would set up a dedicated Urban Transport Fund (UTF) at State level in consultation with Ministry of Urban Development, Government of India through levy of dedicated taxes/levies etc., capturing



the increased land and property value from sale proceeds/rental (as well as increased FAR) all along the metro corridors in Delhi as envisaged in National Urban Transport Policy, 2006 to create pool of resources for replacement of assets, interest subsidy and providing operational subsidies, if any, not only for this project but other Urban Transport projects as well.

75% of the amount realized from the increased land and property value capture from sale/rental proceeds would be credited to Dedicated Urban Transport Fund at Central Government level”.

7. However for achieving the higher FAR it would be essential to allow for plots amalgamation through appropriate amendments in the bye laws. In order that the densification happens quickly and the intended revenue starts flowing to dedicated urban transport fund, it will also be important to provide for some incentives for early utilization of the higher FAR say within three to four years. It should also be kept in mind that higher FAR would not automatically result in densification as we can have penthouses utilizing the higher FAR thereby defeating the very purpose of densification.
8. In addition to what has been captured by Government of Karnataka, there is also room for encasing the increased market value of land and buildings at the time of sale/rental. This can be done by levying a cess of say 100% on the sale of land or building in the influence zone of MRTS and by additional property tax on the existing buildings (whether self occupied or rented but with differential treatment for both). The yield from this should also flow into a Dedicated Urban Transport Fund.
9. There is also a case for enhancement of property tax in the entire city where MRTS projects are being implemented as not only the people residing on the corridor are benefitted but all those living in the catchment area are also benefitted by the MRTS project. Whichever city are aspiring for MRTS system should also resort to 100% property tax collection before the proposed completion date of the project. As such in addition achieving 100% property tax collection would also be made one of the conditions of sanction. The funds of additional revenue on account of both can also be pooled into the Dedicated Urban Transport Fund.
10. In addition to the above, the State Governments may consider any other sources of dedicated levies like vacant land charges, betterment levy, special development charges, cess on fuel etc. to augment the resources for taking up the MRTS projects. A vacant land tax is to ensure time bound densification along with MRTS corridor where the higher FAR is permitted.

All the additional revenue coming out from additional property tax as well as the land monetization as mentioned above can also flow into a Dedicated Urban Transport Fund.

11. Since the revenue in this Dedicated Urban Transport Fund would be flowing in from the Urban Local bodies as well as the State Governments, it would be desirable to have fool proof ESCROW mechanism to use these funds only for the intended purposes. This may be achieved by making the above fund to be operated as a trust fund under a well-structured trust deed duly outlining in the order of priority, the purposes for this fund can be used. A public sector bank may be selected for managing the Trust Fund. This ESCROW mechanism of generating additional revenue from land monetization and additional property tax so as to not only part fund the project but also provide interest subvention and/or credit enhancement, can open up a huge pool of long term funds with Provident Fund and insurance sector for investing in



MRTS projects. This would greatly reduce the over dependence on multilateral funding for taking up MRTS projects as is the case today. This will enable participation of Urban Local Bodies in development of MRTS systems for the city and also development of infrastructure etc for intermodal integration.

12. Reference is also invited to this Ministry's D.O. letter No.K-14011/48/2008-UT dated 12th January, 2009 vide which suggested possible sources of Dedicated Urban Transport Fund at State/city level were advised. Copy of the relevant portion of the same is also enclosed as **Annexure-I** for consideration for generating resources for Dedicated Urban Transport Fund at State and city level.

Annexure-I to letter No.K-14011/8/2012-MRTS dated 20th January, 2012

The possible sources of Dedicated Urban Transport Fund at State and City Level

- a) At the State level, additional sales tax on petrol, additional registration fee on four-wheelers and two-wheelers, high registration fee for personal vehicles running on diesel, annual renewal fee on driving license and vehicle registration, congestion tax, green tax etc. may be used to draw sources for the Dedicated Urban Transport Fund at the State level. The inelastic demand of petrol with respect to price in a short run would ensure sufficient accruals to the funding and which would, in the long run, incentivise such people to shift to the public transport system. The funds so generated by the States can be used for new projects in urban transport, compensate towards exemption of tax on urban buses and replacement of assets of public transport companies and, towards meeting the cost of various other concessions extended to encourage public transport by the State Government.
- b) The cities can generate fund out of betterment levy on land in areas which benefit by investment in urban transport projects; rationalization of parking-fee, property development tax, advertisement revenue on transit corridors, employment tax (as done in France) etc. This fund at the city level can be used for establishing a fare contingency fund to meet the difference between the 'public fare' (paid by the commuters) and the 'technical fare' (payable to the private operators) to sustain the operations and; to provide ULBs' share for funding the urban transport projects.



Attachment 12: Reserve Bank of India Circular Infrastructure Financing by Banks

Given below are the relevant portions of the RBI circular regarding provision of loans for infrastructure sector.

RBI/2011-12/59

DBOD.No.Dir.BC. 6/13.03.00/2011-12

July 1, 2011

Ashadha 10, 1933 (Saka)

2.3.8 Financing Infrastructure/ Housing Projects

2.3.8.1 Housing Finance

Banks may refer to the Master Circular on Housing Finance dated July 1, 2011 in this regard.

2.3.8.2 Guidelines for Financing of Infrastructure Projects

In view of the critical importance of the infrastructure sector and high priority being accorded for development of various infrastructure services, the matter has been reviewed in consultation with Government of India and the revised guidelines on financing of infrastructure projects are set out as under.

2.3.8.3 Definition of 'infrastructure lending'

Any credit facility in whatever form extended by lenders (i.e. banks, FIs or NBFCs) to an infrastructure facility as specified below falls within the definition of "infrastructure lending". In other words, a credit facility provided to a borrower company engaged in:

Developing or

Operating and maintaining, or

Developing, operating and maintaining any infrastructure facility that is a project in any of the following sectors, or any infrastructure facility of a similar nature :

- i. a road, including toll road, a bridge or a rail system;
- ii. a highway project including other activities being an integral part of the highway project;
- iii. a port, airport, inland waterway or inland port;
- iv. a water supply project, irrigation project, water treatment system, sanitation and sewerage system or solid waste management system;
- v. telecommunication services whether basic or cellular, including radio paging, domestic satellite service (i.e., a satellite owned and operated by an Indian company for providing telecommunication service), Telecom Towers, network of trunking, broadband network and internet services;



- vi. an industrial park or special economic zone;
- vii. generation or generation and distribution of power including power projects based on all the renewable energy sources such as wind, biomass, small hydro, solar, etc.
- viii. transmission or distribution of power by laying a network of new transmission or distribution lines.
- ix. projects involving agro-processing and supply of inputs to agriculture;
- x. projects for preservation and storage of processed agro-products, perishable goods such as fruits, vegetables and flowers including testing facilities for quality;
- xi. educational institutions and hospitals.
- xii. laying down and / or maintenance of pipelines for gas, crude oil, petroleum, minerals including city gas distribution networks.
- xiii. any other infrastructure facility of similar nature.

2.3.8.4 Criteria for Financing

Banks/FIs are free to finance technically feasible, financially viable and bankable projects undertaken by both public sector and private sector undertakings subject to the following conditions:

- (i) The amount sanctioned should be within the overall ceiling of the prudential exposure norms prescribed by RBI for infrastructure financing.
- (ii) Banks/ FIs should have the requisite expertise for appraising technical feasibility, financial viability and bankability of projects, with particular reference to the risk analysis and sensitivity analysis.
- (iii) In respect of projects undertaken by public sector units, term loans may be sanctioned only for corporate entities (i.e. public sector undertakings registered under Companies Act or a Corporation established under the relevant statute). Further, such term loans should not be in lieu of or to substitute budgetary resources envisaged for the project. The term loan could supplement the budgetary resources if such supplementing was contemplated in the project design. While such public sector units may include Special Purpose Vehicles (SPVs) registered under the Companies Act set up for financing infrastructure projects, it should be ensured by banks and financial institutions that these loans/investments are not used for financing the budget of the State Governments. Whether such financing is done by way of extending loans or investing in bonds, banks and financial institutions should undertake due diligence on the viability and bankability of such projects to ensure that revenue stream from the project is sufficient to take care of the debt servicing obligations and that the repayment/servicing of debt is not out of budgetary resources. Further, in the case of financing SPVs, banks and financial institutions should ensure that the funding proposals are for specific monitorable projects. It has been observed that some banks have extended financial assistance to State PSUs which is not in accordance with the above



norms. Banks/FIs are, therefore, advised to follow the above instructions scrupulously, even while making investment in bonds of sick State PSUs as part of the rehabilitation effort.

- (iv) Banks may also lend to SPVs in the private sector, registered under the Companies Act for directly undertaking infrastructure projects which are financially viable and not for acting as mere financial intermediaries. Banks may ensure that the bankruptcy or financial difficulties of the parent/ sponsor should not affect the financial health of the SPV.

2.3.8.5 Types of Financing by Banks

- (i) In order to meet financial requirements of infrastructure projects, banks may extend credit facility by way of working capital finance, term loan, project loan, subscription to bonds and debentures/ preference shares/ equity shares acquired as a part of the project finance package which is treated as “deemed advance” and any other form of funded or non-funded facility.

- (ii) Take-out Financing

Banks may enter into take-out financing arrangement with IDFC/ other financial institutions or avail of liquidity support from IDFC/ other FIs. A brief write-up on some of the important features of the arrangement is given in paragraph 2.3.8.8(i). Banks may also be guided by the instructions regarding take-out finance contained in Circular No. DBOD. BP. BC. 144/21.04.048/ 2000 dated February 29, 2000.

- (iii) Inter-institutional Guarantees

Banks are permitted to issue guarantees favouring other lending institutions in respect of infrastructure projects, provided the bank issuing the guarantee takes a funded share in the project at least to the extent of 5 per cent of the project cost and undertakes normal credit appraisal, monitoring and follow-up of the project. For detailed instructions on inter-institutional guarantee, please see paragraph 2.3.9.

- (iv) Financing promoter’s equity

In terms of Circular No. DBOD. Dir. BC. 90/ 13.07.05/ 98 dated August 28, 1998, banks were advised that the promoter’s contribution towards the equity capital of a company should come from their own resources and the bank should not normally grant advances to take up shares of other companies. In view of the importance attached to the infrastructure sector, it has been decided that, under certain circumstances, an exception may be made to this policy for financing the acquisition of the promoter’s shares in an existing company, which is engaged in implementing or operating an infrastructure project in India. The conditions, subject to which an exception may be made, are as follows:

- i. The bank finance would be only for acquisition of shares of existing companies providing infrastructure facilities as defined in paragraph (a) above. Further, acquisition of such shares should be in respect of companies where the existing foreign promoters (and/ or domestic joint promoters) voluntarily propose to disinvest their majority shares in compliance with SEBI guidelines, where applicable.



- ii. The companies to which loans are extended should, inter alia, have a satisfactory net worth.
- iii. The company financed and the promoters/ directors of such companies should not be a defaulter to banks/ FIs.
- iv. In order to ensure that the borrower has a substantial stake in the infrastructure company, bank finance should be restricted to 50% of the finance required for acquiring the promoter's stake in the company being acquired.
- v. Finance extended should be against the security of the assets of the borrowing company or the assets of the company acquired and not against the shares of that company or the company being acquired. The shares of the borrower company / company being acquired may be accepted as additional security and not as primary security. The security charged to the banks should be marketable.
- vi. Banks should ensure maintenance of stipulated margins at all times.
- vii. The tenor of the bank loans may not be longer than seven years. However, the Boards of banks can make an exception in specific cases, where necessary, for financial viability of the project.
- viii. This financing would be subject to compliance with the statutory requirements under Section 19(2) of the Banking Regulation Act, 1949.
- ix. The banks financing acquisition of equity shares by promoters should be within the regulatory ceiling of 40 per cent of their net worth as on March 31 of the previous year for the aggregate exposure of the banks to the capital markets in all forms (both fund based and non-fund based).
- x. The proposal for bank finance should have the approval of the Board.

2.3.8.6 Appraisal

- (i) In respect of financing of infrastructure projects undertaken by Government owned entities, banks/ Financial Institutions should undertake due diligence on the viability of the projects. Banks should ensure that the individual components of financing and returns on the project are well defined and assessed. State Government guarantees may not be taken as a substitute for satisfactory credit appraisal and such appraisal requirements should not be diluted on the basis of any reported arrangement with the Reserve Bank of India or any bank for regular standing instructions/periodic payment instructions for servicing the loans/bonds.
- (ii) Infrastructure projects are often financed through Special Purpose Vehicles. Financing of these projects would, therefore, call for special appraisal skills on the part of lending agencies. Identification of various project risks, evaluation of risk mitigation through appraisal of project contracts and evaluation of creditworthiness of the contracting entities and their abilities to fulfill contractual obligations will be an integral part of the appraisal exercise. In this connection, banks/FIs may consider constituting



appropriate screening committees/special cells for appraisal of credit proposals and monitoring the progress/performance of the projects. Often, the size of the funding requirement would necessitate joint financing by banks/FIs or financing by more than one bank under consortium or syndication arrangements. In such cases, participating banks/ FIs may, for the purpose of their own assessment, refer to the appraisal report prepared by the lead bank/FI or have the project appraised jointly.

2.3.8.7 Prudential requirements

(i) Prudential credit exposure limits

Banks may be guided by DBOD Master Circular on Exposure Norms dated July 1, 2011. (ii) Assignment of risk weight for capital adequacy purposes Banks are required to be guided by the Prudential Guidelines on Capital Adequacy and Market Discipline- Implementation of the New Capital Adequacy Framework , as amended from time to time in the matter of capital adequacy.

(iii) Asset-Liability Management

The long-term financing of infrastructure projects may lead to asset – liability mismatches, particularly when such financing is not in conformity with the maturity profile of a bank’s liabilities. Banks would, therefore, need to exercise due vigil on their asset-liability position to ensure that they do not run into liquidity mismatches on account of lending to such projects.

(iv) Administrative arrangements

Timely and adequate availability of credit is the pre-requisite for successful implementation of infrastructure projects. Banks/ FIs should, therefore, clearly delineate the procedure for approval of loan proposals and institute a suitable monitoring mechanism for reviewing applications pending beyond the specified period. Multiplicity of appraisals by every institution involved in financing, leading to delays, has to be avoided and banks should be prepared to broadly accept technical parameters laid down by leading public financial institutions. Also, setting up a mechanism for an ongoing monitoring of the project implementation will ensure that the credit disbursed is utilised for the purpose for which it was sanctioned.

2.3.8.8 Take-out financing/liquidity support

(i) Take-out financing arrangement

Take-out financing structure is essentially a mechanism designed to enable banks to avoid asset-liability maturity mismatches that may arise out of extending long tenor loans to infrastructure projects. Under the arrangements, banks financing the infrastructure projects will have an arrangement with IDFC or any other financial institution for transferring to the latter the outstanding in their books on a pre-determined basis. IDFC and SBI have devised different take-out financing structures to suit the requirements of various banks, addressing issues such as liquidity, asset-liability mismatches, limited availability of project appraisal skills, etc. They have also developed a Model Agreement that can be considered for use as a document for specific projects in conjunction with other project



loan documents. The agreement between SBI and IDFC could provide a reference point for other banks to enter into somewhat similar arrangements with IDFC or other financial institutions.

(ii) Liquidity support from IDFC

As an alternative to take-out financing structure, IDFC and SBI have devised a product, providing liquidity support to banks. Under the scheme, IDFC would commit, at the point of sanction, to refinance the entire outstanding loan (principal+ unrecovered interest) or part of the loan, to the bank after an agreed period, say, five years. The credit risk on the project will be taken by the bank concerned and not by IDFC. The bank would repay the amount to IDFC with interest as per the terms agreed upon. Since IDFC would be taking a credit risk on the bank, the interest rate to be charged by it on the amount refinanced would depend on the IDFC's risk perception of the bank (in most of the cases, it may be close to IDFC's PLR). The refinance support from IDFC would particularly benefit the banks which have the requisite appraisal skills and the initial liquidity to fund the project.

