5.1. Introduction

As already stated in Chapter 1, the researcher will take a deeper look into the power and road sectors. In this chapter, the researcher maps out the applicability of the procedure, discussed in Chapter 3 on Project Appraisal and Risk Mitigation, to the sectors under study and will try to find out the adaptations that bankers use when they move from general to specific-sector appraisal. This chapter is divided into three sections. Section A covers the power sector and Section B the Road sector. Each section gives a brief profile of the sector before going into appraisal issues. Section C discusses the two Case Studies that were conducted during the course of the research.

Section A

Power Sector

Generation, Transmission and Distribution

5.2 Power Sector: Generation

5.2.1. Historical Perspective: The power sector in India has seen a major transition from the pre-independence era to the post-independence era. Before the Independence in 1947, the Indian power sector was governed by the "The Indian Electricity Act, 1910", which laid down the basic framework for the power sector in the country along with all the policies governing the electricity supply. But the situation was so grim that after the Independence not a single private organization was competent to venture into the power sector in the country, thereby, making way for state participation in electric power supply.
In view of this, The Electricity (Supply) Act, 1948, was enacted. The Act concentrated on increasing the state monopoly by setting up vertically integrated power-sector utilities, which enjoyed absolute control over generation, transmission and distribution even at the intra-state levels. As a result of this, 19 State Electricity Boards (SEBs) came to be formed under the Act and the installed capacity of the country grew substantially. However, the power supplied lacked in quality, security and reliability. The installed capacity proved to be insufficient for meeting the increasing galloping demand. Besides, factors like operational inefficiency of the SEBs, subsidized tariffs, low budget for transmission and distribution, inadequate maintenance, high distribution losses, rampant power thefts and uncollected bills resulted in acute power shortage. On account of all these reasons, the Government of India decided to revamp its policies.

Thus, in 1975, the Electricity (Supply) Act, 1948, was amended to improve the financial position of the state-controlled power sector by allowing the central government to participate in the generation and transmission of electricity. As an outcome of these amendments, the GoI set up The National Thermal Power Corporation Ltd. (NTPC) and National Hydroelectric Power Corporation Ltd. (NHPC) to supplement the efforts of the states and strive for greater capacity generation. In 1991 the government also provided various amendments to create a legal framework for the entry of the private sector.

In order to strictly implement reforms and restructure the tariff structure, the second generation reforms were introduced. The GoI then implemented “The Electricity Regulatory Commission Act, 1998.” It emphasized on the establishment of the state and central level Electricity Regulatory Commissions (ERCs) for rationalizing the tariff structure, bringing about transparency in the system and for framing and promoting environmentally benign policies.

The SEBs incurred heavy losses and failed to make the necessary payments to the Central Public Sector Units (CPSUs) and the outstanding payments reached an all time high of Rs 400 billion (1.5 per cent of GDP). Owing to their size, these boards were becoming cumbersome to manage. It was, therefore, decided to create Generating Company (GENCO), Transmission Company (TRANSO) and Distribution Company (DISCOM) and unbundle the utilities into more ‘manageable’ sizes, which paved the way for the Electricity Act, 2003.

The landmark events in the developments of the power sector are summarized chronologically.
Table 5.1: Landmark Events in Power Sector

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1948</td>
<td>Electricity (Supply) Act provided for the establishment of the Central Electricity Authority (CEA) and the State Electricity Boards (SEBs).</td>
</tr>
<tr>
<td>1950-50</td>
<td>Growth of state grid systems</td>
</tr>
<tr>
<td>1954</td>
<td>Constitution of regional electricity boards.</td>
</tr>
<tr>
<td>1955-73</td>
<td>Interconnecting state grids to form regional grid systems.</td>
</tr>
<tr>
<td>1974</td>
<td>Independent ministry for power sector</td>
</tr>
<tr>
<td>1975</td>
<td>CEA becomes a full-fledged organization.</td>
</tr>
<tr>
<td>1980-88</td>
<td>Growth of regional grid systems.</td>
</tr>
<tr>
<td>1989</td>
<td>Formation of Power Grid Corporation of India (POWERGRID)</td>
</tr>
<tr>
<td>1991</td>
<td>Generation of electricity opened to the private sector.</td>
</tr>
<tr>
<td>2000</td>
<td>Central initiative through Accelerated Power Development Programme (APDP)</td>
</tr>
<tr>
<td>2003</td>
<td>Electricity Act.</td>
</tr>
<tr>
<td>2005</td>
<td>National electricity policy and National tariff policy</td>
</tr>
</tbody>
</table>

5.2.2 Power Supply: Power is a critical infrastructure for economic development and for improving the quality of life of all citizens. The increasing of the installed power capacity from 1352 MW to over 100,000 MW since the Independence and the electrification of more than 5,00,000 villages is an impressive achievement in absolute terms (Economic Times, May 2008). However, it is a matter of concern that the annual per capita consumption of India, at about 350 kWh is among the lowest in the world. In spite of significant growth in electricity generation over the years, the shortage of power continues to plague the nation primarily on account of the geometric growth in demand for power outstripping the algebraic generating capacity. While the energy shortage came down from about 8.8 per cent in 2002-03 to about 8.3 per cent during 2007-08, there was a marginal increase in peaking shortage from 12.2 to 12.3 per cent during the same period mainly due to the shortage of gas ("Indian Electricity Scenario", Ministry of Power, July 2008). The main reasons for shortage of power are: galloping demand for power outstripping the sluggish generating capacity and mounting shortage of peaking power in the grid, low plant load factor of some of the thermal generating
units, high transmission and distribution losses, inadequate sub-transmission and distribution network in some states. Added to these, the financial position of the state utilities was precarious which made it difficult for them to raise the resources necessary for making the required investments to create adequate generation, transmission and distribution systems. The total installed capacity was 1,27,055.97 MW as on September 9, 2008 (Table 5.2).

Table 5.2: All India Installed Power Capacity

(As on July, 2008 in MW)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Hydro</th>
<th>Thermal</th>
<th>RES</th>
<th>Nuclear</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>2555452.00</td>
<td>42379.33</td>
<td>2557.53</td>
<td>0.00</td>
<td>75870.93</td>
</tr>
<tr>
<td>Private</td>
<td>1105.15</td>
<td>10501.72</td>
<td>3523.33</td>
<td>0.00</td>
<td>21245.05</td>
</tr>
<tr>
<td>Central</td>
<td>5422.00</td>
<td>30891.49</td>
<td>0.00</td>
<td>3900.00</td>
<td>48470.99</td>
</tr>
<tr>
<td>Total</td>
<td>35158.75</td>
<td>93114.54</td>
<td>12194.57</td>
<td>4120.00</td>
<td>145,587.97</td>
</tr>
</tbody>
</table>


The PLF has shown a steady improvement over the years as can be seen from Table 5.3

Table 5.3: Plant Load Factors

(Figures in %)

<table>
<thead>
<tr>
<th>Year</th>
<th>Target PLF</th>
<th>Actual PLF</th>
<th>Actual PLF</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Centre</td>
<td>State</td>
</tr>
<tr>
<td>2002-03</td>
<td>70.8</td>
<td>72.1</td>
<td>77.1</td>
</tr>
<tr>
<td>2003-04</td>
<td>72.0</td>
<td>72.7</td>
<td>78.7</td>
</tr>
<tr>
<td>2004-05</td>
<td>73.4</td>
<td>74.8</td>
<td>81.7</td>
</tr>
<tr>
<td>2005-05</td>
<td>74.7</td>
<td>73.5</td>
<td>82.1</td>
</tr>
<tr>
<td>2005-07 (June 2005)</td>
<td>75.1</td>
<td>75.7</td>
<td>82.4</td>
</tr>
</tbody>
</table>

5.2.3 Initiatives for Power Sector Development

5.2.3.1 Accelerated Power Development and Reform Program: It is aimed at bringing down the Aggregate Technical and Commercial losses (AT &C) from 50 to 15 per cent; reduce outages and make distribution financially viable with financial incentives given to SEBs for achieving profitability. Projects worth Rs. 1981 crore have since been sanctioned and 917
towns have been taken under APDRP. 159 towns have recorded Aggregate Technical and Commercial losses (AT & C) losses under 15 per cent and 43 towns recorded between 15 to 20 per cent.

5.2.3.2 Electricity Act, 2003: Driver of Overall Reforms Process: The Electricity Act, 2003, is a paradigm shift for the power sector which targets transforming the sector qualitatively. The Act includes consolidation of the laws relating to generation, transmission, distribution and trading. It contains measures conducive to the development of the industry; and encourage a competitive environment; supply electricity to all areas; rationalize the tariff structure, ensure transparent policies for availing subsidies and provide for the constitution of the Central Electricity Regulatory Commission (CERC), among others. This Act aims to introduce competition, protect consumers' interests and provide a framework for accelerated and more efficient development of the power sector. The main features of the Act are: Liberalization of generation; Tariff determination by the regulatory commissions; Distribution reforms, including mandatory metering; Open access to distribution; Separate mechanism for power trading activity; Full de-licensing of stand-alone systems of generation and distribution in rural areas; Accelerated electrification of rural villages and households; Stringent legal provisions against power theft; and Appointment of ombudsman for looking into non-redressal of grievances by the boards.

5.2.3.3 Merchant Power Plants: The said Act encourages power generation through the establishment of merchant power plants wherein a part of the new generation capacity, close to 15 per cent, could be sold outside the long-term power purchase agreements (PPAs). In addition, it also encourages captive generators to supply surplus power to the grid and also to the rural areas locally.

5.2.3.4 Multiple Licenses in Distribution: The Act's emphasis is on multiple licenses in the same distribution circle by setting up a parallel distribution network with the provision of minimum licensing area as a revenue district to avoid any malpractices. This also ensures a healthy competitive market in the retail segment.

5.2.3.5 Open Access for Bulk Consumers: The Act seeks to provide open access to consumers drawing more than 1 MW of power at any point of time, latest by January 2009, and then extend the same in stages to other consumers as well. The National Electricity Policy (NEP) states that the State Electricity Regulatory Commissions (SERCs) should issue regulations in this regard. Most states have finalized the draft guidelines for open access.
5.2.3.6 Open Access to Intra-state Transmission: Unbundling of SEBs

The most important provision enumerated in the Act is to ensure unbundling of SEBs to the different companies for generation, transmission and distribution. The transmission companies would then pass on the PPAs to the distribution companies within one year to ensure open access and neutrality of the transmission entity. The SERCs have been asked to specify the wheeling charges while Availability Based Tariff (ABT) is also introduced at the state level.

5.2.3.7 Accountability of AT & C Losses: To bring down the AT&C losses to 10 per cent in a phased manner, the SEBs were asked to segregate the commercial and technical losses for reporting it separately by March 2007. It means, greater accountability of all the losses suffered till then by the individual companies, viz. transmission and distribution.

5.2.4 Hydro-Electricity: Potential and Issues: The hydro-electric potential of the country, as per assessment studies completed by Central Electricity Authority, has been estimated at 84044 MW at 50 per cent PLF, equivalent to an installed capacity of about 150000 MW. At present the hydro share in the total installed capacity in the country accounts for 25.12 per cent (33192.77 MW out of total installed capacity of 127055.97 MW). The government has initiated several schemes and measures to boost hydro-power development. Hydro-power corporations in the central sector and in the joint sector (central and state), viz. National Hydro-electric Power Corporation (NHPC), North Eastern Electric Power Corporation (NEEPCO), Nathpa-Jhakri Power Corporation (NJPC-Now SJVNL), and Tehri Hydro Development Corporation (THDC) have been set up. Besides, NTPC has also undertaken a number of hydro projects. Narmada Hydro Development Corporation (NHDC), a joint venture of NHPC and the Madhya Pradesh Government., has been constituted to implement Narmada Sagar (1000 MW) and Omkareshwar (550 MW) hydro-electric projects.

The main constraints responsible for the slow pace of development of hydro-electric potential both for running of the river projects and storage, are land acquisition problems, resettlement and rehabilitation issues (Sardar Sarovar, Indira Sagar, Bansagar, Onkareshwar and Tehri are some of the hydro projects where the progress has been severely hampered from sustained opposition to project construction), geological surprises and inter-state squabbles.
5.2.5 Renewable Sources of Energy: Wind Energy

Rising pollution levels, increasing power requirement and inadequacy of raw material (coal, diesel, etc.) have emphasized the need for alternate clean and renewable sources of energy. Wind energy is the world’s fastest growing renewable energy source with an average annual growth rate of over 20 per cent. It is also the least expensive of all renewable energy sources. Tidal energy generation is also at the experimental stage.

The Government of India has established a separate Ministry for New and Renewable Energy (MNRE) and an R&D set-up like the Centre for Wind Energy Technology (C-WET). Attractive incentives like tax benefits, exemption in customs and excise duties are offered for such projects. MNRE as well as regulatory guidelines stipulate that the states purchase and utilize renewable power at predetermined and attractive rates. The current installed capacity amounts to 5400 MW as on May 2005, and India stands fourth, after Germany, the US and Spain in the race for producing wind energy, with a growth rate of 42 per cent, which contributes 4 per cent of hydro-power generation.

The gross wind energy potential in India has been estimated at 45,000 MW. Domestic companies are manufacturing wind-power turbines and components, achieving an annual turnover of Rs 1,500 crore. Wind electric generators capable of producing 55 to 1250 kW rating capacity are developed and manufactured in the country by using the latest technologies. Leading wind energy equipment manufacturers are Suzlon, Enercon, GE Wind, Vestas RRB, NEG – Micon, and Gamesa.

5.2.6 Ultra Mega Power Projects (UMPPs): The Government of India has envisaged capacity addition of 1,00,000 MW by 2012 to meet its mission of ‘power for all’. The Ministry of Power has drawn up plans for development of seven ultra mega power projects of 4,000 MW each, under tariff-based competitive bidding route, based on ‘pit-head/imported coal. These projects will be awarded to developers on ‘Build, Own, Operate’ (BOO) basis. The sizes of these projects being large, they are expected to meet the power needs of a number of states through a national grid transmission system. The project would be based on the latest highly efficient Super Critical Technology (SCT) with a unit size of 800 MW and station capacity of 4,000 MW. Each project would cost around Rs.15,000 crore.

Shell companies have been set up as wholly-owned subsidiaries of Power Finance Corporation Ltd. to facilitate tie-ups of inputs, linkages and various statutory clearances for
these projects. These companies will undertake preliminary studies and obtain the necessary clearances and tie-ups including water sources, land acquisitions and power sales arrangements, etc. These projects will be awarded to successful bidders selected through tariff-based international competitive bidding process. This is done with a view to enhance investors’ confidence, reduce risk perception and get good responses to competitive bidding.

The Ministry of Power is playing an important role as a facilitator to coordinate with the concerned ministries/agencies and state governments for ensuring: coal block allotment/coal linkage, environment/forest clearances, obtaining support from the state governments and its agencies, financial closure by financial institutions/banks. It also ensures PPA and the proper payment security mechanism with state government/utilities. Three pit-head projects – UMMP Sasan, Krishnapatnam and Tilaiya – have already been awarded to Reliance Energy based on the set process of competitive tariff bidding. The fourth UMPP, Mundhra, which is based on imported coal, has been awarded to Tata Power Co. Both Mundhra and Sasan have since achieved financial closure.

5.2.7. National Tariff Policy: The Government of India has notified the National Tariff Policy in compliance with Section 3 of the Electricity Act on January 5, 2005. It basically deals with various parameters with respect to fixation of tariffs to provide adequate return on investment to the power generator and ensuring reasonable user charges for the customers.

5.2.7.1 Competitive Bidding Guidelines: The Central Regulatory Commission has floated a set of new guidelines for electricity tariff on April 1, 2004. All future projects and new investments in generation, transmission and distribution both by the public sector utilities as well as Individual Power Producers (IPPs) are to be structured through a tariff-based transparent competitive bidding process, so that the benefits of increased economic efficiency are passed on to the customers.

The Act envisages that the tariff parameters should encourage competition, efficiency, and economical use of resources, efficient performance and optimization of investment, while safeguarding consumers’ interest.

The salient features of the new regulations are as follows:

(a) The Capital Cost of all projects shall be as admitted by the Commission.

(b) The normative Debt: Equity Ratio would be 70 : 30.

(c) The Return on Equity shall be 14 per cent post-tax across the board, and this shall be uniformly applicable to the CPSUs and IPPs.
(d) Depreciation shall be allowed over the fair life of the assets at the rate notified by the commission. In addition, advance against depreciation shall also be allowed to meet debt-service obligations by considering the repayment period of the loan as 10 years. While determining the advance against depreciation, cumulative depreciation recovered shall also be computed with the cumulative repayment made.

(e) Working capital shall be allowed on normative basis, and rate of interest applicable shall be the short-term prime-lending rate of SBI.

(f) Income tax on the core activity of the utility shall be reimbursable by the beneficiaries and shall be adjusted subsequently based on the income tax assessment by the IT Authority under the Income Tax Act, 1951.

(g) Incentive benchmark for thermal generating stations has been raised from a plant load factor of 77 to 80 per cent. Rate of incentive has been increased to 25 paise per unit from the existing 21.5 paise per unit.

(h) Efficiency benchmark for coal-based thermal generating units of 500 MW has been revised to 2450 kcal/kWh from 2500 kcal/kWh.

(i) A separate higher efficiency benchmark of 1859 kcal/kWh has been specified for advance-class gas-turbine stations, whereas for other new gas-turbine based generating stations the efficiency benchmark has been revised to 1950 kcal/kWh from 2000 kcal/kWh.

(j) For generating stations using coal or lignite as fuel, the norm for auxiliary energy consumption within the power station has been reduced by 0.5 per cent across the board.

(j) Normative benchmarks have been set for operation and maintenance expenses to be payable to the thermal generating stations and transmission licensees.

The above features are the bases for cash-flow estimation during the appraisal process.

5.3 Project Appraisal: Generation of Power

The main aspects that need to be seen in financing a power project are the following:

- Contractual Framework
- Clearances/Consents
- Security Structure (including health of the SEBs concerned)
5.3.1. **Contractual Framework:** The list of critical Agreements/Contracts to be examined is as follows:

### 5.3.1.1 Power Purchase Agreement (PPA):
This is the most important document which is directly related to the sale of electricity and cash-flow generation. This establishes the power-sale obligations between the project company and the utility. There are several types of PPAs. ‘Take-or-pay’ type contract is the best choice in case bulk power is sold to a public sector utility. The take or pay contract means that there is a contractual obligation to make periodic payments in future for an agreed off-take of power at the set prices and the purchaser must make specified payments even if it does not require the power at a particular time and the agreement can only be cancelled by mutual consent. Some other provisions of PPA that define each party’s responsibilities and penalties in case of non-performance under agreed terms are: Nature of the Plant; Base load or peaking plant; Tenure; Conditions for the PPA to come into effect; Interconnection facilities; Deemed commissioning clause; Tariff determination; Security conditions; *Force majeure* clauses; and Termination payments.

Up till now, Independent Power Producers (IPPs) used to approach banks for financial assistance after entering into a long-term PPA with the state utilities/intending purchasers. This helped in assessing the revenue flows from the project and establishing the financial viability of the project. Keeping in view the present policy of entering into PPA by state utilities, based on competitive bidding only, the banks are being approached for financing of power projects even when the sale tie-up has not been entered into. Promoters now have to bid for supply of power and then enter into PPA with the intending buyers. In view of this, a realistic assessment of revenue flow is difficult to ascertain; hence it has to be assessed on the basis of tariff structure prevailing at the time of appraisal of the project – determined through the competitive bidding route. Therefore, a pre-disbursement condition for entering into PPA for part capacity (so as to have a debt servicing of minimum 1.10) is being stipulated. As the Electricity Act, 2003, allows trading in power and provides for further deregulation, Power Trading Companies are being established to trade in power. Promoters are also entering into PPA with PTC India Ltd for sale of power on a long-term basis. The PTC, in turn, enters into back-to-back PPAs with the state utilities.

### 5.3.1.2 Fuel Supply Agreement (FSA) and Fuel Transportation Agreement (FTA):
A reliable and confirmed Fuel Supply Agreement (FSA), the terms of which match with the terms of PPA, is an integral part of the security package. The FSA contains evidence of the
existence and dedication of fuel reserves sufficient to meet the project requirements for the
duration of the agreement. Some key provisions of this agreement are: Period – which
should be at least for the currency of the term loans; Conditions; Precedents;
Commitment advance; Earnest money; Obligation to sell and purchase coal; Quantity and
delivery of coal; Loading and delivery; Quality of the coal; Liquidated damages; Purchase
price for fuel; Payment terms; Force majeure; and Settlement of disputes.

5.3.1.3. Engineering, Procurement and Construction Contract (EPC): The project company
should enter into a turnkey contract with a reputed contractor for the design, equipment
procurement, erection, testing and commissioning in accordance with the power requirement
spelt out in the PPA. This is also known as the Engineering, Procurement and Construction
(EPC) Contract. The EPC establishes the 'sole' undertaker of the entire responsibilities and
guarantees the plant's performance, schedule, warranty and completion.

Following are usually the main features of an Engineering, Procurement and Construction
Contract: Technical Scope and Specifications; Contractor's Responsibilities; Owner's
Responsibilities; Compensation and Payment; Acceptance and Testing; Insurance; Dispute
Resolution Methods; Force majeure and confidentiality.

The terms, conditions and obligations in the EPC Contract should be at least on par with
or better than the provisions in the PPA. The scope of the suppliers generally includes design,
development and erection.

5.3.1.4 Operation & Maintenance (O&M) Contract: The project company normally
identifies a reputed operation and maintenance contractor in order to conclude the O&M
Agreement. The O&M contractor would be responsible for the operation and maintenance of
the plant in accordance with the prudent practices. The selection of O&M contractor at the
time of finalization of EPC package is advantageous as it helps the contractor to familiarize
with the technical parameters of the facility right from the start of the construction. The term
of this contract should not be less than that of expiry of extended warranties given by the
EPC contractor. The lenders, however, desire that this term should be matched with the
expiry of debt-service obligations.

5.3.1.5 Clearances/Consents/Approvals: Given in Table 5.4 is an illustrative list of
clearances required for a power project.
Table 5.4: List of Clearances Required for Power Projects

<table>
<thead>
<tr>
<th>Item</th>
<th>Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Statutory Clearances</td>
<td></td>
</tr>
<tr>
<td>• Water Availability</td>
<td>Water Resources Department, State Government.</td>
</tr>
<tr>
<td>• Section 18A Clearance (State Government Concurrence), Registrar of Companies</td>
<td>State Government</td>
</tr>
<tr>
<td>• Pollution Clearance, Forest</td>
<td>State Pollution Control Board</td>
</tr>
<tr>
<td>• Environment &amp; Forest Clearance, Rehabilitation &amp; Resettlement</td>
<td>Ministry of Environment &amp; Forests, Government of India</td>
</tr>
<tr>
<td>(b) Non-Statutory Clearances</td>
<td></td>
</tr>
<tr>
<td>• Land Availability</td>
<td>State Government</td>
</tr>
<tr>
<td>• Fuel Linkage</td>
<td>Standing Linkage Committee Department of Coal</td>
</tr>
<tr>
<td>• Transportation of Coal</td>
<td>Ministry of Railways</td>
</tr>
<tr>
<td>(c) Other Clearances</td>
<td></td>
</tr>
<tr>
<td>• Foreign Investment Promotion Board Clearance</td>
<td>Foreign Investment Promotion Board</td>
</tr>
<tr>
<td>• ECB Clearance</td>
<td>RBI</td>
</tr>
<tr>
<td>• Forex permission for foreign equity</td>
<td>RBI</td>
</tr>
</tbody>
</table>

5.3.1.6 Security Structure: Mitigation of the payment risk by SEBs/off-takers is critical for ensuring the viability of the power projects. In addition to direct payment, security package, in the form of Letter of Credit (LC) and Escrow Agreement (EA), serves as a temporary measure for enhancement of creditworthiness of SEBs/off-takers. State Government Guarantees may also be explored, although currently most state governments do not extend guarantees.

Although the security structure has been envisaged for payment dues, SEBs/off-takers in the normal course are expected to make direct payments within a stipulated period from the date of presentation of the invoice. The money in the escrow account is 'flow-in' and 'flow-out' and the cash in the account will be trapped only in the event of default.

5.3.1.7 Direct Payment: The project company would raise the invoices on a monthly basis, i.e. after generating and supplying the power to SEBs/off-takers for a period of one month. SEBs/off-takers would have two options of making the payments according to the
specification: (a) number days (say 5 to 10) from the presentation of the bills and avail of the discount; or (b) time (say 30 days) from the presentation of invoice, but avail of a lower discount (say 1 per cent).

5.3.1.8. **Letter of Credit:** The SEB/off-taker shall also maintain an irrevocable, standby, unconditional, letter of credit issued by an acceptable creditworthy bank in favour of the project company. The LC will be opened in favour of the project company for an amount prescribed in the PPA (e.g. equivalent to one months’ billing) from the date when the project company starts selling power. In the event of default in payment, the LC equivalent to one month’s billing will be invoked.

5.3.1.9 **Escrow Account:** Escrow account is a part of the mechanism intended to capture the revenues of the purchaser in case of default in making payments to the project company. Escrow account is a designated account opened with a commercial bank – the main banker to the purchaser of power – supported by a structure designed to ensure that receivables of the purchaser are deposited to the credit of the said account only. The FIs/banks have developed a Model Escrow Agreement (MEA) that is more suited to vertically integrated SEBs in pre-reform era. In the unbundled scenario, i.e. when the SEBs are split into Transmission Company (Transcom), Distribution Company (Discom) and Generation Company (Gencom), the MEA would need to be modified to accommodate the two-tier escrow structure. Under the two-tier escrow mechanism, Level I escrow would be positioned between the consumers and Discom, and Level II escrow is envisaged to be positioned between Discom and Transcom. On default by Discom, Level I escrow is triggered and receivables are paid directly into the Level II escrow. On default by both Discom and Transcom, both the Levels I and II escrows are triggered so that the receivables are directly paid to the power producers by the consumers. The principles of escrow would however remain the same under both the scenarios.

5.3.1.10 **State Government Guarantees:** The state governments have been providing guarantees with a view to attracting investment into their respective states. This has been the practice and, over a period of time, the state government guarantee was recognized by lenders and sponsors as a part of the security package. However, lately state governments have not been extending their guarantees and most of the power projects are being funded without their guarantees. This is on account of the keener interest being shown by promoters in
setting up power projects and on account of the fact that the lenders now feel that securing the receivables of the power project is a better security than the state government guarantee.

5.3.1.11 **Trust and Retention Account:** The project company opens and maintains a Trust and Retention Account (TRA) and deposits all the cash flows of the company into the said account, and, the proceeds shall be utilized in the manner and according to the priority to be decided by the lenders. A TRA attempts to discipline the utilization of the cash flows entering a project company. The TRA can be at two stages:

- **Implementation stage:** This TRA structure requires that during the implementation stage, all project funds (equity/debt) be placed into it. The main account is designated as the proceeds account, which captures all the revenues. Based on the implementation schedule, during the implementation phase, funds from this account are transferred to the construction account (sub-account) for meeting construction expenses; to the interest service account (sub-account) for meeting the interest payments during construction expenses. Withdrawals from this account are permitted on the basis of an approved project implementation plan that is permitted by project lenders on the basis of project status reports/certification regarding achievement of various yardsticks and milestones as agreed to at the outset. Such a mechanism is considered to be of paramount value to the project lenders, for ensuring end-use of funds and monitoring project implementation. It can serve as a useful tool for taking mid-course corrections, especially in the case of long-gestation infrastructure projects.

- **Operations stage:** Once the Project is fully implemented and starts generating revenues from its operations, the entire revenues continue to be captured in the Trust and Retention Account, while the construction and interest service accounts opened earlier are no longer required.

5.4 Power Sector, Generation: Critical Risk Factors

Projects are rated on risk elements that are identified earlier as a first step towards risk measurement.

5.4.1 **Availability of Fuel:** Coal production is concentrated in the central and eastern regions of India, and, therefore, it needs to be transported over long distances by rail to meet the requirements of end-users in the northern, western and southern regions. Often, traffic congestion on the rail routes results in inadequate supply of fuel reaching the generating
stations on schedule. Hence, several coastal power plants have supplemented a mix of domestic and imported coal. The domestic availability of natural gas is limited. The quantity supplied to almost all users is far below their requirements. The availability of natural gas is likely to improve from 2008-09 onwards due to the discovery of huge natural gas reserves in the Krishna-Godavari basin by Reliance Industries and the availability of imported liquefied natural gas reserves in Gujjarat, Maharashtra and other states along the HBJ pipeline and the recent 20 tcf gas find by GSPC. However, the pricing of this gas is likely to be market determined and in view of the high volatility in gas prices witnessed during the last 2-3 years, gas-based power plants would be bearing a high risk on account of both pricing and availability of gas.

5.4.2 Regulated Pricing: Coal prices, which are fixed by Coal India Limited (CIL) on a 5-monthly basis, have increased by 5-8 per cent per annum over the past 4-5 years. Coal prices (on delivered basis) are affected by rising railway freight rates. The prices of naphtha and fuel oil are de-regulated and are linked to international import parity prices. Thus, these prices are closely linked to the movements in international crude oil prices, which have been extremely volatile in the past. The increase in the international prices of crude oil pushed up the prices of naphtha and fuel oil, leading to a sharp hike in the power tariffs for naphtha-based IPPs.

Natural gas prices are administered by the Ministry of Petroleum and Natural Gas (MoPNG) and are linked to a basket of fuel oils. In the future, if the cap is removed, it could lead to a major increase in gas prices. As per the present indications, any incremental production of gas is likely to be priced at market-related rates only.

5.4.3 Off-take and Credit Risk: When a power generating entity is not able to contract for a Power Purchase Agreement (PPA), it faces an off-take risk. Earlier, the central and state governments used to give counter-guarantees to power generating companies. However, since they have stopped giving guarantees and mechanisms like escrow have failed in the past, generating companies face a default risk from SEBs and other entities buying power.

Apart from this, the progress of tariff rationalization and implementation of open access is still to gather momentum. A speedy implementation of this is likely to have a positive impact on the end-consumer tariffs. In the 2005-06 and 2006-07 Union Budgets incentives for ultra-mega power projects were announced in the form of extensions of tax exemptions under Section 80 IA up to March 31, 2010. This will benefit only the ultra-mega power projects.
5.5. Power Sector: Transmission

Transmission of electricity is defined as bulk transfer of power over a long distance at a high voltage, generally of 132 KV and above. In India bulk transmission has increased from 3708 ckm (circuit kilometer) in 1950 to more than 2,55,000 cks in 2007. The entire country has been divided into five regions, namely: (i) Northern, (ii) North Eastern, (iii) Eastern, (iv) Southern and (v) Western for transmission systems. The inter-connected transmission system within each region is called the Regional Grid.

The Government of India has an ambitious mission of “Power for All by 2012’. The attainment of this objective would require that the installed generation capacity should be at least 200,000 MW by 2012 from the present level of 114,000 MW. In order to deliver this volume of power to the length and breadth of the country, an expansion of the regional transmission network and inter-regional capacity to transmit power would be essential. The latter is required because resources are unevenly distributed in the country and power needs to be carried over great distances to areas where load demand centers exist.

The transmission system planning in the country, in the past, had traditionally been linked to generation project as part of the evacuation system. Ability of the power system to safely withstand a contingency without generation rescheduling or load-scheduling was the main criteria for planning the transmission system. However, due to various reasons such as spatial development of load in the network, non-commissioning of load-centre generating units originally planned and deficit in reactive compensation, certain pockets in the power system could not safely operate even under normal conditions. This had necessitated scaling down of generation and operation to a lower load generation level in the past. Transmission planning has, therefore, moved away from the earlier generation-evacuation system planning to integrate system planning.

A statutory body under the Ministry of Power – the Central Transmission Utility (CTU) – undertakes transmission of energy through the inter-state transmission system and discharges all functions of planning and coordination relating to the transmission system with the state transmission utilities, central government, state governments, generating companies, etc. Power Grid Corporation of India Limited (PGCIL) is the Central Transmission Utility.
5.6 Project Appraisal: Transmission of Power

5.6.1 Implementation Agreement (IA): The Implementation Agreement is entered into by the company with the Central Transmission Utility (CTU-PGCIL), which sets out the terms and conditions of construction and development of each phase of the project until its commercial operation. After COD, the IA ceases to have effect in relation to the operational phase and then the Transmission Service Provider Agreement (TSPA) takes over.

5.6.2 Transmission License: The project company is required to obtain the transmission license from the Central Electricity Regulatory Commission (CERC), as per the Transmission License Regulations (TLR). In case of revocation of license or rejection of application for license, the CTU should take over the project.

5.6.3 EPC and Project Management Contracts: The EPC and project management contractors should enter into a turnkey contract with the company since the implementation of the project should proceed according to the implementation schedule specified by the company to the CTU. In case of delays in commissioning, fines and charges are levied on the company and so timely implementation of the project is essential. Thus, the capability of the EPC contractors is of paramount importance, as well as their ability to arrange for bank guarantees as security/performance bond.

5.6.4 Electricity Supply: The gap between the demand and supply of energy needs to be studied and also the geographic profile of the demand and supply of energy. It is ideal to have a supply agreement with a power generation unit on a long-term basis so as to ensure that power is transferred using the transmission lines being set-up.

5.6.5 Transmission Service Provider Agreement (TSPA) with Beneficiaries: The "off-take agreement" with the transmission sector is called the TSPA. This Agreement is entered into by the company either only with the CTU, or with the CTU and the beneficiaries of the transmission lines. The beneficiaries can be private companies buying power from IPPs or otherwise, and are not presently connected to the state grid or the SEBs. The TSPA provides for the computation of the transmission charges (TSPC), "take or pay" provisions, price escalation factors, payment security, termination provisions, etc. In case the payment is to be made by the SEBs, due consideration has to be given to the creditworthiness of the SEBs.
5.6.6 Linkages with Other Networks: Risk is mitigated substantially if the transmission lines form a part of the overall regional network which can allow state level power transfer, in case the beneficiaries default or power generation units falter on their commitments.

5.6.7 Comforts in Case of Defaults by Beneficiaries or Power Producing Unit.: Comforts provided by PGCIL compensate for the risks of beneficiaries defaulting on their payment, and power producers not performing as per their commitments. Buy-out provisions need to be incorporated in the TSPA in case of default by beneficiaries, power producers, revocation of licenses, force majeure events, etc.

5.6.8 Other Transmission Issues: Some of the issues confronting India’s power transmission segment are detailed below.

- **Transmission congestion:** Congestion is caused when the available transmission capacities are constrained due to excess load. Real-time transmission congestion can be defined as the operating condition in which there is not enough transmission capability to implement all the traded transactions simultaneously due to some unexpected contingencies. This can be caused due to heavy load in a particular region or zone, which requires rescheduling of power dispatch through various congestion management methodologies. Currently, India faces a problem of severe congestion on majority of its networks.

- **Pancaking:** When power is to be transferred across regions or states, it involves payment of transmission and wheeling charges applicable to each region or state. This adds up to a higher tariff, and the process is known as pancaking of tariffs. This system is prevalent in India, as power flow across regions will involve the payment of transmission charges to the state through which it is being transmitted, in addition to payment of transmission charges applicable for the use of the regional network.

- **Slower pace of capacity addition in the transmission segment:** The pace of capacity addition in transmission is slower than the pace of capacity addition in generation. An increase in generation capacity necessitates a consequent increase in power evacuation capacity.

- **High Transmission and Distribution (T&D) losses of 30-35 per cent:** The transmission and distribution (T&D) losses in India are very high, in comparison with the global scenario. Transmission losses account for about 4-5 per cent, while
distribution losses account for the rest. The losses at the distribution level are higher due to pilferage, theft and the presence of several stages in the distribution of power.

- **Lack of private participation:** Though the Electricity Act opened up the sector to private investments, the country has not seen many private players entering the transmission segment. The joint venture between Tata Power Company Ltd. and Power Grid Corporation of India Ltd. (PGCIL) for the Tala transmission project is the only large investment made by a private player.

### 5.7. Distribution of Power

Compared to the generation and transmission sectors, the progress of distribution sector did not receive the attention it really deserves. Excessive Aggregate Technical & Commercial (AT & C) loss is a key area of concern in power sector reform. The distribution system is the worst affected area, with an adverse impact on the quality and reliability of the power supply.

The end users are often confronted with frequent and long power cuts and erratic voltage. They also complain about high metering, over billing, long wait for new connections, poor services from the utilities, etc. This results in low consumer satisfaction and constant complaints.

The Aggregate Technical & Commercial (AT&C) loss of the state power utilities is very high, in some cases exceeding 50 per cent. In addition to high AT&C loss, billing and collection efficiencies of the state power utilities are also poor, the physical infrastructure is overloaded and weak, and new investments are not forthcoming, which worsens the already poor state of these utilities.

While the technical losses should be around 10 per cent (maximum), the actual position represents theft of power, resulting in honest consumers and state having to bear connived pilferage burden. Power supply being a sensitive issue socially as well as politically, bold initiatives are rarely seen in this sector. From lenders' perspective, the politically-motivated clamor for and acquiescence to free/subsidized power for agriculture adds to the woes of this sector in particular and power sector in general.
5.8. Project Appraisal: Distribution of Power

- In India, the distribution system has been lackadaisical and extended on an ad-hoc basis, primarily to provide electricity for agriculture, resulting in the frequent failure of T&D networks and disruption of supply. This issue needs to be examined in detail.

- The distribution system is, thus, bedeviled with high losses. Technical losses are inherent in the system and occur due to conversion of electricity into heat and magnetic energy in T&D equipments. Commercial losses occur due to non-metering, non-billing and pilfering of power.

- Given the large distribution network, multiple transformation stages and large-scale rural electrification in India, the recommended optimal level of T&D losses is fixed at 15 per cent.

- Political interference in the operations of SEBs, especially with respect to tariffs, investments and personnel, is one of the primary reasons for the inefficiency and losses in the distribution sector. This avoidable risk is to be properly structured for protecting lenders' interests.

- The distribution economics is handled on “cash basis” and not on “accrual basis”. This suppresses the actual financial position as revealed in the balance sheet, which is prepared on accrual basis. The viability of a distribution project has to be determined by assessing the actual financial position.

Therefore, the issues for appraisal in generation, transmission and distribution of power are highlighted above.

Section B

Road Sector

5.9. Introduction

Roads are the most important and primary means of transport in India. In the descending order of volume of traffic movement, the road network in India can be divided into the following broad categories: National Highways (NHs), State Highways (SHs), major district roads, urban roads and village roads.
The density of India’s highway network at 1 km of highway per sq km of land is greater than that of the United States (0.55), China (0.15) and Brazil (0.20). However, most highways in India are narrow and congested and have poor surface quality because, historically, the financing of the road sector in India has been inadequate mainly due to poor funding by resource-starved government bodies that have focused more on the development of secondary and tertiary networks.

Roads are the arteries of not only the transport sector but in a sense development itself. India has the world’s second longest road network of over 3.3 million kilometres comprising 55,590 kilometres of national highways, 0.14 million kilometres of state highways, 0.47 million kilometres of major district roads and about 2.5 million kilometres of rural roads. The 55,590 kilometres of national highways constitute just 2 per cent of the road network but carry 40 per cent of the total traffic. 7300 kilometres (about 11 per cent) of these highways are presently 4-lane, 35,300 kilometres (about 54 per cent) are 2-lane and the remaining 35 per cent are either single or intermediate lane roads.

Indian roads for long have been notorious for their poor quality. In the past few years, traffic on Indian roads has been growing at a rate of about 7 per cent per annum while the growth in the number of vehicles has been 12 per cent per annum. This has resulted in India’s transport network coming under great strain of increasing congestion and consequent wear and tear. This acts as a constraint to our economic development. The road network, therefore, needs to be revamped, expanded and strengthened at a very fast pace not only to cater to the increased volume of traffic but also to provide improved accessibility to the hinterland. In fact Indian roads have to be modernized. To address this issue, the Government of India in 1998 conceptualized a 4-lane national highway grid and decided to construct 5,800 kilometres of high-density corridors under the National Highways Development Project (NHDP) connecting the four metropolitan cities – Delhi-Mumbai-Chennai-Kolkata- (referred to as the Golden Quadrilateral) and also provide for port connectivity. This was the first phase of NHDP.

In the second phase of NHDP, it was decided to 4-lane the North-South (Srinagar up in the North to Kanyakumari in the South) and East-West (Silchar in the North-East to Porbandar in the West) Corridors of the country – a total length of 7,300 kilometres. Phases I and II were sanctioned at a total cost of Rs. 54,500 crores or US $15 billion. It was also realized that implementation of this mega project may not be possible under the then
prevailing government departmental ‘Public Works’ system and therefore it was decided to adopt a new approach of contract management by introducing the European FIDIC system in which the work of preparation of project reports and supervision of construction work were outsourced to consultants. All projects and consultancies are put on bid on the basis of a totally transparent International Competitive Bidding process and use Model Concession Agreements that clearly delineate all risks and responsibilities between the contracting parties. Most of the projects under Phases I and II of NHDP were public funded. Though the concept of Public-Private Partnership was introduced, some contracts were awarded on BOT (Built-Operate-Transfer) basis. Currently, nearly 7,300 kilometres of 4-lane highways have been completed. The “Golden Quadrilateral” is virtually completed and has been linked-up to the four metros through these all-weather, high-quality 4-lane highways. The economic impact of this has been tremendous. According to a World Bank study, there is an annual saving of Rs. 8,000 crores (which is equivalent to US$ 2 billion at 1999 price), due to the Golden Quadrilateral alone. The North-South and East-West (NSEW) Corridors are also planned to be substantially completed by early 2009. This would almost double the length of the 4-lane highway network in the country. This success has led the Government of India to expand the National Highways Development Project by including five more phases. It is expected to cost US $ 50 billion and it is to be implemented between the years 2005 to 2015. Hence, NHDP authority proposes the following:

- Phase III to connect the state capitals and other important centres of economic and tourist importance to the Golden Quadrilateral/N-S-E-W Corridor, again through 4-lane roads - having a total length of over 12,000 kilometres.
- Phase IV to re-develop 20,000 kilometres of national highways with 2 lanes plus paved shoulder.
- Phase V to upgrade 5,500 kilometres of the Golden Quadrilateral and other high-traffic density corridors from 4 to 5 lanes.
- Phase VI to provide for 1,000 kilometres of access controlled expressways to connect important centers.
- Phase VII to provide for construction of ring-roads, by-passes.

Encouraged by the success of Public-Private Participation during Phases I & II, the Government of India has decided that from Phase III onwards projects under NHDP will mainly be taken up under the BOT (Build-Operate-Transfer) concept. This decision to
involve Public Private Participation (PPP) is a paradigm shift in the approach to the implementation of projects under NHDP. To utilize private sector resources and also to tap the techno-managerial capacity of the private sector, NHAI is now aggressively promoting PPP projects with an assured viability gap funding of up to 40 per cent of the project cost. This new PPP approach is in contrast to the earlier approach when NHAI directly constructed roads under the EPC (Engineering Procurement and Construction) mode or item-rate contract using public funds. Already NHAI has awarded 78 projects on BOT basis at a total project cost of US$ 5.5 billion, of which 15 projects (US$ 1 billion) have been successfully completed and the rest are in varying stages of implementation. Interestingly, the demand and viability of this model has resulted in several BOT projects getting awarded on ‘negative grant’, i.e. where the concessionaire, instead of asking the government for Viability Gap Funding, offers an up-front ‘negative grant’ to win the concession. As mentioned earlier, projects awarded under Phase I have been completed and those under Phases II, III & V are under various stages of implementation. Not only leading Indian private sector companies but also a total of 85 contracting and consulting firms from 27 countries, that include the US, UK, Australia, France, Germany, Italy, Japan, Malaysia, South Korea and China, are already participating in various projects of NHDP at different stages.

The Government of India has laid down comprehensive policy guidelines for private sector participation in the highway sector and has also announced several incentives such as a 10-year tax holiday, 100 per cent Foreign Direct Investment and duty-free import of road-building equipments and machinery, concession period up to 30 years and the right to collect and retain user-fee (toll). To ensure that the highway building program is not short of funds, the government has created a non-lapsable and dedicated Central Road Fund for financing the road sector by crediting a fixed cess on diesel and petrol consumption and by establishing a transparent structure for user-fee or toll for all – both 4- and 5-lane – new highways. For ensuring the highest level of commitment, the Government of India has set-up a Committee on Infrastructure, headed by the Prime Minister. This Committee is to provide policy guidelines that would ensure time-bound construction, development of strategies to maximize the scope of Public-Private Partnership and continuous monitoring of the progress of the road sector that is envisioned to become a world-class infrastructure. In order to clearly demarcate risk-allocation for road development, NHAI uses the most common and popular form of Public-Private Partnership (PPP) namely the BOT (Toll) Model. They have, however, also introduced the BOT-Annuity concept as an alternative model for stretches where there is insufficient response from the market for BOT-Toll. Under the BOT-Toll model, the
concessionaire is required to meet the up-front cost and expenditure on design, construction, finance, operation and maintenance of the project during the entire concession period (usually around 20 years). The concessionaire, of course, recovers his costs and Return-on-Investment (ROI) out of the toll collection. For increasing the viability of these projects, Viability Gap Fund (VGF) is also provided (up to a maximum of 40 per cent of the project cost). Model Concession Agreements (MCA) are used which provide clearly defined rights and obligations to both the entrepreneurs and the client, i.e. NHAI. Under the alternate BOT-Annuitu model, the concessionaire is required to meet the entire up-front cost and no Viability Gap Fund is paid by the client. The concessionaire, however, recovers his investment and return on it out of the biannual annuities payable by the client over this entire concession period (usually 18 to 20 years). The client (government/NHAI) retains the risk with respect to traffic (toll) and therefore collects the toll through its own agency.

5.10. Legal, Institutional and Policy Framework: Road Sector

5.10.1 Institutional Framework: The overall policy, program development and resource planning, is done by the Planning Commission in consultation with the Ministry of Shipping, Road Transport and Highways (MoSRT&H) and the Ministry of Rural Development (MoRD) at the central level, and by the State planning cells in consultation with the central level Planning Commission, and, at the state level, the state ministry of roads. The ministries allocate and release the funds for the development of roads, to the respective implementing agencies.

The National Highways Authority of India (NHAI) and the state public works department (PWDs) act as the implementing agencies for the NHs. The state PWDs and road development corporations act as the implementing agencies for the development of the state roads.

5.10.2. Policy Framework: Key policy measures by the central government in road sector include 100 per cent FDI permitted projects for which the NHAI/Government of India will provide the:

- Capital grant up to 40 per cent of the project cost, in order to enhance the viability on a case-to-case basis and based on the lowest bid quoted. NHAI is also permitted to participate in the equity in BOT projects up to 30 per cent of the total equity.
- Land required, free from all encumbrances.
• Infrastructure SPV, called India Infrastructure Finance Company (IIFC), to provide the long-term funding requirements.

• Dispute-resolution mechanism in line with the Arbitration and Conciliation Act, 1995.

The transport ministry is authorised to levy higher rates of toll for expressways, major bridges, new bypasses and tunnels, after a competitive bidding process. Actual rates will be decided on a case-to-case and area-to-area bases and the revision of the toll-fee is linked to WPI to be reviewed every 3 years.

5.10.3 Model Concession Agreement (MCA): The BOT projects have been awarded under a Model Concession Agreement, which has undergone changes over the period, based on responses from the concessionaires and lenders.

The MCAs identify the following risks and specify the terms and conditions for risk sharing between the private player(s) and the government.

1. **Partial traffic risk mitigation provisions introduced:** The MCA provides for an increase in the concession period by 1.5 per cent (subject to a maximum of 20 per cent) for every 1 per cent shortfall in traffic. The provisions also provide for a reduction in the concession period by 0.75 per cent (subject to a maximum of 10 per cent) for every 1 per cent in excess of actual traffic over the target traffic.

2. **Government grant:** In no case shall the government provide a grant in excess of 40 per cent of the project cost. Where the minimum grant needed is in excess of 40 per cent of the cost, the project will be awarded either on annuity or cash contract basis.

3. **Concession period:** The concession period has been linked to 5-laning of the stretch, i.e. if the concessionaire agrees to 5-lane the stretch (after a period of 8 years from the appointed date), then the concession period will be available for a period of 20 years; else the concession period shall be granted only for 12 years.

4. **Toll rates:** The MCA provides for indexation of the user fee to the extent of only 40 per cent of WPI since it has been contemplated that repayment of the debt would be neutral to inflation.
5.11. Project Appraisal: Road Sector

5.11.1 BOT-Toll Projects: The NHAI has been awarding projects in economically viable stretches through BOT-route to private investors. The concessionaire is responsible for the construction and maintenance of the project highway which generates revenue through toll collection during concession period. After the completion of the concession period, the project highway is transferred back to NHAI. The concessionaire assumes the traffic risk. The viability of a toll-based project depends on the potential of ‘tollable’ traffic and willingness of users to pay the toll.

Over time, acceptance of toll on roads has been increasing as people are willing to pay the user charges. Hence, the risk is mainly regarding the predictability and reliability of traffic projections, which is not easy to forecast. The traffic on the project-road depends on many parameters such as the movement of agricultural and industrial outputs, charges for alternate means of transport, development of feeder roads, availability of alternate routes, etc. The toll-based road projects are more risky than annuity-based projects. The bidding for toll-based projects is based on a combination of the minimum grant (or the maximum negative grant) quoted along with the minimum concession period.

The onus of tolling and maintaining the stretches rests upon the private player. BOT projects also ensure faster completion as any delay can reduce the concession period for the concessionaire and the resultant loss of toll revenues. The quality of the construction is also taken care of, as the concessionaire is obligated to maintain the stretch for a long period of time.

5.11.2 BOT-Annuity Projects: The concessionaire is responsible for the construction and maintenance of the project highway, and NHAI would pay the concessionaire a semi-annual payment (annuity). The concession contract is awarded to the bidder quoting the lowest annuity amount. In this case, the traffic risk is borne by the NHAI.

Another system in vogue in other countries like the UK, Finland and Netherlands, is the shadow tolling system. No tolls are levied from road users under this approach. Instead, shadow tolls are paid by the government to the operator, based on traffic counts on the road and at an agreed rate per vehicle/vehicle type.

5.11.3 SPV Projects: The port connectivity projects, aimed at connecting all major ports to the nearest NH to facilitate smoother cargo evacuation, are being executed through NHAI-
owned SPVs. NHAI along with the relevant Port Trust Authority together invest around 30 per cent of the project as equity. The EPC contractor or the private sector company may contribute another 5 to 10 per cent, and the balance is to be raised from the market.

Some other major characteristics of the road sector projects are as under:

- **Grant structure**: Under Phase IIIA, a unique financial structuring was used for two of the projects, namely Vadape-Gonde and Pimpalgaon-Dhule road sectors. The concessionaire would get a positive grant in the early years of the concession period and it will pay a negative grant towards the end of the concession period. The projects have been designed to financially support the concessionaire during the early years of the project.

- **Significant level of outsourcing**: NHAI outsources the feasibility studies, designing and construction work, through empanelled consultants involved in the execution of highway projects, and restricts its own role to the overall planning and supervision of the projects. This has enabled it to reduce the pre-execution time.

- **Revenue sharing model**: NHAI has developed a revenue sharing model, which allocates the traffic risk between the concessionaire and NHAI. NHAI is likely to compensate the private player only when the traffic falls below a benchmark level indicated in the concession agreement.

- **Viability gap funding**: It is a grant limited to the revenue shortfall amount to make good the gap between the expected and the actual rate of return of the project. The bid will take place on the basis of the lowest NPV of the grant sought by the concessionaire. The grant would be limited to 25 per cent of the capital cost (maximum of 40 per cent on a case-to-case basis).

- **The expected returns** of the construction player, concessionaire, vary with the type of project that he undertakes (10 to 12 per cent for BOT-Annuity, and 15 to 20 per cent for BOT-Toll projects). The NHAI determines the type of concession agreement based on the returns from a particular project.

### 5.11.4 Other Modes of Private-Sector Participation

- **Develop Build Finance Operate (DBFO)** contracts are similar to BOT concessions in that the private sector assumes the responsibility for building, operating and maintaining the roads. However, it is not a concession as the operating company
cannot charge users directly. The private company is remunerated directly by the public authority in the form of shadow tolls based on the number of vehicles plying, and the length of the road for sharing the traffic risk.

- **Swiss Challenge Approach** permits the submission of an unsolicited bid. For this an independent study is conducted and the “unsolicited” proposal is presented by the developer to the government. The government then calls for competitive bids. If a lower bid is received, the initial proposer has the first right-of-refusal. The initial proposer is awarded the contract if his bid matches the lowest price. Otherwise, the lowest bidder is awarded the contract and the government reimburses the cost of preparation of the unsolicited proposal.

### 5.11.5 Appraisal Process:

The BOT projects are at the relatively evolving stage in India and the required institutional, regulatory and concession arrangements are still at various development stages. It is, therefore, advisable to assess the commercial potential of projects coming up on a large scale before committing substantial exposures. The appraisal of the project, wherein acceptability of the industry for financing key issues and industry-related covenants to be verified, should include:

- All project contracts, including Concession Agreement, EPC and O&M Contracts, State Support Agreements.
- Detailed Techno-Economic Feasibility Report
- Traffic Study done by a reputed consultant of the bank/ NHAI/ company
- Site visit to be conducted before final sanction to inspect location of land, discuss the projects with the promoters, contractors and the consultant, who has prepared the DPR.
- The construction cost may be high due to a number of structures on the project road so that “cost per km” may not be comparable. Further, it needs to be investigated how it is being compensated as toll rates per km are fixed for similar projects. Elongation of tenor for improving the DSCR brings in additional risk.
- A higher moratorium after the construction period is generally required due to uncertainty about the traffic build-up immediately after the new road is constructed. A lower moratorium may be considered for existing road stretches being strengthened.
There would be a gradual build-up of traffic and once the toll-fee system is well-accepted by the people, the revenue balloons-up in each subsequent year. The repayments could accordingly be considered in a step-up form to achieve a satisfactory DSCR.

The cushion available between the loan tenor and concession period needs to be examined. Ideally, it should be ensured that this cushion period is upwards of 5 years. In such cases where it is below these levels, suitable credit enhancers need to be stipulated.

5.12 Critical Risk Issues: Road Sector

The major risks in toll-road projects are given below.

5.12.1 Construction Risk: The key sensitivity in the construction phase is the undue delay in construction due to the inability of any entity associated with the project to carry out current contractual commitments. The execution risk of the construction work is directly linked to the ability of the contractor to meet his contractual commitments under the EPC agreement. The key issues to be addressed are: Level of support to the project from the private developer; Project execution capabilities and financial profile of the EPC contractor; Terms of the EPC contract; Resource requirements and scheduling; Right of way over land; Projected capital costs and the associated risks.

5.12.2 Operations and Maintenance Risk: The terms of O&M contract between the private developer and the contractor are of essence to ascertain the O&M risk. There can be certain circumstances that could adversely affect the operating costs leading to the escalation of the O&M contract price, for both routine and periodic maintenance. Projects, where the O&M contracts were awarded to reliable contractors, carried the minimum risk.

5.12.3 Traffic Risk: The key to the success of road projects is the availability of a certain level of tollable traffic and the willingness of motorists to pay the toll. In a number of cases, the actual toll amount collected was not as per projections. Traffic growth rates are considered on a conservative basis on the basis of various traffic studies done by reputed traffic consultants for Bank/NHAI/Company. Further, a cushion of 4 to 5 years (gap between ending of repayment and concession periods) is desirable. Otherwise, credit enhancements need to be put in place.
5.12.4 Security Package: In the road sector, the ownership of land continues to be vested with the government. Hence, no tangible security can be offered except control through the project documents and the cash flows of the project. The security package and the special terms and conditions for a road project would be as follows:

- Assignment of all project contracts to the lenders and pari-passu first charge on all project assets.
- Maintenance of three/six months’ debt service requirement in the form of either L/C or deposit in the escrow account/trust and retention account to cover three/six months’ principal and interest repayments.
- Assignment of insurance policies.
- Trust and retention account to be opened for depositing all the cash inflows of the company for utilization of the proceeds in a manner and according to the priority to be decided by the lenders including the term-loan disbursements till repayment of the entire debt is completed.
- Adequate insurance cover for the project assets, plant and machinery, labour and project risks are essential as there is no other tangible asset security.
- A certain part, say 50 per cent, of the promoters’ contribution is subscribed to in full and paid up- front and promoters should undertake to bring in the balance 50 per cent of the equity as per the stipulated debt/ equity ratio.

Conclusion

The key aspects of appraisal and risk factors have been identified in Sections A and B of this chapter for the power and road sectors. It is observed that, though the broader elements remain the same as described in the previous chapter, there are subtle nuances which creep in when project appraisal takes place in individual sectors. In the case of power sector for example, the issues are remarkably different even in generation, transmission and distribution.

In Section C, two case studies undertaken during the research are described. These give an appraisal note that is prepared by banks while evaluating the projects. The case studies will bring into sharper focus these sectoral issues.
CASE STUDIES

Introduction

The appraisal methodology discussed in the previous sections is exemplified further with the two case studies, one on Power sector financing and the other on Roads sector. The case studies cover appraisal notes prepared by the manager and also various contracts besides appraisal of the promoter, demand-supply gap and business as such. Calculation of cost of project and means of financing along with creation of security structure is shown in the appraisal note. The credit rating assigned to the projects as a result of numerical credit scoring is given as a part of the case study. The names of the companies have been disguised on the request of the concerned bank.

Case Study 1

Power Sector Financing in India

Southern Energy Ltd, Tamil Nadu

5.13. Introduction

There are extensive proven coal reserves at the project location, which are presently estimated at around 3300 million tones. Coal Company (COCO), a Public Sector Unit (PSU), had established its first 600 MW Thermal Power Station (TPS I) and coal mine (Mine I) in the 1960s. COCO had begun to develop the coal mines and the associated pithead thermal power stations in order to utilize these vast coal reserves for power generation. Subsequently, the second 1470 MW (7 X 210 MW) Thermal Power Station (TPS II) with captive mine (Mine II) was also developed.

The Government of India, through Ministry of Coal (MoC), decided on May 22, 1992, to permit the Electric Power Co. Ltd. (EPCL), a private operator, to build, own and operate the project. Based on this decision, the COCO permitted EPCL to establish a 210 MW (1X 210 MW) power station. On November 17, 1993, EPCL incorporated the Southern Energy Ltd. (SEL) as the Project Company and transferred its rights and interests in the project to the newly constituted project company. Then, on February 3,
1994, the SEB and the Energy Department of Tamil Nadu State Government enhanced
the project size to 250 MW (1 X 250 MW).

5.13.1. Management Appraisal: Southern Energy Ltd. (SEL) is a joint venture power
generating company, promoted by EPCL, an Indian-based wholly-owned subsidiary of
EPCL-USA and AB Energy Ventures (ABEV), Netherlands through its subsidiary, the Power
Investment (India) BV (PI). The board of SEL comprised 4 directors. The Articles of
Association of the company provide for minimum of 2 and maximum of 12 directors and also
the appointment of nominee directors upon request by the financial institutions.

5.13.2. Technology Appraisal: The process of generation of thermal power essentially
entails two main stages. In the first stage, steam is generated by coal-fired boilers, and in the
second stage, this high-pressure steam is run through turbines, which in turn are coupled to
generators which generate electricity. The thermal efficiency of the plant is around 36 per
cent, which is comparable to similar fuel-based power projects elsewhere.

5.13.3 Plant and Machinery: The plant is designed to operate as a base-load plant and
consist of power generation module of one steam generator (boiler), one steam turbine and
one generator and all related auxiliaries, accessories and supporting systems to generate 250
MW of power output with coal as the main fuel and heavy oil (furnace oil/LSHS) as the
supporting fuel.

5.13.4 Location and Site: The project site is at a distance of 10 kms from Mine IA, from
where coal is being supplied by COCO to Southern Energy Ltd. The site is also in close
proximity to the existing mines of COCO.

5.13.5 Environmental Aspects: A study on the Environmental Impact Assessment (EIA) of
the SEL project was conducted by EwP Limited (EPL), of the United Kingdom. According to
the study, the potential impact of the project on the environment is considered to be
insignificant. The expected emission levels and the projected ambient air quality are expected
to be well within the World Bank and the Indian standards. As per the study, the proposed
environmental protection measures are adequate.

5.13.6 Lender's Independent Engineer: M/s. S.W International of India was appointed as
the Lenders' Independent Engineer (LIE) to conduct technical and due diligence study on
behalf of all the lenders to review the technology and design parameters including output,
availability and efficiency. LIE’s scope also included assessing the investment cost and the environmental aspects related to the project.

5.13.7 Lender’s Legal Counsel: M/s. A.O was appointed as Independent Counsel (IC) to act on behalf of the Lenders to assist in the review of the various project and security documents required for the project, including inter alia, the Power Purchase Agreement (PPA), Fuel Supply Agreement (FSA) and the Engineering Procurement and Construction (EPC) contract.

5.13.8 Lender’s Insurance Consultant: M/s. S B, London was appointed as Independent Insurance Consultant (IIC) to act on behalf of the Lenders (including overseas lenders) to assist in the review of the proposed insurance package for the project.

5.13.9. Appraisal of Construction Issues

5.13.10 EPC Contract: The Company awarded the EPC contract to the consortium led by ABKG, which includes AE&E and EVT. ABKG has extensive experience in the development of major infrastructure projects including thermal power projects in Asia and has been one of the world’s leading power plant suppliers with annual sales in excess of DM 1.7 billion. ABKG is among the few power plant producers with the capacity for in-house supply of all key components as well as auxiliary equipments necessary for construction and commissioning. ABKG has supplied steam turbine for the proposed project. It has been supplying turbine generator sets since 1901 and more than 7,500 turbines of all sizes have been supplied with a total output of more than 240,000 MW.

AE&E is a systems supplier in Energy Engineering, Environmental Engineering and Services sectors. EVT is a reputed designer and manufacturer of steam generators and milling systems and is based in Germany. EVT, along with BHEL had supplied some of the boilers for Thermal Power Station II of COCO, which has been functioning satisfactorily.

The EPC contract provided 37 months for the completion of the project from the date of notice to proceed. The contract also guaranteed the net output of the plant to be not less than 227.50 MW and the Net Heat Rate to be not greater than 2393.50 Kcal/Kwh. Capacity Factor (Plant Availability) of 90 per cent was also guaranteed by the contractor. The EPC contract has provisions for Liquidated Damages (LDs) for non-compliance to the agreed upon technical specifications.

5.14.1. Operations and Maintenance (O&M) Agreement: The O&M of the company was done by SEP Operating Company Pvt. Ltd., a subsidiary of EPCL-USA which has rich experience in operating and maintaining electric generating plants. It has a large technology base and ample experience to draw upon for providing O&M services. It has developed substantial operating experience through both its consumer energy utility plants. Its subsidiaries already operate various independent power plants.

The O&M agreement had a term of 30 years from the date of commercial operation. The O&M contractor provided the management, operations and maintenance services for the plant. According to the O&M contract, the services could be broadly classified into three types, namely (i) preliminary operating services during construction, (ii) O&M services during the operation and (iii) management services.

The O&M services during the operation included operation and maintenance of the facility, preparation of annual operating budgets, monthly and annual reports on plant performance, monthly invoicing and collection of payments on behalf of the company and maintenance of books, records and accounts of the plant. The management services include accounting, taxes, insurance and treasury aspects.

5.14.2 Fuel Supply Agreement (FSA): The power plant used coal as the main fuel. Coal was being supplied by COCO, which had developed a new mine – Mine 1A – for the purpose of supplying coal to SEL and to meet its future requirements. Mine 1A from which coal was supplied to SEL is spread across 16 sq. kms with coal reserves of 120 million tonnes (MT). COCO and SEL had entered into a Fuel Supply Agreement in April 1998. The FSA would be valid for a period of 30 years with a provision for extension of the term, if required.

The salient features of the agreement are as follows:

- As per the FSA, SEL was to be provided with coal up to 1.9 million tonnes (MT) per annum.
- The annual liability to COCO on account of liquidated damages for non-supply of coal was of the order of Rs. 90 crore based on a formula agreed to in the FSA, which was considered as a reasonable deterrent for it to default on supply to SEL.
• Delivery of coal was deemed to have been made only if the coal conformed to the quality specification set forth in the agreement.

• The price of coal was equal to the pooled price of coal produced by COCO, i.e. annual weighted average price of coal produced from various mines of COCO. This price will be the same as applicable to the electricity boards of other south Indian states. The pooled price was subject to a minimum price based on the notified price of D grade coal in the year of commencement of supply of coal to the company. The above price was exclusive of all duties, taxes and royalty and was as provided at the pithead.

5.14.3 Fuel Transportation and Handling: The coal was to be transported over a distance of 10 kms from Mine IA to the project site. The company proposed to use the state highway connecting the project site to Mine IA for transportation. The company, with the support of COCO, also studied the feasibility of using an alternative private road.

The plant had a provision for storage of upto 5 days of coal requirement (approximately 25,000 tonnes), which together with the stockpile of 50,000 tonnes located at the mine site made available a fuel stock for about 15 days. The company had to pay COCO in advance for the coal to be stockpiled at COCO's premises.

5.14.4 Secondary Fuel: Heavy oil (furnace oil/ LSHS) was used as the secondary fuel, for which suitable storage and handling facilities was available. Secondary fuel was reportedly available on tap and no problems were envisaged in procuring it. Quantity required being small, there was no problem anticipated in transportation.

5.14.5. Market Appraisal

5.14.5.1 Electricity Availability at the Project Site: The energy deficit for the country stood at 11.51 per cent as of 1996-97 whereas it stood at 13.80 per cent in the project state (20.60 per cent for the southern region) in the same year. The peak power deficit on the other hand was found to be 17.67 per cent for the country and 15.90 per cent for the project state (22.29 per cent for the southern region). In the project state, as of 1996-97, the installed generating thermal capacity was 58.6 per cent and that of hydel was 38.40 per cent.

The State Electricity Board (SEB) had submitted to the State Electricity Regulatory Commission (SERC) that energy demand in the state has been growing at the rate of 6 per
cent every year. As per the 16th Electric Power Survey ("EPS"), the state witnessed a demand growth rate for energy at 7.9 per cent per year (CAGR basis) during the years 1994-98 by industrial users (High Tension + Low Tension) and was projected to increase at 6.7 per cent per annum for the period 2002-05, rising from 16415 Mn kWh in 2001-02 to 19939 Mn units during 2004-05. Assessing the longer-term demand, the over-all peak-load demand from all consumer categories was projected to grow at a rate of more than 5 per cent every year till the year 2017. The peak demand projections of the EPS are given below:

<table>
<thead>
<tr>
<th>Year</th>
<th>Demand (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002-03</td>
<td>7,187</td>
</tr>
<tr>
<td>2003-04</td>
<td>7,573</td>
</tr>
<tr>
<td>2004-05</td>
<td>7,978</td>
</tr>
<tr>
<td>2006-07</td>
<td>8,847</td>
</tr>
<tr>
<td>2011-2012</td>
<td>11,411</td>
</tr>
</tbody>
</table>

*Source: 16th EPS, Central Electricity Authority*

The estimated power demand for 2006-07 was 8847 MW. This would mean that there would be a short fall of 1309 MW (8847 MW demand – 7538 MW availability) even if all the projects presently under execution or planned are commissioned in the Tenth Five Year Plan. Thus, it can be reasonably assumed that SEL would operate at high PLF, given the demand-supply gap in the state.

5.14.5.2 Position of State Electricity Board (SEB): SEB ranks better than many other electricity boards on all the performance parameters. The tariff realized had also shown a consistent rise in fiscal year 1992-93. The only negative aspect was that agricultural tariff had been zero; however this was mitigated by the fact that SEB has actually been receiving a substantial portion of the subsidy amount from the state government every year. SEB had been assessed by ICRA in November 1997. According to the ICRA report for assessment of SEB for the years 1991-92 and 1994-95 it had received the full subsidy amount in cash, whereas it received 86 per cent in cash in 1992-93, 76 per cent in 1993-94 and 85 per cent in 1995-96. The SEB made a commercial profit of Rs. 329.63 crore, which represented a return of 7.47 per cent on its capital, which was very good when compared to the national average. SEB had also been achieving the minimum RoR target specified.

According to ICRA’s assessment, the SEB was in the “lower” range of “Adequate” strength in the assessment scale. The SEB also had been very prompt in making the payments to various central public sector units and had very low outstandings (even these were disputed old dues). Similarly, Duff & Phelps Credit Rating India Private Ltd (DCR), in July 1998, had rated SEB positively and as among the better SEBs in the country.
Both ICRA and DCR assessments showed that there was adequate escrowable capacity to support the new IPPs that would be coming up in the next five years. According to a communication from SEB, six projects had been identified by SEB, which could achieve financial closure by March 31, 1999 and were, therefore, front-runners for receiving the escrow support. Escrow agreement for SEL had already been signed.

5.14.5.3 Power Purchase Agreement: SEL originally entered into Power Purchase Agreement (PPA) with SEB in November 1993. The PPA was subsequently renegotiated and the amended and restated Power Purchase Agreement was entered into with the State Electricity Board in November 1996. Further, two amendments were made to the PPA in October 1997 and January 1998.

Salient features of the PPA were as follows:

- The power tariff was as per the relevant GoI guidelines and included a fixed capacity component (FCC), a variable fuel component (VFC) and incentive charges.
- SEL was allowed such a benefit up to 85 per cent PLF in the event that SEB refused to accept Net Electrical Output offered for sale by the company.
- If there was a delay in achievement of COD, the company was to pay to SEB:
  > Rs. 1.32 lac per day for each day after 38 months and up to 44 months following the effective date.
  > Rs. 5.7 lac per day after 44 months and up to 60 months following the effective date.

If there was an interruption of fuel supply because of which the company was unable to operate the plant at 68.5 per cent PLF, COCO was to pay liquidated damages to the company. Pending receipt of liquidated damages, SEB was to pay a rebate deferral amount which would cover debt service and 50 per cent of the O&M expenses. This amount would be reimbursed by the company upon actual receipt of LDs.

5.14.6 Financial Appraisal

5.14.6.1 Cost of the Project: The project cost was estimated to be Rs. 1427.25 crore, the break-up of which is provided in Table 5.6.
### Table 5.6: Cost of Power Project (Case Study)

<table>
<thead>
<tr>
<th></th>
<th>Foreign Currency Cost</th>
<th>Rupee Cost</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>USD Mn</td>
<td>DM Mn</td>
<td>Rs. Crore</td>
</tr>
<tr>
<td>Land</td>
<td></td>
<td></td>
<td>4.51</td>
</tr>
<tr>
<td>EPC Contract</td>
<td>177.52</td>
<td></td>
<td>626.33</td>
</tr>
<tr>
<td>Misc. Capital Expenditures</td>
<td>8.24</td>
<td></td>
<td>14.30</td>
</tr>
<tr>
<td>Preoperative Expenses (excluding IDC)</td>
<td>18.78</td>
<td>2.43</td>
<td>15.82</td>
</tr>
<tr>
<td>IDC</td>
<td>22.53</td>
<td></td>
<td>97.57</td>
</tr>
<tr>
<td>Financing Expenses</td>
<td>4.68</td>
<td></td>
<td>5.89</td>
</tr>
<tr>
<td>Contingency</td>
<td>0.94</td>
<td>1.89</td>
<td>7.13</td>
</tr>
<tr>
<td>Margin Money</td>
<td></td>
<td></td>
<td>13.63</td>
</tr>
<tr>
<td>Total</td>
<td>19.71</td>
<td>217.29</td>
<td>785.17</td>
</tr>
</tbody>
</table>

#### 5.14.6.2 Comparison of Project Cost

The following table compares SEL’s EPC cost and total project cost with coal-based projects (comparison at the exchange rate of 1USD=Rs. 43.00).

### Table 5.7: Comparison of Power Project Cost (Case Study)

<table>
<thead>
<tr>
<th>CAP</th>
<th>EPC</th>
<th>EPC/MW</th>
<th>Total</th>
<th>Total/MW</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MW</td>
<td>Rs. Crore</td>
<td>Rs. Crore/MW</td>
<td>Rs. Crore</td>
</tr>
<tr>
<td>SEL</td>
<td>250</td>
<td>1081.64</td>
<td>4.33</td>
<td>1427.25</td>
</tr>
<tr>
<td>VPL</td>
<td>1050</td>
<td>3518.48</td>
<td>3.35</td>
<td>5286.29</td>
</tr>
<tr>
<td>BINA</td>
<td>578</td>
<td>1830.85</td>
<td>3.17</td>
<td>2761.22</td>
</tr>
<tr>
<td>DAEWOO</td>
<td>1070</td>
<td>4119.71</td>
<td>3.85</td>
<td>5649.38</td>
</tr>
<tr>
<td>SPIC</td>
<td>525</td>
<td>1873.95</td>
<td>3.57</td>
<td>2633.23</td>
</tr>
</tbody>
</table>

#### 5.14.6.3 Means of Finance

The break-up of various elements of means of finance is given in the table below:
Table 5.8: Means of Power Finance (Case Study)

<table>
<thead>
<tr>
<th></th>
<th>Rs. Crore</th>
<th>DM Mn</th>
<th>USD Mn</th>
<th>Total Rs. Crore</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPCL Generation</td>
<td>48.74</td>
<td></td>
<td>209.56</td>
<td></td>
</tr>
<tr>
<td>ABEV</td>
<td>48.74</td>
<td></td>
<td>209.56</td>
<td></td>
</tr>
<tr>
<td>Total Equity</td>
<td>97.48</td>
<td></td>
<td>419.12</td>
<td></td>
</tr>
<tr>
<td>Subordinated debt</td>
<td>2.10</td>
<td></td>
<td>9.05</td>
<td></td>
</tr>
<tr>
<td>Debt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rupee Term Loans</td>
<td>391.22</td>
<td></td>
<td>391.22</td>
<td></td>
</tr>
<tr>
<td>Foreign Currency Loans</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IFI DM</td>
<td>55.00</td>
<td></td>
<td>141.06</td>
<td></td>
</tr>
<tr>
<td>ECBDM</td>
<td>182.00</td>
<td></td>
<td>466.80</td>
<td></td>
</tr>
<tr>
<td>Total Debt</td>
<td>390.81</td>
<td>237.00</td>
<td>999.08</td>
<td>1427.25</td>
</tr>
<tr>
<td>Total</td>
<td>391.22</td>
<td>237.00</td>
<td>99.58</td>
<td>1427.25</td>
</tr>
</tbody>
</table>

5.14.6.4 Equity: The total equity contribution of US$ 99.58 million was brought in equally by the promoters. The sponsors contributed the subordinated debt in lieu of equity for the incremental equity requirement of US$ 2.10 mn over and above the equity approved by the State Electricity Board /Central Electricity Authority (CEA). Any actual equity contribution over the SEB/CEA approved equity was not eligible for the guaranteed return of 16 per cent. The sponsors were to bring in such amounts as quasi-equity by way of a subordinated loan.

The subordinated loan was to carry an interest rate of 10 per cent per year. and was co-terminous with senior debt. Interest during construction on the subordinated loan was to be accrued and paid during the first year of operations. The interest and repayments of the subordinated loan was subordinated to senior debt in all respects.

5.14.6.5 Financial Analysis: The salient features of the operations are as under:
Table 5.9: Operational Power Estimates (Case Study)

<table>
<thead>
<tr>
<th></th>
<th>1st year</th>
<th>2nd year</th>
<th>3rd year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installed Capacity (MW)</td>
<td>250</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>Plant Load Factor (%)</td>
<td>70</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>No. of Units Sold (MU)</td>
<td>1163</td>
<td>1594</td>
<td>1594</td>
</tr>
<tr>
<td>Tariff (Rs. per kWh)</td>
<td>3.57</td>
<td>3.50</td>
<td>3.51</td>
</tr>
<tr>
<td>Total Income (Rs in Cr)</td>
<td>416</td>
<td>558</td>
<td>560</td>
</tr>
<tr>
<td>Net Profit (Rs in Cr)</td>
<td>37</td>
<td>79</td>
<td>79</td>
</tr>
<tr>
<td>Gross Cash Accruals (Rs in Cr)</td>
<td>130</td>
<td>190</td>
<td>190</td>
</tr>
</tbody>
</table>

5.14.6.6 Key Financial Indicators

Table 5.10: Key Power Indicators (Case Study)

<table>
<thead>
<tr>
<th>Financial Parameters</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min DSCR</td>
<td>1.36</td>
</tr>
<tr>
<td>Max DSCR</td>
<td>2.61</td>
</tr>
<tr>
<td>Average DSCR</td>
<td>1.50</td>
</tr>
<tr>
<td>Fixed Asset Coverage Ratio</td>
<td>1.35</td>
</tr>
</tbody>
</table>

5.14.6.7 Legal Contracts and Security Stipulations: The term loans were secured by:

1. Securing the term loan was by way of a first charge on the moveable and immovable assets, present and future, of the company pari passu with other term lenders subject to prior charge on inventory of the company in favour of the company’s bankers providing the working capital and a pari-passu charge on the receivables of the company with the company’s bankers providing the working capital.

2. Assigning in favor of the lenders or its agents all rights and titles to, and interests in the company and under all assets of the project, all project contracts and documents, insurance policies, permits/approvals, etc., on a pari-passu basis.

3. Assigning a first charge on all the company’s accounts, including but not limited to the Trust and Retention Account and the Debt Service Letter of Credit/Reserve Account, along with other lenders.

4. Pledging in favor of the term lenders, the shares held by the AB and EPCL Groups.
5. Pledging the Trust and Retention Account (TRA).

6. Assigning all the cash inflows of the company to be deposited in the TRA.

7. Utilizing the proceeds in a manner as determined and according to the priority to be decided by the lenders as a waterfall-accounting system.

5.14.6.8. Force Majeure: A three-layer payment security to protect against default by SEBs was enforced:

1. Letter of Credit covering three months of payments and tariff at 68.5 per cent PLF.

2. Escrow account covering 1.25 times the tariff at 85 per cent PLF.

3. The guarantee of state government covering all dues to the company from SEB.

Counter guarantee of Government of India for offshore loans.

- Debt Service Reserve Account (DSRA)
- Payments for fuel and O&M expenses: 1 month
- Insurance expenses and tax payments: 1 year
- Interest on working capital and on long-term debt: 6 months
- Principal repayments: two quarters

In Case of shortfall in DSRA, an LC for the shortfall amount was to be provided by the promoters.

5.15. Risk Assessment

Sensitivity Analysis was carried out on the following scenarios (Table 5.11):

- Inflation going up to 10 per cent from 5 per cent assumed in the base case.

- Fuel price increasing by 10 per cent instead of 5 per cent per annum, assumed in the base case.

- Plant functioning at a lower PLF of 68.5 per cent.

- Rupee depreciating by 8 per cent per year against the dollar and DM.
Table 5.11: Power Sensitivity Analysis (Case Study)

<table>
<thead>
<tr>
<th></th>
<th>Tariff (Year 1)</th>
<th>Tariff (Year 5)</th>
<th>Tariff (Year 10)</th>
<th>Avg. DSCR</th>
<th>Min DSCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Case</td>
<td>3.57</td>
<td>3.56</td>
<td>3.89</td>
<td>1.50</td>
<td>1.36</td>
</tr>
<tr>
<td>A</td>
<td>3.79</td>
<td>3.87</td>
<td>4.37</td>
<td>1.46</td>
<td>1.34</td>
</tr>
<tr>
<td>B</td>
<td>3.57</td>
<td>3.89</td>
<td>4.92</td>
<td>1.44</td>
<td>1.35</td>
</tr>
<tr>
<td>C</td>
<td>3.40</td>
<td>3.44</td>
<td>3.63</td>
<td>1.36</td>
<td>1.25</td>
</tr>
<tr>
<td>D</td>
<td>3.83</td>
<td>4.29</td>
<td>4.92</td>
<td>1.59</td>
<td>1.41</td>
</tr>
</tbody>
</table>

5.15.1 Risk Identification (Rating Variables in the Rating Scale): The following risk factors were identified and were mitigated as follows:

(a) **Management Risk**: This was mitigated by signing off a shareholders’ agreement, and, an up-front equity of 25 per cent was brought by the sponsors. They also provided stand-by equity equal to 10 per cent of the project cost. The track record of sponsors was found to be excellent.

(b) **Market Risk**: The estimated investment of Rs. 2.34 crore for evacuation arrangements was relatively small compared to the nearly Rs. 600 crore per annum proposed to be spent by SEB on transmission. The two-part tariff structure insulated SEL from any actual price increases on account of fuel and other input costs. O&M costs, which were linked to inflation-rate indices, were not being covered beyond 2.5 per cent and were to be borne by the company. However, the amount was not very large.

(c) **Technological Risk**: Assistance from SEB in obtaining necessary approvals and clearances were assured. The plant would operate as a base-load plan. While the company had already acquired 13.19 acres of land, at a price of Rs. 0.48 crore, from private landowners towards the approach road, and they were awaiting permission from the state government for acquiring 17.72 acres of fallow land.

(d) **Financing Risk**: Cost of funds and means were finely wrapped up. Sensitivity results and critical ratios are all within the acceptable parameters. SEB’s credit enhancement mechanism included provision of L/C (3 months at 85 per cent PLF) and escrow account (1.25 months at 85 per cent PLF) backed by state government guarantee. GOI had guaranteed foreign debt in the event of termination of PPA.
(e) Operating Risk: EPC contract stipulated suitable contract guarantees to conform to emission norms. The risk during the operational phase was to be addressed by the O&M contractor who has experience in handling such risks. In the event of production from Mine IA being delayed or a shortfall in fuel availability, COCO had to supply from its existing mines. COCO had obtained the statutory approvals for its investment in Mine IA. In view of COCO’s track record, no delay was expected. Fuel Transport Risk was to be borne by the company.

(f) Construction Risk: Suitable LDs for delay in project completion have been provided in the EPC contract. If the delay was on account of non-EPC works, SEL would have to bear the risk. Cost over-run support of 10 per cent was to be borne by the promoters. The EPC and O&M contractors enjoyed international repute. Suitable LD clauses were provided in the EPC contract.

(g) Legal Risk: All documents were assessed by the legal counsel.

(h) Force Majeure Risk: In the event of termination of the PPA, there was a provision for sale of the complex to SEB at a fair price. The company took suitable insurance for protecting itself.

Based on the scores on the above and the financial parameters, the project was rated “BBB” by the lenders which would mean the interest rate charged would be higher than the Prime Lending Rate (PLR) of the bank. It is not possible to display the credit scoring as it is a confidential document of the bank.

Case Study 2

Toll Road Project

Bharatpur-Mahua Toll Road

5.16. Introduction

The National Highway Authority of India (NHAI) awarded a Letter of Intent to the consortium of SRB Ltd and IDF Ltd (the Company) for the improvement, operation and maintenance and strengthening of the existing 2-lane 78 kms highway and widening it to a 4-lane divided 135 kms (57 km of additional length) National Highway 11 (NH) between Bharatpur-Mahua section in the state of Rajasthan on Build, Operate and Transfer (BOT)
basis. The project stretch connects the historical cities of Bikaner, Jaipur, Bharatpur and Agra. The scope of the project included performance and execution by the company of all design, engineering, financing, procurement, construction, completion and maintenance aspects of the highway. The project was to be completed within a period of 36 months from the date of concession agreement and 30 months from the date of financial closure. Concession period was for 25 years, including construction period. For this purpose, the Special Purpose Vehicle (SPV) RRB Ltd was formed. The concession agreement was signed between the Company and NHAI.

5.16.1. Management Appraisal: The RRB Ltd was an SPV promoted by SRB Ltd and IDF Ltd. The SRB Ltd was the major promoter which was a profit making listed company engaged in the development of infrastructure projects – mainly roads – since 1980. It is, at present, executing projects valued at Rs. 3000 crores. It is enjoying fund-based limits of Rs. 10 crores and non-fund based limits of Rs 100 crores from the bank. Operation of the account has been satisfactory. The IDF Ltd had commenced its operations in the year 1989. It is one of the leading Non-Banking Finance Companies (NBFCs) with special focus on infrastructure development and finance.

The RRB Ltd is managed by a board of directors, who will also be assisted by the qualified professionals in the field.

<table>
<thead>
<tr>
<th>Name</th>
<th>Qualification</th>
<th>Age (Yrs)</th>
<th>Experience (Yrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. X</td>
<td>Civil Engineer</td>
<td>42</td>
<td>18</td>
</tr>
<tr>
<td>Mr. Y</td>
<td></td>
<td>38</td>
<td>14</td>
</tr>
<tr>
<td>Mr. Z</td>
<td>Mech. Engineer</td>
<td>30</td>
<td>9</td>
</tr>
</tbody>
</table>

The company had formed a key management team for construction of the proposed road. The team is a mix of qualified engineers and professionals in finance and accounting and has wide experience. The team is headed by Mr. Z, Project Director, who is a B.E. (Mech.) and has experience of 10 years.

M/s SRB Ltd, one of the promoters of RRB Ltd has sufficient experience in construction of roads, having constructed approximately 560 kms of 4/6-lane national highways during last five years and also 150 kms of rigid (concrete) paved roads during the last three years. A number of road projects has been constructed on EPC contract basis. The SRB Ltd has a
team of professionals, design and civil engineers. Detailed Project Report (DPR) has been prepared in-house by the company. The DPR prepared by an outside consultant was not available. The company also got a traffic study done by a transport economist Mr. G. Vardaraj. The bank also got an independent traffic study done and the cost of the project was vetted by M/s Frischmann Prabhu (India) Pvt. Ltd (FPIPL).

5.16.2. Shareholders' Agreement: The equity contribution by SRB Ltd was proposed to be in the ratio of 74 per cent and of persons acting in concert with IDF Ltd 26 per cent. The Shareholder's Agreement (SA) between SRB Ltd and IDF Ltd was not executed at the time of appraisal. SRB Ltd and IDF Ltd together held more than 50 per cent of the equity of RRB Ltd. Their combined shareholding was pledged to the lenders.

5.16.3. Technological Appraisal: The technological appraisal is described below in the following steps.

5.16.4. Proposed Scope of Work under Concession Agreement: The 'Project Highway' was to be widened to have a 4-lane motorway facility with 1.5 m wide paved shoulders. The typical cross section for the rural area was to have a 4-lane highway with a wide median. For urban areas, the typical cross section would have a narrow median with service roads. Widening of the carriageway in the rural section was erratic, depending on the width of the road available, so that the existing carriageway could be utilized. The proposed 4-laning was designed to provide high standard facilities for traffic movement and also to provide for future growth.

5.16.4.1 Existing Structures: The number of existing structures had a total of 4 minor RCC bridges and one Road Over Bridge (ROB) at 64/3 chainage over the Mumbai-Delhi broad gauge railway track, and one major bridge at km. 97/1, on the project highway. The ROB was to be designed, constructed and maintained as per the requirement of the Railway Department for which the company had to enter into an agreement with Railways and NHAI. Normally obtaining approval from Railway authorities takes a long time.

5.16.4.2 New Structures: The existing and new structures were constructed wide enough to accommodate the adjacent road cross section. All the cross-drainage structures were designed in such a way that the inner edge of the footpath matched with the outer edge of the paved shoulder. One 6-lane grade separator at chainage 116.85 was provided, where a major intersection existed between NH 11 and State Highway No. 25. Considering cross
movement of traffic at village locations, minor underpasses with a 10-meter span, suitable for low-height traffic was provided to avoid conflict between local and highway traffic. These underpasses were provided at design channel 83.30, 100.50, 105.20, 108.30 and 118.30 kms points. Two open toll systems were established. Toll was to be collected upon entry at the toll plaza. There were a total of 8 lanes having semi-automatic system of toll collection. One toll-lane with appropriate technology in each direction was provided for traffic exempted from payment of toll. Road markings such as lines, arrows, road edge markings and road side fixtures such as street lighting in urban areas, junctions and at all major bridges were provided as per the specifications and requirements of IRC codes. Lighting was provided at rest areas, toll plazas and intersections. IS:1944 standards were followed for lighting installations. At the major junctions, location of ROB/flyover, extra lighting was provided.

5.16.4. 3 Lenders’ Independent Engineers (LIE)

5.16.4.3.1 Before financial closure: M/s Frischmann Prabhu (India) Pvt. Ltd. (FPIPL) was appointed as the lenders’ consultant for the purpose of independent traffic estimates and related issues, within the scope of the requirements suggested by the bank, as also to review and vet the reasonableness of various items of cost of the project including EPC costs on account of the under-noted reasons.

The FPIPL is a wholly-owned subsidiary of the Pell Frischmann Group Ltd., UK. The company remained associated with several road projects at various stages like feasibility studies and surveys, designing, supervision, maintenance, etc. FPIPL has had ample experience in conducting traffic surveys (classified volume count, O-D and commodity movement surveys), traffic demand estimates, turning movement count, speed and delay, axle load, truck parking survey as also review of traffic surveys, etc.

5.16.4.3.2 During implementation stage: For monitoring of the implementation of the project, approval of costs incurred on the project, review of the annual budget, M/s. STUPEmeltech Consortium was appointed as Lenders’ Independent Engineer.

5.15.5. Appraisal of Construction Issues

5.16.5.1 Vetting of the Project Cost and EPC Contract: The FPIPL was appointed as LIE for an independent vetting of the cost of the project. In its report, the FPIPL compared its independent cost
estimates with estimates made by the company. This comparison was done by the FPIPL in the absence of the EPC contract, which was yet to be executed.

Table 5.12: Vetting of Road Project Cost (Case Study)

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Item</th>
<th>Cost Estimated by FPIPL</th>
<th>EPC Estimated by RRB Ltd</th>
<th>Percentage of Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Site Clearance and Dismantling</td>
<td>7.14</td>
<td>1.02</td>
<td>85.7</td>
</tr>
<tr>
<td>2</td>
<td>Earthwork</td>
<td>42.96</td>
<td>42.34</td>
<td>1.4</td>
</tr>
<tr>
<td>3</td>
<td>Granular Sub-base Courses and Base Courses (Non-Bituminous)</td>
<td>41.22</td>
<td>39.48</td>
<td>4.2</td>
</tr>
<tr>
<td>4</td>
<td>Bituminous Courses / Cement Concrete Pavement</td>
<td>77.45</td>
<td>76.16</td>
<td>1.7</td>
</tr>
<tr>
<td>5</td>
<td>Widening of Culverts</td>
<td>2.00</td>
<td>2.16</td>
<td>-8.0</td>
</tr>
<tr>
<td>6</td>
<td>Bridges</td>
<td>22.80</td>
<td>21.34</td>
<td>6.4</td>
</tr>
<tr>
<td>7</td>
<td>Flyovers and Underpasses with Retaining wall approaches</td>
<td>33.46</td>
<td>30.62</td>
<td>8.5</td>
</tr>
<tr>
<td>8</td>
<td>Drainage and Protective Works</td>
<td>21.79</td>
<td>24.31</td>
<td>-11.6</td>
</tr>
<tr>
<td>9</td>
<td>Road Junctions</td>
<td>2.33</td>
<td>2.23</td>
<td>4.3</td>
</tr>
<tr>
<td>10</td>
<td>Traffic Signs, Road markings and Other Road Appurtenances</td>
<td>6.06</td>
<td>5.67</td>
<td>6.4</td>
</tr>
<tr>
<td>11</td>
<td>Repair of Existing Bridges / Culverts (LS)</td>
<td>1.06</td>
<td>1.07</td>
<td>-0.9</td>
</tr>
<tr>
<td>12</td>
<td>Repair and Maintenance of Existing Road</td>
<td>0.35</td>
<td>0.35</td>
<td>0.0</td>
</tr>
<tr>
<td>13</td>
<td>Toll Plaza</td>
<td>10.30</td>
<td>10.17</td>
<td>1.3</td>
</tr>
<tr>
<td>14</td>
<td>Miscellaneous Works</td>
<td>7.12</td>
<td>7.79</td>
<td>-9.4</td>
</tr>
<tr>
<td>15</td>
<td>Survey &amp; Geotechnical Investigations</td>
<td>0.50</td>
<td>0.50</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>276.54</td>
<td>265.21</td>
<td>4.1%</td>
</tr>
</tbody>
</table>

As per the consultant, it was normal to have variations of 5 per cent in civil engineering estimates as a whole. Many a times, quantity estimators consider different items under work (for example some consider top soil removal under site clearance while some consider it as a part of earthwork). Some assumptions were made by the estimators when the drawings were not very clear on what items and costs are to be considered. For this reason, it was possible that sometimes larger variations are observed on individual items.

The overall cost difference was just about 4.1 per cent, which was considered very high within the normal variations observed in road-work estimates; hence, the individual
variations were not considered serious. As the total variation in the cost was very much within reasonable limits, FPIPL agreed with the EPC estimates, and considered them fair and reasonable. In view of the above conclusions, the estimates of EPC price submitted by SRB Ltd were accepted.

5.16.5.2 Status of Approvals: The Company obtained all the required permits and approvals as per the applicable laws.

5.16.5.3 Project Implementation Schedule: The main milestones and the corresponding critical dates for the implementation of project are summarized in Table 5.13.

Table 5.13: Project Timeline (Road Case Study)

<table>
<thead>
<tr>
<th>Particulars</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Signing of Concession Agreement</td>
<td>October 31, 2005</td>
</tr>
<tr>
<td>Financial Closure</td>
<td>November 30, 2005</td>
</tr>
<tr>
<td>Construction Commencement Date</td>
<td>January 01, 2006</td>
</tr>
<tr>
<td>Construction Completion Date</td>
<td>June 30, 2008</td>
</tr>
<tr>
<td>Tolling Commencement Date</td>
<td>July 1, 2008</td>
</tr>
<tr>
<td>End of Concession Period</td>
<td>October 30, 2030</td>
</tr>
</tbody>
</table>

5.16.6. Operations and Maintenance (O&M) Appraisal: Under the BOT framework, the RRB Ltd. was responsible for the O&M of the project highway throughout the concessions period. This work was carried out by the company as per provisions of concession agreement.

5.16.6.1 Operation: The operational activities will principally comprise:

(a) Toll collection system: In order to ensure that optimal toll collection was achieved, appropriate operating procedures and policies were implemented with special emphasis on internal controls. In addition, the company set up an independent toll-monitoring unit to monitor and report the toll-collection activities. The toll monitoring unit was equipped with all the necessary surveillance equipments/tools and the personnel were trained and supported by the company to ensure an efficient and effective toll-collection system to be put in place for this project.
(b) Traffic Management: The Company drew up a comprehensive traffic management procedure to ensure safety and smooth traffic flow along the project highway. A key component of traffic management was the emergency and recovery procedures.

(c) Maintenance: A comprehensive maintenance programme was drawn up to ensure the expected performance of the project highway. The maintenance is broadly classified into two types of activities namely, routine and major maintenance:

- Routine maintenance consists of generally repetitive work such as grass cutting, roadway clearing, de-silting, drainage system cleaning and prompt repairs of potholes, cracks, lighting, etc.

- Major maintenance consists mainly of road resurfacing, repairs to structures, equipment refurbishment and replacement and heavy maintenance. The major maintenance works are scheduled to be carried out every 5 years from the Commencement of Operations Date (COD).

5.16.7. Market Appraisal

5.16.7.1 Traffic Assessment: The traffic study on behalf of the company was conducted by Mr G Varada Raj (GVR), a transport economist. He has to his credit a number of traffic studies. Average Daily Traffic (ADT) on the study stretch was estimated from the 7-day observed counts, during February 2005. Average Annual Daily Traffic (AADT) at each location was assessed using the ADT and Seasonal Factors (SF). SF is the variation in the traffic levels during different months/seasons. The estimated AADT is the basis of the estimates of future traffic volumes on the project road. A traffic study is the most crucial factor in ascertaining the viability of road projects. As the bank did not have past association / experience with the above transport economist, Frischmann Prabhu (India) Pvt. Ltd. (FPIPL), a reputed traffic consultant, was appointed by the bank, in consultation with the company, to undertake a comprehensive and independent traffic study on the project highway. The study was completed in August 2005. As part of that exercise, the FPIPL also carried out the Origin-destination survey, the Willingness-to-pay survey, Commodity movement analysis and Alternate route analysis.

5.16.7.2 Annual Average Density of Traffic (AADT): The comparison of AADT, after taking reduction of traffic due to diversion of traffic, etc., was estimated by GVR and FPIPL for the base year of the study, i.e. 2005 as given in Table 5.14.
The bank in their financial model took the AADT base for the year 2005, as per the study conducted by GVR, to be on the safer side.

5.16.7.3 Forecast of Total Tollable AADT: The GVR study has assumed approximately the average Traffic Growth (Tg) of 10 per cent (compounded) on the project road in its forecast of tollable traffic. The forecast is based on the product: the economic growth (Eg) and the elasticity of the traffic demand (e) vis-à-vis economic growth: \[ Tg = e \times Eg. \]

5.16.7.4 Toll Fee: The proposed toll fees for the different types of vehicles are based on the schedule of fees for a 4-lane road in the draft CA. The unit toll rates are based on the year 1997 and are adjusted annually to reflect the changes in the Wholesale Price Index (WPI) from March 31, 1997 onwards.

<table>
<thead>
<tr>
<th>Type of Vehicle</th>
<th>Car / Taxi / Jeep</th>
<th>Minibus</th>
<th>Bus</th>
<th>Tempo Trax Mini door</th>
<th>LCV</th>
<th>HCV 2 Axle E</th>
<th>HCV 3 Axle E</th>
<th>Multi Axle</th>
</tr>
</thead>
<tbody>
<tr>
<td>FPIPL (a)</td>
<td>2434</td>
<td>111</td>
<td>556</td>
<td>363</td>
<td>631</td>
<td>1575</td>
<td>1320</td>
<td>314</td>
</tr>
<tr>
<td>GVR (b)</td>
<td>2092</td>
<td>75</td>
<td>565</td>
<td>73</td>
<td>546</td>
<td>1075</td>
<td>1046</td>
<td>263</td>
</tr>
<tr>
<td>Variations in Number (a-b)</td>
<td>342</td>
<td>36</td>
<td>-9</td>
<td>290</td>
<td>85</td>
<td>500</td>
<td>274</td>
<td>51</td>
</tr>
<tr>
<td>Percentage</td>
<td>16</td>
<td>48</td>
<td>-1.59</td>
<td>397</td>
<td>16</td>
<td>46</td>
<td>26</td>
<td>19</td>
</tr>
</tbody>
</table>

Schedule G of the draft CA specifies that the toll fees shall be revised effective from July 1 of each year. The assumed toll fees as on July 1, 2008, along the Project Highway for through and local traffic are given in Table 5.16.
### Table 5.16: Toll Fees (Road Case Study)

<table>
<thead>
<tr>
<th>Type of Vehicle</th>
<th>Through (RS.)</th>
<th>Local</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car / Van / Jeep</td>
<td>35</td>
<td>10</td>
</tr>
<tr>
<td>Mini Bus</td>
<td>65</td>
<td>60</td>
</tr>
<tr>
<td>Bus</td>
<td>130</td>
<td>60</td>
</tr>
<tr>
<td>LCV</td>
<td>65</td>
<td>30</td>
</tr>
<tr>
<td>Truck 2 Axle</td>
<td>130</td>
<td>60</td>
</tr>
<tr>
<td>MAV</td>
<td>210</td>
<td>100</td>
</tr>
</tbody>
</table>

### 5.16.7.5 Toll Revenue Forecast:

The present and estimated growth in domestic sales of different types of vehicles was considered along with the trend of registration of vehicles in Rajasthan and the medium-term estimated-growth of GDP at 7 per cent. The lender in its financial model had assumed conservatively a compounded annual growth rate of 5 per cent for each type of vehicle but has taken the base estimate of traffic as per GVR study which is sufficiently lower than FPIPL's base traffic for the year 2005.

The comparison of toll revenue projected for the financial year 2008-09, i.e. the first year of COD up to 2018 (TL repayment period) by GVR, FPIPL and outer estimates are given in Table 5.17.

### Table 5.17: Toll Revenue Forecast (Road Case Study)

<table>
<thead>
<tr>
<th>Year</th>
<th>Gvr</th>
<th>Fpipl</th>
<th>Our Estimates</th>
<th>Variation from Gvr</th>
<th>Variation from Fpipl</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>15.71</td>
<td>17.8</td>
<td>18.67</td>
<td>-2.96</td>
<td>-0.86</td>
</tr>
<tr>
<td>2010</td>
<td>26.19</td>
<td>29.4</td>
<td>27.61</td>
<td>-1.42</td>
<td>1.82</td>
</tr>
<tr>
<td>2011</td>
<td>29.67</td>
<td>32.5</td>
<td>30.37</td>
<td>-0.70</td>
<td>2.18</td>
</tr>
<tr>
<td>2012</td>
<td>33.48</td>
<td>35.2</td>
<td>33.51</td>
<td>-0.03</td>
<td>1.70</td>
</tr>
<tr>
<td>2013</td>
<td>37.39</td>
<td>39.0</td>
<td>36.77</td>
<td>0.62</td>
<td>2.30</td>
</tr>
<tr>
<td>2014</td>
<td>41.03</td>
<td>42.9</td>
<td>40.34</td>
<td>0.69</td>
<td>2.56</td>
</tr>
<tr>
<td>2015</td>
<td>45.79</td>
<td>47.0</td>
<td>44.94</td>
<td>0.85</td>
<td>2.12</td>
</tr>
<tr>
<td>2016</td>
<td>51.84</td>
<td>51.8</td>
<td>48.61</td>
<td>3.23</td>
<td>3.21</td>
</tr>
<tr>
<td>2017</td>
<td>56.29</td>
<td>56.4</td>
<td>54.03</td>
<td>2.26</td>
<td>2.37</td>
</tr>
<tr>
<td>2018</td>
<td>63.18</td>
<td>62.7</td>
<td>59.28</td>
<td>3.90</td>
<td>3.44</td>
</tr>
<tr>
<td>Total</td>
<td>400.57</td>
<td>414.9</td>
<td>394.13</td>
<td>6.44</td>
<td>20.84</td>
</tr>
</tbody>
</table>
The above comparison shows that the bank's estimates of toll revenue forecast were lower by Rs 6.44 crore (1.61 per cent) from that of GVR and Rs 20.84 crore (5.02 per cent) from that of FPIPL during the entire repayment of the term loan period. The bank's estimates during the first three years of commercial operations were very close or lower than FPIPL, but marginally higher than GVR. This is on account of discounting of traffic growth and toll revenue done by GVR as stated above, without assigning any reasons. Discounting of 10 per cent in toll revenue of each year of forecast was considered to be very steep as done by GVR, considering negligible changes of alternate route as suggested by FPIPL. In view of the above, the toll revenue forecast by the bank, being conservative, was considered acceptable.

5.16.8. Financial Appraisal

5.16.8.1 Cost of project and means of finance: Table 5.18 gives (A) the Cost of the Project and (B) Means of Finance.

*Table 5.18: (A) Cost of Project (Road Case Study)*

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Particulars</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EPC Cost</td>
<td>265.22</td>
</tr>
<tr>
<td>2</td>
<td>Design, development, LIE and Independent Consultancy Charges</td>
<td>6.63</td>
</tr>
<tr>
<td>3</td>
<td>Preliminary and Pre-Operative Expenditure</td>
<td>5.30</td>
</tr>
<tr>
<td>4</td>
<td>Financing Cost</td>
<td>1.20</td>
</tr>
<tr>
<td>5</td>
<td>Interest during Construction</td>
<td>19.22</td>
</tr>
<tr>
<td>6</td>
<td>Margin Money for Bank Guarantee</td>
<td>0.37</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>297.94</strong></td>
</tr>
</tbody>
</table>

(B) Means of Finance

<table>
<thead>
<tr>
<th>Means of Finance</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Equity capital</td>
</tr>
<tr>
<td>2</td>
<td>Grant (equity support)</td>
</tr>
<tr>
<td>3</td>
<td>Term loan</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>297.94</strong></td>
</tr>
</tbody>
</table>
5.16.8.2 Remarks on Cost of Project

• **EPC Cost:** The EPC contract covered the construction of road works, major and minor bridges at grade junctions, underpasses, Rail Over-Bridges (ROB), toll plazas, lay-bys and the installation of the toll equipments and other fixed assets. The RRB Ltd proposed the fixed-price, fixed-time EPC contract. The EPC contract was awarded through open tender or limited invitation of bids basis. Presently, the SRB Ltd (intending bidder for the EPC contract) had estimated the cost at approximately Rs. 265 crore.

• **Preliminary and Pre-Operative Expenses:** The company had estimated 2 per cent of the EPC cost, i.e. Rs. 5.30 crore, under this head. This covers administrative charges, etc., during the construction period. The charges are considered reasonable, when compared to other road projects such as:

  • **Contingency provisions:** The SRB Ltd had not provided any contingency provision in the project cost as the EPC contract, which forms 89 per cent of the total project, will be awarded on a fixed-price fixed-time basis, with provisions for liquidated damages.

  • **Interest during construction (IDC):** Interest during construction period was estimated at Rs. 19.22 crore, i.e. 6.45 per cent of the total project cost based on the rate of interest at 8.5 per cent; draw-down schedule of the term loan. It was estimated that the debt-draw down will commence from May 2006.

  • **Margin money for bank guarantee:** The SRB Ltd, as per the terms of award of letter of intent for the aforesaid road project, had submitted a Bank Guarantee (BG) dated April 24, 2005 for Rs. 7.50 crores, valid up to December 31, 2008, in favour of NHAI. The BG was provided as a security for compliance of the obligations of the company, under the proposed concession agreement, during the construction period.

  • **Other fixed assets:** Other fixed assets including toll equipments, etc., were proposed to be included in the EPC contract.
5.16.8.3 Means of Finance

- Promoters’ Equity and NHAI’s Grants

(a) The total project cost was proposed to be funded at a Debt : Equity ratio of 1.99:1. The equity consists of promoters’ contribution of Rs.61.11 crores and equity support (during the construction period of the road) of Rs.38.40 crores by NHAI. As per the draft concession agreement, NHAI was to disburse the equity support grant only after the promoters contributed and spent at least 80 per cent of their total contribution to the equity of the project. The SRB Ltd, the main promoter of SRB Ltd, has 74 per cent share in the SPV. The SRB Ltd had raised Rs. 15.60 crore by private placement of 4 lakhs equity shares at Rs.390 each, in the month of March 2005. The SRB Ltd’s tangible net worth as on March 31, 2005 was Rs.103 corers and it had placed deposits of Rs 58.05 crores with the banks, as on the balance sheet date. Besides this road project, the SRB Ltd in consortium with XY Ltd had been short listed for construction of Haryana by-pass road project on BOT basis. Its share in this project was approximately 34 per cent. The SRB Ltd had also submitted other bids worth Rs. 2000 crores to NHAI for road projects on BOT basis.

(b) Apart from equity grant of Rs.38.40 crores, NHAI had also provided Rs. 57.60 crores for meeting the O&M expenses of the project. Disbursement of this grant will be spread over 7 years from the Commercial Operation Date (COD). As per the draft concession agreement, NHAI disbursed the O&M support in quarterly installments, and, the first of such installments was released within 30 days of the commencement of the operation date. The IDF Ltd had to infuse only 24 per cent of the total equity, i.e. Rs. 14.66 crores. Its present level of cash accruals is sufficient to meet the obligation.

(c) In view of the low Debt Service Reserve Account (DSRA), it was proposed to create a DSRA equivalent of one quarter of interest on total term loan amount, i.e. Rs. 4.22 crores at the proposed interest rate.

5.16.8.4 Legal Contracts

- Concession Agreement: The Concession Agreement (CA) was based on the Model Concession Agreement of NHAI. The CA between NHAI and the SRB Ltd.
executed in October 2005. It is stipulated that the company shall execute the Concession Agreement with NHAI before the disbursement of the term loan. The key terms and conditions as per draft CA were as under:

- The Concession shall be for a period of twenty-five (25) years from the date of signing of the CA.

- The concessionaire shall procure a bank guarantee equivalent to Rs 7.50 crores before the signing of the CA as performance security.

- The Concessionaire shall be entitled to levy and collect fees from the users of the project highway or part thereof in accordance with the fee notification in the Concession Agreement (CA), which provides for annual revision in the fees based on variations of the WPI (during the last 8 years, the CAGR and WPI were around 5 per cent).

- The concessionaire shall be entitled to control and regulate traffic on the project road.

- There is also a non-competing facility clause. The draft CA provides that NHAI and the Government of Rajasthan (GoR) shall not construct and operate either itself or through some other agency/person, on BOT basis or otherwise, a competing facility, either toll-free or otherwise, during the first 8 years of the Concession Period.

5.16.9 Force majeure

Force Majeure clauses are given in Table 5.19.

**Table 5.19: Force Majeure Clauses (Road Case Study)**

<table>
<thead>
<tr>
<th>Force Majeure Event</th>
<th>Termination Payments To Concessionaire By NHAI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Political Event</td>
<td>90% of the debt due and 100% of subordinated debt less due insurance claims and 90% of amount of such claims not admitted.</td>
</tr>
<tr>
<td>Indirect Political Event</td>
<td>(a) The total debt due, less due insurance claims and 90% of such claims not admitted, plus (b) 100% of the subordinated debt; plus (c) 110% of the Equity subscribed.</td>
</tr>
<tr>
<td>Political Event</td>
<td>(a) The total Debt due, plus (b) 120% of the Subordinated Debt; plus (c) 150% of the Equity.</td>
</tr>
</tbody>
</table>
• A tripartite substitution agreement would be signed between NHAI, the concessionaire and the senior lenders providing that the latter shall have the right to substitute the former by a selectee for the residual period of the concession, in case of concessionaire’s event of default under any of the financing documents.

• The CA provides for charging and assignment of project contracts, including the CA, with prior permission of NHAI and rights and titles of the project in favor of the lenders for obtaining finance for the project.

• The Company will adopt a comprehensive insurance programme necessary for the successful management of risks for the Project.

This infusion of deposit by SRB Ltd and the IDF Ltd in the DSRA will be in addition to its contribution to the equity to meet the project cost.

5.16.10. Risk Assessment

5.16.10.1 Sensitivity Analysis: The sensitivity analysis has been performed to assess the adequacy of the project’s cash flows in terms of meeting debt service obligations under adverse changes in key parameters. The following scenarios were projected, keeping other factors constant, in addition to the Base Case:

• Reduction of toll revenues by 5 per cent

• Lower WPI adjustment (4 instead of 5 per cent)

The results of the analysis on the above-mentioned parameters are given in Table 5.20.

Table 5.20: Sensitivity Analysis (Road Case Study)

<table>
<thead>
<tr>
<th>No.</th>
<th>Type Of Cases</th>
<th>Min DSCR</th>
<th>Avg DSCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Base Case</td>
<td>1.19</td>
<td>1.37</td>
</tr>
<tr>
<td>2</td>
<td>Toll Revenue – Decrease by 5%</td>
<td>1.18</td>
<td>1.26</td>
</tr>
<tr>
<td>3</td>
<td>WPI for Toll Revenue – Decrease to 4%</td>
<td>1.22</td>
<td>1.31</td>
</tr>
</tbody>
</table>

5.16.11. Risk Identification (Rating Variables on the Rating Scale)

The following risk factors were identified and they were mitigated as follows:
(a) **Management risk:** Mitigated by signing off a shareholders' agreement and letter of intent; the shareholders' agreement is yet to be executed. However equity is pledged. Key contracts and state support agreement have been signed.

(b) **Market risk:** Toll traffic and rates calculated scientifically using lender engineer's estimates. There is a risk of appropriate escalation in toll rates and stability of cash flows has to be maintained.

(c) **Technological risk:** Assistance from NHAI in obtaining necessary approvals and clearances. NHAI was to mitigate the rehabilitation and resettlement costs. Environmental impact assessment was done. All clearances have been sought.

(d) **Financing risk:** Cost of funds and means have been wrapped up. Sensitivity results and critical ratios are all within acceptable parameters. Equity was to be bought up-front and support from NHAI. Debt from banks, substitution risk and TRA mechanism are to be put in place.

(e) **Operating risk:** The risk during the operational phase is to be addressed by the O&M contractor who has experience in handling such risks. Toll systems are appropriate.

(f) **Construction risk:** Suitable LDs for delay in completion have been provided in the EPC Contract. Performance Bank Guarantee, which was 10 per cent of EPC, and Performance Bond, Promoter Support have been provided. Promoter was to fund 5 per cent of the cost overrun.

(g) **Legal risk:** All documents have been assessed by the legal counsel.

(h) **Force Majeure risk:** Clause for amendment in Concession Agreement with force majeure clauses are well defined.

Based on these aspects, the road project was given “BB” rating by the bank, which means the pricing will be some basis points above the prime lending rate. *It is not possible to display the credit scoring as it is a confidential document of the bank.*

### 5.17 Comparison of Road and Power Sector: Inferences from Case Studies

Comparison of appraisal parameters in road and power sectors as revealed by the case studies is given in Table 5.21.
### Table 5.21: Comparison of Road and Power Sectors

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Road</th>
<th>Power</th>
</tr>
</thead>
</table>
| **Industry Analysis** | • National and State Highways are 6% of road network and account for 80% of traffic.  
  • Only 2% is 4-laned and there is congestion.  
  • Roads are developed under NHDP and PMGSY.  
  • There are 2 kinds of road projects: BOT-Toll (which depends on traffic revenue for survival) and BOT-Annuity (which gets fixed 6-monthly payments, irrespective of traffic).  
  • Corporate governance issues are assured as road contractors become project developers. | • Installed capacity is 145,587.97MW. + generating capacity of 100,000MW.  
  • In Transmission in PGCIL alone investment of Rs. 71000 crore is envisaged.  
  • Besides Orissa and Delhi, Maharashtra, UP AP, Haryana and Gujarat have privatized distribution.  
  • In power projects, generation, transmission and distribution are unbundled.  
  • Corporate Governance issues are assured as equipment suppliers become project developers. |
| **Management Appraisal** | • Small project Size.  
  • Maximum BOT – Toll is 50 kms and BOT Annuity is 60 kms.  
  • Not many companies of repute/national standing in this sector. Project developers may be construction contractors.  
  • Project team is critical. Government grant is involved, though limited to 40%.  
  • Strength of shareholders’ agreement, pledging of equity and no dividend clause are often used in appraisal.  
  • Strength of relationship (past) of sponsor with the bank is important. | • As project sizes are big, project developers are national companies of repute.  
  • Power sector generation has a transparent bidding process, which attracts some of the biggest names in this field.  
  • Track record assessment is easier.  
  • Assessment of project team is critical.  
  • Political environment is important.  
  • Shareholders’ agreement, pledging or negative lien of equity and no dividend clause are often used.  
  Strength of relationship (past) of sponsor with the bank is important. |
| **Market Appraisal (Demand and Price)** | • Traffic estimates are critical.  
  • Appraisal requires thorough scrutiny of traffic estimated by lenders’ independent engineer.  
  • Suitable toll escalation rate (to be given by NHAI is quite critical).  
  • Cannot be bound by a separate contract.  
  • Charges are predefined by NHAI and are dependant on concession agreement | • Escrowable capacity of State Electricity Board which is buying power is critical.  
  • Can be bound by watertight Power Purchase agreement. Contingent buyers can be found.  
  • Bids are defined by borrower and must service costs. Control on variable elements of input prices-coal/gas- need to be maintained to obtain bidding price profitability. |

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<table>
<thead>
<tr>
<th>Parameter</th>
<th>Road</th>
<th>Power</th>
</tr>
</thead>
</table>
| Technological Appraisal | • Generally concerned with rehabilitation and resettlement costs, which are met by authority issuing concession.  
  • Toll collection systems must be modern as also the design and testing of roads.  
  • Track record of EPC contractor is critical.  
  • Environmental clearances are obtained and checked by bankers.   | • Availability and suitability of technology is critical.  
  • Nature of plant -base or peak or plant load factors will depend on technology used.  
  • Location of plant and distance from input source plays a role.  
  --Environmental clearance is critical as many projects in hydro get affected since coal produces fly ash. Environment impact analysis is a must. |
| Contractual Appraisal | • The number of important contracts are limited starting from Concession agreement, EPC contract, O & M contract, Force majeure clauses, termination benefits, intercreditor agreements, TRA account, etc. | • Contractual appraisal is vast and issues are quite different in generation, transmission and distribution.  
  • EPC, O&M contract, Fuel Supply agreement, fuel transport agreement, escrow mechanism TRA account, Inter-creditor agreements. |
| Regulatory Appraisal | • Road sector is governed by multiple regulations like:  
  --National Highway Act of India, Central Road Fund Act.  
  • No sectoral regulation.  
  • NHAI acts as regulator and operator.  
  • No appellate tribunal.  
  • Land and Traffic Act, 2002. | • Power sector is governed by multiple regulations like  
  Energy Act, 2006, National Tariff Policy, CERC and SERCS.  
  • No central independent regulator.  
  • Petroleum and Natural gas regulatory Board set up. |
| Security Appraisal | • Non or limited recourse structures.  
  • All project assets are mortgaged and all contracts assigned to the bank on ad valorem stamp duty.  
  • Trust retention account held by borrower | • Limited recourse structures.  
  • All project assets are mortgaged and all contracts assigned to the bank on ad valorem stamp duty.  
  • Letter of credit is sought from the State Electricity Board.  
  • Trust and Retention account and escrow mechanism. |
| Financial Appraisal | • Done on similar parameters but the acceptable ranges for each parameter is different for different sectors. | • Done on similar parameters but the acceptable ranges for each parameter is different for different sectors. |

It is quite clear from the case studies discussed above that management appraisal, financial analysis, risk measurement and sensitivity test utilize almost similar parameters in
both the sectors. However, the economic and structural drivers across the two sectors are different.

- While in the road sector, the technological appraisal focuses on the site and structures; in power sector, it assumes significance as a better technology, and, better equipments will lead to higher efficiency and a better peak load factor.

- In terms of construction issues, the EPC contractor plays a critical role in roads as it is essentially a construction project, and, as observed from the case studies, the vetting of EPC cost aspect has a much more serious role than in power sector.

- Market risks are substantially mitigated in power sector on account of a strong Power Purchase Agreement than in road sector where traffic determines the success of the project. So traffic assessment is given due weightage in the road sector, whereas in the power sector, the escrowable capacity of the State Electricity Board and the demand-supply gap of electricity are given due importance.

- The road sector has a well-defined concession agreement, and, therefore, legal and *force majeure* issues change dramatically on account of different regulations across the two sectors.

However, the dilemma is that while similar risk identification is done on the same factors and sub-variables across both the sectors, often managers tend to give scores based on their intuitive perceptions. An attitude survey was made using the same factors and dividing them into sub-variables, based on descriptive research, for appraising the officers. The results are discussed in the next chapter.