FINANCIAL ANALYSIS

A. Introduction

1. The financial analysis of the proposed Asian Development Bank (ADB) loan for the Madhya Pradesh Power Transmission and Distribution System Improvement Project was carried out in accordance with ADB's *Financial Management and Analysis of Projects*.[1] The cost stream used for estimation of the financial internal rate of return (FIRR) reflects the costs incurred in delivering the estimated benefits. All financial benefits and costs have been expressed in constant 2013 prices. The methodology used for each of the distribution companies was to assess the financial benefits in terms of the reduced electricity purchases arising from the reduction in network technical losses due to strengthening of network infrastructure both at the 33 kilovolts (kV) and 11 kV levels, and additional income from sales owing to an increase in transmission capacity at 132 kV. The methodology used for Madhya Pradesh Power Transmission Company (MP Transco) was to estimate the tariff that will accrue to MP Transco as a result of this incremental investment.

2. The weighted average cost of capital (WACC) was calculated as prescribed by ADB's guidelines, and the financial viability was assessed by comparing the WACC with the FIRR value for the aggregate of investments in all three distribution companies and MP Transco. Sensitivities of the FIRR to changes in various cost and revenue assumptions have also been computed and summarized. The average electricity sales tariff and the average power purchase cost were estimated based on details provided in the tariff order for FY2013–FY2014, determined by the Madhya Pradesh Electricity Regulatory Commission (MPERC). A 20-year operating cash flow for the project investment has been used for the FIRR evaluation.

B. Weighted Average Cost of Capital

3. To compute the WACC, it was assumed that the financing would consist of the ADB loan and equity contributions by the Government of Madhya Pradesh (GOMP). The contribution from each of these sources is outlined in Table 1.

Table 1: Financing Sources and Contribution

Source of Financing	DISCOM-C [a] ($ million)	DISCOM-E[b] ($ million)	DISCOM-W[c] ($ million)	**MP Transco** ($ million)	**Total** ($ million)
ADB	33.33	33.33	33.33	250.00	350.00
GOMP	13.86	14.27	22.40	99.47	150.00
Total	**47.20**	**47.60**	**55.73**	**349.47**	**500.00**

ADB = Asian Development Bank, GOMP = Government of Madhya Pradesh, MP Transco = Madhya Pradesh Power Transmission Company.
Note: Costs include base costs, taxes and duties, and contingencies.
[a] Madhya Pradesh Madhya Kshetra Vidyut Vitaran Company.
[b] Madhya Pradesh Poorv Kshetra Vidyut Vitaran Company.
[c] Madhya Pradesh Paschim Kshetra Vidyut Vitaran Company.
Sources: Asian Development Bank estimates; distribution companies.

4. With the estimated project costs and the commitment of GOMP and the executing agencies, ADB is estimated to finance 70% of the project costs, and GOMP and the executing agencies (collectively) 30%. ADB loan proceeds will be made available by the government of India to GOMP on terms and conditions consistent with Indian legislation and acceptable to

[1] ADB. 2005. *Financial Management and Analysis of Projects*. Manila.

ADB. The cost of equity for GOMP and the executing agencies is assumed in accordance with the MPERC allowance of 15.5% per year. A domestic inflation rate of 7.0% per year and an international inflation rate of 1.9% per year were assumed to compute the real interest rates. The estimated costs of borrowing[2] and equity capital were then adjusted for inflation to obtain the WACC in real terms. The WACC, calculated by applying the weighting percentage to each source of financing, on a pretax basis, is 4.0% (Table 2). The WACC for each distribution company and MP Transco is the same, as the source and mix of financing are identical.

Table 2: Weighted Average Cost of Capital

Item	Amount ($ million)	Weight (%)	Nominal Cost (%)	Real Cost (%)	Weighted Cost (%)
ADB loan	350.00	70.0	4.25	2.31	1.6
GOMP	150.00	30.0	15.50	7.94	2.4
Total	500.00	100.00			4.0

ADB = Asian Development Bank, GOMP = Government of Madhya Pradesh.
Source: Asian Development Bank estimates.

C. Methodology and Assumptions

5. The financial benefits from the proposed investments in the distribution companies result from reduced technical losses in the network. For the estimation of savings, an assessment of technical losses, and to what extent such losses can be reduced, was required. A load flow simulation was conducted on a sample feeder basis with or without the project to determine the loss reduction in the system. Technical losses in the distribution companies are expected to decrease from a minimum of 1% to more than 9% of the input to the 11 kV feeder networks at the subproject areas, as a result of commissioning of new substations and rehabilitation of 11 kV interconnection lines. Along with loss reduction, the project will result in flattening of the load curve, reduction in line losses, reduction in power and distribution failure rates, reduction in interruptions and outages, and provision of quality power to consumers.

6. The loss savings for each distribution company have been computed based on the savings in the power purchase cost for each distribution company at state boundary valued at a pooled power purchase cost for the state, as approved by MPERC in the FY2013-FY2014 tariff order. The incremental operation and maintenance (O&M) cost on an annual basis has been considered at a moderate 3% of the project cost. In accordance with the tariff regulations issued by MPERC, MP Transco will receive a tariff based on the capital invested. The tariff will comprise annual depreciation, interest on long-term debt, interest on working capital (based on applicable norms), annual O&M costs, and return on equity computed at 15.5% net of tax on the equity invested.

D. Financial Viability

7. Incremental cash flows attributable to the proposed investments were estimated based on the methodology and assumptions described above. The FIRRs for the distribution companies and MP Transco and the overall project are in Table 3. The detailed cash flows and FIRR of the project are in Table 4. The FIRR values for all the executing agencies and the project are well above the hurdle rate of 4.0%.

[2] The interest rate considered for WACC computation is determined based on the 10-year London interbank offered rate (LIBOR) fixed swap rate basis (as on 14 August 2013) with a 0.40% annual spread, 0.10% annual maturity premium and no rebates or waiver. GOMP will bear the foreign exchange risk, for which a 1% annual premium is added to the interest rate.

Table 3: Financial Internal Rate of Return for Distribution Companies and Madhya Pradesh Power Transmission Company

Distribution Company	FIRR (%)
Distribution companies	12.7
MP Transco	7.7
Overall project	9.3
Weighted average cost of capital	4.0

FIRR = financial internal rate of return, MP Transco = Madhya Pradesh Power Transmission Company.
Source: Asian Development Bank estimates.

Table 4: Detailed Cash Flows of Overall Project
(Rs million)

Year	Net outflow			Net Inflow			Net Cash Flow
	Capital	O&M	Total	Reduced purchases	Incremental Tariff	Total	
1	(2,747.68)	0.00	(2,747.68)	0.00	0.00	0.00	(2,743.75)
2	(9,057.40)	0.00	(9,057.40)	0.00	0.00	0.00	(9,043.92)
3	(6,309.71)	0.00	(6,309.71)	0.00	0.00	0.00	(6,300.18)
4	(2,917.58)	(193.33)	(3,110.91)	1,187.29	0.00	1,187.29	(1,923.63)
5	0.00	(630.97)	(630.97)	1,187.29	2,166.26	3,353.55	2,722.58
6	0.00	(630.97)	(630.97)	1,187.29	2,155.72	3,343.01	2,712.04
7	0.00	(630.97)	(630.97)	1,187.29	2,134.65	3,321.93	2,690.96
8	0.00	(630.97)	(630.97)	1,187.29	2,113.57	3,300.86	2,669.89
9	0.00	(630.97)	(630.97)	1,187.29	2,092.49	3,279.78	2,648.81
10	0.00	(630.97)	(630.97)	1,187.29	2,071.41	3,258.70	2,627.73
11	0.00	(630.97)	(630.97)	1,187.29	2,050.34	3,237.63	2,606.65
12	0.00	(630.97)	(630.97)	1,187.29	2,029.26	3,216.55	2,585.58
13	0.00	(630.97)	(630.97)	1,187.29	2,008.18	3,195.47	2,564.50
14	0.00	(630.97)	(630.97)	1,187.29	1,987.11	3,174.39	2,543.42
15	0.00	(630.97)	(630.97)	1,187.29	1,966.03	3,153.32	2,522.35
16	0.00	(630.97)	(630.97)	1,187.29	1,969.80	3,157.09	2,526.12
17	0.00	(630.97)	(630.97)	1,187.29	1,858.64	3,045.93	2,414.96
18	0.00	(630.97)	(630.97)	1,187.29	1,837.56	3,024.85	2,393.88
19	0.00	(630.97)	(630.97)	1,187.29	1,816.48	3,003.77	2,372.80
20	0.00	(630.97)	(630.97)	1,187.29	1,795.41	2,982.70	2,351.72
21	0.00	(630.97)	(630.97)	1,187.29	1,784.87	2,972.16	2,341.19
22	0.00	(630.97)	(630.97)	1,187.29	1,784.87	2,972.16	2,341.19
23	0.00	(630.97)	(630.97)	1,187.29	1,784.87	2,972.16	2,341.19
24	0.00	(630.97)	(630.97)	1,187.29	3,243.66	4,430.95	3,799.98[a]
		FIRR	**9.3%**				

( ) = negative, FIRR = financial internal rate of return, O&M = operation and maintenance.
[a] Includes the terminal value of assets taken at 10% of the asset value at the end of 20 years of the operating period.
Source: Asian Development Bank estimates.

E. Sensitivity Analysis

8. Sensitivity analyses have been carried out on the FIRR to changes in assumed values of the key variables. The FIRR values are above the hurdle rate of 4%, so the sensitivity analysis set out below only considers adverse changes. The changes considered are (i) a 10% increase in capital costs, (ii) an increase in O&M costs from 3% of project cost to 4% of project cost, and (iii) a reduction in savings in technical losses by 10% from what was considered in the base case.

9. Table 5 shows the effect of these changes on the FIRR. The financial performance of the overall project is robust for all the changes tested, with the FIRR exceeding the WACC rate of 4.0% in all cases. On this basis, it can be concluded that the investment is financially viable and offers acceptable returns under a range of possible scenarios.

Table 5: Sensitivity Analysis (%)

Sensitivity Parameter	Change from Base Case	Variation		
		Distribution Companies	MP Transco	Overall Project
Base case		12.7	7.7	9.3
Project capital costs	+10.0	11.1	6.6	8.1
O&M cost	+33.3	11.8	6.3	8.2
Reduction of losses	–10.0	11.0	7.7	8.7
Combined		8.4	5.3	6.3

MP Transco = Madhya Pradesh Power Transmission Company, O&M = operation and maintenance.
Source: Project preparatory technical assistance consultants.

G. Conclusions

10. Additional revenues resulting from technical and commercial loss reductions and incremental tariff income were considered benefits in assessing financial viability of the project. The project investment costs and O&M costs were included in the project costs. Analysis at both the distribution companies and MP Transco level and the overall project level shows that the project FIRR exceeds the WACC—demonstrating the financial viability of the project. Sensitivity analysis shows the project's financial benefits are stable against changes in the relevant parameters.

F. Financial Management and Performance Assessment

11. A financial management assessment (FMA) of the four executing agencies was conducted as part of the financial due diligence of the executing agencies to assess their capacity to implement the proposed project administered by ADB, consistent with the methodology recommended in ADB's *Financial Due Diligence: A Methodology Note*.[3]

12. The adequacy of the existing financial management at the executing agencies was mostly found to be in compliance with ADB's guidelines. A few measures were identified and suggested to be instituted with the distribution companies and MP Transco to ensure compliance with best practices. The detailed FMA findings and recommendations are in a supplementary appendix.[4] The summary findings and recommendations are presented below.

13. The existing accounting systems of MP Transco and the distribution companies—the legacy batch processing financial assessment system or Sybase-based systems—are inadequate. The companies are in advanced stages of implementation of enterprise resource planning. Madhya Pradesh Madhya Kshetra Vidyut Vitaran Company (DISCOM-C) is expected to implement this by December 2013 while tenders are being prepared for the other executing agencies with a 2–3 year implementation horizon. Comprehensive enterprise resource planning will be implemented to bring in efficiency. To operationalize the software and prepare the accounting and reporting requirements, the utilities' staff needs to be fully aware of the features and functionalities of the software. This may require additional training. The budgetary practices

[3] ADB. 2009. *Financial Due Diligence: A Methodology Note*. Manila.
[4] Financial Management Assessment and Projections (accessible from the list of linked documents in Appendix 2).

and the external and internal audits are being carried out in accordance with the rules and procedures laid out by the Companies Act, 1956. Internal audit has been recommended to be strengthened for all the executing agencies.

14. The distribution companies have been consistently making losses during FY2007–FY2011. The negative operating cash flow and profitability ratios indicate companies have not been able to generate enough cash to meet their obligations. This has been mainly attributed to failure in achieving the transmission and distribution losses allowed by MPERC in estimating the annual revenue requirements. MP Transco's financial projections show that with progressive tariff increases by MPERC, profitability could be achieved from FY2013 onward with accumulation of retained earnings surging to Rs30 billion at the end of FY2022. Financial projections of DISCOM-C show that with progressive tariff increases, profitability could be achieved by FY2015. With profitability in FY2015, the cash flow position of DISCOM-C improves with the debt service ratio becoming positive in FY2015 and improving to 2.07 in FY2017. The self-financing capacity of the company is limited in the short term but improves over the longer term, so the company should be able to contribute to its capital expenditure in the future. DISCOM–E) and DISCOM-W have shown very similar financial performances in the past and they are predicted to become profitable from FY2015.