FINANCIAL ANALYSIS FOR PROJECT 2

A. Tranche 4 Financial Analysis

1. The financial analysis of Tranche 2 of the multitranche financing facility (MFF) has been carried out in accordance with the Asian Development Bank's (ADB) Financial Management and Analysis of Projects.[1] All financial costs and benefits have been expressed in constant November 2014 prices. Cost streams used for financial internal rate of return (FIRR) determination reflect the costs of delivering the estimated benefits. Benefits flowing to the Assam Power Distribution Company Limited (APDCL) consist primarily of the cost savings resulting from reduced distribution losses and also a marginal increase in regulated revenue accruing from newly constructed distribution facilities. To assess financial viability, the weighted average cost of capital (WACC) of the proposed investment was calculated and compared with the investment's FIRR. Sensitivity of the FIRR to changes in the underlying assumptions was also tested.

2. The tariff revenue that APDCL earns for the new distribution facilities is calculated in accordance with regulations set by the Assam Electricity Regulatory Authority (AERC). An annual revenue requirement is determined by AERC, based on AERC's view of reasonable and efficient power purchase costs, operations and maintenance costs, overhead costs, depreciation, interest on loans and on working capital, and return on equity. In determining tariffs, any grant financing is ring-fenced by AERC and is excluded from depreciation and rate of return calculations. APDCL's regulated revenue from the new facilities has been estimated in accordance with these regulations.

3. The Tranche 2 investment will relieve substation capacity constraints in APDCL's distribution network. APDCL has estimated that this will enable it to supply an additional 8.7 gigawatt-hours (GWh) of demand per year. APDCL estimates that approximately 190 GWh of electricity purchases will be avoided through reduced technical losses [approximately 50% or 50 megawatts (MW) of peak demand] on rehabilitated distribution lines.[2] APDCL also estimates that improved metering and billing practices extended to an additional 1.2 million consumers will reduce commercial losses by 50%–60% (144 GWh) in the targeted areas.[3] The increase in sales will generate regulated income only (that is, AERC will only allow APDCL to earn sufficient revenue on the incremental sales to meet costs and to earn a return on assets). However, the technical and non-technical loss reduction will lower APDCL's overall power purchase costs resulting in additional incremental net revenue. On a net basis, APDCL's total electricity purchases will reduce as a result of this investment.[4] Other minor financial benefits may accrue to APDCL from the investment arising from improved quality and reliability of supply but these were not included in the analysis.

[1] ADB. 2005. *Financial Management and Analysis of Projects.* Manila.
[2] APDCL's estimate of technical loss reduction adopted some optimistic assumptions. For conservatism, APDCL's estimate has been reduced by 50% for the purposes of financial analysis.
[3] APDCL estimated a reduction in the overall distribution loss level of 10 percentage points based on experience with a similar centralized metering and billing implementation in the Guwahati distribution circle. For conservatism, for the purposes of analysis it has been assumed that the average commercial loss reduction achieved in the project area will only be 2.5 percentage points, significantly lower than APDCL's estimate.
[4] From a tariff perspective, a small increase in purchase costs would be allowed in the annual revenue requirement (at the approved loss level) for the increased sales attributable to the relieved capacity constraints. However, because of the overall reduction in losses arising from the investment, APDCL would not actually need to purchase additional electricity.

4. It has been assumed that only 10% of ADB's loan will be on-lent to APDCL as a local currency loan with an indicative interest rate of 10.5%. The balance of ADB's loan (90%) will be provided to APDCL as either a grant or equity. In determining revenue, the AERC allows APDCL a return on equity capital of 14%. This represents APDCL's opportunity cost of capital—it can invest in other distribution projects and earn the same rate of return—therefore this value has been adopted as a proxy for the cost of equity capital and grant financing. The corporate tax rate as it applies to APDCL is 33.99%, although APDCL does not currently pay tax and is not expected to do so in the near future and therefore a marginal tax rate of 0% has been adopted. Assuming a domestic inflation rate of 7.8%, the real, post-tax WACC for the investment is 5.5% as shown in **Table 1**.

Table 1: Weighted Average Cost of Capital

Item	**Amount** ($ million)	**Weight** (%)	**Pre-Tax Nominal Cost** (%)	**Post-Tax Real Cost** (%)	**Weighted Cost** (%)
ADB loan[a]	4.8	8	10.5	2.5	0.2
Grant[a]	43.2	72	14.0	5.8	4.2
GOA equity	12.0	20	14.0	5.8	1.1
Total	**60.0**	**100.0**			**5.5**

ADB = Asian Development Bank, GOA = Government of Assam.
[a] 10% of ADB's loan is on-lent to APDCL and 90% is provided as a GOA grant or equity.
Source: Asian Development Bank estimates.

5. Incremental cash flows attributable to the Tranche 2 investment were estimated based on the methodology and assumptions described above. The estimated real post-tax FIRR of the investment is 27.0% as shown in **Table 2**, which compares favorably with the WACC of 5.5%.

Table 2: Calculation of Financial Internal Rate of Return[a]
(INR million)

Year	**Benefits**			**Costs**		**Net Cash Flow**
	Increased ARR	**Reduced Losses**		**Capital**	**Operating**	
		Technical	**Commercial**			
2016	0.0	0.0	0.0	1,611.7	0.0	(1,611.7)
2017	0.0	0.0	0.0	1,611.7	0.0	(1,611.7)
2018	182.3	522.2	404.6	0.0	72.3	1,036.9
2019	170.3	522.2	404.6	0.0	71.6	1,025.6
2020	159.3	522.2	404.6	0.0	70.9	1,015.3
2021	149.1	522.2	404.6	0.0	70.2	1,005.8
2022	139.7	522.2	404.6	0.0	69.6	997.0
2023	128.2	522.2	404.6	0.0	68.9	986.1
2024	120.2	522.2	404.6	0.0	68.3	978.8
2025	112.9	522.2	404.6	0.0	67.7	972.1
2026	106.0	522.2	404.6	0.0	67.0	965.9
2034	67.8	522.2	404.6	(169.2)	62.2	1,101.6
						FIRR = 27.0%

ARR = annual revenue requirement, FIRR = financial internal rate of return.
[a] For brevity, selected years shown only.
Source: Asian Development Bank estimates.

6. Analyses were carried out to examine the sensitivity of the FIRR to adverse changes in key variables: a 10% increase in capital costs; a 10% reduction in benefits; a 10% increase in

operation and maintenance costs (assuming that the AERC does not allow these costs to be passed through as a tariff adjustment); a one-year implementation delay and combined downside scenario. Results are shown in. The significant reduction in technical and non-technical losses that the APDCL expects to achieve **Table 3** through the investment provides robust returns that exceed the WACC in for all sensitivities examined.

Table 3: FIRR Sensitivity Analysis

	Sensitivity Parameter	Variation (%)	FIRR (%)	Switching Value (%)
	Base case		27.0	
1.	Capital cost Increase	+ 10	24.6	89.7
2.	Benefit decrease	- 10	24.0	-76.1
3.	O&M cost increase	+ 10	26.8	1187.3
4.	Delay	1 year	22.0	
5.	Combined 1-4		18.1	

FIRR = financial internal rate of return, O&M = operations and maintenance cost.
Source: Asian Development Bank estimates.

B. Historical Financial Performance of APDCL

7. Highlights of the historical financial performance of the APDCL FY2010 to FY2014 are presented in the Project Administration Manual.[5] The financial performance of the company is characterized by an average cost per unit of electricity sold that is greater than the average revenue per unit sold. This means the company has insufficient cash to meet interest and principal payment obligations on borrowings from the Government of Assam (GOA); accrued principal repayment obligations were INR2.9 billion by the end of FY2014, representing unpaid principal back to FY2006. This cash squeeze is a consequence of two main factors: (i) poor performance of the company's assets against distribution losses performance benchmarks set by AERC; and (ii) disallowance by AERC of interest cost pass-through on the GOA (due to lack of provision of evidence matching these unsecured borrowings to revenue-generating assets) and on the general provident fund (GPF) liability (no evidence has been provided to AERC of a unique fund or bank account for this liability). There have also been significant delays in the company's submission of audited financial statements to AERC to allow AERC to true-up actual costs against allowed costs, although AERC reports that APDCL's performance is improving and a true-up for FY2014 is expected to be included in the annual revenue requirement for FY2015.[6]

8. **Distribution losses.** Achieving and sustaining reduce distribution loss levels has been a perennial challenge for APDCL. APDCL has some success in reducing losses over the period FY2007–FY2009, but losses have increased again in subsequent years. The company has consistently missed the loss targets set by AERC, which has resulted in significant revenue shortfalls in some years. For example, in FY2013 APDCL achieved an overall loss level of 25.2% against AERC's target of 19.6%. This means that approximately 8% of energy purchase costs will be disallowed by AERC in the subsequent true-up. Energy purchase costs currently represent around 73% of APDCL's overall ARR, and so the revenue shortfall is significant. AERC has issued several directives designed to improve the performance of APDCL, including

[5] FY refers to the fiscal year ended throughout the document, i.e. FY 2013 refers to the fiscal year ended March 31, 2013.
[6] A "true-up" is the process by which AERC compares audited costs to previously approved costs. Over-or under-recovery of actual costs by APDCL, where adequately justified to AERC, can be recovered in subsequent years' tariffs.

instigating a taskforce to improve detection of and prosecution for electricity pilferage. Implementation and commissioning of Projects assets and assets funded under the previous MFF are also expected to materially reduce technical and commercial losses, in particular through the extension of APDCL's centralized metering and billing system to a total of approximately 2 million customers and through reinforcement of 11 kV and low voltage circuits. Covenants have been included in loan agreements to underpin the importance of action to reduce distribution losses.

C. Financial Projections for APDCL

9. Indicative 10–year financial projections have been developed for APDCL. Projections have generally been based on the company's recent performance, AERC's recent tariff and revenue determinations, and multi-year tariff petitions submitted by the company for the period FY2014–FY2016. With the exception of network losses and depreciation, revenue allowed by AERC is assumed to match actual costs from FY2017. In FY2014, AERC reset tariffs for the final third of the year; until then, previous tariffs applied. It has been assumed that AERC will allow the resulting revenue deficit to be recovered in FY2016. Deficits for the years FY2015 and FY2016 are assumed rolled into a regulatory asset to be amortized over 10 years.

10. It has been assumed that capital expenditure beyond FY2018 equals 4% of gross fixed assets. This is adequate to replace assets reaching the end of their service lives and to augment the network to some extent, but would not be sufficient to meet forecast demand growth and network expansion requirements.[7] To reflect this lower level of capital investment, the demand forecast has been scaled back significantly from FY2019 onwards. Financing is assumed to be a mix of debt, equity and grants, as indicated in APDCL's multi-year tariff petition for FY2014–FY2016 and AERC's FY2014 tariff order. Domestic inflation has been assumed to be 8.1% in FY 2014; 7.8% in FY2015; 7.5% in FY2016; and 7.0% thereafter.

11. It is expected that the company will continue to suffer accounting losses over the next three years (the period covered by AERC's most recent tariff order, released in November 2013). The main reasons for these losses are the same as those outlined in paragraph 7 above—missed loss targets and disallowance by AERC of interest cost pass-through on GOA borrowings on the general provident fund liability. The AERC's approved net revenue requirement for APDCL over the period represents only around 77% of the revenue claimed by APDCL in its tariff petition. APDCL is in the process of completing a fixed asset reconciliation and physical verification exercise, which is expected to be completed in FY2015.

12. On the basis of the assumption that AERC will pass through most of APDCL's costs from FY2017 onwards (due to timely and more complete petitioning on APDCL's part and a reduction in inefficient expenditure), the financial projections indicate that the performance of APDCL will improve modestly over the forecast period. However, financial performance will continue to be dictated by the gap between actual and approved network losses. APDCL is expected to continue to lag behind AERC's approved network loss trajectory, which means that APDCL will continue to under-recover its electricity purchase costs. **Table 4** demonstrates the impact of the gap between approved and actual losses on projected financial performance and position.

[7] Analysis undertaken separately as part of the Power System Master Plan update and shown in the FFA indicates a requirement for capital expenditure of at least twice that modeled here to meet demand growth and to maintain the network.

Table 4: Summarized Financial Projections of APDCL

Item		2015	2016	2017	2018	2023
Approved distribution losses[a]		18.1%	17.6%	17.0%	16.4%	16.0%
Scenario 1 (base case - no further distribution loss reduction)						
Actual distribution losses [a]		*25.0%*	*25.0%*	*25.0%*	*25.0%*	*25.0%*
Total operating revenue	(INR m)	34,043	37,771	50,744	61,546	95,106
Total expenses	(INR m)	(41,002)	(46,928)	(53,421)	(62,563)	(98,210)
Net profit before tax	(INR m)	(6,959)	(9,157)	(2,677)	(1,017)	(3,105)
Net cash flow	(INR m)	(11,246)	(3,947)	(2,713)	5,427	4,703
Debt service coverage ratio		-4.64	-0.35	0.04	2.19	1.60
Return on average net fixed assets		-57%	-70%	-1%	7%	1%
Current ratio		0.72	0.55	0.53	0.60	0.77
Scenario 2 (best case - sustained distribution loss reduction)						
Actual distribution losses [a]		*25.0%*	*24.5%*	*24.0%*	*23.5%*	*21.3%*
Total operating revenue	(INR m)	34,043	37,771	50,659	61,392	94,638
Total expenses	(INR m)	(41,002)	(46,704)	(52,921)	(61,706)	(95,165)
Net profit before tax	(INR m)	(6,959)	(8,933)	(2,263)	(314)	(528)
Net cash flow	(INR m)	(11,246)	(3,811)	(2,515)	5,845	6,863
Debt service coverage ratio		-4.64	-0.31	0.09	2.31	2.07
Return on average net fixed assets		-57%	-68%	1%	10%	8%
Current ratio		0.72	0.56	0.54	0.62	0.90
Scenario 3 (worst case - increasing distribution losses)						
Actual distribution losses [a]		*25.4%*	*25.9%*	*26.4%*	*27.0%*	*29.8%*
Total operating revenue	(INR m)	34,043	37,770	50,885	61,803	95,804
Total expenses	(INR m)	(41,170)	(47,352)	(54,179)	(63,789)	(102,597)
Net profit before tax	(INR m)	(7,127)	(9,582)	(3,294)	(1,986)	(6,793)
Net cash flow	(INR m)	(11,348)	(4,158)	(3,101)	4,809	1,657
Debt service coverage ratio		-4.67	-0.41	-0.07	2.02	0.94
Return on average net fixed assets		-59%	-75%	-6%	2%	-11%
Current ratio		0.72	0.54	0.51	0.57	0.61

[a] Distribution losses are shown as percentage of electricity purchases.
Source: Company annual reports and regulatory petitions; Assam Electricity Regulatory Authority determinations; and Asian Development Bank staff estimates.

13. After many years with no new cash equity investment in APDCL and persistent accounting losses, GOA's aggregate capital position in APDCL (the total of long-term debt, current debt maturities, accrued interest, equity, grants and accumulated losses) was negative by the end of FY2014. With no immediate expectation of a turnaround in profitability, a cash equity injection by GOA is required to (at least) restore a position aggregate capital position. The low percentage of equity in APDCL's capital base also limits the cash buffer that the return on equity allowed by AERC should provide. Conversion of part of GOA's long-term lending to equity to bring total equity to 30% of gross fixed assets (the maximum equity allowed for the return on equity calculation under the tariff regulations) would significantly improve APDCL's financial performance (disallowed interest expenses would reduce and return on equity would increase in the ARR).