FINANCIAL ANALYSIS

A. Financial Analysis of Tranche 1

1. The financial analysis of tranche 1 of the multitranche financing facility (MFF) was carried out in accordance with the *Financial Management and Analysis of Projects of the Asian Development Bank* (ADB).[1] All financial costs and benefits are expressed in constant September 2013 prices. Cost streams used for determining the financial internal rate of return (FIRR) (capital investment, fuel, income tax, and operation and maintenance) reflect the costs of delivering the estimated flow of power from the new power plant.[2] Benefits for Assam Power Generation Corporation (APGC) include regulated revenue accruing from newly constructed generating assets. To assess financial viability, the weighted average cost of capital (WACC) of the proposed investment is calculated and compared with the investment's FIRR. Sensitivity of the FIRR to changes in the underlying key assumptions is tested.

2. The tariff revenue that APGC earns for the new plant is calculated in accordance with regulations set by the Assam Electricity Regulatory Authority (AERC). AERC determines a two-part tariff, comprising a fixed component and a variable component. The fixed component includes depreciation, interest on loans and working capital, nonfuel operation and maintenance costs, and return on equity. The variable component is to recover fuel costs. In determining tariffs, any grant financed is ring-fenced by AERC and is excluded from depreciation calculations. APGC's revenue from the new plant is estimated in accordance with these regulations.

3. The government will onlend only 10% of the ADB loan to APGC as a local currency loan with an indicative interest rate of 10.5%. The balance of the loan (90%) will be provided to APGC as a grant. In determining generation tariffs, the Assam Electricity Regulatory Authority (AERC) allows APGC a return on equity capital of 14.0% (subject to certain generation availability targets being achieved). This represents APGC's opportunity cost of capital, i.e., it can invest in other generation projects and earn the same rate of return, Therefore this value is adopted as a proxy for the cost of equity capital. The corporate tax rate, as it applies to APGC, is 33.99%.[3] Assuming a domestic inflation rate of 9.8%, the real, post-tax WACC for the investment is 1.9% (Table 1). The grant component is excluded from the WACC calculation (and, for consistency, is excluded from the capital costs in the cash flow calculation)

Table 1: Weighted Average Cost of Capital

Item	Amount ($ million)	Weight (%)	Pre-Tax Nominal Cost (%)	Post-Tax RealCost (%)	Weighted Cost (%)
ADB loan[a]	5.0	29.0	10.5	0.0	0.0
GOA equity	12.0	71.0	14.0	3.8	2.7
Total	**27.0**	**100.0**			**2.7**

( ) = negative value, ADB = Asian Development Bank, GOA = Government of Assam.
[a] Only the component of the ADB loan that the government onlends is included in the project WACC calculation. The component of the loan that is provided as a grant to Assam Power Generation Corporation is excluded for the purposes of FIRR comparison.
Source: Asian Development Bank staff estimates.

[1] ADB. 2005. *Financial Management and Analysis of Projects.* Manila.
[2] Costs in relation to general capacity development ($4.5 million or approximately 7% of total project cost) are excluded from this analysis because they do not directly contribute incremental revenue.
[3] Tax is treated as a pass-through in the tariff setting regime in Assam.

4. Estimations of the incremental cash flows attributable to the tranche 1 investment are based on the methodology and assumptions described in paras 1 and 2. The estimated real post-tax FIRR of the investment is 5.5% (Table 2), which compares favorably with the WACC of 1.9%.

Table 2: Calculation of the Financial Internal Rate of Return
(Rs million)

Year	Revenue	Costs				Net Cash Flow
		Capital	Fuel	Operating	Tax	
2014	0.0	381.8	0.0	0.0	0.0	(381.8)
2015	0.0	891.0	0.0	0.0	0.0	(891.0)
2016	1,228.0	0.0	756.7	158.2	125.0	188.2
2017	1,147.0	0.0	702.2	154.7	117.2	172.8
2018	1,071.8	0.0	651.8	151.3	109.9	158.8
2019	1,002.2	0.0	605.0	148.1	103.3	145.8
2020	937.7	0.0	561.6	144.8	97.3	134.0
2021	877.9	0.0	521.3	141.7	91.7	123.2
2022	822.5	0.0	484.0	138.7	86.6	113.2
2023	771.1	0.0	449.4	135.7	81.9	104.2
2024	723.5	0.0	417.3	132.7	77.7	95.9
2025	679.4	0.0	387.5	129.9	73.8	88.3
2026	638.5	0.0	359.8	127.1	70.2	81.4
2027	600.7	0.0	334.2	124.4	67.0	75.1
2028	565.5	0.0	310.4	121.7	64.1	69.3
2029	533.0	0.0	288.3	119.1	61.4	64.1
2030	502.9	0.0	267.9	116.6	59.0	59.4
2031	467.8	0.0	248.8	114.1	36.6	68.2
2032	443.0	0.0	231.2	111.7	35.0	65.1
2033	412.5	(22.0)	214.9	109.3	31.0	79.4
					Financial internal rate of return = 5.5%	

Source: Asian Development Bank estimates.

5. Examination of the the sensitivity of the FIRR to adverse changes in key variables includes (i) a 10% increase in capital costs, (ii) a 10% reduction in generation output, (iii) a 10% increase in operation and maintenance costs (assuming that AERC does not allow these costs to be passed through as a tariff adjustment), and (iv) a 1-year implementation delay. While the financial outcomes are sensitive to changes in these variables, the FIRRs exceed the WACC in all cases, except for the 10% reduction in power output (Table 3). The switching value of the power output is 7.8% indicating that power outputs should be 7.8% lower for the investments to be financially nonviable. Because the gas supply is the key variable that determines output of the new plant, risk mitigation measures for tranche 1 should ensure uninterrupted gas supply to the new power plant.

Table 3: FIRR Sensitivity Analysis

	Sensitivity Parameter	**Variation** (%)	**FIRR** (%)	**Switching Value** (%)
	Base case		5.5	
1.	Capital cost increase	+ 10	4.1	25.5
2.	Generation output decrease	– 10	0.9	(7.8)
3.	O&M increase	+ 10	4.4	32.4
4.	Delay	1 year	3.5	

( ) = negative value, FIRR = financial internal rate of return, O&M = operation and maintenance cost.
Source: Asian Development Bank estimates.

B. Historical Financial Performance of APDL and APGC

6. Highlights of the historical financial performance of Assam Power Distribution Company (APDC) and APGC from fiscal year (FY) 2010 to FY2013 are presented in Table 4. The financial performance of both companies is characterized by an average cost per unit of electricity sold that is greater than the average revenue per unit sold. This means that the companies have insufficient cash to meet interest and principal payment obligations on borrowings from the Government of Assam (GOA). About half of the FY2012 closing balance borrowings of APDC (Rs7 billion) and APGC (Rs1.05 billion) from GOA represent accrued interest and principal repayments. This cash squeeze is a consequence of two main factors: (i) poor performance of the companies' assets against distribution losses and plant performance benchmarks set by AERC; and (ii) disallowance by AERC of interest cost pass-through on GOA borrowings (due to lack of provision of evidence that matches these unsecured borrowings to revenue-generating assets) and on the general provident fund liability (no evidence has been provided to AERC of a unique fund or bank account for this liability). The companies' submission of audited financial statements to AERC to allow AERC to true-up[4] actual costs against allowed costs has been characterized by significant delays.

C. Financial Projections for APDC and APGC

7. Indicative 10-year financial projections developed for APDC and APGC are summarized in Table 4. Projections are generally based on the companies' recent performance and AERC's recent tariff and revenue determinations, and multiyear tariff petitions submitted by the companies for FY2014–FY2016. With the exception of network losses for APDC and interest on existing GOA and general provident fund liabilities for both companies, revenue allowed by AERC is assumed to match actual costs from FY2015. In the current year (FY2013), AERC is assumed to reset tariffs for the final quarter of the year; until then, previous tariffs will apply and AERC will allow the resulting revenue deficits to be recovered in FY2016. For APDC, capital expenditure beyond FY2015 is assumed to equal the rolling average of expenditures for the previous 3 years. This is adequate to replace assets reaching the end of their service lives and to augment the network to some extent, but not sufficient to meet forecast demand growth and network expansion requirements.[5] Other than new equity of approximately $10 million in FY2016 as counterpart funding for tranche 3 of the proposed MFF, all new capital expenditure for APDC is assumed to be debt funded. In the case of APGC, new and proposed generation assets are included in projections where sufficient information was available to form a view as to their expected financial impact; otherwise they are excluded.[6] Financing for APGC is assumed to be a mix of debt, equity, and grants, as indicated in APGC's multiyear tariff petition for FY2014–FY2016. Domestic inflation is assumed to be 6.8% in FY2014, 6.5% in FY2015, and 6.0% thereafter.

8. The financial projections indicate that the performance of both companies will improve modestly over the forecast period. APDC is expected to continue to lag AERC's approved network loss trajectory, which means that APDC will continue to under-recover its electricity purchase costs; in FY2014 this represents a cost under-recovery of approximately Rs1.4 billion (including generation and transmission charges). APDC may not be able to reduce losses to

[4] A "true-up" is the process by which AERC compares audited costs with previously approved costs. Over- or under-recovery of actual costs by APGC and APDC, where adequately justified to AERC, can be recovered in subsequent year tariffs.

[5] Analysis undertaken separately indicates a requirement for capital expenditure of at least twice that modeled here to meet demand growth and to maintain the network.

[6] Of most significance, the proposed Margherita coal-fired power station and the refurbished Chandrapur coal-fired power station are not considered in this analysis. Further investment in gas-fired generation is also excluded.

18.5% (of energy sent out) as assumed, particularly given the inadequate capital investment discussed. The low (and reducing) percentage of equity in APDC's capital base limits the cash buffer that the return on equity allowed by AERC should provide; operating inefficiencies will therefore quickly erode the modeled cash surpluses. In the absence of marked operating performance improvements, significant capital expenditure, and an equity injection, APDC's financial position will remain perilous.

9. APGC's new generation assets and retirement of old assets will allow the company to meet AERC's plant performance targets and to pass through a much higher proportion of its interest costs. This will largely eliminate the persistent accounting losses and net cash deficits that have been a feature of the company's historical financial performance. The increase in hydropower generation will produce a marked improvement in profit margin for the company (due to the low variable costs of hydropower). APGC is also expected to receive a revenue premium in FY2015 and FY2016 in relation to AERC's true-up of high fuel costs in FY2013 and in the current fiscal year. The increase in net operating cash flow will improve the company's ability to service GOA borrowings (debt service coverage ratio remains above 1.0 from FY2015 onward), although actual payment of interest and principal has not been modeled and GOA is assumed to not compound accrued interest.[7]

10. The sensitivity analysis undertaken in relation to the tranche 1 investment and as summarized in Table 2 demonstrates the importance to APGC of maintaining its capital assets to ensure their efficient operation. If operating costs increase without adequate justification or if plant efficiency reduces, AERC may disallow expenditure. This will cause cash surpluses and accounting profit margins to decline. APGC's asset base is expected to increase by a factor of four over the forecast period, and the company will need to scale its operations and maintenance capacity and budget accordingly. This will be a challenge to the company and represents a significant risk to the company's financial performance.

[7] This is a material assumption because AERC will not allow this interest to be passed through in the tariff.

Table 4: Summarized Historical and Projected Financial Performance of APDC and APGC[a]

Item		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
			Audited			Prov	Forecast									
Assam Power Generation Corporation																
Commercial																
Electricity sales	(GWh)		1,617	1,615	1,672	1,680	1,733	2,005	2,350	2,350	2,350	2,633	3,369	3,369	3,369	3,369
Average revenue per unit sold	(Rs/kWh)		2.0	2.6	2.6	2.5	2.8	4.5	4.4	3.4	3.4	3.8	3.6	3.6	3.6	3.6
Average cost per unit sold	(Rs/kWh)		2.1	2.6	2.9	3.2	3.6	3.6	3.3	3.5	3.5	3.8	3.3	3.3	3.3	3.3
Financial																
Revenue from sales	(Rs million)		3,313	4,220	4,340	4,194	4,785	9,056	10,341	8,100	8,088	10,010	12,008	11,979	11,978	11,980
Operating expenses	(Rs million)		1,987	2,957	3,369	3,541	3,847	3,862	3,935	3,992	3,981	4,064	4,298	4,291	4,313	4,335
Operating profit	(Rs million)		1,326	1,263	971	652	938	5,194	6,405	4,108	4,107	5,946	7,710	7,688	7,666	7,645
Net profit before tax	(Rs million)		297	119	(487)	(1,028)	(1,308)	1,899	2,609	(4)	(4)	110	994	992	990	988
Capital expenditure	(Rs million)		255	86	2,799	1,912	7,464	9,568	3,317	8,352	8,630	235	115	345	460	230
Operating cash flow	(Rs million)		—	1,627	526	(359)	146	2,613	4,409	3,259	2,893	4,581	5,215	4,684	5,592	5,546
Net cash flow	(Rs million)		—	(199)	(193)	(366)	1,109	3,053	3,685	323	1,633	3,908	2,046	971	1,935	1,944
Long-term borrowings	(Rs million)		4,524	3,601	3,984	5,336	9,600	12,487	13,726	19,978	26,447	26,647	26,548	26,676	26,930	26,962
Return on average net fixed assets			12%	7%	-4%	-9%	-6%	25%	31%	10%	10%	17%	13%	11%	11%	12%
Debt service coverage ratio			—	—	—	—	0.13	1.89	2.72	1.77	1.53	1.34	1.41	1.28	1.55	1.56
Self-financing (3-year average)			—	167%	41%	-24%	4%	41%	65%	46%	43%	80%	174%	2021%	1823%	1608%
Debt (LT) / debt (LT)+equity			50%	44%	47%	54%	57%	54%	57%	65%	71%	72%	72%	72%	72%	72%
Assam Power Distribution Company																
Commercial																
Electricity sales	(GWh)		3,248	3,535	3,970	4,277	4,734	5,328	6,054	6,809	7,692	8,733	9,966	11,436	13,200	15,330
Average revenue per unit sold	(Rs/kWh)		4.3	4.8	5.2	5.2	5.1	7.0	8.2	7.1	7.5	7.8	8.2	8.5	8.8	9.1
Average cost per unit sold	(Rs/kWh)		5.7	6.2	6.0	6.1	6.7	7.0	7.1	7.2	7.5	7.7	7.9	8.1	8.3	8.5
Financial																
Revenue from sales	(Rs million)		14,080	16,971	20,465	22,132	24,188	37,495	49,577	48,311	57,407	68,258	81,263	97,024	116,321	140,165
Operating expenses	(Rs million)		16,797	19,288	23,107	23,891	28,454	32,366	36,566	41,196	48,319	56,926	67,392	80,202	95,985	115,564
Operating profit	(Rs million)		(2,717)	(2,317)	(2,642)	(1,759)	(4,266)	5,130	13,010	7,114	9,089	11,333	13,870	16,822	20,335	24,600
Net profit before tax	(Rs million)		(2,953)	(4,859)	(4,076)	(2,217)	(6,446)	1,318	7,613	(16)	(230)	(409)	(548)	(646)	(689)	(637)
Capital expenditure	(Rs million)		1,131	653	314	6,051	11,508	10,361	9,665	9,151	8,910	8,752	8,644	8,592	8,557	8,534
Operating cash flow	(Rs million)		—	2,367	(1,414)	(688)	771	2,828	14,064	7,806	10,679	8,608	14,499	9,857	17,606	20,119
Net cash flow	(Rs million)		—	3,085	1,876	(1,138)	(85)	1,026	11,156	3,826	5,648	2,474	7,396	1,905	8,907	10,777
Long-term borrowings	(Rs million)		8,003	3,708	4,942	5,841	10,411	16,166	21,707	26,912	32,695	37,826	42,365	46,442	50,056	53,263
Return on average net fixed assets			-25%	-46%	-37%	-11%	-32%	14%	32%	8%	8%	8%	8%	9%	9%	9%
Debt service coverage ratio			—	—	—	(1)	0.51	1.10	3.71	1.57	1.73	1.16	1.70	1.03	1.67	1.77
Self-financing (3-year average)			—	362%	-292%	-22%	9%	26%	140%	83%	118%	97%	167%	114%	205%	235%
Debt (LT) / debt (LT)+equity			76%	60%	66%	70%	81%	87%	89%	90%	91%	92%	93%	94%	94%	94%

( ) = negative value, APDC = Assam Power Distribution Company, APGC = Assam Power Generation Company, GWh = gigawatt hours, kWh = kilowatt hours, LT = low tension, Rs = Indian rupees

[a] Revenue for FY2015 and FY2016 includes assumed true-up revenue arising from previous years' under-recovery of fuel costs (for APGC) and electricity purchase costs (for APDC).

Source: Annual Reports of Assam Power Distribution Company and Assam Power Generation Company.