

FINANCIAL ANALYSIS

A. Introduction

1. The financial analysis of the Power Transmission Improvement Project was carried out in accordance with the Asian Development Bank (ADB) guidelines for the financial management and analysis of projects.¹ The analysis was conducted to determine the financial sustainability of the proposed investment in the construction and commissioning of 230 kilovolt (kV) transmission lines and substations in and around Yangon, Myanmar's largest city. The project will (i) construct an 8.4 kilometer (km) 230 kV double circuit transmission line between the Thida and Thaketa substations; (ii) construct an 8.4 km 230 kV single circuit transmission line between Thaketa and Kyaikasan substations; (iii) extend the Thaketa substation; (iv) upgrade the Kyaikasan substation; and (v) construct two substations at South Okkalapa and West University. The project will help complete the 230 kV transmission ring supplying electricity in the Yangon area and thereby ensure reliable electricity supply to support sustainable economic development in Myanmar.

B. Project Financial Analysis

2. The analysis compared the future revenue and cost streams for the with-project and without-project scenarios in real terms. The future stream of net incremental cash flow was discounted to its present value, and financial indicators such as the financial internal rate of return (FIRR) and financial net present value (FNPV) were calculated. The analysis assumed that the project will start in 2016 and be completed in 2019, followed by a 20-year operating life and revenue generation during 2020–2039. Because the project components are interrelated, costs and benefits were considered on a total project level. The individual components do not provide financial benefits on a stand-alone basis.

3. The incremental project benefits will accrue from the additional electricity sales supplied by the upgraded transmission system. Load flow analysis has determined that electricity sales will increase by 1,000 gigawatt-hour (GWh) once the project becomes operational in 2020, and that incremental sales will grow to 3,300 GWh in 2025 in line with increasing demand. Transmission losses of 4% were taken into account to arrive at the incremental volume of electricity the analysis has assumed will be sold by the Myanmar Electric Power Enterprise (MEPE), the transmission company, to Yangon Electricity Supply Corporation (YESC), the distribution company in Yangon. The incremental benefit was valued by subtracting the costs of electricity purchased from the revenue received from incremental sales. The weighted cost of electricity purchased and generated by the MEPE amounted to \$0.0448 per kilowatt-hour (kWh),² while the transmission tariff charged to the distribution companies was \$0.0528 per kWh.³ The project costs were estimated in March 2015 prices and include physical contingencies. The incremental operating costs were assumed to be the typical rate used in

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

² The weighted cost of electricity was calculated based on the average purchase price of existing independent power producer contracts as of 2014 and the actual average cost of electricity generated by the MEPE's nine thermal power plants for the fiscal year ended March 31, 2014. About 23% of total electricity transmitted through the MEPE's network of systems is generated by the company's nine thermal power plants, with the remaining 78% purchased from various independent power producers. Since 2012, the MEPE has purchased gas at \$5 per one million British Thermal Units (MMbtu) from the Ministry of Oil and Gas Enterprise, a price that is heavily subsidized for energy-producing entities.

³ The Yangon Electricity Supply Corporation tariff is MK57 per kWh, while Electricity Supply Enterprise tariff is MK52 per kWh. These tariffs have been in effect since 1 April 2014.

evaluations of transmission power investments of 3.5% of total capital cost. Two major overhaul costs were assumed for the 20-year period (one for every 10 years).

4. **Weighted average cost of capital.** The weighted average cost of capital (WACC) was calculated as the weighted average cost of equity and debt used to fund the project. The cost of equity was calculated based on benchmarking against the cost of equity of power companies in several developing countries, including Bangladesh, Indonesia, Thailand, Ukraine, and Viet Nam. A 2.5% premium was added to reflect Myanmar's higher country risk. The capital asset pricing model could not be used to assess the cost of the MEPE equity, because Myanmar's equity market is not developed and beta values are not available. ADB's Asian Development Fund long term loan rate of 1.5% was used as the nominal cost of debt. The inflation rates used to adjust the nominal values to real values was based on ADB's long-term price escalation factors forecast. Given the estimated costs of equity and debt, and the relative proportions of equity and debt in the project capital structure, the WACC was calculated to be 0.29% (Table 1).

Table 1: Weighted Average Cost of Capital (%)

Item	ADB Loan	GOM	Total
A. Amount (\$ million)	71.08	3.30	74.38
B. Portion of financing	95.56	4.44	100.00
C. Nominal cost	1.50	13.00	
D. Tax rate	25.00	0.00	
E. Nominal cost adjusted by tax, $C*(1-D)$	1.13	13.00	
F. Inflation rate	1.50	6.10	
G. Real cost adjusted by tax, $(1+E)/(1+F)-1$	(0.37)	6.50	
H. Cost of type of capital, $B*G$	0.00	0.29	0.29
WACC	0.29		

() = negative, GOM = Government of Myanmar, WACC = weighted average cost of capital.

Source: Asian Development Bank estimates.

5. **Financial evaluation.** The post-tax FNPV of the projected incremental cash flows discounted at the WACC of 0.29% is \$178.0 million. The post-tax real FIRR of the project is 12.15%. This is higher than the WACC of 0.29%, which confirms that the project is financially viable.

6. **Sensitivity analysis.** Sensitivity analysis was conducted to ascertain the impact of potential negative changes in project variables on the base case FNPV and FIRR, specifically given (i) a 20% increase in the projected capital costs, (ii) a 20% decline in energy transmitted, (iii) a 20% rise in gas prices, and (iv) a 2-year delay in project implementation.

Table 2: Sensitivity Analysis

Scenario	FNPV	FIRR	SI ^a	SV ^b
Base case	178.0	12.1%		
Capital costs increase by 20%	163.2	11.7%	(0.41)	(241.3)
Energy transmission declines by 20%	122.3	9.3%	1.56	63.9
Gas prices increase by 20%	52.3	4.9%	(3.53)	(28.3)
Delay of 2 years	177.3	11.4%	NPV lower by	0.7

() = negative, FNPV = financial net present value, FIRR = financial internal rate of return, SI = sensitivity indicator, SV = switching value.

^a The ratio of the % of change of NPV to the % change in a variable.

^b It shows the % change required in a variable for the FNPV to become zero.

Source: Asian Development Bank estimates.

7. The analysis indicated that the project remains viable under these adverse changes to the expected base case parameters (Table 2). The FIRR remains greater than the WACC under all the scenarios. The project is more sensitive to an increase in gas prices than to increases in capital costs or a decline in energy transmitted, as is indicated by the sensitivity indicators and

switching values. A 2-year delay in project start-up does not have a material effect on the FIRR and NPV.

C. Historical Performance and Projections of Myanmar Electric Power Enterprise

8. The MEPE and other energy enterprises in Myanmar operate, in effect, as departments under the Ministry of Electric Power. It turns over a substantial portion of its earnings to the state. Due to its non-corporate nature, the MEPE is unable to mobilize commercial funding on its own. Total assets grew at a 17% compound annual growth rate from MK512.50 billion in 2010 to MK960.9 billion in 2014. This was mainly due to investments in fixed assets that were largely funded by equity through state budget cash injections.

9. During 2010–2014, 99.7% of the MEPE’s total revenue came from its sales of electricity to Electricity Supply Enterprise (ESE) and YESC. This leaves the MEPE with very little control over its revenues, which depend mainly on the government-set tariffs and the quantity of electricity sold to these two buyers.

10. Total MEPE revenue grew consistently from MK124.6 billion in 2010 to MK435.0 billion in 2014—a compound annual growth rate of 36.7%. This was due to large increases in electricity demand and tariffs. During 2010–2012, the MEPE earned reasonable profit margins of 8%–12%, since the average tariff of MK20 per kWh was comfortably above the average total expenses of MK17.7–MK18.4 per kWh. However, a major devaluation of the kyat in 2012⁴ and the resulting sharp jump in natural gas prices which resulted in the higher cost of electricity made the MEPE financially unsustainable. Quick intervention by the government to raise the per-kWh tariffs to an average of MK37.3 in 2013 and MK38.4 in 2014 helped to salvage MEPE’s financial position, as did its decision to slash the natural gas price paid by the MEPE to the Ministry of Oil and Gas Enterprise from \$11.2/kWh to \$5.0/kWh. However, this did not return the MEPE to profitability. It incurred losses of MK35.2 billion in 2013 and MK39.4 billion in 2014, since its total expenses per kWh of MK41.0 in 2013 and MK42.0 in 2014 were higher than the corresponding average tariffs.

11. The devaluation of the kyat has raised the MEPE’s foreign debt servicing obligations. Foreign debt has ballooned to more than 10 times the value reflected in the MEPE’s balance sheet. The MEPE indicated that it intended to restate the loans at their true value in FY 2015⁵ and take foreign exchange losses fully into account. However, up to now, the MEPE has booked only a small proportion of the loan losses, and the true value of the outstanding loan balance is not reflected in the balance sheet. The financial projections analysis in paras. 12–14 attempts to revalue the balance sheet debt in local currency terms and to take the accumulated exchange rate losses into the income statement for FY2015. Highlights of the historical performance of MEPE are in Table 3.

12. The financial projection analysis conducted for the MEPE covered the 12-year period of 2015–2026. The financial projections were prepared on the basis of actual financial statements, a list of existing and future capital projects and loans, and other supplementary information provided by MEPE during discussions. The projections also assume that the energy generation, transmission, and distribution capacity needed to ensure an adequate supply of electricity on the scale envisaged will come on stream during this period. Limited data was available, and much of the information came from discussions with the MEPE and best-estimate projections

⁴ In April 2012, the government adopted a managed float for its currency, thereby ending a 35-year fixed exchange rate.

⁵ The fiscal year (FY) of the government ends on 31 March. FY before a calendar year denotes the year in which the fiscal year ends, e.g., FY2008 ends on 31 March 2008.

based on historical data. More accurate projections would be possible if the MEPE had a more rigorous financial planning and reporting regime in place. Highlights of the MEPE financial projections are summarized in Table 4.

Table 3: Summary Historical Performance of Myanmar Electric Power Enterprise, 2010–2014
(MK million)

Item	2010	2011	2012	2013	2014
Income Statement Summary					
Total revenue	124,620	154,528	187,213	371,707	435,042
Operating expenses	104,635	128,309	164,798	405,545	472,598
Net Profit after Income Tax	13,982	18,330	15,687	(35,162)	(39,423)
Balance Sheet Summary					
Non-current assets	178,824	231,241	288,676	451,473	631,865
Current assets	333,650	406,638	420,034	471,972	329,043
Total Assets	512,474	637,879	708,709	923,444	960,908
Equity	469,798	587,184	685,881	898,598	939,490
Non-current liabilities	2,086	2,061	2,050	6,416	13,883
Current liabilities	40,590	48,634	20,778	18,430	7,536
Total Liabilities and Equity	512,474	637,879	708,709	923,444	960,908
Cash Flow Summary					
Net cash flow from operating activities	(259,084)	(44,666)	(21,366)	(81,752)	103,963
Net cash flow from investing activities	(25,064)	(54,332)	(61,628)	(169,169)	(189,877)
Net cash flow from financing activities	284,149	98,998	82,993	250,921	85,914
Increase/Decrease in Cash During the Year	0	0	0	0	0
Accounts receivable (days)	25	25	29	25	34
Operating ratio	89.3%	88.7%	91.8%	109.3%	108.9%
Net profit margin	11.2%	11.9%	8.4%	(9.5%)	(9.1%)
Return on total assets	2.7%	2.9%	2.2%	(3.8%)	(4.1%)
Return on equity	3.0%	3.1%	2.3%	(3.9%)	(4.2%)
Self-financing ratio	(1,034%)	(113%)	(45%)	(86%)	74%
Debt to equity	0.00	0.00	0.00	0.01	0.01
Debt service coverage ratio	0.00	0.00	0.00	0.00	0.00

() = negative.

Source: Myanmar Electric Power Enterprise.

13. The financial projections are based on several important assumptions. Sensitivity testing showed that changes in these variables from the base case would have a significant impact on the MEPE's cash flows, financial ratios, and profits margins—and therefore on its financial viability. The assumptions related to (i) the MEPE's tariff, (ii) the natural gas price, (iii) foreign exchange rates, (iv) the level of capital expenditures, and (v) the electricity purchase price. The changes tested under the sensitivity analysis could realistically occur and are largely or completely beyond the MEPE's control. Whether they do arise will depend mostly on market forces and external factors. This means that the MEPE needs to maintain sufficient margins to weather any sudden, significant adverse shifts in its business and economic environment.

14. Retail tariffs are currently set at MK35–50 per kWh for residential consumers and MK75–150 per kWh for industrial consumers, depending on consumption levels. These tariffs compel the government to subsidize the cost of fuels for power producers and the operations of the MEPE, ESE, and YESC. The government is reviewing various electricity tariff options that would improve the financial sustainability of the electricity enterprises. These could include the introduction of block tariffs on the consumers' electricity usage and measures to protect poor and vulnerable consumers who cannot afford full cost-recovery tariffs.

**Table 4: Summary Financial Projections of
Myanmar Electric Power Enterprise, 2015–2026**
(MK million)

Income Statement Summary	2015	2016	2017	2018	2020	2022	2024	2026
Total Revenue	719,534.06	881,906.58	1,059,180.53	1,269,716.92	1,824,734.20	2,485,170.72	3,384,723.28	4,609,975.77
Operating Expenses	679,763.69	831,728.72	1,010,563.04	1,200,454.60	1,694,345.22	2,252,097.40	2,991,092.40	3,971,428.60
Net Profit after Income Tax	(114,435.13)	13,198.92	(5,779.71)	(4,923.26)	2,999.84	52,474.74	122,159.07	258,156.44
Balance Sheet Summary								
Non-Current Assets	918,514.88	1,174,970.41	1,480,791.58	1,840,467.34	2,547,605.36	3,149,552.19	3,765,118.65	4,405,150.00
Current Assets	388,834.27	426,820.34	468,292.99	517,548.33	647,398.62	850,728.52	1,176,621.84	1,645,929.37
Total Assets	1,307,349.15	1,601,790.75	1,949,084.56	2,358,015.67	3,195,003.98	4,000,280.70	4,941,740.49	6,051,079.38
Equity	880,948.64	939,966.69	981,236.91	1,011,294.80	1,034,601.03	1,089,767.68	1,249,601.93	1,570,071.82
Non-Current Liabilities	379,646.79	605,614.62	908,718.49	1,281,179.00	2,042,207.64	2,748,714.52	3,404,613.10	4,128,906.32
Current Liabilities	46,753.72	56,209.44	59,129.16	65,541.87	118,195.31	161,798.51	287,525.46	352,101.23
Total Liabilities and Equity	1,307,349.15	1,601,790.75	1,949,084.56	2,358,015.67	3,195,003.98	4,000,280.70	4,941,740.49	6,051,079.38
Cash flow Summary								
Net cash flow from operating activities	25,397.36	54,536.81	72,578.44	105,019.02	191,699.60	327,604.49	474,666.18	685,137.14
Net cash flow from investing activities	(203,885.99)	(294,115.21)	(366,209.66)	(438,907.56)	(458,427.01)	(467,427.06)	(526,192.46)	(592,345.90)
Net cash flow from financing activities	178,488.62	239,578.40	293,631.22	333,888.54	266,727.41	174,481.03	89,848.48	19,257.99
Increase/Decrease in Cash During the year	0.00	0.00	0.00	0.00	0.00	34,658.45	38,322.20	112,049.22
Accounts Receivable Days	28.85	30.77	31.05	31.08	31.09	31.48	31.49	31.49
Operating Ratio	0.95	0.94	0.96	0.95	0.93	0.91	0.89	0.86
Net Profit Margin	(0.16)	0.01	(0.01)	(0.00)	0.00	0.02	0.04	0.06
Return on Total Assets	(0.09)	0.01	(0.00)	(0.00)	0.00	0.01	0.02	0.04
Return on Equity	(0.13)	0.01	(0.01)	(0.00)	0.00	0.05	0.10	0.16
Self-financing Ratio	0.14	0.24	0.25	0.29	0.42	0.72	0.96	1.23
Debt to equity	0.45	0.67	0.95	1.29	2.03	2.60	2.87	2.77
Debt Service Coverage Ratio	(6.97)	(6.95)	(6.38)	(6.41)	(2.39)	(0.48)	0.20	0.70

() = negative.

Source: Asian Development Bank; Myanmar Electric Power Enterprise.

15. A new electricity law adopted in 2014 endorses the unbundling of the power sector, a bigger role for the private sector, and the establishment of an independent electricity regulatory commission. Under the law, tariffs will be set based on the recommendation of this commission in consultation with the government. The electricity tariff is to be set at a level that increases the efficiency and economic viability of the power sector, while also meeting the government's poverty reduction objectives.

16. The WB recently provided a \$10 million technical assistance to assist the Government and MEPE in the preparation of a Financial Viability Action Plan for MEPE. ADB has also assisted MEPE in setting up an excel model, which MEPE can use in preparing financial projections so as to improve the institution's planning function.