

FINANCIAL ANALYSIS

A. Introduction

1. The project team conducted the financial analysis for Power Transmission Strengthening Project following Asian Development Bank (ADB) guidelines.¹ The analysis covers the project's four outputs.

B. Methodology and Major Assumptions

2. Cost streams used to determine the financial internal rate of return (FIRR) include capital costs (excluding price contingencies and interest during implementation), operation and maintenance (O&M) costs, and taxes and duties. The costs comprised land development, civil works, equipment, incremental O&M costs, engineering consulting, and project management costs as applicable to the outputs and subprojects, contingencies, and taxes and duties. Costs were carried out in nominal terms in Pakistan rupees.

3. The weighted average cost of capital (WACC) was calculated and compared with the FIRR to ascertain financial viability. The anticipated capital mix of debt to equity was used for estimating the WACC. The sensitivity of the FIRR to adverse changes in the underlying assumptions was also assessed.

4. The financial benefits of the project comprise the incremental electricity transmitted through higher capacity transmission assets. The incremental electricity transmitted has been valued at the applicable use of system charge.²

C. Weighted Average Cost of Capital

5. The WACC was calculated in real terms, considering loans to the government from ADB's ordinary capital resources and concessional resources, which will be onlent to the National Transmission & Despatch Company Limited (NTDC) on the same terms and conditions that is between ADB and government. The domestic annual inflation rate was assumed to be 13.1% for the local currency components. The return on NTDC equity and internal funds was estimated at 21.0%, equivalent to the 3-months Karachi Interbank Offered Rate (Kibor) (as of June 2023). Table 1 shows the calculation of the WACC.

Table 1: Weighted Average Cost of Capital

Financial Component	ADB OCR Loan	ADB Concessional Loan	NTDC Self-Financing	Total
A. Amount (\$ million)	234.9	14.9	206.4	456.2
B. Weighting	51.5%	3.3%	45.2%	100%
C. Nominal cost	5.5%	1.3%	21.0%	
D. Income tax rate	29.0%	29.0%	29.0%	
E. Tax-adjusted nominal cost [C x (1-D)]	3.9%	0.9%	14.9%	
F. Inflation rate	1.9%	1.9%	13.1%	
G. Real cost $[(1+E) / (1+F) - 1]$	2.0%	-0.9%	1.6%	

¹ ADB. 2005. *Financial Management and Analysis of Projects*. Manila; and ADB. 2019. *Financial Analysis and Evaluation, Technical Guidance Note*. Manila.

² National Electric Power Regulatory Authority (NEPRA) used PRs235.30 per kW per month. NEPRA. 2022. Notification S.R.O. 738(I)/2022. Islamabad.

Financial Component	ADB OCR Loan	ADB Concessional Loan	NTDC Self-Financing	Total
H. Minimum rate test (H = 0%)	2.0%	-0.9%	1.6%	
I. Weighted component of WACC	1.0%	0.0%	0.7%	
Weighted Average Cost of Capital				1.7 %

ADB = Asian Development Bank, NTDC = National Transmission & Despatch Company Limited, OCR = ordinary capital resources, WACC = weighted average cost of capital.

Source: Asian Development Bank.

D. Financial Internal Rate of Return

6. NTDC's financial benefits are based on its transmission charge. The determination of transfer and wheeling charges by the National Electric Power Regulatory Authority (NEPRA) provides for a two-part tariff, comprising a fixed charge and a variable charge. The fixed charge per month, PRs235.3 per kilowatt (kW) per month for 2023, is applicable on the maximum demand incident (MDI) value in kW for the billing period for the specific market participant. The use of the system variable tariff (expressed in Pakistan rupees per kilowatt-hour) is applicable to the energy transferred to the market participant during the billing period multiplied by a losses and load factor for the adjustment of losses and load imposed on the market system. Benchmarks for the losses and load factor have not been determined by NEPRA, so the variable charges are not applied.

7. Amid the ongoing challenges in Pakistan's overall macroeconomic situation, the power sector in Pakistan continues to struggle with circular debt and liquidity issues. This greatly affects the financial performance of NTDC, primarily through delayed tariff determination and payment arrears from the Central Power Purchasing Agency-Guarantee (CPPA-G). These issues have a significant probability of negatively impacting NTDC's future financial performance and are also expected to impact the financial viability of the subprojects under the project. Consequently, to integrate these issues into the project's financial viability assessment, the anticipated achieved fixed rate tariff has been adjusted down by a factor of 25%. The adjustment addresses the financial viability gaps and concerns about the sector's overall fiscal sustainability, incorporating the risk of future tariff delays and payment arrears. As a result of this modification, the financial analysis employs an adjusted achieved tariff of PRs176.4 per kW per month, as opposed to the official tariff of PRs235.3 per kW per month, as mentioned para. 6. The modification aligns closely with the observed payment delays from CPPA-G, thereby enhancing the robustness of the financial analysis and reflecting a more realistic financial performance of NTDC going forward.

8. **Output 1, subproject 1: The procurement of goods to construct a 500 kilovolt transmission line connecting Sangal interconnection point to the 500 kilovolt Maira switching station.** The project involves investments in the construction of a new 80 kilometer (km) long, 500 kilovolt (kV) direct current transmission line on a quad bundle bunting conductor connecting Sangal interconnection point to the 500 kV Maira switching station to close the 500 kv transmission grid loop to ensure grid stability. The project will uprate the system voltage profile to acceptable conditions; meet the growing demand of Islamabad Electric Supply Company (IESCO), Gujranwala Electric Power Company (GEPCO), and Lahore Electric Supply Company (LESCO) customers; improve system reliability and the voltage profile; and reduce transmission loss. The financial benefits from the investments are the incremental electricity wheeled through the higher capacity created, estimated at 870 MW in 2026 and stabilizing at 3,250 MW in 2031, to which transmission losses of 3% have been applied.

9. Cash flows for subproject 1 were estimated assuming an O&M cost of 1.0% of total investment. The FIRR is 5.8%.

10. **Output 1, subproject 2: The procurement of goods to construct a 500 kilovolt transmission line connecting the 500 kilovolt Maira switching station to the 500 kilovolt Islamabad West substation and a 500 kilovolt transmission line from the 500 kilovolt Maira switching station to the 500 kilovolt Karot substation.** The project involves the construction of about a 130 km long 500 kV direct current transmission line on the quad bundle Bunting conductor connecting Maira switching station with the 500 kV Islamabad West substation and the construction of about a 20 km long 500 kV direct current transmission line on the quad bundle Drake conductor connecting the 500 kV Karot substation with the Maira switching station to ensure grid stability and energy security. Complimenting subproject 1, the project will uprate the system voltage profile to acceptable conditions, meet the growing demand of IESCO customers, improve system reliability and the voltage profile, reduce transmission loss, and ensure grid stability and energy security. The financial benefits from the investments are the incremental electricity wheeled through the higher capacity created, estimated at 2970 MW from 2026 onwards, to which transmission losses of 3% have been applied.

11. Cash flows for subproject 2 were estimated assuming an O&M cost of 1.0% of total investment. The FIRR is 4.9%.

12. **Output 2, subproject 3: A turnkey contract to construct a new 220 kilovolt transmission line (12 kilometers overhead and 5 kilometers underground) from the 220 kilovolt Bund Road substation to the 220 kilovolt New Kot Lakhpat substation.** The project consists of a turnkey contract to construct about 17 km of a new 220 kV transmission line (12 km overhead and 5 km underground) from the 220 kV Bund Road substation to the 220 kV New Kot Lakhpat substation to replace the aged transmission line to remove the system constraint and reduce technical losses in the system. The project will serve the demand in the LESCO system and improve the voltage profile and reliability to LESCO customers.

13. Cash flows for subproject 3 were estimated assuming an O&M cost of 1.0% of total investment. The FIRR of the subproject is 3.1%.

14. **Output 2, subproject 4: The procurement of goods to construct a 220 kilovolt transmission line from the Mohmand hydropower plant to the 220 kilovolt Jamrud substation and a 220 kilovolt transmission line from the Mohmand hydropower plant to the 220 kilovolt Nowshera Industrial substation.** The project consists of (i) the procurement of goods to construct about 60 km of a 220 kV direct current transmission line on the twin bundle Rail conductor from the Mohmand hydropower plant to the 220 kV Jamrud substation and about 67 km of a 220 kV direct current transmission line on the twin bundle Rail conductor from the Mohmand hydropower plant to the 220 kV Nowshera Industrial substation, and (ii) the expansion of the 220 kV Nowshera industrial substation by adding two-line bays. The project will connect the 220 kV Mohmand substation to the Jamrud substation and the 220 kV Naushera substation, resulting in the improvement of the power supply position at and/or around the 220 kV Jamrud Grid Station and the voltage profile of 132 kV grid stations in the vicinity of the 220 kV Jamrud Grid Station, an increase in the system capacity to meet the future load demand of Peshawar Electric Supply Company (PESCO), the increase in the available system capacity to meet the future load growth at and/or around proposed project, and the reduction in transmission system losses. The financial benefits from the investments are the incremental electricity wheeled through the higher capacity created, estimated at 776 MW from 2026 onwards, to which transmission losses of 3% have been applied.

15. Cash flows were estimated assuming an annual O&M cost of 1.0% of the investment. The FIRR for subproject 4 is 5.3%.

16. **Output 3: Capacity to mainstream gender equality and project community outreach of NTDC strengthened.** The project aims to create gender-inclusive workplaces in NTDC by developing guidelines for internships and mentorships, conducting awareness campaigns, establishing childcare centers, and providing technical training to female staff. The project also includes (i) livelihood skills development for women in the project area to improve their economic opportunities, and (ii) training programs for improving the coping capacity of the local communities to respond to climate change and manmade and disasters triggered by natural hazards. A \$1.5 million fund has been allocated to achieve the objectives of gender strengthening.

17. **Output 4: Institutional, climate-resilient system planning and operation, and project management capacity of NTDC strengthened.** This output supports NTDC's institutional capacity development to promote climate-resilient system planning and operation; financial management capacity building; restructuring of NTDC's project management unit; implementation of the Transmission Master Plan;³ functional separation of the system operator; implementation of the project management dashboard; and project management, implementation, and supervision, as well as the development and adoption of the gender-inclusive recruitment guidelines to increase female job applications approval. A \$12.12 million budget has been allocated to support these activities.

18. **Overall evaluation of the project.** The Power Transmission Strengthening Project is financially viable, with the FIRR of 4.9% exceeding the WACC of 1.7%. The net present value is PRs63,692 million.

19. **Sensitivity analysis.** A sensitivity analysis was carried out on the FIRR by changing the values of key variables. Since the FIRR values easily exceed the WACC rate for the tranche, only adverse changes were considered. A 10% increase in investment cost, a 10% increase in production and O&M costs, and a 10% decrease in benefits were tested. Table 2 shows the effects on the FIRR. The financial performances of subprojects 1–6 and the tranche are robust for all the sensitivities tested.

Table 2: Sensitivity Analysis

Item	Change in Variable	NPV	FIRR	SV
Base case		63,692	4.93 %	
Decrease in MDI	-10%	39,047	3.80 %	3.87
Construction delay	1 year	53,135	4.29 %	1.66
Increase in project cost	+10%	53,548	4.26 %	1.59
Increase in O&M cost	+10%	61,418	4.83 %	0.36

FIRR = financial internal rate of return, MDI = Maximum Demand Incident, NPV = net present value, O&M = operation and maintenance, SV = Switching Value.

Source: Asian Development Bank.

³ The development of the Transmission Master Plan is being supported under ADB technical assistance to Pakistan. ADB. 2019. [Preparing Sustainable Energy Projects](#). Manila (TA 9756-PAK).

E. Entity Financial Analysis

20. The historical and projected financial statements analysis of NTDC was performed and presented in a separate document.⁴ A summarized overview of the conclusion reveals that regulatory risks concerning tariff determination and delays in payments from CPPA-G to NTDC are expected to continue affecting NTDC's liquidity and financial performance. Collaborative efforts with development partners such as ADB are expected to gradually improve NTDC's financial health. However, until these improvements are manifested in NTDC's financial statements, the entity's financial risk continues to be considered high.

21. To address these financial sustainability issues with NTDC, certain covenants have been implemented. These include minimum requirements concerning financial ratios, such as debt service requirements and outstanding receivable days. A covenant regarding the offsetting of receivables from CPPA-G against debt service commitments to the Government of Pakistan is also in place.

F. Conclusion

22. The project is financially viable with a FIRR of 4.9%, which is higher than the WACC of 1.7%. A sensitivity analysis found that the project's financial viability remained robust despite (i) a decrease in revenue (reduction in the Maximum Demand Incident) of 10% (FIRR 6.2%), (ii) a 1-year construction delay (FIRR 6.4%), and (iii) a 10% increase in project costs (FIRR 6.5%).

⁴ NTDC's Entity Financial Analysis is presented as a supplementary document to the report and recommendation of the President.