FINANCIAL ANALYSIS

A. Introduction and Methodology

1. The Coastal Towns Environmental Infrastructure project finances basic urban service improvements and increases climate resilience in *pourashavas* (secondary towns) vulnerable to climate change effects. The eight *pourashavas* will receive investments in two stages. Stage 1 focuses on infrastructure to strengthen climate resilience (e.g., drainage, water supply, sanitation, emergency access roads, cyclone shelters and solid waste). Stage 2 includes other infrastructure contributing to general economic development (e.g., markets, boat landings, and bus terminals). The total project amount for the eight *pourashavas* is $117.10 million, with an implementation period of 6 years. This financial analysis appraises the financial sustainability and viability of subproject investments for batch 1 (four towns), stage 1.[12]

2. Financial sustainability and viability analysis of subprojects assesses the capacity of each *pourashava* to meet future costs, including capital expenditures,[3] operation and maintenance (O&M), debt service and provision for uncollectible debt. A financial discounted cash flow (DCF) analysis has been conducted in real terms to determine the weighted average cost of capital (WACC), financial internal rate of return (FIRR) for revenue-generating subprojects, and financial net present value (FNPV), where applicable, to assess the financial viability of each subproject and incremental tariffs required. For non-revenue generating subprojects, the financial analysis focuses on the financial capacity of the *pourashavas* to meet recurrent costs. Economic analysis has been performed separately.[4] Financial projections for batch 1 p*ourashavas* were conducted to assess their overall financial capacity to sustain and provide urban services and provide for incremental costs associated with project investments.[5]

B. Discounted Cash Flow Analysis and Subproject Viability

3. The DCF analysis follows standard ADB methodology and was undertaken in real terms using constant 2013 prices The analysis was conducted on a “with project” and “without project” basis by estimating incremental costs and revenues over a 32-year period. Subproject capital and O&M costs were derived from the engineer’s estimates, including (i) capital expenditures under the project, including physical contingencies and tax and duties; (ii) O&M expenditures; and (iii) additional capital expenditures to repair and rehabilitate the assets developed under the project. The FIRR is then compared to the WACC. The FIRR is computed in real terms over a 32-year period, including all capital and operating cash flow and physical but not price contingencies. Costs exclude interest and other financing charges during construction.

4. A WACC of 12.76% was computed for the project in real terms. For the 85% grant portion of the project cost the calculation considers the cost of the government’s contribution at 23% in nominal terms,[6] including an equity risk premium of 10.68%.[7] A domestic inflation rate of 6.95% is assumed to convert nominal rates into real rates.[8] The WACC calculation also

[1] Feasibility study for batch 1, stage 1 has been undertaken by the PPTA consultant. Feasibility studies for batch 1, stage 2 and batch 2, stages 1 and 2 will be undertaken by the project management and supervision consultant.
[2] Financial analysis was carried out in accordance with ADB. 2005. *Guidelines for Financial Management and Analysis of Projects*. Manila.
[3] Capital expenditures are limited to expected rehabilitation and replacement needs.
[4] The Economic Analysis is accessible from the list of linked documents in Appendix 2 of the main report.
[5] The project design advance (PDA) consultant shall undertake the same exercise for batch 2 towns.
[6] The government rate offered on a 20-year term of Treasury bills, according to Bangladesh Bank.
[7] A. Damodaran. 2014*. Country Default Spreads and Risk Premiums*.pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/ctryprem.html
[8] ADB estimate of long-term local inflation rate based on the 2012-2016 average of domestic cost escalation factors.

incorporates the re-lending terms between the government and *pourashavas*, with a 4% cost of borrowing for revenue earning subprojects.[9]

5. The project FIRRs are found to be below the WACC because tariffs for water supply and sanitation are not set for full cost recovery.[10] However, by adopting a water supply and sanitation (WSS) tariff plan that envisages tariff increases every 4 years, and increasing property tax collection efficiency, the *pourashavas* are expected to generate sufficient revenue to meet O&M costs, debt service and other requirements to sustain infrastructure and service delivery for all subprojects.

C. Revenue Earning Projects

1. Water Supply

6. The financial analysis of water supply subprojects assumes that 60% of households are connected to the system in Amtali, and 80% in Galachipa and Mathbaria. Revenue projections are based on the current and proposed water tariff, consumption (based on demand assessment), number of connections, continual non-revenue water management and a billing collection rate of 90% by mid-2015. A tariff revision is proposed to recover full O&M costs and debt service for water supply systems and a provision for uncollectible debt. This tariff proposal includes: (i) introduction of volumetric tariff in Mathbaria (BDT17 per cubic meter [m^3]);[11] (ii) increase in tariff rates in Amtali (to 18BDT per m^3) and Galachipa (to BDT16 per m^3) before the completion of works; and (iii) a gradual tariff increase in subsequent years—e.g., 8% (Mathbaria), 17% (Galachipa) and 19% (Amtali) every 4 years during FY2022 to FY2042.[12]

7. Based on the assumptions listed above, FIRRs for the three *pourashavas* are computed for water supply subprojects, including and excluding the cost of future climate-resilience measures (CRMs) (see Table 1). The FIRRs for the base-case scenario with future CRMs range from negative to 3.9%, and do not exceed the WACC of 12.76% because the water tariff structure in Bangladesh is not intended to generate a profit. However, this is acceptable because the proposed tariffs fully recover O&M costs, debt service and provision for uncollectible debt from FY2024 in Amtali, and from FY2020 in Galachipa. The project revenue shortfall in the intervening years will be met from the projected surplus revenues from the respective *pourashava's* overall operations. The FIRRs are lower through inclusion of future CRMs as a result of the higher investment cost, which is justified through the economic analysis. A sensitivity analysis was also conducted under various assumptions. FIRRs for water supply are most sensitive to revenue fluctuations.

Table 1: Summary of Financial Evaluation—
Water Supply with & without Future Climate Resilience Measures

	Amtali		Galachipa		Mathbaria	
Scenario	**FIRR (%) with CRMs**	FIRR (%) without CRMs	**FIRR (%) with CRMs**	FIRR(%) without CRMs	**FIRR (%) with CRMs**	FIRR(%) without CRMs
Base Case	**negative**	2.5	**3.9**	4.8	**negative**	negative
Capital Cost +10%	**negative**	1.9	**3.2**	4.1	**negative**	negative
O&M Cost +10%	**negative**	2.3	**3.6**	4.6	**negative**	negative
Revenues –10%	**negative**	1.6	**2.9**	3.8	**negative**	negative

[9] The government will provide funds to the *pourashavas* on a 15:85 loan:grant basis for revenue-generating subprojects. If ADB's lending terms had been taken as the cost of capital for the project, the WACC would have been much lower (1.2%).

[10] Tariffs have been set to recover O&M costs and debt service, but not future capital investments (e.g. new infrastructure and expansion of existing systems).

[11] The three towns with existing piped water supply (Amtali, Galachipa, Pirojpur) have adopted a volumetric water tariff.

[12] Pirojpur does not have a water supply component under this project.

	Amtali		Galachipa		Mathbaria	
Worst Case	**negative**	0.8	**2.0**	3.0	**negative**	negative
1-Year Delay	**negative**	2.4	**3.5**	4.6	**negative**	negative
WACC			**12.76**			

CRM = climate resilience measures, FIRR = financial rate of return, O&M = operations and maintenance, WACC = weighted cost of capital.
Source: Asian Development Bank estimates.

2. Sanitation

8. The financial analysis of sanitation subprojects covers public toilets and sludge management equipment. Each public toilet facility has four toilets. The analysis for public toilets is based on the user fee (BDT2/use); number of users (50 persons per day per toilet); and days per year (365). Analysis assumes a 20-year economic life for investments. The current desludging fee is BDT1,200 ($15.40 equivalent), and the equipment may be used 5 times per day for 300 days per year. O&M costs are estimated at 5% (public toilets) and 8% (public toilets and septage treatment facilities) of the capital cost.

9. Based on these parameters, the FIRRs of sanitation subprojects with CRMs are lower than the WACC (Table 2), but the project O&M costs and debt service are fully recovered as per the consolidated projections for the four *pourashavas* (footnote 16). Sensitivity analysis shows that FIRRs are generally robust but most sensitive to revenue fluctuation. The analysis also shows that sanitation subprojects with future CRMs are sustainable as the revenue account will be in surplus for the years of analysis.

Table 2: Summary of Financial Evaluation – Sanitation with and without Future CRM

	Amtali		Galachipa		Mathbaria		Pirojpur	
Scenario	**FIRR (%) with CRM**	FIRR (%) without CRM	**FIRR (%) with CRM**	FIRR(%) without CRM	**FIRR (%) with CRM**	FIRR(%) without CRM	**FIRR (%) with CRM**	FIRR(%) without CRM
Base Case	**7.5**	9.0	**6.2**	7.6	**5.2**	6.9	**5.4**	8.1
Cap. Cost +10%	**6.5**	7.9	**5.3**	6.6	**4.3**	5.9	**4.5**	7.0
O&M Cost +10%	**7.0**	8.6	**5.3**	6.7	**4.2**	6.0	**4.4**	7.2
Revenue –10%	**5.8**	7.3	**4.2**	5.5	**3.2**	4.8	**3.4**	6.1
Worst Case	**4.3**	5.8	**2.3**	3.7	**1.3**	3.0	**1.5**	4.2
1-Year Delay	**7.2**	8.7	**5.8**	7.2	**4.7**	6.5	**4.9**	7.7
WACC			**12.76**					

Cap. = capital, CRM = climate resilience measures, FIRR = financial rate of return, O&M = operations and maintenance, WACC = weighted cost of capital.
Source: Asian Development Bank estimates.

D. Non-Revenue Earning Projects

10. FIRRs were not calculated for non-revenue generating subprojects such as drainage, roads, bridges and cyclone shelters. The financial analysis focused instead on the capacity of project *pourashavas* to sustain O&M costs of all assets developed under the project through their own financial resources. Cash flows were projected over a 32-year period. These projections incorporate the incremental revenue and costs associated with the subprojects as well as the impacts of proposed reforms (e.g., improvements in property tax collection). Financial projections show that the four project *pourashavas* are able to absorb O&M costs and debt service, adjust for uncollectible debt and still have a revenue account surplus and a positive closing balance for the revenue account.

E. Financial Performance of *Pourashavas*

11. A financial performance analysis for FY2012 indicates an overall weak financial position

for Batch 1 *pourashavas*, but with steady improvements. The analysis shows that *pourashavas* generate sufficient revenue to meet current expenditures,[13] but do not generate revenue for capital improvements. As a result, they are heavily dependent on central government grants for infrastructure improvements. In addition, some towns have a mismatch in growth rate of expenditures and revenues—e.g., Pirojpur's FY2012 expenditures increased at an average annual rate of 0.9%, with no growth in income. The *pourashavas'* single largest source of income is property taxes. The proportion of property tax revenue to total revenue ranges from 6.6% in Amtali to 35.2% in Mathbaria, while property tax collection rates range from 24.0% (Galachipa) to 75.5% (Amtali). The project will introduce specific measures to increase property tax collection.[14] The FY2012 financial performance of Batch 1 *pourashavas* is in Table 3.[15]

Table 3: Summary Financial Performance of Batch 1 Pourashavas, FY2012

	Amtali	Galachipa	Mathbaria	Pirojpur
RESOURCE MOBILISATION				
Per capita income (BDT)	833.0	669.1	1,308.1	604.5
Sources of Funds				
Share of own sources in total revenue income (%)	98.7	98.6	99.0	99.2%
Share of property tax in total revenue income (%)	6.6	7.3	35.1	16.2
Share of revenue grants & subsidies in total revenue income (%)	1.3	1.4	1.0	0.8
Growth in revenue income (%)	26.1	19.0	14.6	1. negative
Growth in own sources (revenue income) (%)	27.2	19.7	28.1	11.3
Performance Indicators				
Operating ratio	0.9	0.8	1.0	1.0
Property tax collection efficiency (%)	75.5	24.0	63.2	43.4
Water charges collection efficiency (%)	95.7	95.8	NA	86.4

BDT = Bangladeshi Taka, FY = financial year, O&M = operations and maintenance.
Source: Asian Development Bank estimates.

F. Financial Projections of Pourashavas

12. The cash flow of batch 1 *pourashavas* was projected for a 32-year period. The projections demonstrate that from their operating surplus they can maintain non-revenue generating assets, provide improved services and meet debt service obligations.[16]

G. Tariff and Cost-Recovery Mechanism

13. **Water supply**. The financial analysis uses mid-2015 tariffs of BDT18 per m^3 in Amtali, BDT16 per m^3 in Galachipa and BDT17per m^3 in Mathbaria.[17] Analysis shows that with the proposed tariffs Amtali and Galachipa will require a timebound cross-subsidy from property taxes to cover current and incremental O&M costs,[18] debt service and the provision for uncollectible debt during FY2017–FY2024 in Amtali; and FY2019–FY2020 in Galachipa.[19] Revenue shortfalls for these years will be met from the projected revenue surplus of existing *pourashava* operations. Tariffs in the three *pourashavas* should be revised upwards every 4

[13] Expenditures are adjusted to the revenue collected and do not include provision for adequate O&M.
[14] Performance criteria for batch 1/stage 2 investments include a target of 80% property tax collection by mid-2015. The project consultant will provide support and monitor progress in meeting these intermediary targets (mid-2014): (i) Amtali: 80%, (ii) Galachipa: 35%, (iii) Mathbaria: 65%.
[15] Annex 1 of the supplementary linked FMA includes historic financial statements for batch 1 *pourashavas*.
[16] Financial projection statements are provided in the supplementary Financial Management Assessment, available from the list of linked documents in the main text.
[17] Connection fees are assumed to remain static at current rates of BDT5,000 ($64) for Amtali and BDT1,500 ($19) for Galachipa, and BDT1,500 for Mathbaria ($19). These are based on a rate of $1 = BDT78.
[18] The project will introduce a piped water supply in Mathbaria; and expand existing systems in Amtali and Galachipa.
[19] The cross-subsidy amounts to an average of BDT2.4 million ($0.03 million)/year for 8 years in Amtali; and an average of BDT 1.7 million ($0.02 million)/year for 2 years in Galachipa.

years from 2022 to 2042, by 8% for Mathbaria, 17% for Galachipa and 19% for Amtali.[20] Tariff revision combined with ringfencing of the water supply account, increased service coverage, nonrevenue management and improved collection efficiency will help ensure that *pourashavas* adequately sustain systems and provide high quality service. The project will provide capacity support to meet these targets (Table 4).

Table 4: Average Water Tariffs–Current and Proposed[a]

(BDT/cubic meter)

	Amtali	Galachipa	Mathbaria	Pirojpur
Water–current	10.0	10.0	NA	8.5[b]
Water–proposed (by mid-2015)	18.0	16.0	17.0	NA

NA = , not applicable

[a] *Pourashavas* will adopt the new tariff rate before the completion of works. This is a key performance criterion. The financial analysis uses the proposed tariffs; but the project is found to be viable even at current tariffs.

[b] The project has no water supply investments in Pirojpur, and tariff reform will thus not be proposed for Pirojpur.

Source: Asian Development Bank estimates.

14. **Sanitation**. Households will spend an average of BDT120 ($1.50 equivalent) per year to empty their septic tank using the *pourashava* services. This is based on a cost of BDT1,200 ($15.38) for desludging, and the need to empty septic tanks approximately every 10 years.[21]

H. Affordability Analysis

15. Affordability analysis for WSS services was undertaken by estimating the share of utility bills to average monthly household income. The average monthly water bill is estimated at BDT113 (Amtali), BDT132 (Galachipa) and BDT164 (Mathbaria) per household by project completion in 2016; and BDT120 per household per year for sanitation in all *pourashavas*. Total WSS bills as a share of monthly household income are estimated to be 0.4%–2.8%, which is found to be affordable for all income levels (Table 5).

Table 5: Affordability–Water Tariff and Sanitation Fees (% of Household Income)

Income Group	Annual Income (HH)	Amtali BDT annual total utility bill per HH		Galachipa BDT annual total utility bill per HH		Mathbaria annual total utility bill per HH	
	BDT	BDT	% of income	BDT	% of income	BDT	% of income
High	480,000	1,699	0.4%	1,936	0.4%	2,793	0.6%
Medium	240,000	1,567	0.7%	1,854	0.8%	2,344	1.0%
Low	150,000	1,420	0.9%	1,689	1.1%	1,895	1.3%
Poor[a]	48,000	1,200	2.5%	1,358	2.8%	1,267	2.6%

BDT = Bangladesh Taka, HH = households.

[a] The poverty level for Bangladesh is established at less than BDT400 ($5) per household per day.

Source: Asian Development Bank estimates.

[20] Tariff revisions are a key performance criterion and will be included in the loan covenants.

[21] Loan covenant will include a 2% nominal increase of the desludging fee.