

## FINANCIAL ANALYSIS

### A. Project Financial Cost–Benefit Analysis

1. The Dhaka Environmentally Sustainable Water Supply Project consists of two main outputs. The first output is a new surface water supply scheme for supply augmentation, which includes development of a water intake at Meghna river, a raw water transmission pipeline, a water treatment plant (WTP) at Gandharbpur with capacity of 500 million liters per day (MLD), a treated water transmission pipeline to the existing water supply network (zones 4, 5, 8, 9 and 10), and distribution reinforcements. The second major output is the distribution network improvements to reduce nonrevenue water (NRW) in zone 6 of Dhaka, which will improve the quality of water supply services. Since the benefits accruing from these components are separate, this financial analysis appraises the financial sustainability and viability of the two output components separately in accordance with the Asian Development Bank's (ADB's) *Financial Management and Analysis of Projects*.<sup>1</sup>

2. Although the possibility of a public–private partnership was explored during project preparatory technical assistance,<sup>2</sup> it was determined that the private equity investments would not be viable mainly because of political risk and the low tariff. An alternative design–build scheme was analyzed and adopted as the most feasible, with a design–build contractor operating the infrastructure for 3 years and handing it over to Dhaka Water Supply and Sewerage Authority (DWASA).

3. The total cost of the project, excluding interest during construction and price contingencies, has been used for the analysis. The financial analysis assumes that project capital costs are 100% debt financed by loans from international financial institutions (IFIs) including ADB.

4. The total capital costs are estimated at about \$491 million for output 1 and \$52 million for output 2, inclusive of physical contingencies.<sup>3</sup>

5. Financial analysis for output 1 was conducted on a with- and without-project basis by estimating incremental costs and revenues from 2014 to 2048 over a 35-year period (5-year construction period plus 30 years of operations). Figures were derived from the engineer's estimates as well as specific assumptions such as proposed tariff revisions and operational indicators. The different components of the newly created water infrastructure have different useful lives. The average useful life for civil works is assumed to be 50 years and the average useful life of other infrastructure (mechanical and electrical) is assumed to be 10 years. Distribution network improvement works will be implemented in most service areas of Dhaka, which will result in a reduction of NRW from about 30% in 2013 to 20% in 2020. Since a portion of the tariff is intended to cover distribution costs, a proxy tariff has been computed, using the weighted average domestic and non-domestic tariff after reducing it to take into account estimated distribution costs. The base case model compares the estimated financial internal rate of return (FIRR) with the relevant weighted average cost of capital (WACC) to determine the financial viability of the project.

---

<sup>1</sup> ADB. 2005. *Financial Management and Analysis of Projects*. Manila.

<sup>2</sup> ADB. 2007. *Technical Assistance to Bangladesh for Preparing the Khilkhet Water Treatment Plant Project Consultant's Report*. Manila.

<sup>3</sup> For output 1, the costs for land acquisition and construction of the intake that should be attributable to the Saidabad WTP and phase 2 of Gandharbpur WTP are not included in the analysis.

6. **Weighted average cost of capital.** The WACC is estimated at 1.52% based on the government's prevailing practices of applying the relending rate of 5% to DWASA (Table 1). The government may agree to pass on the concessionary terms of IFIs' lending partially to DWASA, lower than 5%, given the special social nature of the project to provide water supply services to the public, including the poor.

**Table 1: Weighted Average Cost of Capital (%)**

Item	Loan to DWASA (relent)
Original Loan - weighting	100.00
Nominal cost	5.00
Tax rate	25.00
Tax-adjusted nominal cost	3.80
Inflation rate	2.20
Real cost	1.52
Weighted component of WACC	<b>1.52</b>

DWASA = Dhaka Water Supply and Sewerage Authority,

WACC = weighted average cost of capital.

Source: Asian Development Bank estimates.

7. **Tariff assumption.** DWASA has the authority to increase the tariff independently by 5% annually. Given a 6%–7% inflation rate per annum, the real cost of water is actually decreasing. The approved tariff for FY2014 is Tk7.34 per cubic meter ( $m^3$ ) for domestic consumers and Tk24.44/ $m^3$  for non-domestic consumers. As it is generally acknowledged that the present tariff is inadequate to enable DWASA to deliver quality services on a sustainable basis, the base-case scenario assumed a progressive tariff increase of Tk1.2–Tk1.6 from FY2016 to FY2022, adjusted from the tariff adjustment plan approved by the DWASA board in 2011.<sup>4</sup> The government has ensured a tariff increase beyond 5% by introducing a tariff adjustment mechanism.<sup>5</sup> The business-as-usual scenario, a 5% increase annually, is also used in the analysis.

8. **Output 1.** Under both the base-case scenario and the business-as-usual scenario, the FIRR of output 1 becomes negative.<sup>6</sup> This shows that the tariff structure for water supply in Dhaka, or more generally in Bangladesh, is not intended to yield a return on investment. This is also due to surface water schemes being generally more expensive than groundwater systems, which account for the majority of DWASA's current systems.

9. **Output 2.** Assuming the distribution network improvement work will reduce NRW from 35% to 15% by 2018 in zone 6, and water demand will increase by 3% per annum, financial analysis was conducted by estimating incremental revenues as a result of the reduction in NRW from 2018 to 2042 over a 25-year period. Under the base-case scenario, the FIRR for this output is estimated at 8.0%. The net present value is \$55 million.

<sup>4</sup> In DWASA's tariff adjustment plan, the tariff is intended to increase over 5 years from Tk6.62/ $m^3$  in FY2011 to Tk14.40/ $m^3$  in FY2015 for domestic users. However, this has not been implemented. Therefore, it was assumed that the tariff adjustments beyond 5% per annum would start in FY2016, from Tk7.71/ $m^3$  in FY2015 to Tk17.71/ $m^3$  in FY2022 over 7 years. The tariff increase will gradually increase in later years when significant loan repayments are required. This is still lower than the level proposed in the tariff adjustment plan, as Tk14.40/ $m^3$  in FY2015 would increase to Tk20.26/ $m^3$  in FY2022 by an annual 5% increase.

<sup>5</sup> The government plans to establish an independent regulatory authority, which will regulate tariff adjustments proposed by water supply and sewerage authorities through an independent and transparent mechanism,

<sup>6</sup> If we consider only operation and maintenance (O&M) costs (excluding the cost of the initial investment), then even under the business-as-usual scenario, at a WACC of 1.52%, the project will generate a positive net present value.

## B. Utility-Level Financial Analysis

10. DWASA's financial capability was assessed to ensure sufficient cash flow at the utility level to recover operation and maintenance (O&M) costs, depreciation, and debt service obligations. Table 2 summarizes DWASA's financial performance under the base-case scenario. Table 3 provides key financial ratios under both the base-case and business-as-usual scenarios.

**Table 2: Projected Financial Performance of Dhaka Water Supply and Sewerage Authority, assuming Progressive Tariff Increase, FY2016–FY 2022<sup>a</sup> (Tk million)**

Item	FY2012 audited	FY2013 projected	FY2015 projected	FY2016 projected	FY2018 projected	FY2020 projected	FY2022 projected
<b>Tariff Increase</b>	<b>5%</b>	<b>5%</b>	<b>5%</b>	<b>Tk1.2</b>	<b>Tk1.4</b>	<b>Tk1.6</b>	<b>Tk1.6</b>
<b>Income and Expenditure Account</b>							
Revenue	6,963	8,119	9,551	11,086	14,733	24,764	30,176
Operating expenses	6,724	7,362	6,606	6,908	7,638	14,316	15,279
Operating profit	239	757	2,946	4,179	7,095	10,448	14,897
Interest expense	146	118	2,666	2,415	4,917	6,657	9,905
Tax expense	23	160	70	441	545	948	1,248
Profit after tax	70	480	210	1,323	1,634	2,843	3,744
<b>Balance Sheet</b>							
Net non-current assets	56,910	60,105	87,786	108,853	166,114	180,778	172,068
Current assets							
- Investments	4,433	4,433	6,146	7,170	9,608	16,410	20,039
- Inventory and materials	422	502	585	683	915	1,562	1,908
- Accounts receivable	3,599	3,569	2,793	5,333	6,785	10,426	12,405
- Other advances	811	964	1,124	1,311	1,757	3,001	3,664
- Cash	663	3,253	4,035	2,290	2,792	(100)	212
<b>Total Assets</b>	<b>66,838</b>	<b>72,825</b>	<b>102,468</b>	<b>125,639</b>	<b>187,971</b>	<b>212,076</b>	<b>210,296</b>
<b>Equity</b>							
Capital	23,410	23,410	23,410	23,410	23,410	23,410	23,410
Retained earnings	(3,147)	(2,668)	(1,451)	(129)	2,906	7,523	15,709
Grants and other funds <sup>b</sup>	37,353	37,353	37,353	37,353	37,353	37,353	37,353
Long-term liabilities	4,372	8,584	36,432	57,161	113,790	125,835	111,899
Current liabilities	4,851	6,147	6,724	7,845	10,513	17,956	21,926
<b>Total Funding Sources</b>	<b>66,838</b>	<b>72,825</b>	<b>102,468</b>	<b>125,639</b>	<b>187,971</b>	<b>212,076</b>	<b>210,296</b>
<b>Cash Flow Statement</b>							
Net profit		480	210	1,323	1,634	2,843	3,744
Add: noncash items		1,149	1,094	1,068	1,023	4,765	4,226
Add or Less: working capital changes		1,093	1,749	(1,704)	(1,635)	369	(675)
Operating cash flows		2,722	3,053	687	1,022	7,977	7,294
Capital investment		(4,344)	(16,195)	(23,160)	(29,724)	(14,733)	(1,747)

Item	FY2012	FY2013	FY2015	FY2016	FY2018	FY2020	FY2022
Borrowings (net)		4,212	13,327	20,728	27,096	5,712	(5,968)
Net increase or (decrease) in cash		2,589	185	(1,745)	(1,606)	(1,043)	(420)
Opening cash balances		663	3,850	4,035	4,399	943	633
<b>Closing Cash Balance</b>		<b>3,253</b>	<b>4,035</b>	<b>2,290</b>	<b>2,792</b>	<b>(100)</b>	<b>212</b>

( ) = negative.

<sup>a</sup> Assumptions: The operation and maintenance (O&M) cost increases by 6.5% per annum, same as inflation; nonrevenue water gradually reduces by up to 20% in FY2021; domestic consumption reduces from 88% in FY2012 to 85% in FY2019 and is maintained thereafter, and commercial consumption increases accordingly; the accounts turnover ratio reduces from 7 months to 6 months in FY2014, to 5 months by FY2015, and remains constant at 5 months thereafter; groundwater production is replaced by surface water schemes in accordance with the long-term development plan. Estimates of investment and O&M costs for other new surface water schemes, comprising the Pagla water treatment plant (WTP) starting operation in FY2020 and Saidabad WTP phase 3 in FY2021, are preliminary, based on the costs of this project and Saidabad WTP phase 2. Additional costs and benefits from new sewerage management projects are not included as no data are available. All the borrowing by Dhaka Water Supply and Sewerage Authority (DWASA) assumes an interest rate of 5% and a repayment period of 20 years, including a 5-year grace period, in accordance with the standard policy of the Ministry of Finance on relending.

<sup>b</sup> No additional government grants are assumed, although the government has provided grants to DWASA to meet its funding shortfalls, including Tk3.6 billion in FY2011 and Tk1.9 billion in FY2012.

Source: Asian Development Bank estimates.

**Table 3: Key Projected Ratios for Dhaka Water Supply and Sewerage Authority**

Item	FY2011 <sup>a</sup>	FY2012 <sup>a</sup>	FY2013 <sup>b</sup>	FY2015 <sup>b</sup>	FY2016 <sup>b</sup>	FY2018 <sup>b</sup>	FY2020 <sup>b</sup>	FY2022 <sup>b</sup>
<b>Base-Case Scenario</b>								
Debt service coverage ratio	3.46	1.11	6.98	1.04	1.26	1.21	1.01	0.90
Accounts receivable Turnover (months)	7.49	7.16	6.00	5.00	5.00	5.00	5.00	5.00
Self-financing ratio <sup>c</sup> (%)	16.00	19.00	23.00	8.00	13.00	14.00		
Return on sales	0.80	1.00	5.91	2.20	11.93	11.09	11.48	12.41
<b>Business-as-Usual Scenario</b>								
Debt service coverage ratio	3.46	1.11	6.98	1.04	1.10	0.87	0.65	0.50
Accounts receivable Turnover (months)	7.49	7.16	6.00	5.00	5.00	5.00	5.00	5.00
Self-financing ratio <sup>c</sup> (%)	16.00	19.00	23.00	8.00	9.00	2.00		
Return on sales	0.80	1.00	5.91	2.20	7.14	(3.84)	(12.13)	(19.44)

( ) = negative.

<sup>a</sup> Based on audited financial data.

<sup>b</sup> Based on projected data.

<sup>c</sup> The self-financing ratio = (profit after tax + depreciation)/3 years average capital expenditure. No significant new investment expected in 2020 and 2022.

Source: Asian Development Bank estimates.

11. The debt service coverage ratio (DSCR) for the project is low, since surface water projects have higher O&M costs per unit of water produced than groundwater. The DSCR for DWASA as an entity, including revenue and costs for all zones and groundwater sources, is considerably better. Under the base-case scenario, the DSCR for most years will generally

remain above 1.0. Under the business-as-usual scenario, the DSCR will remain above 1.0 only until FY2016, after which it will fall significantly as a result of large debt service obligations.

12. Another key factor in ensuring sustainability is to cut the receivables turnover. This was reduced from 12 months in FY2007 to 7 months in FY2012. DWASA has introduced the auto-aging system for accounts receivables, and has been making special drives to collect outstanding bills with the aim of reducing the receivables turnover further. The return on sales is projected to be healthy, once the receivables turnover ratio improves and NRW reduces. The self-financing ratio remains low owing to large investments through loans.

13. A few factors mitigate the risk of default by DWASA. First, DWASA has never defaulted on any of its loan liabilities using its operational income, and restricts its costs to ensure debt obligations are met. Second, DWASA has obtained substantial government grants to meet any shortfalls, although this analysis did not include any such grants. Third, DWASA has a large fixed deposit balance of \$55 million (30 June 2012), 40% of which can be used to offset its debt services. Finally, DWASA has requested more concessional relending terms from the government, and a relending interest rate lower than 5% may be permitted. Since DWASA is a government entity entrusted with implementing social and economic policies, partially passing on IFIs' concessional terms would be acceptable. The government contribution to the project, amounting to about \$225 million, may be given as a grant to DWASA. This will significantly improve the financial projection, although the analysis was conducted assuming 100% lending. Should it become necessary in the future, the government could also restructure its debt to DWASA.

14. A number of assumptions have been made in undertaking the entity-level financial analysis. Only crude assumptions are possible for the investment and O&M costs of future projects, although this would have significant implications on the future debt service obligations of DWASA. While the exact level of tariff increase beyond 5% and the exact timing when such an increase is required are difficult to project because of many variables, the current practice of a 5% increase per annum is clearly financially unsustainable. The government has committed to maintain a minimum DSCR of 1.0 for DWASA and to increase the tariff beyond 5% by 2015 to help DWASA move toward full cost recovery; this has been covenanted in the loan agreement.