

## FINANCIAL ANALYSIS

### A. Introduction

1. The financial analysis and financial management assessment (FMA) of project 1 of the Ulaanbaatar Urban Services and Ger Areas Development Investment Program were undertaken in accordance with the Asian Development Bank (ADB) *Guidelines on Financial Management and Analysis of Projects* and the ADB methodology note on financial due diligence.<sup>1</sup> Project 1 will comprise revenue-generating and nonrevenue-generating subprojects aimed at (i) providing piped water supply and sewerage; (ii) improving urban roads, along with drainage and flood protection; and (iii) delivering efficient and more environment-friendly heating services through heat-only boilers (HOB). Financial internal rates of return (FIRRs) were calculated for all revenue-generating components of the project. A financial sustainability analysis for nonrevenue-generating components was conducted for the Municipality of Ulaanbaatar (MUB) because it will be responsible for operation and maintenance (O&M).

### B. Financial Analysis

#### 1. Revenue-Generating Components

2. A 4-year overall implementation period was assumed for project 1, in annual phases of 10%, 30%, 40%, and 20%. The first year of implementation was seen as the period for detailed engineering design works, planning, and initial preparation for procurement. On the demand side, the projections assumed that consumption of water will increase due to (i) the annual growth rate in the population of Bayankhoshuu and Selbe subcenters, which are the planned service areas; and (ii) an increase in incremental consumption by the existing households in the target subcenters as a result of improved access to water supply.<sup>2</sup>

3. The calculations of the FIRRs and weighted average costs of capital (WACCs) assumed that (i) the European Investment Bank will provide cofinancing for the water supply and sewerage component at terms that parallel those of the ADB loan; (ii) the ADB loan will have a maximum 20-year term, with a 5-year grace period on principal repayment and a tentative rate based on the 10-year US dollar fixed swap rate plus a contractual spread of 0.40%, as well as a commitment fee of 0.15%; (iii) the Asian Development Fund loan will have a maximum term of 25 years, with a grace period of 5 years and the fixed rate of 2% per annum for blend borrowers; (iv) the government will relend the ADB and EIB loans to the MUB at an indicative annual interest rate of 3%; (v) physical contingencies were 5% of civil works and consulting services; and (vi) price contingencies were 3.0%–8.0% for local currency costs and 0.5%–2.2% for foreign exchange costs, including provisions for exchange rate fluctuations under a purchasing power parity exchange rate.

#### (a) Financial Analysis of the Water Supply and Sewerage Services

4. A financial cost–benefit analysis was conducted on an incremental basis. The results confirmed the financial viability of the water supply and sewerage component, with an FIRR of 3.30%, which exceeded the WACC of 0.75%. The financial analysis considered (i) the investment from the European Investment Bank loan in the target areas of Bayankoshuu and

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<sup>1</sup> ADB. 2005. *Financial Management and Analysis of Projects*. Manila; ADB. 2009. *Financial Due Diligence: A Methodology Note*. Manila.

<sup>2</sup> The current rate of water consumption in the target subcenters is 8 liters per capita per day, much lower than the average consumption in Ulaanbaatar City's core area of 240 liters per capita per day.

Selbe; and (ii) tariff collections from incremental demand, based on both population and consumption growth.

5. The projected figures reflect the incremental households to be serviced through the water and sewerage pipelines in Bayankhoshuu and Selbe as densification continues in the two subcenters at an average rate of 9% per annum. In addition, incremental water consumption was calculated based on the increase in the use of water expected as access is facilitated by the project. The with-project calculation assumed that the prevailing average consumption of households in the subcenters of 8 liters per capita per day, or 0.01 cubic meters (m<sup>3</sup>), will reach 0.03 m<sup>3</sup> per capita beginning 2019 and increased gradually to 0.13 m<sup>3</sup> per capita in 2029.<sup>3</sup> This assumption led to positive cash flows and financially viable subprojects. The average incremental financial cost for water supply and sewerage, which is the minimum tariff required for the full cost recovery of capital and operating costs, was calculated at \$0.26 per m<sup>3</sup>. This is lower than the proposed tariff rate of \$0.31 per m<sup>3</sup>, which is equal to the current rate for metered apartments. Currently, the residents of Bayankhoshuu and Selbe are charged higher tariffs of \$0.64 per m<sup>3</sup> at water kiosks due to the additional costs incurred by the Ulaanbaatar Water Supply and Sewerage Authority (USUG) in delivering water to the *ger*<sup>4</sup> areas. It was also assumed that the tariff rate will increase by 5% every 5 years to maintain the project's financial viability. The results of the analysis are in Table 1.

**Table 1: Financial Evaluation of Water Supply and Sewerage—  
Summary of Sensitivity Analysis**

Scenarios	Result
Base case FIRR (in %)	3.30
Case 1: 10% increase in capital cost	2.01
Case 2: 10% increase in O&M	3.21
Case 3: 10% decrease in benefits	2.51
Case 4: 10% increase in capital costs + O&M; 10% decrease in benefits	0.99
Case 5: Delay in project benefits by 1 year	0.92
WACC (in %)	0.75
Proposed initial tariff rate (water and sewerage)	\$0.31/m <sup>3</sup>
Current rate of water per m <sup>3</sup> in the <i>ger</i> area kiosks	\$0.64/m <sup>3</sup>
Current rate for metered apartment	\$0.31/m <sup>3</sup>
WTP expressed for monthly consumption	\$14.11
Proposed rate of increase for tariffs every 5 years	5.00%

FIRR = financial internal rate of return, m<sup>3</sup> = cubic meter, O&M = operation and maintenance, WACC = weighted average cost of capital, WTP = willingness to pay.

Source: Asian Development Bank estimates.

6. The sensitivity analysis showed that financial viability will be at risk if 10% increases in investments and O&M costs are combined with a 10% decline in revenues which is reflected as Case 4 in Table 1. Revenue generation is of utmost importance, which means the targets for new connections and higher consumption must be closely monitored and supported by a strong information, communication, and education program. The USUG currently operates at a financial loss due to collection difficulties. This needs to be addressed.<sup>5</sup> However, this analysis assumed that 30% of gross tariffs will remain uncollected. It also assumed that the additional

<sup>3</sup> The average consumption in Ulaanbaatar is 240 liters per capita per day, although this calculation includes system leakage.

<sup>4</sup> The *ger* areas on the periphery of the city's core are named after the *gers*, the traditional round tents in which many of the once nomadic in-migrants from the countryside that make up most of their populations often continue to use as homes, particularly upon arrival.

<sup>5</sup> USUG financial statements show its collection efficiency to be 60%–70%.

revenues will entail incremental expenses, estimated at 30% of the gross revenues collected.<sup>6</sup> A 10% corporate tax rate was applied to the net revenues of the subproject. This is the minimum rate applicable to utility operators of the local government.<sup>7</sup>

### (b) Financial Analysis of Heating Services

7. The heating component for the Bayankhoshuu and Selbe subcenters will generate revenues from the additional households to be served and their incremental consumption of heating. The financial analysis resulted in an FIRR of 3.67%, which is higher than the WACC of 1.31%. Assumptions and considerations included (i) a growing number of consumer households, based on an annual population growth rate of 9%; (ii) an accelerating level of consumption capacity in megawatt-hours; (iii) the capital and O&M costs; and (iv) the existing and proposed tariffs of the district heating company for metered apartments, as well as what were affordable levels for the households in the service areas.

8. There are a few heating facilities which operate in the *ger* areas, and their tariffs for households are MNT341 per square meter (floor area of housing unit) and MNT900/m<sup>3</sup> for institutional clients. Even with subsidies from the city government, operators of privately-owned heating facilities have suffered financial losses from their operations because of their high O&M expenses and their tariff rates which are not based on full cost recovery. The initial tariff rate proposed under the project is \$5.95 per megawatt (MW),<sup>8</sup> which is the current rate for metered apartments. The calculated annual consumption demand covers the heating period and summer months. It starts at a low level of 4.2 MW in 2020 and rises to 16.3 MW in 2030 in Bayankhosuu, and increases from 6.7 MW to 18.2 MW for Selbe during the same period. The results of the sensitivity analysis are in Table 2.

**Table 2: Financial Evaluation of Heating Services—  
Summary of Sensitivity Analysis**

Scenarios	Result
Best Case FIRR (in %)	3.67
Case 1: 10% increase in capital cost	3.22
Case 2: 10% increase in O&M	3.11
Case 3: 10% decrease in benefits	2.58
Case 4: 10% increase in capital costs and O&M, and 10% decrease	1.55
Case 5: Delay in project benefits by 1 year	1.26
WACC (in %)	1.31
Proposed initial tariff rate (heating facilities)	\$5.95/MWh
Current rate for households in <i>ger</i> areas (heating facilities only)	\$0.24/m <sup>2</sup>
Current rate of metered apartment	\$5.95/MWh
Willingness to pay expressed for monthly consumption	\$14.13
Proposed rate of increase for tariffs every 5 years	10.0%

FIRR = financial internal rate of return, m<sup>2</sup> = square meter, MWh = megawatt hour, O&M = operation and maintenance, WACC = weighted average cost of capital.

Source: Asian Development Bank estimates.

<sup>6</sup> Analysis of USUG financial statements shows that operating costs are about 40% of gross revenues.

<sup>7</sup> The 10%–25% corporate income tax rate is progressive, and the 10% should apply for the projected income of MNT3 billion for the first year (2019). The 25% rate should apply for any amount in excess of MNT3 billion. See PwC. *Doing Business Guide in Mongolia 2012*. [www.pwc.com/en\\_MN/mn/publication/assets/dbg\\_2012.pdf](http://www.pwc.com/en_MN/mn/publication/assets/dbg_2012.pdf)

<sup>8</sup> At the conversion rate of 1.182 gcalorie/hour = 1 Megawatt-hour, the current tariff rate for heating in a metered apartment building, which is also the proposed tariff rate under the project, is equivalent to MNT9,824 per gcalorie/hour or \$5.95 per megawatt-hour.

9. The scenarios adopted for the analysis indicated that the component's FIRR will be most sensitive to an increase in capital investment and O&M combined with by a decrease in benefits and a 1-year delay in revenue generation. A socioeconomic and willingness-to-pay survey showed that heating services ranked highest among the needs and priorities of households. The survey indicated the households were aware that the heating technology they were using to combat severe winter cold was costly and inefficient. They also understood that their heating systems were polluting the air and that prolonged exposure to this pollution leads to serious health problems. The analysis reflected their positive view of the project system by assuming a higher collection efficiency of 90% against the 65–70% current rate, and a lower incremental collection cost of 5%. Revenues from the tariffs were subjected to a 10% tax prior to discounting.

## 2. Nonrevenue Generating Component

10. In accordance with ADB guidelines, a financial sustainability analysis was conducted for the nonrevenue generating urban roads improvement component. The city generates revenues through personal, property, and services taxes; fees; rent collection; and charges on properties. In addition to providing funds to the USUG from internally generated revenues, the city has availed of loans from the Government of Spain and the World Bank to pass on to the utility firm under onlending arrangements. The city is required to provision for O&M expenses in the *ger* areas. A public sector management and finance law compels the city to remit portions of its revenues to the national government for distribution to other poor provinces or districts. This has diminished its financial ability to make larger investments in the *ger* areas.

11. The city will have adequate funds to cover its counterpart contributions to the project, the O&M requirements for the improved roads under the project, and its debt service requirements. The major assumptions used for the forecast of the city's revenues are based on the growth trends in its income statements for the period 2008–2012. Even with the addition of the projected O&M for the roads component, the city will have adequate funds to operate efficiently and maintain the assets, provide counterpart funds, and cover debt service requirements for the subproject. This indicates it is capable financially to render the subproject sustainable. The total counterpart funds requirement for the project development, provision for O&M, and debt repayment requirement are within the projected fiscal expenditure and investment levels of the city, as shown in Table 3.

**Table 3: Fiscal Projections for the Municipality of Ulaanbaatar, 2014–2018**

Item	Actual			Projections				
	2010	2011	2012	2014	2015	2016	2017	2018
Recurrent/operating expenditure (MNT billion)	65.79	69.29	93.16	149.72	149.72	189.81	240,63	305.06
Total operating revenues (MNT billion)	143.07	217.12	310.29	549.02	712.90	931.72	1,225,02	1,651.68
Total funds for urban development (MNT billion)	37.73	110.17	174.58	175.92	181.27	185,28	187,96	187.96
Surplus (MNT billion)	60.75	67.04	79.55	253.33	372.28	536.84	763,63	1,620.14
Total investment requirement of roads improvement component (MNT billion)				3.49	13.97	10,48	6,99	0.00
Government fund required for the urban roads subproject (MNT billion)				1.34	5.35	4.01	2.68	2,68
Component government fund/total fiscal expenditure (%)				0.41	1.44	0.94	0.54	0.47

Item	Actual			Projections				
	2010	2011	2012	2014	2015	2016	2017	2018
Component government fund/fiscal expenditure for urban development (%)				0.8	3.0	2.2	1.4	1.4
Project investment/fund for urban development (%)				2.0	7.7	5.7	3.7	0.0

Sources: Municipality of Ulaanbaatar audit reports, 2008–2012; Asian Development Bank estimates.

### 3. Affordability and Willingness to Pay Analysis

12. The socioeconomic and willingness-to-pay survey was conducted during November 2012–January 2013 to determine household satisfaction with, and ability and willingness to pay for, water supply, sewerage, and heating services. An affordability analysis of the proposed tariffs for water supply and sanitation and heating services was conducted based on the survey results. The analysis showed that the proposed tariff of \$0.31 per m<sup>3</sup> for water supply and sanitation is affordable and would comprise 0.83% to 1.47% of the monthly incomes of households in the bottom three income deciles in the Bayankhoshuu and Selbe subcenters. These ultra-poor and poor households make up about 25% of the total target population. The analysis indicated that the proposed tariff rate of \$5.95 per MW for the heating services is also affordable for these same households and would constitute 1.40%–2.47% of their monthly incomes. Comprising 2.23%–3.94% of these households' monthly incomes, the combined tariffs for water supply, sewerage, and heating services would also be affordable.

13. Households in the Bayankhoshuu and Selbe subcenters are willing to pay for the improved water supply, sewerage, and heating services. The survey revealed a willingness to pay \$14.11 per month for water supply and sanitation and \$14.13 per month for heating services. At the proposed tariff of \$0.31/month, households will be paying \$14.11 per month for an increased water consumption of 45 m<sup>3</sup>, which is significantly higher than the current consumption of 0.96 m<sup>3</sup> per household per month in the two subcenters. For the heating services, the proposed tariff of \$5.95 per MW will allow the households in Bayankhoshuu and Selbe to shift to metered heating and consume about 2.4 MW per month. However, the projected demand for metered heating is only 0.94 MW per month. Currently, households in the target subcenters use about 10% of their income for the use of coal-fired stoves. With the switch to metered heating, their average monthly spending on heating will decline to about 1.5%–2.5% of their average monthly income, providing considerable savings.

#### C. Financial Management Assessment

14. An FMA was carried out in accordance with ADB's guidelines to establish the financial management capacity of the MUB as the executing agency of the project. The assessment covered funds flow arrangements, accounting policies and procedures, staffing, internal and external audit arrangements, the reporting and monitoring system, and the financial information systems. The FMA showed that the city has no experience in managing ADB-funded projects but has prior experience with projects supported by the Government of Spain and the World Bank. The planned capacity-building component of the project will provide the necessary technical assistance to the city on ADB policies and procedures, including disbursement and procurement processes. The FMA also indicated that the city's accounting and financial reporting system adheres to the existing accounting and financial management standards of the Government of Mongolia, which are in accordance with international accounting and financial reporting standards. The designation of qualified staff to manage the financial aspects of the project is critical to the successful implementation of the project by the MUB.