FINANCIAL ANALYSIS

1. A financial analysis has been undertaken in accordance with Asian Development Bank (ADB) guidelines.[1] Financial sustainability and fiscal impact analyses were carried out for all non-cost recovery project components. A financial viability assessment and tariff analysis were performed for the only cost-recovery component—the Baishan improved water supply.

A. Non-cost Recovery Components

2. The financial sustainability analysis assessed the impact of the project components on the local fiscal revenues of the executing agency and end borrowers: the Baicheng Municipal Government (BCMG) and Baishan Municipal Government (BSMG). BCMG will provide counterpart funding during implementation, pay debt service, and provide operation and maintenance (O&M) funds for improved municipal services in Baicheng; BSMG will do the same for solid waste management in Baishan. No other domestic funding sources are provided for this project. A detailed review of BCMG and BSMG revenue and expenditure statements for 2008–2012 was undertaken to assess historical financial performance; capital structure; generation of internal funds to support current operations, and especially their ability to service debt; and ability to finance the O&M of the non-cost recovery components after construction. Projections of the likely financial performance of BCMG and BSMG were made for a period of operation from 2019 to 2030 after component commissioning.[2]

3. A fiscal impact assessment was carried out by comparing annual revenues from the identified financing sources with the annual counterpart funds, required capital expenditures during project implementation, and the recurrent cost of O&M and debt service of the project components. Interest and principal repayments for the ADB loan are estimated based on a maturity of 25 years, including a grace period of 5 years.

4. **Historical revenue and expenditure.** The historical financial performance of each municipal government was analyzed to determine whether they can provide the required counterpart funds during construction, and necessary funds for O&M and debt service during operation. The sources of income are various forms of taxes—e.g., value added tax, business tax, income tax, resource tax, real property tax—but also non-tax revenues and subsidies and/or direct transfers from other levels of government. Expenditures are categorized into general public services, education, public safety, personnel welfare, environmental protection, agriculture, forestry and water, and transportation.

5. BSMG's total fiscal revenues grew at an average annual rate of 21% during 2008–2012, from CNY3.384 billion to CNY7.588 billion. Over the same period, municipal government expenditures grew at an annual rate of 22% (Table 1). BCMG's total fiscal

[1] ADB. 2005. *Financial Management and Analysis of Projects*. Manila; ADB. 2009. *Financial Due Diligence: A Methodology Note.* Manila.

[2] Based on generally accepted criteria employed by the World Bank, counterpart contributions are considered to be affordable by a municipality if annual contributions do not exceed 15%–20% of the projected annual construction budget. Because it is difficult to assess the construction or investment component of the municipal budget from the available data, the annual contribution is compared with overall annual municipal expenditure and also as a share of special infrastructure projects that are funded by the government. The general rule for debt service payments associated with a project is that they are not a cause for concern if they do not exceed 5% of municipal revenues.

revenues and expenditures have followed a very similar pattern, and therefore are not presented here.

Table 1: Historical Revenues and Expenditures of Baishan Municipal Government

Item	2008	2009	2010	2011	2012
Revenues (CNY, million)					
Municipality Fiscal Revenues	1,930.30	3,133.03	4,073.59	4,324.99	5,229.90
1. General budget revenue	1,558.68	1,977.69	2,527.08	3,553.08	4,363.04
2. Funds revenues	371.62	1,155.34	1,546.51	771.91	866.86
Provincial transfers	191.79	213.90	225.29	284.79	328.50
Central Government Transfers	1,261.53	1,445.76	1,572.28	1,960.99	2,029.56
Total	3,383.62	4,792.69	5,871.16	6,570.77	7,587.96
Expenditures (CNY million)					
General public service	945.76	1,164.50	1,330.63	1,469.72	1,328.43
Public safety	338.05	438.05	548.02	589.40	788.87
Education	890.03	1,147.94	1,171.97	1,481.97	2,420.13
Science and technology	30.35	27.87	52.11	48.99	69.51
Social insurance and employment	1,364.39	1,995.20	1,966.25	2,229.18	2,313.26
Medical and sanitation	294.29	532.14	764.70	913.44	937.07
Environmental protection	137.06	214.40	562.51	959.87	708.35
Agriculture forestry and water affairs	531.10	736.57	988.04	1,232.01	1,358.44
Transportation	170.41	221.07	510.54	673.65	550.55
Others	101.77	163.88	1,246.53	2,045.16	2,314.33
Total	6,330.96	9,005.81	11,911.34	13,927.93	15,199.33
Surplus	(2,947.34)	(4,213.12)	(6,040.18)	(7,357.16)	(7,611.37)

( ) = negative, CNY = yuan.
Source: Baishan Municipal Government.

6. **Fiscal impact analysis and affordability assessment results.** The overall project funding entails provision by ADB of a loan of $150 million, and equity contributions by BCMG ($175.5 million) and BSMG ($61.34 million).

7. Based on the growth trend for the past 5 fiscal years, an annual revenue increase of 25% for both project cities is assumed. Assessment of projected annual revenues shows that both BCMG and BSMG can provide sufficient counterpart funds for the project. The analysis indicates that based on the funding sources identified during project preparation—including new budgets, subsidies, and allocations that will be earmarked—all project components are expected to have sufficient funding available from counterpart funds during implementation. The municipal contributions were analyzed in terms of affordability relative to projected revenues and expenditures during 2014–2019. BCMG will provide about CNY1,096.3 million in counterpart funds during implementation, which comprise 0.28%–3.97% of projected revenues during the implementation period. O&M for the non-cost recovery component in combination with debt service are about 0.05% to 0.37% of annual projected revenues until 2030. BSMG will provide CNY384.1 million in counterpart funds, which will comprise a much smaller proportion of projected fiscal revenues. The O&M and debt service are also lower. The impacts on fiscal revenues are in Table 2.

Table 2: Counterpart Funds, Debt Service, and Operation and Maintenance as a Percentage of Total Revenues (CNY million)

Item	2014	2015	2016	2017	2018	2019	2020	2024	2025	2030
BSMG										
Projected	**8,159**	**10,191**	**12,730**	**15,900**	**19,860**	**24,806**	**30,983**	**75,413**	**94,195**	**286,368**
Annual counterpart	7.17	53.18	111.15	174.66	37.96					
% of	0.09	0.52	0.87	1.10	0.19					
Annual debt service and						36.24	37.38	38.92	39.41	35.63
% of						0.15	0.12	0.05	0.04	0.01
BCMG										
Projected	**4,810**	**5,990**	**7,459**	**9,288**	**11,656**	**14,401**	**17,932**	**43,110**	**53,680**	**160,687**
Annual counterpart	20.51	153.85	319.69	499.08	103.21					
% of	0.43	2.57	4.29	5.37	0.89					
Annual debt service and						68.35	68.95	72.04	73.02	79.65
% of						0.47	0.38	0.17	0.14	0.05

BCMG = Baicheng Municipal Government, BSMG = Baishan Municipal Government, CNY = Chinese yuan.
Source: Baishan and Baicheng municipal governments.

8. Furthermore, the executing agency has selected the 10% annuity increase repayment scheme, which delays more of the financial load compared with the straight-line method, and will further alleviate the immediate repayment burden to enable more efficient cash management of the project. The ratios of debt service to total revenues shown in Table 2 are below the threshold.

B. Cost-Recovery Components

9. BSMG is the implementing agency for the Baishan improved water supply management. The project implementation unit is Baishan Xibeicha Qiyuan Hydropower Corporation. To compute the weighted average cost of capital (WACC), it is assumed that the financing sources will consist of both project cities' equity contributions and their ADB foreign currency loans. The Ministry of Finance re-lends the funds from ADB with the same duration—25 years with a 5-year grace period. The loan rate is the London interbank offered rate plus the ADB margin (0.50%) and maturity premium (0.2%). The cost of equity is calculated at 7.00%, assuming a risk-free rate of return of 6.0% plus a 1.0% margin. Income tax is assumed at 25%, with the WACC calculated on an after-tax basis. The other assumptions are a domestic inflation rate of 3.0% and international inflation rate of 1.90%. As shown in Table 3, the WACC is 2.58%.

Table 3: Weighted Average Cost of Capital

Financial Component	ADB	Government	Total
A. Amount (CNY million)	210.00	233.95	443.95
B. Weighting (%)	47.3	52.7	100.0
C. Nominal cost (%)	4.18	7.00	
D. Income tax rate (preferential tax rate) (%)	25		
E. Tax-adjusted nominal cost [D x (1 – E)] (%)	3.14	7.00	
E. Inflation rate (%)	1.90	3.08	
F. Real cost [(1+F) / (1+G) – 1] (%)	1.21	3.80	
G. Weighted component of WACC (%)	0.6	2.00	
Weighted average cost of capital (%)	**2.58**		

ADB= Asian Development Bank, CNY = Chinese yuan, WACC = weighted average cost of capital.
Source: Asian Development Bank estimates.

10. A financial analysis was carried out, including estimation of the financial internal rate of return (FIRR) and WACC. Sensitivity tests were undertaken to test the robustness of the FIRR to changes in the underlying parameters, i.e., increases in capital and operating costs and reductions in revenues, or delays in implementation. Financial projections were prepared to ascertain the overall financial sustainability of the subcomponents' operation.

11. The Baishan improved water supply service component will consist of 27.9 kilometers (km) of source water transmission pipelines, a treatment plant with daily capacity of 50,000 tons (t), and 55.3 km of distribution pipeline networks. However, 6.8 km of the source water transmission pipelines will supply water to Jiangyuan district, which does not constitute a financial benefit for the proposed project, and thus this part of the investment cost is deducted from the FIRR calculation. Benefits accrue from incremental water sales, the improved non-revenue water ratio, and proposed tariff changes.

12. Tariff affordability was assessed by determining the percentage of household income needed to meet the estimated monthly bill for water supply and wastewater services.

13. The analysis made the following additional assumptions: (i) all costs are expressed in mid-2013 prices; (ii) the project is analyzed over a 20-year period, excluding the construction period, and the residual value is not considered; (iii) demand projections are adopted in the feasibility study report;[3] (iv) a foreign exchange rate of CNY6.22 = $1.00 is used when converting foreign exchange costs to their local currency equivalent; (v) O&M costs include personnel salaries and welfare, plant maintenance costs, administration, insurance, taxes, power cost, and other expenses; (vi) capital cost includes the base cost of the cost recovery component, including the investment cost for the associated water supply network pipelines, and physical contingencies, but excludes price contingencies and financial charges during development (as a result of debt financing); (vii) revenues from the cost-recovery component will be derived from the water sales; (viii) net cash flows from the component were determined after income taxes. Income tax was calculated at 25% and sales tax at 6%; (ix) expenses include depreciation (4% of net fixed assets); and (x) technical data and costs were obtained from the revised project feasibility study to form the basis of the financial analysis and FIRR.

14. **Financial internal rate of return and sensitivity.** In line with the guidelines of the government of the People's Republic of China, to achieve full cost recovery an increasing block tariffs scheme with appropriate gradual tariff increases will be implemented by completion of project implementation (2018). In particular, it is assumed that (i) the block tariffs scheme is fully implemented by 2019, with CNY2.30/t for the first block (0–2.4 t/month/capita), CNY3.45/t for the second block (2.4–4.1 t/month/capita), CNY4.60/t for the third block (≥4.1 t), thus complying with the ratio suggested by the national guideline; and (ii) tariffs for all three blocks increase by 15% by 2030. The current water tariff is uniform, with a household water tariff of CNY1.8/t.

15. Assuming the leakage ratio for the newly constructed distribution network is 15%, and the plant operates at full capacity, the FIRR for the Baishan water supply management component is calculated to be 5.82%, or higher than the WACC of 2.58%. The cost-recovery

[3] Water demand projections are based on projected service area population, and current and future consumption. Assumptions include the following: (i) per capita water consumption assumptions as specified in the note below Table 5; (ii) annual population increases by 0.8%–2.1% in different project areas; (iii) constant household size; (iv) 50% of households are connected to the water supply in the first year of operation, 70% in the second year and 100% beginning in the third years for all subcomponents; (v) non-domestic demand based on actual conditions; and (vi) losses at 30% of water production.

component of the project, which amounts to $63.55 million and comprises a relatively small portion of the total project cost, is therefore considered to be financially viable. The results of the sensitivity analysis are in Table 4; the project is most sensitive to a benefit reduction—the FIRR falls to 4.46% if benefits are reduced by 5%.

Table 4: Financial Internal Rate of Return and Sensitivity Analyses

Cases	FIRR	NPV (CNY million)
Base Case	5.82%	155.4
(i) Benefit reduction of 5%	4.46%	79.5
(ii) Investment cost overrun of 5%	4.74%	97.0
(iii) O&M cost increase of 10%	5.03%	105.8
(iv) Delay in implementation of 1 year	5.20%	114.0
(v) Combination of (i), (ii), and (iii)	3.83%	54.4

FIRR = financial internal rate of return, NPV = net present value, O&M = operation and maintenance.
Source: Asian Development Bank estimates.

16. **Tariff and affordability analysis.** The tariff analysis includes assessments of affordability to project beneficiaries and of the agreed degree of cost recovery during operation. The primary social objective of water tariff structures should be to ensure that all members of the community are able to afford access to water services without placing an undue burden on their household finances. Based on generally accepted criteria employed by the World Bank, the tariff for domestic water consumption is affordable if does not exceed 5% of annual household income. The share of income spent on water is below this benchmark (Table 5).

Table 5: Affordability Analysis

Items	2019	2020	2021	2022	2025	2030	2035
Domestic tariff (CNY/m^3)	2.80	2.80	2.80	2.80	2.80	3.20	3.20
Average HH income (CNY/year)	35,293	38,116	41,165	44,459	56,005	82,290	120,911
Water bill (CNY/year)	164	164	164	164	164	187	187
Affordability (% of average HH income spent on water) (%)	0.46	0.43	0.40	0.37	0.29	0.23	0.15
Low-income HH (CNY/year)	2,516	2,717	2,934	3,169	3,992	5,866	8,619
Water bill (CNY/year)	92	92	92	92	92	105	105
Affordability (% of low-income HH income spent on water) (%)	3.66	3.39	3.13	2.90	2.30	1.79	1.22

CNY = yuan, HH = Household, m^3 = cubic meter.
Note: consumption assumed to be 90 liters per capita per day for low-income households and 120 liters per capita per day for average-income households.
Source: Asian Development Bank estimates.

17. **Financial management assessment.** The overall financial management risk-rating of the project at appraisal is medium. The main problems are the lack of ADB project management experience, an insufficient number of accountants, and deficient internal auditing functions. The identified financial management risks will be closely monitored during project implementation and the following actions taken during implementation: (i) add financial staff to the project management office and project implementation unit; (ii) develop a financial policies and procedures manual to guide staff activities and ensure accountability; (iii) develop a training plan and policies for accounting staff; (iv) provide regular training on ADB disbursement policies; (v) purchase and provide training on financial software; and (vi) regularly backup all accounting systems and provide appropriate security measures for the backup data.