

FINANCIAL ANALYSIS

1. The financial analysis was undertaken for the proposed project in accordance with Asian Development Bank (ADB) policies and guidelines.¹ A financial sustainability analysis was carried out to assess the entire project, including all project components; and financial analysis was conducted for the township wastewater component and for the Chukou and Yangdongxia water supply subcomponents, which has a cost-recovery objective.²

A. Financial Sustainability Analysis

2. Zixing City Government (ZCG) will provide funds to ensure the successful implementation and operation of all project components and debt services. ZCG's historical financial statements and budget appropriations for 2010–2013 were analyzed to identify trends in fiscal performance and determine its fiscal capacity to finance, in addition to required current operations, project-related loan counterpart contribution, loan repayment and charges, and operation and maintenance (O&M) of new facilities. Using the compound average growth rate, a forecast of annual revenue and expenditure was developed. Based on the existing fiscal structure, revenue comes from tax (value-added, business, income, resource, and real property taxes) and non-tax sources (ordinary resources, land transfer fees, reserve funds, and upper-level government transfers), while expenditures include payment for general public services, education, science and technology, culture and sports, medical services and sanitation, environmental protection, urban and rural community affairs, agriculture, forestry and water affairs, transportation, and domestic and national security. ZCG's past performance has shown revenue at a compound average growth rate of 26%, with expenditure higher at 28%; and intergovernmental transfers rationalized the discrepancies. Since 2013, ZCG has trimmed fiscal forecast rates to lower than 20%; and further to 10% from 2015 and thereafter. This rate was applied in the forecast. ZCG's revenue is expected to reach CNY6,919 million in 2016. This amount is projected to grow about 10% annually based on budget estimates, in line with economic development.

3. The project counterpart funding, O&M, and debt service as a percentage of ZCG's revenue are in Table 1. The analysis shows that the total fund requirement is heaviest during the project implementation period of 2016–2020. Annual fund requirements during this period are from CNY111.93 million (1.62% of ZCG's total projected revenue) to CNY241.09 million (3.17% of ZCG's total projected revenue). The total fund requirement after implementation is from 0.31% (2040) to 0.74% (2021). This indicates manageable fiscal stress for ZCG.

4. ZCG will bear the O&M costs. As a percentage of annual revenues during the initial operational period of 2017–2020, the O&M fund requirement is projected at 0.66% (2020) to 0.75% (2017).

¹ ADB. 2014. *Financial Management, Cost Estimates, Financial Analysis, and Financial Performance Indicators. Operations Manual*. OM G2/BP. Manila; ADB. 2009. *Financial Due Diligence: A Methodology Note*. Manila; ADB. 2005. *Financial Management and Analysis of Projects*. Manila.

² A single entity is proposed to be engaged as an operator for wastewater services in the six townships, with village councils maintaining rural wastewater services through the establishment of wastewater unions. For urban and rural water supply, a single operator will be engaged to manage the systems served by the Yangdongxia water supply system; and a separate operator for managing those systems under the Chukou water supply system.

Table 1: Project Counterpart Funding, Operation and Maintenance, and Debt Service as Percentage of Revenue
(CNY million)

Item	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2030	2035	2040
ZCG Revenue	6,290	6,919	7,611	8,372	9,209	10,130	11,143	12,257	13,483	14,831	16,314	26,274	42,315	68,148
Counterpart Fund % of Total Revenue		111.93 1.62%	179.97 2.36%	127.62 1.52%	122.59 1.33%	51.83 0.51%								
O&M Cost % of Total Revenue			61.12 0.80%	62.95 0.75%	64.84 0.70%	66.79 0.66%	68.79 0.62%	70.85 0.58%	72.98 0.54%	75.17 0.51%	77.42 0.47%	89.76 0.34%	98.94 0.23%	120.65 0.18%
Debt Service % of Total Revenue							13.68 0.12%	15.08 0.12%	16.63 0.12%	18.33 0.12%	20.28 0.12%	32.92 0.13%	53.62 0.13%	87.34 0.13%
Total Required Fund % of Total Revenue		111.93 1.62%	241.09 3.17%	190.75 2.28%	187.43 2.04%	118.62 1.17%	82.47 0.74%	85.93 0.70%	89.61 0.66%	93.50 0.63%	97.70 0.60%	122.68 0.47%	152.56 0.36%	207.99 0.31%

O&M = operation and maintenance, ZCG = Zixing City Government.

Source: Asian Development Bank estimates.

B. Financial Analysis of the Cost Recovery-Focused Subcomponents

1. Water Supply Component

5. **Yangdongxia water supply.** The Yangdongxia water supply plant, with water treatment capacity of 20,000 cubic meters (m³)/day, will supply about 128,688 residents in five townships. Sustainability analysis was carried out to estimate the tariff structure that would meet cash requirements and be acceptable to the target beneficiaries. Stepped tariffs are proposed, with the initial rate set at CNY1.57/m³ based on the existing tariff. This will be followed by triennial increases of 15% in 2019 and in 2022. The proposed increase from CNY1.57/m³ to CNY1.81/m³ (2019) and CNY2.08/m³ (2022) is within the average of historical tariff adjustment and is still at the low end of the nearby cities and counties. The proposed Yangdongxia water supply subcomponent is financially viable, with a financial internal rate of return (FIRR) of 3.14% (Table 2), exceeding the weighted average cost of capital (WACC) of 2.45% (Table 3). The sensitivity analysis shows an FIRR higher than the WACC under all parameters except for decrease in revenue. The project is most sensitive to a reduction in revenue.

Table 2: Financial Internal Rate of Return and Sensitivity Analysis – Yangdongxia Water Supply

Particular	FIRR	FNPV (CNY million)
Base Case	3.14%	40.95
Sensitivity Scenarios		
Increase in investment by 10%	2.33%	12.33
Increase in O&M cost by 10%	2.93%	32.90
Decrease in revenue by 10%	2.02%	0.18
Implementation delay by 1 year	2.57%	21.26

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

Table 3: Weighted Average Cost of Capital

Particular		Total Cost	ADB Loan	Government Equity Contribution
Amount	CNY million	333.92	203.78	130.14
Weighting	% of Cost		61.00%	39.00%
Nominal cost			3.10%	8.00%
Tax			25.00%	
Tax-adjusted nominal cost			2.30%	8.00%
Inflation rate			1.40%	3.00%
Real cost		5.76%	0.91%	4.85%
Real WACC		2.45%	0.56%	1.89%

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

6. Affordability analysis was undertaken to check the level of household water expenditures against household incomes. Based on cost sustainability tariffs, the analysis reveals that monthly water bills are at most within 0.5% of the monthly earnings of average-income households; and within 0.2% of the monthly earnings of low-income households. All are within the acceptable norm of 4%–5% of income spent on water services.

7. **Chukou water supply.** The Chukou water supply plant, with water treatment capacity of 620 m³/day, will supply about 3,200 residents of Choukou Town. Sustainability analysis was conducted to estimate the tariff structure that would meet cash requirements and be acceptable to the target beneficiaries. The analysis shows that applying the existing tariff is sufficient to cover all projected cash requirements in constant prices. The resulting FIRR would be 5.24% (Table 4), higher than the WACC at 1.70% (Table 5). The sensitivity analysis shows that an FIRR higher than the WACC under all parameters.

Table 4: Financial Internal Rate of Return and Sensitivity Analysis – Chukou Water Supply

Particular	FIRR	FNPV (CNY million)
Base Case	5.24%	3.64
Sensitivity Scenarios		
Increase in investment by 10%	4.34%	3.06
Increase in O&M cost by 10%	3.90%	2.38
Decrease in revenue by 10%	2.82%	1.43
Implementation delay by 1 year	3.86%	2.69

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

Table 5: Weighted Average Cost of Capital

Particular		Total Cost	ADB Loan	Government Equity Contribution
Amount	CNY million	6.56	5.24	1.32
Weighting	% of Cost		80.00%	20.00%
Nominal cost			3.10%	8.00%
Tax			25.00%	---
Tax-adjusted nominal cost			2.30%	8.00%
Inflation rate			1.40%	3.00%
Real cost		5.76%	0.91%	4.85%
Real WACC		1.70%	0.73%	0.97%

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

8. Affordability analysis was undertaken to check the level of household water expenditures against household incomes. The analysis reveals that, based on sustainability tariffs, the monthly water bills are at most within 0.3% of monthly earnings of average-income households; and within 0.4% of monthly earnings of low-income households. All are within the acceptable norm of 4%–5% of income spent for water services.

2. Township Wastewater Treatment Component

9. The project will support the construction of six township wastewater treatment plants (WWTPs) with a total capacity of 2,000 m³/day, and associated sewage collection pipes of about 38.1 kilometers. This component is an integral part of the project to achieve the overall project outcome and impact. The wastewater treatment facilities are needed to protect public health and reduce environmental pollution of the Dongjiang Lake, which is an important water source for the Chenzhou Municipality and Zixing City; and a backup water source for Hunan

Province's major cities of Changsha, Xiangtan, and Zhuzhou in the Xiang River basin to improve the water security of 13 million people in these cities.

10. **Financial sustainability.** In the People's Republic of China, the collection system—consisting of pipelines, manholes, and pump stations—is considered a public good; and the capital and operating costs are paid by the local governments. Wastewater treatment is considered a commercial activity, and a tariff is charged to recover some of the costs. While the wastewater treatment component has a cost recovery objective, the low treatment capacity is a constraint on the financial viability of the investment. An initial financial evaluation determined that at the nationally specified rural wastewater tariff rate of CNY0.85/m³, full cost recovery of the capital investment and O&M costs is not possible given the small scale of the WWTPs.³

11. An analysis of the recurrent costs to operate and maintain the township WWTPs has therefore been carried out. The wastewater tariff will be incremental revenue to ZCG once the WWTPs start operating. The analysis shows that the tariff revenue generated from the component cannot fully fund the O&M cost, so it is not possible to achieve full cost recovery. ZCG will bear the cost for subsidizing the shortfalls for the O&M. Table 6 shows the wastewater tariff coverage of the recurrent costs under the base case scenario.

Table 6: Financial Sustainability for Township Wastewater Treatment

Base Case	Unit	Amount
Capacity	m ³ /day	2,000.00
Tariff	CNY/m ³	0.85
Annual Revenue	CNY ('000)	620.50
Annual O&M		
Labor		208.32
Electricity and Fuel		196.67
Chemicals		224.84
Repairs		123.04
Maintenance		24.61
Administration		138.35
Annual O&M	CNY ('000)	912.82
O&M Cost	CNY/m ³	1.25

m³ = cubic meter, O&M = operation and maintenance.

Source: Asian Development Bank estimates.

³ The current wastewater tariff is set at CNY0.80/m³ for residential customers. The National Development and Reform Commission specified that, by December 2016, the nationwide rural wastewater tariff is CNY0.85/m³ and the urban wastewater tariff is CNY0.95/m³.