

**Validation Report**  
March 2021

# People's Republic of China: Xinjiang Altay Urban Infrastructure and Environment Improvement Project

Reference Number: PVR-749  
Project Number: :43024-013  
Loan Number: 2759



*Raising development impact through evaluation*

## ABBREVIATIONS

ADB	– Asian Development Bank
CNY	– Chinese yuan
DMF	– design and monitoring framework
EIRR	– economic internal rate of return
FIRR	– financial internal rate of return
ha	– hectare
km	– kilometer
m <sup>2</sup>	– square meter
m <sup>3</sup>	– cubic meter
MW	– megawatt
O&M	– operation and maintenance
PCR	– project completion report
PMO	– project management office
RRP	– report and recommendation of the President
WACC	– weighted average cost of capital
WTP	– willingness to pay
WWTP	– wastewater treatment plant

## NOTE

In this report, “\$” refers to United States dollars.

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## PROJECT BASIC DATA

Project number	43024-013	PCR circulation date	10 Sep 2020	
Loan number	2759	PCR validation date	Mar 2021	
Project name	Xinjiang Altay Urban Infrastructure and Environment Improvement Project			
Sector and subsector	Transport	Urban roads and traffic management		
Strategic agenda	Environmentally sustainable growth			
Safeguard categories	Environment		A	
	Involuntary resettlement		A	
	Indigenous peoples		B	
Country	People's Republic of China		Approved (\$ million)	Actual (\$ million)
ADB financing (\$ million)	ADF: 0.00	Total project cost	168.52	142.36
	OCR: 100.00	Loan/Grant	100.00	96.91
		Borrower	68.52	45.45
		Beneficiaries	0.00	0.00
		Others	0.00	0.00
Cofinancier	-	Total cofinancing	0.00	0.00
Approval date	23 Jun 2011	Effectiveness date	1 Nov 2011	18 Nov 2011
Signing date	3 Aug 2011	Loan closing date	30 Jun 2018	30 Jun 2018
		Financial closing date		27 Mar 2019
Project officers	J. Huang X. Liu  F. Wang	Location ADB headquarters People's Republic of China Resident Mission People's Republic of China Resident Mission	From Nov 2011 Dec 2012  Apr 2014	To Dec 2012 Apr 2014  Mar 2019
IED review				
Director	N. Subramaniam, IESP			
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ADB = Asian Development Bank, ADF = Asian Development Fund, IED = Independent Evaluation Department, IESP = Sector and Project Division, OCR = ordinary capital resources, PCR = project completion report.

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## I. PROJECT DESCRIPTION

### A. Rationale

1. Altay Prefecture is the northernmost area in the Xinjiang Uygur Autonomous Region, one of the poorest and most remote regions of the People's Republic of China. Annual precipitation was only 180 millimeters and evaporation rates were high at 2,000 millimeters per year. Thus, water availability was a critical concern. Road surfaces were severely damaged by winter freezing and the road network was incomplete. Utilities were either nonexistent or old and fragile, resulting in frequent service failures and environmental pollution. Water supply capacity was restricted by poor infrastructure and water quality was compromised by high seasonal turbidity. Most counties lacked sewers and wastewater treatment capacity was marginal. Refuse collection and disposal were poorly managed and most landfills were unregulated. Decentralized heating was provided by inefficient coal-fired boilers that created pollution problems while hot water distribution had

limited coverage. Infrastructure facilities in Altay were inadequate to meet existing demand and hindered the expansion of local economies. Inadequate urban infrastructure also threatened human health, polluted the environment, and constrained improvements in living standards.

2. According to the report and recommendation of the President (RRP),<sup>1</sup> the project was to provide roads, water supply, wastewater and solid waste management, and centralized heating infrastructure to five county towns in Altay—Buerjin, Fuhai, Habahe, Jimunai, and Qinghe—and to the Takeshiken Land Port. It was to improve living conditions and the urban environment, support tourism to enhance inclusive growth, and increase the efficiency at land ports. Improving urban infrastructure was also expected to contribute to reducing long-term poverty and improving the quality of life, particularly on health for about 100,000 urban residents in the project counties.

## **B. Expected Impacts, Outcomes, and Outputs**

3. The project impact, as stated in the design and monitoring framework (DMF), was better living standards and conditions in the project counties. The expected outcome was integrated and more efficient municipal services in these counties. The project was to implement seven outputs comprising 26 components. Output 1 envisaged the construction and/or upgrading of 59.1 kilometer (km) of roads. Output 2 concerned the provision of water supply that included better-quality raw water abstraction, fully operational four new water supply plants with a total capacity of 16,890 cubic meters (m<sup>3</sup>) per day, and water pipes with a total length of 153.3 km. Output 3 envisaged a wastewater treatment and disposal in place—consisting of six new wastewater treatment plants (WWTPs) with a total capacity of 31,200 m<sup>3</sup>/day, and 78 km of collector and trunk sewers in operation. Output 4 involved setting up and operationalizing a solid waste management—comprising (i) five new landfills with a total capacity of 238 tons per day, (ii) 11 km of access roads, (iii) a 10-kilovolt power line, (iv) transfer stations, (v) multiple waste collection points, (vi) transport and auxiliary equipment, and (vii) environmental improvement of five existing landfills. Output 5 was to focus on a centralized heating supply that included two new or upgraded central-heating, coal-fired boiler stations, 15 heating exchange stations, and 17.8 km of heating pipes. Output 6 was an infrastructure constructed and operational in White Birch Forest Scenic Area. Output 7 was for capacity building on project management and implementation training undertaken for the Altay and county project management offices (PMOs).

## **C. Provision of Inputs**

4. The project was approved in June 2011 and became effective in November 2011—5 months after the specified date in the loan agreement. It was closed in June 2018 as planned and was financially closed 9 months later.

5. The project was estimated to cost \$168.5 million to be financed by a \$100 million loan from the Asian Development Bank's (ADB) ordinary capital resources (59% of the project cost). The government was to finance the remaining \$68.5 million. Loan proceeds were to be made available to the Xinjiang Uygur Autonomous Region and to the Altay Prefecture governments. At completion, the total project cost was \$142.4 million or 15.5% lower than estimated. ADB loan accounted for 68% of the total cost while the government funded the remaining 32%. At closing, \$3.1 million in savings was cancelled. The cost underrun was caused by scope changes and cost savings resulting from the competitive bidding process.

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<sup>1</sup> ADB. 2011. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the People's Republic of China for the Xinjiang Altay Urban Infrastructure and Environment Improvement Project*. Manila.

6. The project included funding for international and national consulting services to support the executing agency and implementing agencies and the capacity building activities of the operating units. According to the RRP, \$1.5 million was to be provided for 111 person-months of consulting services. A consulting firm was engaged in September 2012 to provide 111 person-months (11 international and 100 national) of consulting services. The project also engaged a procurement agency, several design institutes for preliminary and engineering designs, and construction supervision firms for the civil works contracts financed by the government.

7. At appraisal, the project was classified category A in ADB's environmental categorization. During construction, specific concerns included soil erosion, dust generation, and closure and decommissioning of replaced facilities. During operation, concerns included secondary pollution from the WWTP sludge, wastewater and landfill leachate, and the cumulative impacts on downstream water users. These concerns were included in the environmental management and environmental monitoring plans.

8. The project was classified category A for involuntary resettlement safeguard. It was to acquire about 51.5 hectares (ha), of which 40.8 ha were classified as grasslands. It was also to acquire 68.7 ha of state-owned land. A total of 16,144 square meters (m<sup>2</sup>) of residential housing and 2,773 m<sup>2</sup> of shops and enterprises were to be demolished. Permanent land acquisition and house demolition were to affect 205 households and 657 persons in the project counties. Of these, 54% were ethnic minorities. To mitigate land acquisition and resettlement impacts, resettlement plans were to be developed for each county. Compensation for lost assets and resettlement allowance were to be paid to affected persons before construction activities began and the livelihood rehabilitation arrangements were made in accordance with the resettlement plans.

9. The project was classified category B for the indigenous peoples as ethnic minorities were the majority population in the project area. A project ethnic minority development plan was prepared that focused on measures to ensure the inclusion of ethnic minority individuals in all project activities and to protect them from disadvantages that language barriers may create. The plan also included measures to ensure respect for customs and beliefs.

10. The project was categorized as effective gender mainstreaming. Gender was mainstreamed into the project design (such as road lighting, nonmotorized transport, and pedestrian access). A project gender action plan was prepared, which ensured women's consultation and participation in project activities and provided gender-sensitivity training to the county PMO and implementing agency staff. It also ensured that project decision-making bodies and participants in capacity-building activities were gender-balanced, and the plan included appropriate gender targets, indicators, and sex-disaggregated data.

#### **D. Implementation Arrangements**

11. The Xinjiang Uygur Autonomous Region government established a project lead group and a PMO in 2006, which were tasked to oversee and manage the project preparation and implementation. The Altay Prefecture government was to be the executing agency. The Altay project lead group was to be responsible for providing policy guidance for the project within the prefecture. The Altay Prefecture government, through the Altay PMO, was to (i) undertake project coordination and supervise the technical engineering design institutes, project implementation consultants, and external social and environmental monitors involved in the project; and (ii) manage the procurement process. Each project county's government was to be the implementing agency for the project components. Also, each implementing agency was to designate its county's urban construction bureau as the project implementation unit. According to the project completion

report (PCR),<sup>2</sup> these arrangements were adequate in delivering the project's outcome and outputs. The project was implemented in compliance with the arrangements set out at appraisal and remained unchanged throughout implementation.

12. Of the 58 covenants in the loan and project agreements, 56 were complied with. One covenant—on the use of stabilized sludge from the new WWTPs—was not yet complied with and one pertaining to tariffs was partly complied with. This partly complied with covenant required increases in infrastructure service tariffs and an annual review of these tariffs. However, only some counties increased their water tariffs. The Altay Prefecture government agreed to continue monitoring their progress. All covenants were relevant, unchanged, and remained in force during project implementation. With 58 covenants, the PCR suggested that these should have been consolidated to avoid duplication, and to simplify monitoring work.

## II. EVALUATION OF PERFORMANCE AND RATINGS

### A. Relevance of Design and Formulation

13. The PCR rated the project highly relevant. The project was aligned with provincial and national policies and plans for improving livelihoods. It promoted environmentally sustainable growth. The project complied with the government's development objective of environmentally friendly towns, as outlined in the Twelfth Five-Year Plan.<sup>3</sup> By emphasizing municipal service delivery in water,<sup>4</sup> solid waste management,<sup>5</sup> district centralized heating,<sup>6</sup> and capacity development, it supported the national strategy of increased urbanization while ensuring that the environment and ecology were protected, and resources were used efficiently. The project was aligned with ADB's country strategy at appraisal<sup>7</sup> and remained consistent with ADB's country

<sup>2</sup> ADB. 2020. *Completion Report: Xinjiang Altay Urban Infrastructure and Environment Improvement Project in the People's Republic of China*. Manila.

<sup>3</sup> Government of the People's Republic of China. 2011. *12th Five-Year Plan (2011–2015) for National Economic and Social Development*. Beijing.

<sup>4</sup> The project completion report (PCR) reported the completed facilities included six new WWTPs with a total capacity of 31,200 cubic meters (m<sup>3</sup>)/day and 60.3 km of operational wastewater pipelines. The Xinjiang Uygur Autonomous Region government mandated the enhancement of WWTP standard to Class I-B in 2015 (PCR, footnote 7), and further to Class I-A in 2018. Compared with the original targets, the total treatment capacity remained unchanged, but the length of the wastewater pipelines was reduced by 18 km as a result of the detailed design based on the local terrain. All WWTPs in the project counties satisfied the Class I-A standard and passed final acceptance by the Environment Bureau of the autonomous government, while the WWTP in the Takeshiken Land Port followed the Class I-B standard, which is the township standard.

<sup>5</sup> The completed facilities included five new sanitary landfills with a total capacity of 238 tons/day, supported by garbage collection and transfer facilities. These landfills, together with 222 garbage transfer stations and 61 specialized vehicles, were completed during 2013–2015 and are being used smoothly. The project fully achieved its target of providing 90% of the urban population with solid waste collection and treatment by 2017. The capacity was designed based on the counties' garbage generation projections up to 2025. On gender, the project had a significant impact on reducing women's work and time burdens as they were primarily responsible for household work, along with garbage disposal.

<sup>6</sup> The completed facilities included two new central-heating plants (1x46 megawatts (MW) and 2x58 MW), central-heating coal-fired boiler stations, 14 heating exchange stations, and 25.5 km of heating pipelines. Compared with the original design, the heating plant capacity was larger, the number of heating exchange stations was reduced by one, and heating pipelines were extended by 7.7 km. All heating components were completed and became operational during October 2015–September 2017. These facilities increased the centralized heating area from 520,000 m<sup>2</sup> to 750,000 m<sup>2</sup> in Habahe, from 270,000 m<sup>2</sup> to 610,000 m<sup>2</sup> in Jimunai, and from 420,000 m<sup>2</sup> to 750,000 m<sup>2</sup> in Qinghe by the end of 2017. At the county level, by 2019, the centralized heating supply area increased further to 1,230,000 m<sup>2</sup> in Habahe, 950,000 m<sup>2</sup> in Jimunai, and 1,330,000 m<sup>2</sup> in Qinghe.

<sup>7</sup> ADB. 2008. *Country Partnership Strategy: People's Republic of China, 2008–2010*. Manila.

partnership strategies at completion.<sup>8</sup> It was also aligned with the ADB Strategy 2020.<sup>9</sup> At completion, the project was aligned with the government's Thirteenth Five-Year Plan.

14. By reusing wastewater effluent to irrigate windbreak forest, the project demonstrated a way to address water scarcity in arid lands, thus conforming with ADB's Water Policy.<sup>10</sup> Stakeholder participation occurred at an early stage of design, and the project engaged not only concerned authorities such as water resource authorities and environmental protection bureaus, but also operation and maintenance (O&M) entities, residents, and community office staff.

15. The project design and modality were appropriate. However, there were three minor changes in scope. First was the cancellation of the components related to an originally planned economic development zone in Buerjin County and the White Birch Forest Scenic Area subcomponent in Habahe County. Second was upgrading of wastewater treatment standards and a change in method for ensuring proper operation during winter. Third was a minor adjustment to the road component and heating supply subproject in Jimunai County. The DMF's impact and outcome indicators were adequate and related to the urban development issues that Altay Prefecture faced. The minor changes in scope resulted in small changes in the DMF outputs.

16. This validation assesses the project relevant. Although the project objective was fully aligned with country development priorities and ADB country and corporate strategies, the project scope had to be changed. The PCR provided little evidence that the design was innovative and had transformative and significant demonstration value for other projects.

## **B. Effectiveness in Achieving Project Outcomes and Outputs**

17. The PCR rated the project effective in achieving the outcome and outputs. It achieved or exceeded the target for 18 of the 19 outcome indicators. Only the target of 30% utilization of sludge from the wastewater treatment plant has not yet been achieved. All 13 output indicators for the project were achieved. Three new water treatment plants with a total capacity of 16,800 m<sup>3</sup>/day were constructed, along with 129.6 kilometers (km) of water pipelines, slightly less than the target of 140.3 km. The project also achieved the target construction of six WWTPs with a total capacity of 31,200 m<sup>3</sup>/day, along with 60.3 km of wastewater pipelines, slightly less than the target of 63 km. Buerjin county and the town of Takeshiken were to stabilize wastewater treatment plant sludge for use as soil enhancers for windbreak forests. Buerjin wastewater treatment plant initiated the process pending the results of a sludge content examination. However, Takeshiken had not yet started. The project achieved the target of five new sanitary landfills with total capacity of 238 tons per day. Two new central-heating plants (1x46 megawatts (MW) and 2x58 MW) were constructed, along with coal-fired boilers and 14 heat exchangers and 25.5 km of heating pipelines. A total of 34 new and upgraded roads for 39.9 km were opened to traffic, slightly less than the target of 42.3 km.

18. The project also achieved the three output indicators for capacity building. A 6-year training plan for project management, O&M, financial management, and institutional development with gender targets was to be prepared. Sustainable O&M arrangements were to be developed and an organizational structure and financial management system was to be enhanced. The training plan was prepared and 14 comprehensive training sessions, three

<sup>8</sup> ADB. 2012. *Country Partnership Strategy: People's Republic of China, 2011–2015*. Manila; and ADB. 2016. *Country Partnership Strategy: People's Republic of China, 2016–2020*. Manila.

<sup>9</sup> ADB. 2008. *Strategy 2020: The Long-Term Strategic Framework of the Asian Development Bank, 2008–2020*. Manila.

<sup>10</sup> ADB. 2003. *Water for All: The Water Policy of the Asian Development Bank*. Manila.

domestic study tours, and two specific training sessions on O&M of solid waste facilities and WWTPs were conducted. A total of 91 people benefited from the training program. There were 38 community environment awareness promotion programs conducted for solid waste and water components, benefiting 2,922 people, 50% of which were women and girls. Also, 121 road safety training for communities and schools in the project areas were conducted, benefiting 22,132 people, 50% of which were women and girls.

19. The project included comprehensive safeguards and gender measures. Six annual environmental monitoring reports, five external resettlement monitoring reports, and seven external ethnic minority development plan monitoring reports were submitted on time and all were disclosed on the ADB website. Safeguard measures taken were effective and there were no unresolved issues. The PCR stated that the gender action plan addressed women's needs in the project areas by promoting health and hygiene awareness, employment opportunities, and project participation through training and capacity building. The project conducted two gender training sessions to promote gender awareness and support the implementation of the gender action plan. The gender action plan was successful with (i) 624 jobs filled by women during construction, comprising 31% of the total employment against a target of 20%–50%; and 350 jobs filled during project operation, comprising 45% of the total against a target of 20%–50%; (ii) 1,461 women and girls of the 2,922 urban residents participated in 38 community environment awareness promotion programs on solid waste and water components (50% of target); and (iii) 11,066 women and girls of the 22,132 participants in road safety training provided to communities and schools. The project completed all gender action plan activities and achieved all seven quantitative targets. This validation assesses the project effective in achieving the outcome and outputs.

### **C. Efficiency of Resource Use**

20. The PCR rated the project efficient. The economic rate of return (EIRR) was reevaluated for each component. At completion, the EIRRs ranged at 9.7%–14.7% for the water supply components, 9.2%–15.3% for the solid waste components, 9.5%–13.7% for the road components, 12.1%–26.6% for the heating components, and 1.3%–16.6% for the wastewater components. Of the 21 components, 13 registered an EIRR higher than 12%, six registered an EIRR between 9% and 12%, and two (Habahe and Tateshiken wastewater) registered an EIRR lower than 9%. The EIRR for the whole project was 12.4%, demonstrating the economic viability of the project. These results, however, were generally lower than the appraisal estimates. Changes in capital costs, O&M costs, delayed commissioning of some components, and inclusion of wastewater components in the calculation explained the difference. The sensitivity analysis indicated that a 10% O&M cost increase would result in an EIRR slightly lower than 9% for four components. A 10% benefit reduction would lower the EIRR below 9% for seven components, and a scenario involving both a 10% benefit reduction and 10% O&M cost increase would result in an EIRR below 9% for nine components. The project was completed on time and, therefore, the preparatory and implementation processes were assessed efficient.

21. In this validation's view, the methodology for calculating the EIRRs was appropriate. However, there were a few shortcomings in the identification and valuation of economic benefits. On water supply, the assumption that the project induced incremental water consumption of 30% is arbitrary and ad hoc. The analysis should have started by estimating how much water in the county is consumed by households and by non-household consumers, such as the industries and others, and applied that ratio to the project output. It then should have estimated total household water usage (piped water and other sources, such as bottled water, etc.). The quantity and value of water from other sources that the project displaced is the resource cost savings. The difference

between the project output of water and the water from other sources displaced is the incremental output of water. The same approach should have been taken for non-household water consumption. Incremental water consumption should have been valued in terms of willingness to pay (WTP). In the case of non-household water consumption, it may also be valued in terms of the marginal value of foregone output.

22. Similar to water supply output, an estimate on heating should have started on how much space heating is consumed in the county by households and by non-household consumers, such as industries and others, and applied that ratio to the project output. Since data on consumption of space heating with coal and others—by consumers that are not connected to the central heating system—is available, this is one price–quantity point on the space heating demand curve. Another point is the price–quantity paid by those connected to the central heating system. These two points are bases for calculating WTP for space heating, which should have been used instead of the space heating tariff that grossly underestimated the incremental benefit.

23. On wastewater, the quantification and valuation of wastewater treatment and disposal seem arbitrary and ad hoc. There are three beneficiaries of sewerage services: households, non-household consumers, and the environment. The benefit to the environment should be in terms of resource cost savings since the recycled wastewater displaces other water used for irrigating windbreak, sand stabilizing forests, and ecological shelterbelts. The output of the wastewater project is likely incremental; therefore, it should have been valued in terms of WTP.

24. In this validation's view, the economic benefits of the project were undervalued and the EIRRs are lower than what they should have been if all economic benefits were quantified and valued. Therefore, this validation assesses the project efficient.

#### **D. Preliminary Assessment of Sustainability**

25. The PCR rated the project likely sustainable. The financial internal rate of return (FIRR) was reevaluated for all revenue-generating components. The FIRR results for the 16 evaluated components ranged from 2.7% to 21.5%. Other than the Tateshiken water supply and wastewater components, all were financially viable with FIRRs higher than their respective weighted average cost of capital (WACC). The FIRR for the total project at completion was 4.9%, which is above the updated WACC of 2.9%, and slightly lower than appraisal estimates of 5.2%. Therefore, the project is financially viable. The sensitivity analysis confirmed the financial viability of most components and the overall project.

26. Since infrastructure tariffs were less than the full cost recovery, county governments were responsible for the debt servicing and compensating for revenue shortfalls. Annual O&M and debt servicing costs were 0.4%–0.9% of the county governments' annual revenues. Thus, the PCR indicated sufficient budgetary resources for the recurrent costs of the project. Assuming that the full cost recovery tariff will be achieved during 2022–2025, the combined tariffs for water, wastewater, and solid waste services will account for 0.6%–1.8% of average household incomes across counties, and 0.8%–2.9% for low-income households, which was deemed acceptable in terms of affordability. The project's technical design, capacity building, and gender and safeguards measures ensured that the project is financially, operationally, and environmentally sustainable. Therefore, this validation assesses the project likely sustainable.

### III. OTHER PERFORMANCE ASSESSMENTS

#### A. Preliminary Assessment of Development Impact

27. The PCR rated the project highly satisfactory for its development impact. The DMF defined three impact indicators with a target year of 2020. The per capita annual disposable income of urban households was to increase from Chinese yuan (CNY)13,000 to CNY36,000. By 2018, it had increased to CNY30,005 in Buerjin, CNY28,496 in Fuhai, CNY27,995 in Habahe, CNY27,005 in Jimunai, and CNY31,508 in Qinghe. Thus, it is likely to reach the target level by 2020. Incidences of waterborne and insect- and vermin-transmitted diseases were to decrease from 2.5% to 1.5% in Buerjin, from 9.1% to 3.2% in Fuhai, from 2.5% to 1% in Habahe, from 2.3% to 1.6% in Jimunai, and from 3% to 1% in Qinghe. The targets were exceeded—with incidences decreasing from 2.5% to 0.5% in Buerjin, from 9.1% to 2.7% in Fuhai, from 2.5% to 0.3% in Habahe, from 2.3% to 1.6% in Jimunai, and from 3% to 0.3% in Qinghe. Employment opportunities were to increase with targets for women at 20%–50%, and for ethnic minorities at 40%–55% in the gender action and ethnic minority development plans. These targets were achieved as employment opportunities for women increased to 31% during implementation and 45% during operation, and for ethnic minorities at 43% during implementation and 55% during operation. The project also contributed to reducing greenhouse gas emissions by 393,599 tons of carbon dioxide equivalent per year, which can be reflected in ADB results framework.

28. Some 111,500 residents in around 20,000 households (about 90% of urban households), including 74,735 ethnic minority people, benefited from the project. The project contributed to the economic and social development of the project area through employment creation, business opportunities, tourism development, and an improved investment environment. The construction of the first landfills and WWTPs significantly improved community environmental health. Wastewater treatment also helped avoid the discharge of polluting effluents into rivers and provided reclaimed water for irrigating windbreak forest in arid lands, thereby addressing water scarcity.

29. The project achieved its ethnic minority development plan targets. It benefited 74,735 people from ethnic minorities. In total, the project provided local ethnic minority people with 852 jobs (43% of the total number) during construction and 432 permanent jobs (55% of the total number) during operation. A total of 32,433 ethnic minority people benefited from the public health and hygiene, road safety, and environment awareness programs provided by government institutions. The project addressed employment and training needs of ethnic minorities in the five counties where 4,069 of them benefited from on-the-job training and skills development and livelihood-enhancement opportunities. This validation assesses the project highly satisfactory in terms of its development impact.

#### B. Performance of the Borrower and Executing Agency

30. The PCR rated the performance of the borrower and executing agency highly satisfactory. The Ministry of Finance was the borrower, and the government of Altay Prefecture was the executing agency. The PCR stated that the local governments, including construction bureaus and O&M units, demonstrated strong ownership of the project at the design phase and remained strongly engaged until project completion. The Xinjiang PMO helped ensure the quality of project preparation and implementation, drawing from its previous experiences in a series of ADB-financed projects. Despite the challenges of the complex, multi-sectoral project components, the executing agency and implementing agencies successfully completed the project on schedule, within budget, and complied with most covenants. They became familiar

with ADB procedures and regulations in project management, disbursements, financial management, and safeguards, and the staff at the county levels were able to apply their acquired project experience in other domestic projects. This validation assesses the borrower and executing agency performance highly satisfactory.

### **C. Performance of the Asian Development Bank**

31. The PCR rated ADB's performance satisfactory. During project implementation, ADB fielded eight review missions, including an inception mission, a midterm review mission, and a project completion review mission. The review missions and regular office supervision provided timely guidance and suggestions to the government of Altay Prefecture, the PMO, implementing agencies, and consultants under the loan, which improved project implementation. ADB was responsive to government requests on scope changes, contract variations, and loan reallocations; and these were promptly addressed, thus, ensuring timely project completion and loan closing. Administered by the resident mission, the safeguards team was actively involved in addressing various due diligence requirements that ensured compliance. ADB staff also provided the executing agency and implementing agencies trainings on procurement, financial management, and disbursement. The project's good results strengthened ADB's collaborative relationship with the executing agency and the Xinjiang PMO, benefiting other ADB-financed projects in Xinjiang. This validation assesses ADB performance satisfactory.

## **IV. OVERALL ASSESSMENT, LESSONS, AND RECOMMENDATIONS**

### **A. Overall Assessment and Ratings**

32. The PCR rated the project successful since it was highly relevant, effective, efficient, and likely sustainable. This validation assesses the project relevant as it was aligned with the provincial and national policies and plans, and with ADB strategies for the country. However, it found little evidence that the project design was innovative or had significant demonstration value, or that it was transformative. Thus, the relevance rating is lowered to relevant. The project is assessed effective as it achieved most of the project targets, and it is efficient since the EIRR was higher than the threshold level of 12%. It is assessed likely sustainable since the FIRR was higher than the WACC and local government budgets are sufficient to finance any revenue shortfalls of the operating entities. This validation assesses the project successful.

#### **Overall Ratings**

<b>Validation Criteria</b>	<b>PCR</b>	<b>IED Review</b>	<b>Reason for Disagreement and/or Comments</b>
Relevance	Highly relevant	Relevant	Project scope was changed. The project's innovative features, demonstration value, or transformative effects were not shown.
Effectiveness	Effective	Effective	
Efficiency	Efficient	Efficient	
Sustainability	Likely sustainable	Likely sustainable	
<b>Overall Assessment</b>	<b>Successful</b>	<b>Successful</b>	
Preliminary assessment of impact	Highly satisfactory	Highly satisfactory	
Borrower and executing agency performance	Highly satisfactory	Highly Satisfactory	

Validation Criteria	PCR	IED Review	Reason for Disagreement and/or Comments
Performance of ADB	Satisfactory	Satisfactory	
Quality of PCR		Satisfactory	Para. 38.

ADB = Asian Development Bank, IED = Independent Evaluation Department, PCR = project completion report.  
Source: ADB (Independent Evaluation Department).

## B. Lessons

33. The PCR identified two lessons. First, the project's integrated approach increased its complexity, as reflected by the number of performance indicators, contracts, monitoring reports, and loan covenants. The PCR noted that there was room for consolidation and simplification. Also, given the many common targets in the social action plans, these plans could have been better coordinated. Second, reusing treated effluent from WWTPs to irrigate windbreak and sand-stabilizing forests demonstrated significant ecological benefits, which may be suitable for other regions with similar climate conditions.

34. This validation offers two additional **project-level** lessons. First, a rigorous appraisal establishes the technical soundness of a project's economic viability and its rationale. For a multi-sector project designed for remote regions, it is important to undertake a systematic project-level economic analysis to appropriately capture and value the diverse benefits from such a type of project. Such a critical assessment helps refine the methodology, assumptions, parameters, and numeraires of a project-level economic analysis.

35. Second, a systematic and careful problem diagnosis at the project level strengthens the choice of appropriate operational option (i.e., an investment or a policy, or a combination of both) in meeting the development constraint. During a midterm review when project restructuring is required due to changes in scope, this permits necessary adjustments to project components while helping to ensure that a project remains relevant and its expected outcomes achievable.

## C. Recommendations for Follow-Up

36. The PCR had two recommendations. The first is for the government of Altay Prefecture to closely monitor the progress of the sludge utilization in the Buerjin WWTP and to provide technical and financial support, if needed. The second is for the government of Altay Prefecture and the county governments to gradually implement tariff increases for cost recovery purposes. This validation has no other recommendations to offer.

# V. OTHER CONSIDERATIONS AND FOLLOW-UP

## A. Monitoring and Reporting

37. The Altay PMO submitted semiannual progress reports and the executing agency's PCR, although with some delays. Project safeguard reports were submitted in a timely manner (para. 19). Impacts on women were reported in the semiannual progress reports, and the executing agency's completion report and other reports required by ADB. All of these provided adequate and timely information for the DMF. The government of Xinjiang Uygur Autonomous Region's audit office did the annual audit of project financial statements from 2011 to 2020. All audit reports gave an unqualified opinion with a separate audit opinion on the use of the loan proceeds. The final audit report, covering the period of implementation through the loan closing

date, confirmed that there were no unresolved issues related to the ADB loan. The timeliness and quality of the audited project financial statements were satisfactory.

**B. Comments on Project Completion Report Quality**

38. The PCR was succinct and assessed all the evaluation criteria. However, the identification, quantification, and valuation of economic benefits should have been more thoroughly prepared. This validation assesses the quality of the PCR satisfactory.

**C. Data Sources for Validation**

39. The data sources were the RRP, back-to-office reports, Independent Evaluation Department's project safeguard assessment, and ADB's country partnership strategies.

**D. Recommendation for Independent Evaluation Department Follow-Up**

40. The PCR recommended that the project performance evaluation be conducted after 2023 when the ecological benefits from the WWTPs will be fully realized. However, the PCR evaluated the project sufficiently, and the PCR and this validation already identified the lessons and recommendations. This validation recommends that a project performance evaluation is not necessary.