



# Completion Report

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Project Number: 40641-013  
Loan Number: 2574  
Grant Number: 0171  
June 2018

## People's Republic of China: Hebei Small Cities and Towns Development Demonstration Sector Project

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Asian Development Bank



## CURRENCY EQUIVALENTS

Currency unit – yuan (CNY)

		<b>At Appraisal</b> (9 September 2009)	<b>At Project Completion</b> (19 December 2016)
CNY1.00	=	\$0.1464	\$0.1435
\$1.00	=	CNY6.8318	CNY6.9701

## ABBREVIATIONS

ADB	–	Asian Development Bank
EIA	–	environmental impact assessment
EIRR	–	economic internal rate of return
EMP	–	environmental management plan
FIRR	–	financial internal rate of return
HPG	–	Hebei Provincial Government
HPPMO	–	Hebei Provincial Project Management Office
LAR	–	land acquisition and resettlement
O&M	–	operation and maintenance
PMO	–	project management office
PRC	–	People's Republic of China
TA	–	technical assistance
WACC	–	weighted average cost of capital
WFPF	–	Water Financing Partnership Facility
WWTP	–	wastewater treatment plant

## WEIGHTS AND MEASURES

km	–	kilometer
m	–	meter
m <sup>2</sup>	–	square meter
m <sup>3</sup>	–	cubic meter
m <sup>3</sup> /d	–	cubic meters per day
mu	–	a <i>mu</i> is a Chinese unit of measurement (1 mu = 666.67 m <sup>2</sup> )
MW	–	megawatt
t/d	–	tons per day

## NOTE

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

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## BASIC DATA

### A. Loan and Grant Identification

1.	Country	People's Republic of China
2.	Loan number and financing source	Loan 2574–Ordinary Capital Resources and Grant 0171–Water Financing Partnership Facility
3.	Project title	Hebei Small Cities and Towns Development Demonstration Sector Project
4.	Borrower/Recipient	People's Republic of China
5.	Executing agency	Hebei Provincial Government through the Provincial Project Coordination Group
6.	Amount of loan	\$100 million and Grant \$0.25 million
7.	Project completion report number	1677
8.	Financing modality	Sector loan and grant

### B. Loan and Grant Data

1.	Appraisal	
	– Date started	8 October 2008
	– Date completed	23 October 2008
2.	Loan negotiations	
	– Date started	8 September 2009
	– Date completed	10 September 2009
3.	Date of Board approval and grant approval	6 November 2009
4.	Date of loan agreement	17 December 2009
	Date of grant agreement	27 April 2010
5.	Date of loan effectiveness	
	– In loan agreement	17 March 2010
	– Actual	17 March 2010
	– Number of extensions	0
	Date of grant effectiveness	10 May 2010
6.	Project completion date	
	– Appraisal	31 December 2015
	– Actual	29 June 2016
7.	Loan closing date	
	– In loan agreement	30 June 2016
	– Actual	30 June 2016
	– Number of extensions	0
	Grant closing date	
	– In grant agreement	12 June 2012
	– Actual	30 June 2013
	– Number of extensions	1
8.	Financial closing date	
	– Actual (loan)	19 December 2016
	– Actual (grant)	31 October 2013
9.	Terms of loan	
	– Interest rate	London interbank offered rate-based
	– Maturity (number of years)	26
	– Grace period (number of years)	6

## 10. Disbursements

## a. Dates

## Loan

<b>Initial Disbursement</b> 9 August 2010	<b>Final Disbursement</b> 9 August 2016	<b>Time Interval</b> 76 months
<b>Effective Date</b> 17 March 2010	<b>Actual Closing Date</b> 30 June 2016	<b>Time Interval</b> 75 months

## Grant

<b>Initial Disbursement</b> 17 October 2012	<b>Final Disbursement</b> 15 October 2013	<b>Time Interval</b> 12 months
<b>Effective Date</b> 10 May 2010	<b>Actual Closing Date</b> 30 June 2013	<b>Time Interval</b> 38 months

## b. Amount (\$)

Category		Original Allocation (1)	Increased during Implementation (2)	Cancelled during Implementation (3)	Last Revised Allocation (4=1+2-3)	Amount Disbursed (5)	Undisbursed Balance (6 = 4-5)
<b>01– Civil works</b>	01A–Bazhou subproject	5,280,000	(5,280,000)	0	0	0	0
	01B–Zhaoxian subproject	2,390,000	(970,000)	0	1,420,000	1,307,330	112,670
	01C–Zhengding subproject	1,060,000	(1,060,000)	0	0	0	0
	01D–Subsequent subprojects	16,770,000	(1,160,000)	0	15,610,000	14,939,449	670,551
	<b>Subtotal (A)</b>	<b>25,500,000</b>	<b>(8,470,000)</b>	<b>0</b>	<b>17,030,000</b>	<b>16,246,779</b>	<b>783,221</b>
<b>02– Goods</b>	02A–Bazhou subproject	5,550,000	(5,550,000)	0	0	0	0
	02B–Zhaoxian subproject	10,710,000	3,820,000	0	14,530,000	13,716,966	813,034
	02C–Zhengding subproject	4,090,000	1,950,000	0	6,040,000	5,931,232	108,768
	02D–Subsequent subprojects	47,450,000	11,800,000	0	59,250,000	58,290,596	959,404
	<b>Subtotal (B)</b>	<b>67,800,000</b>	<b>12,020,000</b>	<b>0</b>	<b>79,820,000</b>	<b>77,938,794</b>	<b>1,881,206</b>
<b>03–Institutional strengthening and training (C)</b>		<b>2,500,000</b>	<b>(1,260,000)</b>	<b>0</b>	<b>1,240,000</b>	<b>1,202,249</b>	<b>37,751</b>
<b>04–Interest and commitment charge (D)</b>		<b>4,200,000</b>	<b>(2,290,000)</b>	<b>0</b>	<b>1,910,000</b>	<b>1,871,167</b>	<b>38,833</b>
<b>Grant (E)</b>		<b>250,000</b>	<b>0</b>	<b>0</b>	<b>250,000</b>	<b>250,000</b>	<b>0</b>
<b>Total = (A+B+C+D+E)</b>		<b>100,250,000</b>	<b>0</b>	<b>0</b>	<b>100,250,000</b>	<b>97,508,989</b>	<b>2,741,011</b>

( ) = negative.

## C. Project Data

## 1. Project cost (\$ million)

Cost	Appraisal Estimate	Actual
Foreign exchange cost	100.3	97.5
Local currency cost	135.6	83.1
<b>Total</b>	<b>235.9</b>	<b>180.6</b>



## 2. Financing plan (\$ million)

Cost	Appraisal Estimate	Actual
Implementation cost		
Borrower financed	135.6	83.1
ADB financed	95.8	95.3
Other external financing	0.3	0.3
<b>Total implementation cost</b>	<b>231.7</b>	<b>178.7</b>
Interest during construction cost		
Borrower financed	0.0	0.0
ADB financed	4.2	1.9
Other external financing	0.0	0.0
<b>Total interest during construction cost</b>	<b>4.2</b>	<b>1.9</b>

ADB = Asian Development Bank.

## 3. Cost breakdown by project subproject (\$ million)

Subproject	Appraisal Estimate	Actual
<b>A. Base Cost</b>		
1. Bazhou subproject	23.8	0.0
2. Zhaoxian subproject	30.3	37.4
3. Zhengding subproject	12.9	7.6
4. Subsequent subprojects	127.5	132.2
Huanggezhuang subproject	...	11.5
Huai'an subproject	...	16.6
Zhuolu subproject	...	14.8
Zhangbei subproject	...	12.3
Pingquan subproject	...	18.0
Weichang subproject	...	13.7
Longhua subproject	...	12.2
Baigou subproject	...	15.8
Botou subproject	...	17.3
5. Institutional strengthening	2.8	1.5
<b>Subtotal (A)</b>	<b>197.3</b>	<b>178.7</b>
<b>B. Contingencies (B)</b>	<b>34.4</b>	<b>0.0</b>
<b>C. Financing charges during implementation (C)</b>	<b>4.2</b>	<b>1.9</b>
<b>Total (A+B+C)</b>	<b>235.9</b>	<b>180.6</b>

Note: Numbers may not sum precisely because of rounding.

... = not available at loan appraisal.

## 4. Project schedule

Item	Appraisal Estimate	Actual
Date of contract with consultants		
Project implementation consulting	March 2009	May 2010
Capacity development and training consulting	September 2009	June 2010
Civil works contract		
Zhaoxian subproject		
Commencement	January 2011	January 2011
Completion of works	December 2014	June 2016
Zhengding subproject		
Commencement	August 2013	April 2015
Completion of works	February 2014	March 2016
Huanggezhuang subproject		
Commencement	September 2011	September 2011
Completion of works	May 2012	September 2013
Huai'an subproject		
Commencement	August 2010	August 2010
Completion of works	June 2011	May 2011
Zhuolu subproject		
Commencement	January 2011	April 2011
Completion of works	November 2011	October 2014

Item	Appraisal Estimate	Actual
Zhangbei subproject		
Commencement	November 2012	March 2014
Completion of works	February 2013	January 2015
Pingquan subproject		
Commencement	February 2012	February 2012
Completion of works	October 2013	June 2016
Weichang subproject		
Commencement	October 2010	October 2010
Completion of works	March 2011	November 2012
Longhua subproject		
Commencement	April 2013	January 2014
Completion of works	October 2013	June 2016
Baigou subproject		
Commencement	February 2013	August 2013
Completion of works	August 2013	April 2014
Botou subproject		
Commencement	November 2010	January 2011
Completion of works	November 2013	June 2016
Equipment and supplies		
Date of procurement		
First procurement	January 2010	May 2010
Last procurement	December 2011	September 2015
Start of operations		
First completion of tests and commissioning	October 2010	June 2011
Last completion of tests and commissioning	June 2016	October 2016

Source: Hebei Provincial Project Management Office.

## 5. Project performance report ratings

Implementation Period	Ratings	
	Development Objectives	Implementation Progress
From 17 March 2010 to 31 December 2010	Satisfactory	Satisfactory
From 1 January 2011 to 30 June 2016		On track

## D. Data on Asian Development Bank Missions

Name of Mission	Date	No. of Persons	No. of Person-Days	Specialization of Members
Fact-finding	8–23 October 2008	8	88	a, b, c, d, e, f
Inception	9–17 March 2010	5	45	a, f, g, j, k
Loan review 1 <sup>a</sup>	8–14 December 2010	4	28	f, g, l, m
Loan review 2	4–14 July 2011	4	44	f, g, l, m
Midterm review	20–31 August 2012	8	96	f, g, h, l, m, n, o, p
Loan review 3	23–29 September 2013	4	28	f, h, l, m
Loan review 4	22–28 August 2014	3	21	f, l, m
Loan review 5	26–30 October 2015	1	5	f
Project completion review	31 July–4 August 2017	4	17	f, g, l, m

a = senior urban development specialist, b = principal counsel, c = two consultants engaged under project preparatory technical assistance, d = senior social development specialist, e = two consultants engaged as Asian Development Bank staff consultant, f = senior project officer, g = associate project analyst, h = procurement officer, i = senior environment specialist, j = urban development specialist, k = budget and management service specialist, l = senior safeguards officer, m = environment officer, n = senior financial control officer, o = senior financial management officer, p = operations assistant.

<sup>a</sup> Project administration was transferred to the Asian Development Bank Resident Mission in the People's Republic of China.

Source: Asian Development Bank.

# HEBEI SMALL CITIES AND TOWNS DEVELOPMENT DEMONSTRATION SECTOR PROJECT IN THE PEOPLE'S REPUBLIC OF CHINA



0 20 40 60 80  
Kilometers



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## I. PROJECT DESCRIPTION

1. Hebei Province in the northern People's Republic of China (PRC) covers 187,700 square kilometers (km) and had a population of 75.2 million in 2017, up slightly from 69.4 million in 2006. Hebei urbanized rapidly from 2006 to 2017 and the urban population expanded from 38% of the total in 2006 to 55% in 2017. The pace of this urbanization has not matched growth in urban infrastructure and associated services, creating challenges such as severe pollution, poor services in public utilities, growing poverty, and rural migrants with limited employment. Hebei's economy is dynamic and diverse, spanning heavy industry, light industry, and resource extraction. These were heavy polluters to Hebei and neighboring Beijing and Tianjin. Hebei has undeveloped urban–rural linkages; underinvestment; weak urban management; and significant deterioration in the natural environment, including the depletion of water resources. The project is a direct response to Hebei's Eleventh Five Year Plan,<sup>1</sup> which called for developing a more balanced urban system through the growth of medium-sized cities that can serve as economic centers for surrounding towns.

2. This was the first water supply and other municipal infrastructure and services multisector loan project funded by the Asian Development Bank (ADB) to support small cities and towns in Hebei Province. The project was processed as a sector loan to allow Hebei Provincial Government (HPG) to respond to the rapidly changing needs of the province's cities and towns. The project impact is an improved urban environment and improved public health and quality of life for residents of small cities and towns in Hebei Province. The project outcome is improved urban infrastructure and municipal services in 10 small cities and towns in Hebei Province. The project outputs include (i) the development of infrastructure projects in 10 project cities and counties, including core subprojects in Bazhou City, Zhaoxian County, and Zhengding County, and subsequent subprojects in other seven cities and counties; and (ii) institutional development and capacity building.

## II. DESIGN AND IMPLEMENTATION

3. The project was fully completed by June 2016. Out of 19 subprojects in 10 cities and counties, as envisaged at appraisal, 15 subprojects followed the original project design and four subprojects were replaced with three new subprojects. The impact and outcome of the project were unchanged. The completed outputs included 18 subprojects in 11 cities and counties. The project performance was *highly satisfactory* and *on track* during implementation.

### A. Project Design and Formulation

4. The project design was *highly relevant* and was fully aligned with the PRC's development strategy at appraisal and completion. At the time of appraisal, the project was consistent with ADB's water policy and was designed to help the PRC achieve Millennium Development Goal 7, target 7.C, which established the 2015 target of halving the proportion of people without sustainable access to safe drinking water and improved sanitation.<sup>2</sup> The project was consistent with ADB's strategic objectives in the PRC to make markets work more efficiently through infrastructure development and to promote environmental sustainability. By supporting sustainable development through integrating urban and rural areas, the project

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<sup>1</sup> Hebei Provincial Government (HPG). 2006. *Hebei Province National Economic and Social Development Eleventh Five-Year Plan*. Shijiazhuang.

<sup>2</sup> ADB. 2001. *Water for All: The Water Policy of the Asian Development Bank*. Manila; and ADB. 2006. *Water Financing Program, 2006–2010*. Manila.

supported ADB's country partnership strategy for the PRC, 2008–2010 by promoting efficient infrastructure, strengthening environmental management, and supporting inclusive growth and balanced development to help the PRC build a moderately well-off society.<sup>3</sup>

5. The PRC's Eleventh Five-Year Plan identified small city and town development as a means to provide a higher standard of living to rural migrants through improved basic urban infrastructure services.<sup>4</sup> Building on the conclusions of the 2004 ADB-financed Town-Based Urbanization Strategy Study in the PRC,<sup>5</sup> the national town development policy called for strengthening physical and economic linkages between major cities in metropolitan areas or development corridors and the smaller settlements on their periphery. The project design responds to the call in Hebei's 11th plan to promote sustainable economic development through physical investments in priority small cities and towns with an urgent need for infrastructure improvement and environmental management. The project was formulated to highlight promoting the development of small cities and towns to support economically, socially, and environmentally sustainable urbanization. The project design considered and incorporated comments and ideas from various levels of government, beneficiaries, and affected people, including vulnerable groups, through stakeholder meetings, focus group discussions, informant interviews, and household surveys. This ensured local participation and involvement in subproject identification and implementation and the operation and maintenance (O&M) of improved infrastructure. The project design adopted key lessons from the experience of ADB and HPG in urban development in the PRC.

6. At completion, the project remains consistent with Hebei's Thirteenth Five-Year Plan, which reinforces innovations and coordinated approaches to overall socioeconomic development.<sup>6</sup> The project is also aligned with the PRC's country partnership strategy, 2016–2020, which emphasizes translating innovative ideas into projects and programs for implementation, and supporting transformative and demonstration projects and programs that can be replicated and scaled up.<sup>7</sup> The sector lending modality was appropriate because of the varying degree of preparedness of the subprojects, and the flexibility of the modality allowed changes in some subprojects during implementation. HPG met the conditions and developed subproject selection and appraisal criteria to ensure the project was set to achieve the objectives of sector policies.

7. The project design prepared under the project preparatory TA was adequate.<sup>8</sup> The design incorporated key lessons from previous ADB urban development projects in the PRC. The TA (i) helped the provincial government review and identify selection parameters for the prioritization and listing of cities and towns under the subprojects, (ii) assessed the scope of the most appropriate components to fulfill sector strategy goals, and (iii) prepared a sector-based small cities and towns development and environmental improvement project.

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<sup>3</sup> ADB. 2008. *Country Partnership Strategy: People's Republic of China, 2008–2010*. Manila.

<sup>4</sup> Government of the PRC, State Council. 2006. *National Economic and Social Development Eleventh Five-Year Plan*. Beijing.

<sup>5</sup> ADB. 2004. *Technical Assistance to the People's Republic of China for the Town-Based Urbanization Strategy Study*. Manila.

<sup>6</sup> HPG. 2015. *Hebei Province National Economic and Social Development Thirteenth Five-Year Plan*. Shijiazhuang.

<sup>7</sup> ADB. 2016. *Country Partnership Strategy: People's Republic of China, 2016–2020—Transforming Partnership: People's Republic of China and Asian Development Bank*. Manila.

<sup>8</sup> ADB. 2007. *Technical Assistance to the People's Republic of China for Preparing the Small Cities and Towns Development Demonstration Sector Projects*. Manila; and ADB *Small Cities and Towns Development Demonstration Sector Projects*. <https://www.adb.org/projects/40641-012/main>.

## B. Project Outputs

8. The project outputs comprised 18 urban infrastructure subprojects in 11 cities and counties and an institutional development and capacity building component.

9. **Zhaoxian wastewater treatment phase II subproject.** This subproject at appraisal included construction of the phase II wastewater treatment plant (WWTP) with capacity of 50,000 cubic meters per day (m<sup>3</sup>/d) including primary and secondary (biological) treatment works. The wastewater treatment rate was to increase from 75% to 100%. The population with access to centralized wastewater treatment services was to increase from 117,000 to 130,000; and the service area was to rise from 15.9 million square meters (m<sup>2</sup>) to 22.3 million m<sup>2</sup>. The outputs completed were almost as envisaged at appraisal, but the service area covered increased to 23.1 million m<sup>2</sup>.

10. **Huanggezhuang wastewater treatment plant subproject.** This subproject at appraisal included construction of a WWTP with capacity of 20,000 m<sup>3</sup>/d and a 13.18 km wastewater network. The wastewater treatment rate was to increase from 30% to 80%. The population with access to municipal wastewater service was to increase from 4,300 to 20,000. The outputs completed were the same as at appraisal.

11. **Zhuolu wastewater treatment plant phase II subproject.** This subproject at appraisal included construction of a WWTP with capacity of 20,000 m<sup>3</sup>/d and a 21.66 km wastewater pipe network and 26.22 km rainwater pipe network. The wastewater treatment rate was to increase from 42% to 90%. The population with access to municipal wastewater service was to increase from 60,000 to 124,000. Outputs completed were the same as at appraisal, but the wastewater treatment rate of 95% exceeded the target of 90%.

12. **Longhua Miaoshan wastewater treatment plant subproject.** This subproject at appraisal included construction of a WWTP with capacity of 20,000 m<sup>3</sup>/d and a wastewater pipe network of 18.68 km. The wastewater treatment rate was to increase from 60% in 2010 to 85% in 2015. The population with access to municipal wastewater service was to increase from 50,000 to 112,000. The outputs completed were the same as at appraisal.

13. **Huai'an water supply and drainage subproject.** This subproject at appraisal included construction of a 12.98 km water supply network and a 28.03 km wastewater network. The population with access to water supply service was to increase from 45,000 to 110,000 and service area was to increase from 12 million m<sup>2</sup> to 15 million m<sup>2</sup>. The outputs completed were almost the same as at appraisal, but the population with access to water supply service was increased to 160,000.

14. **Zhuolu water supply subproject.** This subproject at appraisal included construction of eight wells, one water supply plant with capacity of 20,000 tons per day (t/d), and a 20.47 km urban water supply network; and rehabilitated a 15.83 km water distribution network. The centralized water supply rate was to increase from 0% to 80%. The population with access to water supply service was to increase from 28,000 to 70,000. The outputs completed were almost the same as appraisal, but the population with access to water supply service was increased to 80,000.

15. **Pingquan water supply subproject.** This subproject at appraisal included construction of two new water supply plants with capacity of 20,000 m<sup>3</sup>/d and 10,000 m<sup>3</sup>/d, a water supply pipe network of 31.81 km, and 22 wells. The centralized water supply rate was to increase from

30% to 85%. The population with access to water supply service was to increase from 76,000 to 109,500. Outputs completed were almost the same as at appraisal apart from cancelation of one water supply plant (10,000 m<sup>3</sup>/d) and a higher population with access to water supply service (160,000). The original envisaged two water supply plants were adjusted to one in accordance with the feasibility study conclusions, which demonstrated the same supply rate and access coverage.

16. **Weichang water supply subproject.** This subproject at appraisal included construction of eight wells, 18.00 km water supply pipe, and 11.37 km urban water pipe, and rehabilitation of 18.97 km urban water pipe. The centralized water supply rate was to increase from 45% to 80%. The population with access to water supply service was to increase from 29,000 to 58,000; and the service area was to increase from 5.7 million m<sup>2</sup> to 6.8 million m<sup>2</sup>. The outputs completed were almost the same as at appraisal, but the service area exceeded the target by 0.2 million m<sup>2</sup>.

17. **Botou water supply subproject.** This subproject at appraisal included construction of a water supply plant with capacity of 30,000 t/d and a 25.00 km new pipe network for water distribution, one new pump, and a 30.75 km water pipe network. The centralized water supply rate was to increase from 40% to 100%. The service area was to increase from 14.0 million m<sup>2</sup> to 25.6 million m<sup>2</sup>. The outputs completed were the same as at appraisal.

18. **Botou water distribution network subproject.** This subproject at appraisal included construction of 93.00 km water supply network and installation of 28,536 in-house water meters with related valves and chambers. The centralized water supply rate was to remain at 2011 full service level. The population with access to water supply service was to increase from 140,000 to 250,000. The service area was to increase from 17.80 million m<sup>2</sup> to 25.06 million m<sup>2</sup>. The outputs completed were the same as at appraisal.

19. **Zhaoxian urban heating network reconstruction and expansion subproject.** This subproject at appraisal included construction of two primary heat stations (total capacity of 372 megawatts [MW]), 21.00 km of transmission and distribution pipelines, and 63 secondary heat substations. The centralized municipal heating coverage rate was to increase from 14% to 80%. The service area was to increase from 0.30 million m<sup>2</sup> to 1.66 million m<sup>2</sup>. The outputs completed were almost the same as at appraisal, but centralized municipal heating coverage rate was 60% and the service area was 1.30 million m<sup>2</sup> due to some old buildings' insulation could not meet heating supply requirements, so these buildings could not be connected with the heating network.

20. **Huai'an district heating subproject.** This subproject at appraisal included construction of a heating distribution network of 22.42 km and 41 secondary heat substations. The centralized municipal heating coverage rate was to increase from 0% to 80%. The service area was to increase from 0 to 2.30 million m<sup>2</sup>. The outputs completed were almost the same as at appraisal, but the centralized municipal heating coverage rate (85%) exceeded the target.

21. **Zhangbei County district heating subproject.** This subproject at appraisal included construction of one heating source station with capacity of 216 MW to supply heating for 3.05 million m<sup>2</sup>. The centralized municipal heating coverage rate was to increase from 36% in 2011 to 75% in 2016. The service area was to increase to 3.05 million m<sup>2</sup>. The outputs completed were almost the same as appraisal, but the actual centralized municipal heating coverage rate (76%) was higher than envisaged and the service area was increased to 3.60 million m<sup>2</sup> in 2016.



22. **Pingquan district heating subproject (Phase II).** This subproject at appraisal included construction of one heat source station with capacity of 116 MW, 13 heat stations, an 8,951 m primary heating distribution network, and the coverage area of the secondary heating distribution network of 2 million m<sup>2</sup>. The centralized municipal heating coverage rate was to increase from 55% to 80%. The service area was to increase from 0.50 million m<sup>2</sup> to 2.50 million m<sup>2</sup>. The outputs completed were almost the same as at appraisal, but the centralized municipal heating coverage rate (82%) exceeded the target and the service area was increased to 3.17 million m<sup>2</sup>.

23. **Weichang district heating subproject (Phase II).** This subproject at appraisal included construction of a new heat source station with 1.50 million m<sup>2</sup>, total capacity of 92 MW, a heating pipe network of 6,535 m, and seven heat stations. The centralized municipal heating coverage rate was to increase from 60% to 80% and the area was to increase from 0.55 million m<sup>2</sup> to 1.50 million m<sup>2</sup>. The outputs completed were the same as at appraisal.

24. **Zhaoxian waste management subproject.** This subproject at appraisal included construction of one 100 t/d solid waste processing and recycling plant. The solid waste nonhazardous treatment rate was to increase from 0% to 100%. The population receiving solid waste treatment services was to increase by 200,000. The outputs completed were the same as at appraisal.

25. **Zhengding waste management subproject.** This subproject at appraisal included construction of one 600 t/d solid waste processing and recycling plant. The solid waste nonhazardous treatment rate was to increase from 70% to 90%. The population receiving solid waste treatment services was to increase to 150,000. The outputs completed were the same as at appraisal.

26. **Baigou waste management subproject.** This subproject at appraisal included construction of one 500 t/d solid waste processing and recycling plant. The solid waste nonhazardous treatment rate was to increase from 0% to 90%. The outputs completed were almost the same as at appraisal, while the solid waste nonhazardous treatment rate was increased to 80%, slightly lower than the target. By enhancing waste sorting and collection, the envisaged treatment rate is projected to be achieved in 2020.

27. **Institutional development and capacity building.** This component was designed to ensure the executing and implementing agencies (i) implement the subprojects in accordance with ADB and PRC requirements, particularly on safeguard policies; (ii) become operationally efficient and financially sustainable entities; (iii) comply with relevant national policies for cost recovery and tariff and enterprise reform; and (iv) prepare and implement sound plans for O&M of current and future infrastructure works. The consulting contract included project management consulting services and training. The consulting firm arranged 20 training workshops for more than 600 trainees on subjects such as financial management, audit, procurement, contract management, monitoring, and safeguard policies to build adequate capacity to manage the project implementation. Knowledge and capacity gained was disseminated among staff and across agencies and applied in day-to-day implementation. The training was relevant, enhanced the efficiency of project implementation, and helped ensure project sustainability.

28. The Multi-Donor Trust Fund under the Water Financing Partnership Facility (WFPP) provided a grant of \$250,000, administered by ADB, to strengthen the management capacity of water and wastewater service providers involved in the project (footnote 2). In July 2012, the Hebei Provincial Project Management Office (HPPMO) engaged a national consultant, Easen

International Co., Ltd., for the grant. The consultant engaged by the grant strengthened implementing agencies from nine water and wastewater subprojects in developing a more corporate approach to water and wastewater service provision, adopting a demand-driven approach to service delivery, and enhancing financial management and cost recovery. Five water subprojects had 0.78 million beneficiaries and four wastewater subprojects had 0.48 million beneficiaries. The outputs of the grant were achieved by June 2013 and the grant was closed on 31 October 2013.

### **C. Project Costs and Financing**

29. The project cost estimate at appraisal was \$235.9 million, including an ADB loan of \$100.0 million (42.4% of the total financing), a WFPF grant (footnote 1) of \$0.3 million (0.1% of the total financing), and domestic counterpart funding of \$135.65 million (57.5% of the total financing). After selecting and processing subsequent subprojects during implementation, including replacing four subprojects with three new subprojects, the updated total project cost estimate was adjusted to \$180.6 million based on the latest project preliminary designs, of which the ADB loan and WFPF grant components remained unchanged and the domestic counterpart funds were \$83.1 million (46.0% of the total financing).

30. At project completion, the total project cost was \$180.6 million—\$55.3 million less than the cost at appraisal. However, the total cost of subsequent subprojects increased from \$127.5 million at appraisal to \$132.2 million at completion because of the three replaced subprojects. The lower project cost at completion was mainly due to (i) the reduced cost of \$18.6 million resulting from the replaced subprojects, (ii) savings of \$34.4 million in contingencies, and (ii) \$2.3 million in interest during construction and commitment charges.

31. The counterpart funds at completion were \$83.1 million. These came from fiscal budget allocation from local governments, corporate self-raised capital, and state bonds. The breakdown of counterpart funds included \$22.4 million from Zhaoxian County Government, \$1.7 million from Zhengding County Government, and \$59.0 million from the governments of nine cities and counties. All counterpart funds were provided and made available to the respective subprojects in a timely manner. The project costs at appraisal and completion are in Appendix 2. The project cost by financier is in Appendix 3.

### **D. Disbursements**

32. Loan proceeds were disbursed according to ADB's Loan Disbursement Handbook (2007, as amended from time to time). Both the advance account facility and direct payments were used for disbursements. The advance payments to the advance account were used to the allowed maximum of \$10 million. The HPPMO has formed a capable team for preparing and processing withdrawal applications. Its overall disbursement control was satisfactory. Against a committed contract amount of \$99.5 million, a loan saving of \$2.7 million was canceled on 19 December 2016. The first advance of \$7.0 million was disbursed in August 2010. The final disbursement was made on 19 December 2016, with cumulative disbursements of \$97.3 million. The loan was financially closed on 19 December 2016 because of the delayed submission of liquidation for the 18 subprojects. The original disbursement projections at loan effectiveness were appropriate. A comparison of the actual disbursement with the projections is in Appendix 4.

## **E. Project Schedule**

33. The project was to be implemented in 6 years, from December 2009 to December 2015, and the loan was to be closed on 30 June 2016. Actual implementation was generally in line with the schedule after loan effectiveness. The preliminary design and detailed design for core subprojects started early in 2009. The project awarded a works contract during the loan signing and effectiveness period, and began construction of its first subproject in July 2010, about 3 months after loan effectiveness. Construction of the last subproject started in December 2015. The project was fully completed by 30 June 2016 and the original loan closing date was not extended. The contract awards of the ADB loan and grant proceeds are in Appendix 5 and the chronology of major events is in Appendix 6.

## **F. Implementation Arrangements**

34. HPG was the project executing agency. The HPPMO, established in 2007 and was affiliated to Hebei Provincial Finance Department, was designated to undertake and manage the day-to-day project activities. The HPPMO has abundant, capable staff experienced in project administration and project management from their extensive cooperation with ADB and the World Bank. During project implementation, the HPPMO managed all subprojects effectively and professionally. All 11 cities and counties also established respective project management offices (PMOs) to coordinate relevant departments. The HPPMO and each subproject PMO established a suitable financial management system with office facilities. Each subproject also designated an implementing unit to manage each subproject's daily activities.

## **G. Technical Assistance**

35. ADB's Technical Assistance Special Fund provided project preparatory TA of \$1.7 million on a grant basis (footnote 8). The TA helped prepare the Small City and Township Development Demonstration Project, which would cover 15–20 small cities and towns in three provinces—Hebei, Liaoning, and Shanxi. For the Hebei component, the TA assisted the provincial government in preparing the proposed project as a sector loan and developing methodologies that are appropriate for replication across the Hebei Province and elsewhere in the PRC. The TA assisted the provincial government in (i) reviewing and identifying selection parameters for the prioritization and listing of cities and towns to form the subprojects; (ii) assessing the scope of the most appropriate subprojects to fulfill sector strategy goals; and (iii) preparing a sector-based small cities and towns development and environmental improvement project. A total of 143 person-months of international and national consulting services were engaged through a firm in accordance with ADB's *Guidelines on the Use of Consultants* (2006, as amended from time to time) based on the quality- and cost-based selection method. The consultants began field work in February 2008. The TA project's interim review mission was held in July 2008. The TA project was completed in 31 July 2009 and closed on 22 September 2009.

## **H. Consultant Recruitment and Procurement**

36. **Consultant recruitment.** The project financed one consulting services package, which followed quality- and cost-based selection in accordance with ADB's *Guidelines on the Use of Consultants*. A joint venture, HydroQual Inc. in association with China Construction Design International Co., was engaged in May 2010. The consultants were mobilized in June 2010 and their services were ended when the consulting service contract expired in June 2014 and no extension was made since a member of the joint venture was sanctioned by ADB. To continue

the remaining required consulting services, the HPPMO engaged a domestic consultant, NAREE (Beijing) Consulting Limited, in October 2014 using counterpart funding to provide technical and management support to the project until project completion. NAREE completed all the required services in September 2016 and assisted the HPPMO in preparing the project completion report. The actual total inputs of consulting services as of project completion were 182 person-months against 154 person-months envisaged at appraisal. The HPPMO also engaged a qualified national agency through each subproject implementing agency to monitor land acquisition and resettlement, environmental protection, and social impacts under the project.

37. **Procurement.** The ADB loan proceeds financed 17 civil works packages and 33 goods packages. The packages followed ADB's *Procurement Guidelines* (2007, as amended from time to time) and were procured through international competitive bidding or national competitive bidding procedures. The HPPMO engaged a national procurement agent. ADB approved advance procurement during loan processing. The HPPMO started the procurement of works packages under the core subprojects in early 2010 and the contract was awarded within 3 months after loan effectiveness. Construction began in July 2010. The procurement mode in the procurement plan did not change during the project. During the procurement of works and goods packages, relevant sections of ADB's Anticorruption Policy (1998, as amended from time to time) were incorporated in the bidding documents and contracts and implemented during the procurement and contract execution. The HPPMO and each subproject PMO conducted meetings with the disciplinary supervision office, as needed, to discuss any potential issues related to the project.

## I. Safeguards

38. **Land acquisition and resettlement.** The project is category A for involuntary resettlement and category C for indigenous peoples. Fifteen of the 18 subprojects required land acquisition and resettlement. Each implementing agency of 15 subprojects prepared Resettlement plans and due diligence reports. Two subprojects involved house demolition activities. A total of 617.3 *mu* of land were acquired permanently (6.6% less than in the resettlement plan) and 2,779.3 m<sup>2</sup> of residential buildings were demolished (16.0% less than in the resettlement plans). Permanent land acquisition affected 205 households and 866 persons, and buildings demolition affected 31 households and 90 persons. Two subprojects also involved the reemployment of 287 workers because of the demolition of coal boilers. Of the total beneficiary population of the project, 0.4% are ethnic minority people of Manzu nationality in Weichang subproject towns. They have the same job opportunities, income levels, and living conditions as Han people. No land acquisition and resettlement or other negative impacts were identified for indigenous peoples during project implementation.

39. The land acquisition agreements with the affected villages or households were reached based on intensive consultation. All affected villages and people were aware of the compensation rates and were paid following the land acquisition agreement. The actual compensation rate was the same or higher than the rate in the resettlement plans. During implementation, both land and house prices increased based on a newly issued land policy and market price increases in some counties. The compensation standard for permanent acquisition of farmland was from CNY32,173 per *mu* to CNY68,587 per *mu*. The compensation standard of the Huai'an heating subproject for resettlement was 49.42% higher than in the resettlement plan. The land acquisition compensation standard for the Zhuolu water supply subproject was 34.28% higher than in the resettlement plan. The land acquisition compensation standard for the Baigou

solid waste subproject was 33.33% higher than in the resettlement plan. Compensation standards for other subprojects followed the resettlement plan.

40. The project provided various livelihood rehabilitation packages for affected people in different villages. It adopted rehabilitation and income restoration measures including (i) cash compensation packages for affected people according to the affected land; (ii) a social pension and minimum living guarantee for the affected people; (iii) technical training, including welding, car mechanics, cooking, hairdressing, and housekeeping services; and (iv) service-related job opportunities such as security guard, greening, cleaning, and sanitation work. Two subprojects in Huai'an had house relocation impacts. Cash compensation or resettlement houses were options for the relocated households. All affected persons chose the cash compensation option. The Zhangbei heating and Pingquan heating subprojects affected a total of 287 workers of coal-boiler stations, of which 14 were female workers. All affected workers were reemployed after trainings. The level of income varies by industry, but the income level has increased, and the average wage level increased from CNY1,860 to CNY3,160 per month.

41. The HPPMO engaged China Agricultural University and NAREE consulting firm to carry out independent monitoring and evaluation of the resettlement activities. Monitoring and evaluation reports were prepared for each subproject and were uploaded on the ADB website.

42. **Environment (category A).** A summary environmental impact assessment, including the environmental management plan (EMP) and environmental assessment and management framework, was prepared by the consultant in December 2008. The HPPMO was responsible for implementing the EMP and followed the EMP requirements. The PMO of each subproject was responsible for incorporating the EMP into the engineering design and bidding documents, supervising the implementation of environmental mitigation measures during construction and operation, and coordinating external environmental monitoring. The contractors were responsible for implementing the mitigation measures for construction. The implementing agency or operating company was responsible for the implementation of mitigation measures for operations. The EIA institutes regularly conducted public consultation during implementation and the contractors responded to public concerns effectively. According to a public environmental satisfaction survey at completion through interviews and questionnaires conducted in 11 cities and counties, the public satisfaction rate reached 80%, higher than 36%–60% in 2008.

43. The HPPMO engaged HydroQual Inc. in association with China Construction Design International and later with NAREE International Limited to provide environmental management consulting services. The consultants prepared six environmental monitoring reports, which were submitted through HPPMO and uploaded on the ADB website. The project complied with the safeguard documents and national environmental regulations. The completed eight subprojects' domestic environmental acceptance missions confirmed that the project did not cause any serious environmental concerns and that all adverse environmental impacts were being mitigated. No complaints on environmental impacts were recorded by the PMO and implementing agencies during project implementation. Environmental acceptance check missions for the other 10 subprojects will be conducted in 2019 following PRC procedures.

## **J. Monitoring and Reporting**

44. The loan and grant covenants were complied with. No conditions or covenants were modified, suspended, or waived. Environmental, resettlement, and social monitoring reports, and the borrower's project completion report, were submitted on time. ADB received 46 reports,

including monitoring reports, resettlement reports, and environment assessment reports, which were uploaded to the ADB website. The HPPMO, with the assistance of the consultant, county government, and city PMOs, collected and updated all data for the design and monitoring framework as required. At completion, all target data were updated accordingly. Through each subproject PMO, HPPMO maintained separate project financial statements and records for all expenditures incurred in the project in accordance with financial reporting standards acceptable to ADB. The HPPMO consolidated project financial statements annually in accordance with applicable guidance and regulations which were generally consistent with internationally recognized accounting principles and practices. An auditor (acceptable to ADB) audited the detailed consolidated project accounts in accordance with the auditing standards and regulations of the PRC. The HPPMO submitted the audited accounts in English to ADB within 6 months of the end of each fiscal year. The auditor issued an unqualified opinion for all audit reports. Review missions monitored the compliance with financial reporting and auditing requirements and followed up regularly with all concerned, including the external auditor. Appendix 7 presents the status of compliance with loan covenants at completion.

### III. EVALUATION OF PERFORMANCE

#### A. Relevance

45. The project is rated *relevant* because it maintained its strategic alignment at appraisal and completion to national and provincial strategies on economic and urban development, especially regarding people-centered urban development, which is a key theme of the Thirteenth Five-Year Plan, 2016–2020<sup>9</sup> and the State New-Type Urbanization Plan, 2014–2020.<sup>10</sup> At appraisal, based on the conclusions of the ADB-financed Town-Based Urbanization Strategy Study (footnote 5), the project focused on small cities and towns through construction and improvement of water supply, wastewater treatment, solid waste treatment, and heating supply.

46. The project is consistent with ADB's policy, country, and sector strategies to invest in competitive, sustainable, and inclusive infrastructure. ADB's country strategy was to fund infrastructure projects in key sectors that contributed to economic growth. At project completion, ADB's strategy and policy (Strategy 2020) for the urban sector in the PRC and ADB's Water Operational Plan are in synergy with the PRC's twelfth and thirteenth five-year plan objectives to develop infrastructure for economic growth and poverty reduction.<sup>11</sup> The project will continue to be relevant as Hebei maintains rapid urbanization. The core subprojects in Zhaoxian County and Zhengding County—as well as subsequent subprojects representing key issues such as lack of drinking water, poor air quality, and underdeveloped solid waste management—were appropriate.

47. The project included a comprehensive design with sound environmental objectives to improve (i) air quality by substituting central heating for coal boilers and household coal burning, (ii) public health by supplying reliable supplies of potable water, (iii) the collection and treatment of wastewater before discharging, (iv) river quality and flood protection capacity, and (v) municipal solid waste collection and treatment. Significant capacity strengthening for city officials complemented these interventions to ensure sustainability. The project's design for

<sup>9</sup> Government of the PRC, State Council. 2015. *National Economy and Social Development Thirteenth Five-Year Plan, 2016–2020*. Beijing.

<sup>10</sup> Government of the PRC, State Council. 2014. *State New-Type Urbanization Plan, 2014–2020*. Beijing.

<sup>11</sup> ADB. 2008. *Strategy 2020: The Long-Term Strategic Framework of the Asian Development Bank, 2008–2020*. Manila; ADB. 2011. *Water Operational Plan, 2011–2020*. Manila.

institutional strengthening was critical for improving the subprojects' technical, financial, and management capabilities and for meeting the challenges of future urban service needs. Considering the momentum of rapid urbanization in Hebei and the rest of the PRC, the design was deemed relevant. The result chain was sound, and the design and monitoring framework was formulated to monitor and capture the results and outcomes of the projects, with indicators being specific, measurable, realistic, time-bound, and measured directly or through proxy indicators to capture the essence.

## **B. Effectiveness**

48. The project is rated *effective* in achieving its expected outcome of improved urban infrastructure and municipal services through 18 subprojects in 11 small cities and towns in Hebei Province. As this was a sector project, the design and monitoring framework targets for core subprojects were specific and measurable while the targets for subsequent subprojects, based on the similar nature, were identified during project implementation. Five wastewater treatment subprojects were completed in good condition, with effluent quality in accordance with emissions standards. Six water supply facilities were constructed, adding capacity of 80,000 t/d, together with water supply network rehabilitation, including a 197 km water delivery and water supply network and more than 900 km of distribution pipelines. Three waste collection and treatment facilities were constructed with a total processing capacity of 700 t/d, while the waste collection, transportation, and disposal capacity were 1,180 t/d. Five central heating plants were built, which increased the central heating capacity to cover 8.66 million m<sup>2</sup>. Highlighted achievements included (i) the share of the urban population served by the wastewater collection system achieved targets from 80% to 100%, (ii) the wastewater treatment rate was increased to 80% or above, (iii) the urban population access rate to piped water was increased to 80% or above, (iv) the ratio of unaccounted-for water was decreased to 20% or less, (v) water supply service hours were increased to 24 hours per day, (vi) the percentage of the urban population with access to central heating was increased from 65% to 80%, and (vii) the percentage of the urban population served by a solid waste collection system was increased to more than 90%. A few lower achievements were due to (i) some local users continuing to use their own wells, (ii) some old buildings' heat insulation failing to meet heating requirements, and (iii) some wastewater sources being closed by the government for pollution control.

## **C. Efficiency**

49. The project is rated *efficient* in achieving outcome and outputs. Given the challenges in coordination and project management, the target of completing the selecting subsequent subprojects within a short period and awarding contracts and implementing 50 contracts for goods and works, the project achieved all outputs efficiently within 6 years without a cost overrun and followed the planned schedule.

50. The economic viability of the project was reevaluated following the same approach and methodology used at appraisal (Appendix 8). The economic reevaluation shows that the subprojects subject to benefit–cost analysis was economically viable and that they stand up to sensitivity tests where benefits decrease, except for two subprojects. The economic internal rates of return (EIRRs) for individual subprojects at appraisal and completion are in Appendix 8. The recalculated EIRRs for the subprojects are from 12.3% to 44.3%, which is higher than the economic opportunity cost of capital of 12.0%. The economic reevaluation demonstrates the economic viability of the individual subprojects. Cost and benefit are the key factors affecting the EIRRs. Although most actual costs decreased from appraisal to completion, most EIRRs at completion are lower than envisaged at appraisal because of the design on overcapacity and

lower actual demands. Heating subprojects have higher EIRRs at completion since their actual economic O&M costs are lower than estimated at appraisal. A sensitivity analysis was carried out to test the impacts of a decrease in benefit valuation. According to the analysis, most subprojects will remain economically viable except the Huanggezhuang wastewater treatment subproject and the Zhuolu wastewater treatment plant.

#### **D. Sustainability**

51. The project is rated *likely sustainable*. Technically, the design of all the outputs and technology adopted is sound, appropriate, and supports the project's long-term sustainability. The relevant agencies of subproject cities and counties have been operating the completed investments successfully, and the authorities and communities concerned have observed environmental benefits. The institutional strengthening and capacity building component provided 20 training workshops for more than 600 trainees and technical assistance to the HPPMO, implementing agencies, and PMOs of subproject cities and counties to manage the O&M of project facilities. City and government agencies confirmed future fiscal support for required O&M.

52. The after-tax weighted average cost of capital (WACC) in real terms was calculated using the actual capital cost. The financial internal rate of return (FIRR) at appraisal and completion is in Appendix 8. The FIRRs at completion of four subprojects were increased from the FIRRs at appraisal. The FIRRs of other subprojects are lower than at appraisal mainly because of the lower capital cost, lower operation status, and higher tariff on heating and solid waste treatment. A sensitivity analysis, conducted to test the impact of variations in project revenues for eight subprojects, shows that the FIRRs of eight subprojects were higher than their WACCs.

53. The financial reevaluation (Appendix 8) presents the project's overall financial health. The project is expected to remain financially sustainable because HPG and the implementing agencies have enough financial capacity to service debts and repay the ADB loan. The technical standards and quality systems adopted, and the equipment procured and installed, are of high quality. HPG, the implementing agencies, and subproject PMOs have the in-house capacity to operate and maintain the subprojects effectively and efficiently, so the outputs are expected to be operated optimally throughout the life of the project.

#### **E. Development Impact**

54. The project impact is rated *satisfactory*. The expected impact of the project was sustained urban development and improved quality of life for 11 subproject cities and counties. The delivery of project outputs has generated sustainable access to better water supply, well-managed wastewater and solid waste treatment, and central heating—improving the quality of life. The water supply subprojects had 0.62 million beneficiaries, the heating subprojects had 0.42 million beneficiaries, the wastewater subprojects had 0.43 million beneficiaries, and the solid waste treatment subprojects had 0.57 million beneficiaries. Other achievements and indicators include (i) the water quality of drinking water sources for water supply subprojects was improved to class II, while that of other subprojects improved to class II or III;<sup>12</sup> (ii) the total chemical oxygen demand was reduced by 15%–93% for four subprojects and cut by 7% for one subproject; (iii) sulfur dioxide in the air fell by 15%–90% for heating subprojects and decreased by 7%–80% for other subprojects; (iv) the average incidence of serious waterborne diseases in

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<sup>12</sup> Surface Water Quality Standards (GB3828-2002).



the project area fell from 14,342 in 2010 to 8,498 in 2015 per 100,000 people, with a decrease rate of 40.75% over 5 years; (v) the registered city and town unemployment rate decreased from 3.8%–12.5% to 0.2–5.0% over 5 years; and (vi) overall public satisfaction with improved services in water, wastewater, solid waste management, and heating was increased from 36%–60% to 80%–96% over 5 years.

55. The project benefited 2.11 million people in 11 cities and counties. The socioeconomic surveys for 2010–2015 (for core subprojects) and 2013–2015 (for subsequent subprojects) indicated that public satisfaction on the environment improved significantly after the implementation of the project. More than 80% of interviewees were satisfied with a certain environmental improvement and more than 90% were satisfied with the subprojects. The project played a vital role in raising public awareness on environmental protection, particularly on ways to save water. Low-income users, including the poor, were given subsidies or granted a tariff waiver under 13 heating, water supply, and wastewater treatment subprojects. The tariff for 6,974 households was waived, amounting to CNY1.63 million per year.

56. The project reduced water contamination and the incidence of waterborne diseases, improving people's health in the project area. The incidence of the main waterborne disease showed a decreased trend during 2010–2015, while the incidence of serious waterborne diseases in the project areas was reduced from 14,342 in 2010 to 8,498 in 2015 per 100,000 people. The newly built water supply plants provided stable and reliable supply to residents and industries. The improved water supply network reduced nonrevenue water losses. The closure of water wells reduced overuse and mitigated the pollution risk to the underground water system.

57. During project implementation, about 1,616 jobs were created during construction and O&M. Women were paid equal benefits for these jobs. A total of 429 jobs were created, of which 302 were for women and 127 were for the poor, accounting for 26.5% of the total local workers.

58. The central heating facilities have significantly reduced the total emission load of atmospheric pollutants, which contributed to the improvement in regional air quality in Hebei Province. Atmospheric pollutant (sulfur dioxide) emissions were reduced by 19,458 t/year or 24%, compared with the target level of 15%, in 11 counties and towns envisaged at appraisal.

## **F. Performance of the Borrower and the Executing Agency**

59. The overall performance of the borrower, executing agency, HPPMO, and each subproject PMO was *highly satisfactory*. The borrower, executing agency, HPPMO, and each subproject PMO fulfilled their obligations during project implementation. The HPPMO was established in accordance with government regulation, met the loan agreement requirements, was functional from the project processing stage, and was responsible for the overall project implementation. The borrower, executing agency, HPPMO, and each subproject PMO fulfilled their obligations during project implementation. The HPPMO has strong ownership of and commitment to the project. The HPPMO's sound capabilities enabled the project to be completed and become operational in accordance with the planned schedule. The HPPMO played a critical role in coordination and communication among different government agencies and with ADB. Two national consultants conducted adequate external monitoring on environmental protection and resettlement. An independent auditor audited the project accounts annually in accordance with auditing standards acceptable to ADB. The Hebei Province Finance Department managed the advance account and processed fund withdrawal and reimbursement applications in a timely and effective manner.

## G. Performance of the Asian Development Bank

60. ADB's performance was *satisfactory*. The project was administered and supervised from the ADB Resident Mission in the PRC after the handover from ADB headquarters in 2010. ADB maintained close and frequent communication with the HPPMO. ADB supported the HPPMO in project implementation by providing timely advice and efficient approvals, except short disruptions caused by a change in project officer. ADB processed procurement matters efficiently and disbursed loan proceeds in a timely manner. Besides the completion review mission, ADB fielded seven review missions, including a midterm review, during implementation. The review missions and ADB's frequent communications with the HPPMO resolved various issues encountered during implementation. ADB strengthened the safeguards supervision effectively and provided guidance to ensure compliance with all relevant covenants and requirements.

## H. Overall Assessment

61. Overall, the project is rated *successful*. It is deemed *relevant* to the PRC's development strategy and ADB's country partnership strategy and thematic priorities, both at appraisal and completion. The project is also aligned with ADB's urban sector strategy, which supported infrastructure investment—the backbone of the economic growth and job creation, and sources of public services. The improved heating supply and wastewater treatment infrastructure under the project has promoted tourism and supported industrial development and urbanization in the 11 project cities and counties. The project is considered *effective* in achieving its expected outcome to improve the urban infrastructure facilities, including heating infrastructure and wastewater treatment. The project has successfully completed all 18 subprojects within budget and on schedule. Most of the subprojects were completed and put into use ahead of loan closing. The loan closing date was not extended, and minor loan savings were canceled immediately after full liquidation. Based on its implementation progress and achievements of the all the deliverables, the project is assessed *efficient* in achieving the outcome and outputs. The project is rated *likely sustainable* in its engineering, management, and financial aspects. The project facilities were designed and constructed in accordance with the required engineering standards and prevailing best practices. The capacity building and training component developed capacity for management and O&M of the project assets. The responsibilities for O&M of all the subprojects were clearly assigned to specific agencies with capable staff, and adequate O&M budgets have been earmarked. The recalculated EIRRs confirmed the project's financial and economic viability. Local governments accorded adequate importance to the development of resettlement plans and ensured compliance with ADB's Safeguards Policy Statement (2009). By implementing the mitigation measures as proposed in the EMP, the potential environmental impacts were prevented and minimized to insignificant levels.

### Overall Ratings

Criteria	Rating
Relevance	Relevant
Effectiveness	Effective
Efficiency	Efficient
Sustainability	Likely sustainable
<b>Overall Assessment</b>	<b>Successful</b>
Development impact	Satisfactory
Borrower and executing agency	Highly satisfactory
Performance of Asian Development Bank	Satisfactory

Source: Asian Development Bank.

## IV. ISSUES, LESSONS, AND RECOMMENDATIONS

### A. Issues and Lessons

62. Engineering designs for wastewater and water supply subprojects for small cities and towns needs to be realistic to avoid overcapacity design in view of the limited size of the cities and the small population.

### B. Recommendations

#### 1. Project Related

63. **Future monitoring.** The HPPMO and subproject implementing agencies are encouraged to monitor the outcome indicators during 2018–2019 and report to ADB.

64. **Covenants.** The covenants in the loan and project agreements are pertinent and relevant. The covenants will be maintained in their existing form until the project performance evaluation report is prepared in 2021.

65. **Further action or follow-up.** To achieve the expected project benefits, HPG should cause local governments to strengthen monitoring wastewater discharging status of relevant factories and enterprises to avoid disruptions to the wastewater treatment plants' operation.

66. **Timing of the project performance evaluation report.** The project performance evaluation report may be prepared in 2021 or later.

#### 2. General

67. The project used advance procurement effectively and advance procurement contributed to complete the project on schedule. Future interventions will encourage executing agencies to replicate good practices on advance procurement, particularly for many subprojects scattered in small cities and towns. The advance procurement of one subproject would generate a demonstration role for other subprojects.

68. Assistance to urban public services (e.g., wastewater treatment, water supply, and heating supply) usually involved many agencies during project planning, design, implementation, and operation. More ownership of and leadership by local governments are vital to ensure a successful project, so good practices will be replicated in Hebei and the rest of the PRC.

## DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Indicators and Targets	Project Achievements
<b>Impact</b> Improved urban environment and improved public health and quality of life for the urban residents in counties of small cities and towns in Hebei Province	<b>By 2015 (baseline year 2007), in subproject cities and towns in Hebei Province; similar performance targets will be formulated for subsequent subprojects</b>  Water quality of drinking water sources improved from Class IV to Class II  Total chemical oxygen demand of discharge reduced by 15%  SO <sub>2</sub> in the air decreased by 15%  Reduced incidence rate of waterborne diseases in direct project beneficiary areas by 30% in 2020 compared to that in 2007  Registered city/town unemployment rate lower than 5%  Improved overall public satisfaction with improved services in water, wastewater, solid waste management and heating	<b>By 2015</b>  Water quality of drinking water sources for water supply subprojects improved to Class II; water quality of drinking water sources for other subprojects improved to Class II or III.  Total chemical oxygen demand of four subprojects reduced by 15%-93% and one subproject reduced by 7%.  SO <sub>2</sub> of heating subprojects in the air decreased by 15%-90%, and other subprojects decreased by 7%-80%.  Average incidence of serious waterborne diseases in the project area was reduced from 14.342 in 2010 to 8.498 in 2015 per 100,000 people with a decrease rate of 40.75%.  Registered city/town unemployment rate decreased from 3.8%-12.5% to 0.15%-5%.  Overall public satisfaction improved from 36%-60% to 80%-96%.
<b>Outcome</b> Improved urban infrastructure and municipal services in about 10 small cities and towns in Hebei Province	<b>By 2015 (baseline year 2007), in the subproject cities and towns in Hebei province; similar performance targets will be formulated for subsequent subprojects</b>  <b>Wastewater Treatment Component</b> Percentage of urban population served by sewer increased (%): - Zhaoxian: from 70% to 100% - Huanggezhuang: from 30% to 80% - Zhuolu: from 60% to 100% - Huai'an: from 50% to 100% - Longhua: from 60% to 90%	Zhaoxian: 100% Huanggezhuang: 80% Zhuolu: 95% Huai'an: 100% Longhua: 90%

Design Summary	Performance Indicators and Targets	Project Achievements
	Percentage of urban wastewater treated increased (%): - Zhaoxian: from 70% to 100% - Huanggezhuang: from 30% to 80% - Zhuolu: from 42% to 100% - Huai'an: from 0% to 80% - Longhua: from 60% to 85%	Zhaoxian: 100% Huanggezhuang: 80% Zhuolu: 95% Huai'an: 80% Longhua: 85%
	<b>Water Supply Component</b> Percentage change in urban population with access to piped water increased (%): - Huai'an: from 60% to 80% - Zhuolu: from 0 to 80% - Pingquan: from 65% to 85% - Weichang: from 45% to 80% - Botou: from 40% to 100%	Huai'an: 80% Zhuolu: 80% Pingquan: 85% Weichang: 80% Botou: 100%
	Ratio of unaccounted-for-water decreased (%): - Huai'an: from 43% to 20% - Zhuolu: decreased to 20% - Pingquan: from 30% to 20% - Weichang: from 56% to 20% - Botou: from 43% to 20%	Huai'an: 20% Zhuolu: 20% Pingquan: 20% Weichang: 20% Botou City: 20%
	Service hours increased (hour): - Huai'an: from 1 to 24 - Zhuolu: from 24 to 24 - Pingquan: from 24 to 24 - Weichang: from 16 to 24 - Botou: from 13 to 24	Huai'an: 24 Zhuolu: 24 Pingquan: 24 Weichang: 24 Botou: 24
	<b>District Heating Component</b> Percentage of urban population with access to centralized heating increased (%): - Zhaoxian: from 14% to 80% - Huai'an: from 0 to 80% - Zhangbei: from 36% to 75% - Pingquan: from 55% to 80% - Weichang: from 60% to 80%	- Zhaoxian: 60% - Huai'an: 85% - Zhangbei: 76% - Pingquan: 82% - Weichang: 80%
	<b>Solid Waste Component</b> Percentage of urban population served by solid waste collection system increased (%): - Zhaoxian: from 60% to 100% - Zhengding: from 70% to 90 % - Baigou: from 0 to 90%	Zhaoxian: 100% Zhengding: 90% Baigou: 80%
	<b>Revenue Generating Component</b> <b>(water supply, wastewater treatment, heating supply and solid</b>	

Design Summary	Performance Indicators and Targets	Project Achievements
<b>Outputs</b> <b>Wastewater Treatment Component</b>	<b>waste management)</b> Tariffs are progressively set to achieve full cost recovery.	Tariffs were separately set to achieve cost recovery in 5 to 7 years for each subproject.
Wastewater treatment plant (WWTP) and sewerage network are constructed. Residents receive adequate wastewater treatment services. Including:	<b>By 2015</b>	
Zhaoxian wastewater treatment phase II project	Construction of phase II extension (50,000 m <sup>3</sup> /d) of the existing WWTP by constructing primary and secondary (biological) treatment works.	Completed the phase II extension's construction on time. Constructed 1.77 km new trunk sewers and a 50,000 m <sup>3</sup> /d wastewater treatment plant.
	Wastewater treatment rate increases from 75% in 2007 to 100%.	Wastewater treatment rate increased to 100%.
	Population having access to centralized wastewater treatment services increases from 117,000 to 130,000; service area increases from 15.9 million m <sup>2</sup> to 22.3 million m <sup>2</sup> .	Population access to centralized wastewater treatment services increased to 170,000; service area increased to 23.1 million m <sup>2</sup> .
Huanggezhuang WWTP project	Construction of WWTP with capacity of 20,000 m <sup>3</sup> /d and 13.18 km wastewater network.	Constructed one WWTP with capacity of 20,000 m <sup>3</sup> /d and 13.18 km sewage network.
	Wastewater treatment rate increases from 30% to 80%.	Wastewater treatment rate increased to 80%.
	Population access to municipal wastewater service increases from 4,300 to 20,000.	Population access to municipal wastewater service increased from 43,000 to 20,000.
Zhuolu WWTP project Phase II	Construction of WWTP with capacity of 20,000 m <sup>3</sup> /d and 21.656 km wastewater pipe network and 26.223 km rainwater pipe network.	Constructed one new WWTP with capacity of 20,000 m <sup>3</sup> /d, and 21.656 km sewage collection network and a 26.223 km storm water collection network.
	Wastewater treatment rate increases from 42.4% to 90%.	Wastewater treatment rate increased to 95%.
	Population having access to municipal wastewater service increases from 60,000 to 124,000.	Population having access to wastewater service increased from 60,000 to 124,000.
Longhua Miaoshan WWTP subproject	Construction of WWTP with capacity of 20,000 m <sup>3</sup> /d and wastewater pipe network 18.68 km.	Constructed one new WWTP with a capacity of 20,000 m <sup>3</sup> /d, and 18.69 km wastewater pipe network.
	Wastewater treatment rate increases	Wastewater treatment rate increased

Design Summary	Performance Indicators and Targets	Project Achievements
<b>Water Supply Component</b>	from 60% in 2010 to 85% in 2015. Population having access to municipal wastewater service increases from 50,000 to 112,000.	to 85%. Population having access to municipal wastewater service increased from 50,000 to 112,000.
New water supply system and associated facilities operational, including:		
Huai'an water supply and drainage subproject	Construction of 12.983 km water supply network, pipe diameter DN200- DN400; construction of 28.025 km wastewater network, pipe diameter DN300-DN800.  Population having access to water supply service increases from 45,000 to 110,000; service area increases from 12 million m <sup>2</sup> to 15 million m <sup>2</sup> .	Built 12.983 km water supply network, and 28.025 km wastewater pipe network.  Population having access to water supply service increased to 160,000, and service area increased to 15 million m <sup>2</sup> .
Zhuolu water supply for new urban area	Construction of 8 wells, one water supply plant with capacity of 20,000 t/d, 20.474 km urban water supply network, and rehabilitated 15.828 km water distribution network.  Centralized water supply rate increases from 0 to 80%. Population having access to water supply service increases from 28,000 to 70,000.	Constructed 8 wells, built a water supply plant with capacity of 20,000 t/d, constructed 2 km new water pipe network and 20.474 urban water supply network, rehabilitated 15.828 km water distribution network. Centralized water supply rate increased to 80%. Population having access to water supply service increased to 80,000.
Pingquan water supply subproject	Construction of 2 new water supply plants with a capacity of 20,000 m <sup>3</sup> /d and 10,000 m <sup>3</sup> /d, respectively, water supply pipe network 31.813 km, and 22 wells.  Centralized water supply rate increases from 30% to 85%. Population having access to water supply service increases from 76,000 to 109,500.	Constructed one new water supply plant with capacity of 20,000 m <sup>3</sup> /d, 7.7 km water pipelines, and 31.814 km distribution network, and 11 water wells.  Centralized water supply rate increased to 85%. Population having access to water supply service increased to 160,000.
Weichang water supply subproject	Construction of 8 wells and water supply pipe 18 km. Construction and rehabilitation of urban water pipe 11.374 km and 18.967 km respectively.  Centralized water supply rate increases from 45% to 80%. Population having access to water supply service increases from 29,000 to 58,000; service area increases from	Constructed 8 wells, 18 km water supply network, and 11.374 km water pipe; rehabilitated 18.967 km urban water pipe.  Centralized water supply rate increased to 80%. Population having access to water supply service increased to 58,000. Service area increased to 7 million m <sup>2</sup> .

Design Summary	Performance Indicators and Targets	Project Achievements
Botou water supply subproject	5.7 million m <sup>2</sup> to 6.8 million m <sup>2</sup> .	
	Construction of water supply plant with a capacity of 30,000 t/d with 25 km new pipe network for water distribution; one new pump and 30.748 km water pipe network.	Constructed a water supply plant with a capacity of 30,000 t/d with 25 km new pipe network for water distribution, one new pump station, and 30.748 km water pipe network.
	Centralized water supply rate increases from 40% to 100%.	Centralized water supply rate increased to 100%.
Botou water distribution network project	Service area increases from 14 million m <sup>2</sup> to 25.6 million m <sup>2</sup> .	Service area increased to 25.6 million m <sup>2</sup> .
	Construction of 93 km water supply network, installation of 28,536 in-house water meters with related valves and chambers.	Constructed components including 309 km water distribution network, installed 28,536 in-house water meters with related valves and chambers.
	Centralized water supply rate keeps at 2011 level 100%.	Centralized water supply rate kept at 100%.
	Population having access to water supply service increases from 140,000 to 250,000.	Population having access to water supply service increased to 250,000.
<b>District Heating Component</b>	Increase of service area increases from 17.80 million m <sup>2</sup> to 25.06 million m <sup>2</sup> .	Service area increased to 25.06 million m <sup>2</sup> .
	Heat sub-stations and distribution network are constructed. Residents receive adequate heating services. Reduction in use of coal for residential heating	
	Zhaoxian urban heating network reconstruction and expansion subproject	
	Rehabilitation and expansion of urban heating system, including construction of two primary heat stations (total capacity 372 MW), 21 km transmission and distribution pipelines, and 63 secondary heat sub-stations.	Constructed two primary heat stations with a total capacity of 372 MW, 21 km transmission and distribution network, and 63 secondary heat sub-stations.
	Centralized municipal heating coverage rate increases from 14% to 80%.	Centralized municipal heating coverage rate increased to 60%.
	Service area increases from 0.30 million m <sup>2</sup> to 1.66 million m <sup>2</sup> .	Service area increased to 1.30 million m <sup>2</sup> .
Huai'an district heating subproject	Construction of heating distribution network 22.42 km and 41 secondary heat sub-stations.	Constructed 22.42 km heating distribution network and 41 secondary heat sub-stations.
	Centralized municipal heating coverage rate increases from 0 to 80%.	Centralized municipal heating coverage rate increased to 85%. Population covered by heating



Design Summary	Performance Indicators and Targets	Project Achievements
Zhangbei County district heating subproject	Service area increases from 0 to 2.30 million m <sup>2</sup> .	services increased to 70,000. Service area increased to 2.34 million m <sup>2</sup> .
	Building one heating source station with capacity of 216 MW, to supply heating for 3.05 million m <sup>2</sup> . Centralized municipal heating coverage rate increases from 36% in 2011 to 75% in 2016.	Constructed one hot-water chain boilers with capacity of 216 MW to supply heating for 3.05 million m <sup>2</sup> . Centralized municipal heating coverage rate increased to 76%.
	Service area increases to 3.054 million m <sup>2</sup> .	Service area increased to 3.60 million m <sup>2</sup> in 2016.
Pingquan district heating subproject (Phase II)	Construction of one heat source station total capacity of 116 MW, 13 heat stations, 8,951 m primary heating distribution network, and the coverage area of secondary heating distribution network is 2 million m <sup>2</sup> . Centralized municipal heating coverage rate increases from 55% to 80%.	Constructed one heat source station with capacity of 116 MW, 13 heat stations, 8,951 m primary heating distribution network. The coverage area of secondary heating distribution network was 2 million m <sup>2</sup> . Centralized municipal heating coverage rate increased to 82%.
	Service area increases from 0.50 million m <sup>2</sup> to 2.50 million m <sup>2</sup> .	Service area increased to 3.17 million m <sup>2</sup> .
	Construction of a new heat source station with 1.50 million m <sup>2</sup> , total capacity of 92MW, heating pipe network 6,535 m, 7 heat stations.	Constructed a new heat source station with capacity of 92 MW to cover area of 1.50 million m <sup>2</sup> , built 6,535 m heating pipe network and 7 heat stations.
Weichang district heating subproject (Phase II)	Centralized municipal heating coverage rate increases from 60% to 80%, the area increases from 0.55 million m <sup>2</sup> to 1.50 million m <sup>2</sup> .	Centralized municipal heating coverage rate increased to 80%. Service area increased to 1.55 million m <sup>2</sup> .
<b>Solid Waste Management</b>		
Solid waste processing and recycling plant and composting facility constructed		
Zhaoxian waste management subproject	Construction of one 100 t/d solid waste processing and recycling plant. Solid waste non-hazardous treatment rate increases from 0% to 100%. Population receiving solid waste treatment services increases by 200,000.	Constructed one 100 t/d solid waste processing and recycling plan. Solid waste non-hazardous treatment rate increased to 100%. Population receiving solid waste treatment services increased by 200,000.
Zhengding waste management subproject	Construction of one 600 t/d solid waste processing and recycling plant. Solid waste non-hazardous treatment rate increases from 70% to 90%. Population receiving solid waste	Constructed one 600 t/d solid waste processing and recycling plant. Solid waste non-hazardous treatment rate increased to 90%. Population receiving solid waste

Design Summary	Performance Indicators and Targets	Project Achievements
	treatment services increases by 150,000.	treatment services increased by 150,000.
Baigou waste management subproject	Construction of one 500 t/d solid waste processing and recycling plant. Solid waste non-hazardous treatment rate increases from 0% to 90%.	Constructed one 500 t/d solid waste processing and recycling plant. Solid waste non-hazardous treatment rate increased to 80%.
<b>For all subprojects:</b> Institutional capacity for project management is improved; infrastructure and service providers have increased capacity to plan, construct, operate, and maintain facilities.	<p>In Hebei PMO and the subproject city and town PMOs and IAs:</p> <ul style="list-style-type: none"> <li>• PPMS established in 2009 is refined;</li> <li>• project implementation is undertaken in timely manner;</li> <li>• adequate provision of counterpart staff and resources to implement the project;</li> <li>• review and improvement of cost control measures every 2 years</li> <li>• tariffs are reviewed annually and local residents are aware of the results of the annual tariff review process, public consultation process established;</li> <li>• a 5-year (2009–2014) training plan for project management, O&amp;M, financial management and institutional development is implemented; and</li> <li>• organization structure and financial management systems are enhanced.</li> </ul>	<ul style="list-style-type: none"> <li>• PPMS established and refined;</li> <li>• project implementation is undertaken in timely manner;</li> <li>• timely adequate provision of counterpart staff and resources to implement the project;</li> <li>• review cost control measures;</li> <li>• carried out tariffs review and adjustments, public consultations established;</li> <li>• training plan was formulated and implemented; and</li> <li>• enhanced organization structure and financial management system.</li> </ul>

ADB = Asian Development Bank, 11FYP = eleven five-year plan, IA = implementing agency, km = kilometer, m = meter, m<sup>2</sup> = square meter, m<sup>3</sup>/d = cubic meter per day, mg/m<sup>3</sup> = milligram per cubic meter, MW = megawatt, O&M = operation and maintenance, PMO = project management office, PPMS = project performance management system, SO<sub>2</sub> = sulfur dioxide, t/d = ton per day, WWTP = wastewater treatment plant.

<sup>a</sup> PRC GB3838-2002 classifies surface water quality into five categories. Class V is polluted, and class IV is for industrial water supply and recreational waters with no direct human contact.

Source: Hebei Provincial Project Management Office.

**PROJECT COST AT APPRAISAL AND ACTUAL**  
(\$ million)

Item	Appraisal Estimate			Actual		
	Foreign Exchange	Local Currency	Total Cost	Foreign Exchange	Local Currency	Total Cost
<b>A. Base Costs</b>						
1. Construction						
a. Civil Works	25.5	38.2	63.7	16.2	40.3	56.5
b. Preparatory Works	0	12.0	12.0	0	13.0	13.0
c. Capital Goods	65.9	0	65.9	53.7	0	53.7
d. Associated Equipment	0	23.9	23.9	0	7.9	7.9
e. Materials	1.9	0	1.9	24.2	0	24.2
f. Equipment and Furniture	0	0.3	0.3	0	0	0
g. Land Acquisition and Resettlement	0	6.3	6.3	0	7.5	7.5
h. Survey, Research, Design, and Consulting Services	0	1.5	1.5	0	2.3	2.3
i. Environmental Management	0	15.3	15.3	0	1.9	1.9
Subtotal (A1)	93.3	97.5	190.8	94.1	72.9	167.0
2. Institutional Strengthening						
a. Consulting Services and Training	2.5	0	2.5	1.2	0	1.2
b. Capacity Building (grant)	0.3	0	0.3	0.3	0	0.3
Subtotal (A2)	2.8	0	2.8	1.5	0	1.5
3. Recurring Costs						
Implementing Agency Management (A3)	0	3.7	3.7	0	10.2	10.2
<b>Subtotal (A = A1+A2+A3)</b>	<b>96.1</b>	<b>101.2</b>	<b>197.3</b>	<b>95.6</b>	<b>83.1</b>	<b>178.7</b>
<b>B. Contingencies</b>						
1. Physical Contingency	0	19.7	19.7	0	0	0
2. Price Contingency	0	14.7	14.7	0	0	0
<b>Subtotal (B)</b>	<b>0</b>	<b>34.4</b>	<b>34.4</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>C. Financing Charges during Implementation</b>						
Interest during Implementation — ADB Loan	4.1	0	4.1	1.9	0	1.9
Commitment Charges — ADB Loan	0.1	0	0.1			
<b>Subtotal (C)</b>	<b>4.2</b>	<b>0</b>	<b>4.2</b>	<b>1.9</b>	<b>0</b>	<b>1.9</b>
<b>Total (A+B+C)</b>	<b>100.3</b>	<b>135.6</b>	<b>235.9</b>	<b>97.5</b>	<b>83.1</b>	<b>180.6</b>

## Notes:

1. Numbers may not sum precisely because of rounding.

2. Exchange rate used at appraisal is: \$1.00 = CNY6.8318, exchange rate used at completion is: \$1.00 = CNY6.9701.

Sources: Asian Development Bank and Hebei Provincial Project Management Office.

## PROJECT COST BY FINANCIER

Table A3.1: Project Cost at Appraisal by Financier  
(\$ million)

	ADB and WFPF		Bazhou City		Zhaoxian County		Zhengding County		Other Cities		Total
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount
	(A)	(A/F)	(B)	(B/F)	(C)	(C/F)	(D)	(D/F)	(E)	(E/F)	(F)
<b>A. Base Costs</b>											
1. Construction											
a. Civil Works	25.5	40.09	8.0	12.58	3.7	5.82	1.6	2.52	24.8	38.99	63.6
b. Preparatory Works	0	0	2.6	21.67	1.6	13.33	0.9	7.50	6.9	57.50	12.0
c. Capital Goods	65.9	100.00	0	0	0	0	0	0	0	0	65.9
d. Associated Equipment	0	0	0.3	1.26	7.8	32.64	2.4	10.04	13.4	56.07	23.9
e. Materials	1.9	100.00	0	0	0	0	0	0	0	0	1.9
f. Equipment and Furniture	0	0	0	0	0	0	0	0	0.3	100.00	0.3
g. Land Acquisition and Resettlement	0	0	0.2	3.17	1.3	20.63	1.5	23.81	3.3	52.38	6.3
h. Survey, Research, Design, and Consulting Services	0	0	0.2	13.33	0.3	20.00	0.1	6.67	0.9	60.00	1.5
i. Environmental Management	0	0	1.6	10.39	2.1	13.64	1.1	7.14	10.6	68.83	15.4
Subtotal (A1)	93.3	48.90	12.9	6.76	16.8	8.81	7.6	3.98	60.2	31.55	190.8
2. Institutional Strengthening											
a. Consulting Services and Training	2.5	100.00	0	0	0	0	0	0	0	0	2.5
b. Capacity Building (grant)	0.3	100.00	0	0	0	0	0	0	0	0	0.3
Subtotal (A2)	2.8	100.00	0	0	0	0	0	0	0	0	2.8
3. Recurring Costs											
Implementing Agency Management (A3)	0	0	0.1	2.70	0.4	10.81	0.2	5.41	3.0	81.08	3.7
<b>Subtotal (A=A1+A2+A3)</b>	<b>96.1</b>	<b>48.71</b>	<b>13.0</b>	<b>6.59</b>	<b>17.2</b>	<b>8.72</b>	<b>7.8</b>	<b>3.95</b>	<b>63.2</b>	<b>32.03</b>	<b>197.3</b>
<b>B. Contingencies</b>											
1. Physical Contingency	0	0	2.4	12.24	3.1	15.82	1.2	6.12	12.9	65.82	19.6
2. Price Contingency	0	0	1.8	12.16	2.3	15.54	1.0	6.76	9.7	65.54	14.8
<b>Subtotal (B)</b>	<b>0</b>	<b>0</b>	<b>4.2</b>	<b>12.21</b>	<b>5.4</b>	<b>15.70</b>	<b>2.2</b>	<b>6.40</b>	<b>22.6</b>	<b>65.70</b>	<b>34.4</b>
<b>C. Financial Charges during Implementation (C)</b>	<b>4.2</b>	<b>100.00</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4.2</b>
<b>Total Project Cost (A+B+C)</b>	<b>100.3</b>	<b>42.52</b>	<b>17.2</b>	<b>7.29</b>	<b>22.6</b>	<b>9.58</b>	<b>10.0</b>	<b>4.24</b>	<b>85.8</b>	<b>36.37</b>	<b>235.9</b>

ADB = Asian Development Bank, WFPF = Multi-Donor Trust Fund under Water Financing Partnership Facility.

Notes:

1. Numbers may not sum precisely because of rounding.

2. Exchange rate used at appraisal is: \$1.00 = CNY6.8318.

Sources: Asian Development Bank and Hebei Provincial Project Management Office.

**Table A3.2: Project Cost at Completion by Financier**  
(\$ million)

	ADB and WFPF		Bazhou City		Zhaoxian County		Zhengding County		Other Cities		Total
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount
	(A)	(A/F)	(B)	(B/F)	(C)	(C/F)	(D)	(D/F)	(E)	(E/F)	(F)
<b>A. Base Costs</b>											
1. Construction											
a. Civil Works	16.2	28.76	0	0	10.7	18.93	0.3	0.52	29.3	51.92	56.5
b. Preparatory Works	0	0	0	0	4.6	35.71	0.2	1.27	8.2	63.02	13.0
c. Capital Goods	53.7	100.00	0	0	0	0	0	0	0	0	53.7
d. Associated Equipment	0	0	0	0	3.6	45.61	0	0	4.3	54.39	7.9
e. Materials	24.2	100.0	0	0	0	0	0	0	0	0	24.2
f. Equipment and Furniture	0		0		0		0		0		0
g. Land Acquisition and Resettlement	0	0	0	0	2.4	31.81	0.6	8.05	4.5	60.15	7.5
h. Survey, Research, Design, and Consulting Services	0	0	0	0	0.4	16.91	0.1	5.48	1.8	77.61	2.3
i. Environmental Management	0	0	0	0	0.3	16.31	0.1	5.51	1.5	78.18	1.9
Subtotal (A1)	94.1	56.35	0	0	22.0	13.17	1.3	0.77	49.6	29.69	167.0
2. Institutional Strengthening											
a. Consulting Services and Training	1.2	100.00	0	0	0	0	0	0	0	0	1.2
b. Capacity Building (grant)	0.3	100.00	0	0	0	0	0	0	0	0	0.3
Subtotal (A2)	1.5	100.00	0	0	0	0	0	0	0	0	1.5
3. Recurring Costs											
Implementing Agency Management (A3)	0	0	0	0	0.4	4.32	0.4	3.59	9.4	92.09	10.2
<b>Subtotal (A = A1+A2+A3)</b>	<b>95.6</b>	<b>53.47</b>	<b>0</b>	<b>0</b>	<b>22.4</b>	<b>12.55</b>	<b>1.7</b>	<b>0.93</b>	<b>59.0</b>	<b>33.00</b>	<b>178.7</b>
<b>B. Contingencies</b>											
1. Physical Contingency	0		0		0		0		0		0
2. Price Contingency	0		0		0		0		0		0
<b>Subtotal (B)</b>	<b>0</b>		<b>0</b>		<b>0</b>		<b>0</b>		<b>0</b>		<b>0</b>
<b>C. Financial Charges during Implementation (C)</b>	<b>1.9</b>	<b>100.00</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1.9</b>
<b>Total Project Cost (A+B+C)</b>	<b>97.5</b>	<b>54.00</b>	<b>0</b>	<b>0</b>	<b>22.4</b>	<b>12.42</b>	<b>1.7</b>	<b>0.92</b>	<b>59.0</b>	<b>32.66</b>	<b>180.6</b>

ADB = Asian Development Bank, WFPF = Multi-Donor Trust Fund under Water Financing Partnership Facility.

Notes:

1. Numbers may not sum precisely because of rounding.

2. Exchange rate used at completion is \$1.00 = CNY6.9701.

Sources: Asian Development Bank and Hebei Provincial Project Management Office.

## DISBURSEMENT OF ADB LOAN AND GRANT PROCEEDS

**Table 4.1: Annual and Cumulative Disbursement of ADB Loan Proceeds <sup>a</sup>**  
(\$ million)

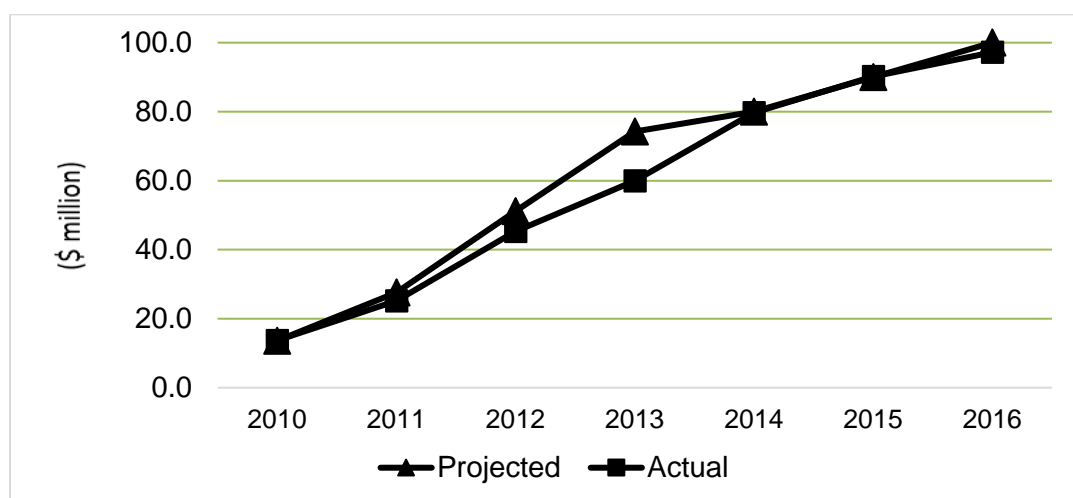
Year	Annual Disbursement		Cumulative Disbursement	
	Amount <sup>b</sup> (\$ million)	% of Total	Amount (\$ million)	% of Total
2010	13.7	14.1	13.7	14.1
2011	11.5	11.8	25.2	25.9
2012	20.1	20.7	45.3	46.6
2013	14.7	15.1	60.0	61.7
2014	19.7	20.3	79.7	82.0
2015	10.5	10.8	90.2	92.8
2016	7.0	7.2	97.2	100.0
<b>Total</b>	<b>97.2</b>	<b>100.0</b>	<b>97.2</b>	<b>100.0</b>

Note: Numbers may not sum precisely because of rounding.

<sup>a</sup> Includes disbursements to advance accounts.

<sup>b</sup> From eOps after actualization.

Sources: Asian Development Bank and Hebei Provincial Project Management Office.

**Figure 4.1: Projection and Cumulative Disbursement of ADB Loan Proceeds**  
(\$ million)

## CONTRACT AWARDS OF ADB LOAN AND GRANT PROCEEDS

**Table 5.1: Annual and Cumulative Contract Awards of ADB Loan Proceeds**  
(\$ million)

Year <sup>a</sup>	Annual Contract Awards		Cumulative Contract Awards	
	Amount <sup>b</sup> (\$ million)	% of Total	Amount (\$ million)	% of Total
2010	11.4	11.5	11.4	11.5
2011	30.5	30.7	41.9	42.2
2012	16.6	16.7	58.5	58.9
2013	7.1	7.1	65.6	66.0
2014	24.0	24.1	89.6	90.1
2015	5.9	5.9	95.5	96.0
2016	4.0	4.0	99.5	100.0
<b>Total</b>	<b>99.5</b>	<b>100.0</b>	<b>99.5</b>	<b>100.0</b>

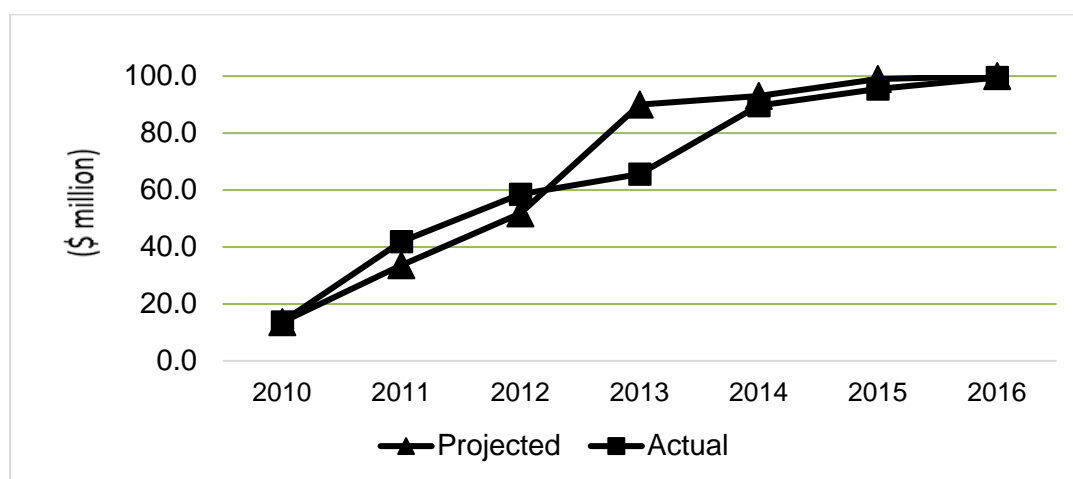
Note: Numbers may not sum precisely because of rounding.

<sup>a</sup> Classified by procurement contract summary sheet. date.

<sup>b</sup> From eOps after actualization.

Sources: Asian Development Bank and Hebei Provincial Project Management Office.

**Figure 5.1: Projection and Cumulative Contract Awards of ADB Loan Proceeds**  
(\$ million)



### CHRONOLOGY OF MAIN EVENTS

<b>Date</b>	<b>Milestone Event</b>
6 August 2007	Project preparatory technical assistance approved
29 September 2008	Concept paper approved
8–23 October 2008	Loan Fact-finding mission fielded
4 December 2008	Management review meeting held
8–10 September 2009	Loan negotiation
15 October 2009	Board Circulation
6 November 2009	Loan approval
17 December 2009	Loan, project and grant agreements signed
9–17 March 2010	Inception mission fielded
17 March 2010	Loan effectiveness
1 May 2010	Project administration transferred to ADB Resident Mission in the People's Republic of China
1 June 2010	Implementation consulting service contract signed
20 July 2010	Approval of Huai'an heating subproject
30 July 2010	First NCB works contract and first NCB goods contract under Huai'an heating subproject awarded
13 August 2010	Approval of Weichang water supply and Zhuolu wastewater subprojects
15 August 2010	First NCB goods contract under Zhaoxian heating subproject awarded
27 September 2010	First NCB works contract under Weichang water supply subproject awarded
6 October 2010	Approval of Huai'an water supply and Huai'an drainage subprojects
15 October 2010	Initial disbursement (capitalization)
28 October 2010	First NCB works contract under Huai'an water supply subproject awarded
24 November 2010	Approval of Botou water supply subproject
25 November 2010	First NCB goods contract under Huai'an water supply subproject awarded
30 November 2010	First NCB works contract under Botou water supply subproject awarded
2 December 2010	First NCB goods contract under Zhaoxian wastewater subproject and first ICB goods contract under Zhaoxian heating subproject awarded
8–14 December 2010	Loan review mission fielded
14 January 2011	First NCB works contract under Huai'an drainage subproject awarded
25 January 2011	First ICB goods contract under Weichang water supply subproject awarded
21 March 2011	First ICB goods contract under Botou water supply subproject and first NCB works contract under Zhuolu wastewater subproject awarded
10 April 2011	First ICB goods contract under Zhaoxian wastewater subproject awarded
17 June 2011	First ICB goods contract under Weichang heating subproject awarded
27 June 2011	Approval of Pingquan heating subproject
4–14 July 2011	Loan review mission fielded
17 August 2011	Approval of Zhuolu water supply and Huanggezhuang wastewater subproject
25 August 2011	First NCB works contract under Huanggezhuang wastewater subproject awarded
8 November 2011	Approval of Pingquan water supply subproject



<b>Date</b>	<b>Milestone Event</b>
25 January 2012	First NCB works contract, first NCB goods contract and first ICB goods contract under Pingquan heating subproject awarded
20 February 2012	First ICB goods contract under Zhuolu wastewater subproject awarded
6 April 2012	First NCB works contract under Pingquan water supply subproject awarded
15 June 2012	First ICB goods contract under Huanggezhuang wastewater subproject and first ICB goods contract under Pingquan water supply subproject awarded
27 July 2012	The first consulting service contract under grant awarded
17 August 2012	First ICB goods contract under Zhuolu water supply subproject awarded
20–31 August 2012	Mid-term review mission fielded
5 October 2012	Approval of Baigou solid waste subproject
1 July 2013	First ICB goods contract under Baigou solid waste subproject awarded
23–29 September 2013	Loan review mission fielded
31 October 2013	Actual closing date of grant
15 November 2013	Approval of Zhangbei heating, Botou pipeline, Longhua wastewater subprojects
31 December 2013	First NCB works contract under Longhua wastewater subproject awarded
3 March 2014	First NCB works contract under Botou pipeline subproject awarded
8 March 2014	First NCB works contract under Zhangbei heating subproject awarded
30 April 2014	First ICB goods contract under Botou pipeline subproject awarded
28 July 2014	Change in project scope and loan proceeds reallocation
22–28 August 2014	Loan review mission fielded
20 October 2014	First ICB goods contract under Longhua wastewater subproject awarded
24 October 2014	First ICB goods contract under Zhangbei heating subproject awarded
14 November 2014	First ICB goods contract under Zhengding solid waste subproject awarded
1 April 2015	Amendment to project agreement signed
2 April 2015	Amendment to loan agreement signed
6 August 2015	First ICB goods contract under Zhaoxian solid waste subproject awarded
26–30 October 2015	Loan review mission fielded
11 May 2016	Reallocation of loan proceeds
19 December 2016	Final disbursement, actual closing date of loan account and partial cancellation of loan proceeds
31 July–4 August 2017	Project completion review mission fielded

ICB = international competitive bidding, NCB = national competitive bidding, PCSS = procurement contract summary sheet.

Sources: Asian Development Bank and Hebei Provincial Project Management Office.

## STATUS OF COMPLIANCE WITH LOAN AND GRANT COVENANTS

Covenant	Reference	Status of Compliance
(a) The Borrower shall cause HPG to carry out the Project with due diligence and efficiency and in conformity with sound administrative, financial, engineering, environmental, water supply, wastewater management, solid waste management, river improvement, and heating practices.	LA, Article IV, Section 4.01	Complied with. HPG carried out the project successfully and met all obligations.
(b) In the carrying out of the Project and operation of the Project facilities, the Borrower shall perform, or cause to be performed, all obligations set forth in Schedule 5 to this Loan Agreement and the Schedule to the Project Agreement.		
The Borrower shall cause HPG to, promptly as needed, make available the funds, facilities, services, land and other resources which are required, in addition to the proceeds of the Loan, for the carrying out of the Project.	LA, Article IV, Section 4.02	Complied with. HPG, through each city and county government made all required resources available for carrying out the project.
The Borrower shall ensure that the activities of its departments and agencies with respect to the carrying out of the Project and operation of the Project facilities are conducted and coordinated in accordance with sound administrative policies and procedures.	LA, Article IV, Section 4.03	Complied with. The project implementation followed relevant policy and procedure requirements.
The Borrower shall take all action which shall be necessary on its part to enable HPG to perform its obligations under the Project Agreement, including the establishment and maintenance of tariffs as stipulated in paragraphs 25 through 27 of the Schedule to the Project Agreement, and shall not take or permit any action which would interfere with the performance of such obligations.	LA, Article IV, Section 4.04	Complied with. HPG fully performed its obligation under the Project Agreement.
(a) The Borrower shall ensure through HPG that the concerned Local Governments to exercise its rights under the Onlending Agreements in such a manner as to protect the interests of the Borrower and ADB and to accomplish the purposes of the Loan.	LA, Article IV, Section 4.05	Complied with. Rights and obligations of Onlending Agreement were duly ensured and exercised by HPG and local government.
(b) The Borrower shall ensure, where applicable, through HPG that no rights or obligations under any Onlending Agreement shall be assigned, amended, abrogated or waived without the prior concurrence of the Borrower and ADB.		
<b>Implementation Arrangements</b>		
HPG shall be the EA for the Project. The PLG, which has been established as being chaired by a Vice Secretary-General of HPG and comprising representatives of HPFD, Development and Reform Commission of Hebei Province, Hebei Provincial Construction Department, Hebei Provincial Land and Resources Department, and Hebei Provincial Environmental Protection Department, shall provide overall guidance to the Project implementation and coordinate Project activities across Hebei Province. The PMO, established by decree in 2007 under Hebei Provincial Finance Department, shall undertake and manage the Project's day-to-day activities.	LA, Schedule 5, para. 1. PA, Schedule, para 1.	Complied with. HPG was the project EA. The PLG was established. HPPMO managed the project until completion. IAs for all subprojects were established.
The IAs for the Subprojects shall be the following:		
(A) in case of the Selected Subprojects,	LA, Schedule 5,	City PLG and County PLG were established. City or County PMO was

Covenant	Reference	Status of Compliance
<p>(i) BUCDC for the Bazhou City Subproject;</p> <p>(ii) ZCUID for the Zhaoxian County Subproject;</p> <p>(iii) HCSWTP for the Zhengding County Subproject; and</p> <p>(B) in case of the Subsequent Subprojects, the agencies appointed by the EA of the Project for the respective Subsequent Subprojects.</p> <p>In each Subproject city or Subproject county, a City PLG or County PLG shall be established to lead the implementation of the Subproject, and a City or County PMO shall be established to liaise with the Provincial PMO and oversee and manage the work undertaken by the IA.</p>	<p>para. 2</p> <p>PA, Schedule, para. 2</p> <p>LA, Schedule 5, para. 3</p> <p>PA, Schedule, para. 3</p>	<p>established and managed each subproject.</p>
<b>Counterpart Funding</b>		
<p>The Borrower shall cause HPG and the concerned Local Governments to ensure that all counterpart funding be provided in a timely manner for the concerned Subprojects, including any additional counterpart funding required for any shortfall of funds or cost overruns.</p> <p>The Borrower shall cause HPG and the concerned Local Governments to ensure that the concerned IAs provide adequate funding for the O&amp;M of the Project facilities, which shall be operated and maintained in accordance with the best engineering practices.</p>	<p>LA, Schedule 5, paras. 4-5</p> <p>PA, Schedule, paras. 4-5</p>	<p>Complied with.</p> <p>Counterpart funds were timely provided for each subproject with exception to Bazhou subproject noted in table A3.2 in Appendix 3. Adequate funds were earmarked and provided by local governments for O&amp;M of the project facilities.</p>
<b>Change in Ownership</b>		
<p>The Borrower shall cause HPG and each concerned Local Government to ensure that in the event that any change in ownership or rights of operation of Project facilities of any Subproject or any sale, transfer, or assignment thereof is anticipated, HPG and the concerned Local Government consult ADB at least six months prior to the implementation of such change. The Borrower shall cause HPG and the concerned Local Government to ensure that such changes be carried out in a lawful and transparent manner.</p>	<p>LA, Schedule 5, para. 6</p>	<p>Complied with.</p> <p>There was no change in ownership.</p>
<p>(a) The Recipient shall cause the Project to be carried out with due diligence and efficiency and in conformity with sound applicable financial, business and development practices.</p>	<p>GA, Section 4.01</p>	<p>Complied with.</p>
<p>(b) In the carrying out of the Project, the Recipient shall perform, or cause to be performed, all obligations set forth in Schedule 4 to this Grant Agreement.</p>		
<p>The Recipient shall make available to HPPMO through HPG, promptly as needed, the funds, facilities, services and other resources which are required, in addition to the proceeds of the Grant, for the carrying out of the Project.</p>	<p>GA, Section 4.02</p>	<p>Complied with.</p> <p>HPPMO was supported with needed resources to carry out the Project.</p>
<p>The Recipient shall enable ADB's representatives to inspect the Project, the goods financed out of the proceeds of the Grant, and any relevant records and documents.</p>	<p>GA, Section 4.03</p>	<p>Complied with.</p> <p>Project review mission inspect deliverables of the Grant.</p>
<p>The Recipient shall ensure that the activities of its departments and agencies with respect to the carrying out of</p>	<p>GA, Section 4.04</p>	<p>Complied with.</p>

Covenant	Reference	Status of Compliance
the Project are conducted and coordinated in accordance with sound administrative policies and procedures.		
The Recipient shall take all action which shall be necessary on its part to enable HPPMO to perform its obligations under the Project Agreement, and shall not take or permit any action which would interfere with the performance of such obligations.	GA, Section 4.05	Complied with.
(a) The Recipient shall exercise its rights under this Grant Agreement in such a manner as to protect the interests of the Recipient and ADB and to accomplish the purposes of the Grant.	GA, Section 4.06	Complied with.
(b) No rights or obligations under the financing arrangements shall be assigned, amended, abrogated or waived without the prior concurrence of ADB.		
The Recipient shall designate HPPMO under HPG as the Project Executing Agency with overall responsibility for Project coordination and implementation, and liaison with ADB and other government agencies concerned. The Recipient shall ensure that HPG and HPPMO carry out the Project in accordance with the provisions of this Grant Agreement.	GA, Schedule 4	Complied with. HPPMO is the project executing agency following stipulations of the Grant Agreement.
(a) HPG shall cause the Subproject Cities and Counties and IAs to perform the obligations and perform the undertakings as required in this Project Agreement.	PA, Article II, Section 2.01	Complied with. Each city and county government and its IA performed the required obligations and undertakings.
(b) HPG and each IA shall carry out the Project with due diligence and efficiency, and in conformity with sound administrative, financial, engineering, environmental, urban (river improvement or area upgrading) and social development, and public facility (wastewater, water supply, heating, and solid waste management) practices.		
(c) In the carrying out of the Project and operation of the Project facilities, HPG and each IA shall perform all obligations set forth in the Loan Agreement to the extent that they are applicable to HPG and the concerned IA and all obligations set forth in the Schedule to this Project Agreement and, where applicable, in the Onlending Agreement.		
HPG and the concerned IA shall make available, promptly as needed, the funds, facilities, services, equipment, land and other resources which are required, in addition to the proceeds of the Loan, for the carrying out of the Project.	PA, Article II, Section 2.02	Complied with. Each city and county government provide counterpart funds on time with exception to one subproject noted in para 10.
(a) In the carrying out of the Project, each IA shall employ competent and qualified consultants and contractors, acceptable to ADB, to an extent and upon terms and conditions satisfactory to ADB.	PA, Article II, Section 2.03	Complied with. All IAs and PMOs engaged qualified design institutes and contractors to design and construct the subproject and meet requirements. Procurement for all packages financed by ADB followed ADB's
(b) Except as ADB may otherwise agree, all Goods, Works and consulting services to be financed out of the proceeds of the Loan shall be procured in accordance with the provisions of Schedule 4 to the Loan Agreement. ADB may refuse to finance a contract where Goods, Works or consulting services have not been procured under procedures substantially in		

Covenant	Reference	Status of Compliance
accordance with those agreed between the Borrower and ADB or where the terms and conditions of the contract are not satisfactory to ADB.		policies and guidelines.
Each IA shall carry out the Project in accordance with plans, design standards, specifications, work schedules and construction methods acceptable to ADB. HPG and each IA shall furnish, or cause to be furnished, to ADB, promptly after their preparation, such plans, design standards, specifications and work schedules, and any material modifications subsequently made therein, in such detail as ADB shall reasonably request.	PA, Article II, Section 2.04	Complied with. The project was carried out following requirements, standards, technical specifications and met the PRC's construction quality criteria and prevailing best practices.
(a) Each IA shall take out and maintain with responsible insurers, or make other arrangements satisfactory to ADB for, insurance of the Project facility to such extent and against such risks and in such amounts as shall be consistent with sound practice.	PA, Article II, Section 2.05	Complied with. Construction related insurance clauses were included in the contract and were standard requirement and were included in all works construction contracts.
(b) Without limiting the generality of the foregoing, the concerned IA shall undertake to insure, or cause to be insured, the Goods to be imported for the Project and to be financed out of the proceeds of the Loan against hazards incident to the acquisition, transportation and delivery thereof to the place of use or installation, and for such insurance any indemnity shall be payable in a currency freely usable to replace or repair such Goods.		
Each IA shall maintain, or cause to be maintained, records and accounts adequate to identify the Goods, Works and consulting services and other items of expenditure financed out of the proceeds of the Loan, to disclose the use thereof in the Project, to record the progress of the Project (including the cost thereof) and to reflect, in accordance with consistently maintained sound accounting principles, its operations and financial condition.	PA, Article II, Section 2.06	Complied with. All IAs and PMOs duly maintained project records during implementation till subproject final acceptance then archiving the records according to regulations.
(a) ADB and HPG shall cooperate fully to ensure that the purposes of the Loan will be accomplished. (b) HPG shall promptly inform ADB of any condition which interferes with, or threatens to interfere with, the progress of the Project, the performance of its or any IA's obligations under this Project Agreement, or the accomplishment of the purposes of the Loan. (c) ADB and HPG shall from time to time, at the request of either party, exchange views through their representatives with regard to any matters relating to the Project, the concerned IA and the Loan.	PA, Article II, Section 2.07	Complied with. Good cooperation established between HPPMO and ADB.
(a) HPG shall furnish to ADB all such reports and information as ADB shall reasonably request concerning (i) the Loan and the expenditure of the proceeds thereof; (ii) the Goods, Works and consulting services and other items of expenditure financed out of such proceeds; (iii) the Project; (iv) the administration, operations and financial condition of the concerned IAs; and (v) any other matters relating to the purposes of the Loan.	PA, Article II, Section 2.08	Complied with. During project implementation, HPPMO prepared and submitted nine semi-annual progress reports to ADB together with monitoring reports. After completion

Covenant	Reference	Status of Compliance
<p>(b) Without limiting the generality of the foregoing, HPG shall furnish to ADB semi-annual reports on the execution of the Project and on the operation and management of the Project facilities. Such reports shall be submitted in such form and in such detail and within such a period as ADB shall reasonably request, and shall indicate, among other things, progress made and problems encountered during the 6 months under review, steps taken or proposed to be taken to remedy these problems, and proposed program of activities and expected progress during the following 6 months.</p> <p>(c) Promptly after physical completion of the Project, but in any event not later than 3 months thereafter or such later date as ADB may agree for this purpose, HPG shall prepare and furnish to ADB a report, in such form and in such detail as ADB shall reasonably request, on the execution and initial operation of the Project, including its cost, the performance by HPG of its obligations under this Project Agreement and the accomplishment of the purposes of the Loan.</p>		<p>of the project, HPPMO prepared completion report to ADB in November 2016 and revised the completion report per ADB's comments accordingly.</p>
<p>(a) HPG and each IA shall (i) maintain separate accounts for the Project; (ii) have such accounts and related financial statements (balance sheet, statement of income and expenses, and related statements) audited annually, in accordance with appropriate auditing standards consistently applied, by independent auditors whose qualifications, experience and terms of reference are acceptable to ADB; and (iii) furnish to ADB, promptly after their preparation but in any event not later than 6 months after the close of the fiscal year to which they relate, certified copies of such audited Project financial statements and the report of the auditors relating thereto (including the auditors' opinion on the use of the Loan proceeds and compliance with the covenants of the Loan Agreement as well as on the use of the procedures for imprest account/statement of expenditures), all in the English language. HPG shall furnish to ADB such further information concerning such financial statements and the audit thereof as ADB shall from time to time reasonably request.</p> <p>(b) HPG and each IA shall enable ADB, upon ADB's request, to discuss the IA's financial statements and its financial affairs from time to time with the auditors appointed by HPG pursuant to Section 2.09(a) hereabove, and shall authorize and require any representative of such auditors to participate in any such discussions requested by ADB, provided that any such discussion shall be conducted only in the presence of an authorized officer of HPG and the IA unless HPG and the IA shall otherwise agree.</p>	<p>PA, Article II, Section 2.09</p>	<p>Complied with. Hebei Provincial Audit Department conducted annual audit of the project and the project account. Six audit reports were submitted to ADB on time. ADB made comments on these reports. Consequently, the HPPMO took immediate actions addressing and rectifying commented issues and submitted responses to ADB.</p>
<p>HPG and each IA shall enable ADB's representatives to inspect the Project, the Goods and Works financed out of the proceeds of the Loan, and other plants, sites, properties and equipment of the concerned IAs and records and documents relevant to the Project.</p>	<p>PA, Article II, Section 2.10</p>	<p>Complied with. Loan review missions visited project site and inspected implementation progress.</p>
<p>(a) In case that the concerned IA is a corporate entity, the IA shall, promptly as required, take all action within its powers to maintain its corporate existence, to carry on its operations,</p>	<p>PA, Article II, Section 2.11</p>	<p>Complied with. Each IA obliged to these requirements and</p>

Covenant	Reference	Status of Compliance
<p>and to acquire, maintain and renew all rights, properties, powers, privileges and franchises which are necessary in the carrying out of the Project or in the conduct of its business.</p> <p>(b) Each IA shall at all times conduct its business in accordance with sound administrative, financial, environmental, and where applicable, water supply, wastewater treatment, river improvement, solid waste management, heating, and other urban development and public facility practices, and under the supervision of competent and experienced management and personnel.</p> <p>(c) Each IA shall at all times operate and maintain its plants, equipment and other property, and from time to time, promptly as needed, make all necessary repairs and renewals thereof, all in accordance with sound administrative, financial, engineering, environmental, O&amp;M, water supply, wastewater treatment, river improvement, solid waste management, heating, and other urban development and public facility practices.</p>		<p>managed the project facilities in diligent manner.</p>
<p>Except as ADB may otherwise agree, the IAs shall not sell, lease or otherwise dispose of any of their assets which shall be required for the efficient carrying on of its operations or the disposal of which may prejudice its ability to perform satisfactorily any of its obligations under this Project Agreement.</p>	<p>PA, Article II, Section 2.12</p>	<p>Complied with. No selling or disposing of any project assets as of completion review.</p>
<p>Except as ADB may otherwise agree, each IA shall apply the proceeds of the Loan to the financing of expenditures on the Project in accordance with the provisions of the Loan Agreement and this Project Agreement, and shall ensure that all Goods, Works and consulting services financed out of such proceeds are used exclusively in the carrying out of the Project.</p>	<p>PA, Article II, Section 2.13</p>	<p>Complied with. Loan proceeds were used for expenditures on the project and supervised by government agencies on such usage.</p>
<p>In case there is an Onlending Agreement to which an IA is a party, except as ADB may otherwise agree, the IA shall duly perform all its obligations under the Onlending Agreement, and shall not take, or concur in, any action which would have the effect of assigning, amending, abrogating or waiving any rights or obligations of the parties under the Onlending Agreement.</p>	<p>PA, Article II, Section 2.14</p>	<p>Complied with.</p>
<p>In case the concerned IA is a corporate entity, the IA shall promptly notify ADB of any proposal to amend, suspend or repeal any provision of its Charter to the extent that will materially affect Project implementation and shall afford ADB an adequate opportunity to comment on such proposal prior to taking any action thereon.</p>	<p>PA, Article II, Section 2.15</p>	<p>Complied with.</p>
<p><b>River Improvement, Treatment, and Flood Control</b></p> <p>HPG and the concerned Local Governments shall ensure that wastewater be treated before being discharged into the rivers to be improved or treated as a part of the river improvement and flood control Subprojects.</p> <p>Implementation shall be in accordance with the local planning for river improvement and flood control and therefore ensure that wastewater treatment plants and sewage pipelines be constructed or improved at the</p>	<p>PA, Schedule, paras 6-9</p>	<p>Complied with. Wastewater was treated before discharge. Implementation was carried out per local master plan and met all technical requirements.</p>

Covenant	Reference	Status of Compliance
<p>Subproject locations during the implementation of the river improvement and flood control Subprojects.</p> <p>The concerned Local Governments shall ensure that direct discharge of untreated and noncompliant wastewater and disposal of any solid wastes into the rivers be prohibited after the Subproject is completed. The concerned Local Governments shall ensure that domestic solid waste collection and treatment systems be constructed in a timely manner in accordance with the urban planning.</p> <p>The concerned Local Government(s) shall ensure that construction of riverside buildings be regulated and excavation, illegal construction and any other activities that might damage the embankment structure be prohibited to ensure that the river improvement and area upgrading works of the Project be sustainable.</p> <p>HPG and each concerned Local Government shall ensure that a flood monitoring and control system be gradually established at the Project areas and integrated into the provincial/municipal flood monitoring and control systems. HPG and each concerned Local Government shall ensure that a water quality monitoring system be gradually established to ensure O&amp;M management and operation of the river improvement Subprojects.</p>		<p>The local government agency enforced these requirements during implementation and operation.</p> <p>Central and local inter-linked flood monitoring and control system was established. Water quality monitoring was conducted on regular basis.</p>
<b>Water Supply and Wastewater Treatment</b>		
<p>The concerned Local Governments shall ensure that the water supply and wastewater treatment works and the wastewater collection networks be of adequate capacity, the associated works of the water supply or wastewater Subprojects be constructed in time in accordance with, as applicable, the master urban plan, the master water supply plan, or the wastewater treatment plan to serve the daily living requirements of the residents and the economic development needs of the Project area.</p> <p>The concerned Local Governments shall ensure that the treated wastewater comply with the environmental standard prior to discharge.</p>	PA, Schedule, paras 10-11	<p>Complied with.</p> <p>All constructed works facilities met required capacity and followed the plan.</p>
<b>Heat Supply</b>		
<p>The concerned Local Governments shall ensure that the heat supply works comply with the master urban plan and the specific planning, the heat supply works include equipment and networks of adequate capacity to meet the needs of development of the Project in a timely manner, and the associated works of the heat supply Subprojects be constructed in time in accordance with the master urban plan and/or the master heat supply plan to serve the daily living requirements of the residents and the economic development needs of the Project area.</p>	PA, Schedule, paras 12-16	<p>Complied with.</p> <p>All constructed works facilities met required capacity and followed the plan.</p> <p>Safety review was conducted for heating subproject.</p>
<p>The concerned Local Governments shall ensure that the design of the heat supply Subprojects be reviewed prior to the implementation of the Project and a safety engineer be engaged for each such Subproject to review the safety</p>		<p>Safety engineer was</p>



Covenant	Reference	Status of Compliance
<p>design of the special equipment to ensure that the Project design be reasonable.</p> <p>The concerned Local Governments shall ensure that a safety engineer be engaged during the implementation of each heat supply Subproject to supervise the quality of the construction and installation of the special equipment, and that the heat supply Subprojects be constructed safely according to the relevant national codes and specifications. HPG shall cause the Government of Zhaoxian County to ensure adequate supply of heat sources in a timely manner to the heat supply system that will be constructed under the Project.</p> <p>HPG shall cause the concerned Local Government having jurisdiction over the Heating Supply Component under the Zhaoxian County Subproject to ensure that after the Heating Supply Component is put into operation the air pollutants, wastewater, ashes and slag and other solid wastes discharged by the boilers under the Heating Supply Component comply with the respective emission and discharge standards. HPG shall also cause the concerned Local Government to ensure that energy-saving, low-noise and environment friendly equipment be procured, vibration-proof and noise-reduction measures be taken to protect the environment, and actions be taken to guarantee the normal operation of desulphurization and dust removal equipment.</p>		<p>engaged during construction and operation of the heat subproject.</p> <p>The air pollutants, wastewater, ashes and slag and other solid wastes discharged by the boilers under the Heating Supply Component complied with the respective emission and discharge standards.</p>
<b>Solid Waste Management</b>		
<p>The Zhaoxian County and Zhengding County Governments, as well as other concerned Local Governments having jurisdiction over the solid waste components, shall ensure that the design of the solid waste management facilities complies with the environmental protection requirements. The Zhaoxian County and Zhengding County Governments, as well as other concerned Local Governments shall ensure that the solid waste management facility be financially and environmentally sustainable.</p>	<p>PA, Schedule, para 17</p>	<p>Complied with. Solid waste treatment construction and operation followed relevant regulations and standards.</p>
<b>Construction Quality and Management</b>		
<p>Each IA shall ensure that all works under the Project be designed and constructed in accordance with national standards and specifications, and that the construction supervision, quality control, contract management, and completion inspection and acceptance follow applicable national laws and regulations.</p> <p>HPG and the concerned Local Government(s) shall ensure that under each Subproject, an engineer be engaged to review the engineering design of the important engineering components and a supervision engineer be engaged to supervise and manage the construction quality and review, supervise and manage the progress, payment and variations under the contract.</p>	<p>PA, Schedule, paras 18-19</p>	<p>Complied with. All project facilities were built in accordance with design specifications and national construction quality requirements.</p> <p>A construction supervision team including the Engineer was engaged for each subproject to ensure good quality control and sound contract management during construction.</p>

Covenant	Reference	Status of Compliance
<b>Implementation and Institutional Arrangements</b>		
<p>HPG and the concerned Local Governments shall ensure that the Subproject implementation procedures be consistent with the ADB requirements, including those in terms of environmental protection and social security. HPG and the concerned Local Governments shall ensure that no changes to any approved financial arrangements, Project assets and IAs, nor transfer of assets be conducted without the prior approval and consent of the concerned Local Governments, HPG and ADB. If such changes to the financial arrangement, ownership of the Project assets and the IAs may affect the ability of debt service of the respective agencies and utilities, such changes shall not be implemented until the approvals are obtained from HPG and ADB.</p> <p>The IAs shall actively explore opportunities for attracting private sector participation, provided, however, the introduction of such private sector participation shall be acceptable to and agreed by ADB prior to implementation. The IAs of the heat supply Subprojects shall ensure that the heat supply systems operate safely after the Subprojects are completed and that corresponding regulations on operation management, such as regulations on safe operation of boilers, monitoring and patrol and safety inspections, job responsibility and maintenance and servicing, be established, and the respective personnel be trained and certified before being assigned to the respective operational posts.</p>	<p>PA, Schedule, paras 20-23</p>	<p>Complied with.</p> <p>All subprojects were implemented meeting ADB safeguard requirements.</p> <p>All approved financial arrangements remain unchanged and there is no change in ownership.</p> <p>Safe operation and facility management were followed for heating subprojects.</p>
<b>Training</b>		
<p>HPG shall cause the Provincial PMO to, in consultation with the concerned IAs, prepare and submit a training plan to be implemented under the Project to ADB for review and concurrence, and shall ensure that training institutes for such purpose be selected in accordance with procedures acceptable to ADB. Following each training event, the concerned IAs shall submit a training completion report to the Provincial PMO for consolidation and transmission to ADB.</p>	<p>PA, Schedule, para 24</p>	<p>Complied with.</p> <p>Trainings were conducted through 20 workshops for more than 600 staff from EA, IAs and PMOs.</p>
<b>Tariff and Cost Recovery</b>		
<p>HPG and the concerned Local Governments shall ensure that (a) water supply and wastewater tariffs be progressively set at the levels, and the heat supply tariffs be progressively set in accordance with the requirements of the concerned Local Governments, to achieve full cost recovery of O&amp;M, depreciation and debt service obligations and reasonable profit margin for operations; (b) annual reviews of tariffs and fees be undertaken by the local Price Bureau or the concerned IAs; and (c) regular reviews on the impact of the increased heat supply, water supply and wastewater tariffs on the poor be carried out by the concerned Local Government agency. The concerned Local Governments shall consider providing lifeline heat supply, water supply and wastewater tariffs to the poor.</p>	<p>PA, Schedule, paras 25-27</p>	<p>Complied with.</p> <p>The tariffs of subprojects (heating supply and water supply subprojects) are set at levels on a progressive manner in accordance with requirements.</p> <p>Local government supervised tariffs setting followed procedures including public</p>

Covenant	Reference	Status of Compliance
<p>HPG and the concerned Local Governments shall ensure that in the setting of new tariffs for heat supply, water supply and wastewater treatment, the local Price Bureau (a) take into consideration (i) calculation of minimum cost recovery tariffs based on actual project costs, (ii) affordability and willingness-to-pay data including the results of surveys, and (iii) price escalation; and (b) conduct a public pricing hearing.</p> <p>To ensure financial sustainability of the Project's facilities, the concerned IAs shall undertake operational improvements such as measuring, reporting, and reducing nonrevenue water and undertaking bulk metering during the Project implementation.</p>		<p>hearings. Low-income users including the poor were given subsidies or granted a tariff waive under 13 heating, water supply and wastewater treatment subprojects. A total of 6,974 households benefited from waiving of tariff which amounted to CNY1.63 million per annum.</p>
<b>Financial Management</b>		
<p>Each IA shall have a relatively independent financial management system. HPG and the concerned Local Governments shall ensure that for the revenue generating Subprojects, including water supply, wastewater, and heat Subprojects, (i) the concerned IA or operating entity be entitled to receive all the collected tariffs; (ii) no agency may withhold any of the collected tariffs; and (iii) appropriate budgetary appropriation be made to meet any shortfalls in operations and maintenance prior to achieving full cost recovery. HPG and the concerned Local Governments shall ensure that for non-revenue generating Subprojects such as river improvement Component under the Bazhou City Subproject, necessary financial budget be prepared each year to cover the needs of the normal maintenance and management of the Project facilities.</p> <p>Each IA shall establish and maintain a sound financial management system in accordance with ADB's Guidelines on the Financial Management and Analysis of Projects (2005) including the establishment of a separate bank account for each Subproject, and the maintenance of minimum balance to ensure smooth cash flow and the timely settlement of Project construction liabilities and future debt servicing.</p>	<p>PA, Schedule, paras 28-29</p>	<p>Complied with. Each IA established independent financial management system with qualified staffing following requirements.</p>
<b>Financial Performance</b>		
<p>The IAs shall develop consolidated financial accounts for the operation and management of the Subprojects. These financial accounts shall include statements of profit and loss, cash flow (or sources and uses of funds) and a balance sheet representing the operational activities of the Subprojects, reflecting the current account of the agencies related to the operation and management of the Subprojects.</p>	<p>PA, Schedule, para 30</p>	<p>Complied with.</p>
<b>Change in Ownership</b>		
<p>The Provincial PMO, the concerned Local Government and the concerned IA shall ensure that in the event that any change in ownership or rights of operation of Project</p>	<p>PA, Schedule, para 31</p>	<p>Complied with. There was no change in ownership.</p>

Covenant	Reference	Status of Compliance
<p>facilities of any Subproject or any sale, transfer, or assignment thereof is anticipated, HPG, the concerned Local Government and the concerned IA shall consult ADB prior to the implementation of such change. The Provincial PMO, the Local Government and the IA shall ensure that such changes be carried out in a lawful and transparent manner.</p>		
<p><b>Governance and Anticorruption</b></p>		
<p>HPG, the concerned Local Governments and the IAs shall comply with ADB's Anticorruption Policy (1998, as amended from time to time). HPG, the concerned Local Governments and the IAs agree (a) that ADB reserves the right to investigate any alleged corrupt, fraudulent, collusive, or coercive practices relating to the Project; and (b) to cooperate fully with any such investigation and to extend all necessary assistance, including providing access to all relevant books and records, as may be necessary for the satisfactory completion of any such investigation.</p>	<p>PA, Schedule, paras 32-34</p>	<p>Complied with. Sound governance and anticorruption measures were adopted and followed during bidding and construction period.</p>
<p>Each IA shall (a) conduct periodic inspections on the contractors' activities related to fund withdrawals and settlements; and (b) ensure that all contracts financed by ADB in connection with the Project include relevant provisions of ADB's Anticorruption Policy in all bidding documents specifying the right of ADB to audit and examine the records and accounts of the Project and all the contractors, supplies, consultants, and other service providers as they relate to the Project.</p> <p>HPG, the concerned Local Governments and the IAs shall undertake the following anticorruption actions: (i) involvement of the local discipline investigation bureaus in bidding and construction to enhance construction quality control and supervise effective work; (ii) introduction of a dual-signing system in which each construction contract winner also signs an anticorruption contract with the concerned IAs; (iii) periodical inspection of the contractors' activities related to fund withdrawals and settlements; and (iv) engagement of the Project implementation consultant to support the concerned City or County PMOs, the concerned Local Governments and the concerned IAs to ensure good governance, accountability, and transparency in Project operations.</p>		<p>HPPMO and other concerned government agencies conducted periodic inspection of each subprojects and ensure compliance with requirements.</p> <p>Local discipline agency representative actively monitored procurement activities, dual-signing system abided by, and periodic inspection conducted, consultant provided trainings to local PMOs and agencies.</p>
<p><b>Construction Contractors</b></p>		
<p>HPG, the concerned Local Governments and the IAs shall ensure that the contractors (i) comply with the applicable labor laws and regulations, including stipulations related to employment, health, safety, welfare and the workers' rights; and (ii) do not employ child labor. The City and County PMOs shall ensure that the contractors maintain records of labor employment and submit a copy of such records to the City and County PMOs.</p> <p>HPG and each IA shall ensure that the contractors (i) be responsible for providing their employees healthy and safe</p>	<p>PA, Schedule, paras 35-36</p>	<p>Complied with. Labors employed by contractors were protected by these requirements and various government regulations. Additionally, the government closely monitored that all labors were paid by the</p>

Covenant	Reference	Status of Compliance
working conditions; (ii) together with the local health bureaus, disseminate information on the risks, hazards, impacts and prevention know-how on HIV/AIDS among the staff, workers on the construction sites and the local community by means of information disclosure, education and consultation; and (iii) observe local protocols concerning acceptable behavior toward the local population.		contractor on time without delay.
<b>Gender</b>		
The IAs shall take all reasonable and necessary steps to encourage women living in the Project areas to participate in the planning and implementation of the Project, including causing the contractors to maximize employment of women in connection with the Project; and monitor the Project's impacts on women during project implementation and report them in the PPMS.	PA, Schedule, para 37	Complied with. Project construction and operation created 302 employment opportunities for women.
<b>Public Awareness and Education</b>		
The IAs shall conduct, in association with a consulting service provider agreed by the concerned Local Government authorities or ADB, public awareness and education programs on public health, hygiene and solid waste and wastewater management in Project areas by means of information disclosure, education and consultation.	PA, Schedule, para 38	Complied with. Public awareness were made on traffic safety, prevention of waterborne diseases and education on water conservation through campaign, education and consultation.
<b>Poverty and Social Development Strategy</b>		
HPG and the concerned Local Governments shall conduct prior review of the impact of increased water supply, wastewater and heating tariffs on the poor and gradually establish or implement a pricing policy favorable to the poor households and ensure that the minimum living standard of the poor be not affected by any tariff adjustment. Impacts on the poor households by the Project during and after implementation shall be monitored and included in the PPMS report.	PA, Schedule, paras 39-40	Complied with.
HPG, the concerned Local Governments and the IAs shall ensure that all civil works contractors engaged under the Project provide (i) timely payment of wages; and (ii) necessary safety protection measures to all workers (with such measures being included in civil works contract and monitored by construction supervision consultants). The IAs shall set employment targets for the poor, ethnic minorities and women who meet the job requirements for all construction and maintenance activities and ensure that the contractors provide the workers with adequate on-the-job training, use local unskilled labor, not differentiate wages based on gender, and monitor the Project impact on poverty in accordance with guidelines set forth in the PPMS.		The project provided 1,616 jobs, of which 429 jobs were for women and the poor. Local government subsidized tariff to the poor and low income groups such as reducing CNY5 per square meter for heating charges.
		During the project construction period, the civil contractors paid wages on time and provided labor safety protection measures and labor insurance to workers.
<b>Land Acquisition and Resettlement</b>		
HPG, the concerned Local Governments and the IAs shall	PA, Schedule,	Complied with.

Covenant	Reference	Status of Compliance
<p>ensure that: (i) prior to the commencement of construction work, all land and rights-of-way required by the Project be made available in a timely manner in accordance with the Borrower's laws and regulations, including land use approvals and agreements with APs; (ii) the RPs be implemented promptly and efficiently in accordance with their terms; and the provisions of the RPs be implemented in accordance with all applicable laws and regulations of the Borrower, and ADB's Policy on Involuntary Resettlement; (iii) all APs be given adequate opportunity to participate in resettlement planning and implementation; (iv) the APs be at least as well off as they would have been in the absence of the Project; (v) counterpart funds be provided in time for land acquisition and resettlement activities; and (vi) any amounts in excess of the RP budget estimates be provided.</p> <p>The IAs shall ensure that each RP be updated according to the final design, including detailed measurement surveys, for the respective Subprojects of the Project, and updated RPs be submitted to ADB for its concurrence prior to award of civil works contracts, and disclosed to APs in accordance with ADB's applicable information disclosure requirements for resettlement.</p> <p>The IAs shall ensure that: (i) adequate staff and resources be committed to supervision and internal monitoring of the implementation of each Subproject RP and provide ADB with semi-annual monitoring reports during resettlement implementation and a resettlement completion report for each Subproject; (ii) an independent agency acceptable to ADB be contracted to carry out monitoring and evaluation, including data disaggregated by gender where applicable, and forward reports to ADB semi-annually; (iii) ADB be promptly advised of any substantial changes in the resettlement impacts and, if necessary, a revised RP be submitted to ADB for its approval; (iv) construction contract specifications include requirements to comply with the RPs and ensure prompt payment and delivery of entitlements to compensate APs for any permanent and temporary Project impacts to APs; and (v) the construction and demolition contractors be supervised to ensure compliance with requirements of the RPs, applicable laws and ADB's Policy on Involuntary Resettlement.</p>	paras 41-43	The monitoring reports show that income of the affected people has increased compared with the baseline. Compared with the baseline year, the average income growth rate is 64.75%.
<b>Ethnic Minorities</b>		
<p>In case that any ethnic minorities in the Project areas will be affected by any Subproject, the concerned Local Governments and the concerned IA(s) shall ensure that (i) an EMDP be prepared according to the requirements of the EMDF; (ii) benefits target ethnic minorities in the Project areas in accordance with ADB's Policy on Indigenous Peoples; (iii) works contract specifications include requirements to comply with EMDF and as a priority provide employment to ethnic minorities; and (iv) adequate staff and resources be committed to supervising and</p>	PA, Schedule, para 44	Complied with. No ethnic minority was affected under the project.

Covenant	Reference	Status of Compliance
<p>monitoring the implementation of EMDF and progress, if any, be reported to ADB on a semi-annual basis; (v) the EA engage an external independent monitoring agency acceptable to ADB to monitor the implementation of the EMDP semi-annually and submit the monitoring report to ADB; (vi) the statistics of the monitoring data be conducted by gender and the monitoring report and the monitoring data include analysis on social impacts by gender.</p>		
<b>Environment</b>		
<p>Each IA shall construct, operate, maintain and monitor the Project facilities in strict conformity with (i) all applicable laws and regulations including national, regional and local regulations and standards on environmental protection, health, labor, and occupational safety and ADB's Environment Policy (2003); and (ii) all environmental mitigation and monitoring measures detailed in EIAs, SEIA and EMP for the Project under guidance of the HPEPD or other environmental monitoring centers. HPG, the Environmental Protection Bureaus of the concerned Local Governments and the IAs shall review any changes to the project design that may have a potential for causing negative environmental impacts, and adjust environmental monitoring and mitigation measures accordingly in consultation with ADB.</p> <p>HPG and the concerned Local Governments shall ensure that an adequate number of full-time personnel and sufficient resources be provided to monitor the implementation of the EMP under guidance of HPEPD, the Environmental Protection Bureaus of the concerned Local Governments, or other environmental monitoring centers. The IAs shall provide monthly environmental monitoring reports during the construction period to the Provincial PMO, who shall prepare and submit to ADB semi-annual environmental reports in a format acceptable to ADB until Loan closure.</p>	PA, Schedule, paras 45-46	<p>Complied with.</p> <p>A total of 6 environment monitoring reports were submitted and uploaded on ADB website.</p> <p>EIA and EMP reports were provided for all subprojects accordingly.</p>
<b>Selection, Evaluation and Approval of Subsequent Subprojects</b>		
<p>Except as ADB may otherwise require, the Subsequent Subprojects shall be identified, selected, prepared, appraised, and approved in accordance with the criteria set forth hereunder.</p> <p><b>Subproject Identification and Selection.</b> The Subsequent Subprojects shall be selected in accordance with the following basic criteria: (i) confirmation by the concerned Local Government on its ability and willingness to arrange counterpart financing; (ii) confirmation by the concerned Local Government on its willingness to comply with ADB safeguard policies and other requirements; (iii) the implementation period of the Subsequent Subproject being in 2009 – 2015; (iv) eligibility of the components, which means that sector(s) of a Subsequent Subproject shall be included in the list of eligible infrastructure and municipal services and comply with the master development plan submitted for review of ADB and specific</p>	PA, Schedule, paras 47-53	<p>Complied with.</p> <p>All listed and agreed criteria were applied during selection and identification of subsequent subprojects</p>

Covenant	Reference	Status of Compliance
<p>development plan of the city; (v) anticipated positive impact on the urban environment; (vi) anticipated positive impact on employment generation; and (vii) anticipated positive impact on the coverage or service level of infrastructure and municipal services.</p> <p><b>Subproject Preparation.</b> The concerned Local Government and IA shall, with the assistance of the Provincial PMO, prepare a feasibility study for each of the components of the proposed Subproject, which shall include Subproject rationale, scope and components, technical description and analysis, cost estimates and financing plan, implementation arrangements, and financial, economic, and institutional analysis including financial management assessment and social dimensions. The concerned Local Government shall also prepare an EIA and a RP (if required). The concerned Local Government shall ensure that the consultants to be engaged under the Project and responsible staff of the City or County PMO review the report, before submitting it to the Provincial PMO for appraisal.</p> <p><b>Subproject Appraisal and Approval.</b> The Provincial PMO shall be responsible for the appraisal of the Subsequent Subprojects. For each Subsequent Subproject the concerned Local Government shall prepare a SAR for consideration by the Provincial PMO. The SAR shall follow the format of the SARs template in the Project Preparatory Technical Assistance (TA No. 4959-PRC: Preparing the Small Cities and Towns Development Demonstration Sector Projects) report. HPG shall appraise the Subsequent Subprojects in accordance with the criteria agreed upon by the Borrower and ADB.</p> <p>The Provincial PMO shall ensure that the Subsequent Subprojects receive the same extent of environmental safeguard scrutiny, modeled on the EIAs for the Selected Subprojects and the SEIA. The Provincial PMO shall submit the EIAs for the Subsequent Subprojects for ADB's review and comment, and having incorporated ADB's comments, the Provincial PMO shall submit the revised EIAs for ADB for posting on the ADB website to meet the 120-day disclosure requirement.</p> <p>For each Subsequent Subproject, the Provincial PMO and the concerned Local Governments shall ensure that a draft RP be prepared following the guidance of the resettlement framework having been approved by ADB, and such PR be upgraded using the representative Subproject RPs as models. The Provincial PMO and the concerned Local Governments shall ensure that poverty and social assessments also be conducted for the Subsequent Subprojects.</p>		

ADB = Asian Development Bank, AP = affected persons, EA = executing agency, EIA = environmental impact assessment, EMDF = ethnic minority development framework, EMDP = ethnic minority development program, EMP = environmental management plan, GA = grant agreement, HPEPD = Hebei Provincial Environmental Protection Department, HPFD = Hebei Provincial Finance Department, HPG = Hebei Provincial Government, IA = implementing agency, LA = loan agreement, O&M = operation and maintenance, PA = project agreement, para. = paragraph, PLG



= project leading group, PMO = project management office, PPMS = project performance management system, PRC  
= People's Republic of China, RP = resettlement plan, SEIA = summary environmental impact assessment  
Sources: Asian Development Bank and Hebei Provincial Project Management Office.

## ECONOMIC AND FINANCIAL REEVALUATION

### A. Introduction

1. The economic reevaluation is based on the economic evaluation prepared under the project preparatory technical assistance (TA) in 2009. It was conducted in accordance with the Asian Development Bank's (ADB) Guidelines for Economic Analysis of Projects (2001). It updates the project economic and financial reevaluation based on actual implementation costs, recalibrates projected benefits, operation and maintenance (O&M) and recent tariff. At appraisal, a cost-benefit analysis was carried out to assess the economic return. The six core subprojects in two cities were analysed in Report and Recommendation of the President to the Board of Directors (RRP) and 13 non-core subprojects in eight cities were fast-analysed based on subproject appraisal report (SAR). At completion, a total of 18 subprojects in 11 cities were completed compared with 19 subprojects in 10 cities and towns at appraisal which have been elaborated in the main text.

### B. Methodology

2. Benefit-cost analysis (BCA) and least cost analysis (LCA) were adopted at appraisal. At completion, the same methodology was applied to re-assess the economic return. Because of all non-revenue generating subprojects were dropped, BCA methodology was applied to revenue generating subprojects. Results of water treatment plan at appraisal were adjusted according to developing trend of gross domestic product (GDP) per capita.

3. Table A8.1 shows GDP per capita and household size developing trend for 10 counties and cities. GDP per capita growth rates of all counties and cities have a rapid increase. The highest growth rate is Weichang County, as high as 14.9% per annum. The lowest is Botou City which is 5.9% per annum. Household sizes in Zhaoxian, Zhengding, Zhangbei, Pingquan, and Longhua counties increased while other counties and cities have a trend of decreasing. With the implementation of the new two children policy in the People's Republic of China (PRC), the household size will be expected to grow trend during the coming years.

**Table A8.1: Comparison on Information of Selected Countries/Cities**

City/County	GDP per capita (CNY)				Household Size		
	2008	2010	2015	Growth (%)	2008	2010	2015
Zhaoxian County	18,116	23,141	33,106	9.0	3.65	3.58	3.70
Zhengding County	28,098	51,551	55,278	10.1	3.63	3.17	4.04
Huanggezhuang in Fengnan District	...	...	...	...	...	...	3.34
Huai'an County	13,233	17,150	25,655	9.9	2.72	2.65	2.52
Zhuolu County	11,274	15,915	26,248	12.8	2.82	2.58	2.45
Zhangbei County	10,383	13,720	25,028	13.4	2.54	2.50	3.49
Pingquan County	14,408	18,074	32,232	12.2	3.21	3.04	3.61
Weichang County	7,123	10,561	18,830	14.9	3.17	3.03	2.77
Longhua County	12,891	16,407	24,669	9.7	3.19	3.06	3.52
Baigou in Gaobeidian City	10,808	15,734	21,357	10.2	3.58	3.52	3.52
Botou City	20,601	19,889	30,836	5.9	3.31	3.11	3.18

... = not available, CNY = Chinese yuan, GDP = gross domestic product  
Sources: Hebei Province Statistical Yearbooks (2009, 2011, and 2016).

4. The financial internal rate of return (FIRR) of subprojects was reevaluated based on financial and operational information obtained from the project completion report prepared by the executing agency as well as revenue and cost assumptions.

### C. Evaluation of Individual Subproject

5. **Cost.** The financial cost was based on actual expenditures incurred for each subproject. All revenues and expenses were expressed in 2016 prices. The calculation period covered period of actual construction period and 20-year of operation period. Equipment's financial costs were converted to economic costs following the same methodology used at appraisal. The economic evaluation at appraisal was based on a comparison of with–and without–project scenarios, using constant 2007 economic prices. The economic costs include (i) the capital cost, excluding taxes and import duties; and (ii) the cost of O&M. The capital costs adopted actual data. O&M costs also were adjusted based on actual expenditures and the latest estimates for future years. Because most subprojects' costs at completion were decreased comparing to which were estimated at appraisal, economic costs keep same variation feature.

6. **Benefit.** Benefits of past years are calculated based on actual supply and waste treatment plant which has been modified in accordance with actual situations. Benefits of future are estimated based on projected supply and WTP which were updated according to the current situation and new developing trends. Actual supply scales of subprojects are listed in the table A8.2 below. Actual supply scales of all wastewater treatment subprojects are much lower than their respective designed capacities. Actual supply scales of water supply subprojects are lower than design capacities except Weichang County Water Supply Subproject. For district heating subprojects, actual supply scales for subprojects in Zhangbei, Huai'an and Weichang are almost the same as the designed capacities, while Zhaoxian's actual supply scale is much lower than the design capacity. For solid waste management subprojects, Baigou's actual supply scale is only half of the design capacity. Solid waste treatment subprojects in Zhaoxian and Zhengding were recently operated with no data. The reevaluated supply scale of subprojects will be reached full of capacity with 3–5 years.

**Table A8.2: Achievement of Project Objectives**

No.	Subproject	Scale		Variation trend
		Design Capacity (10,000 m <sup>3</sup> /d or 10,000 m <sup>2</sup> )	Actual Supply scale (10,000 m <sup>3</sup> /d or 10,000 m <sup>2</sup> )	
1	Zhaoxian Wastewater Treatment Phase II	5.0	3.7	Decrease
2	Zhaoxian Urban Heating Network Reconstruction and Expansion	201.8	120	Decrease
3	Zhaoxian Solid Waste Disposal	315 t/d of garbage collection and transport system, 100 t/d of the sanitary landfill	Normal Use	
4	Zhengding Environment Sanitation Facilities and Management	20 small transfer stations with capacity of 15 t/d, one secondary transfer station with capacity of 250 t/d	Normal Use	
5	Fennan District Huanggezhuang Wastewater Treatment Plant	2	1	Decrease
6	Huai'an Water Supply and Drainage Network Rehabilitation			
7	Huai'an Heating Network	230	234	
8	Zhuolu New Urban Water Supply	2	0.9	Decrease

No.	Subproject	Scale		Variation trend
		Design Capacity (10,000 m <sup>3</sup> /d or 10,000 m <sup>2</sup> )	Actual Supply scale (10,000 m <sup>3</sup> /d or 10,000 m <sup>2</sup> )	
9	Zhuolu Wastewater Treatment Phase II	2	1.7	Decrease
10	Zhangbei Urban East Heating Source Station	305	303	
11	Pingquan Urban Water Supply	2	1.2	Decrease
12	Pingquan Urban Heating Phase II	250	317.4	Increase
13	Weichang Heating Phase II	150	155	
14	Weichang Water Supply Phase II	1	1	
15	Longhua Wastewater Treatment	2	...	
16	Baigou Solid Waste Treatment Plant	Handling and using of baggage waste 300 t/d; handling and comprehensive utilization of domestic waste 200 t/d	The actual operation scale in baggage waste is 100 t/d	Decrease
17	Botou Water Supply Plant and Network Rehabilitation	3	1.6	Decrease
18	Botou Water Distribution Network Rehabilitation	...	...	

Note: Solid waste treatment plant subprojects are opened and assumed can be running at full capacity in 2017.

... = data not available, m<sup>2</sup> = square meter, m<sup>3</sup>/d = cubic meter per day, t/d = tons per day.

Source: Hebei Provincial Project Management Office.

7. Zhaoxian County Municipal Solid Waste Integrated Utilization Phase II Subproject was totally different from the subproject forecasted at appraisal including capacity demand analysis and design, and solid waste treatment technique. Since cost, O&M, served area and population are all different from those at appraisal, therefore no comparison between economic internal rate of return (EIRR) and FIRR are made for at appraisal and at completion of this subproject.

8. Huai'an Water Supply and Drainage Network Rehabilitation Subproject consisted of network only. This subproject is not shown as quantitative data for economic and financial analysis.

9. Baigou Solid Waste Treatment Plant Subproject. Baigou County has no charging policy on solid waste and lack detailed information for economic analysis. EIRR and FIRR data of the subproject was not presented.

10. New policy of value added tax (VAT) replacing the business tax was carried out in 2016. There are two types of VAT taxpayers, i.e. general VAT taxpayer and small scale VAT taxpayer. In order to simplify calculation, VAT of 3% for small scale company was adopted. At appraisal, 3% of business tax was adopted.

11. Repayment of the ADB loan is based on the instalment share prescribed in Schedule 2 of the Loan Agreement. The total effective interest rate for ADB loan was assumed to be 1.91%. Repayment period is 20 years starting from 2016 and ended by 2035.

12. **Tariff:** Current water tariff, wastewater tariff, and solid treatment tariff are listed in table A8.3 below. Most counties have increased tariffs during 2008-2016 as shown for tariff at completion in Table A8.3. Wastewater treatment tariffs have almost no change. Water tariffs were increased except that in Weichang County. Heating tariffs were increased slightly while

heating tariff in Huai'an County was increased significantly. Future tariffs are assumed to maintain at the current level.

**Table A8.3: Comparison on Tariffs**

No.	Subproject	Tariff	
		At Appraisal	At Completion
1	Huai'an HH Water Tariff (CNY/m <sup>3</sup> )		2.8
2	Zhuolu HH Water Tariff (CNY/m <sup>3</sup> )	1.9	2.5
3	Weichang HH Water Tariff (CNY/m <sup>3</sup> )	2.2	2.2
4	Pingquan HH Water Tariff (CNY/m <sup>3</sup> )	1.6	2.1
5	Botou HH Water Tariff (CNY/m <sup>3</sup> )	2.0	3.5
6	Zhaoxian HH Wastewater Treatment Tariff (CNY/m <sup>3</sup> )	0.25	0.8
7	Huai'an HH Wastewater Treatment Tariff (CNY/m <sup>3</sup> )		0.8
8	Zhuolu HH Wastewater Treatment Tariff (CNY/m <sup>3</sup> )	0.8	0.8
9	Longhua HH Wastewater Treatment Tariff (CNY/m <sup>3</sup> )	...	0.8
10	Zhaoxian Heating Tariff (CNY/m <sup>2</sup> /season)	17.50 (22.00)	18.50 (27.00)
11	Huai'an Heating Tariff (CNY/m <sup>2</sup> /season)	15.17	25.65 (37.40)
12	Weichang Heating Tariff (CNY/m <sup>2</sup> /season)	23.00 (28.00)	28.00 (35.00)
13	Pingquan Heating Tariff (CNY/m <sup>2</sup> /season)	20.00 (26.00)	24.00 (31.00)
14	Zhangbei Heating Tariff (CNY/m <sup>2</sup> /season)	...	21.12 (25.08)
15	Zhaoxian Solid Waste tariff (CNY/HH/month)	1.4	3
16	Zhengding Solid Waste tariff (CNY/HH/month)	1.0	3

Note: data in () refer to tariff for enterprise.

...= data not available, CNY = Chinese yuan, HH = household, m<sup>2</sup> = square meter, m<sup>3</sup> = cubic meter.

Source: Hebei Provincial Project Management Office

#### D. Results of Economic Analysis of Individual Subproject

13. The economic reevaluation shows the subprojects that were subject to BCA to be economically viable and that they stand up to sensitivity tests where benefits decrease except for Fengnan Huanggezhuang Wastewater Treatment Subproject and Zhuolu Wastewater Treatment Subproject. The EIRR results of the individual subprojects at appraisal and at completion are presented in table A8.4. EIRR for subprojects are between the ranges of 12.3% to 44.3%, higher than the economic opportunity cost of capital of 12%. The economic reevaluation demonstrates the economic viability of individual subprojects. Cost and benefit are the key factors to impact to economic analysis result. Comparing economic analysis result at appraisal and at completion, even though most actual costs decreased, most EIRRs at completion are lower than them at appraisal due to over design on capacity and demand, and lower actual supply scale. Heating subprojects got a higher EIRR at completion for economic O&M cost in actual are lower than which estimated in appraisal.

**Table A8.4: Comparison on EIRR**

Subproject	EIRR		
	At Appraisal	At Completion	At Completion -10% in benefit
Zhaoxian Wastewater Treatment Phase II	26.9%	23.8%	20.9%
Zhaoxian Urban Heating Network Reconstruction and Expansion	...	38.1%	33.0%
Zhaoxian Solid Waste Disposal	19.3%	17.3%	15.2%
Zhengding Environment Sanitation Facilities and Management	19.7%	24.7%	21.5%

Subproject	EIRR		
	At Appraisal	At Completion	At Completion –10% in benefit
Fennan District Huanggezhuang Wastewater Treatment Plant	18.1%	12.3%	10.1%
Huai'an Heating Network	24.6%	26.6%	17.5%
Zhuolu New Urban Water Supply	28.4%	20.7%	17.4%
Zhuolu Wastewater Treatment Phase II	15.2%	12.6%	9.9%
Zhangbei Urban East Heating Source Station	...	34.4%	29.7%
Pingquan Urban Water Supply	31.9%	21.9%	18.5%
Pingquan Urban Heating Phase II	20.8%	44.3%	38.7%
Weichang Heating Phase II	23.1%	28.7%	23.0%
Weichang Water Supply Phase II	20.2%	15.0%	11.8%
Botou Water Supply Plant and Network Rehabilitation	27.6%	18.4%	15.2%

... = data not available.

Source: Hebei Provincial Project Management Office

14. A sensitivity analysis was carried out to test the impacts of a decrease in benefit valuation. According to the sensitivity analysis, most subprojects will remain economically viable except Fengnan Huanggezhuang Waste Water Treatment Subproject and Zhuolu Waste Water Treatment Subproject.

## F. Results of Financial Analysis of Individual Subproject

15. The after-tax weighted average cost of capital (WACC) in real terms was calculated using actual capital and cost. The table A8.5 presents the FIRR results at appraisal and at completion. FIRR at completion of four subprojects including Hai'an Heating, Pingquan Water Supply, Pingquan Urban Heating, and Botou Water Supply were increased comparing to their respective FIRR at appraisal. The rest subprojects' FIRRs are much lower than that at appraisal. The difference was mainly due to lower capital cost and much lower actual supply scales except Pingquan Urban Heating subproject, and higher tariff of heating and solid waste treatment.

16. A sensitivity analysis was conducted to test the impact of variations in project revenues for 8 subprojects including Zhengding Solid Waste, Huai'an Urban Heating, Zhuolu Water Supply, Pingquan Water Supply, Pingquan Heating, Weichang Heating, Weichang Water Supply, and Botou Water Supply. The scenarios examined all 7 subprojects yielded a FIRR higher than WACC except Huai'an Water Supply Subproject.

**Table A 8.5: Reevaluated Weighted Average Cost of Capital**

Item	ADB Loan	Local Government Equity
<b>Zhaoxian Wastewater Treatment Phase II</b>		
Weight	32.0%	68.0%
Nominal Cost	1.9%	7.8%
Tax Rate	25.0%	25.0%
Tax adjusted nominal cost	1.4%	5.9%
Inflation rate	1.7%	5.1%
Real Cost	(0.3%)	0.7%
Weighted component	(0.1%)	0.5%
		<b>WACC = 0.4%</b>
<b>Zhaoxian Urban Heating Network Reconstruction and Expansion</b>		
Weight	49.0%	51.0%
Nominal Cost	1.9%	7.8%

Item	ADB Loan	Local Government Equity
Tax Rate	25.0%	25.0%
Tax adjusted nominal cost	1.4%	5.9%
Inflation rate	1.7%	5.1%
Real Cost	(0.3%)	0.7%
Weighted component	(0.1%)	0.4%
		<b>WACC = 0.2%</b>
<b>Zhaoxian Solid Waste Disposal</b>		
Weight	31.0%	69.0%
Nominal Cost	1.9%	7.8%
Tax Rate	25.0%	25.0%
Tax adjusted nominal cost	1.4%	5.9%
Inflation rate	1.7%	5.1%
Real Cost	(0.3%)	0.7%
Weighted component	(0.1%)	0.5%
		<b>WACC = 0.4%</b>
<b>Zhengding Environment Sanitation Facilities and Management</b>		
Weight	65.0%	35.0%
Nominal Cost	1.9%	7.8%
Tax Rate	25.0%	25.0%
Tax adjusted nominal cost	1.4%	5.9%
Inflation rate	1.7%	5.1%
Real Cost	(0.3%)	0.7%
Weighted component	(0.2%)	0.3%
		<b>WACC = 0.1%</b>
<b>Huai'an Heating Network</b>		
Weight	73.0%	27.0%
Nominal Cost	1.9%	7.8%
Tax Rate	25.0%	25.0%
Tax adjusted nominal cost	1.4%	5.9%
Inflation rate	1.7%	5.1%
Real Cost	(0.3%)	0.7%
Weighted component	(0.2%)	0.2%
		<b>WACC = 0.1%</b>
<b>Zhuolu New Urban Water Supply</b>		
Weight	66.0%	34.0%
Nominal Cost	1.9%	7.8%
Tax Rate	25.0%	25.0%
Tax adjusted nominal cost	1.4%	5.9%
Inflation rate	1.7%	5.1%
Real Cost	(0.3%)	0.7%
Weighted component	(0.2%)	0.2%
		<b>WACC = 0.1%</b>
<b>Zhuolu Wastewater Treatment Phase II</b>		
Weight	32.0%	68.0%
Nominal Cost	1.9%	7.8%
Tax Rate	25.0%	25.0%
Tax adjusted nominal cost	1.4%	5.9%
Inflation rate	1.7%	5.1%
Real Cost	(0.3%)	0.7%
Weighted component	(0.1%)	0.5%
		<b>WACC = 0.4%</b>
<b>Pingquan Urban Water Supply</b>		
Weight	71.0%	29.0%
Nominal Cost	1.9%	7.8%
Tax Rate	25.0%	25.0%

Item	ADB Loan	Local Government Equity
Tax adjusted nominal cost	1.4%	5.9%
Inflation rate	1.7%	5.1%
Real Cost	(0.3%)	0.7%
Weighted component	(0.2%)	0.2%
		<b>WACC = 0.1%</b>
<b>Pingquan Urban Heating Phase II</b>		
Weight	53.0%	47.0%
Nominal Cost	1.9%	7.8%
Tax Rate	25.0%	25.0%
Tax adjusted nominal cost	1.4%	5.9%
Inflation rate	1.7%	5.1%
Real Cost	(0.3%)	0.7%
Weighted component	(0.1%)	0.3%
		<b>WACC = 0.2%</b>
<b>Weichang Heating Phase II</b>		
Weight	49.0%	51.0%
Nominal Cost	1.9%	7.8%
Tax Rate	25.0%	25.0%
Tax adjusted nominal cost	1.4%	5.9%
Inflation rate	1.7%	5.1%
Real Cost	(0.3%)	0.7%
Weighted component	(0.1%)	0.4%
		<b>WACC = 0.2%</b>
<b>Weichang Water Supply Phase II</b>		
Weight	69.0%	31.0%
Nominal Cost	1.9%	7.8%
Tax Rate	0	0
Tax adjusted nominal cost	1.9%	7.8%
Inflation rate	1.7%	5.1%
Real Cost	0.2%	2.6%
Weighted component	0.1%	0.8%
		<b>WACC = 0.9%</b>
<b>Botou Water Supply Plant and Network Rehabilitation</b>		
Weight	49.0%	51.0%
Nominal Cost	1.9%	7.8%
Tax Rate	25.0%	25.0%
Tax adjusted nominal cost	1.4%	5.9%
Inflation rate	1.7%	5.1%
Real Cost	(0.3%)	0.7%
Weighted component	(0.1%)	0.4%
		<b>WACC = 0.2%</b>

Note: Numbers may not sum precisely because of rounding.

( ) = negative, ADB = Asian Development Bank, WACC = weighted average cost of capital.

Source: Asian Development Bank estimates.



**Table A8.6: Comparison on FIRR**

No.	Subproject	FIRR		WACC	FIRR
		At Appraisal	At Completion	At Completion	At Completion -10% in Benefit
1	Zhaoxian Wastewater Treatment Phase II	5.4%	0.1%	0.4%	
2	Zhaoxian Urban Heating Network Reconstruction and Expansion	9.7%	<0	0.2%	
3	Zhaoxian Solid Waste Disposal	8.8%	<0	0.4%	
4	Zhengding Environment Sanitation Facilities and Management	8.7%	7.8%	0.1%	5.8%
5	Fengnan District Huanggezhuang Wastewater Treatment Plant	0.3%			
6	Huai'an Water Supply and Drainage Network Rehabilitation				
7	Huai'an Heating Network	8.0%	8.3%	0.1%	3.2%
8	Zhuolu New Urban Water Supply	17.5%	8.2%	0.1%	5.7%
9	Zhuolu Wastewater Treatment Phase II	5.9%	<0	0.4%	
10	Zhangbei Urban East Heating Source Station				
11	Pingquan Urban Water Supply	5.0%	22.5%	0.1%	20.0%
12	Pingquan Urban Heating Phase II	6.9%	19.0%	0.2%	10.2%
13	Weichang Heating Phase II	7.7%	12.0%	0.2%	5.9%
14	Weichang Water Supply Phase II	8.2%	5.7%	0.9%	3.0%
15	Longhua Wastewater Treatment				
16	Baigou Solid Waste Treatment Plant				
17	Botou Water Supply Plant and Network Rehabilitation	9.3%	9.6%	0.2%	6.6%
18	Botou Water Distribution Network Rehabilitation				

FIRR = financial internal rate of return, WACC = weighted average cost of capital.

Source: Hebei Provincial Project Management Office.

17. Following tables presents detailed cash flow of economic and financial reevaluation.

**Table A8.7: EIRR of Zhaoxian Wastewater Treatment Phase II Subproject**  
(CNY '000)

Year	COSTS			BENEFITS	
	Investment Cost	O&M Costs	Total Costs	Benefits	Net benefits
	(a)	(b)	(c)	(d)	(e=c-d)
2011	4,649	0	4,649	0	(4,649)
2012	2,503	0	2,503	0	(2,503)
2013		613	613	2,062	1,449
2014		664	664	2,234	1,570
2015		715	715	2,543	1,828
2016		756	756	2,921	2,165
2017		868	868	3,196	2,328
2018		950	950	3,436	2,487
2019		1,021	1,021	3,436	2,415
2020		1,021	1,021	3,436	2,415
2021		1,021	1,021	3,436	2,415
2022		1,021	1,021	3,436	2,415
2023		1,021	1,021	3,436	2,415

Year	COSTS			BENEFITS	
	Investment Cost	O&M Costs	Total Costs	Benefits	Net benefits
	(a)	(b)	(c)	(d)	(e=c-d)
2024		1,021	1,021	3,436	2,415
2025		1,021	1,021	3,436	2,415
2026		1,021	1,021	3,436	2,415
2027		1,021	1,021	3,436	2,415
2028		1,021	1,021	3,436	2,415
2029		1,021	1,021	3,436	2,415
2030		1,021	1,021	3,436	2,415
2031		1,021	1,021	3,436	2,415
2032		1,021	1,021	3,436	2,415
<b>NPV = 6,539, BCR = 1.58, EIRR = 23.8%</b>					

( ) = negative, BCR = benefit cost ratio, EIRR = economic internal rate of return, NPV = net present value, O&M = operation and maintenance.

Source: Hebei Provincial Project Management Office.

**Table A8.8: EIRR of Zhaoxian Urban Heating Network Reconstruction and Expansion Subproject**  
(CNY '000)

Year	Economic Cost	O&M	Total Cost	Resource Cost savings	Time savings	Total Benefits	Net Benefits
2011	6,657		6,657				(6,657)
2012		836	836	3,315	61	3,376	2,539
2013		836	836	3,315	61	3,376	2,539
2014		836	836	3,315	61	3,376	2,539
2015		836	836	3,315	61	3,376	2,539
2016		836	836	3,315	61	3,376	2,539
2017		836	836	3,315	61	3,376	2,539
2018		836	836	3,315	61	3,376	2,539
2019		836	836	3,315	61	3,376	2,539
2020		836	836	3,315	61	3,376	2,539
2021		836	836	3,315	61	3,376	2,539
2022		836	836	3,315	61	3,376	2,539
2023		836	836	3,315	61	3,376	2,539
2024		836	836	3,315	61	3,376	2,539
2025		836	836	3,315	61	3,376	2,539
2026		836	836	3,315	61	3,376	2,539
2027		836	836	3,315	61	3,376	2,539
2028		836	836	3,315	61	3,376	2,539
2029		836	836	3,315	61	3,376	2,539
2030		836	836	3,315	61	3,376	2,539
2031		836	836	3,315	61	3,376	2,539
<b>NPV = 9,814, BCR = 2.5, EIRR = 38.1%</b>							

( ) = negative, BCR = benefit cost ratio, EIRR = economic internal rate of return, NPV = net present value, O&M = operation and maintenance.

Source: Hebei Provincial Project Management Office.

**Table A8.9: EIRR of Zhaoxian Solid Waste Disposal Subproject**  
(CNY '000)

Year	Economic Cost	O&M	Total Cost	WTP	Total Benefits	Net Benefits
2015	29,755		29,755			(29,755)
2016	55,260		55,260			(55,260)
2017		836	836	17,473	17,473	16,638

Year	Economic Cost	O&M	Total Cost	WTP	Total Benefits	Net Benefits
2018		861	861	17,473	17,473	16,613
2019		886	886	17,473	17,473	16,587
2020		1,460	1,460	17,473	17,473	16,013
2021		1,460	1,460	17,473	17,473	16,013
2022		1,460	1,460	17,473	17,473	16,013
2023		1,460	1,460	17,473	17,473	16,013
2024		1,460	1,460	17,473	17,473	16,013
2025		1,460	1,460	17,473	17,473	16,013
2026		1,460	1,460	17,473	17,473	16,013
2027		1,460	1,460	17,473	17,473	16,013
2028		1,460	1,460	17,473	17,473	16,013
2029		1,460	1,460	17,473	17,473	16,013
2030		1,460	1,460	17,473	17,473	16,013
2031		1,460	1,460	17,473	17,473	16,013
2032		1,460	1,460	17,473	17,473	16,013
2033		1,460	1,460	17,473	17,473	16,013
2034		1,460	1,460	17,473	17,473	16,013
2035		1,460	1,460	17,473	17,473	16,013
2036		1,460	1,460	17,473	17,473	16,013
<b>NPV = 25,884, BCR = 1.7, EIRR = 17.3%</b>						

( ) = negative, BCR = benefit cost ratio, EIRR = economic internal rate of return, NPV = net present value, O&M = operation and maintenance.

Source: Hebei Provincial Project Management Office.

**Table A8.10: EIRR of Zhengding Environment Sanitation Facilities and Management Subproject**  
(CNY '000)

Year	Economic Cost	O&M	Total Cost	Improved SWM Services	Total Benefits	Net Benefits
2015	18,385		18,385			(18,385)
2016	27,578		27,578			(27,578)
2017		3,067	3,067	16,059	16,059	12,992
2018		3,159	3,159	16,059	16,059	12,900
2019		3,254	3,254	16,059	16,059	12,806
2020		3,351	3,351	16,059	16,059	12,708
2021		3,452	3,452	16,059	16,059	12,607
2022		3,555	3,555	16,059	16,059	12,504
2023		3,662	3,662	16,059	16,059	12,397
2024		3,772	3,772	16,059	16,059	12,287
2025		3,885	3,885	16,059	16,059	12,174
2026		4,002	4,002	16,059	16,059	12,058
2027		4,122	4,122	16,059	16,059	11,938
2028		4,245	4,245	16,059	16,059	11,814
2029		4,373	4,373	16,059	16,059	11,687
2030		4,504	4,504	16,059	16,059	11,555
2031		4,639	4,639	16,059	16,059	11,420
2032		4,778	4,778	16,059	16,059	11,281
2033		4,921	4,921	16,059	16,059	11,138
2034		5,069	5,069	16,059	16,059	10,990
2035		5,221	5,221	16,059	16,059	10,838
2036		5,378	5,378	16,059	16,059	10,681
<b>NPV = 35,147, BCR = 2.0, EIRR = 24.7%</b>						

( ) = negative, BCR = benefit cost ratio, EIRR = economic internal rate of return, NPV = net present value, O&M = operation and maintenance, SWM = solid waste management.

Source: Hebei Provincial Project Management Office.

**Table A8.11: EIRR of Fengnan District Huanggezhuang  
Wastewater Treatment Plant Subproject**  
(CNY '000)

Year	COSTS			BENEFITS	
	Investment Cost	O&M Costs	Total Costs	Benefits	Net benefits
	(a)	(b)	(c)	(d)	(e=c-d)
2012	1,929	0	1,929	0	(1,929)
2013	2,572	0	2,572	0	(2,572)
2014	1,929	0	1,929	0	(1,929)
2015		474	474	995	521
2016		569	569	1,055	486
2017		664	664	1,185	521
2018		759	759	1,409	651
2019		854	854	1,676	822
2020		949	949	1,993	1,045
2021		949	949	2,370	1,422
2022		949	949	2,370	1,422
2023		949	949	2,370	1,422
2024		949	949	2,370	1,422
2025		949	949	2,370	1,422
2026		949	949	2,370	1,422
2027		949	949	2,370	1,422
2028		949	949	2,370	1,422
2029		949	949	2,370	1,422
2030		949	949	2,370	1,422
2031		949	949	2,370	1,422
2032		949	949	2,370	1,422
2033		949	949	2,370	1,422
2034		949	949	2,370	1,422

**NPV = 125, BCR = 1.01, EIRR = 12.3%**

( ) = negative, BCR = benefit cost ratio, EIRR = economic internal rate of return, NPV = net present value, O&M = operation and maintenance.

Source: Hebei Provincial Project Management Office.

**Table A8.12: EIRR of Huai'an Heating Network Subproject**  
(CNY '000)

Year	Economic Cost	O&M	Total Cost	Resource Cost savings	Time savings	Total Benefits	Net Benefits
2010	4,586		4,586				(4,586)
2011	3,058		3,058				(3,058)
2012		4,438	4,438	7,610	77	7,687	3,249
2013		5,548	5,548	7,610	77	7,687	2,139
2014		5,548	5,548	7,610	77	7,687	2,139
2015		5,548	5,548	7,610	77	7,687	2,139
2016		5,548	5,548	7,610	77	7,687	2,139
2017		5,548	5,548	7,610	77	7,687	2,139
2018		5,548	5,548	7,610	77	7,687	2,139
2019		5,548	5,548	7,610	77	7,687	2,139
2020		5,548	5,548	7,610	77	7,687	2,139
2021		5,548	5,548	7,610	77	7,687	2,139
2022		5,548	5,548	7,610	77	7,687	2,139
2023		5,548	5,548	7,610	77	7,687	2,139
2024		5,548	5,548	7,610	77	7,687	2,139
2025		5,548	5,548	7,610	77	7,687	2,139
2026		5,548	5,548	7,610	77	7,687	2,139

Year	Economic Cost	O&M	Total Cost	Resource Cost savings	Time savings	Total Benefits	Net Benefits
2027		5,548	5,548	7,610	77	7,687	2,139
2028		5,548	5,548	7,610	77	7,687	2,139
2029		5,548	5,548	7,610	77	7,687	2,139
2030		5,548	5,548	7,610	77	7,687	2,139
2031		5,548	5,548	7,610	77	7,687	2,139

**NPV = 6,996, BCR = 1.5, EIRR = 26.6%**

( ) = negative, BCR = benefit cost ratio, EIRR = economic internal rate of return, NPV = net present value, O&M = operation and maintenance.

Source: Hebei Provincial Project Management Office.

**Table A8.13: EIRR of Zhuolu New Urban Water Supply Subproject**  
(CNY '000)

Year	COSTS			BENEFITS	
	Investment Cost	O&M Costs	Total Costs	Benefits	Net Benefits
	(a)	(b)	(c)	(d)	(e=c-d)
2011	935	0	935	0	(935)
2012	1,247	0	1,247		(1,247)
2013	935	0	935	0	(935)
2014		471	471	918	447
2015		471	471	918	447
2016		471	471	1,225	753
2017		628	628	1,633	1,004
2018		838	838	2,041	1,203
2019		1,047	1,047	2,041	994
2020		1,047	1,047	2,041	994
2021		1,047	1,047	2,041	994
2022		1,047	1,047	2,041	994
2023		1,047	1,047	2,041	994
2024		1,047	1,047	2,041	994
2025		1,047	1,047	2,041	994
2026		1,047	1,047	2,041	994
2027		1,047	1,047	2,041	994
2028		1,047	1,047	2,041	994
2029		1,047	1,047	2,041	994
2030		1,047	1,047	2,041	994
2031		1,047	1,047	2,041	994
2032		1,047	1,047	2,041	994
2033		1,047	1,047	2,041	994

**NPV of Net Benefits @ 12% Discount Rate** 2,099

**BCR @ 12% Discount Rate** 1.47

**Economic Internal Rate of Return** 20.7%

**NPV = 2,099, BCR = 1.47, EIRR = 20.7%**

( ) = negative, BCR = benefit cost ratio, EIRR = economic internal rate of return, NPV = net present value, O&M = operation and maintenance.

Source: Hebei Provincial Project Management Office.

**Table A8.14: EIRR of Zhuolu Wastewater Treatment Phase II Subproject**  
(CNY '000)

Year	COSTS			BENEFITS	
	Investment Cost	O&M Costs	Total Costs	Benefits	Net benefits
	(a)	(b)	(c)	(d)	(e=c-d)
2011	1,745	0	1,745	0	(1,745)
2012	2,327	1	2,328	0	(2,328)

Year	COSTS			BENEFITS	
	Investment Cost (a)	O&M Costs (b)	Total Costs (c)	Benefits (d)	Net benefits (e=c-d)
2013	1,745	0	1,745	0	(1,745)
2014		632	632	1,347	715
2015		674	674	1,437	763
2016		716	716	1,796	1,080
2017		842	842	1,796	953
2018		842	842	1,796	953
2019		842	842	1,796	953
2020		842	842	1,796	953
2021		842	842	1,796	953
2022		842	842	1,796	953
2023		842	842	1,796	953
2024		842	842	1,796	953
2025		842	842	1,796	953
2026		842	842	1,796	953
2027		842	842	1,796	953
2028		842	842	1,796	953
2029		842	842	1,796	953
2030		842	842	1,796	953
2031		842	842	1,796	953
2032		842	842	1,796	953
2033		842	842	1,796	953
<b>NPV = 218, BCR = 1.02, EIRR =12.6%</b>					

( ) = negative, BCR = benefit cost ratio, EIRR = economic internal rate of return, NPV = net present value, O&M = operation and maintenance.

Source: Hebei Provincial Project Management Office.

**Table A8.15: EIRR of Zhangbei Urban East Heating Source Station Subproject**  
(CNY '000)

Year	Economic Cost	O&M	Total Cost	Resource Cost savings	Time savings	Total Benefits	Net Benefits
2017	6,488		6,488				(6,488)
2018	721		721				(721)
2019		2,009	2,009	5,170	93	5,263	3,254
2020		2,009	2,009	5,170	93	5,263	3,254
2021		2,009	2,009	5,170	93	5,263	3,254
2022		2,009	2,009	5,170	93	5,263	3,254
2023		2,009	2,009	5,170	93	5,263	3,254
2024		2,009	2,009	5,170	93	5,263	3,254
2025		2,009	2,009	5,170	93	5,263	3,254
2026		2,009	2,009	5,170	93	5,263	3,254
2027		2,009	2,009	5,170	93	5,263	3,254
2028		2,009	2,009	5,170	93	5,263	3,254
2029		2,009	2,009	5,170	93	5,263	3,254
2030		2,009	2,009	5,170	93	5,263	3,254
2031		2,009	2,009	5,170	93	5,263	3,254
2032		2,009	2,009	5,170	93	5,263	3,254
2033		2,009	2,009	5,170	93	5,263	3,254
2034		2,009	2,009	5,170	93	5,263	3,254
2035		2,009	2,009	5,170	93	5,263	3,254
2036		2,009	2,009	5,170	93	5,263	3,254
2037		2,009	2,009	5,170	93	5,263	3,254
2038		2,009	2,009	5,170	93	5,263	3,254

**NPV = 13,008 , BCR = 2.1, EIRR = 34.4%**

( ) = negative, BCR = benefit cost ratio, EIRR = economic internal rate of return, NPV = net present value, O&M = operation and maintenance.

Source: Hebei Provincial Project Management Office.

**Table A8.16: EIRR of Pingquan Urban Water Supply Subproject**  
(CNY '000)

Year	COSTS			BENEFITS	
	Investment Cost	O&M Costs	Total Costs	Benefits	Net Benefits
	(a)	(b)	(c)	(d)	(e=c-d)
2012	720	0	720	0	(720)
2013	720	0	720	0	(720)
2014	720	0	720	0	(720)
2015	720	0	720	0	(720)
2016	720	0	720	0	(720)
2017		858	858	1,905	1,047
2018		1,001	1,001	2,177	1,177
2019		1,144	1,144	2,449	1,306
2020		1,287	1,287	2,721	1,435
2021		1,430	1,430	2,721	1,292
2022		1,430	1,430	2,721	1,292
2023		1,430	1,430	2,721	1,292
2024		1,430	1,430	2,721	1,292
2025		1,430	1,430	2,721	1,292
2026		1,430	1,430	2,721	1,292
2027		1,430	1,430	2,721	1,292
2028		1,430	1,430	2,721	1,292
2029		1,430	1,430	2,721	1,292
2030		1,430	1,430	2,721	1,292
2031		1,430	1,430	2,721	1,292
2032		1,430	1,430	2,721	1,292
2033		1,430	1,430	2,721	1,292
2034		1,430	1,430	2,721	1,292
2035		1,430	1,430	2,721	1,292
2036		1,430	1,430	2,721	1,292

**NPV = 2,760, BCR = 1.34. EIRR = 21.9%**

( ) = negative, BCR = benefit cost ratio, EIRR = economic internal rate of return, NPV = net present value, O&M = operation and maintenance.

Source: Hebei Provincial Project Management Office.

**Table A8.17: EIRR of Pingquan Urban Heating Phase II Subproject**  
(CNY '000)

Year	Economic Cost	O&M	Total Cost	Resource Cost savings	Time savings	Total Benefits	Net Benefits
2014	4,325		4,325				(4,325)
2015	2,884		2,884				(2,884)
2016		1,898	1,898	5,800	139	5,939	4,041
2017		1,898	1,898	5,800	139	5,939	4,041
2018		1,898	1,898	5,800	139	5,939	4,041
2019		1,898	1,898	5,800	139	5,939	4,041
2020		1,898	1,898	5,800	139	5,939	4,041
2021		1,898	1,898	5,800	139	5,939	4,041
2022		1,898	1,898	5,800	139	5,939	4,041
2023		1,898	1,898	5,800	139	5,939	4,041

Year	Economic Cost	O&M	Total Cost	Resource Cost savings	Time savings	Total Benefits	Net Benefits
2024		1,898	1,898	5,800	139	5,939	4,041
2025		1,898	1,898	5,800	139	5,939	4,041
2026		1,898	1,898	5,800	139	5,939	4,041
2027		1,898	1,898	5,800	139	5,939	4,041
2028		1,898	1,898	5,800	139	5,939	4,041
2029		1,898	1,898	5,800	139	5,939	4,041
2030		1,898	1,898	5,800	139	5,939	4,041
2031		1,898	1,898	5,800	139	5,939	4,041
2032		1,898	1,898	5,800	139	5,939	4,041
2033		1,898	1,898	5,800	139	5,939	4,041
2034		1,898	1,898	5,800	139	5,939	4,041
2035		1,898	1,898	5,800	139	5,939	4,041
<b>NPV = 17,903 , BCR = 2.5, EIRR = 44.3 %</b>							

( ) = negative, BCR = benefit cost ratio, EIRR = economic internal rate of return, NPV = net present value, O&M = operation and maintenance.

Source: Hebei Provincial Project Management Office.

**Table A8.18: Weichang Heating Phase II Economic Internal Rate of Return**  
(CNY '000)

Year	Economic Cost	O&M	Total Cost	Resource Cost savings	Time savings	Total Benefits	Net Benefits
2009	3,489		3,489				(3,489)
2010	2,326		2,326				(2,326)
2011		2,201	2,201	4,093	74	4,167	1,966
2012		2,201	2,201	4,093	74	4,167	1,966
2013		2,201	2,201	4,093	74	4,167	1,966
2014		2,201	2,201	4,093	74	4,167	1,966
2015		2,201	2,201	4,093	74	4,167	1,966
2016		2,201	2,201	4,093	74	4,167	1,966
2017		2,201	2,201	4,093	74	4,167	1,966
2018		2,201	2,201	4,093	74	4,167	1,966
2019		2,201	2,201	4,093	74	4,167	1,966
2020		2,201	2,201	4,093	74	4,167	1,966
2021		2,201	2,201	4,093	74	4,167	1,966
2022		2,201	2,201	4,093	74	4,167	1,966
2023		2,201	2,201	4,093	74	4,167	1,966
2024		2,201	2,201	4,093	74	4,167	1,966
2025		2,201	2,201	4,093	74	4,167	1,966
2026		2,201	2,201	4,093	74	4,167	1,966
2027		2,201	2,201	4,093	74	4,167	1,966
2028		2,201	2,201	4,093	74	4,167	1,966
2029		2,201	2,201	4,093	74	4,167	1,966
2030		2,201	2,201	4,093	74	4,167	1,966
<b>NPV = 6,735, BCR = 1.7, EIRR = 28.7%</b>							

( ) = negative, BCR = benefit cost ratio, EIRR = economic internal rate of return, NPV = net present value, O&M = operation and maintenance.

Source: Hebei Provincial Project Management Office.



**Table A8.19: Weichang Water Supply Phase II Economic Internal Rate of Return**  
(CNY '000)

Year	COSTS			BENEFITS	
	Investment Cost	O&M Costs	Total Costs	Benefits	Net benefits
	(a)	(b)	(c)	(d)	(e=c-d)
2010	979	0	979	0	(979)
2011	1,305	0	1,305	0	(1,305)
2012	979	0	979	0	(979)
2013		586	586	1,191	605
2014		586	586	1,191	605
2015		586	586	1,191	605
2016		586	586	1,191	605
2017		586	586	1,191	605
2018		586	586	1,191	605
2019		586	586	1,191	605
2020		586	586	1,191	605
2021		586	586	1,191	605
2022		586	586	1,191	605
2023		586	586	1,191	605
2024		586	586	1,191	605
2025		586	586	1,191	605
2026		586	586	1,191	605
2027		586	586	1,191	605
2028		586	586	1,191	605
2029		586	586	1,191	605
2030		586	586	1,191	605
2031		586	586	1,191	605
2032		586	586	1,191	605

**NPV = 603, BCR = 1.11, EIRR = 15.0%**

( ) = negative, BCR = benefit cost ratio, EIRR = economic internal rate of return, NPV = net present value, O&M = operation and maintenance.

Source: Hebei Provincial Project Management Office.

**Table A8.20: Botou Water Supply Plant and Network Rehabilitation Economic Internal Rate of Return (CNY '000)**

Year	COSTS			BENEFITS	
	Investment Cost	O&M Costs	Total Costs	Benefits	Net benefits
	(a)	(b)	(c)	(d)	(e=c-d)
2012	4,087	0	4,087	0	(4,087)
2013	3,211	0	3,211	0	(3,211)
2014		1,098	1,098	2,177	1,079
2015		1,098	1,098	2,177	1,079
2016		1,098	1,098	2,177	1,079
2017		1,098	1,098	2,449	1,352
2018		1,235	1,235	2,858	1,623
2019		1,441	1,441	3,266	1,825
2020		1,647	1,647	3,674	2,027
2021		1,852	1,852	4,082	2,230
2022		2,058	2,058	4,082	2,024
2023		2,058	2,058	4,082	2,024
2024		2,058	2,058	4,082	2,024
2025		2,058	2,058	4,082	2,024
2026		2,058	2,058	4,082	2,024
2027		2,058	2,058	4,082	2,024

Year	COSTS			BENEFITS	
	Investment Cost (a)	O&M Costs (b)	Total Costs (c)	Benefits (d)	Net benefits (e=c-d)
2028		2,058	2,058	4,082	2,024
2029		2,058	2,058	4,082	2,024
2030		2,058	2,058	4,082	2,024
2031		2,058	2,058	4,082	2,024
2032		2,058	2,058	4,082	2,024
2033		2,058	2,058	4,082	2,024

**NPV = 3,500, BCR = 1.23, EIRR = 18.4%**

( ) = negative, BCR = benefit cost ratio, EIRR = economic internal rate of return, NPV = net present value, O&M = operation and maintenance.

Source: Hebei Provincial Project Management Office.

**Table 8.21: Financial Internal Rate of Return of Each Subproject**  
(CNY '000)

**(i) Zhaoxian Wastewater Treatment Phase II**

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
<b>Cash inflow</b>																						
Net Operational Revenues			10,194	11,044	12,573	14,442	15,801	16,991	16,991	16,991	16,991	16,991	16,991	16,991	16,991	16,991	16,991	16,991	16,991	16,991	16,991	16,991
<b>Cash Outflow</b>																						
Capital Expenditure	38,865	45,334																				
Recurrent Expenditure			7,529	9,210	9,623	9,964	10,828	11,471	12,042	12,095	12,151	12,210	12,271	12,271	12,271	12,271	12,271	12,271	12,271	12,271	12,271	12,271
Working Capital			88	83	13	11	29	21	18													
Tax							124	265	126	117	109	101	92	82	71	63	57	440	432	423	417	412
	38,865	45,334	7,617	9,293	9,636	9,975	10,981	11,757	12,187	12,213	12,260	12,310	12,363	12,353	12,343	12,334	12,329	12,711	12,703	12,695	12,688	12,683
Net Cash flow	(38,865)	(45,334)	2,577	1,751	2,937	4,467	4,820	5,234	4,804	4,778	4,731	4,680	4,628	4,638	4,648	4,656	4,662	4,280	4,287	4,296	4,303	4,307
FIRR (after tax)	0.1%																					
NPV	(2,522)																					

( ) = negative.

Source: Hebei Provincial Project Management Office.

**(ii) Zhaoxian Urban Heating Network Reconstruction and Expansion**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
<b>Cash inflow</b>																						
Net Operational Revenues			22,871	22,871	22,871	22,871	22,871	22,871	22,871	22,871	22,871	22,871	22,871	22,871	22,871	22,871	22,871	22,871	22,871	22,871	22,871	22,871
<b>Cash Outflow</b>																						
Capital Expenditure	22,973	34,460																				
Recurrent Expenditure			90,027	90,101	90,179	90,261	90,348	90,438	90,533	90,633	90,737	90,847	90,963	90,963	90,963	90,963	90,963	90,963	90,963	90,963	90,963	90,963
Changes in Working Capital			(3,018)																			
Tax																						
	22,973	34,460	87,008	90,101	90,179	90,261	90,348	90,438	90,533	90,633	90,737	90,847	90,963	90,963	90,963	90,963	90,963	90,963	90,963	90,963	90,963	90,963
Net Cash flow	(22,973)	(34,460)	(64,137)	(67,230)	(67,308)	(67,390)	(67,476)	(67,567)	(67,662)	(67,761)	(67,866)	(67,976)	(68,091)	(68,091)	(68,091)	(68,091)	(68,091)	(68,091)	(68,091)	(68,091)	(68,091)	(68,091)
FIRR (after tax)																						
FNPV	(1,371,484)																					

( ) = negative.

Source: Hebei Provincial Project Management Office.

**(iii) Zhaoxian Solid Waste Disposal**

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
<b>Cash Inflow</b>																						
Net Operational Revenues			2,638	3,051	3,508	6,678	6,787	6,900	7,019	7,144	7,276	7,414	7,559	7,559	7,559	7,559	7,559	7,559	7,559	7,559	7,559	7,559
<b>Cash Outflow</b>																						
Capital Expenditure	41,821	62,731																				
Recurrent Expenditure			809	856	906	1,117	1,173	1,232	1,270	1,310	1,352	1,397	1,443	1,492	1,543	1,597	1,654	1,713	1,776	1,841	1,910	
Working Capital			(213)	(34)	(38)	(260)	(8)	(8)	(10)	(11)	(11)	(12)	(12)	(13)	(14)	(14)	(15)	(16)	(17)	(17)	(18)	
Tax							213	230	247	272	297	323	353	385	385	385	385	385	385	385	385	385
	41,821	62,731	596	822	868	857	1,378	1,453	1,507	1,571	1,638	1,708	1,783	1,864	1,915	1,968	2,024	2,083	2,144	2,209	2,277	385
Net Cashflow	(41,821)	(62,731)	2,042	2,229	2,640	5,821	5,408	5,447	5,512	5,573	5,638	5,706	5,775	5,694	5,644	5,591	5,535	5,476	5,415	5,350	5,282	7,174
FIRR (after tax)	(0.1%)																					
FNPV (CNY'000s)	(6,467)																					

() = negative.

Source: Hebei Provincial Project Management Office.

**(iv) Zhengding Environment Sanitation Facilities and Management**

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
<b>Cash Inflow</b>																						
Net Operational Revenues			4,704	5,735	6,968	8,441	9,393	10,463	11,666	13,019	14,196	15,484	16,895	16,895	16,895	16,895	16,895	16,895	16,895	16,895	16,895	16,895
<b>Cash Outflow</b>																						
Capital Expenditure	24,089	36,133																				
Recurrent Expenditure			3,167	3,349	3,543	3,748	3,966	4,197	4,443	4,704	4,981	5,275	5,588	5,588	5,588	5,588	5,588	5,588	5,588	5,588	5,588	5,588
Working Capital			358	84	101	121	77	86	97	110	94	103	113	124	136	149	163	179	196	215	236	259
Tax							199	386	600	845	1,123	1,352	1,608	1,892	1,892	1,892	1,892	1,892	1,892	1,892	1,892	1,892
TOTALOUTFLOWS	24,089	36,133	3,525	3,433	3,644	3,869	4,241	4,670	5,141	5,658	6,198	6,730	7,309	7,603	7,615	7,628	7,643	7,658	7,676	7,695	7,716	7,739
Net Cashflow	(24,089)	(36,133)	1,180	2,301	3,324	4,572	5,151	5,793	6,525	7,361	7,998	8,754	9,586	9,291	9,279	9,266	9,252	9,236	9,219	9,200	9,179	9,156
FIRR (after tax)	7.8%																					
NPV(CNY000s)	83,923																					

() = negative.

Source: Hebei Provincial Project Management Office.

**(v) Huai'an Heating Network**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
<b>Cash Inflow</b>																						
Net Operational Revenues			53,797	53,797	53,797	53,797	60,521	60,521	60,521	60,521	60,521	60,521	60,521	60,521	60,521	60,521	60,521	60,521	60,521	60,521	60,521	60,521
<b>Cash Outflow</b>																						
Capital Expenditure		79,947																				
Recurrent Expenditure			48,721	48,721	48,721	48,721	48,721	48,721	48,721	48,721	48,721	48,721	48,721	48,721	48,721	48,721	48,721	48,721	48,721	48,721	48,721	48,721
Changes in Working Capital			1,448				572															
Tax							1,537	1,542	1,548	1,553	1,558	1,564	1,572	1,579	1,587	1,595	1,606	2,612	2,627	2,643	2,658	2,677
		79,947	50,169	48,721	48,721	48,721	50,830	50,263	50,268	50,274	50,279	50,285	50,293	50,300	50,308	50,316	50,327	51,333	51,348	51,364	51,379	51,398
Net Cash flow		(79,947)	3,627	5,076	5,076	5,076	9,692	10,258	10,253	10,248	10,243	10,236	10,229	10,221	10,213	10,206	10,194	9,188	9,173	9,158	9,142	9,123
FIRR (after tax)	8.1%																					
FNPV	96,788																					

() = negative.

Source: Hebei Provincial Project Management Office.

**(vi) Zhuolu New Urban Water Supply**

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>Cash In flow</b>																							
Net Operational Revenues				9,061	9,061	10,356	10,356	11,553	11,553	11,553	11,553	11,553	12,844	12,844	12,844	12,844	12,844	12,844	12,844	12,844	12,844	12,844	12,844
<b>Cash Outflow</b>																							
Capital Expenditure	10,643	22,256	10,643																				
Recurrent Expenditure				5,012	2,930	2,930	3,780	5,067	6,528	6,528	6,528	6,528	6,528	6,528	6,528	6,528	6,528	6,528	6,528	6,528	6,528	6,528	6,528
Working Capital				70			34	54	64														
Tax				960	960	1,284	1,072	1,051	687	688	689	691	1,015	1,017	1,018	1,021	1,024	1,091	1,444	1,447	1,451	1,456	1,526
	10,643	22,256	10,643	6,042	3,890	4,214	4,887	6,172	7,279	7,216	7,217	7,219	7,543	7,545	7,546	7,549	7,552	7,619	7,972	7,975	7,979	7,984	8,054
Net Cash flow	(10,643)	(22,256)	(10,643)	3,019	5,171	6,142	5,469	5,381	4,275	4,337	4,336	4,334	5,301	5,299	5,298	5,295	5,292	5,225	4,872	4,869	4,865	4,861	4,790
	(10,643)	(22,256)	(10,643)	9,061	9,061	7,425	6,541	6,433	4,961	5,025	5,025	5,025	6,316	6,316	6,316	6,316	6,316	6,316	6,316	6,316	6,316	6,316	6,316
FIRR (after tax)	8.2%																						
NPV (after tax)	54,101																						

Source: Hebei Provincial Project Management Office.

**(vii) Zhuolu New Urban Water Supply**

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>Cash Inflow</b>																							
Net Operational Revenues				9,061	9,061	10,356	10,356	11,553	11,553	11,553	11,553	11,553	12,844	12,844	12,844	12,844	12,844	12,844	12,844	12,844	12,844	12,844	12,844
<b>Cash Outflow</b>																							
Capital Expenditure	10,643	22,256	10,643																				
Recurrent Expenditure				5,012	2,930	2,930	3,780	5,067	6,528	6,528	6,528	6,528	6,528	6,528	6,528	6,528	6,528	6,528	6,528	6,528	6,528	6,528	6,528
Working Capital				70			34	54	64														
Tax				960	960	1,284	1,072	1,051	687	688	689	691	1,015	1,017	1,018	1,021	1,024	1,091	1,444	1,447	1,451	1,456	1,526
	10,643	22,256	10,643	6,042	3,890	4,214	4,887	6,172	7,279	7,216	7,217	7,219	7,543	7,545	7,546	7,549	7,552	7,619	7,972	7,975	7,979	7,984	8,054
Net Cashflow	(10,643)	(22,256)	(10,643)	3,019	5,171	6,142	5,469	5,381	4,275	4,337	4,336	4,334	5,301	5,299	5,298	5,295	5,292	5,225	4,872	4,869	4,865	4,861	4,790
	(10,643)	(22,256)	(10,643)	9,061	9,061	7,425	6,541	6,433	4,961	5,025	5,025	5,025	6,316	6,316	6,316	6,316	6,316	6,316	6,316	6,316	6,316	6,316	6,316
FIRR (after tax)	8.2%																						
NPV (after tax)	54,101																						

( ) = negative.

Source: Hebei Provincial Project Management Office.

**(viii) Zhuolu Wastewater Treatment Phase II**

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>Cash Inflow</b>																							
Net Operational Revenues				4,625	4,914	5,782	5,782	5,839	5,839	5,839	5,839	5,898	5,898	5,898	5,898	5,898	5,898	5,898	5,898	5,898	5,898	5,898	5,898
<b>Cash Outflow</b>																							
Capital Expenditure	21,098	28,131	21,098																				
Recurrent Expenditure				2,508	2,588	2,669	2,885	2,900	2,915	2,931	2,948	2,966	2,984	3,004	3,004	3,004	3,004	3,004	3,004	3,004	3,004	3,004	3,004
Working Capital				21	1	1	4																
Tax																					4	13	21
	21,098	28,131	21,098	2,529	2,589	2,670	2,889	2,900	2,915	2,931	2,948	2,966	2,984	3,004	3,004	3,004	3,004	3,004	3,004	3,004	3,007	3,016	3,025
Net Cashflow	(21,098)	(28,131)	(21,098)	2,096	2,325	3,112	2,892	2,940	2,924	2,908	2,892	2,932	2,914	2,894	2,894	2,894	2,894	2,894	2,894	2,894	2,890	2,881	2,873
FIRR (after tax)	(1.8%)																						
NPV	(15,971)																						

( ) = negative.

Source: Hebei Provincial Project Management Office.

**(ix) Pingquan Urban Water Supply**

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
<b>Cash Inflow</b>																									
Net Operational Revenues						17,043	19,884	22,724	25,565	29,825	29,825	29,825	29,825	29,825	31,317	31,317	31,317	31,317	31,317	31,317	31,317	31,317	31,317	31,317	31,317
<b>Cash Outflow</b>																									
Capital Expenditure	8,197	8,197	8,197	8,197	8,197																				
Recurrent Expenditure						6,790	5,114	5,333	5,552	5,771	5,771	5,771	5,771	5,771	5,771	5,771	5,771	5,771	5,771	5,771	5,771	5,771	5,771	5,771	5,771
Working Capital						87	12	12	12	12															
Tax						2,457	3,115	3,772	4,430	5,443	5,446	5,450	5,453	5,456	5,834	5,841	5,847	5,854	5,860	6,025	6,457	6,466	6,476	6,486	6,651
	8,197	8,197	8,197	8,197	8,197	9,334	8,241	9,117	9,994	11,226	11,217	11,220	11,224	11,227	11,605	11,611	11,618	11,624	11,631	11,796	12,227	12,237	12,247	12,257	12,421
Net Cashflow	(8,197)	(8,197)	(8,197)	(8,197)	(8,197)	7,709	11,643	13,607	15,571	18,600	18,608	18,605	18,602	18,598	19,712	19,705	19,699	19,692	19,686	19,521	19,089	19,080	19,070	19,060	18,895
FIRR (after tax)	(8,197)	(8,197)	(8,197)	(8,197)	(8,197)	17,043	19,884	17,379	20,001	24,043	24,055	24,055	24,055	24,055	25,546	25,546	25,546	25,546	25,546	25,546	25,546	25,546	25,546	25,546	25,546
FIRR (after tax)	22.5%																								
NPV (after tax)	313,075																								

( ) = negative.

Source: Hebei Provincial Project Management Office.

**(x) Pingquan Urban Heating Phase II**

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
<b>Cash Inflow</b>																						
Net Operational Revenues			64,823	64,823	64,823	64,823	72,926	72,926	72,926	72,926	72,926	72,926	72,926	72,926	72,926	72,926	72,926	72,926	72,926	72,926	72,926	72,926
<b>Cash Outflow</b>																						
Capital Expenditure	39,395	26,263																				
Recurrent Expenditure			50,402	50,402	50,402	50,402	50,402	50,402	50,402	50,402	50,402	50,402	50,402	50,402	50,402	50,402	50,402	50,402	50,402	50,402	50,402	50,402
Changes in Working Capital			2,772				689															
Tax			2,500	2,500	2,500	2,501	4,530	4,534	4,537	4,541	4,545	4,551	4,556	4,561	4,566	4,574	4,585	5,280	5,290	5,301	5,314	5,330
	39,395	26,263	55,674	52,902	52,902	52,903	55,621	54,936	54,940	54,943	54,947	54,953	54,958	54,963	54,968	54,976	54,987	55,682	55,692	55,703	55,716	55,732
Net Cashflow	(39,395)	(26,263)	9,149	11,921	11,921	11,919	17,304	17,990	17,986	17,983	17,978	17,973	17,968	17,962	17,957	17,949	17,939	17,244	17,233	17,223	17,210	17,194
FIRR (after tax)	19.0%																					
FNPV	254,426																					

( ) = negative.

Source: Hebei Provincial Project Management Office.

**(xi) Weichang Heating Phase II**

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
<b>Cash Inflow</b>																						
Net Operational Revenues			35,733	36,924	36,924	36,924	41,539	41,539	41,539	41,539	41,539	41,539	41,539	41,539	41,539	41,539	41,539	41,539	41,539	41,539	41,539	41,539
<b>Cash Outflow</b>																						
Capital Expenditure	39,395	26,263																				
Recurrent Expenditure			27,809	27,809	27,809	27,809	27,809	27,809	27,809	27,809	27,809	27,809	27,809	27,809	27,809	27,809	27,809	27,809	27,809	27,809	27,809	27,809
Changes in Working Capital			1,602	101			392															
Tax			1,023	1,320	1,320	1,322	2,478	2,480	2,483	2,485	2,489	2,492	2,496	2,500	2,503	2,509	2,516	3,056	3,063	3,071	3,080	3,091
	39,395	26,263	30,434	29,231	29,130	29,131	30,680	30,290	30,292	30,295	30,298	30,301	30,305	30,309	30,313	30,318	30,326	30,865	30,872	30,880	30,889	30,900
Net Cashflow	(39,395)	(26,263)	5,299	7,693	7,794	7,793	10,860	11,249	11,247	11,244	11,241	11,238	11,234	11,230	11,227	11,221	11,214	10,674	10,667	10,659	10,650	10,639
FIRR (after tax)	12.0%																					
FNPV	133,544																					

( ) = negative.

Source: Hebei Provincial Project Management Office.

**(xii) Weichang Water Supply Phase II**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
<b>Cash Inflow</b>																							
Net Operational Revenues				6,562	6,562	7,500	7,500	8,367	8,367	8,367	8,367	8,367	9,302	9,302	9,302	9,302	9,302	9,302	9,302	9,302	9,302	9,302	9,302
<b>Cash Outflow</b>																							
Capital Expenditure	11,250	15,000	11,250																				
Recurrent Expenditure				6,237	4,460	4,460	4,460	4,460	4,460	4,460	4,460	4,460	4,460	4,460	4,460	4,460	4,460	4,460	4,460	4,460	4,460	4,460	4,460
Working Capital				173																			
Tax						26	28	251	257	263	268	276	518	527	536	544	557	621	1,005	1,022	1,039	1,061	1,135
	11,250	15,000	11,250	6,410	4,460	4,486	4,489	4,711	4,717	4,723	4,729	4,736	4,979	4,987	4,996	5,005	5,018	5,082	5,465	5,482	5,500	5,522	5,595
Net Cashflow	(11,250)	(15,000)	(11,250)	153	2,102	3,014	3,011	3,655	3,650	3,644	3,638	3,631	4,323	4,315	4,306	4,297	4,284	4,220	3,837	3,819	3,802	3,780	3,707
	(11,250)	(15,000)	(11,250)	6,562	6,562	3,039	3,039	3,906	3,906	3,906	3,906	3,906	4,841	4,841	4,841	4,841	4,841	4,841	4,841	4,841	4,841	4,841	4,841
FIRR (after tax)	5.6%																						
NPV (after tax)	25,469																						

( ) = negative.

Source: Hebei Provincial Project Management Office.

**(xiii) Botou Water Supply Plant and Network Rehabilitation**

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
<b>Cash Inflow</b>																						
Net Operational Revenues			21,093	21,093	21,093	21,093	23,729	27,684	31,639	35,594	39,549	39,944	39,944	39,944	39,944	39,944	39,944	39,944	39,944	39,944	39,944	39,944
<b>Cash Outflow</b>																						
Capital Expenditure	57,503	38,336																				
Recurrent Expenditure			18,360	14,315	14,315	14,315	14,782	15,538	16,359	16,687	18,198	18,198	18,198	18,198	18,198	18,198	18,198	18,198	18,198	18,198	18,198	18,198
Working Capital			601				26	41	45	18	83											
Tax			530	530	530	532	1,077	1,880	2,667	3,576	4,191	4,295	4,299	4,304	4,308	4,315	4,424	5,179	5,188	5,197	5,209	5,324
	57,503	38,336	19,491	14,845	14,845	14,847	15,885	17,459	19,070	20,282	22,472	22,493	22,497	22,502	22,507	22,514	22,623	23,378	23,387	23,396	23,407	23,522
Net Cashflow	(57,503)	(38,336)	1,601	6,247	6,247	6,246	7,844	10,225	12,568	15,312	17,076	17,451	17,447	17,442	17,437	17,431	17,322	16,567	16,557	16,548	16,537	16,422
	(57,503)	(38,336)	21,093	21,093	6,778	6,778	8,922	12,105	15,235	18,888	21,267	21,746	21,746	21,746	21,746	21,746	21,746	21,746	21,746	21,746	21,746	21,746
FIRR (after tax)	9.2%																					
NPV (after tax)	166,213																					

( ) = negative.

Source: Hebei Provincial Project Management Office.

## **LAND ACQUISITION AND RESETTLEMENT**

### **A. Background**

1. Hebei Small Cities and Towns Development Demonstration Sector Project consisted of 19 subprojects in 10 towns of 7 cities originally, including: (i) three core subprojects cities (counties): Bazhou city, Zhaoxian County, Zhengding County, and (ii) seven non-core subproject counties: Baigou, Botou, Fengnan, Huai'an, Pingquan, Weichang and Zhuolu. During implementation stage, Baigou Water Supply, Bazhou River Training, Fengnan District Jin-Tang Canal Water Environment Integrated Management and Shengfang Water Supply Subprojects withdrew from the Project and three new ones were added, respectively Botou Network Rehabilitation, Longhua Wastewater and Zhangbei District Heating Subprojects. As the result of scope change, the Project comprised 18 subprojects in 11 counties/cities, of which 13 separate resettlement plans (RPs)/due diligence reports (DDR)s have been prepared and approved by Asian Development Bank (ADB). No land acquisition and resettlement (LAR) was involved in five subprojects, i.e. Zhuolu Wastewater, Pingquan Heating, Zhaoxian Heating, and Botou Water Supply and Urban Water Distribution Network Rehabilitation Subprojects. Two subprojects of Huai'an District Heating and Water Supply and Drainage involved house demolition activities. LAR was implemented during the period of 2008 to 2014. The LAR activities for all subprojects have been completed.

### **B. Land Acquisition and Resettlement Impacts**

2. According to the final RPs and DDRs, a total of 660.5 *mu* land would be acquired permanently with 498 people to be affected and 3,689.9 square meters ( $m^2$ ) houses would be demolished due to the Huai'an pipeline network project with 94 people from 32 households to be affected. The actual land acquisition was 617.6 *mu* (reduced by 42.9 *mu* or 6.5% compared with the resettlement plan); 2,779.3  $m^2$  of residential structures were demolished, 24.7% less than that in RPs. Accordingly, 142 households and 498 persons were affected by permanent land acquisition; 31 households and 90 persons were affected by structure demolition. Decrease of land acquisition is caused by the less land occupation by the plant site of Baigou Solid Waste Subproject. Although 121.1 *mu* land was acquired for the project, of which only 78.2 *mu* land was approved for construction purpose and the other acquired 42.9 *mu* was allocated for public greening land. The compensation paid to affected villages was deducted from the project cost as well. The land acquisition and APs of other subprojects are consistent with that of RPs. The decrease of house demolition resulted from avoided demolition of 829.10  $m^2$  public house of five state-owned institutions/enterprises under Huai'an Subprojects, which was implemented separately under another project. In addition, the subprojects of Zhangbei Heating and Pingquan Heating involve reemployment of 287 workers due to the demolition of coal-boilers.

### **C. Resettlement Policy and Compensation Rates**

3. LAR was implemented according to the RPs, ADB's Involuntary Resettlement Policy (1995), PRC's Land Administration Law (1999), Implementation Stipulations of Land Administration Law of the PRC (1999), and the rules and regulations of Hebei Province and the project county governments. The land acquisition agreements with the affected villages or affected households were reached based on intensive consultation, all affected villages and people were aware of the adopted land compensation rates, and were paid all compensation as per the agreement of land acquisition. The implemented compensation rate is the same as or higher than those indicated in the RPs. The compensation standard for permanent acquisition



of farmland is minimum CNY32,173 per mu and maximum CNY68,587 per mu. During the implementation both land and house prices increased based on newly issued land policy and market price increase in some counties. The compensation standard adopted by Huai'an Heating Subproject for house demolition was CNY1,942.5 per m<sup>2</sup>, 49.42% higher than the RP, while the land acquisition compensation standard for Zhuolu Water Supply Subproject is 34.28% higher than the RP and that of Baigou Solid Waste Subproject is 33.33% higher, with those for the other subprojects consistent with the RP. Table A9.1 presents the land compensation standard details.

**Table A9.1: Comparison of Land Acquisition Compensation Rates of the Project**

County/District	Sub-project	Land Compensation rate (CNY/mu)		Variation (%)
		Planned	Actual	
Zhuolu	Water supply	28,300	38,000	34.28
Zhangbei	Heating	32,173	32,173	0
Weichang	Water supply	5,850	6,000	2.56
	Heating	46,000	46,000	0
Pingquan	Water supply	60,000	60,000	0
Longhua	Wastewater	59,000	59,000	0
Huanggezhuang	Wastewater	45,000	45,000	0
Baigou	Solid waste	30,000	40,000	33.33
Zhaoxian	Solid waste	40,000	40,000	0
	Wastewater	62,310	66,000	5.92
Zhengdin	Solid waste	282,000	282,000	0

Source: Hebei Provincial Project Management Office.

#### **D. Livelihood Restoration**

4. Generally the project land acquisition had minimal impacts on affected person's (APs) livelihood for the following reasons: (i) land acquired by six subprojects are collective-owned wasteland or construction land without generating any income; (ii) most of the affected villages are located nearby town area of the project county, so income from agricultural activities accounts very low, usually no more than 15% of the total; (iii) the varied livelihood rehabilitation packages were provided for APs in different villages. Normally, the following rehabilitation and income restoration measures were adopted: (i) cash compensation packages for APs; (ii) social pension and minimum living guarantee to the APs; (iii) technical training, including welding, car mechanics, cooking, hair-dressing and home household service; (iv) service job opportunity, including security guard, greening, cleaning and sanitation work. According to the results of socioeconomic survey of affected villages during the external monitoring and project completion, the APs' income was increased from 13.7% to 130.8% compared with the baseline year before land acquisition. Table A9.2 and A9.3 provides further details of comparison of per capita net income before and after land acquisition and effectiveness of livelihood restorations.

5. Two subprojects in Huai'an have house relocation impacts. Cash compensation and resettlement houses were two options for relocated households. All APs opted for cash compensation since cash compensation is flexible for them to use. Zhangbei Heating and Pingquan Heating subprojects affected a total of 287 coal-boiler workers, of which 14 were female workers. All affected workers have been properly recruited through training and employment arrangements. The level of income varies from one industry to another, but the

income level has increased over time and the average wage level has increased from CNY1,860 to CNY3,160 per month.

**Table A9.2: Comparison of APs income before and after LA by subproject**

Subproject	Affected town/village	Per capita net income (CNY/year)			Growth rate (%)	
		Baseline	Last		Last monitoring	in 2015
			Monitoring	in 2015		
Huai'an Network	Chaigoubao Town	4,367	5,200	8,044	19.07	84.20
Zhuolu Water Supply	Jijiasi Village	5,200	6,500	12,000	25.00	130.77
	Pishan Canal Committee	7,625	10,700	11,492	40.33	50.71
Zhangbei Heating	Xincun Village	3,500	6,194	6,194	76.97	76.97
Weichang	Xinhuzi Village	2,500	na	na	na	na
Pingquan	Xingyuanzi Village	4,408	7,135	7,273	61.86	65.00
Longhua	Sidaoying Village	3,453	4,499	5,452	30.29	57.89
	Michang Village	7,610	9,420	10,500	23.78	37.98
Huanggezhuang	Donghuanggezhuang Village	7,608	9,480	10,900	24.61	43.27
Baigou	Xilusen Village	6,000	11,000	13,426	83.33	123.77
Zhaoxian Solid Waste	Nanxiejiatong Village	7,632	8,800	8,800	15.30	15.30
	Hexizhai Village	7,389	8,400	8,400	13.68	13.68
Zhaoxian Wastewater	Dashiqiao Village	5,088	7,500	8,278	47.41	62.70
Zhengding	Jichangzhuang Village	16,698	24,389	28,234	46.06	69.09

CNY = Chinese yuan, na = not applicable.

Source: Hebei Provincial Project Management Office.

**Table A9.3: Livelihood Restoration Measures by Subproject**

Subproject	Impact Briefing	Livelihood Restoration Actions
Huai'an Pipeline Network	Resettlement of 30 households and 1 business, affecting 90 persons	<ul style="list-style-type: none"> <li>All APs chose monetary compensation;</li> <li>16.67% of affected households chose to build their own houses while the others chose to buy commercial houses;</li> <li>74.56% of the resettlement compensation is used for buying houses while 12.56% for bank deposit.</li> </ul>
Zhuolu Water Supply	Permanent acquisition of 3.7 mu collective-owned land with 30 persons of 9 households affected	The average land loss rate of affected households is 9.6%. As agreed between village committees and LA affected farmers, young crop compensation will be paid in full amount to farmers and 31% of the land compensation fund will be owned by farmers. Most of the villagers chose to deposit land and young crop compensation received from land acquisition into bank.
Zhangbei Heating	Permanent acquisition of 60 mu collective-owned land affecting 109 persons of 35 households; closure of small boilers involving 189 workers.	<ul style="list-style-type: none"> <li>92.1% of the affected farmers deposited the compensation fund in bank and only 7.9% of such fund is used for pure consumption, routine family expenditure and insurance;</li> <li>The 189 affected seasonal workers have been properly resettled, with 10 workers or 5.3% doing the same job in Huaying Heating Co., Ltd., mostly licensed stokers or repairmen; 166 workers or 87.8% employed by local companies; 5 or 2.7% running private business; 8 or 4.2% engaged in transportation services.</li> </ul>
Weichang Water Supply	2.76 mu wasteland acquired	Since land occupied under this subproject is wasteland, no direct impacts are generated on the economic income of affected villagers
Weichang Heating	Acquisition of 65 mu hillside wasteland	through negotiation with villager representative meeting, 64% of the land compensation is allocated among the villagers of Group 1 and the

Subproject	Impact Briefing	Livelihood Restoration Actions
Pingquan Water Supply	The 20 mu land acquired with 111 APs of 27 AHs	<p>remaining 36% used for public welfare undertaking, including construction and maintenance of village roads, drainage, lighting infrastructure and improving villager welfare.</p> <ul style="list-style-type: none"> <li>• The average land loss rate of the affected households is 12.3%.</li> <li>• Since the affected village is close to the county town with a sound economic basis, the affected households no longer rely on agricultural production and almost every affected household is engaged in non-agricultural production</li> </ul>
Longhua Wastewater	33.3 mu Permanent acquisition of dryland, 151 persons of 44 households	Such land acquisition produces very minor impact on affected farmers, who, instead, get compensated and have more time for non-agricultural production. Land acquired under the Subproject has a poor soil quality, mainly growing corn at a low yield and low economic return.
Huangge-zhuang Wastewater	Permanent acquisition of 34.88 mu collective-owned land which has been left uncultivated since 2009, thus involving no APs	The village committees of the affected villages invested the land compensation fund mainly in public welfare undertakings, including construction and maintenance of village roads, water supply and drainage and street light facilities for the sake of daily life convenience for the villagers.
Baigou Solid Waste	Permanent acquisition of 78.15 mu collective-owned land. The acquired land is waste land close to a solid waste pit that used to be a borrow pit of brick factory. Since such land has been wasted for a long time, land acquisition produces no impacts on the income of both farmers and village group.	The village group utilized the land compensation for improving village roads and villager drinking water condition.
Zhaoxian Solid Waste	Permanent acquisition of 249.12 mu collective-owned construction land without any APs	The land compensation fund is used in public facility improvement, such as village roads construction and maintenance. According to the results of sample survey of APs and socioeconomic survey of affected villages during the external monitoring and project completion, thanks to the implementation of the abovementioned livelihood restoration actions, the APs' income was not reduced and was even promoted compared with the base year income before land acquisition. See Table 3 for further details of comparison of per capita net income before and after subproject land acquisition and effectiveness of livelihood restorations.
Zhaoxian Wastewater	55.6 mu farmland was acquired with 48 APs of 17 AHs.	<ul style="list-style-type: none"> <li>• 70% of compensation was paid directly to APs and the other 30% was retained by village collective</li> <li>• the affected Village is located near a world-famous tourism heritage, the site of Zhaozhou Bridge, where tourism developed very well. The income of APs from agriculture only accounts for 5.4% and share of non-agricultural income was 94.6% of the total even though the average land loss percentage amounts to 76.17%.</li> </ul>
Zhengding Solid Waste	15 mu farmland was acquired with 32 people and 6 households affected	<ul style="list-style-type: none"> <li>• All compensation paid directly to APs.</li> <li>• Although the average land loss rate of the APs is 38.95%, it has little impacts on their livelihood because agricultural income takes only 1.43% of the total income while non-agricultural income (including temporary job income and private business income) takes a percentage of 98.57%.</li> </ul>

AP = affected person, LA = land acquisition, mu = 666.67 square meter.

Source: Hebei Provincial Project Management Office.

## E. Resettlement Cost

6. The total actual cost of land acquisition and resettlement was CNY46.03 million (excluding tax and other expenses), which included CNY33.65 million for permanent land acquisition, CNY3.02 million for temporary land occupation, CNY6.71 million for house demolition and CNY2.65 million for ground associated items. Compared with the RP, the actual compensation increased by 5.5%, i.e. CNY2.38 million. The reasons of variation in LAR costs were (i) higher compensation rates as compared with those in RPs (i.e. Huai'an Network, Weichang Water Supply and Zhaoxian Wastewater), (ii) increased temporary land use in Longhua WWTP, Huanggezhuang WWTP and Botou Water supply; and (iii) land acquisition decline of Baigou Solid Waste. Table A9.4 presents the land acquisition and resettlement costs for each subproject.

**Table A9.4 Comparison of Planned and Actual Resettlement Cost**

		Resettlement Cost (CNY 10,000)			Variation Reasons
Subproject		Planned	Actual	Variation (%)	
Huai'an County	Heating and Water Supply and Drainage	550.3	671.4	22.0	Relocation of five government offices and businesses was avoided, and area of resettlement was reduced but compensation standard was increased by 49.42%, resulting in additional compensation cost.
Zhuolu	Water Supply	68.5	68.5	0	No change
Zhangbei	Heating	193.0	193.0	0	No change
Weichang	Water Supply	1.8	1.9	6.6	Compensation standard increased
Weichang	Heating	329.9	329.9	0	No change
Pingquan	Water Supply	121.5	121.5	0	No change
Longhua	Wastewater	196.5	418.1	112.8	After route adjustment in actual implementation, temporary occupation of arable land becomes necessary, thus increasing compensation.
Huanggezhuang	Wastewater	157.9	177.6	12.5	Compared with RP, temporary occupation of farm land was involved, thus resulting in increase of compensation for temporary land occupation
Botou	Water Supply	513.9	440.3	(14.3)	Construction difficulty resulted in increased space for construction operation and thus relative increase of temporary land occupation and compensation.
Baigou	Solid Waste	372.0	308.0	(17.2)	The initial area of land acquisition planned for construction of the integrated solid waste treatment plan was 121.12 mu. In actual implementation, 78.15 mu of land was acquired for the plant site and the remaining 42.97 mu is occupied for roads, not included in the project.
Zhaoxian	Solid Waste	996.5	996.5	0	No change
Zhaoxian	Wastewater	440.3	453.8	3.0	Land compensation standard increased
Zhengding	Solid Waste	423.0	423.0	0	No Change
<b>Total</b>		<b>4,365.0</b>	<b>4,603.4</b>	<b>5.5</b>	

( ) = negative, CNY = Chinese yuan, mu = 666.67 square meter, RP = resettlement plan.

Source: Hebei Provincial Project Management Office.

## F. Participation and Consultation

7. During the preparation and resettlement implementation stage of each subproject, great importance has been attached by the EAs to participation and consultation of the affected organizations and groups to extensively consult the affected groups, repetitively study the design program and minimize land acquisition and resettlement as well as impacts on residents in the affected areas. Multiple villager representative meetings were held by the village committee to allow public participation and discuss LAR plan, income restoration strategy and how to use the compensation fund to develop public facilities of the village group.

8. The Subproject PMOs had set up a grievance redress mechanism prior to land acquisition and developed objective, fair and public procedures for handling APs' complaints. Such complaints include any issues concerning resettlement, e.g. land acquisition, compensation policy and compensation standard. The main channels for grievance redress included: (i) villages may refer their opinions and suggestions to the village group or committee, which is the main channel for village grievance; (ii) the villagers may report to the township / town government and land and resources bureau that the village belongs to; (iii) the villagers may report to the County Complaint Office and the County PMO. No complaints occurred since LAR started under the Project and the LAR activities were carried out smoothly.

## **G. Monitoring and Evaluation**

9. The independent external monitoring of resettlement in the early stage was undertaken by the College of Humanities and Development Studies of China Agricultural University of the subprojects of Zhaoxian Wastewater and Heating, Botou Water Supply, Weichang Heating and Water Supply, Huai'an Heating, Huai'an Water Supply and Drainage, Huanggezhuang Wastewater, Zhuolu Water Supply, Baigou Solid Waste and Pingquan Water Supply were tracked and monitored from 2010-2013. In October 2015, NAREE Consulting Ltd. carried out the external monitoring of 4 subprojects of Zhangbei Heating, Longhua Wastewater, Zhaoxian Solid Waste and Zhengding Solid Waste Subprojects. During implementation, one to five M&E reports were prepared for each subproject and submitted to ADB to report the smooth implementation of resettlement activities. ADB has received and published on ADB website all the resettlement external monitoring and evaluation reports.

## **H. Conclusions**

10. Overall, all the land acquisition and resettlement have been smoothly implemented. Despite of the large number of subprojects, most of them were executed according to the RP standard. Only some individual subprojects were implemented following a standard higher than the RP. The compensation has been paid in full amount and APs are satisfied and workers of closed small boilers are properly resettled. Great importance was attached during both the project preparation and implementation stages. Many subprojects try to use wasteland or construction land and optimize technical design to minimize LAR impacts and land loss of APs. So, neither land acquisition nor house demolition impacts increased during implementation. All subprojects progressed without any delay in resettlement implementation.

## ENVIRONMENT IMPACT ANALYSIS

### A. Background

1. This project covers four sectors: (i) water supply; (ii) sewage treatment; (iii) solid waste management; and (iv) district heating. It includes 18 subprojects in 11 towns located in 6 cities (Shijiazhuang, Tangshan, Zhangjiakou, Chengde, Baoding, and Botou), among of which, four subprojects are considered as core subprojects and the rest 14 subprojects are non-core subprojects.

2. In line with the Asian Development Bank (ADB) Environmental Policy (2002) and ADB EIA Guidelines (2003), the project was classified as category A for the environment. The summary environmental impact assessment (SEIA), including the environmental management plan (EMP) and environmental assessment and management framework (EAMF) was prepared and circulated to ADB in December 2008. During the project implementation phase, all subsequent subprojects followed the EAMF requirements to complete the preparedness and approvals accordingly. Six Environmental Impact Assessments (EIA) and three Initial Environmental Examinations (IEE) were prepared and disclosed for subsequent selected non-core subprojects through 2008~2010. The SEIA/EIAs/IEEs concluded that the anticipated adverse environmental impacts of the project would be minimized to acceptable levels by implementing credible and timely environmental mitigation and monitoring programs as stipulated in the EMP.

3. Following national regulations, out of the 18 subprojects, eight have passed the domestic environmental check and acceptance. Domestic environmental check and acceptance for the remaining ten subprojects shall be conducted in 2018 or 2019 per domestic procedures.

### B. Environmental Protection and Management

4. According to the requirements in the EMP, the Hebei Project Management Office (HPPMO) represents the executing agency (EA) to be responsible for the implementation of EMP and carry out effective management measures. The PMO and IA of each subproject are responsible for incorporating EMP into the engineering design and bidding documents, supervising the implementation of environmental mitigation measures during construction and operation phases, and coordinating external environmental monitoring. The contractors are responsible for implementing the mitigation measures specified for construction phase, and the implementing agency (IA) or operation company is responsible for the implementation of mitigation measures specified for the operation phase. Environmental and soil erosion control specification clauses were included in the contracts signed between IAs and contractors during construction phase. Each contractor's office had a designated environment engineer responsible for verification and mitigation of environmental impacts during construction and defects liability period. Training on environmental management was conducted for project management staff, contractors, and construction supervision companies.

5. The HPPMO engaged the HYDROQUAL Inc in association with China Construction Design International (CCDI) (First Stage by September 2014) and NAREE International Limited (Second Stage) to provide consulting services in environment management. The consulting companies represent the IAs to compile the environmental monitoring reports to document the implementation status of EMP.

### C. Environmental Monitoring

6. Contractors and construction supervision companies conducted daily environmental monitoring activities on site. The contractors' environment specialist conducted periodic internal environmental monitoring and took samples for analysis in accordance with the EMP monitoring procedures and guidelines.

7. Since 2010, each subproject implementation agency has engaged the local environmental monitoring station as its external environment monitoring agency. During construction phase, environmental monitoring on total suspended particles (TSP) and noise at construction site boundary has been conducted 2-3 times each year. A total of six semi-annual Environmental Monitoring Reports (EMR) were provided by the HPPMO to the ADB and uploaded on the ADB website. According to the requirements of monitoring indicators specified in the environmental monitoring plan, operation monitoring was undertaken for all operating subprojects. The monitoring results showed all subprojects comply with relevant standards.

### D. Implementation of Mitigation Measures

8. During construction and operational phases, the EMP was implemented effectively. No major environmental damages occurred during project construction. Measures were taken to minimize the negative impacts to the local and regional environment during construction and operational phases of the project.

9. The four types of subprojects have different adverse environmental impacts during operation phase.

10. **Water Supply Subprojects.** The major adverse environmental impacts of water supply subprojects during operation phase mainly include noise, wastewater, and solid waste as well as leakage risk of chlorine dioxide. According to the requirements of the environmental management plan, relevant environmental protection measures in the project operation phase have been reasonably implemented. Monitoring results show that all effluent meets Standards for Drinking Water Quality (GB5749-2006) and the noises at plant boundary meet Noise Standard for Industrial Enterprises at Boundary (GB12348-2008). The maximum values of fugitive emissions of hydrogen chloride at the downwind boundary is undetectable.

11. **Wastewater Subprojects.** In the operation phase, environmental protection measures have been well implemented, including (i) maintaining a sufficient buffer distance, (ii) noise reduction, (iii) landscaping, and (iv) safe disposal of sludge and screen residues. Monitoring results show that the effluent discharge complies with the class 1A standard of Discharge Standard of Pollutants for Municipal Wastewater Treatment Plant (GB18918-2002); atmospheric pollutants emission complies with Emission Standards for Odor Pollutants (GB14554-93) and Integrated Emission Standard of Atmospheric Pollutants (GB16297-1996).

12. **Solid Waste Subprojects.** The adverse environmental impacts of waste transfer stations and solid waste treatment facilities during operation include odor, particulate matters, leachate on groundwater and noise on the surrounding sensitive receptors. In the operation phase, relevant measures have been taken, including (i) sufficient protection zone, (ii) leachate collection and treatment facilities; (iii) noise reduction, (iv) enclosed operation, (v) landscaping, and (vi) exhaust treatment.

13. **Heating Subprojects.** The major adverse environmental impacts of heating subprojects during operation phase mainly include air pollutant emissions from heating source plants, and noise and solid waste impacts of heat transfer stations. Adequate mitigation measures have been taken, including (i) sufficient protection zone; (ii) low-noise equipment and damping measures; (iii) adequate flue gas treatment; (iv) coal storage areas covered; (v) timely treatment of fly ash and slag; and (vi) heating transfer station equipment installed underground. Monitoring results show that noise and atmospheric emissions of heating source plants comply with relevant standards, including Noise Standard for Industrial Enterprises at Boundary (GB12348-2008) and Emission Standard of Atmospheric Pollutants for Boiler (GB13271-2014). The noises from heating transfer stations meet Environmental Quality Standards for Noise (GB3096-2008). So the operation of heating source plants and heating transfer stations do not cause significant adverse environmental impacts.

14. Public consultation was regularly carried out during the project implementation. The contractors responded to the public concerns effectively. At completion, the PMO reported that a public environmental satisfaction survey through interviews and questionnaires in all 11 project counties/towns concluded that the public satisfaction rate reached about 80%, higher than those respectively at 36% to 60% in 2008.

15. The project is considered to be in compliance with the project's safeguard documents and national environmental regulations, as also observed during the field visits at completion review. The completed eight subprojects' domestic environmental check and acceptance also confirmed that the project did not cause any serious environmental concerns, and that all adverse environmental impacts were being mitigated. No complaints on environmental impacts were recorded during project implementation.

## **E. Environmental Benefits**

16. This project has many positive environmental benefits which are attributed to the improvement of heating, water supply, wastewater collection and treatment infrastructures.

17. The water supply facilities have improved water quality and living condition of local residents, likewise has reduced the incidence of water-borne disease accordingly. The improved water supply alleviates the water shortage problem and provides a reliable supply of local residents, and industries which is a key development area but lacked a reliable water supply before this project. In addition, the completion of water supply network reduced non-revenue water losses. The closure of self-sufficient wells within the subproject areas reduced random exploitation and pollution of groundwater resource.

18. The smooth operation of wastewater collection and treatment facilities has reduced pollutant discharged into the water bodies, contributing to local water environment quality improvement. The PMO reported that the chemical oxygen demand (COD) discharge was reduced by 38,782 tons per annum or 36%, compared with the target level 15% reduction than at appraisal in eight counties/towns.

19. The centralized heating facilities have significantly reduced the total emission load of atmospheric pollutants, which contributed to the improvement in regional air quality in Hebei Province. Atmospheric pollutant (sulfur dioxide) emission was reduced by 19,458 tons per annum or 24%, compared with the target level 15% than at appraisal in 11 counties/towns.



20. Construction of heating facilities, wastewater and solid waste collection and treatment facilities has improved the sanitary condition to the subproject towns living environment. Solid waste collection and treatment facilities also reduce pollution to groundwater caused by waste disposal and waste landfill and its negative impacts to surrounding air quality.

#### **F. Conclusion**

21. During construction, all contractors fulfilled their obligations to protect the environment and implement mitigation measures in their construction schemes. The adverse effects of project construction in the surrounding environment were thus minimized. During operation, impacts on the ambient environment were minor and within the scope of the summary EIA.