



# Technical Assistance Report

---

Project Number: 48470-001  
Policy and Advisory Technical Assistance (PATA)  
September 2015

## People's Republic of China: Study on Green Transformation Guide for Resource-Based Regions of Shanxi Province

This document is being disclosed to the public in accordance with ADB's Public Communications Policy 2011.

Asian Development Bank

## CURRENCY EQUIVALENTS

(as of 14 September 2015)

Currency unit	–	yuan (CNY)
CNY1.00	=	\$0.1569
\$1.00	=	CNY6.3734

## ABBREVIATIONS

ADB	–	Asian Development Bank
GDP	–	gross domestic product
PRC	–	People's Republic of China
SPEPD	–	Shanxi Provincial Environmental Protection Department
TA	–	technical assistance

## NOTE

In this report, "\$" refers to US dollars.

<b>Vice-President</b>	S. Groff, Operations 2
<b>Director General</b>	A. Konishi, East Asia Department (EARD)
<b>Director</b>	Q. Zhang, Environment, Natural Resources, and Agriculture Division, EARD
<b>Team leader</b>	Y. Zhou, Senior Water Resources Specialist, EARD
<b>Team members</b>	H. Luna, Senior Operations Assistant, EARD Z. Niu, Senior Project Officer (Environment), People's Republic of China Resident Mission, EARD

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

## CONTENTS

	<b>Page</b>
POLICY AND ADVISORY TECHNICAL ASSISTANCE AT A GLANCE	
I. INTRODUCTION	1
II. ISSUES	1
III. THE POLICY AND ADVISORY TECHNICAL ASSISTANCE	3
A. Impact and Outcome	3
B. Methodology and Key Activities	3
C. Cost and Financing	4
D. Implementation Arrangements	4
IV. THE PRESIDENT'S DECISION	5
APPENDIXES	
1. Design and Monitoring Framework	6
2. Cost Estimates and Financing Plan	9
3. Outline Terms of Reference for Consultants	10

## POLICY AND ADVISORY TECHNICAL ASSISTANCE AT A GLANCE

<b>1. Basic Data</b>		<b>Project Number: 48470-001</b>	
<b>Project Name</b>	Study on Green Transformation Guide for Resource-Based Regions of Shanxi Province	<b>Department /Division</b>	EARD/EAER
<b>Country Borrower</b>	China, People's Republic of People's Republic of China	<b>Executing Agency</b>	Shanxi Environmental Protection Bureau
<b>2. Sector</b>		<b>Subsector(s)</b>	
✓ Agriculture, natural resources and rural development	Land-based natural resources management	<b>ADB Financing (\$ million)</b>	
	Rural water policy, institutional and capacity development		0.30
		<b>Total</b>	<b>0.10</b>
			<b>0.40</b>
<b>3. Strategic Agenda</b>		<b>Climate Change Information</b>	
Inclusive economic growth (IEG)	Pillar 2: Access to economic opportunities, including jobs, made more inclusive	Climate Change impact on the Project	Low
Environmentally sustainable growth (ESG)	Environmental policy and legislation Natural resources conservation		
<b>4. Drivers of Change</b>		<b>Gender Equity and Mainstreaming</b>	
Knowledge solutions (KNS)	Knowledge sharing activities	No gender elements (NGE)	✓
<b>5. Poverty Targeting</b>		<b>Location Impact</b>	
Project directly targets poverty	No	Rural	Medium
		Urban	Medium
<b>6. TA Category:</b>	B		
<b>7. Safeguard Categorization</b> Not Applicable			
<b>8. Financing</b>			
<b>Modality and Sources</b>		<b>Amount (\$ million)</b>	
<b>ADB</b>		<b>0.40</b>	
Policy and advisory technical assistance: Technical Assistance Special Fund		0.40	
<b>Cofinancing</b>		<b>0.00</b>	
None		0.00	
<b>Counterpart</b>		<b>0.00</b>	
None		0.00	
<b>Total</b>		<b>0.40</b>	
<b>9. Effective Development Cooperation</b>			
Use of country procurement systems		No	
Use of country public financial management systems		Yes	

## I. INTRODUCTION

1. During the 2014 country programming mission, the Government of the People's Republic of China (PRC) requested policy and advisory technical assistance (TA) from the Asian Development Bank (ADB) to prepare a green transformation guide for resource-based regions of Shanxi Province.<sup>1</sup> The TA was included in ADB's country operations business plan, 2015–2017.<sup>2</sup> In August 2015, an ADB mission visited Shanxi Province and reached an understanding with Shanxi Provincial Environmental Protection Department (SPEPD) and other stakeholders on the TA project's impact, outcome, outputs, implementation arrangements, cost, financing arrangements, and consultants' terms of reference. The design and monitoring framework is in Appendix 1.

## II. ISSUES

2. As the PRC has industrialized, some resource-oriented regions have emerged as fast-growing economies. However, though industrialization can promote rapid economic growth in the short term, it brings problems such as overreliance on their resources and associated heavy industrial structure. Narrow-based and resource-intensive economic growth has also caused problems such as tight restrictions on resources, serious pollution, and a degraded ecological system. With the resource depletion, these regions are facing serious challenges to sustainable and inclusive development.

3. Shanxi Province is typical of such a resource-oriented economy. The province's economic development relies heavily on overexploitation of coal resources and preliminary processing. It is rich in coal and mineral resources, with 62,000 square kilometers of coal-bearing area accounting for 40% of its total land area. It has about 265.2 billion tons of identified coal resource reserves, representing 26% of coal resources nationwide. Of its 119 counties and cities, 94 have coal resources. Shanxi Province has made a great contribution to national economic construction and reform through its coal resources. As the pillar industry, coal production in Shanxi Province amounted to 960 million tons in 2013, with about 620 million tons sold to other parts of the PRC. The coal industry contributes to about 30% of the province's gross domestic product (GDP). More than 1 million people work in the coal mining industry in Shanxi Province.<sup>3</sup> As one of the strategic national energy bases, Shanxi Province's development is heavily influenced by the overall energy policy and sector development strategy of the PRC.

4. However, overreliance on a resource-based economy has led to problems in the province such as an undeveloped economy and an industrial structure narrowly based on the coal industry. This region may suffer from the "resource curse," where abundant resources do not bring rapid and comprehensive development but generate a series of severe constraints. Coal mining in Shanxi Province has caused serious damage and deterioration to the ecological environment, excessive use of resources, and a decline in the sustainable development capacity.

5. The pollution from industries such as coal, coking, and thermal power—and the long-term extensive growth mode—have made Shanxi Province one of the provinces with the most serious environmental pollution and ecological destruction. According to various reports, the

---

<sup>1</sup> The TA first appeared in the business opportunities section of ADB's website on 5 August 2015.

<sup>2</sup> ADB. 2015. *Country Operations Business Plan: People's Republic of China, 2015–2017*. Manila.

<sup>3</sup> Government of the PRC, Shanxi Provincial Statistic Bureau. 2014. *Yearly Statistics Report*. Taiyuan.

underground goaf caused by coal mining reaches 5,000 square kilometers, of which 3,000 square kilometers are mining subsistence areas.<sup>4</sup> The cumulative coal gangue and/or waste have reached more than 1 billion tons and have formed more than 1,500 coal gangue mountains.<sup>5</sup> Overdependence on the mining industry has caused serious pollution. In 2013, Shanxi Province's total emissions of smoke and powder dust amounted to 1.02 million tons and ranked second among the provinces in the PRC; sulfur dioxide, at 1.25 million tons, ranked fourth; and nitrogen oxide, at 1.16 million tons, ranked seventh. The emissions per unit area of sulfur dioxide were 3.77 times the national average and nitrogen oxide 3.19 times the national average. The air quality in 11 cities did not meet the Class II air quality requirements of the national environmental standard.<sup>6</sup> About 32% of the monitored river sections suffered serious pollution, particularly the sections near cities and industry concentrated areas. It is estimated that among the resource-based small mining cities by 2020, one-third of state-owned coal mines and half of town-owned coal mines will have been shut down as a result of resource exhaustion.<sup>7</sup>

6. Overall, the traditional economic growth pattern is a great challenge for Shanxi Province. Shanxi Province's economic growth was stagnant in recent years, and the GDP growth rates were declining since 2010. In 2014, its GDP growth stood at 4.9%, the lowest among the provinces in the PRC.<sup>8</sup> How to turn "Black GDP" to "Green GDP" becomes a key issue. Shanxi Province has been selected to pilot comprehensive reforms for economic transformation of resource-intensive economies. Green transformation and moving out from the "resource curse" is necessary for the province's sustainable development for healthy economic development and better ecological environment. The Government of the PRC and the Shanxi Provincial Government are promoting green transformation in Shanxi Province; and international experience is needed in the transformation process, particularly for assistance in developing a guide, including methodologies and indicators for green transformation planning; and its application in selected cities and counties in Shanxi Province.

7. The studies in the selected pilot cities and counties will serve as models for demonstration to other regions in Shanxi Province and other resource-based provinces in the PRC. As a representative case of a resource-based region, Shanxi Province's green transformation will provide both experiences and lessons to other regions that are attempting to break the resource-advantage dilemma, and to realize green and circular development toward achieving the national government's goal of ecological civilization.

8. The national government has introduced ecological civilization as a new concept for green, circular, and low-carbon development. Ecological civilization denotes a departure from the past emphasis on economic growth as the core of development to an approach that focuses on the quality and efficiency of development, and which is more balanced between humans and nature. Ecological civilization was incorporated into the overall plan for promoting economic, political, cultural, social, and ecological progress in 2012 at the Eighteenth Party Congress. The Congress stated that "promoting ecological progress is a long-term task of vital importance to the people's well-being and [the People's Republic of] China's future."<sup>9</sup> The Decision of the

---

<sup>4</sup> Goaf refers to the part of a mine from which the mineral has been partially or wholly removed; the waste left in old workings.

<sup>5</sup> Gangue refers to the worthless rock or vein matter in which valuable metals or minerals occur.

<sup>6</sup> Government of the PRC. 2012. *Ambient Air Quality Standard* (GB3095-2012). Beijing.

<sup>7</sup> The data in this paragraph are from various reports of SPEPD.

<sup>8</sup> Government of the PRC, National Bureau of Statistics. 2015. *Yearly Statistics Report*. Beijing.

<sup>9</sup> Party Secretary General Hu Jintao's Report at Eighteen's Party Congress, available at [http://news.xinhuanet.com/english/bilingual/2012-11/18/c\\_131982275\\_9.htm](http://news.xinhuanet.com/english/bilingual/2012-11/18/c_131982275_9.htm).

Communist Party of China Central Committee on Some Major Issues Concerning Comprehensively Deepening the Reform, adopted at the Third Plenary Session of the Eighteenth Party National Committee in November 2013, specified the priority areas for promoting ecological civilization in the near term by establishing systematic and integrated ecological civilization institutions and systems; implementing the strictest source protection system, damage compensation, and accountability system; and improving environmental protection and ecological restoration systems.<sup>10</sup>

9. Environmentally sustainable growth is a strategic priority of ADB's country partnership strategy, 2011–2015 for the PRC, and it is expected that the next country partnership strategy will continue to support the national government's goal of environmental protection and green transformation.

### III. THE POLICY AND ADVISORY TECHNICAL ASSISTANCE

#### A. Impact and Outcome

10. The impact will be achievement of (i) green and circular economic development in Shanxi Province, and (ii) transformation from a narrow-based industrial structure to a balanced and diversified one in Shanxi Province. The outcome will be improved strategic planning for the regionally balanced green transformation of resource-based regions in Shanxi Province.

#### B. Methodology and Key Activities

11. The TA aims to achieve the outcome through the following outputs and associated activities.

12. **Output 1: Identification of international and national best practices of the regionally balanced green transformation of resource-based regions.** This output will include (i) review and analysis of international and national experiences, and draw lessons from the resource-based region's green transformation; (ii) review and analysis of key issues and constraints; (iii) documentation of successful cases summarizing good practices of green transformation; and (iv) dissemination of the findings at the workshops.

13. **Output 2: Analysis of socioeconomic status of the typical resource-based regions in Shanxi Province.** This output will support the (i) collection and analysis of key issues and constraints of the social and economic development, environmental protection, and natural resource utilization in Shanxi Province, taking into consideration the provincial role as one of the national strategic energy bases; (ii) conduct of surveys and assessments of the cases of industrial transformation, ecological rehabilitation, integrated urban and rural development, and livelihood improvement in several selected typical regions in Shanxi Province; (iii) assessment of key constraints and features in industrial transformation, ecological and environmental protection, and institutional and policy mechanism for resource-based regions in Shanxi Province; (iv) economic analysis for environmental loss; and (v) preparation of an evaluation report based on the above reviews and analyses.

14. **Output 3: Development of methodologies and indicators for planning the regionally balanced green transformation of resource-based regions.** This output will

---

<sup>10</sup> Government of the PRC. 2013. *Communist Party of China Central Committee Resolution Concerning Some Major Issues in Comprehensively Deepening Reform*. Beijing.

support the (i) definition of the regionally balanced green transformation of resource-based regions, and development of a strategic direction and priorities; (ii) development of a set of performance targets and indicators for evaluating the performance and impact of the regionally balanced green transformation of resource-based regions; and (iii) development of technical methodologies and guidelines for planning the regionally balanced green transformation of resource-based regions.

**15. Output 4: Formulation of two green transformation pilot studies for Liulin County and Xiaoyi City.** This output will include (i) conduct of detailed studies on social and economic conditions, natural resources development, environmental carrying capacity, and industrial structure in Liulin County and Xiaoyi City of Shanxi Province; (ii) an assessment or evaluation of the environmental carrying capacity and industrial structure improvement each for Liulin County and Xiaoyi City; (iii) preparation of a policy note for regionally balanced green transformation of resource-based Liulin County and Xiaoyi City; and (iv) development of regionally balanced green transformation zoning and a pilot plan each for resource-based Liulin County and Xiaoyi City by applying the indicators and guide developed under output 3.

16. The TA will take into account the relevant findings of previous ADB-funded studies and relevant work from other donors. It will attach importance to case studies to learn best practices worldwide. The TA will assume that (i) relevant officials from Shanxi Provincial Government will actively participate in the discussions on the development of the technical guidelines and indicators, (ii) inter-sector cooperation and data sharing among key sectors are adequate, and (iii) Liulin County and Xiaoyi City governments fully support the pilot studies.

### **C. Cost and Financing**

17. The TA is estimated to cost \$500,000, of which \$400,000 will be financed on a grant basis by ADB's Technical Assistance Special Fund (TASF-other sources). The government will provide counterpart support in the form of counterpart staff, necessary data, office space, local transportation to the project sites, pilot testing, and other in-kind contributions.

### **D. Implementation Arrangements**

18. The TA will be implemented from 15 January 2016 to 30 June 2017. SPEPD will be the executing agency. A TA management office will be established in SPEPD and will be responsible for day-to-day operations with ADB, consultants, and related government agencies.

19. An expert panel will be set up to obtain experts' opinions, as required, on the work of the TA consultants and counterpart team. The panel will consist of national experts from various agencies. The panel will collaborate with the counterpart team to organize at least two panel meetings during the TA implementation.

20. It is estimated that the TA will require 7 person-months of international and 30 person-months of national consulting services. Four international (environmental planning specialist and deputy team leader, environmental economist, industrial planning specialist, energy and climate change specialist) and nine national specialists (environmental planning specialist and team leader, environmental policy specialist, climate change specialist, air quality specialist, water environment specialist, water resources specialist, macroeconomist, industry planning specialist, and land use planning specialist) will be required for the TA. The specialists will be engaged through a firm in accordance with ADB's Guidelines on the Use of Consultants (2013, as amended from time to time) using the quality- and cost-based selection method and simplified



technical proposal, with a quality–cost weighting ratio of 90:10 given the high technical complexity. Equipment will be procured following ADB’s Procurement Guidelines (2015, as amended from time to time) and will be handed over to SPEPD upon completion of the TA. Operational expenses for translation, printing, and organizing TA-related workshops will be included in the consultant’s contract. The proceeds of the TA will be disbursed with ADB’s *Technical Assistance Disbursement Handbook* (2010, as amended from time to time). The draft outline terms of reference for consultants are in Appendix 3.

21. The ADB inception, interim, and final review missions will be conducted; and tripartite meetings will be held during the missions to review the consultants’ performance, and TA implementation progress and deliverables, based on the design and monitoring framework and the consultants’ work plan. The missions will also monitor the national and local governments’ inputs and contributions, as documented in the TA report. The performance of the TA, including its outputs and outcomes, will be evaluated during the final review mission based on the design and monitoring framework. Good practices and lessons will be disseminated through workshops, conferences, and publications.

#### **IV. THE PRESIDENT’S DECISION**

22. The President, acting under the authority delegated by the Board, has approved the provision of technical assistance not exceeding the equivalent of \$400,000 on a grant basis to the Government of the People’s Republic of China for the Study on Green Transformation Guide for Resource-Based Regions of Shanxi Province, and hereby reports this action to the Board.

## DESIGN AND MONITORING FRAMEWORK

<b>Impacts the Project is Aligned with:</b>			
(i) Green and circular economic development in Shanxi Province achieved; <sup>a</sup> and (ii) Transformation from narrow-based industrial structure to a balanced and diversified one in Shanxi Province achieved. <sup>a</sup>			
<b>Results Chain</b>	<b>Performance Indicators with Targets and Baselines</b>	<b>Data Sources and Reporting</b>	<b>Risks</b>
<b>Outcome</b> Strategic planning for the regionally balanced green transformation of resource-based regions in Shanxi Province improved	By 2017, The technical guidelines issued by Shanxi Provincial Government as a government circular for implementation in Shanxi Province (2015 baseline: 0)	Shanxi Provincial Environmental Protection Department's annual environmental protection report	Shanxi Provincial Government not actively participating in the discussions on the development of the technical guidelines and indicators
<b>Outputs</b> 1. International and national best practices of the regionally balanced green transformation of resource-based regions identified  2. Socioeconomic status of the typical resource-based regions in Shanxi Province analyzed  3. Methodologies and indicators for planning the regionally balanced green transformation of resource-based regions developed	By 2017, 1a. Preliminary findings on the review of the report prepared for presentation at the interim workshop by month 5 (2015 baseline: 0)  1b. The report for output 1 completed by month 6 (2015 baseline: 0)  2a. Preliminary survey and assessment completed by month 4, and findings presented at the interim workshop by month 5 (2015 baseline: 0)  2b. An evaluation report for output 2 completed by month 6 (2015 baseline: 0)  3a. The draft technical guidelines, including a set of indicators, prepared and discussed at the interim workshop by month 5 (2015 baseline: 0)  3b. The draft final technical guidelines completed by month 9 and discussed at the final workshop by month 10 (2015 baseline: 0)	1a–b. TA review reports by ADB missions at week 6, month 5, and month 9  1a–b. TA consultants' quarterly progress report on TA implementation  2a–b. TA review reports by the ADB missions at week 6, month 5, and month 9  2a–b. TA consultants' quarterly progress report on TA implementation  3a–c. TA review mission reports by the ADB missions at week 6, month 5, and month 9  3a–c. TA consultants' quarterly progress report on TA implementation	Inadequate inter-sector cooperation and data sharing among key sectors

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting	Risks
4. Two green transformation pilot studies for Liulin County and Xiaoyi City formulated	3c. The final technical guidelines endorsed by Shanxi Provincial Environmental Protection Department by month 12 (2015 baseline: 0)		
	4a. The draft plans prepared by month 8, and discussed at the final workshop by month 10 (2015 baseline: 0)	4a–b. TA review reports by the ADB missions at week 6, month 5, and month 9	Lack of support from Liulin County and Xiaoyi City governments for pilot study
	4b. Liulin County and Xiaoyi City governments satisfied with the plans and adopt them by month 12 (2015 baseline: 0)	4a–b. Project management office's quarterly progress report on TA implementation	
	4a–b. Liulin County and Xiaoyi City governments' semiannual progress report on TA implementation		

### Activities with Milestones

#### 1. International and national best practices of the regionally balanced green transformation of resource-based regions identified

- 1.1 Conduct desk review and analysis of international and national experiences on regionally balanced green transformation of resource-based regions relevant to Shanxi Province's situation, and draw lessons for application in the province (Q1 2016–Q2 2016)
- 1.2 Review and analyze key issues and constraints for Shanxi Province's sustainable development (Q1 2016–Q2 2016)
- 1.3 Document successful cases summarizing good practices of green transformation (Q1 2016–Q2 2016)
- 1.4 Conduct workshops for dissemination of the findings (Q2 2016)

#### 2. Socioeconomic status of the typical resource-based regions in Shanxi Province analyzed

- 2.1 Collect and assess key issues and constraints of the social and economic development, environmental protection, and natural resources utilization in Shanxi Province (Q1 2016–Q2 2016)
- 2.2 Conduct surveys and assessments of the cases of industrial transformation, ecological rehabilitation, integrated urban and rural development, and livelihood improvement in several selected typical regions in Shanxi Province (Q1 2016–Q2 2016)
- 2.3 Assess key constraints and features of industrial transformation, ecological and environmental protection, and institutional and policy mechanisms for resource-based regions in Shanxi Province (Q1 2016–Q2 2016)
- 2.4 Conduct economic analysis for environmental loss in Shanxi Province (Q1 2016–Q2 2016)
- 2.5 Prepare an evaluation report based on the above review and analyses (Q2 2016)

**Activities with Milestones****3. Methodologies and indicators for planning the regionally balanced green transformation of resource-based regions developed**

- 3.1 Define regionally balanced green transformation of resource-based regions, and develop a strategic direction and priorities (Q2 2016–Q3 2016)
- 3.2 Develop a set of performance targets and indicators for regionally balanced green transformation of resource-based regions (Q2 2016–Q4 2016)
- 3.3 Develop technical methodologies and guidelines for planning the regionally balanced green transformation of resource-based regions (Q2 2016–Q4 2016)

**4. Two green transformation pilot studies for Liulin County and Xiaoyi City formulated**

- 4.1 Conduct detailed studies of social and economic conditions, natural resources development, environmental carrying capacity, and industrial structure in Liulin County and Xiaoyi City of Shanxi Province (Q3 2016–Q4 2016)
- 4.2 Assess or evaluate the environmental carrying capacity and optimization of the industrial structure for Liulin County and Xiaoyi City (Q3 2016–Q4 2016)
- 4.3 Prepare a policy and strategy note for regionally balanced green transformation of resource-based Liulin County and Xiaoyi City (Q3 2016–Q4 2016)
- 4.4 Develop a regionally balanced green transformation zoning and pilot plan each for resource-based Liulin County and Xiaoyi City by applying the indicators and guide developed under output 3 (Q3 2016–Q4 2016)

**Inputs**

ADB: \$400,000

Note: The government will provide counterpart support in the form of counterpart staff, necessary data, office space, local transportation to the project sites, pilot testing, and other in-kind contributions.

**Assumptions for Partner Financing**

Not applicable.

ADB = Asian Development Bank, Q = quarter, TA = technical assistance.

<sup>a</sup> Government of the People's Republic of China, Shanxi Provincial Government. Forthcoming. *Shanxi Provincial Government's Thirteenth Five-Year Social and Economic Development Plan, 2016–2020*. Taiyuan.

Source: Asian Development Bank.

**COST ESTIMATES AND FINANCING PLAN**

(\$'000)

<b>Item</b>	<b>Amount</b>
<b>Asian Development Bank<sup>a</sup></b>	
1. Consultants	
a. Remuneration and per diem	
i. International consultants	150.0
ii. National consultants	155.0
b. International and local travel	22.5
c. Reports and communications	12.0
2. Equipment <sup>b</sup>	5.0
3. Training, seminars, and conferences	20.0
4. Miscellaneous administration and support costs <sup>c</sup>	5.5
5. Contingencies	30.0
<b>Total</b>	<b>400.0</b>

Note: The technical assistance (TA) is estimated to cost \$500,000, of which contributions from the Asian Development Bank are presented in the table above. The government will provide counterpart support in the form of counterpart staff, necessary data, office space, local transportation to the project sites, pilot testing, and other in-kind contributions. The value of government contribution is estimated to account for 20% of the total TA cost.

<sup>a</sup> Financed by the Asian Development Bank's Technical Assistance Special Fund (TASF-other sources).

<sup>b</sup> The equipment, which includes two computers, a printer, and a projector, will be turned over to the executing agency upon completion of the TA.

<sup>c</sup> Includes costs for office operations, secretarial services, miscellaneous travel expenses, and other unanticipated administrative costs.

Source: Asian Development Bank estimates.

## OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

### A. Introduction

1. The technical assistance (TA) is estimated to require 7 person-months of international and 30 person-months of national consulting services. Four international consultants (environmental planning specialist, environmental economist, industry planning specialist, energy and climate change specialist) and nine national specialists (in environmental planning, environmental policy, climate change, air quality, water environment, water resources, macroeconomics, industry planning, and land use planning) will be required for the TA. The specialists will be engaged through a firm in accordance with the Guidelines on the Use of Consultants (2013, as amended from time to time) of the Asian Development Bank (ADB) using the quality- and cost-based selection method with a quality–cost weighting ratio of 90:10, given the high technical complexity. The simplified technical proposal approach will be used. Table A3 provides a breakdown of the required expertise.

**Table A3: Breakdown of Consulting Expertise**

<b>International Consultants</b>	<b>Person-months</b>	<b>National Consultants</b>	<b>Person-months</b>
Environmental planning specialist and deputy team leader	2.0	Environmental planning specialist and team leader	7.0
Environmental economist	1.5	Environmental policy specialist	6.0
Industry planning specialist	2.0	Climate change specialist	3.0
Energy and climate change specialist	1.5	Air quality specialist	3.0
		Water environment specialist	3.0
		Water resources specialist	2.0
		Macro economist	2.0
		Industry planning specialist	2.5
		Land use planning specialist	1.5
<b>Total</b>	<b>7.0</b>	<b>Total</b>	<b>30.0</b>

Source: Asian Development Bank estimates.

### B. Terms of Reference

2. Overall, the consultants will
- (i) maintain close coordination with ADB and the executing agency;
  - (ii) develop the detailed study framework and methodology in consultation with ADB and the executing agency;
  - (iii) develop outlines of the TA inception, interim, and final reports; assign work to respective specialists in the team; compile inputs; and finalize the inception, interim, and final reports;
  - (iv) conduct desk review and analysis of international experiences from both developed and developing countries, and national experiences on regionally balanced green transformation of resource-based regions that are similar to Shanxi Province; and draw lessons for application in the province;
  - (v) review and analyze key issues and constraints for Shanxi Province's sustainable development;
  - (vi) document successful cases summarizing good practices of green transformation;
  - (vii) collect and assess key issues and constraints of the social and economic development, environmental protection, and natural resources utilization in Shanxi Province;
  - (viii) conduct surveys and assessments of the cases of industrial transformation, ecological rehabilitation, integrated urban and rural development, and livelihood

- improvement in several selected typical resource-based regions in Shanxi Province;
- (ix) assess key constraints and features in industrial transformation, ecological and environmental protection, and institutional and policy mechanisms for resource-based regions in Shanxi Province;
  - (x) prepare an evaluation report based on the above review and analyses;
  - (xi) define regionally balanced green transformation of resource-based regions, and develop a strategic direction and planning framework;
  - (xii) develop a set of performance targets and indicators for regionally balanced green transformation of resource-based regions;
  - (xiii) develop technical methodologies and guidelines for planning the regionally balanced green transformation of resource-based regions;
  - (xiv) conduct workshops for dissemination of the findings;
  - (xv) conduct detailed studies on social and economic conditions, natural resources development, environmental carrying capacity, and industrial structure in Liulin County and Xiaoyi City of Shanxi Province;
  - (xvi) assess the environmental carrying capacity and optimization of industrial structure for Liulin County and Xiaoyi City;
  - (xvii) prepare a policy note for green transformation of Liulin County and Xiaoyi City; and
  - (xviii) develop a regionally balanced green transformation zoning and development pilot plan each for Liulin County and Xiaoyi City by applying the indicators and guide developed under output 3 of the TA.

**3. Environmental planning specialists: team leader and deputy team leader** (national, 7 person-months; international, 2 person-months). The specialists will be responsible for the overall coordination and supervision of the TA activities and outputs, and day-to-day liaison with the executing agency as well as other agencies supporting the related work. The specialists will have (i) a graduate degree in environment science or engineering, or related field; (ii) at least 10 years of experience in environment policy and strategy formulation, environmental planning, and environmental management; and (iii) fluent written and spoken English. Experience in green transformation is desirable and experience in the People's Republic of China (PRC) of the international specialist will be an advantage. Specifically, the specialists will have the following tasks:

- (i) assume overall responsibility for the effective and timely implementation of the TA and be responsible for the final outputs and quality control of various reports;
- (ii) lead and foster close coordination between the international and national specialists, and assign detailed tasks for each of the team member for the conduct of all the studies and completion of all the outputs and reports;
- (iii) coordinate with ADB, the executing agency and other relevant government agencies, and other development partners operating in the PRC;
- (iv) report periodically on implementation progress to ADB and the executing agency;
- (v) develop outlines of the TA inception, interim, and final reports; assign work to respective specialists in the team; compile inputs; and finalize the inception, interim, and final reports;
- (vi) conduct desk review and analysis of international and national experiences on regionally balanced green transformation of resource-based regions are similar to Shanxi Province, and draw lessons for application in the province;
- (vii) review and analyze key issues and constraints for Shanxi Province's sustainable development;

- (viii) conduct surveys and assessments of the cases of industrial transformation, ecological rehabilitation, integrated urban and rural development, and livelihood improvement in several selected typical regions in Shanxi Province;
- (ix) assess key constraints and features of industrial transformation, ecological and environmental protection, and institutional and policy mechanisms for resource-based regions in Shanxi Province;
- (x) define regionally balanced green transformation of resource-based regions, and develop a strategic direction and planning framework;
- (xi) develop a set of performance targets and indicators for regionally balanced green transformation of resource-based regions;
- (xii) develop technical methodologies and guidelines for planning the regionally balanced green transformation of resource-based regions;
- (xiii) assess or evaluate the environmental carrying capacity and optimization of industrial structure for Liulin County and Xiaoyi City;
- (xiv) prepare a policy note for green transformation of Liulin County and Xiaoyi City; and
- (xv) develop a regionally balanced green transformation zoning and development pilot plan each for Liulin County and Xiaoyi City by applying the indicators and guide developed under output 3 of the TA.

4. **Other specialists.** The other specialists will have (i) a graduate degree in related fields, (ii) at least 7 years of experience in relevant fields, and (iii) fluent written and spoken English. For international specialists, experience in green transformation in the resource-based regions in developing and developed countries is desirable, and experience in the PRC will be an advantage. For national specialists, experience in the PRC's green transformation and ecological civilization is needed, and experience in Shanxi Province and with international agencies will be an advantage. These specialists will work closely with the team leader and the deputy team leader in their areas of expertise to complete the required studies and deliver the required outputs as specified in the overall terms of reference. The detailed terms of reference will be assigned by the team leader in consultation with the deputy team leader.

### C. Reporting

5. The consulting team will submit the following reports: (i) an inception report within 6 weeks after mobilization, (ii) an interim report within 5 months after mobilization, (iii) a draft final report within 9 months after mobilization, and (vi) a final report 2 months after the final workshop. The inception report, revised interim report, revised draft final report, and revised final report should incorporate and address comments received from ADB, the executing and implementing agencies, and other invited reviewers.

6. All documents will be submitted in both the English and Chinese languages to ADB and the executing agency, both in hard and electronic copies.