Technical Assistance Report

Project Number: 49205-001
Policy and Advisory Technical Assistance (PATA)
October 2015

People's Republic of China: Beijing–Tianjin–Hebei Regional Air Pollution Control

Asian Development Bank

CURRENCY EQUIVALENTS
(as of 30 September 2015)

Currency unit	–	yuan (CNY)
CNY1.00	=	$0.1572
$1.00	=	CNY6.3620

ABBREVIATIONS

ADB	–	Asian Development Bank
BTH	–	Beijing–Tianjin–Hebei and surrounding regions
GDP	–	gross domestic product
MEP	–	Ministry of Environmental Protection
PRC	–	People's Republic of China
TA	–	technical assistance

NOTE

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

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POLICY AND ADVISORY TECHNICAL ASSISTANCE AT A GLANCE

1. Basic Data — **Project Number:** 49205-001

Project Name	Beijing–Tianjin–Hebei Regional Air Pollution Control	**Department /Division**	EARD/EAER
Country	China, People's Republic of	**Executing Agency**	BTH Air Pollution Coordination Group

2. Sector	**Subsector(s)**	**ADB Financing ($ million)**
✓ Public sector management	Public administration	0.40
	Total	**0.40**

3. Strategic Agenda	**Subcomponents**	**Climate Change Information**	
Inclusive economic growth (IEG)	Pillar 1: Economic opportunities, including jobs, created and expanded	Climate Change impact on the Project	Low
Environmentally sustainable growth (ESG)	Environmental policy and legislation Urban environmental improvement		

4. Drivers of Change	**Components**	**Gender Equity and Mainstreaming**	
Governance and capacity development (GCD)	Institutional development Organizational development	No gender elements (NGE)	✓
Knowledge solutions (KNS)	Knowledge sharing activities		

5. Poverty Targeting		**Location Impact**	
Project directly targets poverty	No	Urban	High

6. TA Category: B

7. Safeguard Categorization Not Applicable

8. Financing

Modality and Sources	**Amount ($ million)**
ADB	**0.40**
Policy and advisory technical assistance: Technical Assistance Special Fund	0.40
Cofinancing	**0.00**
None	0.00
Counterpart	**0.00**
None	0.00
Total	**0.40**

9. Effective Development Cooperation

Use of country procurement systems	No
Use of country public financial management systems	No

I. INTRODUCTION

1. A series of loan and technical assistance (TA) projects are being prepared to support coordinated development in the Beijing, Tianjin, and Hebei (BTH) region with a focus on sustainable and inclusive growth. Immediate support includes four TAs and one sovereign loan in the areas of air pollution, balanced economic and social development, and low carbon transport.[1]

2. The Government of the People's Republic of China (PRC) requested a TA from the Asian Development Bank (ADB) for Beijing–Tianjin–Hebei Regional Air Pollution Control. ADB fielded a consultation mission on 30 March 2015 to clarify and agree with the Office of the Beijing–Tianjin–Hebei and Surrounding Regions Air Pollution Prevention and Control Coordination Group on the TA's scope, impact, outcome, outputs, implementation arrangements, cost, financing arrangements, and terms of reference of consultants.[2] The design and monitoring framework is in Appendix 1. The government confirmed the TA during the 2015 country programming midterm review on 3 June 2015 and ADB Management approved the TA concept paper on 24 August 2015.[3]

3. The TA will (i) develop a road map for BTH regional air pollution prevention and control in the medium to long term, (ii) conduct a study on mechanisms and measures for joint air pollution prevention and control in the key cities of BTH, and (iii) build the capacity of the local environmental protection agencies on air quality management. The TA will help improve the air quality in BTH, which is a national public priority.

II. ISSUES

4. BTH is among the most polluted regions in the PRC.[4] According to a report released by the Ministry of Environmental Protection (MEP), eight of the top 10 cities in the PRC with the worst ambient air quality in 2014 were in BTH. In that same year, 13 BTH cities had an average 156 days that met the national air quality standard; in contrast, the average for 74 major cities across the PRC was 241 days. The table below compares BTH to two other population and economic centers of the PRC, i.e., Yangtze River Delta region and Zhu River Delta region, in terms of major air pollutants. BTH is significantly inferior across different pollutants.

Annual Average Concentrations of Major Pollutants in 2014 (mg/m^3)

Pollutants	**BTH** (13 cities)	**Yangtze River Delta** (25 cities)	**Zhu River Delta** (9 cities)
$PM_{2.5}$[a]	93.0	60.0	42.0
PM_{10}	158.0	92.0	61.0
SO_2	52.0	25.0	18.0

[1] The four technical assistance projects are: (i) *Study on the Coordinated Development of Beijing–Tianjin–Hebei*; (ii) *Study on Beijing–Tianjin–Hebei Air Pollution Control*; (iii) *Policy Study on the Development of Intercity Railway in the Beijing–Tianjin–Hebei*; and (iv) *Study on Handan Low Carbon Emission Transport Project*. The sovereign loan is the *Beijing–Tianjin–Hebei Air Quality Improvement Policy-Based Lending Project*.

[2] The TA first appeared in the business opportunities section of ADB's website on 26 August 2015.

[3] The proposed TA was not included in the latest country operations business plan of the PRC. During the country programming midterm review on 3 June 2015, the Government of the PRC and ADB's East Asia Department both agreed to process and implement the TA as soon as possible given the significance and urgency of the problem the project aims to address.

[4] BTH refers to seven province-level districts in the northern PRC: Beijing and Tianjin municipalities; Hebei, Henan, Shandong, and Shanxi provinces; and the Inner Mongolia autonomous region.

Pollutants	**BTH** (13 cities)	**Yangtze River Delta** (25 cities)	**Zhu River Delta** (9 cities)
NO_2	49.0	39.0	37.0
CO	3.5	1.5	1.5
O_3	162.0	154.0	156.0

BTH = Beijing–Tianjin–Hebei and surrounding regions, CO = carbon monoxide, mg = milligram, m^3 = cubic meter, NO_2 = nitrogen dioxide, O_3 = ozone, PM = particulate matter, SO_2 = sulfur dioxide.

[a] $PM_{2.5}$ is a particulate matter with an aerodynamic diameter less than 2.5 micrometers. The PRC standard is 35 mg/m^3. The World Health Organization standard is 10 mg/m^3, with the first interim target at 35 mg/m^3, second interim target at 25 mg/m^3, and third interim target at 15 mg/m^3.

Source: Ministry of Environmental Protection, People's Republic of China.

5. The severe air pollution in BTH poses a significant public health concern. According to the latest census data, in 2010, 104 million or 7.79% of the total population of the PRC reside in BTH. Population density reached 484 persons per square kilometer, four times the national average. The figures have been increasing since. It was reported that the lung cancer incidence in Beijing increased by 43% from 1998 to 2007.[5] While multiple factors could have contributed to this increase, air pollution is considered to be a major factor.

6. The deteriorating air quality in BTH has drawn considerable attention from the public, policy makers, and even the international community. The State Council issued the Ambient Air Pollution Prevention and Control Action Plan in September 2013 to set unprecedented air quality improvement targets for BTH by 2017. In particular, ambient $PM_{2.5}$ concentrations, one of the most harmful air pollutants, need to be reduced by 25% in BTH, by 20% in Shanxi and Shandong provinces, and by 10% in Inner Mongolia vis-à-vis the 2012 concentration levels.[6]

7. Improvement of the air quality in BTH becomes more significant if viewed in the context of the BTH regional development synchronization, which has been adopted as a national strategy to promote balanced growth across the region. Regionally coordinated air pollution prevention and control is both a contributor to as well as a result of the regional development synchronization. Thus, in 2013, the PRC established the Beijing–Tianjin–Hebei and Surrounding Regions Air Pollution Prevention and Control Coordination Group to guide, coordinate, and supervise air pollution control in BTH. The group is supervised by a vice-premier and joined by the key central government agencies, including the Ministry of Finance, the National Development and Reform Commission, and MEP, as well as the seven provincial governments. Under the coordination group, an office manages daily work led by the vice mayor of Beijing Municipality and the vice minister of MEP.

8. Improving air quality in the BTH is a long-term challenge. First, BTH encompasses a large area with diverse sources of pollutants. Some of the identified major sources of pollutants include automobiles in Beijing, fuel-intensive industries in Tianjin and Hebei, shipping emissions from Tianjin harbor, and coal burning (for power generation and residential use) in Hebei. The pollutants can travel across the region given certain climatic conditions, making pollution control a complex task. Second, the region observes substantial disparities in economic and social development. For instance, in 2013, Beijing and Tianjin had per capita gross domestic product (GDP) above $16,000, while Hebei and Shanxi's per capita GDP were just about $6,000. Within Hebei, the per capita GDP varies between $3,762 (Xingtai City) and $13,148 (Tangshan City). Consequently, the economic structure, capacity for environmental management, emission standards, and pollution prevention and control techniques differ greatly between areas within BTH. This calls for concerted actions by local governments in dealing with air pollution in the

[5] People. People Health Channel. http://health.people.com.cn/n/2014/0414/c14739-24890405.html

[6] $PM_{2.5}$ is particulate matter with an aerodynamic diameter less than 2.5 micrometers. It is one of the most harmful air pollutants because of its ability to penetrate deep into the lungs.

long run. Mechanisms to encourage such coordination and collaboration have begun to emerge with the establishment of the coordination group. Preparation of the master plan for BTH regional air pollution prevention and control also started in mid-2015. At this initial stage, the government needs urgent technical support and capacity building to help establish an effective regional system for air pollution prevention and control.

9. Due to their higher population and pollution intensities, Beijing, Tianjin, and four neighboring cities in Hebei Province, i.e., Baoding, Cangzhou, Langfang, and Tangshan, are designated as the key areas within BTH in the 2015 Priorities for BTH Air Pollution Joint Prevention and Control approved by the coordination group. Reducing air pollution in these areas is considered more urgent as well as more effective in improving the air quality of the whole BTH. In addition to developing the regional air quality management system, the TA will support an in-depth study focusing on these municipalities and cities as core areas and pilots of the plan and mechanisms developed for BTH.

10. The TA is in line with ADB's country partnership strategy for the PRC, 2011–2015, which identifies environmentally sustainable growth as one of the three pillars for the strategic framework. ADB will support government efforts to foster a cleaner and more sustainable growth process by strengthening capacity in environmental management, helping to develop livable and low-carbon cities, and promoting the development and institutionalization of green financing instruments. The TA will be a timely response to pressing air pollution issues in the northern PRC, and will directly support environmentally sustainable growth.

III. THE POLICY AND ADVISORY TECHNICAL ASSISTANCE

A. Impact and Outcome

11. The impact will be the improved air quality in BTH.[7] The outcome will be the promotion of coordinated regional approach for air pollution prevention and control in BTH.

B. Methodology and Key Activities

12. The TA will produce the following outputs:

(i) **Road map and policy recommendations.** The TA will introduce international experience on regional air quality management and conduct expert review and consultations to support the preparation of the master plan for BTH regional air pollution prevention and control. A detailed road map and related policy recommendations will be developed to specify the paths and policies needed to put the master plan in practice. The report will cover unified emission standards, regional pre-warning and joint emergency response, and consistent emission monitoring and coordinated reduction actions, among others, and will examine the technical, institutional, economic, financing, and legal aspects for establishing the regional mechanisms.

(ii) **Mechanisms and measures for joint air pollution prevention and control.** The in-depth study will focus on Beijing, Tianjin, and Hebei Province's Baoding, Cangzhou, Langfang, and Tangshan cities. The study will survey the pollution status and existing control measures as well as the economic development of these cities. It will then propose detailed cross-city cooperation mechanisms and

[7] As aligned with Government of the People's Republic of China, State Council. 2013. *Air Pollution Prevention and Control Action Plan*. Beijing.

policies applying the framework developed under the medium- to long-term road map.

(iii) **Capacity building.** To implement the regional cooperation mechanisms, the TA will help harmonize the technical, monitoring, and management capacities of the local environmental protection agencies in BTH. Selected local environment bureaus will be trained and will attend the inception, interim, and final TA workshops. The TA will explore and mobilize additional resources from line agencies such as the MEP and other international development partners for these capacity–building initiatives.

13. One potential risk is that effective regional air pollution prevention and control policies recommended by the study may result in asymmetric costs and benefits across subregions, which may give rise to political opposition to the regional approach. Another risk is delays in the development of coordinated mechanisms across boundaries and agencies in practice. To mitigate both risks, policy makers should be well informed and consulted when developing policies and mechanisms. A steering committee comprising senior officials from relevant agencies and municipalities will be formed to provide guidance and to help disseminate the TA outputs among the policy makers.

C. Cost and Financing

14. The TA is estimated to cost $450,000, 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 staff time, access to administrative data, assistance to field trips, use of office space and facilities, logistical support, and other in-kind contributions. The cost estimates and financing plan are in Appendix 2.

D. Implementation Arrangements

15. The Office of the Beijing–Tianjin–Hebei and Surrounding Regions Air Pollution Prevention and Control Coordination Group will be the executing agency. The secretariat of the executing agency, which is set up in the Beijing Municipal Bureau of Environmental Protection, will be the implementing agency. A steering committee comprising senior officials from comprehensive and key line agencies and from involved municipalities will be formed to provide technical guidance and policy advice during TA implementation. A TA management office will be established within the implementing agency and will be responsible for (i) day-to-day implementation and management of the TA, such as overseeing the consultants' work, organizing domestic reviews of the TA outputs, and holding TA review workshops; (ii) liaising with the steering committee for their participation in the TA events and guidance on the TA; and (iii) guiding and supervising the consultants to conduct the TA workshops and capacity–building events.

16. The TA will engage one international consultant (4 person-months) as an individual consultant, and a consulting firm consisting of five national consultants (20 person-months) with expertise in environmental planning, environmental policy, environmental engineering, environmental economics, and green financing, all with a focus on air pollution prevention and control.[8] The outline terms of reference of the consultants are provided in Appendix 3. The

[8] Engaged as individual consultant, the international consultant is expected to start work a few months earlier than the national consultants. Some outputs on the international experience can be prepared and incorporated directly in the master plan for BTH regional air pollution prevention and control, which is under preparation now and expected to have the first draft in early 2016.

consultants will be recruited in accordance with ADB's Guidelines on the Use of Consultants (2013, as amended from time to time). The consulting firm will be selected using the quality- and cost-based selection method with a quality–cost ratio of 90:10 and by applying the simplified technical proposal approach. Resource persons may be invited to review the consultants' outputs, serving as an independent third party, and share knowledge during workshops and capacity–building events in complement to that of the consultants. The proceeds of the TA will be disbursed in accordance with the *Technical Assistance Disbursement Handbook* (2010, as amended from time to time).

17. The TA will be implemented over 15 months, tentatively from 15 October 2015 to 31 December 2016. ADB will field inception, interim, and final review missions in addition to regular monitoring of TA implementation. During the missions, tripartite meetings involving the executing and implementing agencies and consultants will be held to review performance of the consultants, implementation progress, and completion of deliverables based on the design and monitoring framework and the consultants' work plan. The reports submitted by the consultants will be reviewed by the executing and implementing agencies, ADB, and external peer reviewers. The final outputs will be disseminated to key policy makers and stakeholders through the executing agency.

IV. THE PRESIDENT'S DECISION

18. 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 Beijing–Tianjin–Hebei Regional Air Pollution Control, and hereby reports this action to the Board.

DESIGN AND MONITORING FRAMEWORK

Impact the TA is Aligned with
Air quality in BTH improved (Air Pollution Prevention and Control Action Plan)[a]

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting	Risks
Outcome Coordinated regional approach for air pollution prevention and control in BTH promoted	By 2016: a. At least one policy document recognizes and/or adopts the policy recommendations from the study advocating a coordinated regional approach (2015 baseline: NA)	a. BTH Air Pollution Master Plan or official memo of the Office of the Beijing–Tianjin–Hebei and Surrounding Regions Air Pollution Prevention and Control Coordination Group	Effective air pollution control policies identified by the study may result in asymmetric costs and benefits across subregions, which may give rise to political opposition to the regional approach.
Outputs 1. Road map and policy recommendations for BTH regional air pollution prevention and control in the medium to long term formulated	By 2016: 1a. High-quality report with detailed road map and solid or innovative policy recommendations (2015 baseline: NA)	1a. TA review missions and back-to-office reports; consultant technical reports and reviewers' comments	Delays in development of coordinated mechanisms across boundaries and agencies in practice
2. Mechanisms and measures for joint air pollution prevention and control in the key cities of BTH developed	2a. High-quality report containing detailed mechanisms and measures (2015 baseline: NA)	2a. TA review missions and back-to-office reports; consultant technical reports and reviewers' comments	
3. Capacity building on air quality management for BTH local environmental protection agencies conducted	3a. At least 2 training events such as capacity–building workshops (may be conducted jointly with TA review workshops) with at least 25 trainees each (2015 baseline: 0)	3a. Feedback from the executing agency	

Key Activities with Milestones

a. Mobilize the consultant team by month 4.
b. Develop the study framework, prepare inception report, and conduct inception workshop by month 6.
c. Prepare the interim report and conduct interim workshop by month 9.
d. Prepare the draft final report and conduct final workshop by month 12.
e. Finalize the TA outputs by month 15.

1. Road map and policy recommendations for BTH regional air pollution prevention and control in the medium to long term formulated

1.1 Review international experience, literature, and official documents, including draft master plan by month 6.
1.2 Conduct data collection, including field surveys and consultations, by month 8.
1.3 Prepare an interim draft by month 9.
1.4 Conduct further data collection and analysis by month 11.
1.5 Prepare draft final report by month 12.
1.6 Revise and finalize the report by month 15.

2. Mechanisms and measures for joint air pollution prevention and control in the key cities of BTH developed

2.1 Review status quo, identify issues and challenges, and prepare inception report by month 6.
2.2 Conduct data collection including field surveys and consultations by month 8.
2.3 Prepare an interim draft by month 9.
2.4 Conduct further analysis and consultations by month 11.
2.5 Prepare draft final report by month 12.
2.6 Revise and finalize the report by month 15.

3. Capacity building on air quality management for BTH local environmental protection agencies conducted

3.1 Conduct the first training event by month 9.
3.2 Conduct the second training event by month 12.

Inputs

ADB: $400,000

Note: The government will provide counterpart support in the form of staff time, access to administrative data, assistance to field trips, use of office space and facilities, logistical support, and other in-kind contributions

Assumptions for Partner Financing

Not applicable.

ADB = Asian Development Bank, BTH = Beijing–Tianjin–Hebei and surrounding regions, NA = not applicable, TA = technical assistance.

[a] Government of the People's Republic of China, State Council. 2013. *Air Pollution Prevention and Control Action Plan*. Beijing.

Source: ADB.

COST ESTIMATES AND FINANCING PLAN

($'000)

Item	Amount
Asian Development Bank[a]	
1. Consultants	
a. Remuneration and per diem	
i. International consultants	80.0
ii. National consultants	120.0
b. International and local travel	20.0
c. Reports and communications	15.0
2. Training, seminars, and conferences[b]	
a. Resource person	20.0
b. Workshops, conferences, and trainings	80.0
3. Surveys	40.0
4. Miscellaneous administration and support costs[c]	5.0
5. Contingencies	20.0
Total	**400.0**

Note: The technical assistance (TA) is estimated to cost $450,000, of which contributions from the Asian Development Bank (ADB) are presented in the table above. The government will provide counterpart support in the form of staff time, access to administrative data, assistance to field trips, use of office space and facilities, logistical support, and other in-kind contributions. The value of government contribution is estimated to account for 11% of the total TA cost.

[a] Financed by the ADB's Technical Assistance Special Fund (TASF-other sources).

[b] Includes travel costs of ADB staff as resource persons and/or facilitators.

[c] Includes translation, office operations, and other unanticipated administration and logistics costs.

Source: ADB estimates.

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

A. Introduction

1. The technical assistance (TA) will engage an international consultant, as an individual consultant, and a consulting firm comprising five national consultants. The consultants will be engaged in accordance with the Guidelines on the Use of Consultants (2013, as amended from time to time) of the Asian Development Bank (ADB). The consulting firm will be engaged using the quality- and cost-based selection method with a quality–cost ratio of 90:10 and by submitting simplified technical proposal.

Table A3: Breakdown of Consulting Expertise

International Position[a]	Person-Months	National Position[b]	Person-Months
Environmental policy specialist	4.0	Environmental planning specialist and team leader	7.0
		Environmental engineer	4.0
		Environmental policy specialist	4.0
		Environmental economist	3.0
		Green financing specialist	2.0
Total	**4.0**		**20.0**

[a] The consultant will be engaged as an individual and on an intermittent basis.
[b] A consulting firm will be recruited.
Source: Asian Development Bank estimates.

B. Terms of Reference

2. **Environmental planning specialist and team leader** (national, 7 person-months). The specialist should have (i) a postgraduate degree in environmental planning, environmental management or other relevant fields; (ii) 15 or more years of experience in environmental planning with a focus on air quality management; (iii) demonstrated experience on developing plans for cross-jurisdiction regions; and (iv) proficiency in the English language. As the team leader, the specialist will be responsible for the final outputs of the TA, as well as for the daily coordination and supervision of the team. Specifically, the specialist will

(i) develop the detailed study framework and methodology in consultation with the executing and implementing agencies;
(ii) develop the outlines of the TA inception, interim, and final reports, and assign work to respective specialists in the team;
(iii) prepare inception, interim, and final reports and their revisions with inputs from the team members;
(iv) ensure timely implementation of TA activities, which include conducting field investigation and data collection, preparing reports, organizing inception, interim, and final workshops, conducting two capacity–building events with guidance from the executing and implementing agencies, and other related activities;
(v) ensure coordination with the international specialist, including ensuring access to key information and documents in English and guiding the international specialist to identify international experience and lessons that could be incorporated by Beijing–Tianjin–Hebei and surrounding regions (BTH);
(vi) coordinate team members, including the international specialist, to review and provide feedback on the draft medium- to long-term master plan for BTH regional air pollution prevention and control;

(vii) prepare road map and policy recommendations for BTH regional air pollution prevention and control to support and substantiate the master plan;
(viii) conduct in-depth study on the key cities of BTH, i.e., Baoding, Beijing, Cangzhou, Langfang, Tangshan, and Tianjin, applying the framework of the master plan and the road map;
(ix) identify gaps in technical and management capacity among the local government protection agencies, assist the executing and implementing agencies in preparing capacity–building programs, and coordinate the team to offer lectures; and
(x) carry out other tasks necessary to accomplish the TA objectives.

3. **Environmental engineer (national, 4 person-months).** The specialist should have (i) a postgraduate degree in environmental engineering, energy or other relevant fields; (ii) 10 or more years of experience with air pollution control techniques and measures, and/or development of air quality and energy models; (iii) demonstrated experience on pollution emission standards; and (iv) proficiency in the English language. The specialist will

(i) conduct a comprehensive assessment of the air pollution sources and existing techniques and measures adopted to reduce emissions in various sectors in BTH;
(ii) propose technical road maps for air pollution prevention and emission reduction in the region with analysis of the required investments and corresponding emission reduction potentials;
(iii) assess technical feasibility and potential road maps for uniform emission standards across the region;
(iv) identify gaps of local environmental agencies in technical capacity and propose training programs to close the gaps;
(v) provide substantial inputs to the TA reports;
(vi) participate in the TA workshops to present and discuss study findings;
(vii) participate in capacity–building events and provide lectures and other technical inputs; and
(viii) conduct other related tasks assigned by the team leader.

4. **Environmental policy specialist** (national, 4 person-months). The specialist should have (i) a postgraduate degree in environmental or energy policy, environmental management or other relevant fields; (ii) 10 or more years of experience with air pollution control policy and institutions; (iii) demonstrated experience on regional collaboration on air pollution prevention and control; and (iv) proficiency in the English language. The specialist will

(i) conduct a comprehensive review of existing policies and institutions of local governments across BTH and regional collaboration mechanisms for air pollution prevention and control;
(ii) identify challenges and constraints for developing consistent policies and institutions and more collaborative mechanisms between local governments, and propose improvement to the system;
(iii) propose road maps to establish joint pre-warning and emergency response mechanisms in the region;
(iv) identify gaps in the management capacity of local environmental agencies and propose training programs to fill the gaps;
(v) provide substantial inputs to the TA reports;
(vi) participate in the TA workshops to present and discuss study findings;
(vii) participate in capacity–building events and provide lectures and other technical inputs; and
(viii) conduct other related tasks assigned by the team leader.

5. **Environmental economist** (national, 3 person-months). The specialist should have (i) a postgraduate degree in environmental economics, environmental management or other relevant fields; (ii) 10 or more years of experience with research on environmental regulation and industrial policy; (iii) demonstrated research experience on effects of industrial transformation on air quality, effectiveness of incentive programs on air–polluting behaviors, and costs and benefits of environmental regulation; and (iv) proficiency in the English language. The specialist will

(i) conduct a comprehensive assessment of existing economic and industrial policies, which aim to promote emission reduction, industrial transformation or behavioral changes in various sectors;
(ii) undertake economic analysis of policies or interventions proposed in the master plan, which may take into account the synergy effects of air pollution control and greenhouse gas mitigation, and propose improvements to maximize their positive impacts on air quality;
(iii) propose new policies, incentive programs, and regionally coordinated economic and industrial policies for BTH with analysis of the costs and their distribution among stakeholders and jurisdictions within the region;
(iv) provide substantial inputs to the TA reports;
(v) participate in the TA workshops to present and discuss study findings;
(vi) participate in capacity–building events and provide lectures and other technical inputs; and
(vii) conduct other related tasks assigned by the team leader.

6. **Green financing specialist** (national, 2 person-months).The specialist should have (i) a postgraduate degree in finance, public finance or other relevant fields; (ii) 10 or more years of experience with green finance; and (iii) demonstrated experience on research and practice in financing environmental goods with public or private capital. The specialist will

(i) conduct a comprehensive review of existing financing sources and mechanisms for air pollution reduction in BTH;
(ii) assess financial viability and sustainability of major programs and projects in the pipelines of the local governments for air pollution prevention and control, taking into account the carbon market benefits whenever possible;
(iii) propose possible financing sources or innovative mechanisms for different types of programs and projects;
(iv) with inputs from other team members, put forward a series of project concepts for subsequent ADB sovereign or nonsovereign loans;
(v) provide substantial inputs to the TA reports;
(vi) participate in the TA workshops to present and discuss study findings;
(vii) participate in capacity–building events and provide lectures and other technical inputs; and
(viii) conduct other related tasks assigned by the team leader.

7. **Environmental policy specialist** (international, 4 person-months). The specialist should have (i) a postgraduate degree in environmental policy, environmental management or other relevant fields; (ii) 10 or more years of experience in the policy and practices of ambient air pollution prevention and control in developed countries; and (iii) demonstrated experience on regional air pollution prevention and control. Familiarity with the status quo of air pollution and environmental policy in the People's Republic of China is desirable. The specialist will

(i) conduct a comprehensive review of policies, institutions, and mechanisms adopted in the main developed countries to prevent and control ambient air

pollution on a regional basis, including critical assessment of their effectiveness and underlying conditions for their success or failure;

(ii) in coordination with the national experts, assess the applicability of the above policies, institutions, and mechanisms to BTH, identifying necessary conditions for those policies, institutions, and mechanisms to work in BTH;

(iii) provide substantial inputs on international experience for regional air pollution prevention and control to the TA reports;

(iv) participate in the TA workshops to present and discuss study findings;

(v) participate in capacity–building events and provide lectures and other technical inputs; and

(vi) conduct other related tasks assigned by the team leader.

C. Reporting

8. The consulting team will submit the following reports: (i) a TA inception report within 2 months after mobilization; (ii) a revised inception report within 2 weeks after the inception workshop; (iii) an interim TA report within 5 months after mobilization; (iv) a revised interim report within 1 month after the interim workshop; (v) a draft final report within 8 months after mobilization; and (vi) a final report 3 months after the final workshop. The revised inception report, revised interim report, and the final report should incorporate and address comments from the executing and implementing agencies, ADB, and other invited reviewers.

9. All documents will be submitted in both English and Chinese languages to the executing agency and ADB in hard and electronic copies. The final outputs will be posted online in both languages.