



Technical Assistance Report

Project Number: 51420-001
Knowledge and Support Technical Assistance (KSTA)
October 2018

People's Republic of China: Study on the Road Map for Air Quality Improvement in Pilot Cities in Beijing–Tianjin–Hebei and Its Surrounding Areas

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Asian Development Bank

CURRENCY EQUIVALENTS

(as of 5 September 2018)

Currency unit	–	yuan (CNY)
CNY1.00	=	\$0.146103
\$1.00	=	CNY6.844500

ABBREVIATIONS

ADB	–	Asian Development Bank
BTH	–	Beijing–Tianjin–Hebei
MEE	–	Ministry of Ecology and Environment
PRC	–	People’s Republic of China
TA	–	technical assistance

NOTE

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

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KNOWLEDGE AND SUPPORT TECHNICAL ASSISTANCE AT A GLANCE

1. Basic Data		Project Number: 51420-001
Project Name	Study on the Road Map for Air Quality Improvement in Pilot Cities in Beijing-Tianjin-Hebei and Its Surrounding Areas	Department/Division EARD/EAEN
Nature of Activity	Policy Advice	Executing Agency Ministry of Ecology and Environment former "Ministry of Environmental Protection"
Modality	Regular	
Country	China, People's Republic of	
2. Sector	Subsector(s)	ADB Financing (\$ million)
✓ Energy	Energy efficiency and conservation	0.40
	Total	0.40
3. Strategic Agenda	Subcomponents	Climate Change Information
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 Global and regional transboundary environmental concerns Urban environmental improvement	ADB Financing Mitigation (\$ million) 0.40
4. Drivers of Change	Components	Gender Equity and Mainstreaming
Governance and capacity development (GCD)	Institutional development	No gender elements (NGE) ✓
Knowledge solutions (KNS)	Application and use of new knowledge solutions in key operational areas	
5. Poverty and SDG Targeting		Location Impact
Geographic Targeting	Yes	Regional High
Household Targeting	No	
SDG Targeting	Yes	
SDG Goals	SDG3, SDG8, SDG9, SDG11, SDG13	
6. Risk Categorization	Low	
7. Safeguard Categorization	Safeguard Policy Statement does not apply	
8. Financing		
Modality and Sources		Amount (\$ million)
ADB		0.40
Knowledge and Support technical assistance: Technical Assistance Special Fund		0.40
Cofinancing		0.00
None		0.00
Counterpart		0.00
None		0.00
Total		0.40

I. INTRODUCTION

1. The knowledge and support technical assistance (TA) will support the People's Republic of China (PRC) government's continued efforts in air quality improvements in Beijing–Tianjin–Hebei (BTH) and its surrounding areas (the greater BTH region).¹ The TA will develop a road map for air quality improvements in Handan City, Hebei Province, which can be replicated elsewhere in the greater BTH region and beyond.

2. The TA is included in the Asian Development Bank (ADB) country operations business plan, 2018–2020 for the PRC. It is aligned with the core aim of ADB's country partnership strategy, 2016–2020, i.e., to manage climate change and the environment to support the government's priorities of building an "ecological civilization"² and shifting from high-speed growth and high pollution to high-quality development.³ The TA supports the strategic thrust of ADB's Strategy 2030 to mitigate climate change and promote environmental sustainability.⁴

II. ISSUES

3. The greater BTH region contributes to almost one-third of the PRC's total gross domestic product, making it one of the most important and dynamic regions in the country.⁵ High energy consumption and pollution emissions, however, have accompanied the country's rapid economic growth from the 1980s to the mid-2010s. In 2017, 239 of 338 cities in the PRC failed to meet national ambient air quality standards.⁶ In 2016, the greater BTH region accounted for large portions of total national emissions: 38.6% of sulfur dioxide, 38.3% of nitrogen oxide, and 45.4% of smoke and dust (footnote 5). According to the 2017 State of the Environment Report, 74 cities are implementing the newly amended ambient air quality standards. Among these, the top 10 most heavily polluted cities are all in the greater BTH region, while Handan City is the second worst polluted city (footnote 6).

4. Air pollution has become an increasingly obtrusive problem. It greatly constrains the PRC's social and economic development and poses a substantial threat to public health. A 2016 World Bank study showed that the cost of air pollution accounted for about 10% of the PRC's total gross domestic product.⁷ The World Health Organization attributed almost half a million deaths in the PRC in 2012 to ambient air pollution.⁸

¹ Beijing–Tianjin–Hebei and its surrounding areas include Beijing and Tianjin municipalities; Hebei, Henan, Shandong, Shanxi, and Liaoning provinces; and Inner Mongolia Autonomous Region.

² An "ecological civilization" refers to achieving harmony between growth, people, and nature. It includes activities to mitigate ecological damage, relieve pressures on natural resources, and improve the balance between the environment and the economy. ADB. 2016. *Country Partnership Strategy: People's Republic of China, 2016–2020—Transforming Partnership: People's Republic of China and Asian Development Bank*. Manila. The TA first appeared in the business opportunities section of ADB's website on 2 July 2018.

³ Ministry of Ecology and Environment. 2018. *2018 National Working Conference on Environmental Protection*. Beijing. http://english.mee.gov.cn/About_MEE/leaders_of_mee/liganjie/Activities_lqj/201802/t20180213_431467.shtml

⁴ ADB. 2018. *Strategy 2030: Achieving a Prosperous, Inclusive, Resilient, and Sustainable Asia and the Pacific*. Manila.

⁵ National Bureau of Statistics. 2018. *2017 China Statistical Yearbook*. Beijing. <http://www.stats.gov.cn/tjsj/ndsj/2017/indexch.htm>

⁶ Ministry of Ecology and Environment. 2018. *2017 Report on the State of the Environment in China*. Beijing. <http://www.mee.gov.cn/hjzl/zghjzkgb/lzghjzkgb/201805/P020180531534645032372.pdf>

⁷ Institute for Health Metrics and Evaluation. 2016. *The Cost of Air Pollution: Strengthening the Economic Case for Action*. Washington, DC: World Bank.

⁸ World Health Organization. 2016. *Ambient air pollution: A global assessment of exposure and burden of disease*. Geneva. <http://www.who.int/phe/publications/air-pollution-global-assessment/en/>

5. The implementation of the Comprehensive Action Plan on Air Pollution Prevention and Control (CAAP) between 2013 and 2017 resulted in a decrease in average concentrations of particulate matter less than 10 micrometers in diameter (PM₁₀) by 22.7% in 338 major cities, and particulate matter less than 2.5 micrometers in diameter (PM_{2.5}) by 39.6% in the BTH region (footnote 6). ADB has contributed to this achievement through supporting the central government with several analytical, policy advisory, and capacity development assistance projects⁹ and loans for air quality improvement in the greater BTH region.¹⁰ However, the PRC is still facing huge challenges in air pollution control, especially in the greater BTH region. In 2017, the percentage of days with non-attainment of national ambient air quality standards ranged from 38.9% to 79.7% in 13 major cities in the BTH region, averaging 44% (footnote 6). In the State Council executive meeting in June 2018, the government stated that fighting air pollution for a blue sky was the top priority of pollution control and prevention, and one of the main battlefields of the war to defend blue skies was in the BTH region.¹¹

6. The current air quality management system needs to be further strengthened, taking into consideration long-term sustainability, all sources of pollution, and associated reduction costs. Efforts to control air pollution are currently constrained because

- (i) top-down targets for reducing pollutant emissions, set by the central government, are not coupled with air quality improvement targets;
- (ii) baseline data on emissions at the city level are inadequate to inform and set regional and municipal pollution reduction targets;
- (iii) current air quality control puts much emphasis on key polluting industries instead of also considering emissions from other industries, traffic, and households, especially during heating season; and
- (iv) apportionment studies of pollution sources and cost–benefit analyses of various pollution reduction measures are inadequate or even lacking.

7. The scope of ADB's previous TAs was mainly regional, while this TA will use a bottom-up approach to help develop a post-CAAP road map for air quality improvement at a city level, which can be replicated by the cities with similar air pollution problems elsewhere in the greater BTH region and beyond. Handan City is selected as a pilot city since it is one of the key cities for pollution reduction targeted by the government in the greater BTH region.

⁹ ADB. 2014. *Technical Assistance to the People's Republic of China for the Study on the National Control of the Important Pollutant–Volatile Organic Compounds*. Manila; ADB. 2015. *Technical Assistance to the People's Republic of China for the Beijing–Tianjin–Hebei Regional Air Pollution Control*. Manila; ADB. 2015. *Technical Assistance to the People's Republic of China for the Study on the Coordinated Development of Beijing–Tianjin–Hebei*. Manila; ADB. 2016. *Technical Assistance to the People's Republic of China for the Developing Cost-Effective Policies and Investments to Achieve Climate and Air Quality Goals in the Beijing–Tianjin–Hebei Region*. Manila; and ADB. 2017. *Technical Assistance to the People's Republic of China for the Study of Clean Energy Supply for the Rural Areas in the Greater Beijing–Tianjin–Hebei Region*. Manila.

¹⁰ ADB. 2015. *Report and Recommendation of the President to the Board of Directors: Proposed Beijing–Tianjin–Hebei Air Quality Improvement—Hebei Policy Reforms Program*. Manila; ADB. 2016. *Report and Recommendation of the President to the Board of Directors: People's Republic of China: Air Quality Improvement in the Greater Beijing–Tianjin–Hebei Region—China National Investment and Guaranty Corporation's Green Financing Platform*. Manila; ADB. 2017. *Report and Recommendation of the President to the Board of Directors: People's Republic of China: Air Quality Improvement in the Greater Beijing–Tianjin–Hebei Region—Regional Emission-Reduction and Pollution-Control Facility*. Manila; and ADB. Forthcoming. *Report and Recommendation of the President to the Board of Directors: Proposed Beijing–Tianjin–Hebei Air Quality Improvement—Shandong Clean Heating and Cooling Project*. Manila.

¹¹ Government of the PRC. 2018. *Deploying Three-year Action Plan to Defend Blue Skies*. Beijing. http://www.gov.cn/premier/2018-06/13/content_5298502.htm

III. THE TECHNICAL ASSISTANCE

A. Impacts and Outcome

8. The TA is aligned with the following impacts: air pollution reduced, climate change mitigated, and air quality and public health improved in the greater BTH region.¹² The TA will have the following outcome: management and decision-making in air pollution control by the Handan Municipal Government enhanced.¹³

B. Outputs, Methods, and Activities

9. **Output 1: Emission inventory for Handan City developed.** Policy-making for air quality improvements requires a comprehensive and accurate emission inventory. This TA will support a survey to collect basic pollution emission data from different sectors and areas such as energy, industrial, traffic, and residential in Handan City, Hebei Province. The TA team will use the results to develop an emission inventory for Handan City, which will also take into consideration pollution sources from neighboring cities. Based on the emission inventory, the TA will conduct a source apportionment study and a simulation, and analyze the contributions of key industries and sources to total emissions in Handan City using a simulation and receptor model.

10. **Output 2: Impacts of energy consumption and industrial structures on air quality and climate change assessed.** The TA team will study the emissions from energy and main industrial sectors to evaluate their impacts on air quality and climate change. The study will develop different scenarios to optimize energy and industrial structures in Handan City to reduce air pollution and mitigate climate change.

11. **Output 3: Investment cost database of main pollution reduction measures established.** The TA team will survey the current costs, including operation and maintenance costs, of main air pollution control measures from different sectors such as transport, energy, or industries in Handan City and undertake a cost–benefit analysis. The team will use the results to create a database detailing investment costs of key air pollution reduction measures.

12. **Output 4: Air pollution emission management database established.** The TA will establish a dynamic air pollution emission management database using a bottom-up approach. This will enable the Handan Municipal Government to make policies and allocate financial resources for air quality management more effectively.

13. **Output 5: Road map for air quality improvements in Handan City developed.** Based on the above studies and analysis, the TA team will develop a road map for air quality improvements in Handan City and submit it to the Handan Municipal Government once the Ministry of Ecology and Environment has reviewed and approved it.

¹² State Council. 2018. *Three-year Action Plan (2018–2020) to Defend Blue Skies Beijing*. http://www.gov.cn/zhengce/content/2018-07/03/content_5303158.htm; and Government of the PRC. 2016. *Thirteenth Five-Year Plan for the National Economic and Social Development, 2016–2020*. Beijing.

¹³ The design and monitoring framework is in Appendix 1.

C. Cost and Financing

14. The TA is estimated to cost \$440,000, of which \$400,000 will be financed on a grant basis by ADB's Technical Assistance Special Fund (TASF-other sources). The key expenditure items are listed in Appendix 2.

15. The government will provide counterpart support in the form of counterpart staff, office accommodation, office supplies, information and documents for the preparation of the TA, and other in-kind contributions.

D. Implementation Arrangements

16. ADB will administer the TA. ADB's Sustainable Infrastructure Division, East Asia Department will select, administer, and supervise a consulting firm for the TA, and evaluate the consulting firm's outputs. The implementation arrangements are summarized in the table.

Implementation Arrangements			
Aspects	Arrangements		
Indicative implementation period	October 2018–December 2020		
Executing agency	Ministry of Ecology and Environment		
Implementing agency	Foreign Economic Cooperation Office, Ministry of Ecology and Environment		
Consultants	To be selected and engaged by ADB		
	QCBS (90:10)	Consulting firm	\$400,000
Disbursement	The technical assistance resources will be disbursed following ADB's <i>Technical Assistance Disbursement Handbook</i> (2010, as amended from time to time).		

ADB = Asian Development Bank, QCBS = quality- and cost-based selection.

Source: Asian Development Bank estimates.

17. **Consulting services.** ADB will engage the consultants following its Procurement Policy (2017, as amended from time to time) and its associated project administration instructions and/or staff instructions.¹⁴

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 Study on the Road Map for Air Quality Improvement in Pilot Cities in Beijing–Tianjin–Hebei and Its Surrounding Areas, and hereby reports this action to the Board.

¹⁴ Terms of Reference for Consultants (accessible from the list of;" linked documents in Appendix 3).

<p>Key Activities with Milestones</p> <p>1. Emission inventory for Handan City developed</p> <p>1.1 Collect data on emission sources in Handan City through field survey, meetings with local environmental protection bureaus, and other relevant institutions (Q1 2019)</p> <p>1.2 Develop an emission inventory for Handan City (Q3 2019)</p> <p>1.3 Conduct a source apportionment study in Handan City (Q1 2020)</p> <p>2. Impacts of energy consumption and industrial structures on air quality and climate change assessed</p> <p>2.1 Assess the impacts of energy consumption and industrial structures on air quality and climate change (Q1 2019)</p> <p>2.2 Establish energy and industrial structure optimization and its corresponding emission reduction scenarios (Q3 2019)</p> <p>3. Investment cost database of main pollution reduction measures established</p> <p>3.1 Conduct a survey on the cost of main pollution control measures (Q3 2019)</p> <p>3.2 Analyze emission reduction cost and environmental benefits under different reduction scenarios (Q1 2020)</p> <p>3.3 Establish investment cost database of main pollution-reduction measures (Q3 2020)</p> <p>4. Air pollution emission management database established</p> <p>4.1 Establish a dynamic air pollution emission management database based on the emission inventory developed to provide technical support to local government for the meticulous management of emission source control and air quality improvement (Q3 2020)</p> <p>5. Road map for air quality improvements in Handan City developed</p> <p>5.1 Prepare a report on a road map for air quality improvements in Handan City (Q3 2020)</p> <p>5.2 Organize a workshop on air quality improvements in the greater BTH region (Q3 2020)</p>
<p>Inputs</p> <p>ADB: \$400,000 (TASF-other)</p> <p>Note: The government will provide counterpart support in the form of counterpart staff, office accommodation, office supplies, information and documents for the preparation of the TA, and other in-kind contributions.</p>
<p>Assumptions for Partner Financing</p> <p>Not applicable</p> <p>ADB = Asian Development Bank, BTH = Beijing–Tianjin–Hebei, Q = quarter, TA = technical assistance.</p> <p>^a Government of the People's Republic of China. 2018. <i>Deploying Three-year Action Plan to Defend Blue Skies</i>. Beijing. http://www.gov.cn/premier/2018-06/13/content_5298502.htm.</p> <p>^b Government of the People's Republic of China. 2016. <i>Thirteenth Five-Year Plan, 2016–2020</i>. Beijing.</p> <p>Source: Asian Development Bank.</p>

COST ESTIMATES AND FINANCING PLAN
(\$'000)

Item	Amount
Asian Development Bank^a	
1. Consultants	
a. Remuneration and per diem	
i. International consultants (2 person-months)	45.5
ii. National consultants (19 person-months)	227.8
b. International and local travel	8.8
2. Workshops, seminars, and conferences ^b	40.0
3. Survey ^c	57.0
4. Contingencies	20.9
Total	400.0

Note: The technical assistance (TA) is estimated to cost \$440,000, 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, office accommodation, office supplies, information and documents for the preparation of the TA, and other in-kind contributions. The value of government contribution is estimated to account for 10% of the total TA cost.

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

^b Workshops, seminars, and conferences under the TA will be conducted in Asian Development Bank member countries. Includes interpretation and translation costs.

^c A survey team will be engaged by the consulting firm to undertake the survey.

Source: Asian Development Bank estimates.

LIST OF LINKED DOCUMENTS

<http://www.adb.org/Documents/LinkedDocs/?id=51420-001-TARreport>

1. Terms of Reference for Consultants