

TERMS OF REFERENCE FOR CONSULTANTS

1. The project team will establish an air pollution emission management database and develop a road map for air quality improvement in Handan, Hebei Province in the greater Beijing–Tianjin–Hebei (BTH) region.

2. Asian Development Bank (ADB) will engage the consulting firm following the ADB Procurement Policy (2017, as amended from time to time) using the quality- and cost-based selection method (90:10) with an output-based partial lump-sum contract. It is estimated that the technical assistance (TA) will require a team of consultants consisting of one international consultant (2 person-months) and five national consultants (19 person-months) for TA implementation. The national consultants will comprise (i) a team leader/air quality policy expert, (ii) an energy policy expert, (iii) an air quality modelling expert, (iv) an environment economist, and (v) a project coordinator.

3. The following terms of reference are indicative and meant to provide guidance on achieving the objectives of the proposed TA.

4. **Terms of reference.** The consulting firm will support ADB in establishing an air pollution emission management database and developing a road map for air quality improvements in Handan City in the greater BTH region. The firm shall have been involved in supporting the Ministry of Ecology and Environment (MEE) in drafting or implementing the Comprehensive Action Plan on Air Pollution Prevention and Control (2015–2017) and the Three-year Action Plan to Defend Blue Skies (2018–2020). It shall also either hold the data or have the access to the data required for the study. It will be reporting to the ADB’s team leader. In particular, the consulting firm will:

- (i) carry out a survey to collect basic pollution emission data from different sectors including energy, industrial, traffic and residential sectors in Handan;
- (ii) use the results to develop emission inventories for Handan and conduct a source apportionment study based on the emission inventories;
- (iii) quantitatively analyze the contributions of key industries and sources from both the hinterland and the city to the total emissions in Handan using a simulation and receptor model;
- (iv) study the emissions from energy sector and main industrial sectors to evaluate their impacts on air quality and climate change, and develop different scenarios to optimize energy and industrial structures in Handan to reduce air pollution and mitigate climate change;
- (v) conduct a cost-benefit analysis of air pollution reduction measures;
- (vi) establish an air pollution emission management database; and
- (vii) prepare a road map for air quality improvement in Handan.

A. International consultant (2 person-months)

5. **Air Quality Policy Expert** (2 person-months, intermittent). The consultant must have (i) at least a master’s degree in environmental sciences/engineering or related fields; (ii) a minimum of 15 years of experience in air pollution prevention and control, air quality modeling or energy and environmental policy projects; (iii) at least 5 years of experience in similar projects in China; (iv) excellent written and oral English skills; and (v) good understanding of air pollution problems and air quality management in the People’s Republic of China (PRC). The expert will perform, but not limited to the following tasks:

- (i) provide international experience in air pollution control and air quality improvement policy to the project team;
- (ii) support the project team in developing the emission inventories in Handan;
- (iii) review the source apportionment study;
- (iv) assist the team leader in evaluating the impacts from energy and main industrial sectors on air quality and climate change;
- (v) support the project team in preparing the road map for air quality improvement in the Handan; and
- (vi) assist the team leader in preparing and reviewing the required reports.

B. National consultants (19 person-months)

6. **Air Quality Policy Expert/Team Leader** (6 person-months, intermittent). The expert must have (i) at least a master's degree in environmental sciences/engineering or related fields; (ii) a minimum of 15 years of experience in air pollution prevention and control, air quality modeling, or energy and environmental policy projects; (iii) at least 10 years of team leadership experience in similar projects in the PRC; (iv) involved in supporting the MEE in drafting/implementing the Comprehensive Action Plan on Air Pollution Prevention and Control (2015–2017) and the Three-year Action Plan to Defend Blue Skies (2018–2020); (v) experience in international cooperation and management of similar projects; (iv) experience in providing air quality improvement policy recommendations to MEE and other relevant government agencies; and (vi) good written and oral English skills. The expert will perform, but not limited to the following tasks:

- (i) provide guidance to the survey team on the collection of data and ensure that all data required for the project are acquired on a timely manner;
- (ii) provide guidance to other experts in analyzing the data acquired and conducting the studies;
- (iii) work with air quality modeling expert on the source apportionment study;
- (iv) review the assessment of the impacts from energy and industrial sectors on air quality and climate change;
- (v) communicate with local governments and relevant agencies regarding surveys, data acquisition and policy support;
- (vi) provide guidance to the project team on establishing the investment coast database of main pollution reduction measures;
- (vii) work with the project team on establishing the air pollution emission management database;
- (viii) prepare and review required reports based on ADB requirements;
- (ix) prepare knowledge products and organize final workshop; and
- (x) strengthen the relationship between ADB and the consultants, and make sure the project is carried out on time and as required.

7. **Energy Policy Expert** (3 person-months, intermittent). The expert must have (i) at least a master's degree in environmental sciences/engineering, public policy or energy-related fields; (ii) a minimum of 10 years of experience in air pollution prevention and control, and energy and environmental policy projects; (iii) experience in providing policy recommendations to MEE and other relevant government agencies; (iv) involved in supporting the MEE in drafting/implementing the Comprehensive Action Plan on Air Pollution Prevention and Control (2015–2017) and the Three-year Action Plan to Defend Blue Skies (2018–2020); and (v) at least 6 years of experience in similar projects in the PRC. The expert will perform but not limited to the following tasks:

- (i) conduct survey on the emissions from energy and main industrial sectors;
- (ii) conduct baseline analysis of current energy consumption and industrial structure;

- (iii) assess the impacts on air quality and climate change from the energy and industrial sectors;
- (iv) develop different scenarios to optimize energy and industrial structures to reduce air pollution and mitigate climate;
- (v) provide inputs to the development of the road map for air quality improvement in Handan; and
- (vi) assist the team leader in preparing knowledge products and presenting the TA findings in the final workshop.

8. **Air Quality Modelling Expert** (3 person-months, intermittent). The expert must have (i) at least a master's degree in environmental sciences/engineering, or related fields; (ii) a minimum of 10 years of experience in air pollution prevention and control, emission data acquisition and air quality modeling, and source apportionment studies/projects; (iii) experience in providing policy recommendations to MEE and other relevant government agencies; and (iv) at least 6 years of experience in similar projects in the PRC. The expert will perform, but not limited to the following tasks:

- (i) conduct a survey to collect baseline pollution emission data from different sectors including energy, industrial, traffic and residential sectors in Handan;
- (ii) establish emission inventory for Handan;
- (iii) apply appropriate modeling tools to determine source contributions to air quality;
- (iv) prepare source apportionment study report;
- (v) provide inputs to the development of the road map for air quality improvement; and
- (vi) assist the team leader in preparing knowledge products and presenting the TA findings in the final workshop.

9. **Environment Economist** (3 person-months, intermittent). The consultant must have (i) at least a master's degree in environmental economics/sciences or related fields; (ii) a minimum of 10 years of experience in air pollution control, cost-benefit analysis or environmental policy projects; (iii) experience in providing policy recommendations to MEE and other relevant government agencies; and (iv) at least 6 years of experience in similar projects in the PRC. The expert will perform, but not limited to the following tasks:

- (i) conduct a survey on the current costs of main air pollution control measures in Handan;
- (ii) conduct cost-benefit analyses of existing pollution control measures and select the most cost-effective solutions for air quality improvement based on the cost-benefit analysis;
- (iii) establish the investment cost database of main pollution reduction measures;
- (iv) support the project team in finalizing the road map for air quality improvement based on the above study; and
- (v) assist the team leader in preparing knowledge products and presenting the TA findings in the final workshop.

10. **Project Coordinator** (4 person-months, intermittent). The consultant must have (i) at least a master's degree in environmental sciences/engineering or related fields; (ii) a minimum of 10 years of experience in air pollution prevention and control, air quality modeling or air quality improvement policy projects; (iii) at least 6 years of experience in similar projects in the PRC; (iv) involved in the Comprehensive Action Plan on Air Pollution Prevention and Control (2015–2017) or the Three-year Action Plan to Defend Blue Skies (2018–2020); and (v) good written and oral English skills. The coordinator will perform, but not limited to the following tasks:

- (i) support the team leader in coordinating with the local government and other institutions involved in the study to ensure the TA is being implemented as scheduled smoothly;
- (ii) support the team leader in coordinating with the international and national consultants, follow-up on deliverables, and review and compile reports;
- (iii) coordinate with executing and implementing agencies on the implementation of the TA;
- (iv) support the project team in collecting data and conducting survey;
- (v) coordinate with the project team and ADB on submitting the required deliverables; and
- (vi) support the team leader in preparing knowledge products and organizing the final workshop.

C. Deliverables

11. The consulting firm will submit (i) an inception report within 2 months after mobilization, (ii) a revised inception report within 2 weeks after receiving comments from implementing agency and ADB, (iii) a midterm report within 12 months after mobilization, (iv) a revised midterm report within 2 weeks after receiving comments from implementing agency and ADB, (v) a draft final report within 24 months after mobilization, and (vi) a final report within 1 month after the final workshop and receiving comments from ADB.

12. All TA deliverables and progress reports will be written in English. National consultants will be responsible for translating documents into Chinese. Two copies of the deliverables will be submitted to ADB in English, and three copies will be submitted to the executing agency (one in English and two in Chinese). The deliverables and progress reports should address the terms of reference, with details appropriate to that stage of the TA. The consulting firm will be invited to participate in workshops and seminars to present key findings to relevant government agencies in the greater BTH region.

13. ADB will conduct inception, interim, and final review missions in addition to regular monitoring of TA implementation. During the missions, meetings with executing and implementing agencies and consultants will be held. ADB, together with the executing and implementing agencies and the consultants, will review consultant performance, 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's cross-divisional team, other relevant government agencies, and external peer reviewers. The final outputs will be disseminated to key policy makers and stakeholders through the executing agency. The proceeds of the TA will be disbursed in accordance with ADB's Technical Assistance Disbursement Handbook (2010, as amended from time to time).