

## OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

1. For the proposed knowledge and support technical assistance (TA), a team of individual international and national consultants will be recruited to undertake the studies listed under the TA. The Government will also provide counterpart support to the consultants, including (i) adequate office space; (ii) bilingual counterpart personnel available to provide assistance in collecting data and coordinating with government agencies, if required; (iii) assistance with visas and other permits required by the consultants to enter and to work; and (iv) access to all data, including documents, reports, accounts, drawings and maps, and permission to enter offices, as appropriate and necessary, to undertake the work. Consultants will be engaged in accordance with ADB's Procurement Policy (2017, as amended from time to time) and the associated Project Administration Instructions. Consultants will be engaged to prepare the TA, using the individual selection method and output-based partial lump-sum contracts. Consultants will be engaged using individual consultant and quality- and cost-based selection and output-based partial lumpsum contracts. The terms of reference of the consulting services will include, but not be limited to, the following.

### A. International consultant

2. **Renewable Energy Specialist** (1 person-month, intermittent). The consultant must have (i) at least a master's degree on distributed energy, renewable energy or relevant fields; (ii) minimum of 10 years experience in renewable energy field; (iii) excellent written and oral English; and (iv) experience in international cooperation and management. The proposed consultant will also be the team leader and will:

- (i) Analyze local data from an international perspective to ensure the reliability, compare with the data collected in other countries, and prepare an analysis report;
- (ii) Offer technical solutions to local problems from an international perspective: (a) compare distributed energy technologies (like biomass technology, solar and energy, heat pump, sewage treatment, etc.), and (b) come up with a solution proposal, which includes what technologies should be used and under what conditions should they be applied;
- (iii) Identify the infrastructure needs based on the most cost-effective solution;
- (iv) Cooperate with other experts: (a) compare the energy usage scenario, while taking local conditions into consideration, and (b) propose a solution to energy usage, which is consistent with the local economy;
- (v) Analyze policies of government in the pilot areas, and then make requests to the project based on the policies; and
- (vi) Review rural clean energy supply plan prepared by other experts.

### B. National consultants (18 person-months)<sup>1</sup>

3. **Team Leader/Clean Energy Specialist** (3 person-months, intermittent). The consultants must have (i) at least a master's degree on clean energy or relevant fields; (ii) minimum of 10 years experience in clean energy fields; (iii) good ability to communicate in English; and (iv) experience in international cooperation. The proposed consultant will serve as the team leader and will:

- (i) Analyze data about the distribution on local clean energy to ensure the reliability, including wind, solar, and geothermal, etc., based on the local exploitable potential;
- (ii) Select a pilot area for future deployment of clean energy resources;

---

<sup>1</sup> Consultants will be engaged through a national firm using quality- and cost-based method using biodata proposals.

- (iii) Study how similar communities utilized clean energy in Europe and the People's Republic of China (PRC), including applicable policy, development plan, local resources, energy demand, technology used, economic and social impacts, and culture;
- (iv) Collect relevant information and parameters about solar energy, ground-source heat pump, and water-source pump;
- (v) Design solution proposals and then decide what clean energy technologies should be applied, while taking local social and environmental factors into consideration;
- (vi) Suggest the most appropriate business model to develop clean energy in rural Beijing–Tianjin–Hebei (BTH) region;
- (vii) Analyze social impact made by clean energy technologies and heat pump technologies, including the economic influence on target customers, impacts on lifestyles, etc.;
- (viii) Communicate with the local governments for policy support;
- (ix) Provide training and workshops to the relevant agencies;
- (x) Compose specific execution plans on every step of the solution proposals;
- (xi) Prepare required reports based on ADB requirements; and
- (xii) Build up contacts between ADB and the experts, and make sure the project will be carried out on time and as requested.

4. **Energy Policy and Regulatory Expert** (2 person-months, intermittent). The expert should have a degree in public policy, sociology, law or other relevant field, with at least 5 years of relevant work experiences. The expert should have worked with banks and other financial institutions to provide policy recommendations to the government. The expert must be able to demonstrate that he or she understands and writes, clearly and fluently, high-quality policy recommendations in English and Chinese. The expert must also be fluent in Chinese and English. The proposed expert will:

- (i) Review and assess the existing relevant energy policies and regulations;
- (ii) Conduct baseline analysis of current energy supply in rural BTH region;
- (iii) Support the ADB team leader and the project team in conducting all necessary policy and regulatory analysis for the TA;
- (iv) Prepare clean energy, air quality policy, and regulator assessment;
- (v) Provide and prepare suitable policy recommendations to the government to promote clean energy supply in rural BTH region; and
- (vi) Assist the team leader in preparing the necessary reports.

5. **Rural Clean Energy Specialist** (2 person-months, intermittent) The consultant must have (i) at least a master's degree on distributed energy, renewable energy, district heating or relevant fields; (ii) minimum of 10 years experience in renewable and district heating energy fields; (iii) fair ability to communicate in English; and (iv) experience in international cooperation and management. The proposed consultant will serve as the deputy team leader and will:

- (i) Analyze local data to ensure its credibility;
- (ii) Review feasibility study report, and collect relevant information and parameters;
- (iii) Assist the team leader in designing solution proposals: (a) compare the energy technologies (like solar energy, wind energy, and bio-energy), and (b) come up with specific technical proposals while taking local social conditions and environmental conditions into account;
- (iv) Assist the team leader in analyzing social impact, including the economic influence on target customers, impacts on lifestyles, etc.;
- (v) Conduct the feasibility study on project report;
- (vi) Communicate with the local municipal government for policy support;

- (vii) Assist the team leader in providing trainings and workshops to the relevant agencies;
- (viii) Compose specific execution plans on every step of the solution proposals; and
- (ix) Build contacts between ADB and the experts, and make sure the project will be carried out on time and as requested.

6. **Energy efficiency expert** (2 person-months, intermittent). The expert should have (i) a postgraduate degree in engineering or in a relevant field and (ii) at least 10 years of working experience in energy efficiency, including industrial and building-specific energy efficiency. Oral and written English proficiency is required. Tasks include the following:

- (i) Conduct baseline study of rural energy efficiency in the greater BTH region;
- (ii) Assess the current status of rural energy efficiency in the greater BTH region;
- (iii) Identify the potential for energy efficiency improvement in rural BTH region;
- (iv) Propose technologies to improve energy efficiency in rural BTH region;
- (v) Determine issues and challenges that may arise for the identified energy efficiency technologies;
- (vi) Quantify and calculate greenhouse gas reduction and air quality improvement benefits and other environmental benefits with the proposed technologies;
- (vii) Support the team leader in capacity building activities relevant to the identified energy efficiency technologies and business models;
- (viii) Suggest the most appropriate business model to develop energy efficiency in rural BTH region;
- (ix) Work with the policy and regulatory expert to assess the existing energy policies related to energy efficiency and propose policy recommendations on how to promote deployment of energy efficiency measures in rural BTH region; and
- (x) Assist the team leader in preparing the necessary reports.

7. **Economist** (2 person-months, intermittent). The economist will have (i) at least a bachelor's degree in economics or related field, (ii) a minimum of 5 years of experience in economic analysis of projects, (iii) good written and oral English, (iv) good understanding of the PRC's energy sector, and (v) experience in international cooperation. Experiences on clean energy investment would be an important asset. The consultant will:

- (i) Take charge of the overall analysis of relevant policies, regulations and incentive plans, to ascertain the obstacles in financing of clean energy in rural BTH region;
- (ii) Confirm available financing tool and loan measures, especially funds from banks for clean energy in rural BTH region;
- (iii) Assist the team leader in writing the necessary reports of the TA;
- (iv) Undertake cost-benefit analysis and select the most cost-effective solution for rural BTH region based on the cost-benefits analysis;
- (v) Identify investment needs with possible financing sources for the selected pilot areas;
- (vi) Suggest the most appropriate business model to develop clean energy in rural BTH region;
- (vii) Recommend the actions needed on how to engage the private sector; and
- (viii) Assist the team leader in providing training and workshops to the relevant agencies.

8. **Distributed energy network specialist** (2 person-months, intermittent). The consultants must have (i) at least bachelor's degree in mechanical or electrical engineering or relevant fields; (ii) a minimum of 5 years experience in distributed energy design; (iii) strong technical background in distributed energy field, including design, construction, operation and maintenance, lifecycle

cost and energy supply chain; (iv) good ability to communicate in English; and (v) experience in international cooperation. The proposed consultant will serve as the team leader and will:

- (i) Assess the current rural energy supply structure in the greater BTH region;
- (ii) Work with other experts together to propose the suitable clean energy supply in rural BTH region;
- (iii) Propose how to effectively design the energy network in the pilot areas taking into consideration local resources, local social, economic and environmental conditions;
- (iv) Support the team leader in capacity building activities;
- (v) Suggest the most appropriate business model to develop clean energy in rural BTH region; and
- (vi) Assist the team leader in delivering the necessary reports of the TA.

9. **Environmental Specialist** (1 person-month, intermittent). The consultant must have (i) at least a bachelor or above degree on environmental engineering or relevant fields; (ii) minimum of 10 years experience on environmental due diligence; (iii) experience in air quality management, and (iv) experience in international cooperation. The consultant will:

- (i) Analyze local pollution emission inventories to confirm their reliability;
- (ii) Review and collect relevant information and parameters about solutions to rural pollution;
- (iii) Assist the team leader in designing solution proposals to rural pollution and then decide what clean energy supply should be proposed, while taking local economic, social, and environmental factors into consideration;
- (iv) Conduct an environmental risk assessment to all the alternatives to make sure no influence will be cast on local residents and no environmental risks will be taken in the selected pilot areas;
- (v) Assist the team leader in writing necessary reports on sections about how clean energy supply will solve pollution problems;
- (vi) Assist the team leader in analyzing social impact made by clean energy supply including the economic influence on target customers, impacts on lifestyles, etc.; and
- (vii) Assist the team leader in providing training and workshops to the relevant agencies.

10. **Geothermal Energy Specialist** (1 person-month, intermittent). The consultant must have (i) at least a bachelor or above degree on mechanical engineering or relevant fields; (ii) minimum of 5 years experience in geothermal energy fields; (iii) good ability to communicate in English; and (iv) experience in international cooperation. The consultant will:

- (i) Investigate on local geothermal energy resources to ensure the reliability in the selected pilot areas;
- (ii) Review and collect relevant geothermal energy information and parameters;
- (iii) Assist the team leader in designing solution proposals and then decide if geothermal for heating should be applied, while taking available resources, local economic, social and environmental factors into consideration;
- (iv) Assisting the team leader in providing training and workshops to the relevant agencies;
- (v) Work with the policy and regulatory expert to assess the existing energy policies related to geothermal energy and propose policy recommendations on how to promote deployment of geothermal energy; and
- (vi) Compose specific execution plans of the solution proposals about geothermal energy for heating.

11. **Biomass Energy Specialist** (1 person-month, intermittent). The consultant must have (i) at least a bachelor or above degree on bio-energy or relevant fields; (ii) minimum of 10 years' experience in bio-energy fields; (iii) good ability to communicate in English; and (iv) experience in international cooperation. The consultant will:

- (i) Investigate on local biomass data to ensure reliability;
- (ii) Review and collect relevant biomass energy information and parameters in the selected pilot areas;
- (iii) Assist the team leader in designing solution proposals and then decide what biomass gasifying technologies should be applied, while taking local economic, social and environmental factors into consideration;
- (iv) Assisting the team leader in providing training and workshops to the relevant agencies;
- (v) Work with the policy and regulatory expert to assess the existing energy policies related to biomass energy and propose policy recommendations on how to promote deployment of biomass energy; and
- (vi) Compose specific execution plans of the solution proposals about biogas plants.

12. **Clean Stoves Specialist** (1 person-month, intermittent). The consultant must have (i) at least a bachelor or above degree on mechanical engineering or relevant fields; (ii) minimum of 5 years' experience in clean stove technology development or utilization fields; (iii) good ability to communicate in English; and (iv) experience in international cooperation. The consultant will:

- (i) Review and collect information on what stoves are being used in rural BTH region;
- (ii) Recommend best available technologies for clean stoves;
- (iii) Recommend suitable cost-effective clean stoves for the selected pilot areas based on the available coal type, and efficiency and pollutant emission of the stove;
- (iv) Assist the team leader in designing solution proposals for clean energy supply, while taking available resources, local economic, social and environmental factors into consideration;
- (v) Assisting the team leader in providing training and workshops to the relevant agencies;
- (vi) Work with the policy and regulatory expert to assess the existing energy policies related to clean stoves and propose policy recommendations on how to promote deployment of clean stoves; and
- (vii) Compose a specific execution plan of the solution proposals about clean stoves.

13. **Solar Energy Specialist** (1 person-month, intermittent). The consultant must have (i) at least a bachelor's engineering degree or relevant fields; (ii) minimum of 5 years of relevant working experience including designing of solar projects, developing technical specifications and experience in operations of solar plants; (iii) good ability to communicate in English; and (iv) experience in international cooperation. The consultant will:

- (i) Investigate on local solar resource data to ensure the reliability in the pilot areas;
- (ii) Collect relevant solar energy information and parameters;
- (iii) Assist the team leader in designing suitable solution proposals and then decide what clean energy supply should be designed in the pilot areas, while taking local available resources, and social and environmental factors into consideration;
- (iv) Assist the team leader in writing the necessary reports;
- (v) Conduct the feasibility study;
- (vi) Assist the team leader in analyzing the social and environmental impact made by the clean energy supply, including the economic influence on target customers, impacts on lifestyles, etc.;

- (vii) Assisting the team leader in providing training and workshops to the relevant agencies; and
- (viii) Compose a specific execution plan of the solution proposals about solar power supply.

### **C. Deliverables**

14. The consultant team shall collectively submit the following reports to ADB (both in English and Chinese) and to the Government (in Chinese):

- (i) **Survey Report.** It will be submitted in June 2018. The report includes a detailed survey result of the status and structure of rural energy consumption in the greater BTH region.
- (ii) **Report of the Impacts of Rural Energy Consumption on Air Quality.** It will be submitted at the end of 2018. The report includes impacts of pollutant emissions from rural energy consumption on air quality.
- (iii) **Final Report.** It will be submitted by June 2019. The final report shall include: (i) the survey results, (ii) impacts of rural energy consumption to air quality, (iii) rural clean energy supply plan considering the local available resource, economic development levels, social and environmental conditions and people's lifestyle, and (iv) clean energy development strategy and policy recommendations. A maximum of 10 pages of executive summary should be included in the final report.