

## **Terms of Reference for Consultants**

1. The TRTA Facility will require a total of 98 person-months of consulting services (8.5 person-months of international and 39.5 person months of national ) in the areas of power sector assessment, power distribution network planning, SCADA system design, mini hydropower project design and environmental and social safeguards. A consultancy firm will be recruited for undertaking distribution network survey and network planning. The other consultants will be recruited as individuals.

### **A. Consultancy Firm Selection**

#### **1. Power Distribution Network survey and Planning Firm**

2. The national consultancy firm will undertake detailed survey of the existing distribution network in Varanasi urban circle of Uttar Pradesh and identified zones/circles in Meghalaya, including the loading, adequacy, redundancy and status of existing distribution assets (33 kV/11 kV substations, 33 kV and 11 KV medium voltage lines, distribution transformers, protection devices in medium voltage network, metering facilities at feeder and distribution transformer level, low voltage lines). The survey firm will identify the distribution assets that need to be replaced and upgraded and prepare Geographical Information System (GIS) maps of the distribution network.

3. Based on the survey results, the consultancy firm will undertake network planning to optimize the distribution network to minimize technical losses, maintain voltage levels and eliminate overloading of the network assets after taking into account future load growth, provide adequate redundancy in the medium voltage network to maintain acceptable level of reliability and design protection systems for isolating network faults. The Detailed Project Reports will be prepared and technical specifications for procurement packages will be prepared for distribution network rehabilitation. The key consultancy inputs required for undertaking this assignment is summarized below. In addition, survey enumerators (non-key) of 50 person-months will be required.

Position	Qualifications	Person-months		Responsibilities
		Uttar Pradesh	Meghalaya	
Team Leader	Electrical Engineer with over 15 years' experience in electricity distribution	6	3	Take overall responsibility for distribution network survey and planning. Provide guidance and supervise the survey teams undertaking field work.  Take responsibility for quality and accuracy of survey and network planning.
Distribution Network Planning Engineer	Electrical Engineer with 5 years of experience	3	1.5	Undertake network planning based on the survey. Prepare technical specifications for medium voltage and low voltage lines.
Distribution network design engineer	Electrical Engineer with 5 years of experience	2	1	Prepare technical specifications for 33kV/11 KV sub stations, distribution transformers, protection systems etc.
Survey team leader	Electrical Engineer with 5 years of experience	4	2	Take responsibility for field survey.
Survey enumerators (non-key)		30	20	

## B. Consultants to be recruited as Individuals

4. **Power Distribution Planning Specialists (International, 3 person-months and National, 6 person-months).** This international specialist shall be able to review the survey data and Power System Planning Report prepared by the power distribution system survey and planning firm, identify gaps if any and recommend the best international practices to achieve the desired outputs and outcomes. This consultant shall progressively review the reports of the survey and planning firm and provide continuous feedback in preparing a robust power distribution planning report. Preferably, the international expert would have a master's degree in electrical engineering, minimum 15 years of experience in a power distribution utility and advising utility management globally. The national expert should have a degree in electrical engineering, minimum 10 years of experience in a power distribution utility.

5. **Power Sector Specialist (International, 3 person-months and National, 6 person-months).** The International Power Sector Specialist, together with national experts, shall work with the implementing agencies in several states of India including Uttar Pradesh, Meghalaya and Tamil Nadu, reviewing their existing power sector plan and identify possible investments, provide technical and management expertise to implementing agencies, provide necessary guidance, recommendation and undertake all the required technical support in selecting the development of priority projects across transmission, distribution and generation sectors. The diagnostic studies to identify specific investment requirements to improve the power sector performance will be undertaken and impact of these investments in terms of improvement in financial performance and service quality will be assessed. The international consultant should have a master's degree in electrical/power engineering together with 15 years of experience in

energy sector project development. The national experts should have similar qualifications with 8 years of experience.

6. **SCADA and Communication Systems Specialist (International, 1 person-months, and National, 3 person-months).** Prepare technical specifications for a new communication and SCADA system in the new substations, considering amongst others, the required signaling facilities, data transmission and communication channel requirements, telephone system. The use of fiber optical transmission system based on optical pilot ground wire on the new distribution lines should be given priority in their assessment. The international communication and SCADA Specialist should have a degree in electrical or communication/electronic engineering or a related area, and at least 12 years of working experience including communication systems and SCADA in the utility industry. The national expert should have similar qualifications with 8 years of experience.

7. **Smart Meter Specialist (National, 2 person-months).** Qualified national expert with a bachelor or higher degree in mechanical, electrical or related engineering field, and at least 12 years of relevant working experience in smart meter and pre-paid meter deployment. In collaboration with implementing agency shall be able to identify the best possible solutions suitable for reducing the commercial losses and pilferages, propose the optimal investment in meters (smart or prepaid) depending on the type of customers to achieve the desired results.

8. **Environment Specialist (International, 1 person-month).** The consultant will undertake preliminary due diligence of mini hydro power projects proposed in Meghalaya for ADB financing. This will include identifying any potential environmental issues, climate risk screening and defining the scope of environment studies to be undertaken to meet the ADB's Safeguards Policy Statement (2009) requirements. The consultant will prepare a preliminary due diligence paper and fill up an ADB environmental safeguard categorization form based on the due diligence. Preferably the expert has at least a master's degree in environmental science or similar, and has at least 10 years' experience in technical assistance of development agencies like ADB, particularly in the power sector.

9. **Social Development Specialist (International, 0.5 person-month).** The consultant will undertake preliminary due diligence of mini hydro power projects proposed in Meghalaya for ADB financing. This will include identifying any potential resettlement and indigenous peoples (including gender aspect for indigenous peoples) issues, and defining the scope of social studies to be undertaken to meet the ADB's Safeguards Policy Statement (2009) requirements. The consultant will prepare a preliminary due diligence paper and fill up a ADB resettlement and indigenous peoples categorization forms based on the due diligence. Preferably the expert has at least a master's degree in social science or similar, and has at least 10 years' experience in technical assistance of development agencies like ADB, particularly in the power sector.