

TERMS OF REFERENCE

FOR PROJECT MANAGEMENT AND SUPERVISION CONSULTANTS

REHABILITATION AND UPGRADE OF SCADA SYSTEM AND EMS

A. Background

1. The Government of Armenia has received financing from the Asian Development Bank (ADB) in the form of a loan toward the cost of Power Transmission Rehabilitation Project (the Project). The Project objective is to enhance power system operation efficiency and reliability, in order to ensure a reliable and efficient power supply as well as the energy exchange with the neighboring countries.
2. The Project consists of the following components: **Expansion and Upgrade of SCADA system and EMS**. The components include a partial upgrade of the SCADA System hardware as well as their extension in various substations and within the National Load Dispatch Center (LDC), in order to cater for enhanced performance and to provide prerequisites for implantation of enhanced functionality. The SCADA System software will be upgraded to the latest release of Network Manager Software Package in order to meet state-of-the-art EMS functionality and Inter-Control-Center Communication capability based on international standard communication protocols. Some minor rearrangement and refurbishment of the Control Center Facilities such as visualization devices and anti-glare lighting at the Control Room are included as well. The project completion is expected in December 2016.
3. Electro Power Systems Operator (EPSO) Closed Joint-Stock Company (CJSC), an implementing agency (IA), intends to recruit a firm of Project Management and Supervision Consultants (the Consultants) for implementation of the Project. The Consultants will be responsible for review existing designs, support EPSO in procurement of turnkey contractors, supervise the works of the suppliers and contractors and ensure successful commissioning of the Project. The Consultants will be recruited using quality and cost based selection (QCBS) method with a quality :cost ratio of 90:10 under full technical proposal, following ADB Guidelines on the Use of Consultants (2013, as amended from time to time).
4. The project feasibility study, technical specifications, and bidding documents for a turnkey contract to be procured have been prepared by an ADB engaged consulting firm. It is expected that the Bidding Documents for a turnkey contract will be issued in the 2nd half of 2014 and the contractor is expected to be mobilized starting from the first half of 2015. The Consultants will provide project management and supervision services for the duration of the Project.
5. A Project Implementation Unit in EPSO will manage the project on behalf of EPSO. EPSO will provide and make available to the consultants, free of charge, the following facilities, services, equipment, materials, documents and information as required by the consultants for carrying out the assignment:
 - (i) Counterpart staff/technical support;
 - (ii) Office space: sufficient office space for the consultant team, with national and international telephone lines, electricity and air conditioning/heating, and internet connections;
 - (iii) Office furniture: desks, office chairs, and bookshelves/cabinets adequate to accommodate the full complement of international and local consultants;
 - (iv) Organizational support: assistance in all arrangements for workshops, meetings, and field visits; and access to required data, maps and other relevant information.

The consultant will be responsible for their personal computers and other facilities for producing reports.

B. Objective of the Assignment

6. An international consulting firm with national experts experienced in power transmission and SCADA/LDC projects is required to provide assistance on tendering, evaluation and contract award to the successful Bidder, project management and supervision including review and audit the detailed engineering design, procurement, construction, erection, testing and commissioning, environmental safeguards monitoring, issue of necessary progress reports, and improve the agency's project management capacity. The Consultants will also be responsible for the financial management of Project-related activities including establishing a management information system, assistance in accounting, and issuance of payments certificates, etc. The Consultants will ensure that the Project is built on schedule in a satisfactory manner to the required standards within budget.

7. A total of 24 international person-months and 24 national person-months of consulting services will be required under the services. The team composition of the key International and National Consultants along with their estimated person-months is provided in Table below:

Positions	Number	Key Person–Months
Component 1: SCADA/EMS		
International	4	24
SCADA expert/Team leader	1	12
Telecommunication Engineer	1	4
Transmission Line (OPGW) Engineer	1	4
Procurement Specialist	1	4
National	3	24
Electrical Engineer	2	18
Environmental Safeguard Specialist	1	6
Total	7	48

C. Scope of Work

8. The primary place of assignment is Yerevan, Armenia. The Consultants will work within the project management office based in Yerevan, and be responsible for inspection and supervision of the construction works, installation of equipment and testing, in order to ensure that the works are implemented and goods supplied in accordance with the designs, specifications and terms and conditions of the relevant civil works and supply contracts. The Consultants would ensure that procurement of goods, services, and civil works contracts are in accordance with ADB's procedures and guidelines. The services to be provided by the Consultants include but are not limited to, the following:

- (i) Assist EPSO in tendering of the project;
- (ii) Assist EPSO during tender phase and prepare answers to potential queries of the Bidders;
- (iii) Assist EPSO in the evaluation of the Bids, and prepare the bid evaluation report in accordance with ADB's guidance and requirements;
- (iv) Assist EPSO in contract negotiations and contract award;

- (v) Organization of and participation in initial Kick-off Meetings with Contractors and relevant stakeholders;
- (vi) Support to EPSO for management of contracts awarded under this project;
- (vii) Assistance in handing over of sites and facilitation of site access;
- (viii) Advising EPSO in timely provision of required permits as required by Contractor,
- (ix) Arranging with contractors reconstruction of missing drawings necessary for project implementation;
- (x) Convening and conducting site and periodic coordination meetings,
- (xi) Checking and approval of designs, plans, technical calculations and drawings submitted by contractor;
- (xii) Review and approval of programs for manufacturers and delivery of materials for site construction;
- (xiii) Preparing, maintaining and monitoring Project Master Schedule;
- (xiv) Establishing and maintaining cost control and monitoring cost, issuing of payment certificates;
- (xv) Quality Control during Manufacturing of Equipment and Witnessing of selected Factory Tests;
- (xvi) Supervision of dismantling and construction works to ensure required quality and progress of the Project;
- (xvii) Assist EPSO in overall implementation of the environmental management plan (EMP) and monitoring contractor's implementation of environmental mitigation measures as outlined in the EMP;
- (xviii) Assessment of Contractors' Claims and related claim management;
- (xix) Provide capacity building to the EPSO in environmental safeguards. Assist EPSO in preparing semi-annual safeguard monitoring reports and to provide early warning and reporting of any potential safeguard risks with detailed description of the event and proposed corrective actions;
- (xx) Approval of methods and procedures for commissioning tests to be submitted by Contractors;
- (xxi) Witnessing of Contractor's tests on completion and commissioning;
- (xxii) Preparation and follow-up of deficiency lists for Contractors;
- (xxiii) Assistance in issuing of Provisional Taking Over Certificates;
- (xxiv) Compilation and checking on correctness of Contractors' final technical documentation and operation and maintenance manuals;
- (xxv) Provision of Home Office support for the assistance to the EPSO in the relevant technical matters;
- (xxvi) Review of project progress and preparation of quarterly progress reports;
- (xxvii) Preparation of Final Project Completion Report; and
- (xxviii) Provide on-the job training to EPSO's staff during all phases of the project. Training (based on a training needs assessment of the target staff) shall include technical design, procurement, contract administration, disbursement, financial management, safeguards, O&M, etc.

D. Qualification of the Firm

9. The firm shall have experience in project management and supervisory work on power transmission projects as well as implementation of SCADA/LDC projects of at least 10 years. The firm shall have the international consultants with expertise in design and operation of SCADA/LDC systems, control, and communication, project management and implementation. The firm shall have experience in developing countries in the region.

E. International Consultants-Qualification and Detailed Tasks

10. **Team Leader/SCADA (International, 12 person-months).** The qualified engineer shall have a bachelor or higher degree in engineering and at least 5 years of team leadership and at least 10 years experience in design of SCADA/EMS systems. The Engineer should have previous experience in procurement, engineering, business administration; knowledge of international organizations/agencies; previous work experience in projects financed by international financial organization, especial associated knowledge of ADB financed project, disbursement and monitoring procedures. The Engineer will manage the Consultant's team as team leader and be the SCADA/EMS Engineer at the same time. Previous experience in developing countries in the region is preferable. The Team Leader will undertake the following, but not limited to:

- (i) Assist the EPSO during tendering, evaluation and contract award;
- (ii) Participation in Project Start-Up Meeting with EPC Contractor ;
- (iii) Prepare a project implementation manual covering project organization, payment procedures, project timetable and quality assurance program;
- (iv) Coordinate with other team members to develop a detailed work plan and implementation schedule; Conduct joint Workshops with Contractor for supervision of System Design, Training Program and Test Strategy. Assist the Client in review and approval of System Design, Training- and Test Plans;
- (v) Ensure reports are delivered to required quality and schedule;
- (vi) Review and approve the engineering design drawings, calculations, delivery program, and documents submitted by the contractors;
- (vii) Review of required modification in control room layout and design;
- (viii) Review of required modifications for the auxiliary systems like lighting, UPS power supply, HVAC;
- (ix) Monitor execution of the projects in line with timetables and work schedules submitted by the contractors;
- (x) Certify invoices, prepare withdrawal applications and keep records of disbursements; draw up and update on a regular basis the anticipated disbursement schedules;
- (xi) Conduct field visits and tests at regular and appropriate times during construction, trials and commissioning;
- (xii) Identify any problem areas during project implementation, propose remedial actions and promptly report any unresolved issues;
- (xiii) Conduct coordination meetings on site during training, installation and commissioning phase;
- (xiv) Ensure compliance with quality assurance plan;
- (xv) In line with the work programs of the contractors, prepare and advise the client on outage planning of existing facilities during implementation;
- (xvi) Review and approve commissioning test reports submitted by contractors; witness commissioning; compile a deficiency list after commissioning; and draw up a timetable for contractors to remedy defects; prepare a monitoring program for the client;
- (xvii) Certify As-Built drawings;
- (xviii) Witness Factory Acceptance Tests;
- (xix) Plan and supervise the execution of the capacity building measures, like classroom instruction and on-the-job training, to enhance the client's capacity in project management; arrange for workshops and study tours on new technologies in the energy sector;

- (xx) Coordinate safety measures between live components in operation and components under construction; advise and train the client's staff on safety planning and safety measures;
- (xxi) Prepare and issue provisional acceptance certificates for the works and spare parts; prepare the final taking over certificates along with the final payments to be made by the client at the end of the warranty period and after all defects have been remedied;
- (xxii) Monitor the client's compliance with the loan agreement covenant and report to ADB; track project outputs, outcomes and impacts against ADB's Design Monitoring Framework; and
- (xxiii) Prepare monthly progress reports, quarterly reports, project completion report, and other reports deemed necessary by the client and/or ADB.

11. **Telecommunication Engineer (International, 4 person-months).** The Engineer shall have a bachelor or higher degree in engineering and at least 10 years of relevant experience in applying design and application of telecommunication systems. Previous experience in developing countries in the region is preferable. The Engineer will undertake the following, but not limited to:

- (i) Assist the EPSO during tendering, evaluation and contract award;
- (ii) Coordinate with other team members and help team leader develop a detailed work plan and implementation schedule;
- (iii) Conduct joint Workshops with Contractor for supervision of System Design, IT Security, Training Program and Test Strategy;
- (iv) Assist the Client in review and approval of System Design, Training- and Test Plans;
- (v) Monitor progress against plan;
- (vi) Supervise and monitor the project implementation for the telecommunication part and advice to the employer any deviations and non-conformance with the Specifications;
- (vii) Ensure adherence to project quality assurance plan;
- (viii) Witness Factory Acceptance Tests; and
- (ix) Perform setup of snag lists and supervise settlement of open issues.

12. **Transmission Line Engineer (International, 4 person-months).** The Engineer shall have a bachelor or higher degree in engineering and at least 10 years of relevant experience in design of transmission lines which shall include projects of 220 kV or above. Previous experience in developing countries in the region is preferable. The Transmission Engineer will undertake the following:

- (i) Assist the EPSO during tendering, evaluation and contract award;
- (ii) Work closely with the team leader in ensuring efficient project implementation;
- (iii) Review and confirm the contractor's design submissions;
- (iv) Supervise and monitor the project implementation related transmission lines;
- (v) Monitor progress against plan;
- (vi) Certify As-Built drawings and progress payments;
- (vii) Ensure adherence to project quality assurance plan; and the
- (viii) Preparation of relevant parts of the Project Completion Report

13. **Procurement/Contract Specialist (International, 4 person-months).** The Procurement/Contract Specialist shall have a bachelor or higher degree in contracts management, engineering or administration, with preferably 7 years of relevant experience.

Previous experiences in undertaking procurement in power sector of developing countries and ADB funded projects are required. The Expert should be well versed with ADB's procurement guidelines and bid evaluation process, and have worked as procurement expert in at least two ADB/other development agencies funded projects. The Procurement/Contract Specialist's responsibilities include, but are not limited to:

- (i) Work closely with EPSO in reviewing and updating procurement documents and procurement plan;
- (ii) Assist EPSO in issuance of bidding documents, organizing site visits, assisting pre-bid meetings, responding to requests for clarification on bidding documents.
- (iii) Preparation of bid evaluation reports in accordance with ADB's Bid Evaluation Guide and other requirements;
- (iv) Assist EPSO on contract negotiations and contract awards; and
- (v) Assist EPSO in contract management and providing all necessary inputs.

F. National Consultants-Qualification and Detailed Tasks

14. **Electrical Engineers (National, 18 person-months).** The Engineers shall have a bachelor or higher degree in engineering and at least 10 years of relevant experience in applying design and application of electrical/control & instrumentation system for substations at 220 kV and above. Previous experience in developing countries in the region is preferable. The Engineer will undertake the following, but not limited to:

- (i) Coordinate with other team members and help team leader develop a detailed work plan and implementation schedule;
- (ii) Review and confirm the contractor's design submissions;
- (iii) Update of existing power supply systems, UPS, HVAC and other auxiliary systems;
- (iv) Supervise and monitor the project implementation with electrical/control & instrumentation related equipment; and
- (v) Ensure adherence to project quality assurance plan.

15. **Environmental Safeguard Specialist (National, 6 person-months).** The National Environmental Safeguard Specialist should have a bachelor or higher degree in environmental management and at least 10 years of relevant experience in power transmission related projects. Previous experience in developing countries in the region is desirable. The specialist will assist in the following, but not limited to:

- (i) Update the initial environmental examination (IEE) and the associated Environmental Management Plan (EMP) in accordance with ADB's Safeguard Policy Statement (2009) and Armenia Environmental Guidelines, if necessary;
- (ii) Assist the EPSO that any adverse environmental impacts are minimized by implementation of the mitigating measures and monitoring program as detailed in the environmental management plan (EMP) in the IEE;
- (iii) Supervise and report the progress of implementation of the EMP to ADB twice a year;
- (iv) Report any violation of environmental standards and the measures taken to restore compliance twice a year to ADB;
- (v) Assist the EPSO with capacity building on environmental safeguard;

G. Reporting requirements

16. **Inception Report.** Within 2 months of startup, the consultants will prepare an inception report that would include the work plan and implementation schedule with priority action sand milestones.

17. The Consultant shall prepare various reports/documents at the time and with pertinent number of copies for printed versions as indicate below:

Report/Document	Number of copies	Deliverable
Brief Monthly Report	2 hard copies duly signed by the Team Leader, and electronic version (in PDF format) to PIU team.	Every month after the effective date of the Contract, within 10 working days from the end of the month.
Quarterly Report	2 hard copies duly signed by the Team Leader, and electronic version (in PDF format) to PIU team.	Every three months after the effective date of the contract, within 10 working days from the end of each quarter
Final Project Report	3 hard copies duly signed by the Team Leader, 3 (three) CD ROMs and electronic version (in PDF format) to PIU team	One month after the completion of the Project
FAT Reports (prepared by the related contractor/manufacturer)	2 hard copies and electronic version (in PDF format) to PMU team.	Within 2 weeks of test
Minutes of Progress Meetings	Scanned copy of the Minutes signed by the parties to PMU members	Within 5 working days from each progress meeting

18. The detailed contents of the reports on the status of project implementation will be discussed and agreed with PIU. However, the reports are proposed to contain the following topics:

19. **Project Progress Reports:**

- Summary of main issues and obstacles, including recommended corrective action;
- Project Description including time schedule and project value;
- Progress and activities of the Contractors;
- Progress of manufacturing;
- Progress of deliveries;
- Progress of construction versus original schedule;
- Actual status of deliveries/works in percentages;
- Planned activities for the next reporting period;
- Changes in the scope of the Project and scope of services, including the list of issued change orders, if any;
- Contractors' site office activities and works accomplished;
- List of invoices issued by the Contractor and their status;
- Progress of contractors' design, preparation of drawings, calculations and documents received by the Consultant and their status of approval;
- Actual status of implementation of Environmental Management Plan;
- Status of physical disbursements of payment to the contractors; and

- Annexes (plans, schedules, progress photographs);

20. **Environmental Safeguards** The Consultants shall assist EPSO to prepare a bi-annual environmental monitoring report on the implementation of the Environmental Management and Monitoring Plan (EMMP), to ensure that the preparation, design, construction implementation, operation and commissioning of the Project comply with (a) all applicable laws and regulations of Armenia relating to environment, health and safety; (b) the Environmental Safeguards; (c) all measures and requirements set forth in the IEE, the EMP, and any corrective or preventive actions set forth in a safeguards monitoring report, and (d) any violation of environmental standards under this Project. The bi-annual report shall be submitted within 2 weeks by end of June and December of each year. The monitoring results will also be included in the quarterly progress reports.

21. **Project Completion Report** The consultants shall assist HVEN to prepare a project completion report within 6 month of physical completion of the Project. The project completion report format is available at: <http://adb.org/Consulting/consultants-toolkits/PCR-Public-Sector-Landscape.rar>.

TERMS OF REFERENCE

FOR PROJECT MANAGEMENT AND SUPERVISION CONSULTANTS

REHABILITATION AND EXTENSION OF FOUR HV GRID SUBSTATIONS

A. Background

1. The Government of Armenia has received financing from the Asian Development Bank (ADB) in the form of a loan toward the cost of Power Transmission Rehabilitation Project (the Project). The Project objective is to enhance power system operation efficiency and reliability, in order to ensure a reliable and efficient power supply as well as the energy exchange with the neighboring countries.

2. The Project consists of the following components: **Rehabilitation and Extension of four High-Voltage (HV) Grid Substations**. The component covers the substations Agarak 2, Shinuhayr, Yeghegnadzor and Ararat 2. The Agarak 2 and Shinuhayr substations (Lot 1) will be financed by ADB, while other two substations at Yeghegnadzor and Ararat 2 (Lot 2) are expected to be financed and administered by the European Bank of Reconstruction and Development (EBRD) on a parallel basis. The rehabilitation of the substations includes the installation of new autotransformers (Agarak 2 and Ararat 2 only), replacement of obsolete voltage transformers, surge arrestors, disconnections, post insulators, steel supports and foundations, control & monitoring equipment, protection equipment, batteries and other secondary systems. The project completion is expected in December 2019.

3. High Voltage Electrical Networks (HVEN) Closed Joint-Stock Company (CJSC), an implementing agency (IA), intends to recruit a firm of Project Management and Supervision Consultants (the Consultants) for implementation of the Project. The Consultants will be responsible for review existing designs, support HVEN in procurement of turnkey contractors, supervise the works of the suppliers and contractors and ensure successful commissioning of the Project. The Consultants will be recruited using quality and cost based selection (QCBS) method with a quality:cost ratio of 90:10 under full technical proposal, following ADB Guidelines on the Use of Consultants (2013, as amended from time to time).

4. The project feasibility study have been prepared by an ADB engaged consulting firm. Separate draft bidding documents for turnkey contracts (Lot 1 and Lot 2) financed by separately ADB and EBRD are prepared based on the standard templates and in accordance with procurement rules of EBRD and ADB. ADB and EBRD will conduct the review of the respective bidding documents in accordance with their own policies, procedures and guidelines. It is expected that the Bidding Documents for a turnkey contract (Lot 1) will be issued in the 2nd half of 2014 and the contractor is expected to be mobilized starting from the first half of 2015. The Bidding Documents for a turnkey contract (Lot 2) will need to be updated by the Consultants in early 2016 and then issued in the 2nd half of 2016. The Consultants will provide project management and supervision services for the duration of the entire Project (Lot 1 and Lot 2).

5. A Project Implementation Unit in HVEN will manage the project on behalf of HVEN. HVEN will provide and make available to the consultants, free of charge, the following facilities, services, equipment, materials, documents and information as required by the consultants for carrying out the assignment:

- (i) Counterpart staff/technical support;
- (ii) Office space: sufficient office space for the consultant team, with national and international telephone lines, electricity and air conditioning/heating, and internet connections;

- (iii) Office furniture: desks, office chairs, and bookshelves/cabinets adequate to accommodate the full complement of international and local consultants; and
- (iv) Organizational support: assistance in all arrangements for workshops, meetings, and field visits; and access to required data, maps and other relevant information.

The consultant will be responsible for their personal computers and other facilities for producing reports.

B. Objective of the Assignment

6. An international consulting firm with national experts experienced in power transmission is required to provide assistance on tendering, evaluation and contract award to the successful Bidder, project management and supervision including review and audit the detailed engineering design, procurement, construction, erection, testing and commissioning, environmental safeguards monitoring, issue of necessary progress reports, and improve the agency's project management capacity. The Consultants will also be responsible for the financial management of Project-related activities including establishing a management information system, assistance in accounting, and issuance of payments certificates, etc. The Consultants will ensure that the Project is built on schedule in a satisfactory manner to the required standards within budget.

7. A total of 60 international person-months and 70 national person-months of consulting services will be required under the services. The team composition of the key International and National Consultants along with their estimated person-months is provided in Table below:

Positions	Number	Key Person-Months
Component 2: Substation Rehabilitation		
International	6	60
Substation Engineer - Team leader	1	30
Electrical and Control Engineer	1	8
Protection Engineer	1	4
Civil Engineer	1	12
Environment Specialist	1	2
Procurement Specialist	1	4
National	5	70
Civil Engineer	2	30
Electrical Engineer	2	30
Environmental Safeguard Specialist	1	10
Total	11	130

C. Scope of Work

8. The primary place of assignment is Yerevan, Armenia. The Consultants will work within the project management office based in Yerevan as well as the project offices in sites, and be responsible for inspection and supervision of the construction works, installation of equipment and testing, in order to ensure that the works are implemented and goods supplied in accordance with the designs, specifications and terms and conditions of the relevant civil works and supply contracts. The Consultants would ensure that procurement of goods, services, and civil works contracts are in accordance with ADB's procedures and guidelines. The services to be provided by the Consultants include but are not limited to, the following:

- (i) Assist HVEN in tendering of the project;
- (ii) Assist HVEN during tender phase and prepare answers to potential queries of the Bidders;
- (iii) Assist HVEN in the evaluation of the Bids, and prepare the bid evaluation report in accordance with ADB's guidance and requirements (Lot 1) and EBRD's guidance and requirements (Lot 2);
- (iv) Assist HVEN in contract negotiations and contract award;
- (v) Organization of and participation in initial Kick-off Meetings with Contractors and relevant stakeholders;
- (vi) Support to HVEN for management of contracts awarded under this project;
- (vii) Assistance in handing over of sites and facilitation of site access;
- (viii) Advising HVEN in timely provision of required permits as required by Contractor,
- (ix) Arranging with contractors reconstruction of missing drawings necessary for project implementation;
- (x) Convening and conducting site and periodic coordination meetings;
- (xi) Checking and approval of designs, plans, technical calculations and drawings submitted by contractor;
- (xii) Review and approval of programs for manufacturers and delivery of materials for site construction;
- (xiii) Preparing, maintaining and monitoring Project Master Schedule;
- (xiv) Establishing and maintaining cost control and monitoring cost, issuing of payment certificates;
- (xv) Quality Control during Manufacturing of Equipment and Witnessing of selected Factory Tests;
- (xvi) Supervision of dismantling and construction works to ensure required quality and progress of the Project;
- (xvii) Assist HVEN in overall implementation of the environmental management plan (EMP) and monitoring contractor's implementation of environmental mitigation measures as outlined in the EMP;
- (xviii) Assessment of Contractors' Claims and related claim management;
- (xix) Provide capacity building to the HVEN in environmental safeguards. Assist HVEN in preparing semi-annual safeguard monitoring reports and to provide early warning and reporting of any potential safeguard risks with detailed description of the event and proposed corrective actions;
- (xx) Approval of methods and procedures for commissioning tests to be submitted by Contractors;
- (xxi) Witnessing of Contractor's tests on completion and commissioning;
- (xxii) Preparation and follow-up of deficiency lists for Contractors;
- (xxiii) Assistance in issuing of Provisional Taking Over Certificates;
- (xxiv) Compilation and checking on correctness of Contractors' final technical documentation and operation and maintenance manuals;
- (xxv) Provision of Home Office support for the assistance to HVEN in the relevant technical matters;
- (xxvi) Review of project progress and preparation of quarterly progress reports.
- (xxvii) Preparation of Final Project Completion Report; and
- (xxviii) Provide on-the job training to HVEN's staff during all phases of the project. Training (based on a training needs assessment of the target staff) shall include technical design, procurement, contract administration, disbursement, financial management, safeguards, O&M, etc.

D. Qualification of the Firm

9. The firm shall have experience in project management and supervisory work on power transmission projects of 220 kV and above of at least 10 years. The firm shall have the international consultants with expertise in design and operation of 220 kV and above substations, protection, control, SCADA and communication, project management and implementation. The firm shall have experience in developing countries in the region.

E. International Consultants-Qualification and Detailed Tasks

10. **Team Leader/Substation Engineer (International, 30 person-months).** The qualified engineer shall have a bachelor or higher degree in engineering and at least 5 years of team leadership and at least 10 years' experience in design of substations on at least 220 kV and above including secondary systems. The Engineer should have previous experience in procurement, engineering, business administration; knowledge of international organizations/agencies; previous work experience in projects financed by international financial organization, especially associated knowledge of ADB financed project, disbursement and monitoring procedures. The Engineer will manage the Consultant's team as team leader and be the Substation Engineer at the same time. Previous experience in developing countries in the region is preferable. The Team Leader/Substation Engineer will undertake the following, but not limited to

- (i) Assist HVEN during tendering, evaluation and contract award;
- (ii) Participation in Project Start-Up Meeting with EPC Contractor;
- (iii) Prepare a project implementation manual covering project organization, payment procedures, project timetable and quality assurance program;
- (iv) Coordinate with other team members to develop a detailed work plan and implementation schedule;
- (v) Ensure reports are delivered to required quality and schedule;
- (vi) Review and confirm the proposed technical design and configuration of the substations and ensure contractor's designs and works are executed following project requirement;
- (vii) Supervise and monitor the project implementation in line with timetables and work schedules submitted by the contractors;
- (viii) Identify any problem areas during project implementation, propose remedial actions and promptly report any unresolved issues;
- (ix) Certify invoices, prepare withdrawal applications and keep records of disbursements; draw up and update on a regular basis the anticipated disbursement schedules;
- (x) Assist the Client in review and approval of System Design, Training- and Test Plans;
- (xi) In line with the work programs of the contractors, prepare and advise the client on outage planning of existing facilities during implementation;
- (xii) Coordinate safety measures between live components in operation and components under construction; advise and train the client's staff on safety planning and safety measures;
- (xiii) Conduct coordination meetings on site during training, installation and commissioning phase;
- (xiv) Ensure compliance with quality assurance plan;
- (xv) Plan and supervise the execution of the capacity building measures, like classroom instruction and on-the-job training, to enhance the client's capacity in

- project management; arrange for workshops and study tours on new technologies in the energy sector;
- (xvi) Review and approve commissioning test reports submitted by contractors; witness commissioning; compile a deficiency list after commissioning; and draw up a timetable for contractors to remedy defects; prepare a monitoring program for the client;
 - (xvii) Certify As-Built drawings;
 - (xviii) Witness Factory Acceptance Tests;
 - (xix) Witness Pre Site Acceptance Tests and Final SAT;
 - (xx) Prepare and issue provisional acceptance certificates for the works and spare parts; prepare the final taking over certificates along with the final payments to be made by the client at the end of the warranty period and after all defects have been remedied;
 - (xxi) Perform setup of deficiency lists and supervise settlement of open issues;
 - (xxii) Monitor the client's compliance with the loan agreement covenant and report to ADB; track project outputs, outcomes and impacts against ADB's Design Monitoring Framework; and
 - (xxiii) Prepare monthly progress reports, quarterly reports, project completion report, and other reports deemed necessary by the client and/or ADB.

11. **Electrical and Control Engineer (International, 8 person-months).** The Engineer shall have a bachelor or higher degree in engineering and at least 10 years of relevant experience in applying design and application of electrical/control & instrumentation system for substations at 220 kV and above. Previous experience in developing countries in the region is preferable. The Engineer will undertake the following, but not limited to:

- (i) Assist HVEN during tendering, evaluation and contract award;
- (ii) Coordinate with other team members and help team leader develop a detailed work plan and implementation schedule;
- (iii) Act as deputy team leader in his absence;
- (iv) Review and confirm the contractor's design submissions;
- (v) Supervise the project implementation with electrical/control & instrumentation related equipment; and
- (vi) Ensure adherence to project quality assurance plan.

12. **Protection Engineer (International, 4 person-months).** The Engineer shall have a bachelor or higher degree in engineering and at least 10 years of relevant experience in applying design and application of protection system for substations at 220 kV and above. Previous experience in developing countries in the region is preferable. The Engineer will undertake the following, but not limited to:

- (i) Assist the IA during tendering, evaluation and contract award;
- (ii) Coordinate with other team members and help team leader develop a detailed work plan and implementation schedule;
- (iii) Review and confirm the contractor's design submissions;
- (iv) Supervise the project implementation with protection related equipment;
- (v) Ensure adherence to project quality assurance plan; and
- (vi) Supervise the protection commissioning activities.

13. **Civil Engineer (International, 12 person-months).** The Engineer should have a bachelor or higher degree in engineering and at least 10 years of relevant experience in design

and implementation of substations at 220 kV and above. Previous experience in developing countries in the region is preferable. The Engineer will undertake the following, but not limited to:

- (i) Assist HVEN during tendering, evaluation and contract award;
- (ii) Coordinate with other team members and help team leader develop a detailed work plan and implementation schedule;
- (iii) Review and confirm the contractor's design submissions;
- (iv) Supervise and monitor the civil works of the Project;
- (v) Ensure adherence to project safety plan and quality assurance plan; and
- (vi) Preparation of relevant parts of the Project Completion Report.

14. **Environmental Specialist (International, 2 person-months).** The Environmental Specialist should have a bachelor or higher degree in environmental engineering and preferably 8 years of relevant experience in power sector. Previous experience in developing countries in the region is preferable. The specialist will assist in the following:

- (i) Update the initial environmental examination (IEE) and the associated Environmental Management Plan (EMP) in accordance with ADB's Safeguard Policy Statement (2009) and Armenia Environmental Guidelines, if necessary;
- (ii) Assist the HVEN that any adverse environmental impacts are minimized by implementation of the mitigating measures and monitoring program as detailed in the environmental management plan (EMP) in the IEE;
- (iii) Supervise and report the progress of implementation of the EMP to ADB twice a year;
- (iv) Report any violation of environmental standards and the measures taken to restore compliance twice a year to ADB; and
- (v) Assist the HVEN with capacity building on environmental safeguard.

15. **Procurement/Contract Specialist (International, 4 person-months).** The Procurement/Contract Specialist shall have a bachelor or higher degree in contracts management, engineering or administration, with preferably 7 years of relevant experience. Previous experiences in undertaking procurement in power sector of developing countries and ADB funded projects are required. The Expert should be well versed with ADB's procurement guidelines and bid evaluation process, and have worked as procurement expert in at least two ADB/other development agencies funded projects. The Procurement/Contract Specialist's responsibilities include, but are not limited to:

- (i) Work closely with HVEN in reviewing and updating procurement documents and procurement plan;
- (ii) Assist HVEN in issuance of bidding documents, organizing site visits, assisting pre-bid meetings, responding to requests for clarification on bidding documents;
- (iii) Preparation of bid evaluation reports in accordance with ADB's Bid Evaluation Guide and other requirements;
- (iv) Assist HVEN on contract negotiations and contract awards; and
- (v) Assist HVEN in contract management and providing all necessary inputs.

F. National Consultants-Qualification and Detailed Tasks

16. **Civil Engineer (National, 30 person-months).** The Engineer should have a bachelor or higher degree in engineering and at least 10 years of relevant experience in design and

implementation of substations at 220 kV and above. Previous experience in developing countries in the region is preferable. The Engineer will undertake the following, but not limited to:

- (i) Coordinate with other team members and help team leader develop a detailed work plan and implementation schedule;
- (ii) Review and confirm the contractor's design submissions;
- (iii) Supervise and monitor the civil works of the Project; and
- (iv) Ensure adherence to project safety plan and quality assurance plan.

17. **Electrical Engineer (National, 30 person-months).** The Engineer shall have a bachelor or higher degree in engineering and at least 10 years of relevant experience in applying design and application of electrical/control & instrumentation system for substations at 220 kV and above. Previous experience in developing countries in the region is preferable. The Engineer will undertake the following, but not limited to:

- (i) Coordinate with other team members and help team leader develop a detailed work plan and implementation schedule;
- (ii) Review and confirm the contractor's design submissions;
- (iii) Supervise and monitor the project implementation with electrical/control & instrumentation related equipments; and
- (iv) Ensure adherence to project quality assurance plan.

18. **Environmental Safeguard Specialist (National, 10 person-months).** The National Environmental Safeguard Specialist should have a bachelor or higher degree in environmental management and at least 10 years of relevant experience in power transmission related projects. Previous experience in developing countries in the region is preferable. The specialist will assist in the following, but not limited to:

- (i) Update the initial environmental examination (IEE) and the associated Environmental Management Plan (EMP) in accordance with ADB's Safeguard Policy Statement (2009) and Armenia Environmental Guidelines, if necessary;
- (ii) Assist the HVEN that any adverse environmental impacts are minimized by implementation of the mitigating measures and monitoring program as detailed in the environmental management plan (EMP) in the IEE;
- (iii) Supervise and report the progress of implementation of the EMP to ADB twice a year;
- (iv) Report any violation of environmental standards and the measures taken to restore compliance twice a year to ADB; and
- (v) Assist the HVEN with capacity building on environmental safeguard.

G. Reporting requirements

19. **Inception Report.** Within 2 months of startup, the consultants will prepare an inception report that would include the work plan and implementation schedule with priority actions and milestones.

20. The Consultant shall prepare various reports/documents at the time and with pertinent number of copies for printed versions as indicate below:

Report/Document	Number of copies	Deliverable
Brief Monthly Report	2 hard copies duly signed by the	Every month after the effective

	Team Leader, and electronic version (in PDF format) to PIU team.	date of the Contract, within 10 working days from the end of the month.
Quarterly Report	2 hard copies duly signed by the Team Leader, and electronic version (in PDF format) to PIU team.	Every three months after the effective date of the contract, within 10 working days from the end of each quarter
Final Project Report	3 hard copies duly signed by the Team Leader, 3 (three) CD ROMs and electronic version (in PDF format) to PIU team	One month after the completion of the Project
FAT Reports (prepared by the related contractor/manufacturer)	2 hard copies and electronic version (in PDF format) to PMU team.	Within 2 weeks of test
Minutes of Progress Meetings	Scanned copy of the Minutes signed by the parties to PMU members	Within 5 working days from each progress meeting

21. The detailed contents of the reports on the status of project implementation will be discussed and agreed with PIU. However, the reports are proposed to contain the following topics:

22. **Project Progress Reports:**

- Summary of main issues and obstacles, including recommended corrective action;
- Project Description including time schedule and project value;
- Progress and activities of the Contractors;
- Progress of manufacturing;
- Progress of deliveries;
- Progress of construction versus original schedule;
- Actual status of deliveries/works in percentages;
- Planned activities for the next reporting period;
- Changes in the scope of the Project and scope of services, including the list of issued change orders, if any;
- Contractors' site office activities and works accomplished;
- List of invoices issued by the Contractor and their status;
- Progress of contractors' design, preparation of drawings, calculations and documents received by the Consultant and their status of approval;
- Actual status of implementation of Environmental Management Plan;
- Status of physical disbursements of payment to the contractors; and
- Annexes (plans, schedules, progress photographs).

23. **Environmental Safeguards** The Consultants shall assist HVEN to prepare a bi-annual environmental monitoring report on the implementation of the Environmental Management and Monitoring Plan (EMMP), to ensure that the preparation, design, construction implementation, operation and commissioning of the Project comply with (a) all applicable laws and regulations of Armenia relating to environment, health and safety; (b) the Environmental Safeguards; (c) all measures and requirements set forth in the IEE, the EMP, and any corrective or preventive actions set forth in a safeguards monitoring report, and (d) any violation of environmental standards under this Project. The bi-annual report shall be submitted within 2 weeks by end of

June and December of each year. The monitoring results will also be included in the quarterly progress reports.

24. **Project Completion Report** The consultants shall assist HVEN to prepare a project completion report within 6 month of physical completion of the Project. The project completion report format is available at: <http://adb.org/Consulting/consultants-toolkits/PCR-Public-Sector-Landscape.rar>.