Millennium Challenge Account Nepal (MCA-Nepal)

Electricity Transmission Project

Power Sector Technical Assistance

Outreach Event, Kathmandu
1 August 2023

Disclaimer

Contents of the Slides presented in this presentation are exclusively for the purpose of the Market Outreach of ETP Technical Assistance Activity and may differ at the time of Request for Proposal.

Overall Scope of the program

- The Power Sector Technical Assistance Activity ***aims to support NEA by improving its transmission business in the areas of regulatory cost recovery, improved grid operations, and better system planning.***

- ***It will increase the pace of investment required for transmission network capacity to meet growth in electricity supply and demand that will increase the reliability of the transmission network by reducing outages and power quality problems***.

- Finally, it will ***increase the financial viability of the power sector***.

Present Status of Technical Assistance to NEA

- Project Cooperation Agreement Between MCA-Nepal and NEA was signed on May 30, 2023.

- 1st Joint Project Steering Committee Meeting between NEA and MCA-Nepal was held on June23, 2023.
- Draft RFP for the Technical Assistance to NEA is prepared. Depending of the availability of the budget for the Transmission Business Transformation (TBT) program, the RFP for the TA to NEA will be finalized.
- Market outreach program for TA to ERC and NEA is planned in Kathmandu and Delhi on August 1 and 8, respectively.

Technical Assistance Program to NEA

Five TA programs focusing on Transmission Business Group of NEA. Their Estimated Duration and Business Areas of NEA

- Transmission Business Transformation (TBT) - 20 Months
- Asset Maintenance & Operation (AMO) – 20 Months
- System & Market Operation (SMO) – 8 Mont
- Network Development Effectiveness (NDE) - 12 Months
- System Planning (SP) – 13 Months

TA Program	Business Areas				
Transmission Business Transformation (TBT)	SPD/PM&IT	GDD/TD	GOD/TD	SOD/LDC/TD	
Asset Maintenance & Operation (AMO)			GOD/TD		
System & Market Operation (SMO)			GOD/TD	SOD/LDC/TD	PTD/PM&IT
Network Development Effectiveness (NDE)		GDD/TD			
System Planning (SP)	SPD/PM&IT				

Transmission Business Transformation (TBT)

Objective

The objective of this assignment is ***to help NEA transform its transmission business to successfully manage the ongoing growth of the power system and assist NEA to develop and implement a program to establish a results-based management approach and asset management model.***

Scope of Work

- Business Transformation Development
  - Project Initiation and Management Structure
  - Business Process Analysis and Development
  - Result-based Management Process Design
  - Asset Information Management – Data and Enabling Information Technology
  - Transmission Business Transformation Roadmap
- Asset Management System
- Transformation Program Implementation

Training program Under TBT:

1. Asset Management System
2. New Business processes in Transmission Business

Transmission Business Transformation (TBT) – Key Activities

Key Activities of Business Transformation Development

- ***Detailed analysis of NEA's core transmission business practices and operational performance***
  - Review of all reference materials and ensure proper understanding of the project requirements
  - Prepare process chart of activities
- ***Document the current business processes at the physical activity level*** including timeline of the process cycle, in network planning, network development & execution, maintenance planning & execution, and system operations to document "as-is" situation and analyze the process metrics
- ***Conduct detailed analysis and process-mapping of the "to be" NEA transmission business processes*** according to the specific requirements for activities in each of the NEA transmission business areas
- ***Incorporate in the processes the common functional modules/entities,*** namely DAT, LCP, SDM and ADM required for the business operations in Grid Development, Grid Operation, System Planning and System Operation
- ***Process improvement in: network development, asset maintenance & operation, asset condition data and performance information management, asset information management system, power market operation, and utility financial management***

TBT Key Activities– cont'd.

Key Activities of Asset Management System

- ***Design asset management system based on the requirement developed by asset information management*** – data & enabling information technology, ***procurement of asset management system***

Key Activities of Transformation Program Implementation

- ***Establish project management structure aligned with the proposals in the TBT Roadmap*** which should include overall management/coordination of process implementation, performance monitoring approaches, and assignment of staff to support strengthening of business processes in priority business areas
- ***Advise and support NEA staff in core business process areas to oversee other technical assistance activities*** – including training/capacity building, new tools/technology, etc. into updated business processes
- **Support NEA staff in monitoring transmission business performance** on key indicators, identify challenges/obstacles to improvements, and adapt approaches in response to challenges
- **Develop staff training program and conduct training** on core business processes
- ***Work with NEA designated staff to establish overall transformation plan and monitoring strategy***, and support ongoing management to execute the project plan including tracking of project performance indicators

Asset Maintenance & Operation (AMO)

Objective

To strengthen NEA's ability to drive productivity and efficiency by leveraging the benefits of technologies and tools that maximize its effort of managing its assets ***to improve network availability and security by reducing the number of outages and outage duration***.

Scope of Work

- Maintenance and Operations Improvement Program
- Geographic Information Applications for Asset Maintenance and Operations
- Live-line Maintenance Program
- Aerial-based Maintenance Program
- Health and Safety Program

Coordination of all TA Programs

- The AMO Program is considered as a core program of the transmission business. The Consultant is required to provide the leading coordination effort for all TA programs with all Program Leaders to ensure effective implementation of the TA activities.

Asset Maintenance & Operation (AMO)

Training program and Pilot Projects under AMO:

1. Data Management Procedures
2. Asset Condition Assessment and Performance Monitoring
3. SS Maintenance Plan Development
4. Maintenance & Operations Skills Training
5. Geographic Information Applications for Asset Maintenance & Operations
6. Live Working Maintenance Program
7. Aerial-Based Maintenance Program –Helicopter and UAV
8. Worker Health and Safety Program

Asset Maintenance & Operation (AMO) Key Activities.

Maintenance and Operations Improvement Program

- ***Review existence Maintenance & Operations Policy and Standards***, identify specific gaps and update Policy and Standards
- ***Review Asset Data for Maintenance & Operations***, identify data gaps and develop and implementation plan for data management including complete procurement cycle for asset.
- ***Review, analyze and develop process for Asset Condition Assessment and Performance Monitoring***
- ***Review, analyze and develop Maintenance Plan Development***
- Develop and conduct Maintenance & Operations Skills Training

Geographic Information Applications for Asset Maintenance & Operations

- ***Identify the Applicable GIS applications/tools for analyzing assets and their associated spatial information for maintenance activities to be carried out in the field.***
- Procure GIS applications, hardware and accessories, and training.

Asset Maintenance & Operation (AMO) Key Activites –cont'd.

Live-line Maintenance Program

- ***Develop a comprehensive live-line maintenance program*** that includes establishing requirements for work method standards, operating procedures and safety protocol, procurement of equipment, tools and worker protective equipment.
- ***Develop and provide technical requirements for full procurement process*** and technical support for acquisition for live line tools, equipment, worker protective equipment, and worker training for the pilot project
- ***Assist NEA in implementing the pilot project and training of NEA*** staffs ***in Live-line maintenance program for overhead transmission lines.***

Aerial-Based Maintenance Program

- ***Helicopter and UAV Based Maintenance programs***
- ***Develop the program requirement***, implementation plan, ***technical requirements for procurement and technical support for the pilot project***.
- **Assist NEA in the implementation of the pilot project** and start-up training of NEA staffs
- Procure relevant tools and conduct training to NEA staff on UAV based program.

Asset Maintenance & Operation (AMO) Key Activities–cont'd.

Health & Safety Program

- Conduct detailed health & safety condition & practice assessment, and develop health & safety management program.
- Conduct workshops & training for NEA staff in key areas ***(in transmission line & substation maintenance and operational safety practices)***

System & Market Operations (SMO)

Objective

The SMO program is intended to address certain global or root cause issues and improve INPS reliability and operational efficiency focusing on the real time operations of the network under System Operations Department (SOD).

Considering the expanding transmission network, increased generation capacity, and increased power trade with India, it is important to address the issues with the system operation and improve the real-time operations of the transmission network, and protection and coordination system.

Scope of Work

- ***Develop a strategy and plan to enable rapid implementation of load and generation rejection schemes*** as need arises.
- ***Perform System Operation Function Gap Analysis and recommend projects to improve the system and market operations***
- Strategy and Plan for Cross-Border Electricity Trade Market. ***Develop a roadmap and readiness plan for NEA to optimize utilization of its synchronous connection to Indian electricity market***.

Training program under SMO

1. Load & Generation Rejection Schemes
2. System Operations Function - Analysis & Recommendations
3. Strategic Plan for Cross Border Electricity Trade Market

System & Market Operation (SMO) Key Activities

Major Activities

- Develop a ***strategy and plan to enable rapid implementation of load and generation rejection schemes*** as need arises.
- Perform ***System Operation Function Gap Analysis and recommend projects to improve the system and market operations***
- Strategy and Plan for Cross-Border Electricity Trade Market. ***Develop a roadmap and readiness plan for NEA to optimize utilization of its synchronous connection to Indian electricity market.***

Network Development Effectiveness (NDE)

Objective

The objective of this program is to strengthen NEA's ability to meet transmission expansion goals in Nepal. The NDE Program will be invoked by the TBT work with a focus on building the capacity of NEA's staff in key areas related to transmission network development, procurement and contracting, environment and social impact assessment, and project management and monitoring.

The aim is to improve the quality of transmission line and substation designs and standards, and to make the process of project implementation more efficient ***by reducing the time of whole project life cycle from project identification to commissioning.***

Scope of Work

- Program inception and management
- Network Development and Design
- Project Execution and Management

Training program under NDE:

1. Capacity Building in Network Development and Design- Auto-CAD, PLS-CADD, DGPS, and drones
2. Capacity Building in Project Execution and Management- MS Project, Primavera

Network Development Effectiveness (NDE) Key activities

Project Inception and Management

- Review of all ***reference materials and organizational structure of NEA and the departments involved in the network development*** and execution and monitoring of transmission projects.
- Update and elaborate work plan
- Clarify lists of participants in capacity building activities and timelines for activities.
- ***Prepare Inception report***

Network Development Effectiveness (NDE) Key Activities – cont'd.

Network Development and Design

- Update ***processes and guidelines for review of design and technical specifications***
- Update ***methods/processes for transmission line route alignment and substation siting*** integrating technical, environment and social requirements.
- Recommendations on the ***procurement/contracting strategies including evaluation of consultancy and construction bids***, contract negotiations and award of contracts.
- Provide Technical support requirement to MCA-Nepal for the ***complete procurement cycle in the procurement of software programs for the design of transmission line and towers (e.g., PLS-CADD) from a vendor***
- ***Capacity building of NEA staff in technical design and survey skills,*** and use of design and route survey software packages, such as **Auto-CAD, PLS-CADD, DGPS, and drones**.
- Capacity building of NEA staff in network development including ***appraisal of bids, contract negotiations, project costing and investment planning, stakeholder consultation and grievance handling.***
- Conduct Capacity Building / Trainings In Network Development and Design

Network Development Effectiveness (NDE) Key Activities – cont'd.

Project Execution and Management

- Provide support ***in enhancing the project management and monitoring processes*** including project scheduling, project coordination, progress meetings and reporting, risk assessment and its mitigation, management of scope change, and budget control
- Provide support ***in streamlining the process of review and approval of design and other technical documents***
- ***Updating/development of processes for monitoring the environmental and social, and health and safety policies compliance*** in the construction of transmission line and substation projects
- ***Updating/development of processes for health and safety policies compliance*** in the construction of transmission line and substation projects.
- ***Conduct training on capacity building*** in the whole project life cycle, and project management by using software such as ***MS Project, Primavera***.

System Planning (SP)

Objective

To strengthen the ability of System Planning Department (SPD) of NEA ***to meet transmission investment expansion goals in Nepal.***

Scope of Work

- Future load demand forecast (Spatial and Global)
- Generation Planning
- System studies including load flow, stability and short-circuit analysis
- Transmission Planning
- Economic and Financial analysis/evaluation of Plans

Training program under SP:

1. Global and Spatial Load Forecast
2. Generation Planning- Stochastic Dual Dynamic Programming (SDDP)
3. System Need Studies- Power System Simulation (PSS/E), Electromagnetic Transient Program (EMTP)
4. Economic & Financial Evaluation
5. Transmission Plan (Project Definition Plan)

System Planning (SP) Key Activites

Load Forecast

- The Consultant will ***develop the capacity of SPD to perform the Global Load forecast based on domestic electricity demand and export, and Spatial Load forecasting.***
- ***Assist in procurement and train: A Regression Analysis Software, e.g. E-views*** or any other suitable software required for Global and Spatial Load Forecasting

Generation Planning:

- Formation of a team of trained engineers/staff in SPD fully equipped with performing Generation Planning
- Complete know-how of ***Stochastic Dual Dynamic Programming (SDDP) for generation planning (Opt-Gen/Least Cost Generation Planning)*** with hands-on practice.
- ***Assist in procurement and train*** to run the software.

System Planning (SP) Key Activities – cont'd.

Power System Studies

- ***Upgraded skills of engineers/staff in SPD*** to be fully equipped with advanced features of ***PSS/E to carry out load flow analysis, contingency analysis, short circuit analysis and system stability analysis***
- ***Assist in procurement of PSS/E and Electromagnetic Transient Program (EMTP) softwares*** and conduct a customized hands-on training workshop.

Economic & Financial Evaluation

- Formation of a team of trained staff with framework of coordination with Economic Department and Finance Division of Transmission Directorate of NEA, fully equipped with performing the evaluation and financial appraisal of a project,
- **Provide Model or software for economic and financial evaluation**

Transmission Plan (Project Planning)

- Formulation of a team of trained staff of SPD and related directorate/division of NEA capable of developing transmission plan including project implementation and scheduling plan.

Resource Plan for the TA Program

- The Consultant is expected to have in-depth electric power utility sector expertise **in** ***transmission business, broad experience in carrying out business process re-engineering activities, local and regional knowledge in addition to international best practices and necessary technical and administrative support.***
- The Consultant is required to assemble a team of international and domestic personnel ***with in-depth electric power sector expertise, particularly in business transformation, change management, asset maintenance and operations, electricity markets, power system planning and studies, transmission infrastructure procurement including bidding process, development and implementation of high voltage transmission line and substation projects, and risk analysis and mitigation relevant to electric sector projects.***
- Local knowledge and experience in the region would be an advantage.
- The performance of the assignment is in Kathmandu, Nepal to facilitate close and frequent interaction with NEA, MCA-Nepal and other stakeholders.
- The consulting services should be provided and managed with a functional organization directly responsive and responsible through the Team Leader. ***Team Leader entrusted with full responsibility and authority to act on behalf of the Consultant.***

Level of Effort (LOE) for TA Programs

TA Program	Total Duration (Months)	No. of Key Experts	Level of Effort of Key Experts (Man-Months)
Transmission Business Transformation (TBT)	20	6	62
Asset Maintenance & Operation (AMO)	20	5	50
System & Market Operation (SMO)	8	7	21
Network Development Effectiveness (NDE)	12	4	18
System Planning (SP)	13	7	17
Total for Five Programs		**29**	**168**

Tentative List of Key Experts for TA to NEA

Tentative List of Key Experts for TBT

	Proposed Staff Position
1	Program Leader – Utility Management Expert
2	Technical Analyst – Utility Expert
3	Business Analyst (Specialist) – Change Management
4	Information Management Specialist
5	Management Information System Analyst(Specialist)
6	Corporate Finance Specialist

	Proposed Staff Position
1	Program Leader
2	Senior Technical Specialist
3	Technical Specialist – Transmission Lines
4	Technical Specialist – Transmission S/S
5	Health & Safety Specialist

Tentative List of Key Experts for AMO

Tentative List of Key Experts for TA to NEA

Tentative List of Key Experts for SMO

	Proposed Staff Position
1	Program Leader
2	Senior Power System Operations Strategist Expert
3	Production/Dispatch Expert
4	Grid Operations Expert
5	Electricity Market Operations Strategist Expert
6	Electricity Market Operations IT Expert
7	Business Process Analysts Specialist

Tentative List of Key Experts for NDE

	Proposed Staff Position
1	Program Leader
2	Transmission Line Expert
3	Substation Expert
4	Procurement Expert

Tentative List of Key Experts for SP

	Proposed Staff Position
1	Program Leader
2	Load Forecasting Expert
3	Generation Planning Expert
4	System Studies Expert
5	EMTP Expert
6	Engineering Economist Specialist
7	Transmission Planning Expert

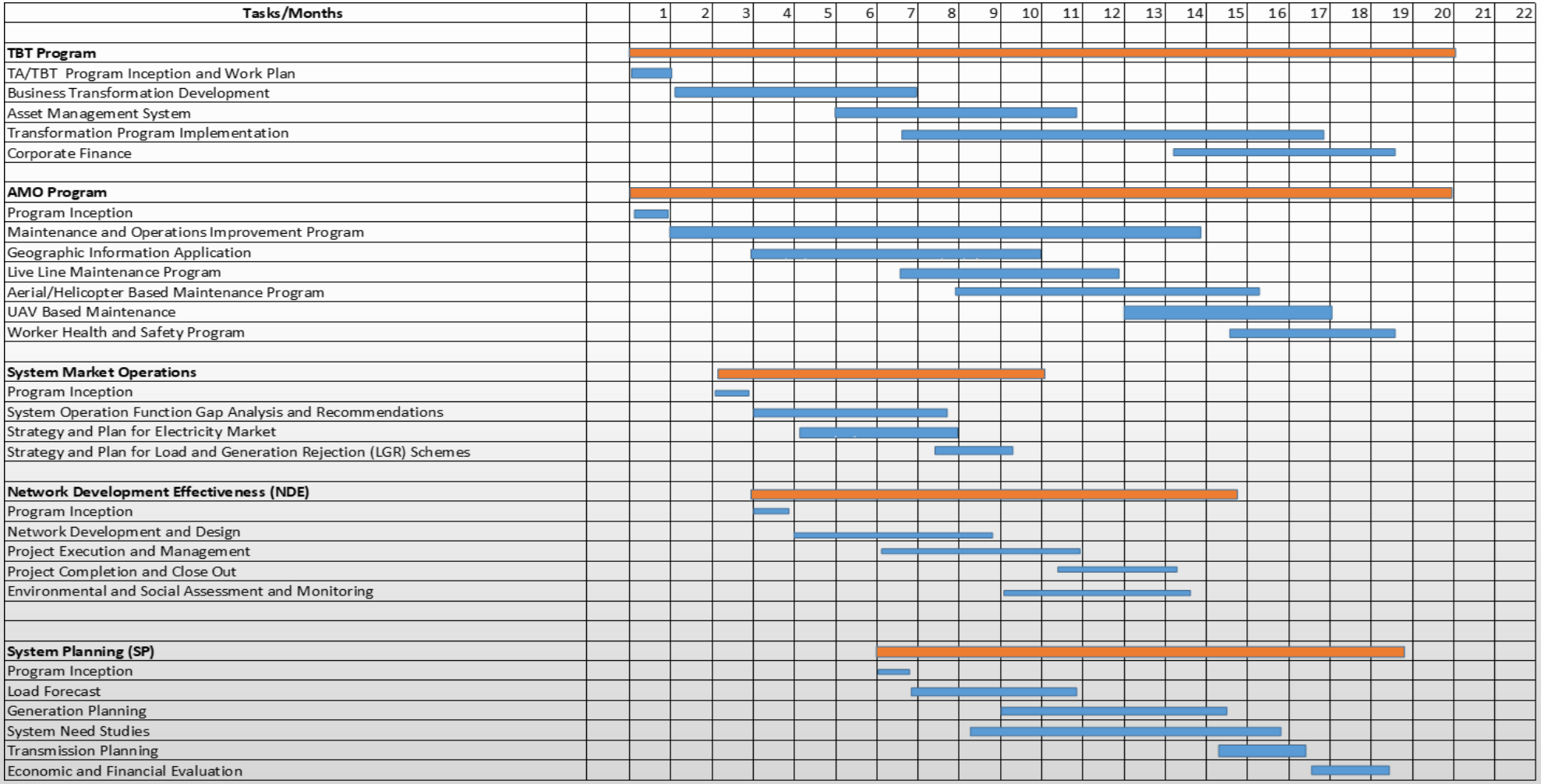
Procurement of TA to NEA

Procurement of "Consulting Services to provide Technical Assistance to Nepal Electricity Authority" will be carried out by QCBS process.

Procurement Schedule for TA Program

Work schedule

Implementation Schedule for TA Programs



Other Key Responsibilities of the Consultant

- Work with NEA designated staff ***to establish overall plan, and support ongoing management to execute the project plan including tracking of project performance indicators.***
- Ensure ***NEA understands the needs for development and integration of any new processes into the overall TA program***;
- ***Prepare and submit a COVID-19 risk mitigation plan*** considering MCA-Nepal Guidelines.
- Plan and manage Training / Executive Tour to fulfill the objective of compact and enable the NEA staff to build capacity as identified in the scope of works of the TA Programs.
- To run the office establishment in Kathmandu and provide all necessary financial and administration management / services to its team.
- For all expenses and the resources required to successfully complete the assignment as per Terms of Reference/ scope of work and the Conditions of Contract.

Other Key Responsibilities of the Consultant- Contd

- Responsible ***for securing work visas (as applicable)*** for all the key experts that will be stationed in Kathmandu. It is strongly recommended that during the proposal preparation stage, the Consultants conduct due diligence to get fully familiar with visa requirements, annual fees, and limitations for start the work.
- For the ***Monitoring and Evaluation (M&E) of the Program***, based on the agreed project logic and indicator, the consultant is to collect and report the required data that will be reviewed by MCA-Nepal through the MCC Data Quality Review (DQR) standards and process. ***The Consultant will be responsible for addressing the recommendations of DQR findings***.
- For a ***Kick-off meeting***, which shall be conducted at MCA-Nepal office within the first (1) week after the Contract effective date.
- To ***follow MCA-Nepal Branding guidelines and Communication Protocol*** related to media and digital media, which will be provided by MCA-Nepal to the Consultant during Inception workshop.

Fostering economic growth with better access to electricity and roads.