

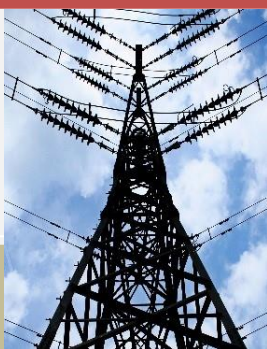
Task 7 – Implementation Planning

Detailed Feasibility Studies: Transmission Projects in Nepal

Volume 7 (Report)

MCC-15-BPA-0032, MCC-16-CL-0002

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Detailed Feasibility Studies: Nepal Priority Transmission Projects

Volume 7 (Report) Task 7: Implementation Planning

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Acronyms

ADB	Asian Development Bank
CIF	Compact Implementation Funding
EIA	Environmental Impact Assessment
EIF	Entry in force
EPC	Engineering, procurement and construction
ESIA	Environmental and Social Impact Assessment
FCAN	Federation of Contractors' Associations of Nepal
FECOFUN	Federation of Community Forestry Users Nepal
GIS	Gas-insulated switchgear
GoN	Government of Nepal
IEE	Initial Environmental Examination
KfW	The German Development Bank
MCC	Millennium Challenge Corporation
M&E	Monitoring and evaluation
MCA	Millennium Challenge Account
MIS	Management information system
NEA	Nepal Electricity Authority
NTGC	Rastriya Prasaran Grid Company Ltd (RPGC)
OHS	Occupational Health and Safety
OMCN	Office of Millennium Challenge/Nepal
PIU	Project Implementing Unit
PMU	Project Management Unit
ROW	Right of way
TOR	Terms of reference
WB	World Bank

1. Executive Summary

Implementation planning is a management approach that is used to define an overall strategy for project execution and management. As per the terms of reference for this project, implementation planning involves three main activities:

- Review of the existing implementation mechanisms prevalent in Nepal
- Recommendations on an Implementation Plan for MCC's compact
- A market assessment of the capabilities of local and international vendors to undertake implementation planning.

Most transmission projects in Nepal are implemented by the Nepal Electricity Authority (NEA), Asian Development Bank (ADB), and World Bank (WB). A small transmission project has also been implemented by the German development bank KfW. After examining the implementation mechanisms of these four of these actors, we determined that all of them have more or less similar implementation mechanisms. Their central feature is that the implementation entity is NEA. The project sponsoring/donor agency enters into an agreement with the Government of Nepal (GoN). This agreement guides the flow of funds, implementation mechanism and other support the GoN is bound to extend. The role of the project sponsoring/donor agency is limited to ensuring adherence to agreement conditions and high-level supervision of the project.

In addition, MCC guidelines for procurement and compact implementation were studied. In particular, we analyzed the challenges (such as the fixed five-year compact period, rugged terrain, and difficulties in transporting heavy material to sites) in the implementation of transmission projects in Nepal.

Based on these reviews, we recommend an implementation plan for this compact covering project management, project execution, Project Advisory Board, Stakeholder Committee, and positively impacted stakeholders. The success of this plan will depend upon the effective utilization of the 27-month period between the compact's approval by MCC's Board and the compact coming into force, incentivized by the implementation of a success fee model and involvement of positively impacted stakeholders from the beginning. A number of activities that can be performed during this 27-month period are suggested. We have recommended creation of a Project Implementation unit (PIU) in NEA specific for MCC project as one of the conditions for compact agreement. The role of PIU will be to facilitate in design and specification uniformity with NEA, provide ground support, participate in procurement process, review progress, quality check, witness tests, facilitate integration of MCC project with Nepal transmission system and finally smooth handover of project to NEA/new entity.

A market assessment was conducted using MCC's tool kit. Eighty-nine firms that have worked on transmission projects in Nepal sponsored by the WB, ADB, and NEA, as well as Tetra Tech data sources, were identified for the market assessment. The firms were first given a structured questionnaire which was followed by telephone calls, face-to-face interactions and email exchanges.

Data on many firms were collected through by desktop studies. As a result, 49 responses were obtained from four categories of firms:

- Engineering, procurement and construction (EPC) contractors
- Civil contractors
- Materials suppliers
- Local consultants.

Our overall assessment of the market is that Nepal has the indigenous capability to take up civil works and supply some of the minor accessories. There are few good local consulting firms that can extend support to international firms. Thus, it is recommended that materials, EPC contractors and engineers be procured from outside Nepal (in particular, India and China). The international firms can be encouraged to have local partners. Since, terrain (and therefore logistics) is a major difficulty for infrastructure projects in Nepal, we recommend that the MCA employs a professional logistics and material supplier who can also prepare a logistics roadmap. Such firms are also recommended as part of the Market Assessment. A skilled workforce will also be required from outside Nepal as 220 kV and 400 kV transmission lines and gas-insulated switchgear (GIS) substations will be installed in Nepal for the first time.

2. Background and Introduction

The objective of implementation planning is to make compact implementation staff proactive rather than reactive, ensure that best practices are used from the start, and that the compact is implemented within MCC's five-year timeframe. The terms of reference (TOR) for the implementation task (Task 7) list three major sub-tasks:

- Review of implementation mechanisms used in the implementation of power infrastructure projects in Nepal.
- Meeting the guidelines and procedures of MCC and the implementation challenges specific to Nepal.
- Market Assessment: Assessing the availability of resources inside and outside Nepal that are required to implement the compact.

To develop the implementation plan, we reviewed the experience of various entities active in Nepal's transmission sector, including the Nepal Electricity Authority (NEA), Asian Development Bank (ADB), World Bank (WB) and KfW, which have implemented or are implementing similar projects in Nepal. We also examined the implementation mechanisms they have adopted. In addition, we studied MCC's objectives for this compact, as well as its *Compact Implementation Guidelines* and *Procurement Guidelines*, which have set the parameters for the development of the project's implementation plan. Last, the Tetra Tech team conducted its own assessment of the challenges that will likely be encountered based on several site visits and discussions with stakeholders. We also studied best practices in general for the implementation of infrastructure projects in South East Asia (Section 2). Another key inputs for the preparation of this report came from the comments received on the Conceptual Assessment Report and the subsequent discussions we had with the MCC. Section 3 provides a review of prevalent implementation mechanisms in Nepal and our analysis, while Section 4 provides implementation plan for this compact.

The market assessment was conducted using the *MCC Market Exploration Toolkit for Focusing and Shaping Procurement Strategies in MCC Operations* (referred to as the Market Analysis toolkit). The tools used for this assessment were a questionnaire, telephone and face-to-face to interviews, Tetra Tech's own experience in this sector and South East Asia, and desktop research. The desktop research was used largely for to assess the China and US markets as we were unable to obtain responses from these regions using other methods, probably due to a paucity of time. The assessment of the Nepal and South Asia markets employed these tools, supplemented by desktop research. Our assessment of market for this compact is described in Section 5.

3. Review of Implementation Mechanisms in Nepal

The generic implementation mechanism used in Nepal for transmission projects is presented in Figure 1. Most of the donor agencies active in Nepal have adopted a more or less similar mechanism. The central feature of this mechanism is the implementation entity, NEA. The project sponsoring/donor agency enters into an agreement with Government of Nepal (GoN). This agreement guides the flow of funds, implementation mechanism and other support GoN must extend. As far as implementation mechanism is concerned, the role of the project sponsoring/donor agency is limited to ensuring adherence to the agreement conditions and high-level supervision of the project.

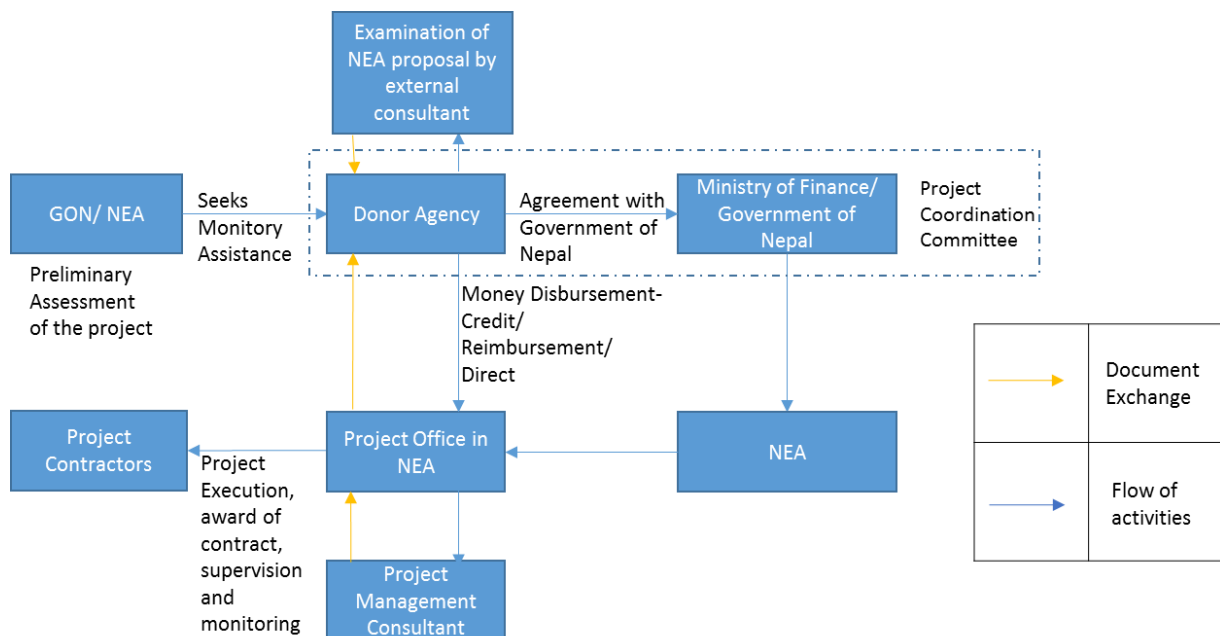


Figure 1. Generic Implementation Mechanism for Donor-Funded Transmission Projects in Nepal

Our research and interactions with various agencies implementing transmission projects centered on the following key points:

- What implementation mechanism has been adopted, what are the challenges faced, and how have these challenges been resolved?
- What are the local implementation constraints?
- What is the overall performance of the implementing agency? How can it be improved?
- What are the suggestions for improving the implementation mechanism?
- What are key challenges and what activities are critical?

The objective here was to first understand what has worked in Nepal and what has not for these projects. This information was modelled to develop an implementation mechanism for this MCC compact. This section describes the implementation mechanisms for the transmission projects adopted by the ADB, World Bank (WB), KfW, and Nepal Electricity Authority. It also analyzes the guidelines provided by MCC for implementing the compact and procuring materials and services for

its implementation. Last, it presents an analysis of the challenges in implementing transmission projects in Nepal.

3.1 Asian Development Bank

ADB has long standing (dating from 1970, with a gap from 2000 to 2009 due to Maoist activities) experience working in Nepal's transmission sector through such projects as:

1. Khimti to Kathmandu transmission line: 400 kV, charged at 200 kV
2. Marsyangdi to Kathmandu (Marki to Chowk Matatirtha): 220 kV transmission line
3. Marsyangdi Corridor (Manang to Bharatpur): 220 kV transmission line
4. Kali Gandaki basin to the India border (Dana to Kusma): 220 kV transmission line, Kusma to New Butwal 220 kV transmission line, New Butwal to Bardaghat 400 kV transmission line
5. Kohalpur Mahendranagar 132 kV second circuit stringing project transmission line
6. Butwal to Kohalpur – 132 kV double circuit transmission line
7. Tamakoshi (New Khimti) to Kathmandu 220/400 kV transmission line
8. 220 kV substation at Kusma.

Our team took the approach outlined in Table 1 to analyze ADB's implementation mechanism.

Table 1. Approach for Analyzing ADB's Implementation Mechanism	
Stakeholder Engagement	
Meetings with ADB Nepal Mission	Mr. Pushkar Manandhar (Project Officer) and Mr. Rabindra Shah Nepal Resident Mission
Meetings with Project Managers (NEA Project Management Directorate)	Mr. Roshan Agrawal, Mr. Chiran Raua, Mr. Tara P Pradhan and Mr. Chandan Ghosh, Project Management Directorate
Telephone Conference	Mr. Rabindra Shah
Desktop Research and Document Review	
Document Review	▪ ADB Procurement Guidelines 2015 ▪ Project Concept Papers for Power Transmission and Distribution Efficiency Enhancement Project, 2016
Project Documents	▪ Project Administrative Manual for Nepal Electricity Transmission Expansion and Supply Improvement Project, 2011 ▪ Project Procurement Plans for Electricity Transmission Expansion and Supply Improvement Project, July 2016 ▪ Project Data Sheet for Power Transmission and Distribution Efficiency Enhancement Project, 2016 ▪ Monitoring reports submitted by the Project Management Directorate to ADB for Electricity Transmission Expansion and Supply Improvement Project, September 2014
Desktop Research	
Tender Documents	Expressions of interest floated by ADB to procure various services such as Consulting Services for a Feasibility Study of the

Table 1. Approach for Analyzing ADB's Implementation Mechanism

	Nepal-India Second Cross-border Transmission Line (Bardaghat-Gorakhpur Transmission Line), February 2015
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To administer its projects, ADB prepares a Project Administrative Manual that describes the essential administrative and management requirements for project implementation. This document is signed by ADB and the Government of Nepal (GoN). An important aspect of the Manual is how the funds will flow from ADB. Figure 2 shows the funds flow for a particular project: the Electricity Transmission Expansion and Supply Improvement Project, which began in October 2011.¹

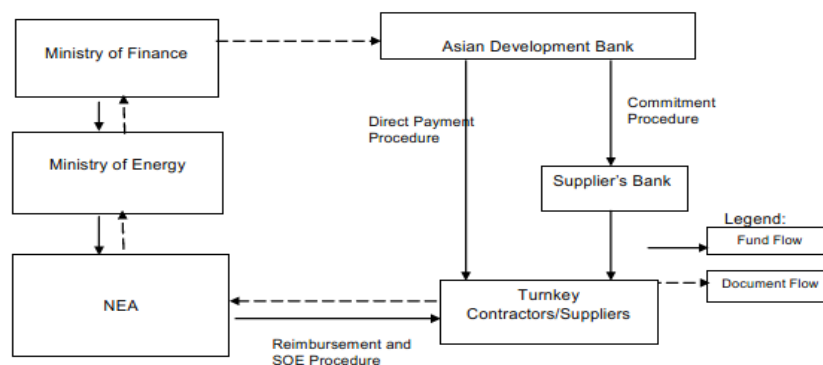


Figure 2. Fund Flow Diagram for the ADB-funded Electricity Transmission Expansion and Supply Improvement Project

Similarly, a special document for procurement referred to as the "Procurement Plan," is prepared for each project. Figure 3 shows a screenshot from the Procurement Plan of the ADB-funded Electricity Transmission Expansion and Supply Improvement Project.

Procurement of Goods and Works		
Method	Threshold	Comments
International Competitive Bidding for Goods	US\$ 500,000 and Above	
National Competitive Bidding for Goods	Between US\$ 100,000 and US\$ 499,999	
Shopping for Goods	Up to US\$ 99,999	
International Competitive Bidding for Works	US\$ 1,000,000 and Above	
National Competitive Bidding for Works	Between US\$ 100,000 and US\$ 999,999	
Shopping for Works	Up to US\$ 99,999	

Consulting Services	
Method	Comments
Quality- and Cost-Based Selection for Consulting Firm	
Individual Consultants Selection for Individual Consultant	

Figure 3: Procurement Plan of the ADB-funded Electricity Transmission Expansion and Supply Improvement Project

The implementation mechanism adopted by the ADB is illustrated in Figure 4.

¹ Figures 2 and 3 were taken from "Project Administration Manual – Nepal Electricity Transmission Expansion and Supply Improvement Project, October 2011."

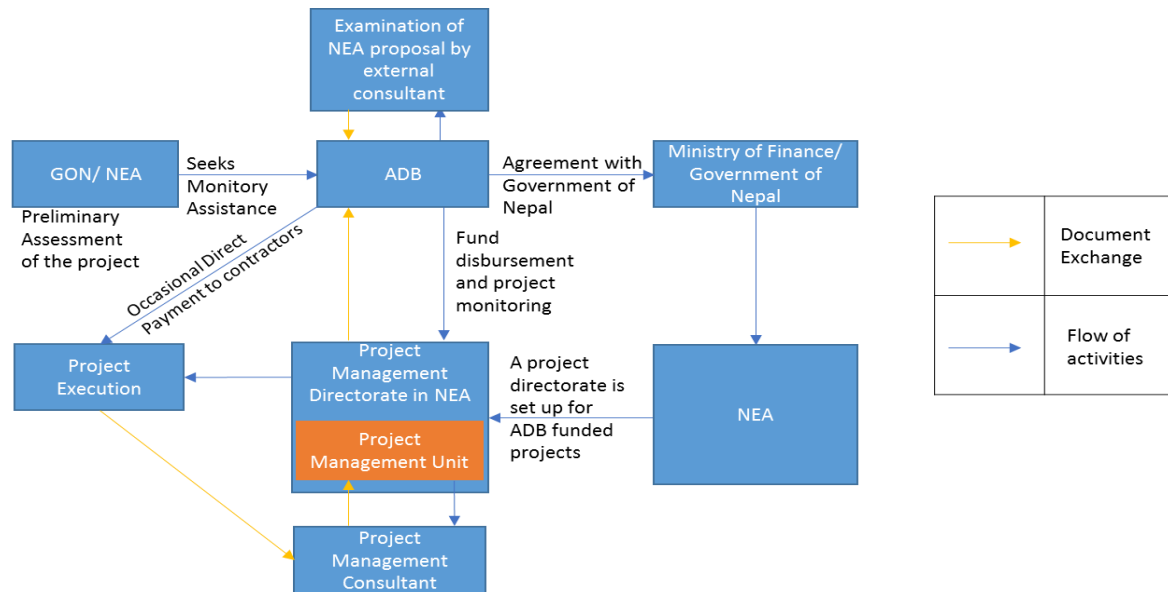


Figure 4. Implementation Mechanism adopted by the ADB for Transmission Projects in Nepal

Under the ADB implementation mechanism, NEA serves as the executing agency and implements all activities for a specific project. For the implementation of ADB-funded projects, NEA has created a Project Directorate headed by the Deputy Managing Director of NEA, who is assigned exclusively to this task. Generally, each project has a project management unit headed by a Project Manager. For example, Mr. Tara Paradha holds this position for the 220 kV substations and transmission line from Marsyangdi to Kathmandu, while Mr. Rana is project manager for the 220 kV substations and transmission line from Manang to Bharatpur. A Project Management Consultant is hired to support NEA in implementing the project. All consultants are engaged in accordance with the ADB's Guidelines on the Use of Consultants (2013, as amended). If requested by NEA, advance contracting and retroactive financing are considered, subject to a certain ceiling (e.g., 20%) and a specific time limit (e.g., not more than 12 months prior to the date of the loan agreement). ADB's Procurement Guidelines (2015, as amended) are followed for the procurement of all goods and services.

Resource Deployment

ADB has a multi-sectoral presence in Nepal. Apart from the transmission sector, it is active in a wide range of socio-economic sectors such as institutional reforms, earthquake relief, and distribution reforms, among other areas. Its portfolio for the power sector is large and includes power distribution and power sector institutional reforms. ADB and World Bank together are putting \$1 billion toward power sector institutional reforms. The staff deployment in ADB is on sector basis and there are a few common staff for environment, social, resettlement, finance and administrative purposes. As such, it is difficult to identify the precise resource loading for the transmission sector. The staff for power sector take cares of transmission project also. The personnel in the ADB mission who support energy sector projects are shown in Table 2. The Project Officer (Energy) and Project Analyst (Energy) are fully deployed for power sector projects; the others support projects in other sectors as well. We could not find any staff exclusively deployed for transmission projects.

Table 2: Resource Deployment in the Asian Development Bank for Transmission Projects

Position	Roles and Responsibilities
Country Director	Leading and overall management of the Nepal Resident Mission
Sr. Project Officer (Energy)	Project management of all the energy sector projects
Project Officer (Energy)	Project management of all the power sector projects
Project Analyst (Energy)	Analysis of all the power sector projects
Senior Financial Management	Heading the financial disbursements, project finance and administration of project portfolio under the Nepal Resident Mission
Procurement Officer	Project procurement oversight for all project portfolio of ADB Nepal Resident Mission
Senior Project Officer (Infrastructure)	Project management of all the infrastructure projects
Social Safeguards Specialist	Oversight of preparation of resettlement plan and indigenous peoples plan (IPP), resettlement implementation, etc.
Gender and Social Development Consultant	Ensuring gender, voice and accountability, social inclusion, participation and empowerment, and vulnerability and poverty related issue are addressed in ADB projects
Environmental Safeguards Specialist	Management of environmental impact analysis (EIA), initial environmental examination (IEE), Environmental Clearances
Project Analyst	An analyst is responsible for the following activities: - Contract Management - Financial Disbursement - Project status update and reporting
Senior Programs Officer	Development and management of new and existing programs
Senior Public Management Officer	Overall planning and management of ADB programs in Nepal

3.2 World Bank

Similar to the ADB, the World Bank has been active in Nepal's transmission sector for many years. It is now supporting about 620 km of transmission line projects at the 132 kV, 220 kV and 400 kV levels, and a few substations. Some of its key projects are the Khimti to Dhalkebar 220 kV transmission line, the Dhalkebar to Innaura 220 kV lines, and Hetauda substation. In reviewing the implementation mechanism of World Bank-funded projects in Nepal, an approach similar to that for the ADB analysis was employed (Table 3):

Table 3. Approach for Analyzing the World Bank's Implementation Mechanism

Stakeholder Engagement	
Meetings with World Bank Nepal	Mr. Rabin Shrestha, Senior Energy Specialist Ms. Barsha Pandey, Operations Analyst Mr. Subodh Adhikari, Energy Specialist
Desktop Research and Document Review	
Document Review	World Bank Procurement Guidelines
Project Documents	Project Appraisal Document for Nepal-India Electricity Transmission Trade Project. This exercise was completed for

Table 3. Approach for Analyzing the World Bank’s Implementation Mechanism

	a specific project therein (the Khimti- Dhalkebar 220 kV transmission line project) Project progress reports, such as the Hetauda to Dhalkebar-Duhabi 400 kV transmission line, 20164
Desktop Research	
Tender Documents	Tender documents posted for the Khimti to Dhalkebar 220 kV transmission line project

The implementation framework under which a project will be executed is framed under the Project Appraisal Document signed by the GoN and WB. The WB contract requires that for every large project, there will be a Project Coordination Committee formed at the NEA. This committee is required to keep tabs on the project’s execution and reporting to the WB. The WB mandates that an exclusive Project Management Unit (PMU) be formed in NEA for the project’ implementation. The size of the project determines the number of staff and the seniority of the staff heading the PMU. For multiple projects, multiple PMUs are created. All PMU staff generally come from NEA. The typical implementation mechanism adopted by the World Bank for transmission projects in Nepal is presented in Figure 5.

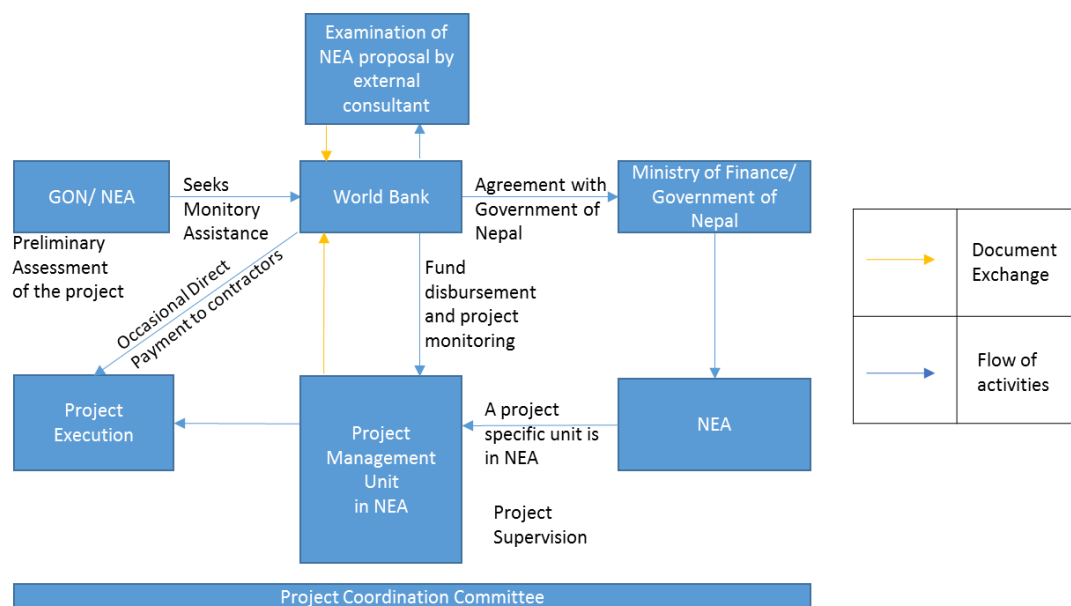


Figure 5. Implementation Mechanism Adopted by the World Bank for Transmission Projects in Nepal

The main responsibility for project implementation lies with the NEA, including the preparation of bid documents, hiring of contractors, and overall project execution. However, the WB keeps close tabs on the project, either through informal interactions with NEA, site visits, quarterly monitoring reports submitted by NEA, and/or a comprehensive evaluation every six months. Moreover, for the key decisions, such as on bid documents for a large bid or the final selection of contractors, are taken with the approval of the World Bank. A distinctive feature of the WB implementation mechanism is that it does not hire a “Lenders Engineer” (due to the sovereign guarantee). Payments

to the contractors are made by the PMUs; however, in some cases the WB also clears contractors' bills directly on the recommendation of the PMU.

Resource Deployment

Like the ADB, the World Bank has a large presence in Nepal. The power sector is one of the many sectors in which the WB operates in Nepal and transmission sector is part of its power sector portfolio. In Nepal, activities common to all projects (e.g., finance, administration, human resources, resettlement, environmental clearances, monitoring) are carried out by staff common to all World Bank projects. The Bank has designated three staff in Nepal for power sector projects, including transmission projects (Table 4).

Table 4. Resource Deployment in the World Bank for Transmission Projects	
Position	Roles and Responsibilities
Senior Energy Specialist	Overall project management of all the transmission projects
Associate Officer	Supporting the Senior Energy Specialist in project management of the transmission project
Operations Analyst	An analyst is responsible for the following activities: 1. Contract Management 2. Financial Disbursement 3. Project status update and reporting

3.3 KfW Development Bank (KfW)

KfW is not as active in the transmission sphere as the ADB and World Bank; however, it is currently executing two projects: the 27 km Chilime to Trishuli transmission line and the upgrading of the load dispatch center at Siuchatar substation. The total cost of the projects is €65 million, of which €16.5 million is being contributed by KfW and the remainder by the European Investment Bank and GoN. The project is under construction and procurement notices have been floated. Table 5 shows the approach we adopted to understand KfW's implementation mechanism.

Table 5. Approach for Analyzing KfW's Implementation Mechanism	
Stakeholder Engagement	
Meetings with the KfW development team in Nepal	Mr. Niraj Subedi, Energy Sector Specialist, Sanepa, Lalitpur
Desktop Research and Document Review	
Document Review	World Bank Procurement Guidelines
Project Documents	- Ex- Post-Evaluation Brief Nepal: Load Dispatch Centre and Extension of the Balaju Substation, 2011 - KfW Guidelines for the Procurement of Goods, Works and Associated Services in Financial Cooperation with Partner Countries, 2016
Desktop Research	
Tender Documents	Prequalification notice prepared for consulting services for construction of 220 kV Chilime to Trishuli transmission system

Table 5. Approach for Analyzing KfW's Implementation Mechanism

	and upgrading of the Load Dispatch Centre, posted on the NEA website in April 2015
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The implementation mechanism adopted by KfW follows a typical arrangement followed by a lending agency, in which implementation is undertaken by the NEA and the lending agency takes the role of facilitator and project supervisor. However, there are certain distinctive points under the KfW models:

- KfW mandates that Project Management Consultant report to both NEA and KfW. The terms of reference for these services are prepared by KfW.
- Unlike the WB and ADB, KfW does not provide additional funding in the case of cost overruns. If there are any additional requirements for funds, they must be provided by NEA and are considered as the GoN's contribution.

The implementation mechanism adopted by KfW in Nepal is illustrated in Figure 6.

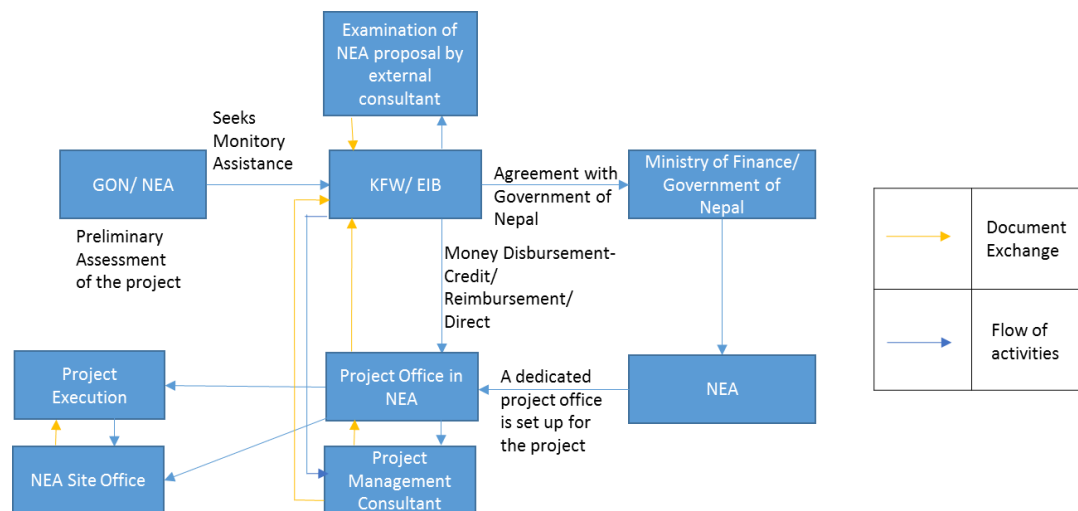


Figure 6. KfW Project Implementation Mechanism

Although KfW has its own procurement guidelines, in Nepal it follows the ADB procurement guidelines. The contracts KfW signs with GoN are master binding documents that stipulate the project timelines, fund disbursement, and project targets. KfW also requires that NEA establish a site office.

Resource Deployment

Compared to the ADB and WB, KfW has a small portfolio of power sector projects in Nepal (described above). As such, there are only two full-time staff deployed by the KfW in Nepal (Head of Office & Local Representative, and Energy Specialist), as described in Table 6.

Table 6. Resource Deployment in the KfW Development Bank for Transmission Projects- Nepal Resources

Position	Roles and Responsibilities
Head of Office and Local Representative	Overall project management of all the KfW projects in Nepal
Energy Specialist	Dedicated staff for overall project management of transmission project in Nepal.

However, KfW garners a good deal of support from their headquarters in Frankfurt for various activities, described in the Table 7.

Table 7. Resource Deployment in the KfW Development Bank for Transmission Projects- International Resources

Office/Department/Unit	Support Extended
Project Management Unit under the Energy Division	A dedicated team for project management of transmission projects all across the globe
Technical Division	Support for design and technical aspects of the project
Contract Management Division	Contract mManagement
Legal Division	Building contracts and resolving any legal issues
Disbursement Division	Funds disbursement
Finance and Administration	Finance and Administration

3.4 National Electricity Authority (NEA)

To provide a holistic picture of the various implementation mechanisms in place in Nepal, it is important to understand the implementation mechanism of the NEA. This is especially important because for donor-funded projects because ultimately, the executing agency is NEA. To understand the implementation frameworks of the NEA, Tetra Tech interviewed more than 10 NEA staff at various levels and visited a few substations. We also reviewed the Authority's annual reports.

NEA has eight directorates headed by the Managing Director of NEA. One of the directorates is the Transmission Directorate, which has eight units. Four of these are directly responsible for building new transmission lines and substations. The implementation mechanism adopted by the NEA is shown in Figure 7.

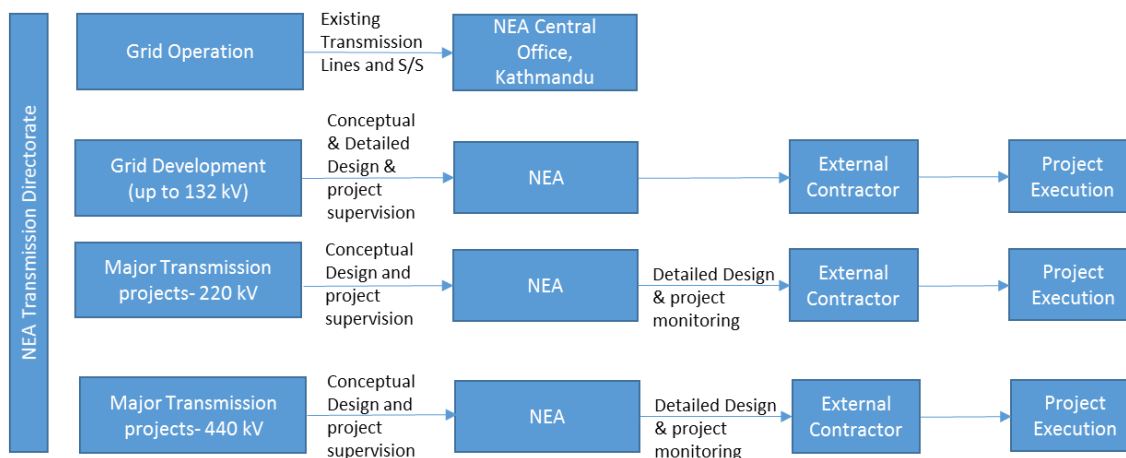


Figure 7. NEA's Implementation Mechanism for NEA/GoN-Funded projects

The specific responsibilities of these four divisions are:

1. *Grid Operations*: Responsible for the operation and maintenance of the transmission network.
2. *Grid Development*: Executing projects up to 132 kV. All activities, including detailed design, procurement and supervision, are implemented by NEA. Contractors are used for field activities.
3. *Major Transmission Projects (220 kV)*: NEA currently has limited capabilities to design 220 kV systems. Hence, an external consultant is hired to work in collaboration with NEA. NEA's role is limited to that of a conceptual designer and providing supervision and facilitation for the project.
4. *Major Transmission Projects (400 kV)*: NEA currently has limited capabilities to design 400 kV systems. Hence, an external consultant is hired to work in collaboration with NEA. NEA's role is limited to that of a conceptual designer and providing supervision and facilitation for the project.

A separate project management office is set up for all the projects to be executed by NEA. The internal staff of the Transmission Directorate are assigned to the projects under implementation. A project office is established at the project site and dismantled after the project is completed.

Resource Loading

Depending upon the size of the project, resource deployment changes. Based on our discussions with the NEA, generally the following staff are deployed for a project depending upon the size of the project.

For Small Projects (< 50 km)

Table 8. Resource Deployment in the NEA for Transmission Projects < 50 km length	
Position	Number of Staff
Project Manager	1
Technical Experts	
Electrical Engineer	1
Civil Engineer	1
Technical Assistants	4
Finance	
Senior Accountant	1
Junior Accountant	1
Administration	
Senior office Assistant	1
Junior office Assistant	1
Office Helper	1
Environmental Expert	1
Social Expert	1
Miscellaneous Staff/ Assistants	
Drivers/Assistants	3
Total	17

For Larger Projects (>50 km)

Table 9. Resource Deployment in the NEA for Transmission Projects > 50km length	
Position	Number of Staff
Project Manager	1
Technical Experts	
Electrical Engineer	2
Civil Engineer	2
Technical Assistants	8
Finance	
Senior Accountant	1
Junior Accountant	1
Administration	
Senior Office Assistant	1
Junior Office assistant	1
Office Helper	1
Environmental Expert	2
Social Expert	2
Miscellaneous Staff/ Assistants	
Drivers/Assistants	3
Total	25

3.5 Review of MCC Compact Guidelines

MCC has a unique way of implementing projects in countries with which it signs compacts. Per the review of MCC procurement policies, implementation guideline documents (especially the Guidelines for Accountable Entities and Implementation Structures) and discussions with the OMCN and MCC, a high-level understanding of MCC compact implementation was established.

MCC sets up its own local MCA (Accountable Entity) to manage and oversee all aspects of implementation. A project is to be completed within five years after the compact enters into force. Hence, the implementation structure to be formulated in this project should work within these boundaries.

MCC's requirement for executing a project through MCA – which acts as an “implementing agency” – is untested in Nepal. As such, an understanding of how MCC implements its compacts will help set the boundaries under which an implementation framework will be designed. Table 10 shows the approach taken to understand and frame the MCC's implementation mechanism.

Table 10. Approach for Analyzing MCC's Implementation Mechanism Prevalent in Other Countries	
Stakeholder Engagement	
Stakeholder Consultations with Office of Millennium Challenge Corporation Nepal (OMCN) and MCC	Dr. Himesh Dhungel, Country Director (Nepal) Mr. Tulasi Prasad Sitaula, National Co-coordinator OMCN Mr. Hitendra Dev Shakya, Deputy MD, Planning NEA ² Mr. Michael Hamilton, Energy Team, MCC (Washington)
Document Review	
Document Review	▪ MCC Program Procurement Guidelines, 2016 ▪ MCC Compact Implementation Guidelines (inclusive of all documents on specific topics) ▪ FIDIC Guidelines (Red Book and Yellow Book) ▪ Conceptual Report and discussions on it with MCC
Desktop Research	
MCC Projects being Executed in Various Countries	▪ Desktop research on various Compacts being executed by MCC in countries such as Indonesia, Philippines and Indonesia ▪ MCC Implementation Guidelines ▪ MCC Issue Brief: Principles into Practice: Country Ownership, 2011 ▪ Working Paper: MCC's Approach to Country Ownership, 2009
Consultants Experience	
Consultant's Firsthand Experience in Working with MCA in Other Countries	▪ The Tetra Tech team has worked with MCC on compacts in the Philippines, Indonesia, Benin, Ghana and Tanzania.

² At the time of this discussion, Mr. Shakya held the position of Transmission Sector Specialist at OMCN

Once a Compact is signed with the country government, MCC establishes a separate entity called the Millennium Challenge Account (MCA) which is responsible for Compact execution. This entity works on the principles of accountability, independence and transparency. The structure of a MCA can vary from country to country and is decided based on local conditions. MCC Guidelines for Accountable Entities and Implementation Structures are relevant to the development of an implementation structure for this compact. The guidelines states that the MCA should ideally have the following components:

- A decision-making body, person, or advisory council that will be accountable for the Compact's implementation
- A Stakeholders Committee representing beneficiaries and local constituencies
- A Management Unit that will be responsible for implementing the decisions of the Board or designated decision-maker, and overseeing the day-to-day management of the program.

There is a provision in Section P1.A.1.10 of MCC Program Procurement Guideline for Advance Contracting and Retroactive Financing. It can be used for to accelerate project implementation. The Clause, as stipulated the MCC Program Procurement Guidelines is:

"P1.A.1.10 In certain circumstances, such as to accelerate Project implementation, the MCA Entity may, with the approval of MCC, wish to proceed with the procurement of goods, works, or non-consultant services before the obligation of Compact funds that will finance such procurement. This process is referred to as advance contracting. In such cases, the procurement procedures, including advertisement, shall be in accordance with these Guidelines, and MCC shall review the process used by the MCA Entity. The MCA Entity undertakes such advance contracting at its own risk, and any concurrence by MCC with the procedures, documentation, or proposal for award does not commit MCC to fund the contract in question. If the contract is signed, reimbursement by MCC of any payments made by the MCA Entity under the contract prior to obligation of the related Compact funds is referred to as retroactive financing. Under no circumstances will MCC reimburse the MCA Entity for any contract costs if the contract is signed prior to obligation of funds by MCC and any required MCC approval."

3.6 Implementation Challenges in Nepal

Before making recommendations on an implementation mechanism, it is prudent to understand the real world challenges faced by various agencies while executing transmission projects in Nepal. To do so, Tetra Tech interviewed the agencies shown in Table 11.

Table 11. Other Stakeholders Consulted	
Domain	Stakeholder Consultation/ Field Visits
Project Management Contractors	▪ Jade Consulting, Nepal ▪ Total Management Solutions, Nepal

Table 11. Other Stakeholders Consulted

Domain	Stakeholder Consultation/ Field Visits
Private- Project Implementation Contractors	▪ Mudbhary and Joshi Construction Pvt. Ltd., Nepal ▪ Feedback Infrastructure Limited, India ▪ Sigma Con. (P) Ltd. ▪ Waiba Infratech Pvt. Ltd. ▪ KEC International Limited ▪ Mohan Energy Corporation Pvt. Ltd. ▪ Urja International (P) Ltd. ▪ Tata Projects Limited ▪ GE Electric
Site Staff	Tetra Tech team visited numerous project sites and spoke with such stakeholders as: ▪ Contract Manager of the NR4 Line ▪ Site Manager, Syule ▪ NEA Manager, Mata Tirtha Substation ▪ Chief District Officers, Dadeldhura ▪ Engineer, Load Dispatch Center, Suchatar

Based on our interactions with the stakeholders listed in Table 11 and our own assessment, we identified the following key challenges that this Compact is likely to face:

- **Rights of Way:** Some of the project lands are owned by private parties, raising the possibility that some of them may resist selling their land. In transmission line projects, the failure to secure even a small piece of land for one tower will delay the commissioning of the entire transmission line.
- **Resettlement Timelines:** In several previous projects in Nepal, land acquisition has been slow. In the period between initial discussions and final acquisition, land prices generally skyrocket.
- **Resettlement Cost:** NEA has fixed guidelines on the amount that can be reimbursed for resettlement land. However, most local landowners ask quite high prices. Negotiating the price can result in major project delays.
- **Statutory Approvals:** There is need for clearances from various government departments, such as the Ministry of Environment, village development committees, and forest, highway, railway, and aviation departments, which can take as long as two or three years.
- **Difficult Terrain:** Nepal has tremendous geographic diversity. Its elevations range from 59 meters (194 ft.) to over 7,000 meters (22,966 ft.), and include the earth's highest elevation (8,848 meters or 29,029 ft.) at Mount Everest. For the MCC project, elevations will vary from 103 meters (338 ft.) to around 2000 meters (6563 ft.). The NR1 transmission line, for example, needs to pass several times from mountain to valley and vice versa, but some of its locations, such as Likhu substation, lack roads. Thus, it will be very difficult to transport materials, particularly high-capacity transformers, to the project site. Adverse weather

conditions such as heavy rain and low temperature are also challenges.

- **Contractors' Performance:** Lack of design/supervision engineers, procurement specialists, safeguard specialists, etc. causes unnecessary delay to the project.
- **Technical Capabilities:** Most of the transmission line and substations in the project are 400 kV. MCC will be building the first 400 kV transmission line and substation in Nepal. Therefore, a skilled work force must be imported, adding to project costs.
- **Poor Monitoring and Evaluation:** Most of the donor-funded projects have well-defined M&E procedures. However, the M&E activities undertaken by NEA are inadequate. This is especially crucial in terms of the restricted timelines of the MCC compacts.
- **Project Timeline:** As per the MCC guidelines for compact implementation, projects must be completed within five years from the compact's entry into force. This may be a very aggressive benchmark for the transmission projects. In addition, due to climate, holidays and political situations in the country, in a year, only 9 months are effectively available for work.
- **Public Interference:** This project will covers a large geographic area, which will compound the environment, resettlement, compensation and land acquisition issues that precipitate public disagreements/interference.
- **Consultation and Communications:** An ill-defined communication protocol, lack of coordination, and improper monitoring and evaluation are reasons for project delays in Nepal. A proper communication and M&E protocol needs to be established for timely execution of the projects.
- **Corruption and Fraud:** Corruption is a reality in Nepal. Therefore, it is important that particularly for the procurement process, various approvals (Forest, Environment, and Village Development Committee, etc.) and payment process should be sufficiently safeguarded with proper checks and balances to avoid any chance of corruption and fraud during implementation of the Compact.

4. Recommendations on Implementation Planning

Our recommendation on the implementation plan for this compact rests on three pillars: 1) Time utilization, 2) Incentivizing and 3) Engagement. This is presented graphically in Figure 8.

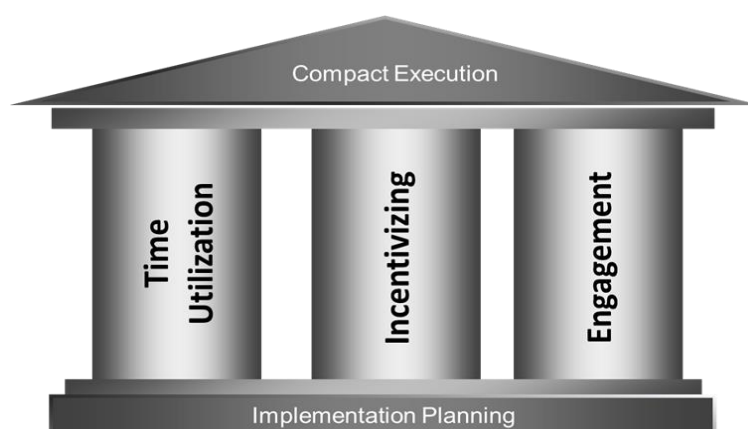


Figure 8: Pillars for Recommendations on MCC Implementation Mechanism

4.1 Time Utilization

How effectively the time period between MCC Board approval and the compact start date is used to determine the timely completion of this compact in Nepal. Based on this Detailed Feasibility Study, a proposal will be placed for approval before the MCC Board in March 2017. It is expected that the Board will take a decision on this proposal in its June 2017 meeting. Once it is approved, in all probability the compact will be signed by the GoN, in view of the fact that MCC funding is grant funding and the GoN needs investment to improve the country's economic situation. However, it is expected that the process will take about three months and that the compact will be signed in September 2017. We refer this three-month period (June 2017 to September 2017) as "Pre-CIF."

Then, there is also a 12-24 month window called "Compact Implementation Funding" (CIF) between the compact's signing and its entry into force (EIF). The five-year window starts after the EIF. Thus, in addition to the five-year period, 21 months are available (Pre-CIF plus, assuming a mid-range of 18 months for CIF). We suggest this 21 months be used effectively to reduce the pressure of the 5-year window. If it is not used properly, it will break the continuity and will take some additional time to gear up activities when the compact comes into force. The following activities can be undertaken during these periods.

Proposed Activities during the Pre-CIF Phase

- OMCN prepares the tender document for engaging the Engineer. The terms of reference for engineers are included in the detailed feasibility study.
- Identification of Procurement and Fiscal Agents.
- Identification of land owners for the land needed in the project, and preliminary consultations with them on each parcel of land.
- Identification of positively-impacted stakeholders for each transmission line and substation.

Proposed Activities during the CIF Phase

- Seamless transition from OMCN to MCA.
- Selection of Procurement and Fiscal Agent.
- Selection of Engineer.
- Selection of EPC contractors.
- Development of the Resettlement Action Plan.
- Land acquisition (identification of land owners, settlement of compensation and other preparations. The actual land acquisition can start as soon as the Compact Entry Into Force, EIF)
- Development of Environmental and Social Impact Assessment (ESIA) and its approval
- Detailed design.

These activities are provided in tabular form with a time line in Figure 9. Further details are provided in the implementation schedule in Volume 1 (Annexure 4).

S N.	For	Agencies to be established/ Procurred/ Contracted	Pre- CIF (July- Sep 2017)	Compact Implementation Funding (CIF) (Oct 2017 - September 2019)								Compact Implementation (October 2019 to September 2024)																								
			-									Year 1				Year 2				Year 3				Year 4				Year 5								
			Q1	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4					
			Jul- Sep 17	Oct- Dec 17	Jan - Mar 18	Apr- Jun 18	Jul- Sep 18	Oct- Dec 18	Jan - Mar 19	Apr- Jun 19	Jul- Sep 19	Oct 2019 - Sep 2020	Oct 2020 - Sep 2021	Oct 2021 - Sep 2022	Oct 2022 - Sep 2023	Oct 2023 - Sep 2024																				
1	Compact	Seamless Transition from OMCN to MCA																																		
2	Compact	Identification of PA and FA																																		
3	Package	Identification of positively-impacted stakeholders for each transmission line and substation																																		
4	Compact	Preparation of tender document for Engineer																																		
5	Compact	Identify land owners and the parcel of land to be procured																																		
6	Compact	Selection of PA																																		
7	Compact	Selection of FA																																		
8	Compact	Selection of Engineer																																		
9	Compact	Selection of Site Contractors																																		
10	Package	Development of the RAP																																		
11	Package	Land Acquisition																																		
12	Package	Development of the EIA and Approval																																		
13	Package	Detailed Design																																		

Figure 9. Broad Overview of the Compact Activity Timelines

4.2 Incentivizing

We recommend the adoption of a “success fee” model for activities that have a definite outcome and fixed timeline. In India, for example, several independent power producers use this model for the construction of transmission lines from their power plant to utility substations. The activities for this model adopt include:

1. Approval of EIA
2. Land acquisition
3. Completion of the substations
4. Completion of the transmission lines.

4.3 Engagement

To facilitate the projects’ timely execution, OMCN/MCA should identify stakeholders who will be positively impacted by these projects. These are:

- Power generators, who will be able to evacuate more power and will have to build shorter transmission networks to evacuate power from their generation plants.
- Land owners, who will be able to sell their lands at a cost higher than the market price. The value of land also goes up when such a project is announced.
- Citizens, who will receive employment opportunities due to this project.
- Knowledgeable citizens, who will see the larger picture and understand how this project will help increase the access to and reliability of electricity.

We recommend involving these stakeholders from the very beginning. They will help in developing a positive climate for this project, which will reduce any unnecessary agitation, demonstrations, etc., thus avoiding or reducing any loss of time. They will also be helpful in providing local support for the construction of the project.

4.4 Proposed Implementation Mechanism

Based on the above, Figure 10 provides a representation of our recommendation for the implementation mechanism of this compact:

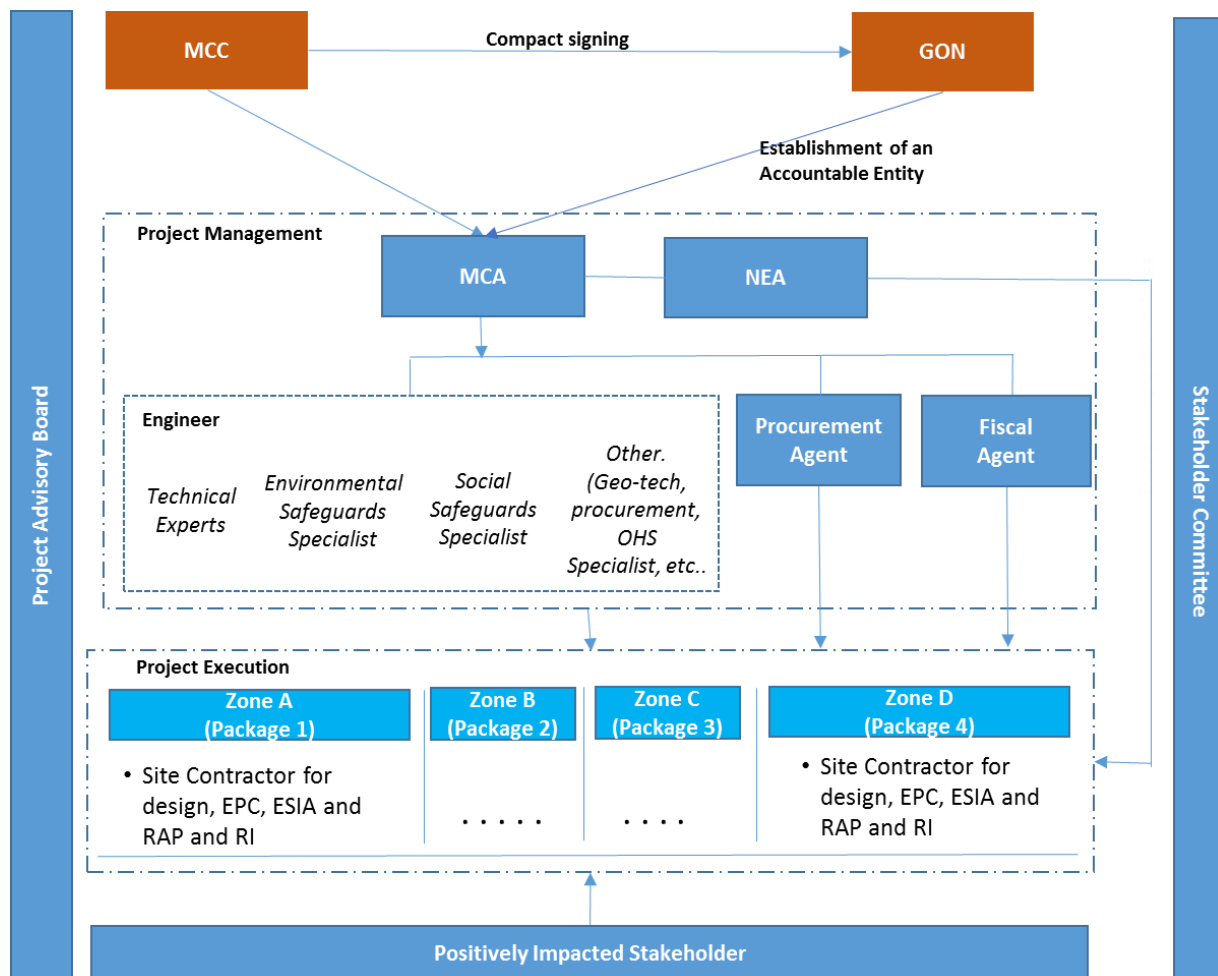


Figure 10. Proposed Implementation Mechanism for Project Execution in Nepal

The implementation mechanism consists of the following activities/entities:

- Project Management
- Project Execution
- Project Advisory Board
- Stakeholder Committee
- Positively Impacted stakeholders.

Below we describe briefly the roles and responsibilities of each of the above activities/entities.

Project Management

Project management involves MCA, the Engineer, Procurement Agent and Fiscal Agent.

- **MCA:** The lead responsibility for the management and smooth execution of the MCC compact will lie with the MCA. MCA will be the decision maker (under the ambit of MCC guidelines) for the four packages envisaged in this compact. MCA staff will also oversee auxiliary activities such as public relations, project tracking, monitoring and evaluation, and financial disbursements.

- **NEA:** It is prudent to involve NEA in any large-scale transmission project in Nepal due to the sheer experience that the organization holds. Furthermore, since NEA (or a designated organization such as NTGC³⁴) will ultimately become the owner of the assets, and will be responsible for their operation and maintenance, it is crucial to have their involvement from the start. NEA is also well-positioned to provide inputs on the technical standards, project specifications, etc. that are to be followed in the project's execution by providing inputs on the preparation of bid documents. Thus NEA can provide valuable insight.

Despite the fact the MCA will be largely created by the GoN, the MCC compact will be perceived as a donor funded project. Hence, the dynamics of project execution – especially in coordination with other agencies (for clearances, collection of data, etc.) as well as interactions with society at large (in land acquisitions, stakeholder consultations, etc.) will be perceived differently. Involving NEA will help make inroads with these agencies and also ease way for stakeholder interactions, as NEA is considered a government entity.

Therefore, it is suggested that an Implementing Entity Agreement (IEA) be formed between MCA-Nepal and NEA (or the transmission company). The IEA should require that a dedicated Project Implementing Unit (PIU) be established under the NEA as part of the terms and conditions of the compact. It will be further useful if PIU sits in the MCA/Engineer office rather than in NEA office, this will keep PIU fully dedicated for MCC work. At the time of handing over of MCC projects to NEA/NTGC/New entity, PIU should be transferred to the receiving entity, it will maintain continuity and simplify operation and maintenance of new MCC system which is otherwise may face problem of capacity constraint.

This entity may consist of at least five senior/mid-level professionals, each with more than 15 years of experience and appropriate academic qualifications. The five staff should be drawn from the fields of substation design/construction; transmission line design/construction; protection and control, communication; environment and resettlement.

This unit will assist the engineer and MCA in project management and execution. The following are the specific activities expected from this unit:

- Review of the design and specifications, and approval thereof
- Review of tender documents
- Participation in the technical evaluation of the bids
- Quality inspection and guidance as needed
- Implementation support and technical advisory (such as support in securing clearances, resolving local issues, etc.)
- Witnessing the testing and commissioning of the completed projects and their performance and guarantee tests, and approval thereof.
- Facilitating the transfer of projects from MCC/MCA to NEA/NTGS/other entity.

³ Also known as Rastriya Prasaran Grid Company Ltd (RPGC)

⁴ At the time of compact handover, NTGC (or any other successor entity of current the Transmission Directorate of NEA) will have the majority of its staff from existing NEA staff.

Engineer

A single Engineer will work across all four packages. This entity will also ensure coordination, quality, adherence to MCC and compact guidelines, and uniformity among package implementation. Thus it is important that a strong Engineer is selected. Detailed terms of reference are provided in the Volume 1 report. Below, we provide a brief description of the roles of the key experts.

- **Technical Experts:** As an implementing agency, it is necessary for MCA to have in-house technical expertise on various aspects of the projects. This will ensure that any possible technical, environmental, social, economic and financial issues are resolved well in advance. This is especially essential because of the restricted timelines. The technical experts will consist of the following positions:
 - International Consultants
 1. One (1) Program Manager / Team Leader / Transmission System Engineer
 2. Two (2) Substation Engineer- Electrical
 3. Two (2) Transmission Engineer –Electrical
 4. One (1) SCADA / P&C / Communications /Automation Engineer
 5. One (1) Transmission Automation Engineer
 - National Consultant
 1. One (1) Deputy Program Manager / Team Leader / Transmission System Engineer
 2. One (1) Transmission Line Engineer - Electrical
 3. One (1) Substation Engineer - Electrical
 4. One (1) Transmission Engineer – Civil / Structural
 5. One (1) SCADA / P&C / Communications /Automation Engineer

These experts will also support the Procurement Agent by developing the technical specifications and technical evaluation of bids for engagement of the site contractors.

- **Environmental Safeguards Specialists:** These individuals will ensure that all activities are in compliance with local and national laws as well as acceptable environmental standards. They will also be responsible for the review of environmental assessment reports prepared by the contractors, development of environmental impact mitigation measures if required, and assist as needed in the preparation of the Environmental and Social Management Plan, etc. One international and one national consultant will be hired for the positions of Environmental Safeguards Specialist.
- **Social / Gender Safeguards Specialist:** will provide necessary inputs and advice to the project team and to MCA on social concerns pertaining to transmission networks and transmission substations, and ensure that all activities are in compliance with local and national laws especially in terms of land acquisition, resettlement and rehabilitation. They will also be responsible for the review of social assessments reports prepared by the contractors, and the development of impact mitigation measures. They will be responsible for overall facilitation of any land acquisition, resettlement and

rehabilitation activities. One international and one national consultant will be hired for the position of Safeguards Specialist.

- Other Experts:
 - International
 - Two (2) Structure Engineer-Transmission: Review structural designs for towers, substation equipment structures and other activities as required.
 - Geotechnical engineer: review and approve geotechnical investigations and assessments.
 - Occupational health and Safety (OHS) Specialist: Review OHS policies and management at all project locations.
 - One (1) Resettlement / RAP / RIC Specialist
 - Sufficient Administrative / Support Staff
 - National:
 - Geotechnical Engineer: review and approve geotechnical investigations and assessments.
 - One (1) Resettlement / RAP / RIC Specialist
 - One (1) Communication and Out Reach Specialist
 - Sufficient Administrative / Support Staff
- **Procurement Agent:** Support the procurement of goods and services, administration of bidding process and development of contracts for vendors. Also be responsible for negotiating vendor terms, prices and delivery schedules using knowledge of budget and schedule requirements. Ensure that any procurement adheres to the MCC Procurement Guidelines. Maintain procurement information, files and records e.g. Requests for Proposals, purchase orders, vendor files. This agent will be selected by the MCC directly.
- **Fiscal Agent:** This individual will have overall responsibility for maintaining accounts, disbursing money, and authorizing all financial matters of the MCA. S/he will be responsible for budget preparation, budget allocation for various goods, services and activities for all the four packages proposed. S/he will also guide MCA in following accounting practices as per MCC guidelines. Other responsibilities will include initiating budget transfers when necessary, monitoring account funds to preclude overspending, and ensuring compliance with MCC expenditure policies. This agent will be selected by the MCC directly.

Project Execution

The project will be executed in four packages as outlined below and fully described in Volume 1 (Task 1 Report). For each package, a separate contractor will be hired following MCC's Procurement Guidelines for design, EPC, ESIA, Resettlement Action Plan and Resettlement Implementation (RI). This contractor will be responsible for the design, supply of plant and equipment, land acquisition, construction, installation, testing and commissioning of transmission lines and associated substations, communications and protection facilities, permitting, environmental clearance, preparation of a resettlement action plan and project resettlement among others. No contractor

should be awarded more than two packages. As mentioned in the Volume 1, the proposed four packages are:

- **Zone A EPC Contractor:**
 - NR1: Transmission line between New Damauli and Naubise
 - NR1: New Damauli substation work
 - NR1: Transmission line between New Damauli and New Butwal
 - NR1: New Butwal 400 kV substation work (400 kV switchyard, transformers and 400 & 220 kV transformer bays) to connect to ADB's 220 kV substation
 - XB1: Transmission line Between New Butwal substation and Nepal/India border
 - T8: New Lamki 400 kV substation
 - T8: 400 kV Transmission line between New Lamki substation and Nepal/India border
- **Zone B EPC Contractor:**
 - T3: 220 kV Transmission line between Tadhekani and Kusma
 - T3: 220 kV Tadhekani substation work
 - T3: 220 kV Kusma substation upgrade work
 - NR4: Adding one circuit to the existing transmission line
 - NR4: Upgrading (adding one line bay) to Balanch substation
 - NR4: Upgrading (adding one line bay) to Attariya substation
- **Zone C EPC Contractor:**
 - NR1: Naubise 400 kV substation work
 - NR1: 400 kV Lapsiphedi substation upgrade (400 kV switchyard, transformers and 400 & 220 kV transformer bays) to connect to ADB's 220 kV substation
 - NR1: 400 kV New Hetauda substation upgrade (400 kV switchyard, transformers and 400 & 220 kV transformer bays) to connect to WB's 220 kV substation
 - NR1: Transmission line between Naubise to Lapsiphedi
 - NR1: Transmission line between Naubise to New Hetauda
- **Zone D EPC Contractor:**
 - T2': 220 kV Likhu Hub substation work
 - T2': 220 kV New Khimti upgrade
 - T2': Likhu Hub to New Khimti 220 kV transmission line
 - NR3: Upgrading (adding two line bays) to Ilam substation
 - NR3: Upgrading (adding two line bays) to Inaruwa substation
 - NR3: Ilam to Inaruwa 220 kV transmission line

These packages are illustrated on physical map of Nepal in Figure 11.

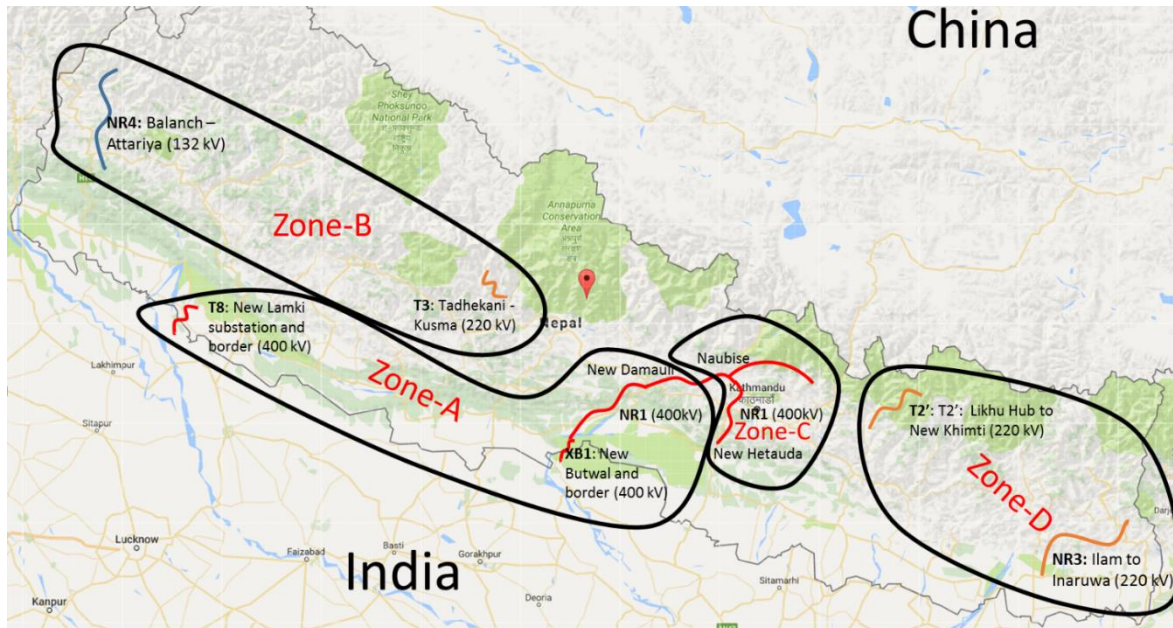


Figure 11: Procurement Packaging for the Proposed Transmission Lines in Nepal

A critical aspect of compact execution is the requirement for close coordination among the RAP team, design engineers, environmental consultants, the Resettlement Implementation Contractors and the Construction Contractors. Many things need to get started even if its preceding activity is not fully completed. Some benefits of a single contractor are:

- Close coordination between RAP team and the designers through frequent project and site meetings
- A common database of files available to all teams, including:
 - Survey, Base Maps, and Design Files from the Designers available to the RAP team
 - Database of impacts from the RAP team available to the designers
- The RAP and Environment team should provide clear guidance to the designers regarding the project objectives and the degree to which impacts are reduced at the expense of other costs or impacts
- Designers need to provide ongoing feedback to the RAP team on impacts and alternative designs
- A schedule of joint field visits to review the field conditions and gain common understanding

If there are multiple RAP and design contractors working on an adjoining project (e.g. – such as the NR1 line may have this situation), it is desirable to have common practices to apply to the resettlement work which should be well-coordinated by MCA-Nepal through initial meetings and frequent communication.

The key parameters and their pros and cons considered for single vs multiple contractors for a package are elaborated in the **Figure 1**Figure 12 below

Contractors per package	Coordination among Contractors	Efficiency in Project Completion	Project Management Effectiveness for MCA	Cost Advantage	Specialization	Risk due to Contractor Performance
A. Single Contractor EPC Contractor + Design Engineer + Environmental Consultant + Social & Resettlement Consultant	High	High	High	High	Low	Medium
B. Two Contractors a) EPC Contractor + Design Engineer, & b) Environmental Consultant and Social & Resettlement Consultant	Medium	Medium	Medium	Medium	Medium	Medium
C. Multiple Contractors a) EPC Contractor + Design Engineer, b) Environmental Consultant, & c) Social & Resettlement Consultant	Low	Low	Medium	Low	High	Low

Figure 12: Procurement Packaging and Bundling of Contractors

As evident from the Figure 12, the best option for the Compact execution is to appoint single contractor who will be responsible for EPC, Project Design, Environmental and Social activities. To mitigate the performance risk, a strong backup plan need to be prepared, such as: awarding the contract to the other contractors, partial payment for the work completion, penalty for the losses, etc. We have already suggested not to allocate one contractor more than two packages.

Project Advisory Board

Consistent with the MCC Guidelines, the Project Advisory Board will consist of high-level representatives from the GoN such as officials from the Ministry of Finance, Department of Energy Ministry of Forest and Ministry of Environment, a representative from MCC as an “observer,” Managing Director NEA, Minister of Energy, etc. This high-level advisory board will advise and govern the activities of the overall program. The Board should be responsible for exercising oversight and taking major decisions for the program on behalf of the MCA.

Stakeholder Committee

Consistent with the MCC implementation guidelines, a stakeholder committee will be formed. This entity will be responsible for informing the concerned stakeholders as well as the project

beneficiaries regarding the program implementation and stipulated activities. The committee can have representatives from the private sector, civil society, etc. (e.g., Federation of Community Forestry Users Nepal (FECOFUN), Presidents Chure Conservation Program).

Positively Impacted Stakeholders

These were described earlier.

4.5 Other Recommendations

Transition from OMCN to MCA

The other strong feature of the proposed implementation mechanism is the continuity of the project. Our experience with MCC procedures in other countries suggests that sometimes, the predecessor entity (such as the OMCN) is disbanded once the compact is signed. The establishment of MCA, which is responsible for project execution, is then undertaken, which takes time as new persons must be recruited to fill the MCA positions. Our recommendation is to add a condition in the compact that OMCN will continue to work until MCA is established and at least 75% of the positions are filled. The transition from OMCN to MCA should be seamless.

Bundling of Contractors

We suggest a total of five contractors: 1) one Engineer common to all four packages, and 2) one site contractor for each package. We recommend a design-build model, in which the site contractor will conduct detailed design, procurement of materials and construction of the project. This site contractor will also be responsible for developing the Environment Social Impact Assessment (ESIA), and the development and implementation of the Resettlement Action Plan. This will avoid any coordination issues. This type of bundling is suggested in *The Yellow Book - Conditions of Contract for Plant and Design-Build for Electrical and Mechanical Plant and for Building and Engineering Works, Designed by the Contractor* (the plant and design/build contract) of FIDIC.

4.6 Challenges Addressed by the Proposed Implementation Framework

Table 12 describes how our proposed implementation mechanism addresses the compact challenges identified in Section 3.6

Table 12. Challenges Addressed by the Proposed Implementation Framework		
Challenge	Elements of Implementation Mechanism	Challenge Redressal
Right of Way and Timelines	- Engineer - Positively Affected Stakeholders - Environmental and social Experts	Technical and Environmental – Social consultants will identify the issues likely to arise in obtaining rights of way (ROW) well in advance. They will address these issues with the help of local agencies and if required, the positively-affected stakeholders.
Resettlement Timelines and Public Interference	Positively-affected stakeholders	Environmental – Social consultants will identify the issues likely to be encountered in resettlement well in advance. They will try to address these issues with the

Table 12. Challenges Addressed by the Proposed Implementation Framework

Challenge	Elements of Implementation Mechanism	Challenge Redressal
	Environmental and social Experts	help of local agencies and if required, positively-affected stakeholders.
Resettlement Cost	- Stakeholders Committee - Environmental and social Experts	The Environmental – Social consultants will engage local agencies on a fixed cost and property agents can work on a success fee basis. The stakeholder committee will ensure that the resettlement and related activities match the MCC principles of transparency and accountability.
Statutory Approvals	- Engineer - Project Advisory Board	Early engagement of the technical consultations and utilization of the Pre-CIF and CIF periods.* The project advisory board can help facilitate this process.
Difficult Terrain	- Procurement Agent - Engineer	Nepal's rough terrain poses large challenges for the transport of materials in a timely manner. If a procurement plan is in place before the implementation begins, significant time will be saved.
Contractor Performance	- Procurement Agent - Engineer	Lack of design/supervision engineers, procurement specialists, safeguard specialists, etc. causes unnecessary delays in the project. As such, a technically competent implementation framework can identify and resolve possible issues with the project.
Technical Capabilities	- Procurement Agent - Engineer	Highly qualified and experienced consultants will be recruited and engaged to ensure that the MCA office is technically capable of undertaking all the stipulated activities.
Monitoring and Evaluation	- Engineer - MCA	Most of the donor-funded transmission projects have well-defined monitoring and evaluation procedures. However, the M&E activities undertaken by the implementing agency (NEA) are generally inadequate. As such, a strong M&E framework will be established (see Task 6 for more details).
Project Timelines	- Procurement Agent - Engineer	The MCA consultants will ensure (through the CIF Phase) that various aspects of the projects are completed before implementation begins.
Consultation and Communications	Engineer	The Engineer will establish sound network through the M&E mechanism (as proposed in Task 6) to continuously communicate and interact with all the project proponents. The Engineer should review each package progress on regular basis.

Table 12. Challenges Addressed by the Proposed Implementation Framework

Challenge	Elements of Implementation Mechanism	Challenge Redressal
Corruption and Fraud	All the units	It is suggested that the MCC's Policy on "Prevention, Detection, and Remediation of Fraud and Corruption" be incorporated in the project from the start and it should be made an integral part of all the contracts that are awarded under this Compact. There should be capacity building programs on ethics and integrity.
*Pre-CIF refers to the approximate three- month gap (June 2017 to September 2017) between the MCC's Board approval of the project and Compact signing. CIF Phase refers to the 12-24 month period when Compact Implementation Funding (CIF) is available before the Compact comes into force.		

4.7 Handing Over the MCC Transmission System to NEA/ NTGC

Once the MCC transmission subsystems are commissioned and ready for operation, the question of its proper handover will arise. Today, there are two registered companies in Nepal that could accept the handover: NEA and the Rastriya Prasaran Grid Company Ltd (NTGC). However, it is virtually NEA only, as NTGC's roles and responsibilities exist only on paper. The third candidate for takeover can be a private transmission company. At present no private transmission company exists in Nepal.

NTGC was registered on July 2015 at the Nepal Registrar Office. Total paid-up capital for NTGC is equal to NRS 1.5 billion. The objective of this organization will be to take over the transmission network projects (both under construction and already set up projects). This company was established by the GoN from eight Ministries. The shareholding ministries are:

- Ministry of Energy
- Ministry of Finance
- Ministry of Home
- Ministry of Defence
- Ministry of Forest and Soil Conservation
- Ministry of Information & Telecommunication
- Ministry of Environmental & Science
- Ministry of Land Reform Ministry.

The Ministry of Energy has recently appointed its CEO. Even after discussions with the Ministry of Energy, NEA, ADB, WB and other stakeholders, it is difficult to predict what the situation will be at the end of the compact. However, the chances are that both the NEA and NTGC will be responsible for transmission operations are low. Similarly, the chances that privately owned transmission companies will be operating in Nepal when the compact ends are very low. Thus, it is unlikely that at the end of the compact, MCA will have options for handing over the transmission system. In short, MCC/MCA will hand over the transmission system to the government entity running transmission operations at the time of compact completion. In view of capacity constraint, majority of the staff of new company will be from NEA only.

5. Market Assessment

Tetra Tech was tasked to conduct a market assessment of service providers and construction firms – including resources (bandwidth), skills, and technical and financial capacity to execute the compact investment programs.

This section presents an approach for identifying prospective vendors and evaluating their capabilities to implement procurement packages (see Volume 1). Our research focused on well-respected contractors in Nepal, South Asia, China and the US that might be able to execute/support large transmission projects in Nepal. The key objectives of the market analysis were to:

- Understand and analyze the capabilities of the vendors in Nepal to support this compact. This includes the capabilities of vendors to execute the project as well as their ability to resolve local challenges.
- Develop a catalogue of vendors who can execute the compact. Vendors were to be classified based on the specialization required to implement the project.
- Form a better understanding of the general business environment and structural components of the national market.
- Reach out to the vendors and contractors to sensitize them about the MCC compact in Nepal.

5.1 Methodology

We have used MCC’s Market Analysis Toolkit, 2016 for conducting the market assessment of vendors. A broad overview of the Toolkit is presented in Figure 13.

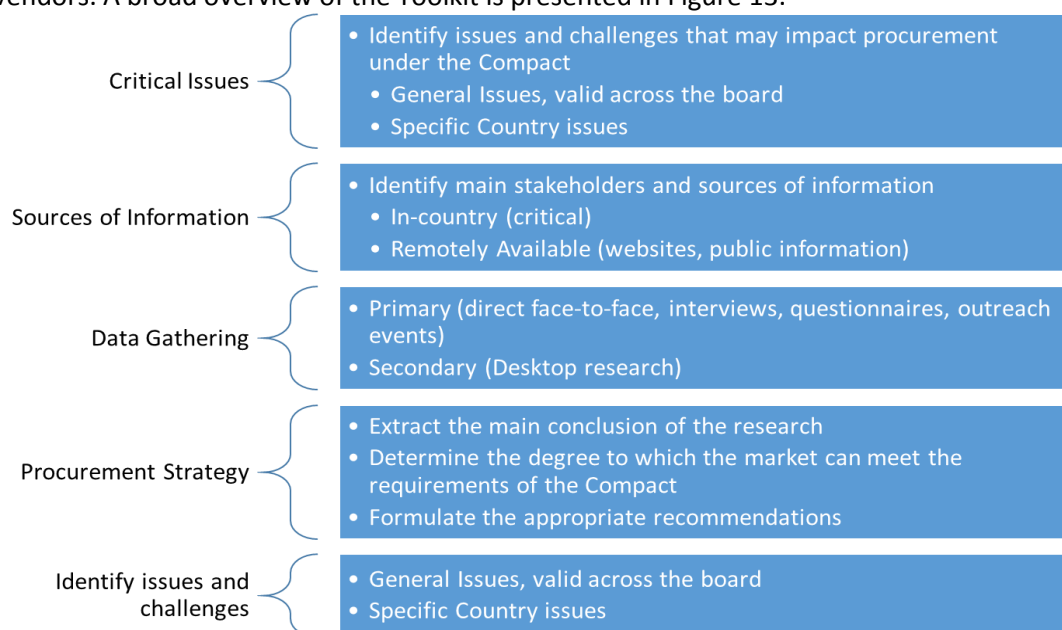


Figure 13. Approach for Market Assessment

5.2 Critical Issues

One of the key objectives of conducting the market assessment is to resolve multiple challenges that the project may face during implementation. The vendor survey sought to measure the capabilities of local and international vendors in resolving any challenges relevant to project implementation. The key challenges on which the vendors need to be evaluated are:

Common Issues

- Capability to obtain clearances from various departments
- Capacity to absorb cost overruns
- Adoption of innovative and cost-efficient technologies available globally
- Capacity to handle complex and large volumes of work
- Project management practices in planning and monitoring for smooth project execution
- Capacity to transport materials in difficult terrain.

Country-Specific Issues

- *Experience with the 220 kV and 400 kV transmission network in Nepal:* Although Nepal has a fairly well established transmission network, the country lacks experience with the development of higher-voltage (220 kV and 400 kV) transmission networks. Furthermore, the MCC compact will include setting up GIS substations, which is another area where Nepal's experience is limited.
- *Project Delays:* Almost all of large transmission network projects in Nepal suffer from delays. Hence, it is prudent to identify contractors that are capable of adhering to the project schedule.
- *Local Capabilities:* Almost all of the large transmission projects, especially the EPC portions, are executed by either Chinese or Indian vendors with the support from local Nepalese vendors. The vendor survey also sought to evaluate the capabilities of the Nepalese vendors.

5.3 Sources of Information

To identify potential vendors for the survey, we obtained information from various sources. We then identified 89 vendors relevant for this project in 5 categories: 1) EPC (36), 2) civil contractors (13), 3) material suppliers (30), 4) local consultants (8) and Logistics Contractors (2). Details on these vendors are provided in Annex A. The sources and methodology of selection of the 89 vendors are described below.

Donor Agencies

Although the MCC compact has an implementation mechanism that differs from those of other donor agencies, its implementation of large projects, in terms of geography, terrain, working climate, availability of resources etc., is similar. Hence, it is beneficial to consider contractors that have prior experience in working with donor agencies. Thus, we sourced the list of contractors that

have been awarded contracts by other donors (e.g., ADB, WB), and collected informal feedback on the performance of various vendors.

World Bank Vendor List for Transmission Projects

The World Bank prepares a list of all the contractors to which it has awarded contracts globally. The list is available at the WB website: <https://finances.worldbank.org/Procurement/Major-Contract-Awards/kdui-wcs3/data>. From this, we filtered 54 vendors on the basis of date (vendors that have been awarded contracts in the last decade) and contracts awarded for consulting, goods and services relevant to the transmission sector (distribution and other energy projects). We omitted contracts awarded to individuals and those involved in unrelated activities such as supply of vehicles, and sanitary works, and consortia (only the lead vendor was included). As a result, 30 vendors were identified and contacted.

ADB Vendor List for Transmission Projects

Similar to the World Bank, the vendors appointed by the ADB will be crucial for implementing transmission sector projects in Nepal. The contractors to which ADB has awarded contracts are listed under three categories. The original sources of information were:

- Contracts Awarded - Goods, Works, and Services: <https://www.adb.org/site/business-opportunities/transaction-advisory-services/contracts-awarded>
- Contracts Awarded - Consulting Services: <https://www.adb.org/site/business-opportunities/operational-procurement/consulting/contracts-awarded>
- Contracts Awarded: Transaction Advisory Services: <https://www.adb.org/site/business-opportunities/operational-procurement/goods-services/contracts-awarded>

A methodology similar to that used for the WB was used to short-list vendors from the ADB website.

NEA Vendor List

NEA is the implementing agency for all the donor-funded projects and also contracts for its own projects. All the contracts awarded by the NEA are listed on its website at: http://www.nea.org.np/award_of_contract.html. We have filtered from this list vendors that have worked on transmission projects. Here, we included the names of the vendor to whom the contracts were awarded and the names of those vendors that submitted bids. If the winning bidders were joint ventures or consortia, all the vendors were considered.

Federation of Contractors' Associations of Nepal (FCAN)

FCAN is an association of construction/infrastructure companies. Headquartered in Kathmandu, it was established to represent the interests of various contractors of Nepal. FCAN holds a portfolio of 124 infrastructure development contractors as associate members. Its vendors were hand selected, with the help of our local consultants, on the basis of the vendors who have experience in the transmission sector.

Exhibitions and Conferences

Tetra Tech attended the Electro Tech exhibition in Nepal to meet Nepalese vendors (specifically, material suppliers). The aim of attending the exhibitions was to see and evaluate the products first-hand and make recommendations accordingly.

Other Sources

To augment the data collected from the aforementioned sources, our team also included various world-renowned vendors using the consultant team's experience, secondary research and market references. The team also referred to the catalogues of international and national trade associations.

5.4 Data Gathering

To collect the data from the identified 89 vendors, the following tools were adopted:

Vendor Survey Questionnaire

We prepared a "Vendor Market Survey Questionnaire" (Annex B). This questionnaire was sent via email and in certain cases hard copies were given to the identified vendors as well. A common questionnaire was used for EPC, design/consulting and manufacturing (including product supply) companies.

The questionnaire was structured to collect vendor information on:

- *Capability to execute large projects:* To gather information on vendor's overall capabilities to undertake large projects such as those envisaged in the compact, basic information such as number of employees, annual turnover, years of experience in their respective fields, and their global presence was collected.
- *Overall experience in working in the transmission sector:* This included the past experience of vendors in their respective fields. A field asking for the specialization of a vendor was also given.
- *Experience working on 400 kV and 220 kV systems:* As the compact primarily consists of 220 kV and 400 kV systems, emphasis was placed on the vendor's experience in working on 220 kV and 400 kV networks.
- *Presence in Nepal and prior experience working in Nepal:* Because Nepal presents a unique set of challenges for large transmission projects, a vendor that has worked in Nepal will have a better understanding of the on-the-ground situation and will be better able to resolve project issues. The questionnaire collected information on whether the vendors are currently executing a project in Nepal or have a physical presence in Nepal. This is especially crucial in the case of large vendors from India and China.
- *Competing firms:* We also asked for information on the vendors' competitors in Nepal to gather information on any additional vendors that could be contacted for the survey and to understand if a sufficient number of vendors is available in their respective fields.
- *Local challenges of working in Nepal:* Another objective of this survey was to collect information from the vendors on the challenges that they have traditionally faced while working in Nepal. We also asked for suggestions that might help the timely completion of projects. This was done to better structure our implementation mechanism and produce efficient procurement packages.

- *Experience working with the donor agencies:* The questionnaire also aimed to understand if the vendors have prior experience in working with the donor agencies and are familiar with the procurement guidelines typically followed by the donors such as FIDIC guidelines and WB procurement guidelines.

Telephone Interactions

Although the vendor survey questionnaire was in most cases circulated via e-mail, our team also followed up with various firms through telephone calls. These conversations were also used to clarify information submitted by vendors and to obtain more information.

Face-to-Face Interactions

Our team arranged for meetings with various vendors and also attended an exhibition in Nepal.

Secondary Data Collection through Desktop Studies

While the survey questionnaire was circulated to 87 identified organizations and followed through with telephone calls, only 16 surveys (Annex C) had been completed at the time of this report was submitted. However, based on desktop research, we completed data for 31 vendors. We found that data from three vendors were insufficient for their inclusion on the list. Thus, the summary responses received for 44 vendors are presented below in four categories as mentioned above.

5.5 Results of the Market Assessment

Based on the market survey, the following companies are capable of undertaking various aspects of the compact. These firms are categorized by their main country/region of operations: India, China and international. They are also categorized on the basis of the nature of work for which they are being nominated: EPC, material supply and construction activities.

EPC Contractors

It has been observed that in majority of cases, large EPC contractors working in Nepal are either from India or China. Many EPC contractors with capabilities to undertake 220 kV and 400 kV work are available in these two countries. However, Nepal does not have a large EPC contractor that can implement one package job alone. Table 13 provides details of the 21 large EPC contractors that can take up the work of one package.

Civil Works

Nepal has a fairly well-developed civil industry with significant experience. It has been observed that all major EPC contractors partner with Nepalese firms that take care of the civil works. See Table 14.

Material Suppliers

The electrical industry in Nepal is in a nascent stage, for example, the maximum capacity transformer that is manufactured in Nepal is just 50 MVA. Similarly, conductors for capacities up to only 132 kV are manufactured in Nepal. Thus, most of the materials such as conductors, transformers, insulators, etc. need to be imported. However, various accessories such as those used for jointing, earthing, fabrication of panels, etc. can be procured locally. There are multiple traders present in Nepal who can help import materials (List provided in Table 16). However, globally there is no shortage of materials for the transmission sector. There are many good material suppliers available in India and China that are active in Nepal. The details on some of the key vendors for material supply from India and China are provided in the Table 15.

Transportation of Materials

Transportation of materials is one of the most critical aspect of transmission projects in Nepal. Nepal's peculiar mountainous terrain has been the cause of numerous delays in the execution of projects in the past. The poor roads, low bridge capacities, sharp turns, and different bends have posed numerous problems for transportation of both heavy (especially transformers) and light materials. Hence, an added focus should be given to the transport of materials for transmission projects. During our interactions with the EPC contractors active in Nepal's transmission sector, it was revealed that the major EPC contractors hire the services of specialized logistics companies to prepare a "Transportation Plan" and transport material from the manufacturer's works to the site. Generally, this also involves border crossing and custom clearance. For example, Tata Projects recently hired on a logistics firm (Premier logistics, for more details, see Table 18) to prepare a roadmap for material transportation for the EPC of the Nepal portion of the Indo-Nepal cross border 400 kV transmission line from Dhalkebar to Muzzafarpur. Tata Projects told us that one of the reasons for on-time completion is the engagement of a logistics supplier. There are numerous such firms available in India and outside. The results of our market survey for these firms are presented in

Table 18. The firms presented in our assessment also have a local presence in Nepal in terms of both the manpower and transportation equipment (heavy trucks) needed. This is an additional benefit since the vehicle duty in Nepal is 100%.

The transportation of materials for towers requires different techniques as opposed to substation construction, normally an approach road is not constructed. Historically these material were transported with the help of manual labor and animals. When we checked with EPC contractors, they told us that nowadays, motorcycles are more frequently used.

Labor Pool

During our interactions with the local and international EPC contractors as well as NEA, it was understood that there is no shortage of unskilled labor in Nepal. The local labor is, however, divided into two categories:

- **Unskilled Labor:** All the developers employ Nepalese labor, mainly in civil construction. However, for electrical works, even unskilled labor is imported from India or the EPC contractor's country. None of the contractors informed us that the availability of unskilled labor in Nepal is a problem. However, to match the geographic conditions of Nepal (such as steep hills), even unskilled labor is imported from similar geographies (for example, in the case of India, from Jammu and Kashmir, Himachal Pradesh).
- **Skilled Labor:** The highest capacity transmission lines and substations built on a larger scale in Nepal are at 132 kV. Hence, Nepal lacks sufficient experience in executing projects at a higher voltage level (220 kV and 400 kV). NEA itself involves large global firms for any work above 132 kV (see Section 3.4). There is no shortage of skilled labor in India or China, from where most of the contractors are working in Nepal. Both countries have constructed thousands of kilometers of 220 and 400 kV lines and of higher voltage. For example, India built its first 400 kV transmission line more than 30 years ago. Thus, for specialized work such as stringing, tower erection, etc., labor is typically imported by the EPC contractors from their own staff in their home countries. These contractors have pre-set work crews for various activities and are mobilized from one project to another. However, these crews are almost always supplemented by local labor.

Procurement Packaging, Availability of Contractors and the Level of Difficulty

As part of the market assessment, we also analyzed the level of difficulty that each of the recommended four transmission packages will face. This analysis is presented in Figure 14.

Package	Electrical works	Civil Works	Material	Transportation	Skilled Labor	Unskilled Labor	Land Acquisition	Clearances and Approvals such as EIA, RAP
A								
B								
C								
D								
Highest				Medium			Low	

Figure 14: Level of Difficulty that the Contractor Will Face in Project Execution

As shown below, it is evident the key differentiating factor in procurement packaging is the geographic conditions. To overcome the hardships in Zone-C, it is suggested that work be started early and a higher float be maintained, the contractor with higher creditworthiness and more experience working in similar terrain should be given a higher weight in selection. The higher creditworthiness will help ensure that the contractor can put more manpower in place to complete the job on time. The help of an experienced (in Nepal) logistics supplier can be made mandatory in the contract. While evaluating contractors for this package, higher weights may be given to the experience of civil works, transportation, material supply and land acquisition firms.

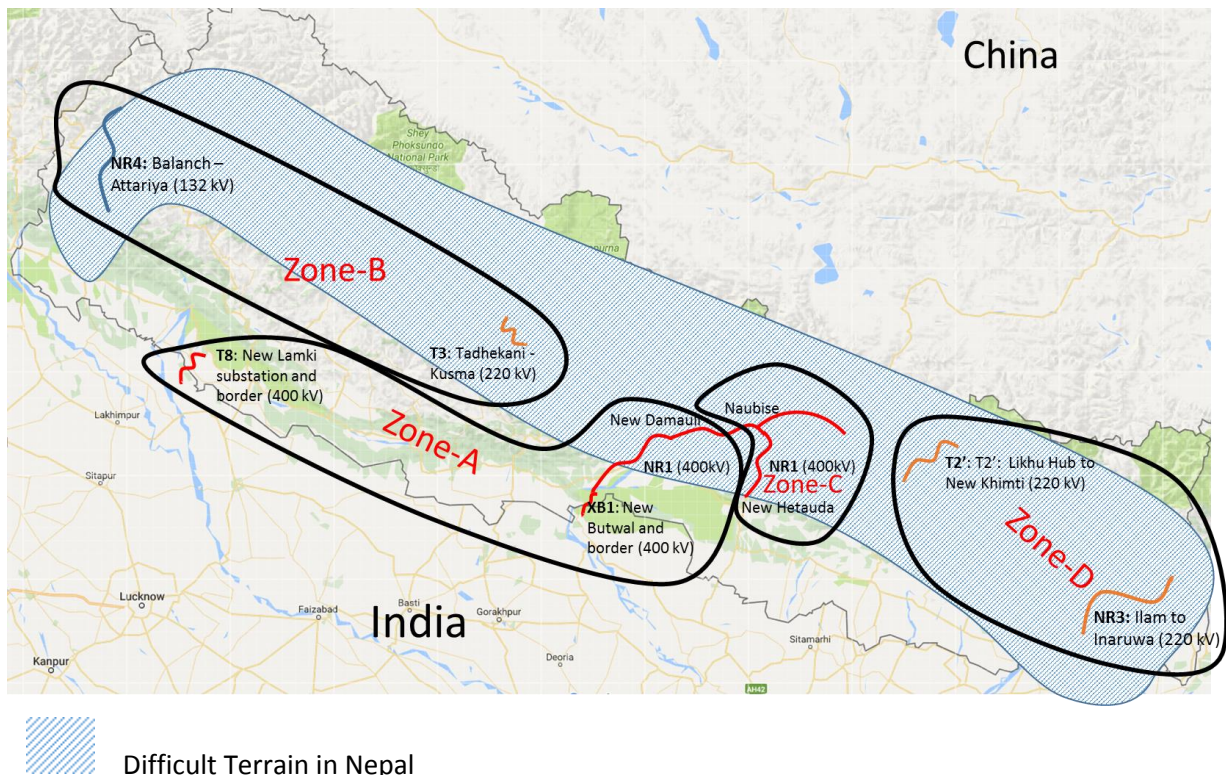


Figure 15: Procurement Packaging Based on Terrain

Recommended EPC Contractors

Table 13. Recommended EPC Contractors					
S. N.	Name of the Firm	Country of Origin	Contact Details	About the Company	Experience in Nepal
1	M/s. BS Limited	India	#504, Trendset Towers, Road No.2, Banjara Hills, Hyderabad, Telangana State, India – 500034. E-mail : corpcomm@bsgroup.in	Manufacturing of transmission line (TL) towers & substation structures up to 1200 kV and 400 kV. Execution of transmission & distribution projects up to 1200 kV voltage class on an EPC & build, own, operate and maintain (BOOM) basis. Execution of substation (SS) projects up to 400 kV voltage class on an EPC & BOOM basis	No experience reported
2	KEC International Limited	India	RPG House, 1st Floor, 463, Dr. Annie Besant Road, Worli, Mumbai – 400030, India Kathmandu Nepal; E-Mail: talukdarbb@kecrpg.com; Cell No.: +9779840367552	Leading EPC of India with more than 60 years in TL and > 15 years in SS. Turnkey capabilities of substations up to 765 kV/ transmission lines up to 1200 kV, underground cabling up to 220 kV	Currently executing the 220 kV D/C TL & SS from Gongar to Khimti for Upper Tamakoshi Hydro Power Ltd
3	Mohan Energy Corporation Pvt. Ltd.	India	Mr. Rajesh Ramachandran Asst Vice President Mohan House	EPC Company with experience in the following:	Currently executing the Solu Corridor 132 kV transmission line project Construction of 90 km of 132 kV Solu Corridor

Table 13. Recommended EPC Contractors					
S. N.	Name of the Firm	Country of Origin	Contact Details	About the Company	Experience in Nepal
			Community Centre, 8-9, Zamrudpur, Kailash Colony Extn, New Delhi – 110048, INDIA	Transmission lines Substations Distribution lines Solar power plants Biomass power plants	transmission line from Mirchaiya –Tingla Construction of 132/33/11 kV substation at Tingla
4	Unitech Power Transmission Limited	India	Unitech House, L-Block, South City-1, Gurgaon-122001, Haryana (India)	Large transmission sector EPC contractor. Active across the globe with experience in executing executed various 765 kV, 400 kV & 220 kV transmission line projects on turnkey basis.	No experience reported
5	Angelique International Limited	International	104-107, Hemkunt Towers,. First Floor, 98 Nehru Place,. New Delhi - 110019 (India). T : +91 11 26413873 E: info@angelique-india.com	Angelique was Established in 1996 as an EPC company. It has a turnover of about US\$ 250 million. They are active in undertaking turnkey projects in the power, water, irrigation and agriculture sectors as well as industrial projects in international markets of Africa, Middle East, South and South East Asia.	Angelique has been an active player in the transmission sector of Nepal. It has recently been awarded a contract for the design, supply, and construction of 132 kV second circuit transmission lines by NEA
6	Larsen and Toubro	India	Mr. Ellan Kumaran I Larsen & Toubro Limited L&T House, Ballard Estate P. O. Box: 278, Mumbai 400 001	Larsen & Toubro is a major technology, engineering, construction, manufacturing and financial services conglomerate, with global operations. L&T addresses	No experience reported

Table 13. Recommended EPC Contractors					
S. N.	Name of the Firm	Country of Origin	Contact Details	About the Company	Experience in Nepal
			India E: igrc@larsentoubro.com	critical needs in key sectors: hydrocarbon, infrastructure, power, process industries and defense, for customers in over 30 countries around the world.	
7	Aster India	India	Aster Private Limited # 141/1, Phase – II, I.D.A, Cherlapally, Hyderabad info@aster.in	EPC company with experience in: Transmission line construction Transmission towers EHV substations construction Testing & commissioning of substations up to 400 kV Transmission tower design & supply	Experience working with NEA on site surveys, tower plotting, design, manufacturing & supply, and construction of transmission towers for 132 kV double circuit power lines
8	Kalp Taru	India	Mr. N.K.Kaushal nkkaushal@kalpatarupower.com +91-9167997810 101, Kalpataru Synergy, Opp. Grand Hyatt, Vakola, Santacruz (E), Mumbai 400055. India	KPTL is part of the Kalpataru Group established in 1969. It is a diversified conglomerate spanning real estate, power generation and transmission, construction of roads, factories, buildings and oil and gas infrastructure, and agri-logistics spaces. It is one of the largest EPC contractors in Nepal's transmission sector.	Already working with NEA on a US \$9 million WB-funded transmission project in Nepal

Table 13. Recommended EPC Contractors					
S. N.	Name of the Firm	Country of Origin	Contact Details	About the Company	Experience in Nepal
9	Mohan Energy Corporation Pvt. Ltd.	India	Mr. Rajesh Ramachandran Asst. Vice President Mohan House Community Centre, 8-9, Zamrudpur, Kailash Colony Extn, New Delhi – 110048, INDIA Email: rramachandran@mohanenergy.com Tel: +91-11-45003500/3592 Mob: +91-9811069866	EPC company with experience in: Transmission lines Substations Distribution lines Solar power plants Biomass power plants	Currently executing the Solu Corridor 132 kV transmission line project Construction of 90 km of 132 kV Solu Corridor Transmission line from Mirchaiya –Tingla Construction of 132/33/11 kV substation at Tingla
10	PGCIL	India	B-9, Qutab Institutional Area, Katwaria Sarai, New Delhi-110016 EPABX : 011-26560112, 26560115, 26560193, 2656489 chetan@powergridindia.com	Central Transmission Utility (CTU) of India. Extensive EPC experience in India and abroad	Owner engineer for Hetauda-Dhalkebar-Duhabi-400 kV transmission line project. Consultancy services for short term strengthening of India-Nepal interconnection. Consultancy assignments for 220 kV D/C transmission line from Khimti-Dhalkebar. Consulting services for detailed feasibility studies and ESIA of 400 kV TA3-Dhalkebar-Sakari transmission line. DPR for evacuation of power from West Seti hydro project in Nepal. Preparation of DPR for Indo-Nepal interconnection (Nepalese portion).

Table 13. Recommended EPC Contractors					
S. N.	Name of the Firm	Country of Origin	Contact Details	About the Company	Experience in Nepal
					Consultancy services for carrying out system studies for transmission system in Nepal for cross-border trading. Amongst numerous other projects
11	Tata Projects	India	Mr. Abhik Pal 1st Floor, Tower 1 Okaya Centre, B-5, Sector-62 Noida – 201301, Uttar Pradesh, India abhikpal@tataprojects.com Cell No. : +919818692932	Turnkey EPC construction of substation (electrical)/substation (civil)/tower/LV & MV lines & Substation design & manufacturing of transmission line towers up to 800 kV Services offered: turnkey EPC construction of transmission lines, substations & distribution lines up to 800 kV.	400 kV D/C Dhalkebar - Bhattamod (Nepal border (EPC construction of Nepal portion of Indo-Nepal cross-border 400 kV transmission line from Dhalkebar to Bittamod) Design, supply and installation of Dana – Kushma 220 kV double-circuit transmission line & associated substations (Kali Gandaki Transmission Corridor Project) Route alignment completed, detailed survey & check survey are ongoing. Substation: soil investigation completed, detailed engineering & site leveling are ongoing.
12	Isolux Corsan	International	C/ Caballero Andante, 8 28021 - Madrid (Spain) Tel: 91 449 30 00 info@isoluxcorsan.com	Isolux Corsán is a global benchmark in the areas of concessions, energy, construction and industrial services, with a track record spanning over 80 years of professional activity. It operates in more than 40 countries	No experience reported

Table 13. Recommended EPC Contractors					
S. N.	Name of the Firm	Country of Origin	Contact Details	About the Company	Experience in Nepal
				on four continents, and has an EPC backlog of €6.8 Bn.	
13	Central China Power Grid International	China	ZHOU BIN Telephone: +86 027-87862692 12F/L, Zhongnan Building, No. 80 Zhongnan Road, Wuhan, CHINA Email: zhoubin@cet.sgcc.com.cn	Leading supplier of machinery and electronic products in the South Asian region	Currently executing a NEA project in Nepal for the procurement of plant design, supply and installation of Hetauda, Dhalkebar and Inaruwa substations
14	China International Water and Electrical Company	China	Bhatbhateni, P.O. Box: 3324, Ktm, Kathmandu, Nepal headoffice@cwe.cn	China International Water & Electric Corporation (CWE) is a Chinese construction and engineering consulting company that is a subsidiary of China Three Gorges Corporation (CTE). CWE specializes in the construction of water and hydropower projects, but its work runs the gamut including road and bridge, power transmission, drainage and sewage treatment systems, dredging, port maintenance, and interior design.	Currently executing hydropower projects in Nepal. The company has capabilities to undertake large transmission projects as well.
15	Urja International Pvt. Ltd	Nepal	Mr. Gambhir Man Shrestha Lagankhel – 5, Lalitpur, Nepal M:977- 9851022682 E: urjainternationalnepal@gmail.com	EPC contractors for turnkey contracts for transmission line constructions	Upper Chaku – Lamosanghu 132 kV transmission line- survey/ supply/ construction/installation of 132 kV transmission line for Shiva Shree Hydropower (P) Ltd.

Table 13. Recommended EPC Contractors					
S. N.	Name of the Firm	Country of Origin	Contact Details	About the Company	Experience in Nepal
					Ipa – Bhimphedi 66 kV transmission line: survey/ supply/ construction/ installation of 66 kV transmission line for Mandu Hydropower Ltd. Emergency restoration of the Lamosangu 132 kV transmission line: survey, supply, installation, testing and commissioning of 132 kV T/L for Bhote Koshi Power Company Pvt Ltd. Mailung Khola HP - Grang 66 kV transmission line: survey, maintenance, installation, testing and commissioning of 66 kV T/L.
16	Zhongding International Engineering Co., Ltd	China	ziec@zeic.com.cn	Zhongding International Engineering Co., Ltd. is listed as one of the largest international construction contractors in the world, having recorded international contracting revenue of US \$275.4 million. ZICG's core enterprise, Zhongding International Engineering Co. Ltd., as one of ENR's Top 225 international contractors, is mainly engaged in	Executed the Sunkoshi hydropower project in Nepal

Table 13. Recommended EPC Contractors					
S. N.	Name of the Firm	Country of Origin	Contact Details	About the Company	Experience in Nepal
				various professional fields such as industrial & civil construction, mines & tunnel construction, electromechanical equipment installation, coal mining & processing, geological exploration, hydraulic & electric engineering, sewage treatment, road & bridge construction, civil air-defense engineering, engineering design & consultation, real estate development, labor service export, international trade, etc.	
17	GMR Energy GMR Group	India	K V V Rao Kvv.rao@gmrgroup.in GMR Centre, 7th Floor, C-31, G Block, Bandra-Kurla Complex, Bandra (East), Mumbai, India M: +91-9259036882	GMR Energy has developed two transmission projects in Rajasthan, India during FY 2014 awarded on a (BOOM) basis by Rajasthan Rajya Vidyut Prasaran Nigam Ltd (RRVPL). The concession period of these projects is 25 years, including the construction phase. The projects include 366 km of 400 kV transmission lines with two power substations based at Alwar and Deedwana.	In the process of developing two dedicated transmission lines with a total length of 276.9 km associated with Nepal HEPs connecting Nepal and the northern region of India for the evacuation of power to India. GMR Energy is developing the transmission line projects in Nepal for which necessary survey licenses have been granted by GoN to these Nepal SPVs. These lines will interconnect with the Indian grid for the evacuation of power. For Upper Marsyangdi - 2 HEP, the transmission line is 201 km in length , whereas in case of Upper

Table 13. Recommended EPC Contractors					
S. N.	Name of the Firm	Country of Origin	Contact Details	About the Company	Experience in Nepal
					Karnali, the HEP transmission line is 79.5 km in length under the Nepal leg. Each of these transmission lines will be commissioned three to six months before commissioning of the respective power generation project
18	Reliance Infra Limited	India	Sanjay Mulgund M: +9323646216 sanjay.mulgund@relianceada.com	Reliance Infrastructure Limited is a premier power transmission utility in the Indian private sector, at both the interstate & intrastate levels. On a rapid growth path, it currently has a portfolio of 4 transmission projects with an asset base of US \$800 million. These projects comprise approximately 4,100 circuit km of transmission lines.	No experience reported.
19	Sterling & Wilson	India	C-56 / 38, Institutional Area Sector 62, Noida, Uttar Pradesh 201307 Phone: 0120 407 1000 E:	Sterling and Wilson serves the entire portfolio of design, engineering, supply, project management, erection, testing, commissioning and Maintenance of EHV substations and transmission lines. The division is executing a number of 132 kV / 220 kV / 400 kV substations in both AIS and GIS versions, including	Worked with NEA on engineering, supply, installation, civil, testing & commissioning of 132/33 kV, 30 MVA power transformer at Bharatpur Switchyard.

Table 13. Recommended EPC Contractors					
S. N.	Name of the Firm	Country of Origin	Contact Details	About the Company	Experience in Nepal
				railway feeding substation projects all over India, of which many have already been working satisfactorily after successful commissioning. Many of the substations are equipped with state-of-the-art SCADA systems, which have been engineered and developed by Sterling and Wilson's in-house engineering team.	
20	Chongqing New Century Electrical Co., Ltd.	China	Andy Liu +86-023-60351550 cqneftc@126.com 3 Zhixin Road, Shuangfengqiao Block, Yubei District, Chongqing, China	Chongqing New Century Electrical Co., Ltd. was established on 1992. They are engaged in R&D, manufacture, sales and technical service of power automation and relative software, and providing overall technology solutions of automation system and complete electro-mechanical equipment supply and service.	Chongqing has been bidding for various projects in Nepal either independently or in association with other large firms
21	Guangxi Transmission & Substation Construction Company	China	ZHANG XIANGYIN +86-13517713751 Intdpt@Vip.Sohu.Com 18 Dancun Road, Nanning, Guangxi, China.	Guangxi Transmission & Substation Construction Company is a Chinese state company founded in 1958. The company has more than 1,601 staff and workers, among whom more than 713 are technicians in different	Has been awarded a contract by NEA for the Tamakoshi-Kathmandu 220/400 kV transmission project funded by the ADB

Table 13. Recommended EPC Contractors					
S. N.	Name of the Firm	Country of Origin	Contact Details	About the Company	Experience in Nepal
				specialties. The company possesses more than 1,000 units of various plants and equipment with a yearly construction capability of 800 km of transmission lines and 8 substations at 500 kV or above and 1,200 km of transmission lines and 15 substations at 220 kV simultaneously, with a total capacity 4,200 kVA.	

Recommended Civil Works Contractors

Table 14. Recommended Civil Works Contractors					
S. N.	Name of the Firm	Country of Origin	Contact Details	About the Company	Experience in Nepal
1	Waiba Infratech Private Limited	Nepal	N. D. Lama, Director, Swayambhu-Bijeswari Marg, Kathmandu-15, Nepal Cell: ++977-9851198751 E-mail: director.waibainfratech@gmail.com E: waiba_cmc@yahoo.com	Infrastructure company in Nepal with experience in substations (electrical)/substation (civil)/tower/transmission line/tunneling)	Experience working with NEA on the 132 kV Syaule substation project on a turnkey basis

Table 14. Recommended Civil Works Contractors					
S. N.	Name of the Firm	Country of Origin	Contact Details	About the Company	Experience in Nepal
2	Ashish Nirman Sewa Pvt Ltd.	Nepal	Bharatpur-10, Chitwan Nepal Tel: 056-560729, Fax: 056-560829 City Office: Post Box No: 10952, Maharajgunj, Kathmandu, Nepal. Tel: 01-4720273, 4720973, Fax: 01-4721031, 4374829 Email:ashishnirmansewa@yahoo.com	Ashish Nirman Sewa Pvt. Ltd (ANS) is a leading general contractor based in Nepal. It was established in 1982 and provides services in the road sector, buildings, irrigation, and transmission, amongst other areas	A detailed list of projects in Nepal is available at: http://www.ashishnirmansewa.com.np/project_completed
3	ANK Construction Co. Pvt. Ltd.	Nepal	GPO Box: 5813, Rabibhawan, Kathmandu, Nepal 977-1-4278130, 4280799 Fax: 977-1-4280799 ank@mhp.wlink.com.np ank.nepal@gmail.com	ANK Construction Co. Pvt. Ltd. is one of the leading construction companies in Nepal. Since 1982, it has delivered the best value in construction services by placing expert construction professionals on every project undertaken. ANK Construction Co. Pvt. Ltd. is consistently ranked among the top general contractors and construction managers in the nation.	The company's transmission sector experience is given in detail at: http://www.ank.com.np/electrical_transmission.php
4	Mudbhari & Joshi Construction Pvt. Ltd.	Nepal	Mr. Kiran Kumar Mudbhary (M.E. Project Coordinator) and Mr. Ajay Mudvari (MD) Tel. No.: 00977-1-4241182 / 4231513	One of the most experienced construction/infrastructure companies active in the transmission sector in Nepal.	- Design, manufacturing, supply, erection, stringing and commissioning of 132 kV double circuit tower. Wt. 19-Ton Ht. 57.5 m. - Replacing existing earth-wire with OPGW (100 km.)

Table 14. Recommended Civil Works Contractors

S. N.	Name of the Firm	Country of Origin	Contact Details	About the Company	Experience in Nepal
			Fax No.: 00977-1-4220452 E-mail : nwpi@mos.com.np	They have extensive experience working on WB/ADB funded projects implemented by NEA	• Construction of 66 kV & 132 kV with OPGW transmission lines (205 km) • Rural electrification of different districts of Nepal. • Turnkey substation projects for 33/11 kV. • Supply & commissioning of power transformers (15 MVA – 63 MVA) • Supply and installation of 132 kV substation extensions at Khimti- Dhalkebar, Package – 2 • Construction of 220 kV D/C (single circuit strung) Khimti-Dhalkebar transmission line of NEA. • Supply, delivery & commissioning of 132/33 kV 63 MVA power transformer at Butwal and Duhabi substation. • Supply, delivery, stringing and testing of optical fiber with ground wire in Pathlaiya-Lahan 132 kV T/L project. Among other projects

Recommended Material Suppliers

Table 15. Recommended Material Suppliers					
S. N.	Name of the Firm	Country of Origin	Contact Details	About the Company	Experience in Nepal
1	Jyoti Structures Limited	India	Block C, Sushant Lok Phase I, Sector 32, Gurugram, Haryana 122002 contact@jsl.co.in contact@jyoticanada.com	Jyoti Structures Limited (JSL) was incorporated as a private limited company on May 27, 1974. The company began commercial operations in 1979 in engineering, procurement, tower testing, manufacturing and construction. Their global capacity for tower manufacturing is about 215,000 MT annually. They have worked across 45 countries executing more than 600 projects	Has experience of working in hydropower projects in Nepal
2	GE Energy Connections	International	Ravi.Segal@ge.com Grid Solutions Global Office: 1-877-605-6777	Manufacturer and supplier of various transmission grid and substation materials, such as: HV/MV equipment, automation equipment, mobile systems, amongst many others.	GE has been regularly supplying and supervising the commissioning of various substation equipment to Nepal Electricity Authority, through various EPC contractors. GE has also been bidding on selective substation project tenders of NEA.
3	Siemens India	International	Mr. Vikram Gandotra M: +91 9811110288 vikram.gandotra@siemens.com	Global leader in power transmission technology with a product range that spans	No experience reported

Table 15. Recommended Material Suppliers					
S. N.	Name of the Firm	Country of Origin	Contact Details	About the Company	Experience in Nepal
			7000 Siemens Dr, Wendell, NC 27591, USA	the entire field of high-voltage power transmission.	
4	Crompton Greaves Limited	International	Mr. Ravi Swarup CG House, 6th Floor, Dr. Annie Besant Road, Worli , Mumbai - 400030 Maharastra, India Tel : +91 22 2423 7777 E: ravi.swarup@cglobal.com	CG Power Solutions' transmission line projects, ranging from 12 kV to 500 kV, have been implemented geographically across the US. Its project teams are currently working for several utility companies on projects as diverse as new EHV transmission lines, voltage upgrades and conductor replacements on existing lines, and tower and pole analysis for upgrade projects. Its projects have ranged from engineering only projects to full EPC projects where it takes total responsibility for the entire project.	No experience reported
5	BHEL	India	Mr. G.K. Hedao (gkh@bhel.in) Mr. S Gopalakrishnan (sgop@bhel.in) Mr. A K Gupta (anilg@bhel.in)	BHEL is one of the India's largest suppliers of heavy electricals. BHEL has the unique distinction of being one of the very few companies in the world, manufacturing all major power generating equipment under one roof.	No experience reported
6	China National Cable Engineering Corporation (CCC)	China	C2405, Huapu Garden, No.9, Dongzhimen South Street, Dongcheng District, Beijing, 100007, P.R.China Tel : 86 - 10 – 84094833,	Leading supplier of transmission line and substation materials in China.	No experience reported

Table 15. Recommended Material Suppliers					
S. N.	Name of the Firm	Country of Origin	Contact Details	About the Company	Experience in Nepal
			84094873 cccoffice@chinacables.com		
7	Zhejiang Yinhe Cables CO.,LTD	China	Yinhe Industrial Park Baishi Yueqing China Tel: +86 0577-57123333 yinhe@china-yinhe.cn	Leading supplier of power cable, control cable, high-voltage cross-bonding cable, rubber jacket cable, cable for civilian use, overhead stranded conductor, aluminum alloy overhead stranded conductor, high-temperature cable, H-cable, computer cable and other special cable types.	Already working in Nepal on a US \$16 million assignment implemented by the NEA. It is providing aerial bundled cables in the WB-funded Nepal Power Development Project: Supply and Delivery of LV ABC Cable
8	ABB	International	21st Floor, World Trade Center No. 26/1, Dr. Rajkumar Road, Malleshwaram West Bengaluru, 560055, Karnataka, India E: contact.center@in.abb.com E: akshay.mandlekar@in.abb.com T: 08022949123	ABB (ASEA Brown Boveri) is a Swedish-Swiss multinational corporation headquartered in Zürich, Switzerland, operating mainly in robotics and the power and automation technology areas. Leading manufacturer of transformers, switchgear, circuit breakers, cables, and associated high-voltage equipment such as digital protective relays, electrical substations and substation automation systems. Additional areas include flexible AC transmission systems (FACTS), high-voltage direct current (HVDC) systems and network management systems. The division is	No experience reported

Table 15. Recommended Material Suppliers					
S. N.	Name of the Firm	Country of Origin	Contact Details	About the Company	Experience in Nepal
				subdivided into five business units - High Voltage Products, Transformers, Grid Systems, Grid Automation and Grid Integration. Also supplies power line communication equipment such as ETL600.	
9	Liaoning Mec Group Co., Ltd.	China	Mr. Wei Shuai 28f.World Trade Centre, No.25 Tongxing Street, Dalian, Liaoning, China sgz@mec.com.cn	Liaoning MEC Group Co., Ltd. is the standing member of China Chamber of Commerce for Import & Export of Machinery & Electric Products.	In the past it has been awarded WB contracts for the supply and delivery of distribution transformers, under the Nepal Power Development Project, the contract was worth \$50,000.
10	M/S. Zhejiang Zhongda Technical Export Co. Ltd.	China	Address : 18-20/F Huashun Building NO.58 West Lake Avenue, Hangzhou, Zhejiang, China Tel : 0086-571-87818189 Fax : 0086-571-87817517 Email:sever@ztiec.com	Zhejiang Zhongda Technical Export Co. Ltd is the core company of the Zhejiang Zhongda Technical Group Holding Co., Ltd and Zhejiang Zhongda Technical Export and Import Group Co., Ltd. It was established in the beginning of 1999 from state-owned company reform. The company now it has more than 70 staff and annual exports amounting to billions of dollars. They are product suppliers of various electric power transmission equipment	In the past they have been awarded contracts for the supply and delivery of tools and equipment by the World Bank under the Nepal Power Development Project, the contract was worth \$431,912.
11	Nepal Wire And Cables (P) Ltd.	Nepal	2322 Basundhara (Narayan Gopal Chowk) Maharajgunj, Chakrapath - 5	Nepal Cables' is an industrial, contracting and trading house group supplies conductors for various voltage level projects. A detailed list	Extensive experience of working in the transmission sector.

Table 15. Recommended Material Suppliers					
S. N.	Name of the Firm	Country of Origin	Contact Details	About the Company	Experience in Nepal
			P.O.Box: 930, Kathmandu, Nepal. Tel: 4372113, 4372323, 4373315 E-mail: info@nepalcables.org.np, necables@wlink.com.np	of their products is available at: http://www.nepalcables.org.np/products.php	
12	ABC Transformers Private Limited	India	Amil Bansal (Manager) A. B. C. Transformers Private Limited A- 41, Sector- 58, Gautambudh Nagar, Sector 58 Noida - 201301, Uttar Pradesh, India M: +(91)-9811137483 M: +(91)-9555886099	ABC Transformers is an engineering enterprise established in 1993. It is one of India's leading manufacturers and exporters of power and distribution transformers in the low/medium voltage segment.	ABC transformers are supplied in Nepal via local vendors.
13	Sieyuan Electric Co., Ltd	China	Sieyuan Electric Co., Ltd. Address: No.3399,Huaning Road, Minhang Dist, Shanghai, China Tel: 008621-61610471/008621-61610149 (Answering service time: Monday to Friday 8:00-12:00, 13:00-17:00, except	Sieyuan Group Co., Ltd. was founded in 1965, as a manufacturer of power transmission, distribution, protection, and metering equipment for voltages up to 750 kV. It engages in the manufacture and sale of power transformers, distribution transformers, HV surge arrestors, transformers, insulators, MV&LV switchgears, prefabricated substations, etc.	Has been awarded a contract by NEA for the procurement of Chapali 132 kV Substation, Lainchaur-Chabahil 66 kV underground cable link and associated work

Table 15. Recommended Material Suppliers					
S. N.	Name of the Firm	Country of Origin	Contact Details	About the Company	Experience in Nepal
			legal holidays) E: mail:webmaster@sieyuan.com		
14	Aditya Birla Insulators	India	P.O. Meghasar District Panchmahal Holol, 389330, Gujarat, India E: abi.export@adityabirla.com	Aditya Birla Insulators is the country's largest, and the world's fourth largest manufacturer of electrical insulators	No experience reported
15	EMC Limited	India	Constantia Office Complex, 11, Dr. U. N. Brahmachari Street, 8th Floor, (South Block), Kolkata – 700017 +91-33-22893122-24 +91 –33-40158888 +91-33-22893121 info@emcpower.com	EMC is one of the leading Indian EPC player qualified for high-voltage transmissions line up to 765 kV and is ready for 1200 kV projects. Its capabilities under this segment include: Transmission line projects of up to and including 765 kV EHV substations (both GIS & AIS) of up to and including 765 kV	No experience reported

Traders in Nepal for Material Supplies

Table 16. Traders in Nepal for Material Supplies			
S.N.	Name	Contact Details	Material Supply
1	Pallavi Electra Limited	Ram Chandra Rauniyar Marketing Executive M: +977 9852027490 E: sales.pallavielectra@gmail.com	Transformers
2	Premier Wires Pvt. Ltd.	K P Lamichhane Marketing Manager +977 9860224183 E: krishna@shardagroup.com	Conductors
3	Prime Ventures Pvt Ltd	Alok Singh Sales Manager M: +977 9841736618	Panel Material
4	Transweld Nepal Pvt Ltd.	Anil Aryal Marketing Executive M: +977 9851172147 E: anilaryal11@gmail.com , business@transweldnepal.com	Safety Equipment
5	Machinery & Electric Complex	Rajendra Bothra T: +977-1-4232545 E: mecktm@mos.com.np , sales@mecktm.com	Cable Joints and related accessories

Local Consultants

There are few local Nepalese firms active in the transmission sector. They are generally engaged by international firms as subcontractors for various activities and to provide local knowledge. We met almost all of them and feel they can be good fit with international engineer/EPC companies. The recommended firms are shown in Table 17.

Table 17. Recommended Local Project Management/ Engineering Firms

S. N.	Name of the Firm	Country of Origin	Contact Details	About the Company	Experience in Nepal
1	Fichtner	Inter-national	Mr. Dietmar Brakemeier, Business Development Asia and Mr. Tilman Herzig Fichtner GmbH & Co. KG Sarweyastraße 3, 70191 Stuttgart, Germany Tilman.Herzig@fichtner.de	One of the leading companies in consulting/ project management in the world with technical, commercial and economic expertise. Expertise in planning and optimization of facilities for power transmission and distribution.	Engaged in project management of Middle Marsyangdi Run-of-River Hydropower Plant, Nepal
2	Jade Consult P. Ltd.	Nepal	Mr. Prawin Aryal, General Manager 42/34 Kabil Marg, P.O. Box: 746, Thapathali, Kathmandu, Nepal E: prawin.aryal@jadeconsult.com.np M: 9851074619	Transmission line, substation, hydropower projects, geological study, environmental study and other civil infrastructure-related works.	Owner's engineer for construction supervision and contract management for Hetauda-Dhalkebar-Duhabi 400 kV Transmission Line Project, Nepal 400/220 kV Tamakoshi (Khimti) - Kathmandu Transmission Line Project-reparation of technical specifications and bidding documents, support in bidding process, supervision during construction, testing and commissioning of the project. Consulting services for engineering of the construction of the 220 kV Chilime – Trishuli

Table 17. Recommended Local Project Management/ Engineering Firms

S. N.	Name of the Firm	Country of Origin	Contact Details	About the Company	Experience in Nepal
					Transmission System Project and associated components such as substations and neighborhood electrification. Feasibility study and Initial Environmental Examination study for 220 kV Upper Trishuli-1 HEP Switchyard – Trishuli 3B Hub Transmission Line
3	Total Management Solutions	Nepal	Mr. Prajol Shrestha Lalupate Marg, Kathmandu 44600, Nepal Phone: +977 1-4439182 E: prajol.sh@gmail.com	TMS Pvt. Ltd. is a leading multidisciplinary ISO 9001: 2008 and ISO 9001:2015 certified Nepali consulting firm established in 2002. TMS provides quality engineering and management consultancy services. TMS provides wide ranging services in review, planning, design, implementation supervision & management, and monitoring & evaluation of infrastructure projects including institutional development and capacity building of its clients.	A detailed list of projects in Nepal is available at: Ongoing Projects: http://tms.com.np/new/?page_id=207 Completed Projects: http://tms.com.np/new/?page_id=445
4	Sigma Con	Nepal	Gunja Prasad Shrestha. Managing Director. 111/19, Miteri Marga, Baneshwore, Kathmandu.	EPC contractors for substations (electrical)/substation (civil) and transmission lines	Hetauda – Kulekhani – Matatirtha – Siuchatar 132 kV second circuit line stringing project: hot line stringing of second circuit.

**Table 17. Recommended Local Project Management/ Engineering Firms**

S. N.	Name of the Firm	Country of Origin	Contact Details	About the Company	Experience in Nepal
			sigmacon@wlink.com.np shresthagp@gmail.com +977 9851020796		220 kV twin conductor, double circuit, transmission line construction from Gonger to Khimti

Recommended Local Transportation Companies

Table 18. Recommended Local Transportation Companies					
S. N.	Name of the Firm	Country of Origin	Contact Details	About the Company	Experience in Nepal
1	Premier Global Logistics Ltd	India	Shivendra Kumar I General Manager M: 91-99711 73016 E: shivendra@pglindia.com	Global shipping and logistics company active in the infrastructure projects sector.	The company is fairly active in Nepal and also has an office in Kathmandu. They were also engaged by Tata Projects in completing the Nepal side of the Indo-Nepal 400 kV transmission line
2	Atlas De Cargo Pvt Ltd	India	S K Sharma Mob.No+91 9810176957, 8130295961 W: http://www.atlasdecargo.com/ E: sk@atlasdecargo.com	Registered multimodal transport operator offering door-to-door services from all the ports in India to all international destinations. A certified non-US based Federal Maritime Commission.	The company is fairly active in Nepal and also has an office in Kathmandu

Overall Market Assessment

Nepal has the indigenous capability to take up civil works and supply of some the minor accessories. There are few good local consulting firms that can extend support to international firms. Thus, it is recommended that EPC contractors and engineers be procured from outside Nepal. India and China can be expected to be likely source of EPC contractors. The international firms will be likely to have local partners. A skilled workforce will also be required from outside Nepal as 220 kV and 400 kV transmission line and GIS substations will be installed for the first time in Nepal under this compact. Capacity building, spares for the next two years, and O&M for one year should be standard conditions of contracts with local companies.

5.6 Suggestions on Project Execution and Challenges Faced by Vendors in Executing Projects in Nepal

Vendors face several key challenges in Nepal:

- Forest clearance: Forest clearance is a major issue, which usually results in project delays and cost overruns.
- ROW issues include cooperation with local administrations.
- Land acquisition is a critical activity.
- Unstable project governance and a lack of project supervision can delay the projects.
- Transporting large, heavy materials such as transformers is a challenge.
- Lack of expertise and support to understand adherence to local rules and regulations of the rules of Government of Nepal can hamper implementation.

We also asked the vendors to provide inputs in the form of suggestions on how to effectively execute projects in Nepal. Their key suggestions were:

- Environment Clearance, Forest Clearance, ROW issues and land acquisition need to be finalized in a fast track mode before awarding the contract.
- Ensure timely distribution of compensation to locals.
- Deploy security forces in hostile locations.
- Employ rigorous monitoring and evaluation of the progress of work to identify shortcomings and potential delays well in advance.



For Information/Clarifications

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