Mapping Integrity in Hydropower Development Process with Focus in Hydropower Projects Developed by Public Sector

Final Draft

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ACRONYMS

AEPC	Alternative Energy Promotion Centre
BoD	Board of Directors
CBS	Central Bureau of Statistics
CIAA	Commission for the Investigation of Abuse of Authority
DoED	Department of Electricity Development
DWRC	District Water Resources Committee
EIA	Environment Impact Assessment
EPA	Environment Protection Act
ETFC	Electricity Tariff Fixation Commission
GoN	Government of Nepal
HIDCL	Hydro-electricity Investment and Development Company Limited
IBN	Investment Board Nepal
IEE	Initial Environment Examination
NEA	Nepal Electricity Authority
NWP	Nepal Water Plan
OD	Organization and Development
MoEn	Ministry of Energy
MoSTE	Ministry of Science, Technology and Environment
MP	Master Plan
MW	Megawatt
PPA	Power Purchase Agreement
WECS	Water and Energy Commission Secretariat

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CHAPTER I: INTRODUCTION

1.1 Background

Nepal occupies around 0.3% of Asia's area and 0.01% that of world. Nepal possesses about 2.3% of the world's freshwater resources.Water is one of the most important natural resources of Nepal. The country is rich in water resources. The major sources of water are glaciers, rivers, rainfall, lakes, ponds and ground water. There are over 6000 rivers (NWP 2005) with an estimated length of 45000 Kilometres (CBS 1995). The total annual average run-off through these rivers is 225 billion cubic metres (WECS 2005).Of the total available annual water budget, only 15 billion cubic meter or 6.7% is used for various end uses (WECS, 2005). The use of water in the domestic, industrial and agricultural sector is 3.43, 0.27 and 96.3% respectively (Yogacharya, 1996).

The country has utilized mainly medium and small rivers for different uses such as drinking water, watermill, irrigation and hydropower. The larger and perennial Himalayan rivers, except for a few run-off-the-river schemes such as Marsyangdi, Middle Marsyangdi, Kaligandaki A, Sunkosi, Bhote Koshi and Trishuli, have been left so far untapped for hydropower generation. Nepal's storage capacity is estimated at 88 billion cubic metres. The average annual precipitation is approximately 1700 mm (80% of which occurs in the monsoon season from June to September).

Nepal's electricity generation is dominated by hydro-power. The steep topography, monsoon rain, high-runoff, and snow-fed rivers offer great potential for hydropower development in Nepal. Theoretically, it is estimated that 83000 MW of electricity could be produced (Shrestha, 1968), however, the economically feasible potential is evaluated at approximately 43000 MW. Nepal has a history of over 100 years of hydro-power development with the first hydro-power plant of 500 kWelectricity, built in Pharping, Kathmanduin 1911 A.D. at the time of Rana Prime Minister Chandra Sumsher.

Until now, the country has been able to harness only 713 MW of hydro-power, which is less than 2 percent of economically potential hydro-power of the country. Out of this 713 MW, Run-off-River (R-o-R) type hydropower contributes 621 MW and remaining 92 MW is contributed by storage type hydropower. Currently, peak hour demand for electricity stands at 1200 MW. Most of the hydro-power plants in the country are run-of-the river type, and there is only one storage type hydro-power plant till now. The rivers and streams are generally dried up in winter and there is low volume of water in the rivers during this season. This has direct impact on electricity generation. In the past, there used to be power surplus in summer and power deficit only in winter. For some years in the recent past, there has been power shortage in both summer and winter seasons, but the power shortage is acute in winter when load-shedding

hours are very long. The country has been facing acute power shortage since 2006 and currently, the country is facing 12 hours of load shedding.

The Government of Nepal (GoN) has been giving priority to harness electricity in all periodic plans. There has been a paradigm shift in hydro-power generation since the eighth five-year plan which was implemented after restoration of democracy in 1990. The government brought out Hydropower Development Policy, 1992, Electricity Act, 1992, Electricity Rules 1993, and Electricity Tariff Fixation Rules, 1994. The Hydropower Development Policy for the first time paved the way for private sector investment (both national and foreign) in hydropower development and envisaged to export hydropower including establishment of an independent Electricity Tariff Commission, among others. The government came up with new Hydropower Development Policy, 2001 which aimed to develop hydropower as exportable commodity.

The GoN brought out Water Resources Strategy, 2002 and National Water Plan, 2005 which have recognized the fact that low utilization of hydro-power is primarily attributable to high cost of hydro-power projects, financial resource constraints and inherent delays in project implementation. They envisaged developing 2230 MW of hydropower by 2017 and 4000 MW with substantial amount of hydro-power for exports by 2027, in 25 years period.

The GoN formed a task force in 2008 to make a 10-year energy plan to produce 10,000 MW of electricity. The government formed another task force in 2009 to formulate a 20 year energy plan to produce 25,000 MW of hydro-power; however, the report has not been endorsed by the GoN. In order to address the ever growing power shortage in the country, the GoN declared 'energy crisis ' in the country in 2010 for four and a half years period and brought out an energy plan to produce 2500 MW of hydropower by the end of 2071 B.S. There have always been changes in the energy plan with the change in the government.

The current thirteenth plan (2013/14-2015/16) envisages hydropower projects with 668 MW capacity to be completed in the plan period. Political instability, conflict, insecurity, lack of financial resources, lack of suitable environment for foreign investment and bureaucratic hassles are often cited as impediments for hydropower development in Nepal. Besides these, the contribution of systemic and other forms of corruption and lack of integrity is very high in the present acute shortage of energy and the sluggish development of hydro-power development in the country which might aptly be called a situation of "poverty in the mildest of riches". Transparency International in its global corruption report, 2008 has cited hydropower development as one of the most important water subsectors which offer large opportunities for corruption which most often stems from large investments and highly complex engineering projects.

Although hydropower policy has emphasized on hydropower development process to be made simple, and transparent, present hydropower development process still seems very cumbersome and requires passing through 14 major stages. There has been no study on Nepal's hydropower development process from integrity perspective, it is very important to look into integrity aspect in hydropower development process because if integrity could be maintained in the hydropower development process, not only the prospect for corruption could be checked or minimized, the development of this important sector of economy could be accelerated and the energy could be cheaper too. Keeping this in mind, this present study has been carried out, with support from Jalsrot Vikash Sanstha (JVS) and Global Water Partnership (GWP,to examine current hydropower development process in Nepal through integrity lens and suggest appropriate measures to improve and enhance integrity in hydropower development process. There has been no study on hydropower development process.

1.2 Objectives

The overall objective of this study is to contribute to enhance integrity in hydropower development in the public sector to be followed by hydropower projects developed by public sector.

The specific objectives are:

- To identify integrity risks in the major identified stages of hydropower development process, and
- To suggest appropriate interventions/measures to mitigate the identified integrity risks.

1.3 Approaches and Methodologies

The following approaches and methodologies were adopted:

1.3.1 Literature review of relevant materials

There have been very few studies on corruption in water sector, be it on water supply and sanitation, irrigation or hydropower. These studies have revealed that each water sub- sector across countries, particularly in African and Asian countries has been victims of corruption, the extent and magnitude of corruption may be different ranging from petty corruption to grand corruption or to systemic corruption. Each country has adopted measures to combat such corruption. They have anti-corruption laws and institutions in place to fight with corruption. All governments are committed to control corruption in their respective countries.

In Nepal also, all these water subsectors are prone to corruption as there have been huge investment and there is lack of transparency and accountability in these sub-sectors. The Commission for the Investigation of Abuse of Authority (CIAA), an apex and constitutional anti-corruption body investigated a case of transformer procurement of Nepal Electricity Authority (NEA) in 2013 and filed cases to the Special Court against its officials which is a glaring example of corruption in electricity sector.

1.3.2 Review of institutions involved in hydropower development process

Institutions involved in hydropower development:

The main public institutions involved in hydropower development process include:

- Ministry of Energy (MoEn)
- Water and Energy Commission Secretariat (WECS)
- Ministry of Science, Technology and Environment (MoSTE)
- Department of Electricity Development (DoED)
- Nepal Electricity Authority (NEA)
- Alternative Energy Promotion Centre (AEPC)
- Electricity Tariff Fixation Committee (ETFC)
- Investment Board Nepal (IBN)
- Hydro-electricity Investment and Development Company Limited (HIDCL)

The MoEn which was established in 2009 (with the disintegration of Ministry of Water Resources into Ministry of Irrigation and MoEn) is the key government ministry, mainly responsible for formulation and implementation of policies related to hydropower development which is the most promising energy sector, in Nepal. The WECS is also a central level organization and is involved in policy formulation and research and development of water sector. The MoSTE is mandated to look into Environmental Impact Assessment (EIA) of Hydropower projects and its approval is necessary to implement hydropower projects. The DoED is the government department, established to carry out promotional and regulatory functions with respect to hydropower development. The DoED issues licenses to study, build and operate hydropower projects greater than 1 MW. The NEA is the main state enterprise responsible for generation, transmission and distribution of electricity. The AEPC has been established under the MoSTE and promotes renewable technologies in rural areas and implements pico, micro and mini-hydro projects. The ETFC is the tariff regulator of electricity. The IBN is mandated to mobilize and manage domestic and foreign investment for the development of hydro-power projects above 500 MW. Similarly, The HIDCL has been established as a company in 2011 to invest either as debt or equity in medium or large hydro-power generation, transmission and distribution projects.

Besides public sector entities, after Nepal opened power sector to private sector investment in 1992, many private hydropower development companies have come into operation and are actively involved in hydropower development projects in the country. As per Electricity Act, 1992 and Electricity Rules, 1993; both public and private power companies need to obtain approvals of the MoEn for study and survey, and generation license. However, private power producers are required to enter into Power Purchase Agreement (PPA) with NEA and financial closure within one year of PPA prior to obtaining generation license from the MoEn.

1.3.3 Review of Relevant Policies

Hydropower Development Policy, 1992 is the first policy for hydropower development which required a license to be obtained for constructing a hydro-electric project with a capacity of more than 1000 KW and thus opened hydro-power development to private sector as well and envisioned to export hydroelectricity produced in excess to the national demand to the neighboring countries. In order to implement the provisions of the policy, Electricity Act, 1992 and Electricity Rules, 1993 were formulated and implemented and these legal instruments have specified the process for hydropower development in Nepal.

The Act has classified hydro-power projects to be developed into two types based on their capacity-hydropower project with <100 kW to ≥ 1 MW and hydropower project with> 1 MW capacity and has set different provisions for two types. For the first type of hydro-power project, a project proponent (who may be a citizen or corporate body) does not require a license for survey, construction, and/or operation of production/transmission/distribution of a hydropower project with installed capacity less than 100 kiloWatt (kW) (Section 3 of Electricity Act). However, the proponent will have to obtain a permit from the District Water Resources Committee (DWRC) prior to the commencement of survey, construction and operation of production/transmission/distribution facility (Water Resources Act, 1992). For the second type of hydro-power project (with a capacity of > 1 MW) a person or a corporate body is required to take a license to conduct survey, and for generation, transmission or distribution of electricity and should submit an application to the concerned officer with the economic, technical and environmental study report of the proposed project along with other necessary documents.

The Electricity Act also requires the concerned officer to issue license to the applicant in the prescribed format within 30 days of application received in the case of carrying out the survey and within 120 days, in the case of license for generation, transmission or distribution of electricity. Though there is no requirement of obtaining license the act requires that a person or a corporate body who wants to generate, transmit or distribute electricity with the capacity ranging from 100 kW to 1000 kW to inform the concerned officer of the government. The terms of license for survey is 5 years, in maximum, whereas the terms of license for generation,

transmission or distribution of electricity is up to 50 years, in maximum. In case, a licensee desires to sell or transfer, approval of the concerned government authority is needed. According to this Act, if a licensee acts against the Act, the concerned officer may issue an order to make necessary improvement as prescribed within the specified period. If he or she fails to do so the concerned officer may cancel the license of such person by giving reasonable opportunity to explain one's own innocence.

The Act authorizes the government to enter into agreement with licensee for bulk purchase of electricity, guarantee for the necessary capital to be invested or other financial and technical matters. The Act also requires licensee to pay specified amount of royalty after generation of electricity. Only one percent custom duties are imposed for the import of materials which are not produced in Nepal and imported for generation, transmission, or distribution of electricity. The Act has also provision to repatriate principal and interest of loan in necessary foreign currency if foreign investment is made in the form of loan or equity for generation, transmission or distribution of electricity. The Act authorizes the licensee to realize electricity tariff or other charges in the amount as fixed by electricity tariff fixation commission.

The Act mandates Electricity Tariff Fixation Commission (ETFC) to fix the electricity charges and other charges based on the rate of depreciation, reasonable profit, mode of plant's operation, consumers' price index, royalty etc. It offers opportunity for a person who desires to sell electricity in bulk to the government. The rate of electricity to be produced will be on the basis of fixed percentages of avoided cost or an addition to the generation cost or fixed percentage of average tariff of NEA so that total investment could be recovered in 25 years by deducting depreciation cost. It also enables a person who desires to import or export electricity with government approval.

The Act has provision for appeal. If a person is not satisfied with the decisions of cancellation of license, on the amount of compensation and on the punishment given by the prescribed authority, the person can appeal to the appellate court within 35 days against such decisions. The Act prohibits nationalization of land, building, equipment, structure related to electricity generation, transmission or distribution. It disallows substantial adverse impact on environment by way of soil erosion, flood, landslide, air pollution etc. Environment Protection Act, 1997 and Environment Protection Rules 1997 require a proponent, who wishes to supply electricity through installation of transmission lines of 132kV or above capacity, or generates electricity of less than 50 MW capacity, needs to carry out Initial Environment Examination (IEE),and get it approved from the concerned ministry (Ministry of Energy), but if the construction of hydro-power project is inside forest areas, national parks, sanctuaries, conservation areas, buffer zones, and environment conservation zones or displaces with more

than 100 people with permanent residence and involves construction of multi-purpose reservoirs, in that case the proponent has to carry out EIA study. For generating electricity more than 50 MW, a proponent needs to carry out an Environment Impact Assessment (EIA) and get it approved from the concerned ministry (MoSTE).

Considering the internal consumption demand and export possibility of hydropower, GoN brought out a new Hydropower Development Policy in 2001 which is geared towards establishing investment friendly, clear and transparent procedures to promote private sector participation in the development of hydropower The policy also envisions restructuring of existing public institutions to create competitive environment by encouraging the involvement of community/cooperative institutions, local bodies and private sector in generation, transmission and distribution of hydropower for reliable and quality electricity service at reasonable price. It also aims to make the procedures of fixing the electricity tariff rational and transparent with a view to establish a reasonable price of electricity.

Interim Constitution of Nepal 2007 and Right to Information Act, 2007 empowers every citizen the right to information and ensures every citizen access to information held in public bodies. The Act requires a public body to respect and protect the right to information of a citizen, to make the citizens' access to information simple and easy, and to conduct its function openly and transparently.

Good Governance (Management and Operation) Act, 2008 requires every government office to maintain citizen's charter and officials to make decisions in transparent way by following procedures as prescribed and within the time stipulated by law and to hold public hearing on delivery of service to the people. It also necessitates government to make arrangements for the provision of operating any project or programme with direct participation and ownership of the people.

Public Procurement Act, 2007 has made various provisions to make the procedures, processes and decisions relating to public procurement much more open, transparent, objective and reliable.

1.3.4 Guidelines/Manuals/Directives

The DoED has developed guidelines for study of hydropower projects in 2003. The department has also brought out in operation a number of manuals that include: Manual for Preparing Scoping Documents, Manual for Preparing Terms of Reference, Manual for Preparing Environmental Management Plan, Manual for Public Involvement, Manual for Developing and

Reviewing Water Quality Monitoring Plan and Results, Manual for conducting Public Hearing and Manual for Addressing Gender Issues. The MoEST (now MoSTE) has also prepared a Guide to Environmental Auditing of Hydropower Projects and a Handbook on Licensing and Environment Assessment Process for Hydropower Development in Nepal. With a view to make power development agreement clear, transparent and properly manage, the MoEn has made procedural guidelines, 2013 for power development agreements (PDAs) with proponents of hydro-power projects who intend to do so. The ministry has also prepared Directives on licensing of hydropower survey and generation.

1.3.5 Hydro-power Development Stages/Process

Hydropower development process is not simple and involves the following 14 stages:

1. Preliminary selection of hydropower project based on master plan and on-site visit
2. Submission of application with necessary documents to DoED for survey permit
3. Recommendations to the MoE from the DoED for ministry's approval if found appropriate to issue a survey license through document examination
4. Issuance of survey permit by the MoE after reviewing documents
5. Conduction of project feasibility study (technical, financial and environmental) and approval of concerned government agency on environmental impact assessment study
6. Submission of necessary documents to NEA (or other appropriate agency) for PPA
7. PPA after examining documents, technical study and review process
8. Submission of necessary documents, including project feasibility study (technical, financial and environmental), initial funding arrangement, power purchase agreement, to electricity development department for permission of electricity generation
9. Recommendation by the DoED to the MoE for approval
10. Issuance of generation permit by the MoE after reviewing
11. Financial source to be ascertained by the proponent within one year of power generation license
12. Construction of project after necessary detail designing of the project and submission of half-yearly progress report of construction by the proponent
13. Generation of power by the proponent throughout the license period as per the terms and conditions of the license
14. Handing over of the project by the proponent to the GoN , free of cost, at the end of the period of generation license

1.3.6 Development of Integrity Framework and Identification of Integrity Risks

Integrity Framework: Integrity is synonymous with honesty and refers to the need for public officials to be honest in carrying out their functions and resist corruption. Transparency, Accountability, and Participation (TAP) are considered main pillars of integrity.

Integrity Parameters	Definition
Transparency	Public decision making processes are open, and information about the process are communicated to those who are affected, all stakeholders have easy access to data and information and are knowledgeable about the standards to expect from public officials
Accountability	Public agencies responsible for public good are answerable for their actions to those they serve and refrain from abuse of power
Participation	People who have access to information, a stake in upcoming decisions with the opportunity to get involved in and influence the decision making process, and rights and possibilities to effectively file complaints and complaints are heard.

How integrity aspects have been addressed and integrated in hydropower development processes are analyzed through these three integrity parameters lens.

1.3.7 Focus Group Discussion

Focus group discussions and interactions were held with concerned stakeholders and experts to discuss about integrity aspects in hydropower processes which are important for hydropower projects promoted by public sector (Annex 1: List of people met).An interview guide was also developed to solicit required information.

1.3.8 Selection of Hydropower Projects (Case Projects)

The share of public sector in hydro-power production is still two-thirds of total hydropower generation. Hence, public sector hydropower projects were chosen for the study. Hydropower projects developed by the NEA, namely, Kulekhani III and Upper Trishuli III A have been taken as case projects for the study. These projects were thought to be appropriate candidate for such study because of the controversy surrounding these projects as well as the availability of time and resources for the study. A short-description of each project is presented in Annex 2.

1.3.9 Sharing of Findings and Submission of Recommendations

Findings of the study were shared at the stakeholders' workshop and recommendations were made after incorporating feedback of the workshop (Annex 3).

1.4 Limitation of the Study

The study looked into integrity aspects at various stages of hydropower projects, particularly of hydropower projects developed by public sector. It neither measured nor looked into corruption of individuals or public and private agencies engaged in hydropower development.

1.5 Structure of the Report

The report is presented in three chapters. The first chapter deals with introduction which covers background, objectives, approaches, limitation and structure of the report. The second chapter analyzes to what extent integrity aspects have been addressed and incorporated at various stages of hydropower development. The last and final chapter provides recommendations to improve integrity in hydropower development process.

CHAPTER II: ANALYSIS

There are different models of hydropower development in Nepal. Hydropower projects are developed by both public and private sectors. There are hydropower projects developed by the government itself and by the NEA in the public sector. In the private sector, both domestic and foreign companies are involved in hydropower development. The share of public sector hydropower development projects is still higher in total hydropower generation of the country. Two-thirds of the total hydropower generation is still in the public sector as this sector was open to private sector only after 1990. For this study, the hydropower project developed by the NEA has been given focus and two projects being developed by the NEA have been taken as candidate projects, namely Kulekhani III Hydro-electric Project and Upper Trishuli Hydro-electric project III A.

Unlike other developmental projects, hydropower development projects have a complicated process and are time consuming. A hydro-power project has to pass through a number of stages-starting from identification, pre-feasibility, environment impact assessment, detailed feasibility study, PPA (in case of private power producer), financing, designing, construction, and operation, including clearances from government. As per the prevailing hydropower development related laws, a hydropower project has to pass through 14 major steps to get it implemented and various agencies are involved in the process. If everything goes fine, a hydro-power project is completed within five years.

As per the Electricity Act, 1992, a person or a corporate body can develop hydro-electricity by taking license from the concerned agency of the government. The Act empowers government of Nepal that it may do or cause to do the generation, transmission or distribution of electricity by entering into a contract with any person or corporate body subject to the terms and conditions as mentioned in such contract. A person or a company is not generally given permission to undertake hydro-electric projects identified under Master Plans (MPs) of Koshi, Gandaki, Karnali and Mahakali.

Besides this, a person or a company will not normally get permission for those hydropower projects whose studies have been completed by the government or underway or which are already selected for study or are included in annual program of the government. Hydro-electric projects which have been studied by the government or through foreign assistance, government can develop such hydropower projects itself or can give to a domestic or a foreign company, or joint venture through competitive bidding or government can develop such hydropower through cooperatives which have objectives to develop hydropower.

An analysis has been done to find out to what extent integrity aspects have been safeguarded in those steps and what are the potential integrity risks at major stages of hydro-electricity development.

2.1 Integrity Risk Area One: Project Selection/Identification

It is the first and important step of any hydro-electricity project. In the past, it was the government who used to select the project. After the opening of hydro-power development to private sector, an individual or a company who wants to involve in hydropower development can also chose a project of his choice after getting license from the concerned agency of the government. In the case of an individual or private company, it is the individual or private company who selects the hydro-electricity project and applies for licenses as per the Electricity Act. It is the government who provides licenses to the individual, private company for survey and for generation, transmission and distribution of hydro-electricity on first come first basis.

In the beginning, many people who had access to political power were in fact attracted to take the licenses of hydro-power projects. The financial and technical capacity of the applicants for hydro-power development projects was not assessed properly. As a result, hydro-power licenses went to the hands of wrong people, not in the hands of real developers, and hydro-power projects could not be developed as they involved in horse-trading of hydro-power licenses instead of developing the hydro-electric project.

The governance of licensing hydro-power projects has not been so strong; the licenses of some license holders who have not complied with terms and conditions of the license have not been canceled as per the Electricity Act.

Before Electricity Act came into effect, the NEA being a fully state-owned public company, did not require license to take from the government to do any hydro-power development project. Electricity Act now requires the NEA also to take license from the government for survey and for generation, transmission and distribution of hydro-electricity, treating equally with the private hydro-power producers. The project development department under the Engineering Services Directorate of the NEA conducts and designs the hydropower projects to be developed by the NEA. The Board of Directors (BoD) decides on the selection of hydropower projects.

In the past, Government prepared Master Plans of major rivers such as Koshi, Gandaki, Karnali and Mahakali, a number of potential hydro-electric projects were identified under these Master Plans. These Master Plans have covered large hydro-power projects that can be developed in these rivers. The government has also prepared Master Plan of medium hydropower projects. However, these master plans have not covered many hydro-power projects of small capacity. There seems to be a need for another Master Plan for hydro-power projects which are not covered by earlier MPs. Moreover, these Master Plans need to be updated. The optimal and

sustainable use of water resources must be assessed properly and thoroughly. Moreover, the government has not prioritized hydro-power projects mentioned in the MPs. There is a need to prioritize and implement the hydro-power projects accordingly.

Government has also carried out some independent pre-feasibility and feasibility studies of some hydro-power projects. Based on Master Plan and feasibility study reports, government selects hydro-electricity projects to be undertaken by the government or public company. However, this is not always the case, the private individual or company may identify a project on its own and requests for survey license.

In the case of the NEA, once the hydro-electric project is selected, project manager is appointed by the Managing Director of the NEA and project office is established and necessary staffs are made available. This mode of executing projects these days are changing as NEA is also engaged in setting up independent companies to do projects where other investors too may partner with NEA.

Integrity Risks

There has been political influence In the selection of hydropower projects as there is no clear cut policy for selection of hydropower projects. Sometimes, selection of the project is donor driven (if it is a donor funded project). There has been no reasonable and convincing basis for selection of some hydropower projects developed by the NEA. Kulekhani III and Chameliya hydroelectric projects are such type of projects. The Board of Directors of NEA selected these projects in absence of valid reasons. The basis of the decisions related to selecting a project is not made public. There lacks transparency and accountability in the selection of such projects. These projects were thought to be infeasible and there were other cheap potential hydro-power development projects that could be undertaken by the NEA in the place of these two projects. The costs of these two projects have gone up unexpectedly, and the NEA is bearing unnecessarily high costs for these projects. Nobody is taking the responsibility for this. There should be some mechanism to hold state agency accountable and responsible for such wrongdoings.

If it is a hydro-electric project to be developed by a private developer, either a person or a company, the proponent has to submit application along with a desk study report which contains detailed costs breakdown, work schedule, hydrological analysis of the project, and documents that testify the proponent's financial and technical capacity, among other things, to the hydro-electricity department to get permission for survey of the project. In this case also, there may be political undue influence.

There are numerous management problems in the execution of the projects which ultimately translates into high costs. There is political influence to send own project manager to the project in order to get undue benefits from the project. There is weak project management. The project manager is given limited authority. The authority is vested in Managing Director and /or in the Board of Directors of NEA. The decision making is slow in NEA as a result it has to bear huge amount of money to contractors as compensation for not meeting contractual obligations in time. In Kulekhani III project, 4 project managers have been changed and 152 staffs have been deployed as against 52 staffs to be necessary for the project as pointed out by organization and management study. The project is incurring heavy administrative cost. Same is the case of Upper Trishuli A project, 4 managers have already been changed, but there is no problem of over staffing as in Kulekhani project. There are no valid reasons why project managers have been changed so frequently. There are chances of collusion with suppliers for supply of materials and equipment.

2.2 Integrity Risk Area Two: Planning/ Study/Investigation

The GoN has carried out Master Plans of some large rivers such as Koshi, Gandaki, Karnali and Mahakali. They have not been updated. The NEA has also conducted pre-feasibility and feasibility studies of some hydro-power projects. This year, the GoN has allocated over one billion rupees for feasibility of hydro-power projects, including 4-reservoir type hydro-power projects and 3 large and medium hydro-power projects (including Upper Arun hydro-electric project). In the case of private party, reconnaissance or preliminary study, pre-feasibility study, and feasibility studies are carried out by the proponents after getting license from the ministry of energy.

The survey work has to be finished by a proponent within 5 years. Environment Protection Act (1997) and Environment Protection Rules (1997), require a proponent to submit an Initial Environmental Examination (IEE) report if it is a hydro-power project of 1-50 MW capacity and an Environment Impact Study (EIA) report for a hydro-power project above 50 MW capacities. A public hearing is mandatory for projects requiring EIA by EPA 1997 and EPR 1997 and is a forum for interested and affected communities to obtain and exchange adequate and accurate project information. This provides the public an opportunity to examine relevant project information and make their concerns, opinions and suggestions known to the proponents and other concerned authorities.

There have been guidelines for study of hydropower projects, 3 different formats have been prescribed for run-of-river type hydropower projects based on their capacity (run-of-river type capacity >1≤ 10 MW; 10≥100 MW and >100 MW). There have been manuals for environmental impact assessments as well. There have been public procurement guidelines that have to be

strictly followed by the government and the NEA while selecting a consultant for conducting feasibility studies.

Integrity Risks

The NEA carries out feasibility studies through its own staff or outside consultants following standing procurement processes. If the feasibility study is financed under grant assistance by the donor, there is limited competition among consultants and there is high say of the donor. Sometimes, complaints are heard that the NEA has not selected consultants properly.

In the case of private hydro-power developers, there are possibilities of manipulating hydrological data and changing site of the project in order to make the project feasible. Initial Environment Examination (IEE) is only required for hydro-power project which has capacity of less than 50 MW if the construction of such hydro-power project is not inside forest areas, national parks, sanctuaries, conservation areas, buffer zones, and environment conservation zones or does not displace with more than 100 people with permanent residence and does not involve construction of multi-purpose reservoirs. Hydro-power project of such capacity may also have substantial impact on the environment and people living in downstream. There are many projects in one river, environmental flow is very necessary to maintain as water is diverted to generate electricity in many places, which requires detailed EIA.

There may be opportunities to manipulate both IEE and EIA reports of hydropower projects by proponents without properly assessing and stating actual impact of the project on the environment although public hearing of the project has been provisioned mandatory to check such manipulation. The concerned ministry may have given some remarks while giving consent to EIA report on measures to be undertaken by the proponent, but there has been no follow-up in this aspect.

The hydro- electric projects are generally in remote places and in the areas of forests or protected areas. In such case, it is experienced that a proponent has to get clearance from the Ministry of Forests and Soil Conservation (MoFSC) which is not a simple task for the proponent and may have to wait for a long time. A proponent incurs a substantial amount of money up to this stage. If he could not get the clearance from MoFSC, he may have to attempt to use political influence or other undue means to please officials and get clearance. Similar may be the case with the Ministry of Science, Technology and Environment whose final clearance is mandatory. There should not be a situation to give license to hydro-power projects before clearance from concerned ministry, government should decide in advance where and which hydro-power projects government want to develop. If this task is left to private developer on his own, sometimes, there may be risk of collusion, bribing and undue political influence.

2.3 Integrity Risk Area Three: Power Purchase Agreement

It is one of the most important steps of hydro-electric projects, if a project is to be developed by an independent power producer or private power developer. There is a provision in the Electricity Act that government may enter into agreement with the licensee for bulk purchase of electricity. The task of power purchase agreement (PPA), on behalf of the government, is entrusted to the NEA, and which itself is a public power producer. The NEA has started doing PPA with private electricity producers since 1996. The PPA is not required for up to 25 MW capacity of hydropower projects as the NEA has already agreed to purchase electricity from independent power producers at Rs 8.40 in winter and at Rs 4.80 in rainy season. The NEA has done PPAs with various independent power producers for about 2000 MW of electricity and PPA-done projects are at different stages of development.

Integrity Risks

The PPA has been a greatest hurdle and difficult task for an independent power producer. The NEA is ready to buy electricity from other power producers only when there is electricity shortage based on its demand forecast, which is conservative. In fact, it should be dictated by the economic planning. The per capita energy requirement which NEA has based for demand forecast is low. There are no clear guidelines for the PPA and the PPA process is very slow and bureaucratic. It is subjected to varied interpretations and the process of the PPA is not transparent and non-business like with all types of risks (which are not under the proponent's control) to be shouldered by the proponent. It is generally believed that hydro-power projects are economically feasible on the average of 16% of Internal Rate of Return..

There is conflict of interest, as the NEA itself is a power producer; there is often a question how it can fairly treat with other power producers. Naturally, the NEA wants to purchase electricity from private producers at a cheaper price. Besides, PPA is constrained by transmission system's incapacity. It is NEA who decides the transmission expansion and it may have preference to its own projects. On the contrary, in the past, the NEA purchased power from some independent power producers (Khimti Power Company in 1996 at 5.9 cents per unit and Upper Bhotekoshi in 1997 at the rate of 6 cents per unit)at a very high price and has now been incurring heavy losses (NEA pays about 30 percent or Rs 5 billion out of its total income).There have been public uproars that these PPAs should be reviewed by NEA. In the case of Chilime Hydro, the rate given by NEA is at par with Khimti Hydro now. As this is a hydro-electric project with shareholding of NEA and its staffs mostly. That is why it has been able to fetch high price of electricity. This is an example of conflict of interest.

2.4 Integrity Risk Area Four: Financial Closure

Hydro-electric projects by their nature are very expensive. It is therefore impossible to a private proponent to carry out a project without the involvement of financial institutions or government support. A proponent is required to submit a detailed financial plan on how the project is being financed. The financial plan should clearly state how much fund is managed from developers as equity and how much through lending or other means. A private proponent often submits a bank's commitment along with technical, economic and environmental proposal. If it is a project promoted by the government, government itself makes necessary arrangement for funding. The fund to be required for the project is apportioned in the country's budget, there may be entirely government financing or government may receive grants or concessional loans from donors.

Integrity Risks

In the case of hydro-electric projects promoted by independent power producer or a private company, there may be risks to raise the cost of the project. There may be unhealthy competition among banks and financial institutions in financing the hydro-electric projects. Sometimes, even donors may choose the hydro-electricity projects to be financed by them and may try to influence the government to get the project citing inability of local private and public entities to finance.

In middle Marsyangdi Hydro-electric Project, the agreed initial cost of the project was 17.4 crore Euro (12. 8 crore Euro to be borne by KfW and 4.6 crore Euro from Nepal government). The cost of the project was unexpectedly increased to 31.3 crore Euro citing various reasons. The amount to be invested by the government/NEA also increased from 4.6 crore Euro to 10.8 crore Euro. In this project, donor's interest got high say and NEA was not able to properly analyze price escalation, interest during construction, foreign currency exchange risk. In donor funded projects, there are high risks that the project costs may be inflated. It is an example of a grant-funded project in which the concerned donor had more influence or say on the increament of the costs of the project.

Kulekhani III project was thought to be one of the costliest projects, infeasible from the viewpoint of its costs, but the NEA undertook the decision to implement the project without having reasonable basis. The initial cost of the project was Rs. 2 billion and 43 crore, but the cost has been increased to Rs. 4 billion 46 crore. The decision to this effect is not transparent and what led the decision is still unclear.

2.5 Integrity Risk Area Five: Designing of the project

One of the most important steps of the hydro-electric project is designing of the project. Generally, the government seeks foreign assistance for designing of the hydro-power projects.

In the case of the NEA, it has engineering department that is responsible for designing hydro-electric projects. In Nepal, the hydro-power projects with a capacity of over 20 MW have been designed by the foreign consultants. If it is a project developed by the government or the NEA, the government or the NEA receives foreign grants or loans and selects a consultant for designing through competitive bidding. Upper Tamakoshi Project was designed with Norwegian grant assistance. If it is a private company, it carries out designing of the project hiring consultant or through its own people. The actual costs of the project can be determined only after detailed design.

Integrity Risks

There are risks of over-designing or under-designing of the hydro-electric projects in the case of government or the NEA developed hydro-power projects. The hydro-power projects designed with foreign assistance are costliest as huge amount of money is spent to hire services of foreign consultants. If the government receives financial support from donors, in that case, donors have upper hand in selecting the consultant and he is accountable to the donors than to the national project manager. The consultant may work to serve the interests of the donors rather than the interests of the recipient government. This has been experienced in the projects in the past. In the case of Middle Marsyangdi Project, the German consultant-Fishner JV was selected to design and supervise the project. A tender was called for construction based on basic design before the detailed design was completed. In the Kulekhani-III hydro-electric project, a Nepali consultant was selected but he failed to carry out the tasks and he was dismissed.

If it is a project developed by a private proponent, there is a chance to manipulate the costs in order to get loans from commercial banks.

2.6 Integrity Risk Area Six: Construction

It is another most important step of hydro-electric project. In the case of private hydro-power developers, they have freedom to select contractor of their choice on whom they have full trust to complete the project within stipulated time meeting set quality standards. In the case of public company, the NEA, the construction of hydro-electric project is usually awarded to the contractor selecting from competitive bidding following procurement laws.

Integrity Risks

One of the problems of hydro-power projects in Nepal is that they are not completed in time resulting in cost-overrun and time over-run, whether they are promoted by private developers or public developer. In the case of private developers, the question of integrity risk with respect to construction of hydro-electric project does not normally arise. But there have been questions, doubts and controversies in the construction of a hydro-electricity project developed

by the NEA. In such projects, there are risks of substandard works and unwarranted contract variations, false claims, corruption in land acquisition. In Upper Trishuli A project, contractor attempted to increase the capacity of the project from 60 MW to 90 MW through undue means. If it is a donor funded project, there may be provisions restricting competitive bidding and construction materials to be compulsorily imported from the donor country like in Middle Marsyangdi Hydro-electric Project. There may not be fair practice of procurement. The initial costs of the Kulekhani-III hydro-electricity project was estimated at Rs 2 billion 43 crore, but it is now estimated to be Rs 4 billion 46 crore, almost double from the earlier estimated amount. The initial estimated cost of the Upper Marsyangdi hydro-electricity project was Euro 17.4 crore (12. 8 crore from KfW and 4.6 crore from Nepal government/NEA) which was increased to Euro 26 crore 97 lakh (16 crore 17 lakh Euro from KfW and 10 crore 80 lakh Euro from Nepal government). In the case of Chameliya hydro-power project, the initial cost was Rs 7 billion 18 crore, but it is estimated to be Rs 15 billion 6 crore, over 100 percent price escalation as construction variation orders have been approved in different times. The cost of the project has not been assessed properly; the cost of one MW electricity is estimated to be Rs 54 crore.

Many contracts for hydropower project construction are based on FIDIC (or contracts similar to FIDIC). Most project managers are not well trained on contractual issue, e.g., interpretation of various clause, delay damage penalty due to Employer's fault etc. On the other hand international contractors involved in the project construction are well versed in contractual issues and have a number of experienced lawyers in their payroll.

Most contracts (such as FIDIC) state that price escalation (due to increase in market prices of construction materials such as cement, reinforcement diesel etc) becomes effective after one year from the date that the contract is signed. Although, this is intended to save costs on price escalation, the tendency among the contractor is to start major construction works only after one year from the date of contract signing.

Contracts on transmission line construction often offer a larger proportion of contract value after supply of equipment and materials (steel towers and cables) and small percentage for erection at site. As the contractor receives most of the contract price after delivery (and has made his profit) he has no incentive to speed up the installation works (which is often priced at lower than his actual costs – as profit margins are high on supply of materials). Such installation work is often sub-contracted to local contractors who also have no incentive to speed up installation work as the prices are not competitive.

2.7Integrity Risk Area Seven: Policy

Although, most polices related to hydropower implementation are clear and well defined, there are a number of ambiguous/conflicting areas, especially between various policies.

Integrity Risks

Clearing of trees and land acquisition become time consuming and the final clearance need to be given by the Cabinet of Ministers. In a politically fragile environment with frequent changes in government, this becomes more time consuming than initially envisaged and thus the project completion time is delayed. The developer will then have to pay the cost of delay in construction.

Despite the standard clauses in the PPA such as the buy-back rates are uniform (now for projects up to 100 MW), there are also a number of other clauses that are different between hydropower plants. This provides ample opportunities for developer and the off taker to negotiate on an individual basis (instead of Developer and "the Institution") in return for financial gains by the individual. In an "ideal world", the PPA contract should be a template that can be downloaded from the internet and the blanks (name of the project, capacity and other technical parameters) filled by the developers and submitted to NEA along with the necessary fees and guarantees. Then once NEA verifies the insertions, the PPA could be signed by the two parties.

CIAA as an excuse for not making timely decision: Most authorities in the government (DoED, MoEN, NEA) are reluctant to make critical decisions on time and cite probable prosecution by CIAA. It appears that at times CIAAis a hindrance to infrastructure development rather an institution that curbs corruption. In any case most of the individuals prosecuted by CIAA are freed by the court at a later stage. Thus, CIAA needs to also focus on prosecuting civil servants for not performing their work on time (or for not performing at all!).The culture of "take no risk, make no mistake" seems to be promoted in the civil service as a result of CIAA prosecution.

2.8 Integrity Risk Area Eight: Operations

It is the final stage of hydropower development. Once the construction of a hydropower project is completed, it comes into operation. The project is required to generate electricity within time period as mentioned in the generation license. The timely maintenance of electricity plant is very crucial at this stage. During operation of a power plant, maintenance cost of equipment is generally 2% of capital costs. The quality of generated electricity has been maintained or not is also equally important. The Electricity Act requires regular inspection of quality of electricity by the concerned department.

Integrity Risks

The regular maintenance of plant is necessary which may be compromised citing financial resource and other constraints resulting in huge losses to the project. There is risk of overpricing of the spare parts by the supplier as he becomes the sole supplier in absence of effective supervision. The quality assessment report is not made public, hence, there may be undue influence to inspectors to produce positive report.

CHAPTER III: CONCLUSION AND RECOMMENDATION

Nepal is bestowed with over 6000 rivers flowing through elevations which provide suitable locations for hydro-power generation. Despite huge potential for hydro-power development, Nepal has been able to harness only less than one percent of its total potential. Traditional sources (biomass)of energy still dominates energy sector and the share of electricity in total energy is less than 2 percent. There is high demand for hydro-electricity within and outside the country.

The government of Nepal has brought out various policy measures to promote hydro-electricity production. Hydro-power development has been open to private sector as well and the government of Nepal this year has announced to provide subsidy of Rs 5 million per MW and 100 percent income tax rebate for 10 years and 50% income tax rebate until 15 years for hydro-power developers who complete projects within July 16, 2023. The government has also made power trade agreement with India. There has been agreement among SAARC member states on power trade during recently concluded 18th SAARC Convention in Kathmandu. This has paved the way for Nepal to sell out its surplus hydro-power to India and other SAARC countries, besides domestic market.

Hydro-power development projects are capital intensive. Nepalese private sector and domestic financial institutions have limited capacity to finance large-scale hydro-power projects, for which Nepal has to rely on support of bilateral or multilateral donors/funding agencies in the form of grants or loans. Some foreign private companies have already involved in hydro-power development projects in the past and many have shown interests to involve in this sector.

Hydropower development projects are marred with time overrun, cost overrun, indecision, corruption and conflicts at both local and national levels. A number of integrity risks do prevail in hydro-power development projects, particularly in projects implemented by NEA, which need to be addressed to promote integrity in hydro-power development.

This study recommends the following potential interventions to mitigate integrity risks in hydro-power development which needs to be implemented on priority basis.

1. An Electricity Regulatory Commission should be established to regulate production, transmission and distribution of electricity.

2. MPs should be the basis for project identification and guide the decision making. No project should be developed outside MPs. MPs need to be updated. An MP should be prepared for hydro-power projects which are not covered by previous MPs. The optimal and sustainable use of water resources must be assessed properly and thoroughly for a hydropower project. The government should prioritize the hydropower projects and should make it public and stick to it. It should be open to Nepalese investors first, if it s beyond their capacity, then only, it should be open to foreign investors.

3. Competitive bidding should be strictly followed for both loan and grant projects. The practice of limited competitive bidding should be discouraged.

4. Tied-loans or grants should be avoided.

5. There should be a mechanism for proper vetting of design work.

6. Maximum Construction variation percentage needs to be fixed.

7. EIA should be made mandatory for hydropower projects above 15 MW capacity.

8. PPA rate of hydropower projects above 25 MW should also be made public to attract private investors.

9. The authority of project manager, concerned department head, managing director and the BoD should be clearly spelled out. The project manger should be given more authority to make decisions. The concerned authority should be made responsible for not taking proper and timely decisions. If the loss is incurred, the concerned authority should be punished.

10. An organizational and development (OD) study should be carried out to assess the manpower needs of the project. The manpower for the project should be hired based on OD study. Project manager and other staff of the project should not be transferred until the project is completed.

11. Formats for feasibility studies should be revised. Formats for reservoir type hydro-electric project need to be developed.

Annex I: List of People Met for Focus Group Discussion

1.	Mr. Madhusudan Pratap Malla, Project Manager, Kulekhani III Hydro-electric Project, 2071/3/10
2.	Mr. Uttam Amatya, Project Manager, Upper Trishuli A Hydro-electric Project, 2071/3/15
3.	Mr. Dinesh Kumar Ghimire , Director General, Electricity Development Department, 2071/5/8
4.	Mr. H.D. Shakya, PPA Unit Chief, NEA, 2071/5/10

Annex II: Brief Description of Upper Trishuli 3A and Kulekhani III Hydro-electricity Projects

Upper Trishuli 3A Hydro-electricity Project

The under-construction Upper Trishuli 3A Hydroelectric project is a Run-off-River (R-o-R) scheme which is located in Rasuwa and Nuwakot District of Bagmati zone in the northern central Nepal. It has an installed capacity of 60 MW and gross annual average energy generation of 489.76 GWh. The headworks of the project is located about 1 km downstream of Mailung Khola-Trishuli River confluence in Dandagaun VDC (right bank) and Ramche VDC (left bank) of Rasuwa district. The underground powerhouse is located near Simle village in Manakamana VDC of Nuwakot District. The project has intake channel of 148m length and headrace tunnel of 4095m length. A 48 km long 220 kV double circuit transmission line is proposed in-order to evacuate power generated from the powerhouse to the Matatirtha substation of Kathmandu.

The construction of the project was initiated in FY 2010/11 with the financial support (soft loan) from EXIM Bank of China. An agreement was signed between GoN and China EXIM bank for a concessional loan of US$ 120 million. The estimated cost of the project is US$ 125.775 million. The loan from EXIM bank of China is expected to cover the cost of major works including civil, electromechanical, hydro-mechanical and transmission line.

Salient Features

Location: Rasuwa and Nuwakot Districts
Type: Run-off-River Scheme
Installed capacity:60 MW
Design Discharge: 51 m^3/s
Powerhouse:underground
No. of Turbine:2 in number
Headrace Tunnel Length :4.095 km
Gross Average Annual energy:489.76 GWH
Full supply Level:870.5 masl.
Tail Water Level:726.0 masl.
Project Road length:2.3 km
Transmission length:48 km (220 KV double circuit)
Estimated Project Cost:125 million USD

Contract Arrangements

The construction of this project is being undertaken under Engineering Procurement and Construction (EPC).Contract for the major construction work (Civil, electromechanical and hydro-mechanical works) was signed in 28 May 2010 with China Gezhouba Group Co. Ltd. (CGGC) at a cost of US $ 89.1779. After signing of the Loan Agreement and subsequent Subsidiary Loan Agreement (SLA) between GoN and NEA, the contract has become effective since June 1, 2011.

Contract for construction supervision of the project was signed with Northwest Hydro Consulting Engineers in September 2010. The supervision work has started since June 1, 2011.

Kulekhani III HEP

The Kulekhani III Hydroelectric Project with an installed capacity of 14 MW is located in Makwanpur district of Narayani zone southern central Nepal. This project is developed on a cascade model of Kulekhani –the only reservoir type HEP of Nepal and uses tailrace water of Kulekahni II HEP. The project site is accessible from the East –West Highway from Hetauda.The construction work of the project has already commenced.

The civil works contract was awarded to Sinohydro Corporation of China and the Electromechanical Contract was awarded to M/S Zhejiang Jinlun Electromechanical CO., China. The power generated from the project will be evacuated and connected to national grid through a 500 m long 132 kV single circuit transmission line.

GoN and NEA are funding the construction of the project. The initial total estimated cost of the project was NRS. 2.43 billion and was scheduled to be completed by December 7, 2011 (within a period of 44 months). But the construction work was halted by contractor citing various problems. Renegotiations were held with the Contractor and a Memorandum of Agreement (MOA) was signed on Feb 18, 2012 and subsequently the construction of the project resumed from March 23, 2012. As per the MOA, the project duration has been extended by another 30 months and the revised completion date is Sept. 13, 2014.

Salient Features

Location	:	Headworks near the tailrace of Kulekhani II at Bhaise Dobhan and Powerhouse in Sanutar Village (4.5 km north of Hetauda City), Makwanpur District.
Type	:	Cascade project of Kulekhani Storage Project
Installed Capacity	:	14 MW
Annual energy	:	40.85 GWh
Design Discharge	:	16.0 m^3/s
Gross Head	:	109.8 m

Annex III: Participants list

Consultation on Assessment of Integrity in Hydropower Development Processes in Nepal
October 21, 2014 (Tuesday) • The Union House, Anamnagar, Kathmandu

Registration

S.N.	Name	Organization	Signature
1	Naveen M. Joshi	JVS	
2	Upendra Santam	JVS	
3	Sanjay Dhungel	WECS	
4	Dr Sanjay Sharma	DOED	
5	Dr. Kishor Babu Nyaupane	JVS	
6	Mr. Bal Krishna Prasai	"	
7	Kaver Outa	"	
8	Som Nath Poudel	"	
9	M.P. Malla	NEA	
10	S. Lacaul	OPMCM	

Registration

S.N.	Name	Organization	Signature
11	Shital Babu Regmee	JVS	
12	JANAK KARMACHARYA	CEDB2	
13	KP Sharma	JVS	
14	Kumar Pandey	IPPAN	
15	Samundra Sigdel	JVS	
16	Tejendra Bdr SC	GWP Nepal	
17	Bharat Kumar Sapkota	VWP/JVS	
18	Rukmini Adhikari	JVS	Bohikari
19	Monica Maharjan	JVS	
20.	Surya Nath Upadhyay	GWP Nepal / JVS	

Annex IV: Photographs