

Comprehensive Options
Assessment for

Electricity Sector in Nepal

Dialogue on

DAMS & DEVELOPMENT:

NEPAL

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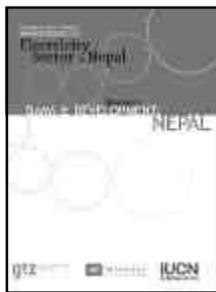
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This Dams and Development Strategic Priorities Series summarizes the findings and serves as a platform for continuing the dialogue on the issues of water resources development and dams in Nepal. This report can assist in the evolution of the policy process, but it is not the policy document of any of the organizations involved in the specific priorities series consultative processes.



Foreword

It is five years since the first publishing of the report of the World Commission on Dams (WCD) in 2000.

Globally, reactions to the report ranged from strong support to serious concerns. Supporters pointed to the opportunities the WCD process provided for finding ways beyond the polarised debates of the past. Others perceived the guidelines as unrealistic and impractical claiming that they could unnecessarily delay the implementation of projects. His Majesty's Government of Nepal (HMG/N) also expressed reservations about the WCD framework and had taken a critical view of its report. In order to move beyond the polarized debate, IUCN Nepal facilitated a consultative process on January 2003 where representatives of government, private hydropower developers, non-governmental research organisations, and people affected by dams participated in the process, which compared Nepal's legal provisions with WCD guidelines. The report of scoping study suggested that Nepal's legal provisions cover many recommendations made by the WCD. Furthermore, new policies on water and energy development and management have been introduced in a pluralised policy terrain.

The consultative process recommended that the dialogue be continued in a second phase focusing on the strategic priorities. Of the seven strategic priorities, four were prioritized for further consultation and analysis. They were gaining public acceptance, conducting a comprehensive options assessment, recognising entitlements and sharing benefits, and

ensuring compliance. The responsibility for dialogue and analysis were as follows: gaining public acceptance: IUCN Nepal and DBS Consultancy with the representation from the Department of Electricity Development (DoED); conducting a comprehensive options assessment, Winrock International with representation from Nepal Electricity Authority (NEA); entitlements and sharing benefits and ensuring compliance, Nepal Water Conservation Foundation (NWCF); and ensuring compliance, Water and Energy Users Federation (WAFED). IUCN Nepal facilitated the second phase consultative process.

This report analyzes the demand and supply scenario of electricity, water resources policies, environmental concerns of the funding agencies, and the comprehensive options assessment in relation to different guidelines. The report argues that not all suggestions made by the WCD/COA can be implemented by Nepal at once but they should be taken positively and included gradually in the system. Nevertheless, a three-tier approach, suggested by the Geneva workshop in 2003 for comprehensive options assessment, is more practical in the Nepalese context.

Sagendra Tiwari
Acting Country Representative
IUCN Nepal



Acknowledgements

One of the 7 strategic priorities for improved water resource development and dam building identified by the World Commission on Dams in its report titled “Dams and Development: A New Framework for Decision Making” is Comprehensive Options Assessment. These options include demand side management, alternative supply side technologies and improving and expanding the performance of existing systems. This study was jointly carried out by IUCN Nepal Country Office and Winrock International. The financial assistance of GTZ, Germany, made the analysis possible which is highly appreciated and acknowledged.

Dr. Jagdish C. Pokharel deserves deep appreciation for undertaking the task of assessing how comprehensively Nepal’s Water Resources Policies, Acts and Regulations have covered Options Assessment in the development of irrigation, drinking water and hydropower projects. Dr.

Pokharel’s efforts seeks to bring forward practical ways of recommendations in enabling that all options are examined upstream of the water resources project but at the same time that each project developer does not necessarily have to carry out the entire range of options assessment himself or herself.

IUCN Nepal and Winrock International would like to thank Dr. Janak Lal Karmacharya, MD/NEA and Ajaya Dixit, Nepal Water Conservation Foundation, for their elaborate suggestions and comments, and Mr. Mohan Shakya from NEA for providing his insights into the report. Special appreciation goes to Mr. Sameer Karki of IUCN Nepal for facilitating the entire process of the dialogue and the study, and to all the individuals and organisations for their invaluable support in making this assessment possible.



Acronyms

BS	Bikram Sambat (Nepali Calendar)
CBS	Central Bureau of Statistics
COA	Comprehensive Options Assessment
DAP	Distribution Analysis of Project
DDC	District Development Committee
DoED	Department of Electricity Development
EIA	Environmental Impact Assessment
EPA	Environmental Protection Act
ERA	Economic Risk Assessment
GGE	Green House Gas Emission
GWh	Giga Watt hour
HMG/N	His Majesty's Government of Nepal
IUCN	The World Conservation Union
LCA	Life Cycle Analysis
LSGA	Local Self Governance Act
MCA	Multi Criteria Analysis
MDG	Millennium Development Goals
MW	Mega Watt
MoWR	Ministry of Water Resources
NCS	National Conservation Strategy
NEA	Nepal Electricity Authority
NPC	National Planning Commission
SIA	Social Impact Assessment
ToR	Terms of Reference
UNDP	United Nations Development Programme
VAT	Value Added Tax
VDC	Village Development Committee
VSEI	Valuation of Social and Environmental Impact
WCD	World Commissions on Dams
WECS	Water and Energy Commission



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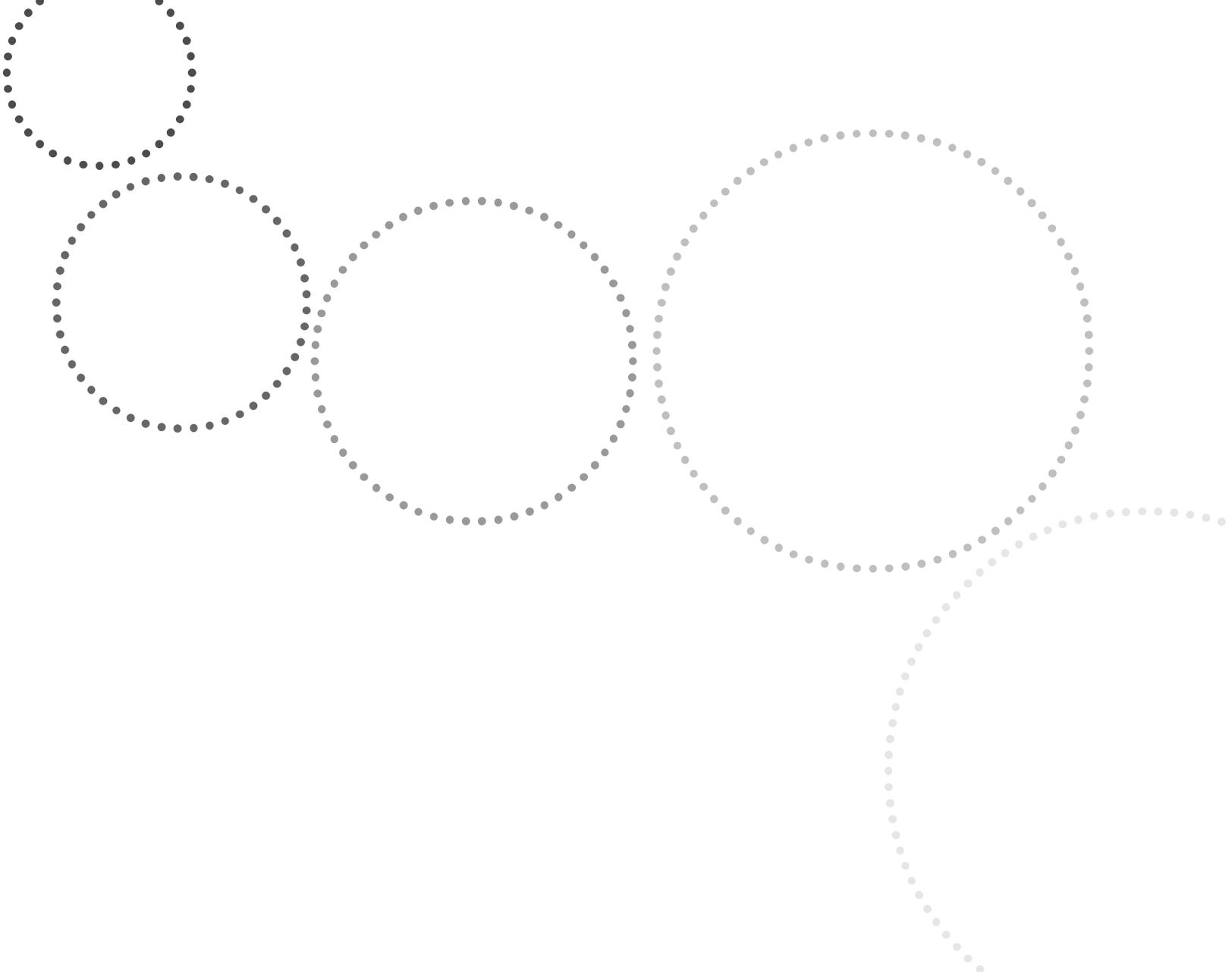


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1

Introduction

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Success of a project defined as timely completion and within the cost implementation for planned output depends on the soundness of policy and programme choices. Most projects, however, do not fulfil these criteria. They are delayed due to dispute over the nature, location and other aspects of the project. The cost overrun the initial estimate and some do not get implemented at all. For projects to get smoothly implemented, it is necessary that the all viable alternatives be considered before picking up one particular project for detailed design and implementation. The purpose of the study is to analyze the way water resources development – irrigation, drinking water, hydropower development decisions are made in Nepal. It describes how comprehensively the options for meeting the needs are assessed to identify the gaps and make suggestions for its use. Though the review includes water resource development in general, its main focus is on the hydropower development as a means for electricity supply.

Specific objectives of the study are as follows:

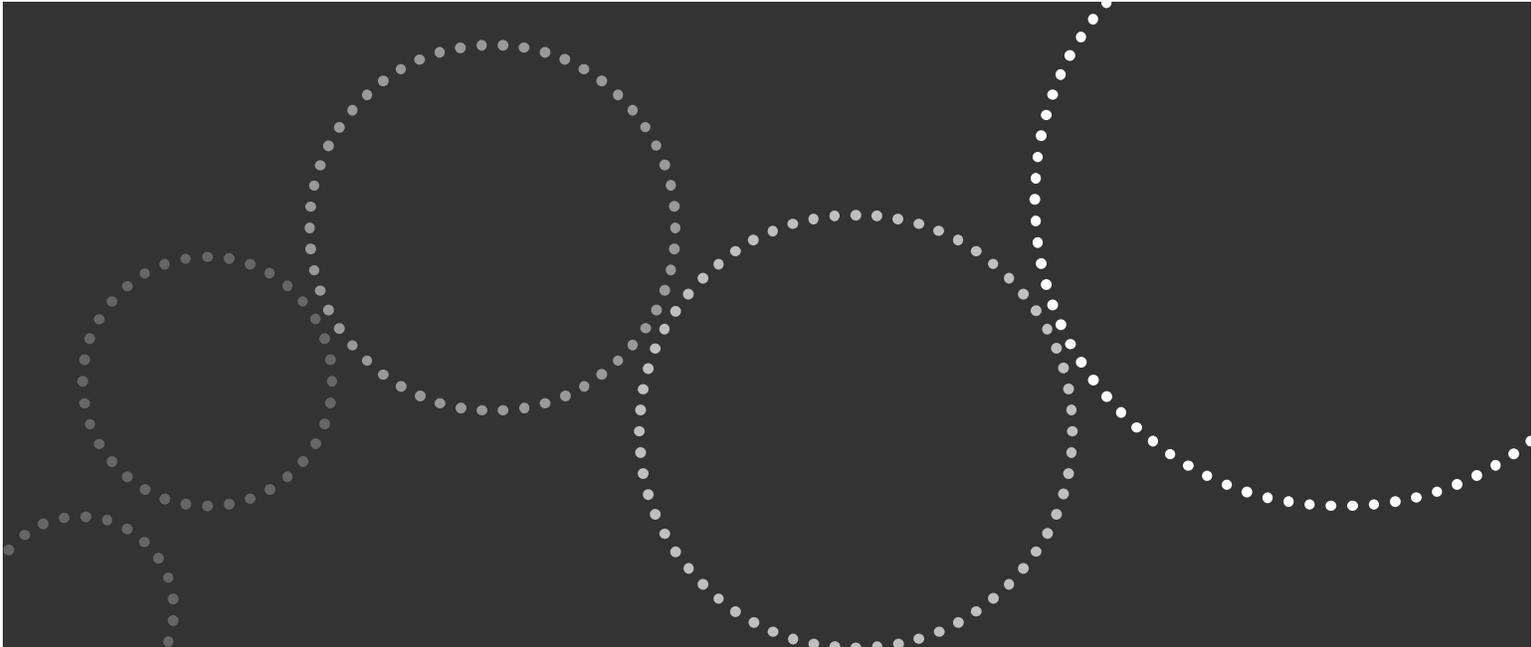
- » Review the policy, regulations and guidelines governing hydroelectricity production and use in Nepal;
- » Review environmental policy and guidelines that affect hydropower generation;
- » Assess the adequacy of these guidelines for comprehensive options assessment;
- » Identify gaps, if any, in the current regulatory framework;
- » Assess what major donors require in their guidelines for projects in Nepal (WB, ADB, KfW JBIC) to address the options assessment;
- » Propose how options assessment can be carried out more comprehensively for projects in Nepal so that investment projects do not end up in controversy on accounts of options not been considered;

- » Propose how comprehensive needs assessment and options assessment can be carried out for electricity sector in Nepal looking at full range of options and financing modalities; and
- » Propose responsibility to the appropriate players for carrying out upstream needs assessment and comprehensive options assessment at policy, sectoral and project levels.

The study relied on Nepal's policy and laws affecting electricity production, distribution and consumption and reviews of WCD guidelines and underlying principles to assess the gaps between the two. It reviewed the existing institutional arrangements to implement the policy, laws and regulations governing Nepal's electricity sector.

Since comprehensive options assessment is driven by the needs assessment at local and national levels, explicit assumptions are made in terms of its transparency and decisions documented. It includes full range of options (supply and demand, structural/non-structural); follows participatory process (affected groups at project level, stakeholders and national level); recognizes limitations of knowledge base and resources available and follows iterative process with time bound outcomes to accommodate short and long-term needs. The policies, Acts and decision making framework governing the hydropower development was assessed against these criteria.

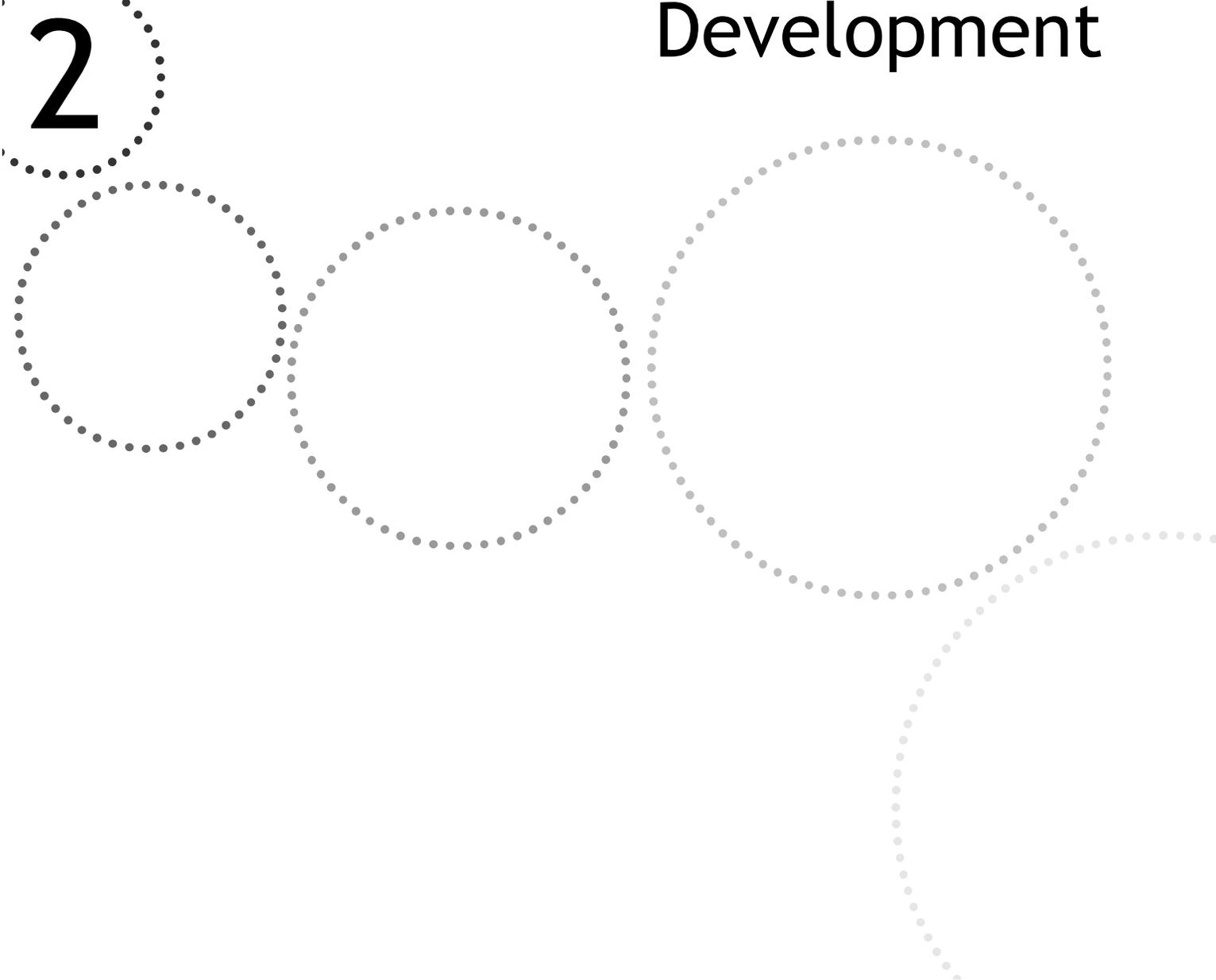
The study makes recommendations for the improvement in the development outcomes making them responsive to the needs; helps gain wider legitimacy for selected options— less controversy and enhance a sense of ownership and buy-in to results.



Electricity and Nepal's

Development

2



Demand Side

Nepal is a country with per capita income is \$270 and per capita consumption in nominal terms is NRs 15,162 (about \$220) per year (CBS 2004). It ranks 136th among world's 177 countries with Human Development Indicator 0.526 in 2003 (UNDP, 2005), indicating a significant progress in education and health over the past decade. Still, nearly 30% of its population is below poverty line. The current 10th national plan/Poverty Reduction Strategy Paper (PRSP), has set its target to increase its growth rate at 6.2. % year under an optimistic scenario. This growth rate is expected to reduce the poverty of the country from the 38% in the beginning of the Plan in 2002 to 30% in the five year plan period.

Electricity is a key input for industrialization and economic growth and social well-being of a society. The 10th plan's target for electricity is 842 MW, including 70 MW for export.

Nepal's low economic development is both the cause and effect of electricity supply. Its target is to add 10% consumers in the national grid. It also counts on 5% additional people to be served by alternative energy sources (NPC 2002). It is a vicious cycle of lower access to electricity and low level of industrialization. Electricity consumption is also a result and cause of poverty. In 2005, the peak demand for electricity in Nepal estimated was 557.53 MW. By 2040, the electricity peak demand in Nepal is expected to reach the level of 1733 MW (NEA 2005). This demand is based on the projected economic growth needed for the development of the country. The current 10th Plan/PRSP has developed three scenarios for economic growth. About 15% of total population lives in urban areas which is growing at a rate of about 5% per year.

According to the load forecast, generation expansion and capacity balance studies conducted by the NEA in February 2004, there is an impending deficit in the system in the year 2005/06 and 2007/08. In order to meet the projected capacity shortage in 2005/06 that is in the order of just 12 MW, NEA has already initiated the process of refurbishing and enhancing the capacity of the Devighat and Sunkoshi hydropower plants. For the next shortage in 2007/08, which is again expected to be in the order of about 15 MW, NEA is encouraging the Chilime Hydropower Company to develop at least 10 MW plant in the upper reaches of the existing Chilime plant and then add another 30 MW in the same system by the year 2008/09.

Supply Side

Currently, only 37 % of households have access to electricity (NLS 2004). Current supply is mainly from hydroelectricity followed by diesel and solar. The contribution of wind power is negligible. NEA's power generation expansion planning includes several medium sized hydro projects to be commissioned through the private as well as NEA-private sector joint ventures from 2008 to 2010. Nepal's second storage plant in the public sector, the 122 MW Upper Seti Project, is planned for commissioning by 2010/11. The hitherto imbalance in supply and demand can be attributed to the dominance of run-off-river (ROR) daily pondage hydropower plants in the Nepal power system which has difficult periods of acute capacity shortage during the dry seasons when the demand rises phenomenally while the rainy season sees a glut of surplus energy.

Demand and Supply Gap

Clearly, there is a gap between supply and demand of the electricity in Nepal. By the commissioning of Upper Seti, NEA expects this imbalance to be eradicated and the system to have the required capacity and energy to meet the projected demand in 2011/12. Immediately after the commissioning of Upper Seti, NEA is planning to add 250 MW Upper Tamakoshi project in 2011/12 with the public-private sector participation. For rural electrification separate programmes are being introduced.

His Majesty's Government of Nepal (HMG/N) meets this current and projected demand and supply of electricity through short-term arrangements and more permanent ones. The short-term gap is met with control mechanism, including load shedding and price adjustments. Nepal also meets short-term demands through power exchange with India. In the medium and longer terms, the demand and supply is managed through increased electricity production.

Nepal's various policy documents on hydropower development makes it clear that water is the real dependable option for the source of power to Nepal. The following chapter gives a succinct overview of Nepal's existing policy and legal instruments for water resource development.



3

Nepal's Policies and Laws for
**Water Resources
Development**

Water Resources

Nepal's major river basins make over 6000 rivers and rivulets where every year 220 billion cubic metre water flows when there is on an average 1530 mm annual precipitation. These rivers have potential to generate 43,000 MW power every year. Nepal's southern flat plains are vast storehouses for ground water as are the glaciers and ice in the northern high mountains, the Himalayas (WECS, 2002).

Nepal's water resource policy is guided mainly by agricultural production, electricity generation and drinking and sanitation purpose. Since nearly 85% of its population is rural and agrarian, agricultural development is key to majority of people's livelihood improvement. Therefore, irrigation takes highest priority in water resource development policies and plans. The government has also accorded high priority on drinking water for human development. For economic growth, however, export of electricity generated through water resource development still tops the alternatives.

Irrigation Policy

Nepal's current Irrigation Policy, 2060 (2003), states that its objectives are to provide round the year irrigation facility; to develop institutional capability of water users for sustainable management; and to enhance knowledge, skills and institutional capacity of main actors involved in the irrigation. Increasingly the irrigation development depends on utilizing participation of users in the implementation and eventually take over management. The approach of declaring "irrigation area" for irrigated area (like forest area) makes it mandatory to secure government's permission for changing any land use patterns of those irrigated areas other than agriculture. Currently, 2642000 ha is cultivated area of which only about 17% has year-round irrigation facility.

Drinking Water Policy

On an average, 71.6% people have access to drinking water. The government's policy is to cover the remaining population with basic drinking water access while simultaneously enhancing the quality of water. The 10th Plan has envisioned a strategic goal for basic service extension and improved quality water supply. One of the major shifts in the government policy is to make people educate that water is a "commodity" and that the consumers should pay for water. In rural areas, water user committees are responsible for a portion of cost and take up management responsibilities after completion of projects. In urban areas, the policy is to encourage private sector involvement in the development and management of water supply. Similarly, the central government is gradually withdrawing from this responsibility and making the local bodies more responsible. Under the current devolution scheme envisaged in the Local Governance Act 2055, the government has already started transferring such

responsibilities to the local bodies. For drinking water schemes benefiting less than 1000 population, the user groups are given full responsibility to build and operate such schemes.

There are two ways of planning for drinking water scheme. One for smaller schemes, the local people make demands. Those demands are discussed at the village and district levels and prioritized accordingly. Based on the priority and available resources, the schemes are included in the final budget which is then sent to the National Planning Commission and respective ministries and departments for approval. After the devolution, these schemes are approved at the district level which receive an earmarked fund for drinking water.

Water Resources Act, 1992, requires that water resources not to be polluted. Section 19 (1) mentions that the government through notification in Nepal Gazette prescribes pollution tolerance limits for water resources. Similarly, Section 19 (2) requires any person to abide by the rule and not to pollute water resources beyond specified limit. Section 20 states that while utilizing water resources there should not be significant adverse impacts on the environment with regard to soil erosion, flood, landslide and other similar cases.

Hydroelectric Power Development Policy

Nepal has theoretical potential of generating 83,000 MW electricity of which 43,000 is at present economically viable. This total can be divided into 229 projects of different sizes. There are 157 projects between 10-100 MW, 47 between 100-300 MW; 20 between 300-1000 MW; and 5 above 1000 MW. In totality, they make 176,764 GWh/year generation potential. Nepal's present installed capacity is less 639 MW which can keep pace with the demand until 2005.

The objective of Hydropower Policy, 2001, which guides the hydroelectric development in the country, is to produce clean energy through the development of hydroelectric projects, which could also assist in environmental conservation. One of the policies is to utilize indigenous labour and skill in hydropower projects. It emphasizes to extend the use of electricity in rural areas to reduce fuel wood consumption. Clause 6 of the Policy refers to the arrangements of hydropower projects and it also provides environmental provisions in sub-clause 6.1, such as arrangement of compensation, land acquisition and resettlement of displaced families. Provision of water rights has also been mentioned in sub-clause 6.2.

Electricity Act, 1992, intends to develop electric power and provide standards and safe electricity services. Section 24 states that there should not be any significant adverse impacts on environment through electricity generation, transmission and distribution.

Electricity Regulation, 1993's rule 12 (f) Application for Production License shall include: "Analysis of environmental effect (measures to be taken to minimize adverse effects due to the project on environment, social and economic effect of project on said area, utilization of local labour, source and material, benefits to be taken by local people after the completion of the project, training to be provided to local people in relation to construction, maintenance and operation; facilities to be required for construction site, safety arrangements and effect on landowners due to the operation of the project, details of people to be evacuated (relocated) and necessary plan for their rehabilitation should also be shown", Rule 13 (g) Application for Production License shall include: (same as Rule 12(f))

Water Regulations, 1993, states about the provision relating to the use of water resources and about the formation of water resources committee in Chapter 3. It describes about the analysis of environmental effect in Clause 17 of the chapter. It also describes "Inquiry relating to the dispute regarding water resources" in Chapter 4 and provisions relating to acquisition of house and land compensation in Chapter 6.

The Water Resources Strategy, 2002, has emphasized the importance of the protection of environment during the implementation of water resources projects. Strategic Environmental Assessment will be needed in the long run (up to 25 years) to evaluate the impact of the massive water resources project in large scale on the whole ecosystem of the country and the region.

Licensing Hydropower Projects

The government has two types of licensing system for hydropower projects by size. For small hydropower projects with 1000 kw or less, no license is required and they do not pay royalty and corporate tax. For hydropower plants greater than 1000 kw, license is required and issued by the Ministry of Water Resources (MoWR). The license period is for 30-35 years.

Electricity Act, 1992, regulates survey, generation, transmission and distribution of electricity. Under Section 3 of the Act it is stated that survey, generation, transmission or distribution of electricity without obtaining a license is prohibited. The Act makes the provision that license shall be issued by MoWR. The provision for license shall be a) study/survey license; b) generation license; c) transmission license; and d) distribution license.

According to the Section 3 of the Act and sub clause 6.12.3 (b) of "The Hydropower Development Policy, 2001", no license is required for hydropower projects up to a capacity of one MW. Such hydropower shall be registered with the District Water Resources Committee prior to the

commencement of the works of such projects. Information of such registration shall be given to the Department of Electricity Development (DoED). As sub-clause 6.12.3 (c), an application has to be duly submitted to the DoED to obtain the license. The study/survey license of a hydropower project up to a maximum capacity of 10 MW shall be issued normally within 60 days of the submission of all the details. The licenses of all other types shall normally be issued within 120 days of the submission of all the details.

Sub clause 6.12.7 of the afore-mentioned policy makes the provision for the export of electricity. It mentions that the license may be granted to export electricity from projects with installed capacity of more than 100 MW and deemed appropriate by His Majesty's Government. The license for such a project shall be issued by HMG through the invitation of proposals or through negotiation with the applicant who has submitted application for license.

Section 5 of the Act and sub clause 6.12.11 of the hydropower development policy has made the provision on the term (duration) of the license. The term of the study/survey license shall be for a maximum period of five years. The term of the generation license, depending upon the nature of the project, shall be 35 years from the date of issuance of the generation of license for those projects which are supplying the internal demand; 30 years from the date of issuance of the generation license for the export oriented hydro-power projects; the term of the generation license for the storage project may be extended for a maximum of 5 years on the basis of the construction period.

Similarly, the term of the electricity transmission and distribution licenses shall be 25 years from the date of the issuance of license. According to the sub clause (e) of the afore-mentioned 6.12.11 (3), of the Hydropower Development Policy, 2001, the term of license for electricity transmission and distribution may be renewed for ten years at a time in accordance with the prevailing law.

The government is in the process of finalizing two Acts – Nepal Electricity Act 2062 and Nepal Electricity Regulatory Commission Act 2062—which are intended to be enacted through an ordinance. The first Act is intended "to regulate and systematize the electricity development and management to make electricity service simple, accessible, standard, reliable and safe." The second Act intends to "make the electricity generation, transmission, distribution, or trade activities simple, regular, systematic, and transparent to balance the domestic demand and supply and regulate the electricity price and electricity tariff and to make the electricity market competitive and electricity service more reliable, accessible, ...".

The first draft Act makes provision for licensing and related procedures; institutional reform and restructuring of already existing institutions (with direct implication for

NEA's authority); national transmission grid; electricity sell purchase and import/export; quality of electricity, regularity, and safety; water right and environment; land acquisition, compensation, resettlement and rehabilitation; investment mechanism; water resources and rural electrification; compensation and penalty; and other miscellaneous provisions such as tax, bonus, inspections, etc.

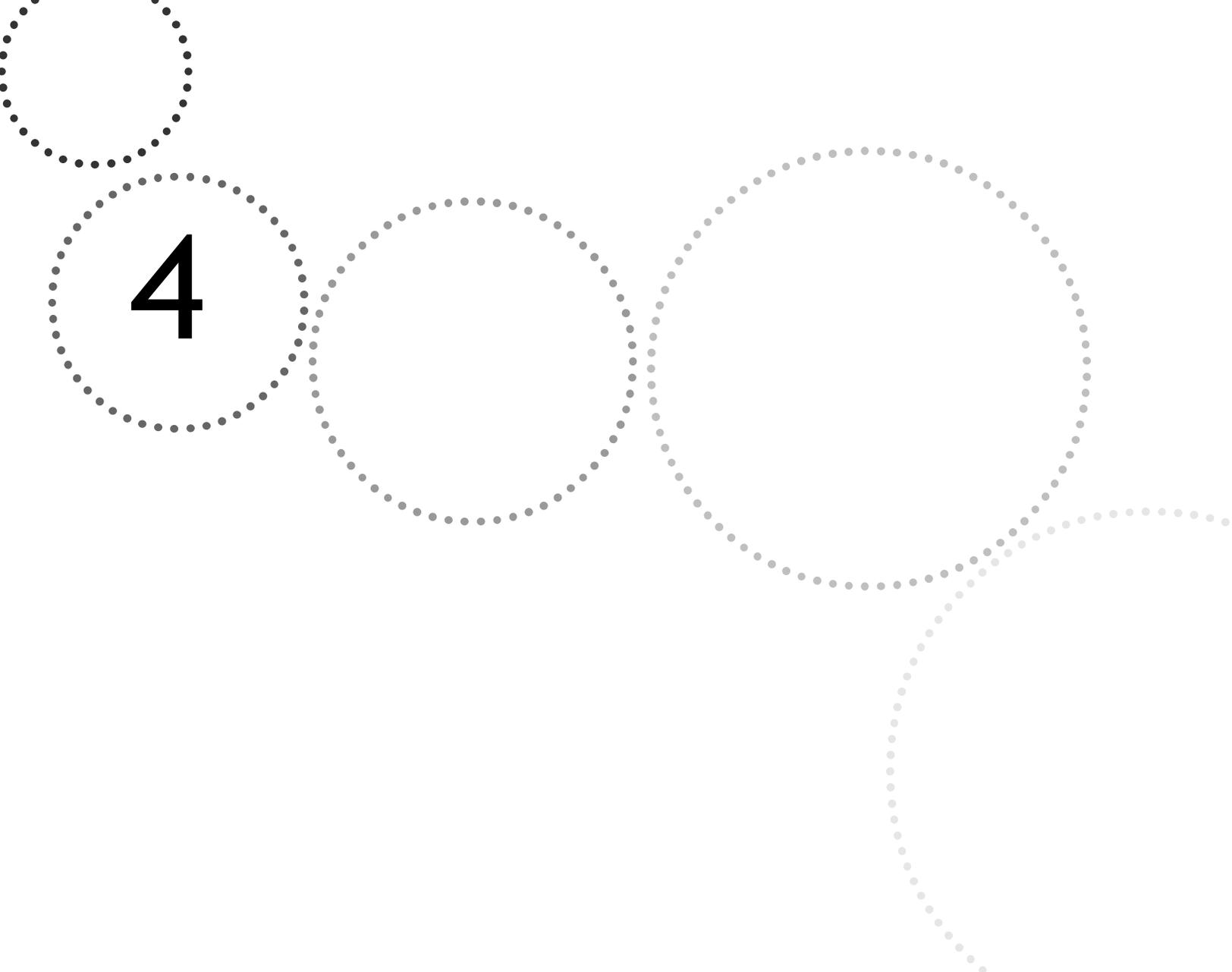
The second draft Act makes the provision for the establishment of the Commission; its rights and responsibilities; electricity price and tariff; and other miscellaneous provisions related with chairman's service conditions, secretariat, fund, transitional provisions,

accounting and auditing, and other related provisions to operationalize the Commission.

The proposed "Nepal Electricity Act 2062" is quite comprehensive and builds on the experience and innovations on electricity generation and services over the past decades. It builds on the best practices to make power accessible to consumer of all levels. The role of the utility company, private sector, community, cooperatives, are made explicit and clearer than in the previous Acts. The provisions related to the EIA is also expanded and refined. The "Nepal Electricity Regulation Commission Act 2062" gives sole responsibility of regulation to an independent body and breaks some of the monopolies of NEA.



Environmental Policies/Laws



4

Article 26(4) of the Constitution of the Kingdom of Nepal, 2047 BS (1990 AD), requires the State to give priority to the protection of environment and prevention of further damage of the environment on the account of physical development activities and to take special measures for the protection of wildlife, vegetation and forests. Hence, to prevent such damages, the application of this clause requires the study of environmental resources in all developmental works and assess their impacts so that measures could be taken to prevent any harmful effects on environment.

Protection and management of resources have been developing together with other long-term national plans and initial alternatives focused at alleviating poverty through sustainable development. This leads to avoid any projects, which are not environmentally-friendly and outside the scope of mitigation measures. Environmental Impact Assessment (EIA) in Nepal thus has become mandatory as part of all projects in order to avoid all unfavourable circumstances such as delay in the implementation and increase in project cost. The practice of EIA which should be viewed as both a process and as a mechanism for decision-making has been gradually evolving and it has become an acceptable tool in the development planning. Its methodologies have become useful tool for identifying, predicting and evaluating the environmental impacts during the formulation and feasibility stages. The output from the EIA process has provided decision makers with useful information necessary to determine whether or not the project should be implemented. The National EIA Guidelines (1993) reflects the importance of EIA as a mechanism for decision making.

In practice, there is still plenty of scope for the refinement of the process. Currently, EIA is done to fulfil the criteria of schedules 5 of Environmental Protection Rules (EPR). The practice, however, falls short of being adopted as the criteria for decision making. The decision makers first select the project based on the ranking by Least Cost Generation Plan. The environmental study is done parallel without considering project alternatives during the feasibility study. The EIA is done to mitigate the impact rather than questioning the project on the basis of environmental findings.

Environmental Protection Act, 1997, recognizes that sustainable development is possible through proper consideration of inter-dependence between economic development and environmental conservation by minimizing adverse impacts on physical, biological and socio-economic environments, wise use and management of natural resources, incorporation of environmental concerns in the development process, participatory role of communities and stakeholders, are among the salient features of the Act. The Act has outlined procedure and

framework for: (a) project planning and project approval; (b) project implementation and pollution control mechanism; and (c) punishment and penalties for non-compliance. Section 10 has a provision to maintain any place within Nepal as environment protection area. This Act defines the term 'environment' as a physical, biological and socio-economic aspects based on their interaction and inter-relationship.

As per the Environment Protection Rules, 2054 (1997), section 24 of EPA, HMG can formulate rules to operationalize the Act. Section 2 of these rules deals with IEE and EIA procedures which were amended in 1999. Annexes specify particular environmental requirements. According to the rules, scoping is to be carried out for proposals. Scoping and the Terms of Reference (TOR) are to be approved by concerned agency or the Ministry of Environment, Science and Technology (erstwhile Ministry of Population and Environment) dependably upon the size of the project mentioned in EPR 1999 (first amendment). Emphasis has been given to stakeholders' involvement and public participation. Appendix 6 of the rules specifies matters related to EIA report preparation. Section 12 of the rules states that proponent should comply with all matters specified in the EIA report and the conditions prescribed by the concerned agency. Provision and actions to be taken in case of environmental pollution and indiscriminate waste disposal are dealt in Section 17 and 18. Section 8 specifies provisions and processes to be followed by the victim of violation of pollution standards.

The National EIA Guidelines (1993) developed by the National Planning Commission in conjunction with IUCN, has set out the process for the environmental review and management of infrastructure projects in all the sectors, roles and responsibilities of relevant government agencies and project proponents. These guidelines were part of a comprehensive programme to develop national and sectoral guidelines for establishing a national system for Environmental Impact Assessment which was a part HMG's National Conservation Strategy and Nepal's Seventh Plan. The guidelines were endorsed by HMG/N on 27 September 1992 and gazetted on 19 July 1993. The six schedules attached to the Guidelines include projects requiring an IEE report; projects requiring an EIA; EIA based on project sites; projects requiring an IEE report; format for ToR; and environmental impact report format respectively.

With regard to environmental management in the hydropower projects, the Ministry of Water Resources has drafted a separate EIA Guideline for the Water Resources Sector in 2050 B. S., which were revised by the then MOPE in 2054 BS. The revised draft EIA Guidelines for the Water Resources Sector, 2054, also contains steps for EIA report preparation.

The government guided by the spirit of the National EIA Guidelines, 1993, has framed EIA Guidelines for the Forest Sector, 1997. The Guidelines aim at facilitating the sustainable use of forest resources for socio-economic development and to meet basic needs of the communities from the forest products, to make proposals socio-culturally acceptable, economically feasible and environmentally benign to conserve genetic resources and biodiversity. It also intends to minimize environmental damage in forest areas and facilitate in identification of positive and negative impacts of progress to be implemented by other agencies in forest areas. On the whole, the guideline emphasizes the need to carry out EIA of development projects and programmes proposed for the implementation in forest areas.

The natural resources development is also guided by the National Conservation Strategy (NCS), 1998, which has emphasized the inter-dependence of conservation and development. The NCS suggests the following policy guidelines regarding development projects:

- » The terms of reference for feasibility study related to the development project will include requirement for the preparation of environmental and socio-economic impact statement, including proposed measures to minimize possible detrimental impacts.
- » The proponent of any large scale project will be required to establish a conservation fund as part of project costs to carry out the necessary social and environmental programmes related to the project. The purpose of the programmes would be to minimize the detrimental sector, economic and environmental impacts.
- » Establish a conservation section within the project to manage the social and environmental programmes.

Other Related Policies and Laws Affecting Power Development

Besides the power sector policy, Acts and regulations, there are many other policy, Acts and regulations which have strong bearing on the selection, design and implementation of power projects. Such laws as related to forest, conservation and finance, and should be fully understood

for successful completion of a project. These policies and laws are:

Forestry Sector Policy, 2000, intends to conserve forests, soil, water and biodiversity while simultaneously meeting the basic needs on a sustainable basis, land and forestry resources will be managed and utilized according to their ecological status. It is concerned with the conservation of biodiversity, ecosystems and genetic resources.

National Wetland Policy, 2009, (Clause 7.6) states that the environmental impact assessment should be carried out according to the prevalent laws before approving the development and construction works within and in the vicinity of the wetland.

Land Acquisition Act, 1977, section 3 and 4 of land Acquisition Act empowers HMG/N to acquire any land at any place giving compensation and all other expenses pursuant to the Act for any public purpose.

The Forest Act, 1993, recognizes the importance of forests in maintaining a healthy environment. The Act requires decision-makers to consider all forest areas of biodiversity importance, not just the production of timber and other commodities. The Act incorporates resource-oriented approach to forest and forest products. The Act authorizes the government to permit the use of any part of government managed forest, community forest, leasehold forest, if there is no alternative except to use the forest area for the implementation of a plan or project of national priority without significantly affecting the environment.

Soil and Watershed Conservation Act, 1982, is applicable only to protect watersheds. Under Section 10 of the Act, power is extended to the Watershed Conservation Officer to grant permission to construct dams, drainage ditches and canals, cut privately owned trees, excavate sand, boulders and soil, discharge solid waste and establish industry or residential areas within any protected watersheds. The Act outlines the essential parameters necessary for proper watershed management.



5

Environmental Requirements
of International Financing
Agencies



Nepal needs support of international donors and financing agencies to invest on power projects. It also needs to mobilize international private sector investment if it wants to materialize its power development plans. Therefore, policies, guidelines and positions of international agencies on factors affecting power development has important bearing. In the following sections, policy and guidelines of some major donors and financing agencies about their environmental concerns are presented.

World Bank and EIA

World Bank's Environmental Assessment (EA) process depends on the project's nature, scale and potential of environmental impact. As per its policy, EA should take into account natural (air, water, etc); human health and safety; social aspects (involuntary resettlement, indigenous people, and cultural property) and trans-boundary and global environmental aspects. World Bank's policy suggests that when project is likely to have sectoral or regional impacts, sectoral or regional EA is required.

For category A and B project proposed for IBRD and IDA financing, during the EA Process, the borrower consults project-affected groups and NGOs about the project's environmental aspects and takes their views into account. For category A project, the consultation should be at least twice but for category B project it is not explicit.

ADB's EIA Requirements

ADB's policy also does not differ much from the World Bank. However, it has some differences in the presentation of the report. ADB's EIA guidelines include physical, ecological, economic development and social and cultural themes in the report. The physical aspect includes atmosphere, topography and soil, surface water, ground water, geology/seismology; ecological part includes fisheries, aquatic biology, wildlife, forest, rare or endangered species, protected areas, coastal resources; economic development includes industries, infrastructure facilities, transport (road, airport, harbour, etc), land use, power sources, agricultural development, mineral, tourism facilities; and social and cultural aspect includes population and communities—number, location, employment, composition, health facilities, education facilities, socio-economic conditions, physical and cultural heritage, current use of land by indigenous people, and historical/archeological sites.

Regarding public consultations, ADB suggests that it should describe the process undertaken to involve public and recommend measures for the continuation of public participation; summarize major comments by all the stakeholder groups- NGOs, local government bodies and others; list milestone public involvement (date, attendance, topic of hearing, etc) and recipients of the report and other

project related documents; summarize (if possible) public acceptance or opinion on the proposed project; and describe other related materials or activities (press release, notifications, etc) as part of the effort to gain public participation

European Investment Bank (EIB)

The EIB applies the core environmental management principle of "prevention", "precaution" and the "polluter pays" principle. EIB claims that it applies highest environmental standards established by EU. In developing countries, its policy is in accord with the internationally recognized social safeguard measures, including labour standards. It takes safeguard policy on indigenous peoples' involuntary resettlement and cultural property as the core labour standards that apply to members of the International Labour Organization (ILO). There is a new emphasis on social issues in developing countries as an integral part of the EIB environmental work. It requires that its approach is "equivalent to the Equator Principles" adopted in 2003 by a number of commercial banks and also based on the International Finance Corporation Guidelines.

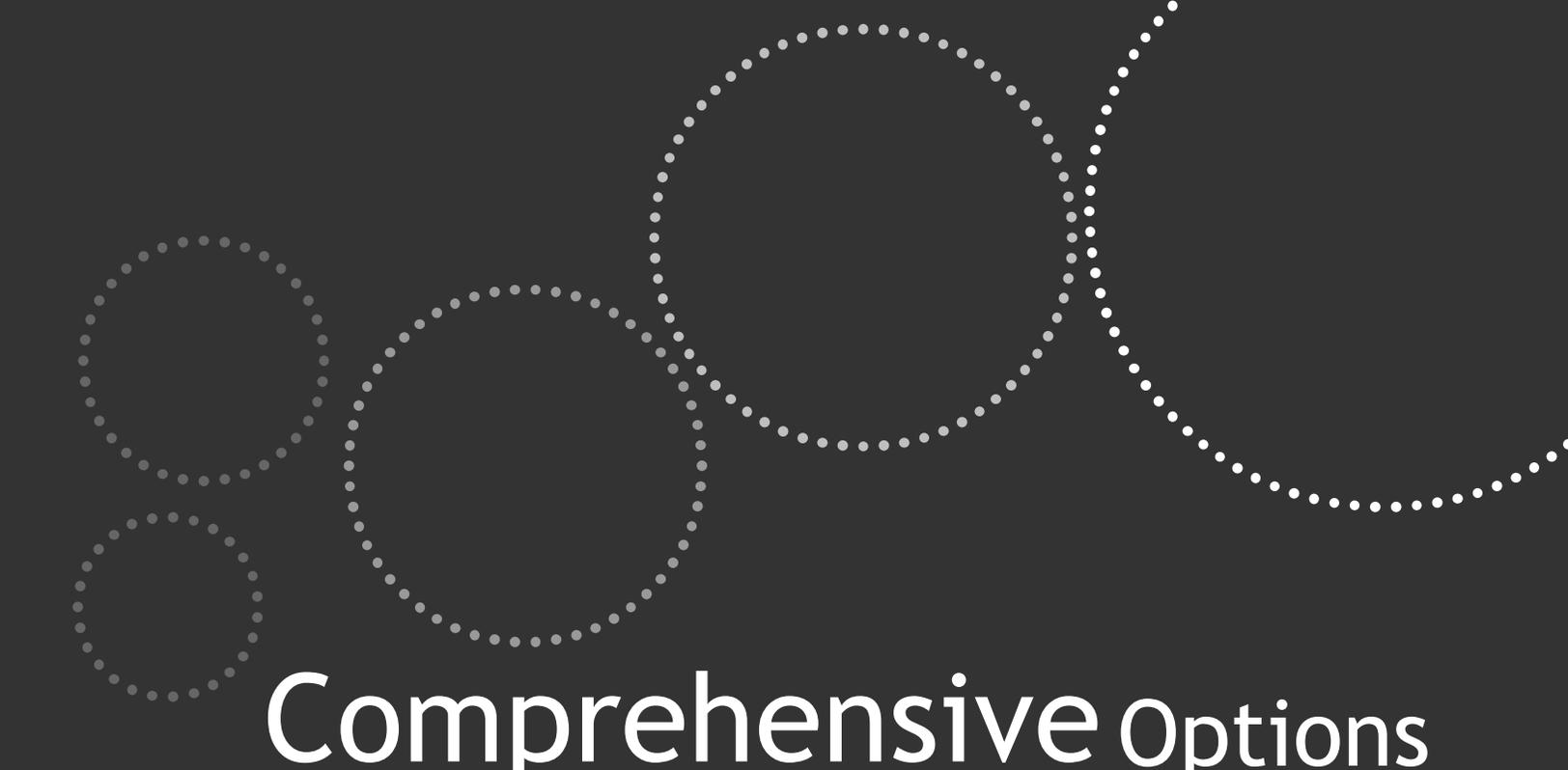
UNDP/UNEP Policy for Project EA

Guided by the sustainable development agenda and declarations in various Conventions such as the World Summit in Rio, 1992, and the Johannesburg Summit in 2002 and other resolutions of the General Assembly regarding Human Rights, Indigenous Population Rights, Women's Rights, Child Labour, and other discriminations and rights based policies and others.

JICA/ Japan

Japan's development cooperation is guided by the principle of environmental conservation and development. Japan applies the concept of "environmental consideration" which implies assessing significant environmental impacts of a project and proposing practical measures to avoid or mitigate negative impact. Projects are classified into A, B and C according to the magnitude of their impact. For category A project, which may have significant impact, the EIA in recipient country is to be submitted to Overseas Economic Cooperation Fund (OECF). For category B projects, which are rather small than that of category A projects, the projects are reviewed in the light of the guidelines.

Neither JICA nor OECF give the detail requirements but they require that the EIA report includes the objectives and justification for the proposed project; the beneficiaries of the project; the impact on land ownership and land use and impact on general economic activity of the area (arid, tropical and wetlands, closed water bodies, etc).



Comprehensive Options Assessment



6

The WCD guidelines are based on the findings that not all available options are examined seriously by the project hydropower developers. It maintains that the developers (private business as well as the state) in their decision to develop a project ignore other possibilities for meeting the demand. It implies that the developers ignore existence of other equally or more attractive alternatives; that proponents of hydropower development (dam development) often under-estimate the actual cost of a project by ignoring other important factors such as environment and social costs; that developers' narrow vision for alternative assessment does not allow learning and innovations, which is key to the improvement in an uncertain environment. These findings underlay the suggestions for Comprehensive Options Assessment.

As documented in *Dams and People* (Earthscan, 2000), the Commission intends to give the following messages while suggesting framework and guidelines for options analysis:

- a. Alternative to dams do often exist;
- b. To explore these alternatives, needs for water, food and energy should be assessed and objectives clearly defined;
- c. The appropriate development response should be identified from a range of possible options;
- d. The selection should be based on a comprehensive and participatory assessment of full range of policy, institutional, and technical options;
- e. In the assessment process, social and environmental aspects have the same significance as economic and financial factors; and
- f. The options assessment process should continue through all stages of planning, project development and operations.

It recommends that the following policy principles should be applied for the effective implementation of the comprehensive options assessment (COA):

1. Development needs and objectives are clearly formulated through an open and participatory process before identification and assessment of options for water and energy resource development;
2. Planning approaches that take into account the full range of development objectives are used to assess all policy, institutional, management, and technical options before the decision is made to proceed with any programme or project;
3. Social and environmental aspects are given the same significance as technical, economic, and financial factors in assessing options;
4. Increasing the effectiveness and sustainability of existing water, irrigation, and energy systems are given priority in the options assessment process;
5. If a dam is selected through such a comprehensive options assessment process, social and environmental

principles are applied in the review and selection of options throughout the detailed planning, design, construction, and operation phases.

Its recommendation is that to take a more balanced decision, the developers should carry out certain planning activities while conducting COA for power supply. They are: (1) Strategic Impact Assessment for environmental, social, health and cultural heritage; (2) Project level Impact Assessment for environmental, social, health, and cultural heritage issues; (3) Multi Criteria Analysis; (4) Life Cycle Assessment; (5) Greenhouse Gas Emissions; (6) Distributional Analysis of Projects; (7) Valuation of Social and Environmental Impacts; and (8) Improving Economic Risk Assessment.

Strategic Impact Assessment

The general goal of SA is to include:

- » Recognition of the right of stakeholders and assessing risks;
- » Incorporating environmental and social criteria in the selection of demand and supply options and projects before major funds to investigate individual projects are committed;
- » Screening out inappropriate or unacceptable projects at an early stage;
- » Reducing upfront planning and preparation costs for private investors and minimizing the risk that projects encounter serious opposition due to environmental and social considerations; and
- » Providing an opportunity to look at the option of improving the performance of existing dams and other assets from economic, technical, social and environmental perspectives

It is recommended that the SA be revisited at appropriate intervals with period "state of the sector" reporting using important variables determining the frequency and intensity of this ongoing process such as technology, demography, and public opinion. The review of SA reports is recommended to be done at the highest political level.

Project Level Impact Assessment

1. Project should be subject to two stage Impact Assessment—scoping including full public participation, that identifies key issues;
2. The timing of IA should allow the results feed into the final design of the project. There should be total integration of technical, environmental and social studies during the design phase;
3. IA should be carried out independently of the interests of the project developer and financing mechanisms;
4. IA should include environmental, social, health, and cultural and heritage impacts. It should provide a pre-project baseline against which post-project monitoring results can be compared;

5. An independent panel of experts should be appointed to assist the government and developer in reaching sustainable social and environmental outcomes. The panel's findings and developer's response should be made public within a reasonable period;
6. Developer should open local office;
7. IA process should culminate in a series of written agreements with those departments or organizations that are required to implement mitigation, development and compensation plans or respond to the impact. The scope of these agreements should be fully defined prior to tendering for construction;
8. IA process continues through and beyond project construction and adequate institutional and financial arrangements for social and environmental audit and monitoring should be included in the planned measures. Contracts with monitoring agencies should be agreed prior to tendering for construction;
9. A redress process should be put in place that provides mechanism for addressing the grievances during the resettlement plan following construction;
10. IA should be public documents, posted on relevant websites and disseminated in appropriate language;
11. IA should be guided by the precautionary approach. The state and water development proponents should exercise caution when information is uncertain, unreliable, or inadequate and when negative impacts of actions on the environment, human livelihood, or health are potentially irreversible. Determining what an acceptable level of risk is should be undertaken through a collective political process.

Multi Criteria Analysis

Multi Criteria Analysis (MCA) as a screening tool using qualitative and quantitative criteria to assess policy, programmes and project options and compare options should be carried out by a multi-disciplinary planning team. The guideline suggests the following 7 steps to carry out the MCA:

- » Step 1: preparation of terms of reference for overall process;
- » Step 2: formation of stakeholder forum;
- » Step 3: public comment on the options inventory including proposal for additional options to be considered;
- » Step 4: the stakeholder forum decides on criteria for screening the options and criteria for coarse and fine ranking of options;
- » Step 5: screening of options according to the agreed criteria and wide review and approval of results;
- » Step 6: preparation of sequencing of steps of coarse and fine ranking options. The list of options at each step made public and soliciting comments. Public hearing may be held at each stage if appropriate;
- » Step 7: final selection of options that form the basis for detailed planning and presented to agencies,

communities or groups responsible for detailed planning.

Life Cycle Assessment

Life cycle assessment (LCA) is an options assessment procedure, which compares the performance of an energy project throughout its life, including environmental impacts and market barriers and incentives for different demand and supply options. It is located at the front end of the planning cycle. Its results may be fed into multi criteria screening and ranking process, which are the basis for deciding which options to include in subsequent stages of planning. LCA procedure that quantifies potential impacts of different options on land, air and water resources, including greenhouse gas emissions, can be transferred and adapted to different countries.

LCA could typically include:

- » Categorization of the different stages in the life cycle of each option where the impacts and effects are relevant;
- » Identification of material flows and resources impacts in each stage and comparison of each option using a set of indicators (such as net efficiencies, consumption of resources, or the impact of per unit of output of the option such as land use, water use, and others); and
- » Identification of the range and magnitude of the direct, indirect, and hidden subsidies, external factors and incentives across each stage of the life cycle of each option.

Greenhouse Gas Emissions

This provision is based on the findings that reservoirs can emit greenhouse gases. Therefore, precise assessments are necessary to assist in the selection of climate friendly options and if hydropower projects seek to benefit from any form of carbon credit. The emissions from the natural pre-impoundment stage should be included in comparison with other options. Good field studies with modeling predictions of emissions should be an explicit components of relevant feasibility studies.

To calculate net emissions, the planners must:

- » Assess the carbon (CO₂, CH₂) and nitrogen cycle (NO₂) in the pre-impoundment watershed context.
- » Assess future changes to carbon inputs in watershed from various activities, including deforestation;
- » Assess the characteristics of proposed reservoir or reservoirs and inundated area (s) including size, temperature, bathymetry, primary productivity and other relevant measures after dam completion; and
- » Assess the cumulative emissions from multiple dams on a watershed basis in cases where a dam and its operations are linked to other dams.

Such data includes variations in different climate zone and different level of population concentration will help to take decision on energy options and climate change.

Distributional Analysis of Projects

The purpose of this analysis is to gain better understanding as to who gains and who loses by the decision. These gains and losses can be in terms of economic or financial or they can be simply expressed in physical quantities. In some cases only the direction of a specific impact may be noticeable. A number of methods focusing on specific aspects of distribution can be used within the overall approach at different stages of the planning cycle.

- » Equity (poverty) assessment comprises an assessment of the impacts and risk of a project on specific group of population;
- » Macro-economic or regional analysis using either a simple economic or fiscal impact analysis or a formal regional or macro-economic model; and
- » Economic distributional analysis with explicit analysis of distribution of the direct costs and benefits of the project, including external social and environmental impacts that are to be valued.

Integrated distributional analysis at a preliminary level should be initiated during the early states of screening and selecting options as part of SIA. A qualitative equity assessment should also be undertaken and inform the screening process about the comparative impact of alternatives on vulnerable groups in society.

A more detailed and integrated distributional analysis should be undertaken during the feasibility study and include both and economic distribution analysis and equity assessment.

Valuation of Social and Environmental Impacts

The purpose of this assessment is to internalize environmental and social impacts in the economic analysis of the project. Methods for such valuation are well developed in developed countries and some of these can be equally applicable in developing world. Many of the external impacts of large dams affect household livelihoods and thus should be assessed using relatively straight forward market or revealed preference method. How change occurs in water quantity, quality, and flow regime affect household productivity and consumption, and how the impact of changes in the water flow affects the communities downstream? The study of this nature should at least involve the following three steps:

- » a scoping exercise to identify and select impacts to be valued;
- » valuation studies; and
- » public meetings to report back to the stakeholder forum on the result of the studies.

The scoping exercise may be incorporated into the initial stage of project impact assessment. The information generated through valuation studies should have an explicit role in informing not only applicable cost benefit and distributional analyses but also the negotiations between stakeholders and decision-makers.

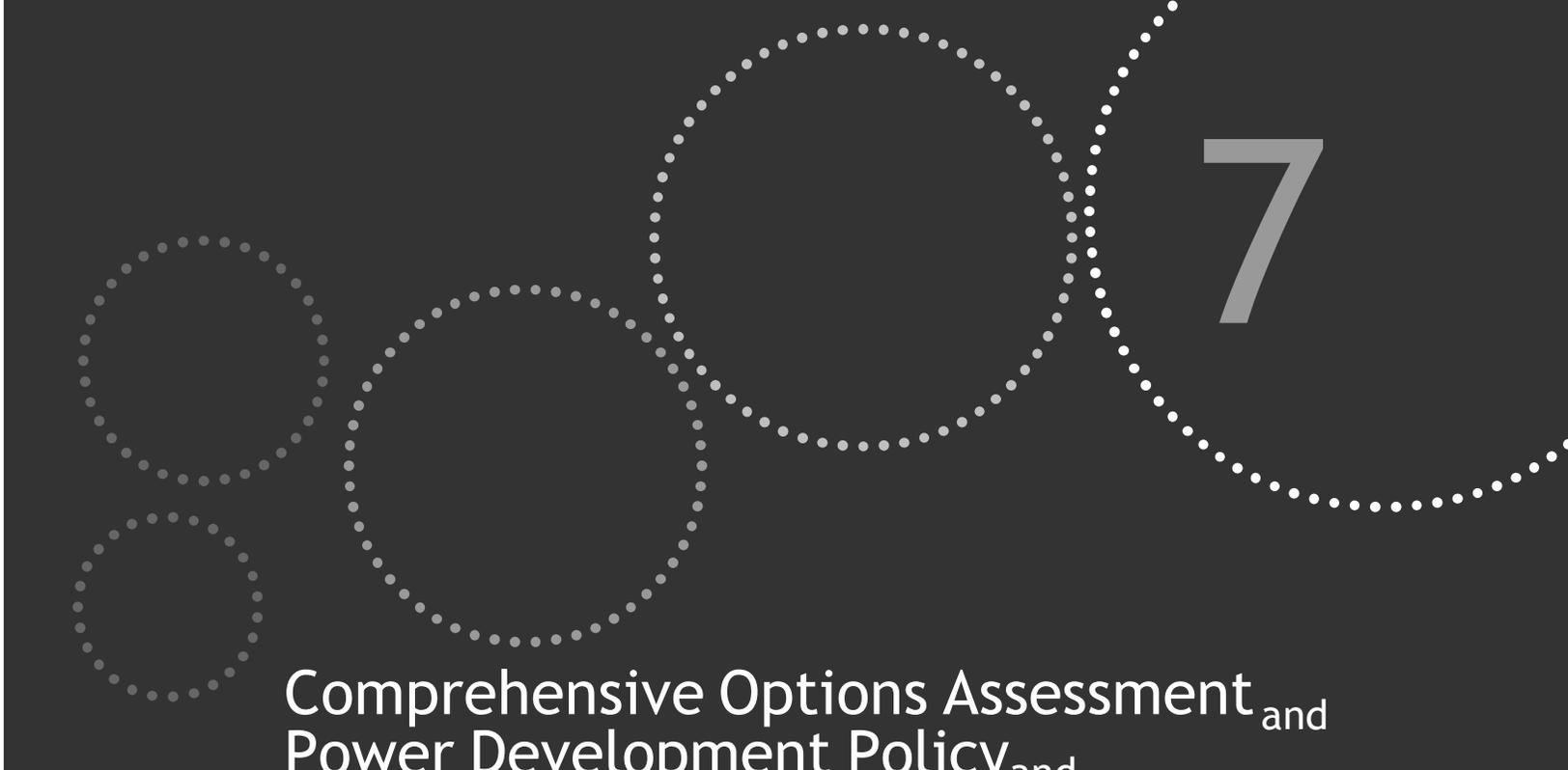
Improving Economic Risk Assessment

The WCD recommends the following as a general approach for technical, financial, and economic risk assessment:

- » The assessment of risks should be included in all steps of planning cycle;
- » Identification and selection of risks for assessment should be undertaken as larger stakeholder and multi criteria process;
- » Past performance of large dams should be used to identify likely ranges for the variables and values to be included in risk and sensitivity analysis; and
- » Sensitivity analysis should be complemented by a full probabilistic risk analysis.

The sensitivity analysis is used to see whether the project is still profitable when the planned project cost increases by certain percentage. The WCD suggests that on economic risk analysis across the planning cycle, the following specific suggestions should be considered:

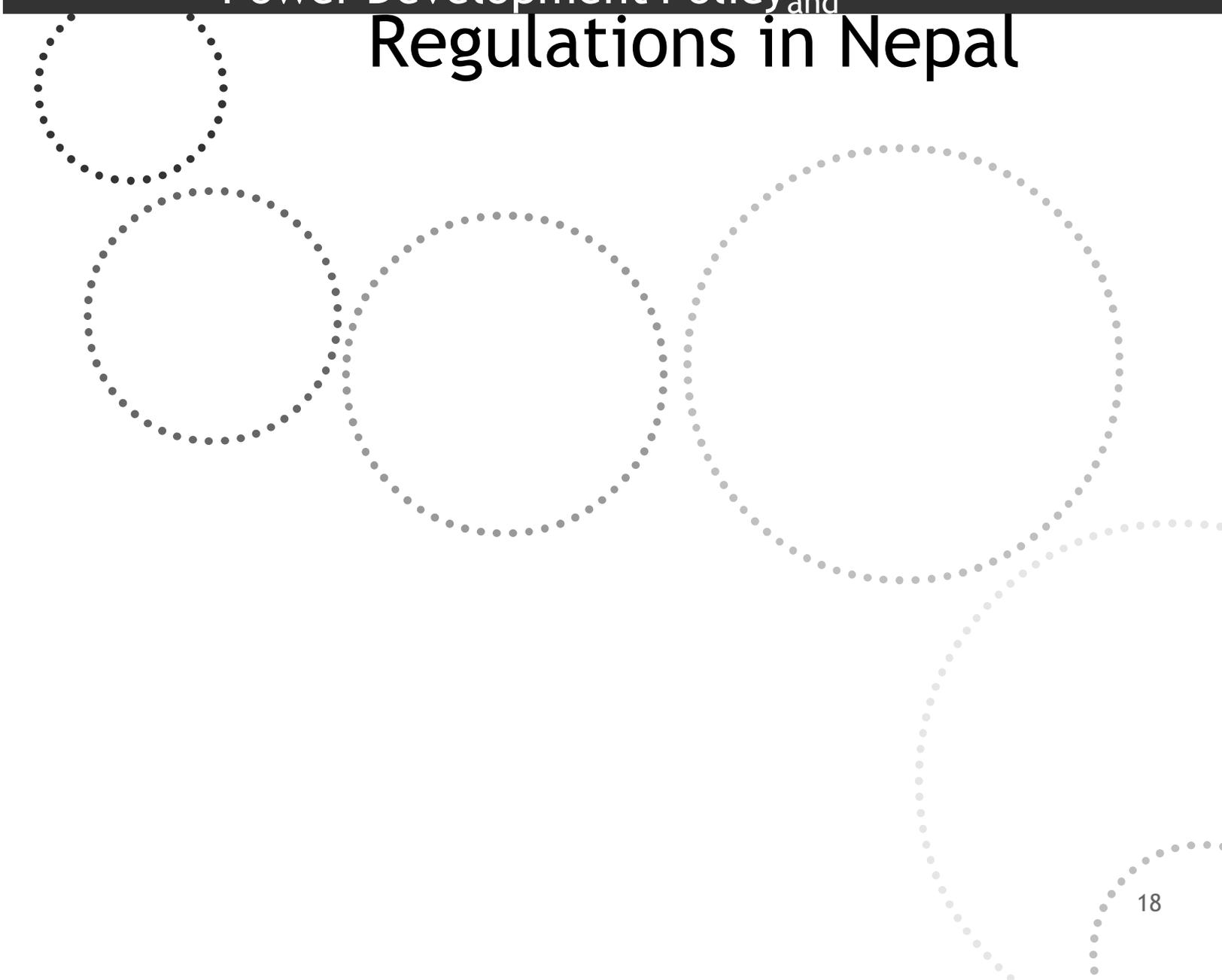
- » That at all stages improved prediction of project cost by using a frequency distribution of the cost overrun for similar projects;
- » That at options assessments stage, a simple sensitivity analysis using agreed value ranges for key variables; and a qualitative comparison of options under consideration in terms of the uncertainty associated with the cost and benefit streams of each project; and
- » That a full probabilistic risk analysis of economic profitability; modeling of changes and variability in hydrological estimates that may result from climate change and their effect on delivery of services and benefit flows; and investigation if the likely benefits of risk reduction measures and the costs it entails.



7

Comprehensive Options Assessment and
Power Development Policy and

Regulations in Nepal



Of the eight guidelines - 1, 2, 3 and 8 - which relate to SIA, stages of IA, Multi Criteria Analysis, and Economic Risk Assessment respectively, are largely covered in the current practice of power development in Nepal. The three provisions which are not covered include Life Cycle Assessment, Green House Gas Emissions, and Valuation of Intangible Impacts. They are either not legally mandated or technically difficult as in the case of quantifying intangible impacts. One provision related with the regional distribution of benefits to some extent covers some policy consideration but there is not legal provision to conduct distributional analysis.

In brief, following are the issues that are yet to be covered by the prevailing process:

SIA: the rights issue is addressed as the Constitution guarantees it; the screening is not always covered but it was once done for medium size projects (less than 300 MW) by NEA; there have been some efforts to reduce the cost for private sector by adopting one window policy and also by providing initial list of likely projects but it is too preliminary and does not address the concerns of the private sector regarding more reliable information; the “state of the sector” report is not published but NEA does publish its annual report where the sector’s status is presented briefly; SA report is not reviewed at the “highest political level,” rather it is done at technical and bureaucratic levels.

PLIA: Scoping and public consultation is done at the project level as a rule and as required by the law and as per guidelines; total integration of social, economic and environmental concerns during project design is very weak; IA is affected by project developers and financiers biases; IA process does not continue beyond project construction phase; redressing mechanism following construction does not exist; language is still an issue as most documents are prepared in English whereas the affected and the real stakeholders are largely Nepali; collective political process to determine the risk does not exist.

MCA: there is no process for policy and programmes screening through public participation. This happens only at the project level. There is no way to collect public opinion on the inventory of projects and additional options to be considered; stakeholders do not decide on criteria for screening the options but in some cases there have been some involvement for coarse ranking; wide review for screening of options does not take place.

LCA: The LCA activity as suggested by the COA is not included in the current process.

GGE: This exercise is not included in the current process.

DAP: Regional distribution is implicitly ensured by LSGA. Special attention given to the indigenous ethnic groups and Dalit (disadvantaged) groups does address the equity and poverty issues but it is inadequate to address the wide range of issues affecting them.

VSEI: This exercise is done mostly through qualitative assessment; public is informed of the result.

The list of yet to be covered provisions suggest that for Nepal it is not so much about following or not following the WCD guidelines but rather when and how. That the WCD recommendations are simply “guidance” and should not be taken as “regulatory framework” makes its implementation flexible and adaptable as it suits the country’s development context and peculiarities. However, the challenge is to overcome the practical difficulties in operationalizing the COA.

The main concern for Nepal’s policy makers is “are all these studies required and affordable for a country which needs to develop fast to reduce its poverty and to catch up with neighboring countries?”. Their view is that the continued studies at every level and point of decision will delay the development of resources especially its only resources – water making is too costly and, therefore, detrimental to its development targets. They do not deny the value of such studies though. They suspect that looking for options when there is “no other than hydropower” is simply the wastage of time and money. As energy developers, they also suspect that once agreed the WCD guidelines will become mandatory. As one energy developer said, “we know it is just a recommendation and it is not binding but when major financiers ask have you addressed this or that issue raised by the WCD, then you realize that it is more than guidance.”

When one examines the WCD recommendations in broader development philosophy and policies that Nepal has adopted, we find that the suggestions of WCD actually support Nepal’s own values and philosophy of development. The COA in power development is guided by equity efficiency, participatory decision-making, sustainability and accountability. These are not different from the values Nepal’s development policies and plans are derived from. The acceptance of private sector (business and non-profit) role in development decision-making, economic liberalization, decentralized governance and pluralism as a basis for governance, acceptance of diversity as its asset,

and focus on government reform all support these values. Therefore, using COA helps promote Nepal's development agenda in general. This realization has made Nepali stakeholders in power development agree that Nepal does not have to disagree with the substance of WCD recommendations rather it should come up with Nepali version of recommendations. Having agreed on this common agenda, the issue is not whether Nepal should use COA in power development, rather how can Nepal adapt it to make it useful and affordable in Nepal's context and what does it take to do so. This agreement implies that COA should be seen as a "second generation" EIA which is upgraded and improved to suit the changes that have taken place in knowledge, technology, financial regime, environmental consciousness over three decades of evolution of environmental agenda globally and Nepal's own experience of just over a decade with internalizing environmental agenda at the national development thinking. The multiplication of actors in power supply, and the ever-increasing innovative techniques used to make power accessible and affordable in Nepal, suggests that any framework that further enhances this trend should be encouraged. The policy and rules should encourage these initiatives and support in realising the objective.

The experience of EIA's (based on the EPA 1997) internalization in Nepal's hydropower planning, therefore, is an instructive one to reflect while discussing the COA practice. When it was first introduced, similar reservations and questions were raised. Proponents suggested that this was good for the values that they were promoting while the system side thought that it was a "luxury" and that a country like Nepal could not afford to spend time and money on such things. With time, however, the process has been widely accepted and adopted with fairly successful results. The initial reservations about the process, and the availability of expert work force, are mostly gone. Though the concerns for the resources and learning are weak, the process is internalized in the system. It is now acceptable tool for power development planning. Therefore, the WCD's recommendation for COA practice should be taken as a gradual process which will get better and its values more established with practice.

COA poses challenges and opportunities for Nepal power development. A country which is depending on the development of water resources, it imposes more challenges to the hydroelectric power development. As one can see most of the recommendations of the WCD are either fully or partially accommodated in Nepal's policies and regulations. Those which are not already accommodated should be examined and positive aspects from its implementation should be the objective of further analysis and debate. However, we should be aware that in a country like Nepal which is always resource-strapped and which is just coming out of age regarding development, without such challenge the system's inertia keeps it from moving ahead.

When we examine the problem from the need for reform and innovation point of view, the challenges of COA should be taken positively and adapted to Nepal's needs and capacity. Such reform requires openness in our policy and flexibility in our approach. This need is more obvious when we examine the current electricity regime. It is not at all difficult to observe how little out national thinking about power supply has been guided by utility agency's interest for more production and always looked at the problem from supply side. Even when we try to address the demand we control it through producer's side. We have applied black outs (load shedding) than conscious effort to reduce demand through efficiency increase from the end user side during peak hours. We have not done any research as to how efficient our appliances, machines and behaviour are when it comes to electricity use. The demand projections and capacity increases are made without giving adequate attention as to how much power could be saved through certain changes in these gazettes and behavior in the urban areas. The innovations elsewhere to reduce demand through innovative approaches have yet to enter Nepali market. For example, the State of Illinois in the US has reduced 25MW out of 50MW targeted reduction in power demand by applying a system called Virtual "Negawatt" Power Plan which allows an operator to remotely control commercial, industrial, and government lighting system over a managed and secure network (<http://www.energyusernews.com>).

Similar innovations are going on the supply side management. Nepal's own policy and programme to use community organizations and cooperatives for bulk purchase and selling electricity is a new one. Though at its early stage, its positive result in terms of controlling the transaction cost and increasing reliability is already visible. The policy to liberalize the power market has already increased the private domestic and international investment in the power sector. These innovations would have not been possible had there been no challenge for policy reform. The COA should be seen as a challenge for policy reform.

In Nepal, therefore, the issue regarding COA is how to gradually internalize the recommendations of WCD by adapting to its own institutional, economic and geo-political situation. Given that Nepal's policy environment is quite responsive when it comes to accommodate new ideas, the WCD concerns in its energy development process, we can assume will be addressed in due time. It needs discussions within the HMG and among other stakeholders to come up with the real options available for Nepal. It should also take the WCD recommendations positively and try to enhance further its capacity to carry out the suggestions. Such approach will help reform and adjust the policy, regulatory, institutional, financial and technical environment to adopt new possibilities to get the same result. For this

to happen, the analysis of context should be broadened beyond energy sector. The WCD suggestions make such expansion possible.

Let us take the example of the debate as to which option should Nepal choose—hydro, thermal, solar, bio-mass and wind. The choice becomes clearer when we add one more dimension to the analysis—the purpose of electricity. If it is for industries then the two choices get eliminated and hydro and thermal become the real choice. Between the two sources, however, when we consider time and environmental impacts, including social impact of the project, then thermal might emerge as the first choice as it is easier and faster to complete and is less complicated environmentally and socially. This choice, however, becomes less attractive when we add the long-term cost, price of oil, foreign exchange, and green house gas emission. Clearly, the choice goes for hydro-electricity despite its complex and time consuming construction and initial cost, it is less costly in the long run. Therefore, water becomes first choice for Nepal as a source of electricity. Yet with technological progress, this undisputed position of water as a power source may not remain for ever. This position also can change with the changes in the value system of Nepali people. The value of keeping the rivers undimmed might surpass the value to dam and develop it for power and economic well-being.

The options assessment helps us break the rigidity of “either” “or” choice. It can help us come with a range of choices and even come up with a mixed choice for power supply. To the production if we added another dimension to the debate – the transmission and distribution of electricity then the choice becomes even clearer. For scattered rural households, grid system may not be the choice as they either cannot pay for the electricity or are deterred by poor quality of services. In such cases, feasible non grid system and new institutional arrangement should be done to make electricity accessible such as solar panels, micro hydro projects managed by communities, etc.

In Nepal, given its terrain, the community managed projects for rural electrification and alternative sources of energy have become successful. There have been innovations in electricity supply in remote and scattered settlements where grid supply will take long time to connect. One recent example of such an innovative approach was introduced by one social worker in remote Humla District where he planned to provide electricity to every household in 4 years through solar panels. The government subsidy for solar panels and individual contribution to put together the plant made the scheme quite attractive. The programme is ongoing. Similarly, technologies have been adapted to suit the economic conditions of the villages to make power affordable. In rural isolated areas, communities have been generating

and distributing electricity by themselves. Therefore, options can be expanded through technological, financial and institutional rearrangements. Options assessment provides opportunity to the decision-makers to come up with innovative approach to provide the same service with less cost. Institutional innovations have also made some new options more attractive for electricity supply such as community managed power generation and distribution which are gaining popularity in rural Nepal.

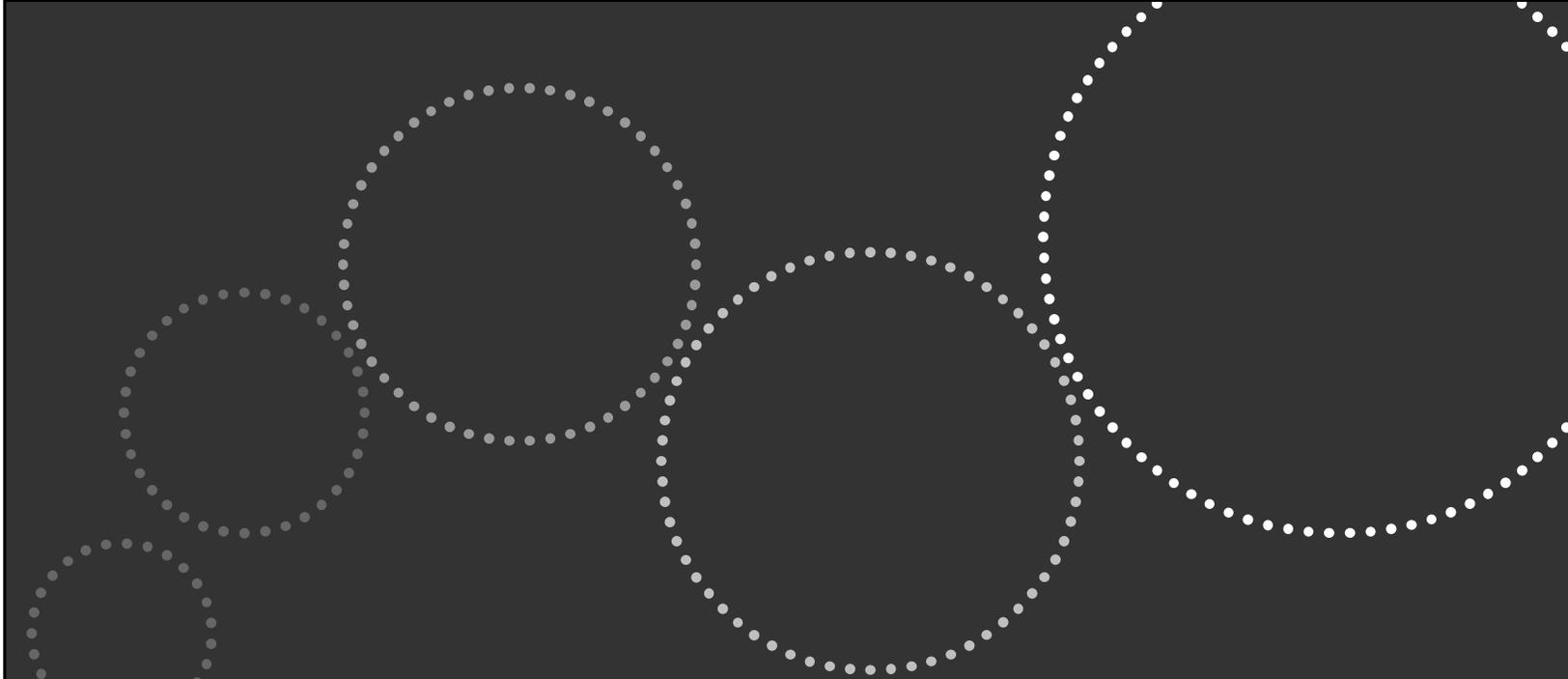
Technology broadens the choices and number of options for electricity supply. Therefore, we need to understand the available and affordable technology, to provide electricity. In developed countries like USA, the technology is going to affect the proportion of renewable vs non renewable energy in renewable energy's favour. Clean energy has also attracted larger share of investment globally albeit small in absolute terms. In Nepal also this trend is picking up, particularly where more environmentally conscious people are living such as in Kathmandu.

Changes in institutional arrangements can make henceforth inaccessible electricity accessible to the user. Deregulation and liberalization of electricity sector has opened up opportunity for private sector investment. There is a plenty of room for further enhancement of this sector. Making communities responsible for electricity services by making them responsible to produce, bulk purchase from the producer and selling to the consumers are new ways to make electricity accessible and affordable to the users. Decentralized options provide simple way to extend electricity supply to remote areas. These institutional innovations have helped reduce leakages and default.

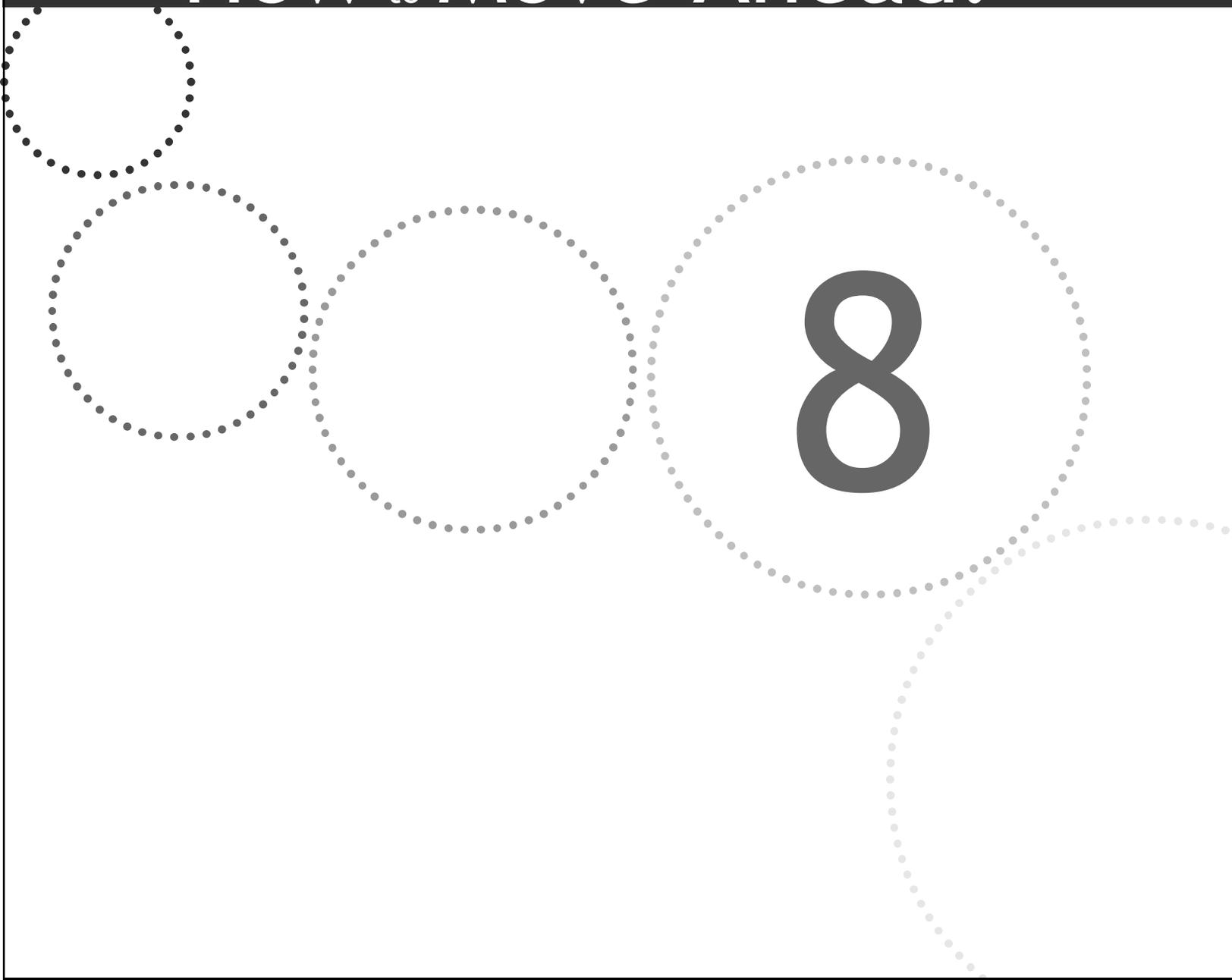
Demand Side Management (DSM) provides some unique features to make the electricity accessible. DSM has two cost components—cost of new end use technologies and practices themselves; and the administrative and transaction cost of the programme or policy to encourage their use. The DSM depends mostly on energy saved and therefore, they are strongly related to the cost and environmental and social impacts of displaced energy supply sources. In developing countries like Nepal, DSM may not provide as much options as in the developed countries mainly because of limited volume of consumption. The incentives for consumers to invest on saving should be higher than the cost. This is an area where Nepal is yet to focus. The efficiency of end use technology such as electric bulbs, gazettes in the household consumption and more efficient factories and industrial machines can save energy. As Nepal is just beginning to industrialize, its opportunity to save energy by investing in more efficient technology is high. In the longer term, such investments can have even greater value as current investment will be used well into the next century.

As a summary of discussions and recommendations made so far, the following should be reiterated:

- » WCD guidelines are a result of growing awareness and increased understanding regarding environment and development. It is a new way of thinking about development and should be taken as a “second generation” environmental awareness;
- » The Comprehensive Options Assessment (COA) should be seen as a decision-making tool, which helps us broaden the range of options available for electricity supply at both ends – demand and supply. It should be participatory and transparent but once decisions are made it should only facilitate implementation of the decision;
- » The COA is a continuous process and the lessons learned along the project implementation should be used for mitigating the adverse effects for improving future projects and not for stopping the ongoing project;
- » The framework should be adapted to Nepal’s special situation with clear priority of themes to be analyzed;
- » COA should be seen as a framework to understand innovative approaches (technical, financial and institutional) to electricity supply and apply ones that are likely to increase the quality of power in affordable price.



How to Move Ahead?



8

Nepal's electricity policy should be seen within broader national policy regime for development, environmental protection and social justice. Since all development allocations are justified by certain macro level goals – human development – the electricity policy should also be seen and analyzed within this regime. The three level policy frameworks for development—global (MDG), national (PRSP/10th Plan) and local (DPP) should be kept in mind while discussing the possibility and use of options assessment in water resources in general and electricity supply in particular. The MDG provides universal principles and targets to be met in the longer term (by 2015), the 10th Plan/PRSP provides framework for medium term and Decentralization and Devolution under the LSGA 2055 provides basis for regional distribution of resources and national income. The first provides long-term development goals and framework, the second provides medium-term framework for resource allocation, and the third provides a basis for serving the interests of the local level people.

To consolidate what has been achieved and to continue reforming the electricity services, the policy for pro-multiple-actors (private sector, community, local bodies, national agencies) in power sector should be enhanced. While addressing the demand for power supply, the issues raised by the developers as well as communities and environmental groups should be discussed in transparent way. The suggestions made by the WCD should be taken positively as a challenge and as a learning process. All key stakeholders should be ready to accept good practices and be willing to accommodate other's interests and concerns.

Clearly, not all the suggestions made by WCD/COA can be implemented by Nepal and certainly not immediately but they should be taken positively and gradually and included in the system as far as possible. With the cooperation of international donors and private investors, these suggestions should be implemented. Each stakeholder should be ready to accept the legitimate interest and concerns of the other. If there are different ways to do the same thing in better ways, there should be no reservation to accept it. For this to happen, the government should take certain responsibilities that other actors cannot. The areas where it should take leadership include research and development, monitoring of qualities, services and price, coordination of multiple actors; support weaker section of population to bargain better; and similar other activities.

The question from practical point of view is what is that can be done so that COA is applied while private sector also is willing to invest in electricity supply in Nepal. Since it is the private sector that needs to find the environment for investment friendly, things should be seen from its perspective. From private parties point of view, certain risks should be borne by the public sector. It is very unlikely that that the private sector will engage in doing

the studies and keep spending its resources in an uncertain environment for unrestricted implementation of project and early revenue generation. Therefore, consistent policy is the key to attract private sector. Enforcement of rules without discretionary power is another important aspect which has become more and more evident lately as developers have to make controversial payments like VAT.

We can break the stakeholders in the electricity development in Nepal broadly into three groups: HMG (State), civil society (environmental groups, consumer groups and others) and profit-making institutions (private developers). The interests of these three groups coincide when it comes to using electricity. They can agree on one point that they all need electricity. This common interest should become the basis for dialogue and develop and agree for COA process. Confidence in each other is critical for moving ahead in power development. The State has the responsibility of supplying the electricity as demanded, the civil society is both the beneficiary and impacted side by the state decision and the private sector is largely concerned with the profit and security of its investment. Only the institutional arrangement which addresses these three interests can take decisions which can be applied unhindered. Policy decisions process should be participatory but at the same time firm when it comes to implementation. For this the government should take lead and demonstrate its commitment, continuity and firmness.

A three-tier approach, suggested in the Geneva workshop in 2003, can be applied for Comprehensive Options Assessment in Nepal. The three levels being policy level, strategic level, and project level. At the policy level, the choice for fulfilling the need is made; at the strategic level, the choice is made between various options for meeting the need; and at the project level, various details are worked out to meet the need. Being the apex body which frames the values and sets the goal for country's development, the National Planning Commission is well placed to take the responsibility of the policy level COA agency. It should do the regular research, coordination, policy innovations, regarding the changes in the options of power in Nepal. NPC can be assisted in this effort by WECS, DOED and other HMG agencies. Private sector and academic institutions can provide support in this effort. It can designate responsible division and section to do the COA and to come up with suggestions. Since NPC conducts regular consultations at different levels for any major planning activity, its approach can be useful in COA for power development. Being the highest policy making body, it can also organize periodic discussions among the respective ministries to discuss the risk of one or the other project. Moreover, NPC is the agency which monitors the outcomes of planned development under Poverty Monitoring and Analysis System (PMAS, MDG Operationalization and monitors the expenditure under MTEF, it can assess the power sector in general and

electricity development in particular in a more integrated manner.

The Ministry of Water Resources can take the lead at the strategic level. It should conduct constant evaluation and publish the outcomes of screening results as NEA did in the case of screening the medium-sized projects. NEA will keep doing such activities, even after proposed “unbundling” but it will do so for its own internal decision-making. The ministry will do the screening and prioritizing the projects from broad national perspective, including regional balances and other distributive objectives as suggested in the WCD guidelines. The “unbundling” of NEA assumes that the proposed Nepal Electricity Act, 2062, will be implemented.

The above assumption is in line with the 10th Plan concept, but does not coincide with the Water Resources Strategy Nepal, 2002, where under the institutional changes it simply proposes “restructuring NEA to operate more efficiently and in compatible manner with private sector” and suggests “corporatization” of its operating units. Also the Strategy does not foresee establishment of an independent Commission. It rather suggests strengthening of DOED for licensing, promotion and studies. It does,

however, recommend upgrading WECS with mandate to do central planning and coordinating water resources development. The implication of these recommendations for the electricity services as recommended in the proposed NERC and Electricity Act needs to be clarified before its enactment. Legally, the Acts override the policy statements and recommendations as in the Water Strategy, in practical terms it can create hurdles.

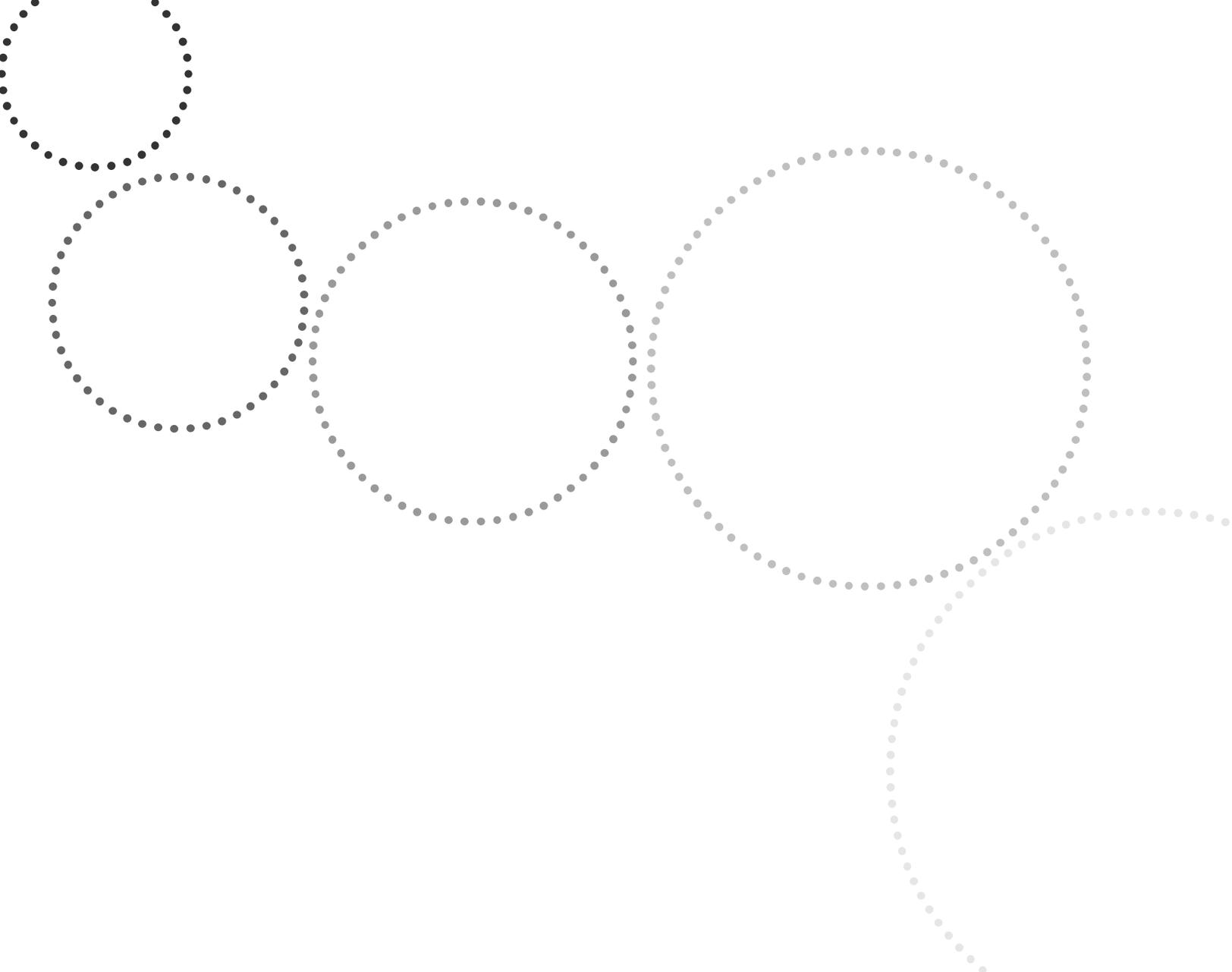
At the project level, the COA can be carried out by the project proponents and the process can be guided by the division responsible for EIA at the Ministry of Environment, Science and Technology (MEST). Given the long experience of implementing EIA, this division (under the MEST) has developed skills and has internalized the process of carrying out the EIA related exercise with capacity building support. The prevailing project EIA guidelines require and EIA to recommend for improvement in the process, indicators, and method of assessment, to make them more relevant in future assessment. NPC can take up the recommendations from different project EIAs for further research and use the research findings and recommendations to refine the policy and guidelines for COA. This can break the almost non-existent learning from EIA reports and recommendations for policy improvements.

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ANNEX



Annex I

Terms of Reference

Coverage of Comprehensive Options Assessment in Nepal's Regulatory Framework

Background

One of the 7 strategic priorities for improved water resource development and dam building identified by the World Commission on Dams in its report, "Dams and Development: A New Framework for Decision-Making" is 'Comprehensive Options Assessment'.

Many of the controversies over dam projects have focused attention on whether a particular dam was the most appropriate response to a development need or objective, and whether these were correctly identified in the first place. In other controversies, critics of projects have felt that the decision to proceed with a dam was taken before considering all options or followed strong backing from specific constituencies that undermined options assessment.

The WCD report states that: "This failure to assess strategic options rigorously at an early stage has led to a number of disputes. Often dams take a long time to come on stream, delaying the delivery of benefits. Because they are high cost investments they divert resources and can exclude other options that may be able to deliver benefits more quickly. These options include demand side management, alternative supply side technologies and improving and expanding the performance of existingsystems. There are also some new options reaching the stage where they can compete in the market, for example renewable energy technologies for electricity generation such as wind and solar power. Options assessment involves determining the relevance of individual options or a mix of options to respond to development needs in a specific location."

This assignment seeks to examine how comprehensively Nepal's Water Resources Policies, Acts, and Regulations have covered Options Assessment in the development of irrigation, drinking water and hydropower projects. It also anticipates recommendations on a practical way forward to make sure that all options are examined upstream of the water resources project but at the same time that each project developer does not necessarily have to carry out the entire range of options assessment himself or herself.

The major outcomes of an international workshop held in Geneva on the subject in 2003 came with the following conclusions:

- a. Comprehensive Options Assessment needs to be carried out at Policy, Strategic Planning and Project levels.
- b. Comprehensive Options Assessment would lead to:
 - » Improved development outcomes responsive to needs
 - » Wider legitimacy for selected options – less controversy
 - » Sense of ownership and buy-in to results.
- c. Characteristics of Comprehensive Options Assessment are:
 - » Driven by needs assessment (at local and national levels)
 - » Transparent – explicit assumptions and documented decisions
 - » Include full range of options (demand/supply, structural/non-structural)
 - » Participatory process (affected groups at project level, stakeholders at national level)
 - » Recognizes limitations of knowledge base and resources available
 - » Iterative process with time-bound outcomes to accommodate short and long-term needs.

Tasks for the Consultant

The consultant will carry out the following tasks:

- a. Assess how comprehensively Nepal's Water Resources Policies, Acts, and Regulations have covered Options Assessment in the development of irrigation, drinking water, and hydropower projects.
- b. Identify gaps, if any, in the present regulatory framework and in planning and implementation of projects.
- c. Assess what the major donors require in their guidelines for projects in Nepal (mainly WB, ADB, KfW, JBIC) to address options assessment.
- d. Propose how options assessment can be carried out more comprehensively for projects in Nepal so that investment projects do not end up in controversy on account of options not having been considered.
- e. Propose responsibility to the appropriate players for carrying out upstream needs assessment and comprehensive options assessment and project level options assessment.

Annex 2

Comments and Suggestions of Participants in the Draft Presentation (Hotel Yak and Yeti, September 18, 2005)

A. Panelists

Dr. J.L. Karmcharya, NEA

- » WCD guidelines is not adequate/ appropriate; we need not revolve around we can move. Do not universalize. In Nepal there is no other options other than hydropower.
- » COA's most difficult thing is where does the assessment end?
- » Continue forever?
- » Developing countries and our compulsion
- » COA continues all stages of planning cannot afford assessment
- » We should do rather—when does the assessment stop? Should we stop implementation and review?
- » It is a time consuming exercise.
- » I think CA process should be done at the planning stage and once we have decided we should continue.
- » We should complete projects and should provide return
- » COA cannot take place without considering multiple uses
- » WCD options assessment process should focus on the viable options not the one that is not viable—why to assess nuclear options in Nepal?
- » Medium hydroelectric project assessment cost millions of dollars. Can we afford?
- » Therefore, it should address the specific issues specific to our needs.
- » The WCD elements do not limit which process is more important, when and at what stage of project cycle?
- » What operationlization mechanism (?)
- » The “whether” and “how” question is loaded? It is rather “what to assess and what not?” can we assess GHGE in Nepal? Where is the money?
- » Are you talking about option assessment or how electricity is supplied?
- » For the electricity, there is no viable option in Nepal except hydro.
- » Globally in our context there is no alternative for hydropower.
- » Our cropping intensity should increase how can we do it? Ground water pumping?
- » We can develop “additionality” but not the main need for electricity.
- » Options assessment experience of WB.
- » After Arun, WB wanted to invest in India for diesel plant. They wanted us to buy the power.
- » Is that an option?

Ajaya Dixit, Nepal Water Conservation Foundation

- » Rather theoretical – historical juncture, water related issues controversy.
- » WCD brought report in 2000. It did not clarify the dispute/did not resolve.
- » Rather raised the controversy.
- » Dialogue initiated—Nepal context.
- » Supply multiple institutions—is not limited small vs big, government vs private this dichotomy is artificial
- » Water and environmental resources does not fall in neat category.
- » It implies actually “Risk” who takes how much
- » How the risk is resolved and what are the ways?
- » Too cursory and too broad conceptual – market civil society . Management, egalitarian solidarities—3 types of risk
- » In Nepal, in energy terrain the three types of risks have come dialogue. It is unique.
- » Paper is like essay.
- » How positions are negotiated in Nepal is not mentioned – how government, market and egalitarian perspectives are negotiated.
- » NEA” unbundling decentralized arrangement.
- » New power sector reform – utility unbundling. How does this affect our COA?
- » How has the buy back rate in 1998 affected the market?
- » Individualist market flourishes.
- » Bulk purchase and “communitization”
- » “Mahasangh” is formed of the communities ?
- » How would this affect?
- » Statement— about values might change.
- » We do not need to hang on WCD process.
- » Make Nepali guidelines.
- » Institutional analysis should be done to come up with what has been done and what is happening in different areas.
- » 7th strategy does not need to be reiterated because we agree that it is not relevant to Nepal
- » There is no ours or theirs.
- » Options should be examined with economic values as well.
- » Economic analysis.
- » Public participation in SIA is weak not like EIA were it his mandatory.
- » APP is target; all these are connected.
- » Electricity is not only for household consumption.

B. Participants

Gopal Siwakoti Chintan, WAFED

- » Not all issues are included. What other issues are raised from outside government?
- » The issue is not how much water we have?
- » Did you consult others like us?
- » What lessons? Comparative case studies should be considered to complete this study. Good and bad lessons.
- » Our national policy is too private-friendly. They have done too much. Too broad a statement about private sector.
- » The following statement is not relevant
DR Karmacharya issue is:
 - > What type of project, what does our experience say?
 - > How to move ahead from here? Use the previous studies.

Dilli Bahadur Singh, DoED

- » Observations: WCD guidelines came in 2000 but we had our Guidelines in 1993. Should WCD follow us or we should follow them?
- » Many of WCD guidelines are taken from us.
- » We need to harmonize our Acts and other parameters that are necessary.
- » Why should we abide by their guidelines. Yours is global ours is relevant in Nepal.
- » They impose their ideas. We should not adopt every thing.
- » Have we done COA in other projects —case studies of EIA?

Annu Rajbhandari, NEA

- » Choice and option at what stage?
- » Post construction studies done—Kali Gandaki, etc.

Karuna Sharma, Winrock International

- » Example of option assessment already done by NEA or others in Nepal.

Mr. S.B. Pun, former MD/NEA

- » Private friendly? too friendly? unfriendly? Often too friendly due to lobbying. BPC distributed bonus

(profit) how? PPA revised. Regulatory body should come forward.

- » What options do we have in Nepal? if we go little bit up than small community things?
- » Is our interest served by small? What options?
- » India factor. Why is India's NHPC coming to invest in Nepal?
- » India did not participate in WCD. If India comes and invest, then what?

Bir Bahadur Ghale, (AEPC)

- » AEPC is investing only with the donors support. Is that a viable option?
- » HMG does not invest.
- » Electricity against social justice.
- » Consider the villagers.

Yuba Raj Adhikari, Winrock International

- » If hydropower is for export, then do they ask for WCD criteria?

Mr. Devendra Adhikari, AEPC/ESAP

- » On grid/off-grid electricity?
- » Why so much on grid electricity?

Bikash Pandey, Winrock International

- » Level of options.
- » Policy options does not exist.
- » Project developer looks at only project—i.e. higher level options; is seen by public agency.
- » Whose options are you considering—if it is Humla then may be water resources is not the option.
- » Policy level option is not for NEA—sectoral perspective.
- » Make the pokhari bigger then only you will see more options.
- » Policy as a public good be managed?
- » Can NPC implement? If there are other institutions then NPC could only guide.
- » NERC- who is going to look at options? We have opportunity to changes.
- » WECS for studies.
- » Policy level issues be brought out –higher level sorting out.

Annex 3

List of Participants in the Workshop (Hotel Yak and Yeti, September 18, 2005)

	Name	Organization	Contact Number
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21.	Yuba Raj Adhikari	Winrock International	4467087
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24.	D.B.Singh	DOED	
25.	Bir Bahadur Ghale	NMEF	4356026
26.	Bharat Poudel	Winrock International	4467087
27.	Karuna Sharma	Winrock International	4467087
28.	Birendra K. Pathak	NEA	4225499
29.	Dr. Jagadish C. Pokharel		

IUCN - THE WORLD CONSERVATION UNION

Founded in 1948, IUCN-The World Conservation Union brings together states, government agencies and a diverse range of non-governmental organizations in a unique world partnership: over 1,087 members in all, spread across some 180 countries. The World Conservation Union builds on strengths of its members, networks and partners to enhance their capacity and to support global alliances to safeguard natural resources at local, regional and global levels.

As a Union, IUCN seeks to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable.

IUCN-The World Conservation Union officially launched the Nepal Country Office on 23 February 1995 with the Ministry of Finance, His Majesty's Government as the government partner. IUCN Nepal has been developing partnerships with various government line agencies as well as non-governmental organizations to carry forward its activities to conserve Nepal's natural resources and ecological processes.

WINROCK INTERNATIONAL

Winrock International is a non-profit organization based in Arkansas, USA, with a global network of 65 countries spanning Latin America, Africa, and Asia. Winrock is committed to building human capacity, creating long-term relationships, managing effectively, communicating openly and promoting teamwork in order to create lasting solutions based on good science and sound economics. Our strength lies in unity as an organization and dedication to our mission objectives, equitable development, and inclusion of marginal groups. Our approach to development has been that of overall commitment to tackle problems where they occur, encouraging local initiatives in finding solutions to problems to promote long-term adoption of new ideas, technologies and practices.

We use innovative approaches in Agriculture, Natural Resource Management, Clean Energy and Leadership Development with the unique needs of rural communities in order to catalyze long-term productivity, equity and responsible resource management.

GTZ - THE GERMAN TECHNICAL COOPERATION

The Deutsche Gesellschaft fuer Technische Zusammenarbeit (GTZ) GMBH is an international cooperation enterprise for sustainable development with worldwide operations. Its corporate objective is to improve people's living conditions on a sustainable basis. Owned by the Federal Republic of Germany, GTZ translates the federal government's international cooperation into practice in more than 130 countries

For the past forty years, the German government has developed a strong collaboration with the Kingdom of Nepal. During this period the bilateral technical cooperation, implemented by the GTZ, has covered a broad range of sectors. In constant dialogue with our Nepalese partners and the German Federal Ministry for Economic Cooperation and Development (BMZ), the program is continuously adjusted according to the changing environment.