Public Private Partnership Initiatives in Hydropower in Nepal

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Project Development Manager, Butwal Power Company
Kathmandu, Nepal

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Presentation Outline

1. Present situation of Hydropower
2. Hydropower Policy
3. Hydropower Projects
4. PPP Initiatives
5. Kabeli ‘A’ Project: A PPP Initiative in Nepal
6. Opportunities and Challenges
Present situation of Hydropower in Nepal
Nepal Profile

Location:
Southern Asia, between China and India

Area: 147,181 Sq. KM
Water: 2.6% (3820 Sq Km)

Population: 29.4 Million (July 2011 est.)
In the World: 41 position

GDP per head: US$536 (2011 IMF )
Annual growth: 3% in 2010 estimate (IMF)

Literacy: 48.6%

Major River Basin: Koshi, Gandaki, Karnali, and Mahakali

Average Annual Precipitation: 1700mm (May – September)
There are about six thousand big and small rivers in three major river basins namely Koshi, Gandaki and Karnali.

All of the country's rivers drain into the River Ganges. Nepal's rivers account for approximately 40% of the total flow to the River Ganges.

Hydropower projects are under construction from 3000 M High elevation to as low 500 m.

100 yrs of History, Farping Hydropower Plant commissioned in 1911

85,000 MW potential capacity, only 1.3% has been harnessed.
• Estimated Total Annual Average run-off for the countries for more than 600 perennial rivers = 200 billion m³

• Estimated water storage potential = 88 billion m³

• Estimated theoretically potential hydropower = 85,000MW

• Estimated Technically viable Hydropower = 43,000 MW

• Present Status of Energy
  – Hydro : Installed capacity – 645 MW (GoN 478MW, IPP167 MW)
  – Thermal: Installed Capacity – 53MW (GoN)
  - Solar: 200 Kw (2 x 100)

• Electricity Access to people – 42% of Population
River Ganges and Nepal Rivers
698 MW is current installed capacity, in dry season only about 200 MW electricity produced, 14 hrs Load shedding in dry season

<table>
<thead>
<tr>
<th>Description</th>
<th>Capacity (MW)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Grid Connected Hydro Power</td>
<td>698</td>
</tr>
<tr>
<td>Diesel Plants (Thermal)- Capacity</td>
<td>53</td>
</tr>
<tr>
<td>Peaking Capacity</td>
<td>668</td>
</tr>
<tr>
<td>Import from India 150 MW (100 regular +50 need based)</td>
<td>150</td>
</tr>
<tr>
<td>Peak Demand</td>
<td>885</td>
</tr>
<tr>
<td>Current deficit -In Wet Season (July-Dec.)</td>
<td>-217 (885-668)</td>
</tr>
<tr>
<td>Current deficit – In Dry season (January-June)</td>
<td>-685 (885-200)</td>
</tr>
<tr>
<td>Under Construction (possibility within coming 3 yrs)</td>
<td>500</td>
</tr>
<tr>
<td>Possibility to come within 6 years (2011-2016)</td>
<td>1422</td>
</tr>
</tbody>
</table>

* Data updated from last presentation (as per Nepal Electricity Authority Report, 2010)
Load Forecast

Load Forecast-3600 MW in 2027-28

Source: NEA Annual Report, 2010
# Hydropower Plants in Operation

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Power Plant</th>
<th>Capacity (MW)</th>
<th>Annual Energy (GWh)</th>
<th>Owned by</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Trishuli</td>
<td>24</td>
<td>292</td>
<td>NEA</td>
<td>ROR</td>
</tr>
<tr>
<td>2</td>
<td>Sunkoshi</td>
<td>10</td>
<td>66</td>
<td>NEA</td>
<td>ROR</td>
</tr>
<tr>
<td>3</td>
<td>Gandak</td>
<td>15</td>
<td>53</td>
<td>NEA</td>
<td>ROR</td>
</tr>
<tr>
<td>4</td>
<td>Kulekhani I</td>
<td>60</td>
<td>164</td>
<td>NEA</td>
<td>STO</td>
</tr>
<tr>
<td>5</td>
<td>Devighat</td>
<td>14</td>
<td>13</td>
<td>NEA</td>
<td>ROR</td>
</tr>
<tr>
<td>6</td>
<td>Kulekhani II</td>
<td>32</td>
<td>96</td>
<td>NEA</td>
<td>STO</td>
</tr>
<tr>
<td>7</td>
<td>Marshyangdi</td>
<td>69</td>
<td>519</td>
<td>NEA</td>
<td>PROR</td>
</tr>
<tr>
<td>8</td>
<td>Puwa</td>
<td>6</td>
<td>41</td>
<td>NEA</td>
<td>ROR</td>
</tr>
<tr>
<td>9</td>
<td>Modi</td>
<td>15</td>
<td>87</td>
<td>NEA</td>
<td>ROR</td>
</tr>
<tr>
<td>10</td>
<td>Kaligandaki</td>
<td>144</td>
<td>791</td>
<td>NEA</td>
<td>PROR</td>
</tr>
<tr>
<td>11</td>
<td>Andhikhola</td>
<td>5</td>
<td>38</td>
<td>BPC</td>
<td>ROR</td>
</tr>
<tr>
<td>12</td>
<td>Jhimruk</td>
<td>12</td>
<td>81</td>
<td>BPC</td>
<td>ROR</td>
</tr>
<tr>
<td>13</td>
<td>Khimi</td>
<td>60</td>
<td>353</td>
<td>HPL</td>
<td>ROR</td>
</tr>
<tr>
<td>14</td>
<td>Bhotekoshi</td>
<td>36</td>
<td>246</td>
<td>BKPC</td>
<td>ROR</td>
</tr>
<tr>
<td>15</td>
<td>Indrawati</td>
<td>7.5</td>
<td>51</td>
<td>NHPC</td>
<td>ROR</td>
</tr>
<tr>
<td>16</td>
<td>Khudi</td>
<td>3.45</td>
<td></td>
<td>KHL</td>
<td>ROR</td>
</tr>
<tr>
<td>17</td>
<td>Rairang</td>
<td>0.5</td>
<td></td>
<td>Rairang HP</td>
<td>ROR</td>
</tr>
<tr>
<td>18</td>
<td>Baramchi</td>
<td>0.98</td>
<td></td>
<td>Unique Hydel</td>
<td>ROR</td>
</tr>
<tr>
<td>19</td>
<td>Thoppal</td>
<td>1.65</td>
<td></td>
<td>Thoppal HP Co.</td>
<td>ROR</td>
</tr>
<tr>
<td>20</td>
<td>Syange</td>
<td>0.2</td>
<td>1.2</td>
<td>SHC</td>
<td>ROR</td>
</tr>
<tr>
<td>21</td>
<td>Chilime</td>
<td>20</td>
<td>101</td>
<td>CHC</td>
<td>PROR</td>
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<tr>
<td>22</td>
<td>Piluwa</td>
<td>3</td>
<td>18</td>
<td>AVHCO</td>
<td>ROR</td>
</tr>
<tr>
<td>23</td>
<td>Sunkoshi</td>
<td>2.6</td>
<td>14.5</td>
<td>SHPC</td>
<td>ROR</td>
</tr>
<tr>
<td>24</td>
<td>Chaku Khola</td>
<td>1.5</td>
<td></td>
<td></td>
<td>ROR</td>
</tr>
<tr>
<td>25</td>
<td>Small hydro</td>
<td>12.5</td>
<td>26</td>
<td>NEA</td>
<td>ROR</td>
</tr>
<tr>
<td>26</td>
<td>Small hydro (Isolated)</td>
<td>6.4</td>
<td>NEA</td>
<td>ROR</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Microhydro</td>
<td>14.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Middle Marshyangdi</td>
<td>70</td>
<td>NEA</td>
<td>PROR</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>645.28</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Projects under construction

<table>
<thead>
<tr>
<th>HEP Project</th>
<th>Capacity (MW)</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chameliya (06/07)</td>
<td>30</td>
<td>40% work completed</td>
</tr>
<tr>
<td>Kulekhani – III</td>
<td>14</td>
<td>30% work completed</td>
</tr>
<tr>
<td>Rahughat</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Upper Trishuli- 3A</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Upper Trishuli- 3B</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Upper Modi - A</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>Sanjen Upper</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Sanjen</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>Middle Bhotekoshi</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>Rasuwagadhi</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>Kabeli – A</td>
<td>30</td>
<td>Will be commissioned in 2014</td>
</tr>
<tr>
<td>Upper Marsyangdi</td>
<td>50</td>
<td>Will be Commissioned in 2014</td>
</tr>
<tr>
<td>Nyadi Project</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>527</strong></td>
<td></td>
</tr>
</tbody>
</table>
## Proposed Storage Type Projects

<table>
<thead>
<tr>
<th>HEP Project</th>
<th>Capacity (MW)</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Seti</td>
<td>128</td>
<td></td>
</tr>
<tr>
<td>Nalsyangu Gad</td>
<td>400</td>
<td>Public-Private Model</td>
</tr>
<tr>
<td>Budhi Gandaki</td>
<td>600</td>
<td></td>
</tr>
<tr>
<td>West Seti</td>
<td>750</td>
<td></td>
</tr>
<tr>
<td>Arun-III</td>
<td>402</td>
<td>10% free energy basis</td>
</tr>
<tr>
<td>Upper Karnali</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>Panchesworo</td>
<td>6480</td>
<td></td>
</tr>
<tr>
<td>Multiple project</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>9060</strong></td>
<td></td>
</tr>
</tbody>
</table>

Storage Type Projects are necessary for constant supply of electricity
Three types of HEP projects are in operation in Nepal:

- **ROR (Run-off-river type)** - Very common
- **PROR (Peaking Run-off-River type)**
- **Ponding type** - Only one project under operation - Kulekhani Project
Nepal Hydro development policy
Until 1990, hydropower development was under the domain of government utility.

From 1992, hydropower development was opened for private sector.

New policy seek investment by private sector and expand electrification within the country and export.

60 MW Khimti project developed in 2001 with Norwegian Partnership.

In 1990, Small Hydropower Master Plan Project initiated, which has contributed 148 MW of power (1 to 10 MW) to Integrated Power system from Private Sector.

Nepal Government’s policy and plan of 10,000 MW in 10 years (2010-2020) and 25,000 MW in 20 years (2010-2030).
<table>
<thead>
<tr>
<th>Hydropower Policy...</th>
</tr>
</thead>
<tbody>
<tr>
<td>• No license required up to 3MW capacity projects.</td>
</tr>
<tr>
<td>• Fixed PPA Tariff (up to 25 MW, NRs. 4 (~5.7 USC)/kWh for dry season and NRs. 7 (~10 USC)/kWh for wet season) and negotiable for more than 25 MW</td>
</tr>
<tr>
<td>• Implementation of projects on BOO basis</td>
</tr>
<tr>
<td>• Encourage to develop Storage &amp; multi purpose projects, PPP approach</td>
</tr>
<tr>
<td>• Mobilization of internal capital market for investment</td>
</tr>
<tr>
<td>• Electricity Export</td>
</tr>
<tr>
<td>• Encouragement of community / cooperatives / local bodies</td>
</tr>
<tr>
<td>• Foreign investment on HP generation/ transmission and distribution</td>
</tr>
<tr>
<td>• Private sector establishment not be nationalized during license period</td>
</tr>
<tr>
<td>• Exchange facilities to foreign investors, can repatriate the amount in foreign currency at the prevailing rate</td>
</tr>
</tbody>
</table>
Public Private Partnership Initiatives
What is PPP?

PPP is joint ventures in which: business and government cooperate, each applying its particular strengths, to develop a project more quickly and more efficiently than the government could accomplish on its own.
Range of PPP Options

Public Responsibility

Conventional Procurement

- The procurement of assets by the public sector using conventional funding

Public Private Partnerships

- Design, build, finance and transfer (DBFT)
- Build, operate and transfer (BOT)
- Build, own, operate and transfer (BOOT)
- Design, build, finance and operate (DBFO)
- Build, operate and own (BOO)

Private Responsibility

Full Privatisation

- Publicly regulated but privately owned in perpetuity

Source: KPMG (2003) and authors own additions
PPP Initiates in Nepal

- Privatization policy in 1992
- Two projects (60 MW Khimti and 34 MW Bhotekoshi) build under private initiatives
- Govt owned Butwal Power Company privatized in 2003
- Many Small hydropower developers came up
- Contributed about 148 MW (1 to 10 MW) power to Integrated Power System
- Kabeli Project (30 MW) first in PPP model called for development in public private model in 2005
- 8 other projects (altogether 153 MW) called for bidding in PPP model in 2009
A complete paradigm shift is needed to attract the private sector to work in partnership with Government. That would necessitate:
(1) the creation of an environment,
(2) requiring changing of mindsets,
(3) changing of bureaucratic attitudes and
(4) above all the changing of legislative, legal and regulatory frameworks.

Four principal roles for the private sector to play in PPP schemes:
(1) the private sector may provide additional capital;
(2) alternative management and implementation skills;
(3) value added to the consumer and the public at large; and
(4) better identification of needs and optimal use of resources.
Pakistan has been developing many PPP model projects in hydropower sector
- 496 MW Spat Gah-Indus River (KfW Germany Funded)
- 15 MW Tangir HEP

In India many hydropower projects have been developed and is being developed under PPP Model
- More than 3.4% to power generation contributed by Private Sector

- 114 MW Dagachhu HEP in Bhutan, ADB Bank funded
- Gov. Of India supporting Bhutan for Hydropower development
PPP in NEPAL

- Bid for development of 30 MW Kabeli A project in 2005 in tariff basis
- Bid Notice for 8 projects (in total 142 MW) in 2009 under high bid basis
- Project Development Agreement (PDA) signed with Project company for Kabeli ‘A’ project in Jan 2010
- MOU signed with FNCCI for 2.17 MW Mahesh Khola in Sept 2010-(Project Cost : 5 MUS$)
- PDA signed for development of 8 Projects between Government and Project company
About BPC

- BPC is a leading Company in Hydropower development in Nepal since 1966
- BPC also owns and operating three projects:
  - 5.1 MW Andhikhola Hydroelectric Plant
  - 12 MW Jhimruk Hydroelectric Plant
  - 4 MW Khudi Hydroelectric Plant
  - 16% stake in 60 MW Khimti Hydroelectric Plant
- BPC is developing following hydropower projects:
  1. 30 MW Nyadi Hydropower Project
  2. 38 MW Kabeli ‘A’ Hydropower Project
  3. 140 MW Lower Manang Marsyangdi Project
  4. 42 MW Marsyangdi-III Hydropower Project
Maps of BPC’s Projects
Kabeli ‘A’ Hydropower Development:
A PPP Initiative
Kabeli ‘A’ Hydropower Project

• Kabeli ‘A Hydroelectric Project-First Initiative in development of hydropower with PPP Model
• A SPV (Special Purpose Vehicle) or Project Company established in Jan 2010-
• Name of Company: Kabeli Energy Limited
• Promoters of company are:
  1. Butwal Power Company Limited, Nepal- 54%
  2. SCP Hydro International, Quebec, Canada-30%
  3. Shangri-La Energy with Khudi Hydropower Ltd, Nepal-11%
  4. Asia Pacific Power Tech P. Ltd. Guangzhou, China- 5%
Project Location in Regional Basis

Pakistan

China

NEPAL

Bhutan

Bangladesh

Myanmar
Funding Arrangement

Project Cost
70 MUSD

80% Loan
World Bank: 40%~50%
Local Banks: 40%~30%

20% Equity
Developers
Financial Parameters

- **World Bank Interest rate**: LIBOR +2.5% (Current rate is 0.46% +2.5% = 2.96%)
- **Local Banks Interest rate**: 12%~14%
- **PPA BaseTariff**: 5.766 US Cent/Kwh
- **Payment**: in US $ (47%) and Nepali Rupees (53%)
- **Escalation**: 3% in US component and 6% in Nepali Component till 10th year after COD
- **Flat rate** after 11th year
- **Fixed Foreign Exchange Rate**: 1 US$ = 71.25 NRs.
- **Conseinnure period**: 25 years plus 5 year with 50% ownership of NEA on completion of PPA term
# Government Role

<table>
<thead>
<tr>
<th></th>
<th>Project Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Right to possess, use and procure benefits from the Project and Property by the Project Company including the right and sale the generated electricity.</td>
</tr>
<tr>
<td>2</td>
<td>Water rights</td>
</tr>
<tr>
<td></td>
<td>Govt. cannot issue license for any basin transfer project on Kabeli river.</td>
</tr>
<tr>
<td>3</td>
<td>Project Facilities</td>
</tr>
<tr>
<td></td>
<td>Own construct, operate, maintain, and repair the project and facilities</td>
</tr>
<tr>
<td>4</td>
<td>Use of Local Natural resources</td>
</tr>
<tr>
<td></td>
<td>Project company has right to use local material such as stone, sand etc.</td>
</tr>
<tr>
<td>5</td>
<td>Employment of Expat Project Resources</td>
</tr>
<tr>
<td></td>
<td>Government will expeditiously grant necessary work permits, visas, permits or other employment authorizations</td>
</tr>
<tr>
<td>6</td>
<td>Import and Export of Materials and Equipment</td>
</tr>
<tr>
<td></td>
<td>1% Custom duty for permanent import and free duty on plants &amp; equipments temporary import</td>
</tr>
<tr>
<td>7</td>
<td>Use of Foreign Currency and Bank Account</td>
</tr>
<tr>
<td></td>
<td>Right and authority for the Project Company for the duration of the Concession Period to receive, disburse, hold, effect payments, distributions and dividends and to otherwise transact business in and with Foreign Currency</td>
</tr>
<tr>
<td></td>
<td>Topic</td>
</tr>
<tr>
<td>---</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>8</td>
<td>Use of Foreign Currency and Bank Account</td>
</tr>
<tr>
<td>9</td>
<td>Income Tax</td>
</tr>
<tr>
<td>10</td>
<td>Against Change in Law</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td>11</td>
<td>Tax and Royalties</td>
</tr>
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<tr>
<td>12</td>
<td>Import of explosives</td>
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## Project Schedule

<table>
<thead>
<tr>
<th>SN</th>
<th>Task</th>
<th>Start Date (MM/DD/YY)</th>
<th>Finish Date (MM/DD/YY)</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sign PDA</td>
<td></td>
<td>01/31/10</td>
<td>Completed</td>
</tr>
<tr>
<td>2</td>
<td>Survey License</td>
<td>02/01/10</td>
<td>03/19/10</td>
<td>Completed</td>
</tr>
<tr>
<td>3</td>
<td>Feasibility study update</td>
<td>03/19/10</td>
<td>09/15/10</td>
<td>Completed (Deadline 03/18/2011)</td>
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<tr>
<td>4</td>
<td>EIA update</td>
<td>09/01/10</td>
<td>12/31/10</td>
<td>Ongoing</td>
</tr>
<tr>
<td>5</td>
<td>Approval of Feasibility/ESIA Study from GoN</td>
<td>11/15/10</td>
<td>02/11/11</td>
<td>Ongoing</td>
</tr>
<tr>
<td>6</td>
<td>Design/Tender document preparation</td>
<td>10/04/10</td>
<td>02/28/11</td>
<td>Ongoing</td>
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<tr>
<td>7</td>
<td>PPA and Generation License</td>
<td>02/15/11</td>
<td>05/20/11</td>
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<td>8</td>
<td>Financial Negotiation and Closing</td>
<td>03/15/10</td>
<td>06/19/11</td>
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<td>9</td>
<td>Civil Work Contractor/Supplier procurement</td>
<td>03/15/11</td>
<td>06/22/11</td>
<td>Ongoing</td>
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<tr>
<td>10</td>
<td>Main Construction Works</td>
<td>07/13/11</td>
<td>11/06/14</td>
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<tr>
<td>11</td>
<td>Project Testing and Commissioning</td>
<td>09/28/14</td>
<td>12/15/14</td>
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<tr>
<td>12</td>
<td>Commercial Operation</td>
<td></td>
<td>12/25/14</td>
<td></td>
</tr>
</tbody>
</table>
Project Status

- Survey License received on March 19, 2010
- Feasibility Study Update
  - Study completed – submitted to GoN and World Bank (WB) in Nov. 2010
  - Panel of Expert (POE) reviewed the report as per requirement of WB and
  - Government of Nepal is reviewing the study report
- Environment Impact Assessment/SIA/IEE
  - ToR/Scoping completed– Approval of WB Nepal office received.
  - TOR for IEE approved from GoN
  - IEE/ESIA Study Completed in Nov. 2010
  - Under Review by POEs, preliminary report received on Jan7, 2011
  - Final report will submitted to WB
- World bank appraising the project for loan Agreement
On going Activities

- 10 hectare land purchased
- Prequalification (PQ) process for Civil work contractor/EM-HM Suppliers
- Tender for Test Adit Tunnel
- Tender Documents finalization
- Physical River Modeling
- Detail Design underprocess
- Detail Design Review Consultant recruit process
- Track opening for Access Road
  - Headwork site: 8 KM
  - PH site: 12 KM
Google View of Project Site
Headwork Layout Plan
Power House Area
Gauge installation
River Model Photographs
Salient Features

- 6 Radial Gated Barrage type of headworks
- Underground settling basin- 113m x 15.8 m
- Head Race Tunnel-D shaped, 4330 M, 5.65 m dia
- Surge shaft- 51.7 M depth/10 m dia.
- Penstock: 250 M, 3.55 m Int. dia.
- Francis Turbine: 2 Nos., Vertical axis (2 x 19 MW)
- Tailrace: 93 M (4.9 m wide x 4.65 m high Rectangular)
- Power house: Semi Underground
- Gross Head: 117 M
- Design discharge: 37 Cumec
- Construction time: 3.5 Years
• The project will be managed by CEO/Project Director.
• The Project Manager is responsible to the Chief Executive Officer for the delivery of the agreed project outputs including the project construction outputs.
• The following corporate documents shall be prepared to guide the project development activities.
  – Code of Ethics
  – Corporate Governance Code
  – Code of Conduct
  – Financial Regulation
  – Personal Manual
  – Procurement Manual
Opportunities and Challenges in Hydropower Projects
Opportunities

1. **Clean energy as hydropower projects are demand of modern world**

2. **Possibility of High head projects**
   - Generates much energy in less investment
   - 456 MW Upper Tamakoshi project - Govt project

3. **High potential for Ponding type of Projects:**
   - Upper Karnali, West Seti, Burhi Gandaki, Pancheswar

4. **Interested foreign investors**
   - Indian investors are interested in developing the projects ranging from 50 MW~1000 MW

5. **High flow in rivers**
   - 8 of the 10 snow-capped and highest mountains in the world are located in Nepal. Himalaya is the source of most rivers of Nepal.
Opportunity…

6. High demand in local market (Electricity based activities)
7. High potential demand in Regional Market
   Highly populated areas of India and Bangladesh are located near to Nepal. Electricity market is available. Surplus energy can be exported.
8. Hassle free investment during operational phase
   No need of import of raw materials, Low production cost
   Less labor intensive
9. Private/foreign investor favorable policy of Government
10. Environmental risk free after construction
Challenges

A. Technical Aspects:
   1. Geological condition varies in short span
   2. Weak geology: prone to landslides, heavy investment requires to control land slides
   3. High Sedimentation: erodes turbine blades significantly
   4. High cost in construction of settling basin
   5. High Monsoon flood/discharge: need strong (costlier) structures to control a short span problem
   6. Limited accessibility: high technology (TBM machines) cannot be used
   7. Steep sloped rivers
   8. Highly active seismic zone
   9. Great data management required (hydrology, geotechnical etc.) during DPR study-Skilled resource
7. Lack of Transmission Line
   - Government not been able to construct transmission line to cater private developers
   - Lack of planning
   - Scattered projects, not near to more demand area

8. Local/Managerial/Administrative Aspects
   - Local people demand
   - ILO 169, which deals specifically with the rights of indigenous and tribal peoples.
   - Changing demand of local people
   - Multi aspects involvement
     - Road, Housing, environmental mitigation etc.
   - Lack of infrastructure facilities: Developers have to build at their own cost
   - Resettlement problem and issues for big reservoir projects, resist from local people
9. Financial/Economical Aspects

- Huge initial investment required: Average Investment cost ranges from $2000-$4000 per KW. Big financial risks
- National developers do not have enough money to invest
- Lack of fluidity (money) in local Banks: Cannot invest in big Mega Projects
- Local Bank interest rate is high (10%-14%)
- Government buying rate (tariff) is not encouraging (100 \$/Kwh in dry season and 60\ during wet season)
- Government facilitation policy is not favorable: Government does not provide the guarantee to private developers to get loan from the Foreign Banks
- Lack of government fund to invest in hydropower

10. Attitude of license capture

- Tendency of capturing of development license by influential people,
- True developers deprived from development of projects
11. Weaknesses of private developers
   - Local company does not have organizational strength to implement the mega projects
   - Foreign investors wants more than 51% stake in the company, weakening local parties
   - Some developers have even no capacity to invest equity portion of the project cost

12. Instability of the political system
   - Leaders’ focus is in government formation
   - Focus in preparation of Constitution
   - Lack of understanding of development in leaders
Conclusion

- Nepal has potential to generate 85,000 MW of electricity power
- Only able to produce 1.3% of capacity
- Nepal is in shortage of electricity power
- Hydropower policy prepared to facilitate private investment
- Independent Power Producers (IPPs) with private investment coming up
- PPP model has been introduced
- BPC is working under PPP initiatives of Government
- BPC is developing 4 new projects and running 3 power plants
- 38 MW capacity Kabeli ‘A’ Project is first in PPP model
- Kabeli Project is being financed by World Bank
- Kabeli Project is scheduled to be completed within 2014
- There is a lot of opportunity to develop HEP
- Number of challenges are also existed
THANK YOU FOR YOUR ATTENTION! ANY QUESTIONS??