The Prospects of Investment in the sector of Hydropower & Drinking Water in Nepal
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1. Introduction of K-water's ongoing hydropower project in Nepal

2. About K-water

3. Present state of drinking water sector in Nepal

4. Prospect of investment in drinking water sector in Nepal
1. K-water's ongoing hydropower project

**Project Summary**

- **Location**: Kaski District of Gandaki Zone, 170 km West of Kathmandu
- **Type**: Run-of-River (Cascade development)
- **Installed Capacity**: 62.6 MW (Annual Gen.: 310.4 GWh, Plant Factor: 56.6%)
- **Total Cost**: 154 million USD
- **Duration**: Construction 4 years, O&M 31 years (BOOT basis)

<table>
<thead>
<tr>
<th>Items</th>
<th>Upper Modi A HEP</th>
<th>Upper Modi HEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installed Capacity</td>
<td>42.6 MW</td>
<td>20 MW</td>
</tr>
<tr>
<td>Average Annual Generation</td>
<td>215.6 GWh</td>
<td>94.8 GWh</td>
</tr>
<tr>
<td>Plant Factor</td>
<td>57%</td>
<td>54.1%</td>
</tr>
<tr>
<td>Headrace Tunnel Length</td>
<td>7 km (D 3.4~4.0 m)</td>
<td>3 km (D 3.4~4.0 m)</td>
</tr>
<tr>
<td>Construction Duration</td>
<td>4 yrs</td>
<td>2~2.5 yrs</td>
</tr>
</tbody>
</table>
1.1. Project Location

The Proposed site of Upper Modi A HEP (42.6MW)

The Proposed site of Upper Modi HEP (20MW)
1.2. Site View
1.3. Site Map
1.4. Project Structure

**Shareholders**
- NEA 60%
- K-water 30%
- Local residents 10%

**Lenders**
- ADB
- KEXIM (EDCF)
- MoF
- NEA, MoE
  - PPA
  - Permit, License
- MoF Guarantee
- Concessional Loan Agreement
- Concessional Loan Agreement
- Guarantee

**NEA, MoE**
- PPA
- Permit, License
- NEA 60%
- KEXIM (EDCF)
- Concessional Loan Agreement
- Concessional Loan Agreement

**EPC Contractor**
- EPC Contract

**O&M Contractor**
- O&M Contract
1.5. Financing Plan

- **Equity Financing**
  - The shareholder ratio was tentatively agreed: NEA (60%), K-water (30%), Local residents (10%).

- **Debt Financing**
  - The following banks are considered as potential lenders:
    - Korea Exim Bank (EDCF)
    - Asian Development Bank (Concessional Loan)
### 1.6. Project Milestones

<table>
<thead>
<tr>
<th>Procedures</th>
<th>Schedule</th>
<th>Counterpart</th>
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</thead>
<tbody>
<tr>
<td>MOU for Joint Development</td>
<td>June 2011</td>
<td>NEA</td>
</tr>
<tr>
<td>Joint Development Agreement</td>
<td>March 2012</td>
<td>NEA</td>
</tr>
<tr>
<td>Update of Feasibilities Studies</td>
<td>May 2014</td>
<td>NEA</td>
</tr>
<tr>
<td>Update of EIA</td>
<td>July 2014</td>
<td></td>
</tr>
<tr>
<td>Loan Request</td>
<td>July 2014</td>
<td>Lenders</td>
</tr>
<tr>
<td>Initiation and Establishment of SPC</td>
<td>June 2014</td>
<td>NEA</td>
</tr>
<tr>
<td>Concessional Loan Processing and Finalization</td>
<td>March 2015</td>
<td>Lenders</td>
</tr>
<tr>
<td>PPA Draft</td>
<td>September 2014</td>
<td>NEA</td>
</tr>
<tr>
<td>EPC Contract</td>
<td>April 2015</td>
<td>EPC Contractor</td>
</tr>
<tr>
<td>Commencement of Construction</td>
<td>March 2015</td>
<td></td>
</tr>
</tbody>
</table>
2. About K-water

Establishment & Vision

To become one of the leading water resources companies in the world

Key Roles and Objectives

Key implementation arm of the Korean Government

- Develop & manage water resources
- Improve water quality
- Carry out flood control measures

Organization

- Divisions: 13
- Departments: 58
- Employees: 4,072

'10 Financial Summary

Unit: bn. USD

1 USD=1,049.43 KRW (July 28, 2011)

<table>
<thead>
<tr>
<th></th>
<th>17.6</th>
<th>10.0</th>
<th>7.6</th>
<th>2.0</th>
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<tbody>
<tr>
<td>Total Asset</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equity Capital</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Liability</td>
<td></td>
<td></td>
<td>7.6</td>
<td></td>
</tr>
<tr>
<td>Revenue</td>
<td>2.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.1. Financial Highlight

Full Government Support
- **100%** Government Ownership
- Sovereign Equal Rating: **A1/A**

Pivotal Policy Role
- Importance of Water Resources Highlighted
- **Sole Public Entity** for Many Water-Related Business
- Practically **No Privatization Risk**

Key Government Project
- Four Rivers Restoration Project
- Gyeong-In Canal Project
- Engaged in other ongoing Major Projects nationwide

Solid Financial Profile
- Sound Capital Structure
  Debt/Capitalization: **40.1%**
- Solid Cash Flow
  Operating Margin Ratio: **10.7%**
2.2. Business Overview

Water Resources

- Construction and Management of Multi-Purpose Dams
- **Hydro-electric Power Generation** - The Market Share of the sector in Korea: 32% / Ranked No.1
- 4-River Restoration Project

Site development

- Development of Industrial Complexes
- Development of Special Areas

<table>
<thead>
<tr>
<th>Revenues (as end of 2010)</th>
</tr>
</thead>
<tbody>
<tr>
<td>In mil. USD / 1 USD = 1,049.43 KRW</td>
</tr>
<tr>
<td>940.3 (46.1%)</td>
</tr>
<tr>
<td>775.5 (38.0%)</td>
</tr>
<tr>
<td>161.5 (7.9%)</td>
</tr>
<tr>
<td>162.6 (8.0%)</td>
</tr>
</tbody>
</table>

Water supply

- Multi-Regional waterworks
- Industrial Waterworks
- Serving 25 mil. people

Others

- Alternative Energy Business
- Local waterworks
- Waste water treatment
- Overseas business
- Gyeong-In Canal Project
2.3 Operation Overview

**Water Resources Management**
- Managing 16 multi-purpose dams
  - Flood control (2.2 bill. m³)
  - Water supply (10.9 bill. m³/yr)
  - Hydro-power generation (1,300 MW)
- Managing 16 water supply dams
  - Water supply (1.4 bill. m³/yr)
- 5 new dams under construction
- 21 existing dams under rehabilitation

**Water Supply Management**
- Managing 33 multi-regional water supply systems
  - Capacity: 17 Billion Litre/day
  - Intake facility: 24 units
  - WTP: 40 units
  - Pumping station: 76 units
  - Pipe line: 4,800km
※ app. 50% market share in Korea
- Managing 18 Local water supply systems by “Concession Agreement”

**Wastewater Management**
- Managing 112 wastewater treatment plants
- Construction of Integrated management system
- Participating in Public-Private Partnership projects
2.4 K-water’s Overseas Business

- Overall project organization and management including equity investment
- Feasibility study, Detailed design and construction supervision
- Technical assistance to improve the management level

- Completed 30 projects in 18 countries (China, Laos, Vietnam, etc)
- 11 on-going projects in 10 countries (Pakistan, China, Indonesia, Philippines, etc)
2.5 Pakistan Patrind HEP

Overview

Outline
- Total Cost: 436 million USD
- Generation Capacity: 147MW
- Type: Run of River
- Concession Periods: 30yr (BOT)
- Commercial Operation Date: 2016
Project Structure

- K-WATER (80%)
- DAEWOO (10%)
- GIF (10%)

Equity: 109 million US $

O&M Contract

EPC Contract

Debt: 327 million US $

K-EXIM
ADB
IFC
IsDB

K-EXIM ADB IFC IsDB

Approvals and Guarantees
Guarantees
PPA
2.6 Pakistan Patrind HEP

Key Stakeholder of SPC

K-Water (80.00%)

Daewoo (10.00%)

GIF (10.00%)

KDS Hydro Pte Limited

Lenders: KEXIM, ADB, IsDB, IFC

Star Hydro Power Limited

O&M Contractor: K-Water

EPC Contractor: Daewoo

Power Purchaser: NTDC

Governments of Pakistan, NWFP and AJ&K
3. Present state of drinking water sector in Nepal

Access to drinking water: urban 90%, rural 81%
(Tap/piped 47.8%, Hand pump 35.1%, Well 12.9%, River 1.1%)

(Source: UN)
3.1. Conditions of piped water supply systems

(Source: UN)
### 3.2. Present status

#### Urban Area

Urban water demand is increasing rapidly at between 6% and 9% per annum.

#### Rural Area

Around 85% of Nepal’s population currently lives in rural areas. Around 20% of the population do not yet have access to safe drinking water.

#### Arsenic (As) contamination in groundwater

Nearly 47% of Nepal’s population currently lives in the southern part of the country (the Terai region).

High levels of As contamination in the drinking water poses a serious risk to the health of residents living in the Terai plain regions.
3.3. Melamchi Water Supply Project

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Diversion raw water from the Melamchi river to Sundarijal outlet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>170,000 m3/d</td>
</tr>
<tr>
<td>Beneficiaries</td>
<td>1,100,000 persons in Kathmandu Valley</td>
</tr>
<tr>
<td>Total Cost</td>
<td>350 million USD</td>
</tr>
<tr>
<td>Progress</td>
<td>Construction started in 2009, completion expected in 2016</td>
</tr>
</tbody>
</table>
4. Prospect of investment in drinking water sector in Nepal

**Opportunities**

- Increasing demand of clean & safe water
- Economic growth
- Intention from international financing agencies

**Challenges**

- Scattered settlements
- Thin population density
- High cost
- Contamination of water sources
- Unstable electricity supply
4.1. Implementation Planning for Water Project

Short-term measures

- Grant from foreign countries
- Soft loan (EDCF by GOK, Concessional loan by ADB)

Long-term measures

- Foreign Direct Investment (on a basis of BOOT)
  - Some conditions required: “Take-or-pay” guarantee
  - Priority: Cities
4.2. Recommendations

A program for reconstruction and rehabilitation for water supply systems with improved water quality should be initiated.

Improvement in functionality and quality of water supply systems must be taken into consideration.

GON needs to establish investment-friendly environment in drinking water sector in Nepal.

K-water is eager to cooperate with GON to promote joint activities such as knowledge sharing, capacity building and exchange of experts.
Thank you for your attention!