Government of Nepal
Ministry of Energy
Department of Electricity development

BUDHIGANGA HYDROPOWER PROJECT
Achham (20MW)

Progress Report
(Progress Period – Second Quarter, 2015)

Development Partner
Kuwait Fund for Arab Economic Development (KFAED)
Saudi Fund for Development (SFD)

September 2015
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1 INTRODUCTION

The Budhi Ganga Hydropower Project is located at Achham district of far western Development region. The project location is about 5.5 km north from Sanfe bazar to near Thanti bazaar of Ghughurkot VDC. The dam site is located about 13 km from safe bagar bazaar at Babala VDC-3 and Kuskot VDC-5 near Buddha Bagar and power house site is proposed in Thapa Gaun of Hattikot VDC-4. The project boundary lies between 29°15' 30" and 29°18' 35" latitude north and between 81°14' and 81°17' 50" longitude east.

The Feasibility Study and Environmental Impact Assessment of the Budhi Ganga Hydropower Project (BHP) were carried out by Canadian International Water and Energy Consultants (CIWEC) on behalf of Nepal Electricity Authority (NEA) and METCON Consultants Pvt. Ltd. on July 18, 1997. This project is currently being developed by Budhi Ganga Hydropower Project under Government of Nepal, Ministry of Energy, Department of Electricity Development (DoED). The loan agreement has already been concluded between the Government of Nepal and Saudi Fund for Development and Kuwait Fund for Arab Economic Development (KFAED) to develop the project.

On the basis of feasibility study report, the Budhi Ganga Hydropower Project is a run-of-river project with daily poundage (PRoR) configuration having 20 MW installed capacity. The annual average energy generation of the project is 106.28GWh. The flow of Budhi Ganga River is diverted by constructing 25m high, 8m wide and 54m long dam near Buddhabagar of Babla and Kuskot VDC. Water is then conveyed through 5.6km long, 5.1m dia shortcrete lined and 3.9m concrete lined headrace tunnel up to surge tank. Surge tank of 57.1m high and 7.5m diameter has been proposed for resisting water hammer effect. Then flow will conveyed to power house through 3.5m diameter and 206 m long Penstock pipe. Water is discharged back into the Budhi Ganga river through 83m tailrace tunnel after the power is generated through two units of Francis turbine of 10 MW each capacity. The generated power will be used by the districts of this region and remaining generated power will be evacuated through the 132kV transmission line of length 96.41 km to the Lamki Sub-station in Kailali district.

This project is aimed to supply 20MW capacity of reliable power to the Independent National Power System of Nepal (INPS). It is believed that, the project brings the economic development of the Achham district as well as far western region of Nepal.
2 BHP STRATEGIC PLANNING

2.1 Vision

- "Brighter and prosperous Nepal through the sustainable hydropower generation harnessing the country's available water resources with the competent public sector"

2.2 Mission

- Capacity building of Public sector in hydropower development for sustainable economic growth of the country.
- Completion of the hydropower projects of desired quality within the stipulated time by the estimated cost.
- Supply of reliable energy in Integrated National Power System (INPS) by the early completion of the project.

2.3 Objectives

- Complete the 20MW capacity Budhi Ganga hydropower project, located in Achham district of specified standards within 2020 by the estimated cost.
- Develop 132KV transmission line from Budhi Ganga to Lamki (96.41km) to evacuate the power developed; this line may also used to evacuate the power developed by the private sector in this region.
- Capacity building of the public sector in hydropower generation as well as in regulation and monitoring activities learning from this project and implement larger projects successively.
- To open up the economic activities and other development program in integrated manner with this project, achieving the regional balance in development of far western region.

2.4 Targets

- Completion of the pre-construction activities including detailed design and environmental study by 2017
- Completion of the main construction activities (Civil, electro-mechanical and hydro-mechanical works) of the project by 2020.
- Completion of the 96.41km long 132kV transmission line from Budhi Ganga to Lamki by 2020.
3 PROJECT FEATURES

3.1 Dam and Reservoir Area

The dam site is proposed in between Kuskot VDC-3 and Babla VDC-5, near Buddhhabagar area. The proposed dam is 54m in length and 25m in height and 8m in width. Two numbers of radial gates of 12.5m diameter is proposed for water regulation and storage at the dam. The water diverted from the intake is conveyed to the desander basin by 57m length intake tunnel.

Figure 1: Headwork's (Dam site)

About 8.46 Ha of poundage area creates 0.236M m$^3$ volume of water up to 3km upstream of the 25m height dam.

3.2 Desander

The optimum design discharge of 27.6m$^3$/sec is used for the design of the water conveyance system. Two parallel intake tunnels are designed up to desander basin to carry the diverted water. Two desander basin of 57m length has been proposed to settle sediment on bed of desander basin and flush the settled particle considering the design discharge.

3.3 Headrace Tunnel, Surge Tank and Penstock

The diverted water is conveyed through 5.6km long, 5.1m dia shortcrete lined and 3.9m dia concrete lined headrace tunnel up to the surge tank. To resist water hammer effect, 57.1m
high and 7.5m dia surge tank is proposed and then the flow will conveyed to power house through 3.5m diameter and 206 m long penstock pipe.

3.4 Powerhouse and Tailrace

Surface Powerhouse having dimension of 30x24x14 m is designed with consisting 2 units of Francis turbine of each 10MW of capacity connecting with generator on Hattikot VDC-4. After generation of electricity water will be conveyed through 83m of tailrace tunnel to Budhi Ganga River again.

Figure 2: Powerhouse area (Hattikot VDC-4)

3.5 Transmission Line and Substation

The generated power from Budhi Ganga hydropower project, 20MW is evacuated to the Lamki Substation, Kailali by constructing 99.41km long 132 KV transmission line.

3.6 Access Road

The project area is located about 5km north from the Sanfe Bazaar, Achham district. Around 1.98km of access road is proposed for the access to powerhouse site from the Thanti point of the Achham-Bajura Road and about 650m length of access road is proposed for damsite from the Achham-Bajura Road near Buddha bagar.
4  FINANCIAL ASPECT

On the basis of feasibility study carried out, the total cost of the project is estimated as 50.64 million US$ including transmission line. The project parameters such as B/C ratio is 1.2, IRR 13.77% and Payback period 6.12 year based on the price level of 1997.

The loan agreement has been concluded between Government of Nepal and Saudi Fund for development for Saudi Riyals 112.5 million (30 million US$) on 18 June 2014. And the loan agreement has been concluded between Government of Nepal and Kuwait fund for Arab economic development for Kuwaiti Donor 5 million (18 million US$) on 4 July 2012. The remaining fund will be managed by Government of Nepal to develop the project.

5  PRESENT STATUS OF THE PROJECT

5.1  Land acquisition

- Initial report for Land Acquisition was submitted to District Administration Office on 18th May, 2014.
- Details of Land, Houses, and Trees etc. required for the project has been identified and initial report was revised and submitted on 29th Jan, 2015 to District Administration Office.
- Public notice was published on National Daily Paper, Village Development committee offices, District Administration Office, District Land Revenue Department, Special Survey Department and Village Development office.
- Land Rate Fixation Committee has been formed under the chairmanship of District Administrator Officer, Achham as per the provision of the Land Acquisition Act 2034 BS. The other members of the Committee are Representative from District Land Revenue Office, District Development Committee and Project Manager of BHP.
- Rates of land were fixed on 18th June, 2015 by Land fixation committee and Public notice was published on National Daily Paper on 19th June, 2015.
- Applications for compensation has been collected & about 65% land has been acquired (Compensation distribution) (136 Ropanies out of 217 Ropanies) till 15th July, 2015.
- For acquisition of remaining land, the budget has been allocated in this fiscal (FY 2072/073) year. The acquisition of remaining land is in process and expected to be completed soon.
5.2 Office Building and Camp Facilities

This consists of Office Building and other infrastructures at Ghughurkot V.D.C., Achham.

- The final report of survey, design and cost estimate incorporated with comments were provided by the consultant on 22\textsuperscript{nd} April, 2015.
- The final report along with PQ document was sent to SFD and DoED for concurrence on 24\textsuperscript{th} May, 2015. No Objection letter was obtained from DoED on 30\textsuperscript{th} May, 2015 and from SFD on 11\textsuperscript{th} June, 2015.
- Invitation for Prequalification was published on 12\textsuperscript{th} June, 2015 with deadline on 12\textsuperscript{th} July, 2015.
- A prequalification document submitted by the contractor was evaluated and the prequalification evaluation report and draft bid report was sent to SFD for No Objection on 11 August 2015.
- Invitation for Bidding was published on 20\textsuperscript{th} August, 2015 (with deadline on 18\textsuperscript{th} September, 2015) after getting approval from SFD on 19\textsuperscript{th} August, 2015.

5.3 Access Road to Powerhouse Chainage (0+765)

This consists of Access road from Thanti Bazaar to Budhi Ganga Bridge location.

- The track opening works of the Access road to Powerhouse work was conducted in this fiscal year 2072/73(2015/2016) through the user’s association. Upgrading, survey, design and tender document of this access road to Powerhouse was completed.
- Bid for upgrading was invited on 15\textsuperscript{th} March, 2015 and agreement with the contractor was done on 17\textsuperscript{th} May, 2015.
- The construction has been started and the contractors have completed the alignment, earthwork related work and gabion and structure improvement work is ongoing.

5.4 Bridge and Access Road Construction

This consists of Bridge at Budi Ganga, Access Road to Dam site, Access road to Powerhouse and Access Road to Surge Tank. During the discussion with the Saudi Fund for Development Mission, on 19\textsuperscript{th} Feb 2015, it was agreed to conduct the construction work of all access road and bridge work in a single package.

- National Consultant has been selected for survey design and cost estimation of the Bridge in the access road to powerhouse. Feasibility study report was received on
26th Feb, 2015 and revised feasibility study report incorporating the comments was received on 9th March.

- The PQ documents in addition to survey, design and cost estimation has been sent to SFD and DoED for concurrence on 5th July, 2015.
- No Objection letter was obtained from DoED on 20th July, 2015 and from SFD on 28th July, 2015.
- Invitation of Prequalification was published on 29th July, 2015 with deadline on 28th August, 2015. The prequalification document evaluation works is ongoing.

### 5.5 Detailed Engineering Design & Environmental Study including Social Impact Study

- The proposal submitted by the consultant for detailed design & environmental study including the social impact study has been evaluated and sent for concurrence from Kuwait fund for Arab Economic Development.
- No objection letter for EOI document was obtained on 9th Sep, 2014 from KFAED.
- Technical proposals were evaluated and send for concurrence to KFAED on 12th Jan, 2015 and no objection letter was obtained on 4th March, 2015.
- Negotiation was done with the consultant on 19th April, 7th May and 22nd May, 2015 and contract agreement was done on 30th June with SMEC JV with Udaya.
- The work order has been given to the consultant. The Consultant has submitted the registration of the joint venture firm as per GoN rules and has requested for mobilization advance on 3rd September, 2015. The consultant is also planning to mobilize team for site visit.

### 5.6 Transmission Line

- Desk Study report for the transmission line survey was prepared and field Reconnaissance was conducted on July 2015.
- Detailed Survey and Land Acquisition work will be conducted in current fiscal year (2072/073).

### 5.7 Community Support Program (Basic Plumbing Training Program)

- As a community support program basic plumbing training program was successfully conducted in co-ordination with the hired local consultant. The seven days training program was conducted in affected areas from 26th June to 2nd July, 2015. Fifteen numbers of local participants were selected for the program.
6 Packaging of Work

Budhi Ganga Hydropower Project has carried out the planning works and based on the loan agreement following packages of the works has been prepared for execution.

<table>
<thead>
<tr>
<th>S.No</th>
<th>Title</th>
<th>Fund</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Detailed Engineering Design and Environmental study</td>
<td>GoN+ 100% Kuwait Fund</td>
<td>GoN's contribution for VAT and matching fund</td>
</tr>
<tr>
<td>2</td>
<td>Consultancy Services for Construction Supervision</td>
<td>GoN+ 100% Saudi Fund</td>
<td>GoN's contribution for VAT and matching fund</td>
</tr>
<tr>
<td>3</td>
<td>Access Road (PH access Road, up to Bridge point (0+00 to 0+770)</td>
<td>GoN</td>
<td>This portion is fully financed by GoN- Track opening concluded by GoN fund in previous FY</td>
</tr>
<tr>
<td>4</td>
<td>Access Road (PH access Road, HW Access Road, ST Access road) including Bridge</td>
<td>GoN + 100% Saudi Fund</td>
<td>GoN's contribution for VAT and matching fund</td>
</tr>
<tr>
<td>5</td>
<td>Office building and camp facilities</td>
<td>GoN + 100% Saudi Fund</td>
<td>GoN's contribution for VAT and matching fund</td>
</tr>
<tr>
<td>6</td>
<td>Main construction (Civil)</td>
<td>GoN+ Saudi90%+Kuwait10%</td>
<td>GoN's contribution for VAT and matching fund</td>
</tr>
<tr>
<td>7</td>
<td>Main construction (Hydro mechanical)</td>
<td>GoN+ Saudi20%+Kuwait80%</td>
<td>GoN's contribution for VAT and matching fund</td>
</tr>
<tr>
<td>8</td>
<td>Main construction (Electromechanical)</td>
<td>GoN+ Saudi 20%+Kuwait 80%</td>
<td>GoN's contribution for VAT and matching fund</td>
</tr>
<tr>
<td>9</td>
<td>Transmission Line</td>
<td>GoN+ 50%Saudi+50%Kuwait</td>
<td>GoN's contribution for VAT and matching fund</td>
</tr>
<tr>
<td>10</td>
<td>Land Acquisition</td>
<td>GoN</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Contingencies</td>
<td>GoN+ Saudi +Kuwait</td>
<td></td>
</tr>
</tbody>
</table>

7 Future Plan

The budget preparation works and approval for this fiscal year 2072/073 (Mid July 2015 to Mid July 2016) of Government of Nepal has been carried out. Budhi Ganga Hydropower Project team has been involved in the budget preparation and discussion activities. Following provision is considered for the budget preparation for next fiscal year:

- In this fiscal year GoN has allocated Budget and has prepared program for remaining land required for project to be acquired. So, the land acquisition program for the project will be completed in the targeted date. The identification of Land for Transmission Line and Sub Station will be done and process will be initialized to acquire those lands.
• The upgrading of the access road to power house has initiated and will be completed by May 2016.

• Budget has allocated and program has prepared for bridge and remaining all access roads (access road to dam site, access road to surge tank, access road to powerhouse site after bridge). For this portion, Saudi Fund for Development's fund shall be used. The GoN's fund is for VAT portion and for matching fund. The construction of the bridge and other access road will be started after completing the Evaluation process and entering into the contract agreement in this FY.

• Budget has allocated and program has prepared for Office Building and Camp: For this portion, Saudi Fund for Development's fund shall be used. The GoN's fund is for VAT portion and for matching fund. Similarly, the construction of the office building and the camp site will be started after the completion of the evaluation process and entering into the contract agreement and Concurrence from Donor (SFD) in this FY.

• Budget has allocated and program has prepared for Detailed Engineering Design and environmental study including social impact assessment: For this portion, Kuwait Fund for Arab Economic Development's fund shall be used. The GoN's fund is for VAT portion and for matching fund. The work order has already given to the consultant and it will be completed by March 2016.

• Budget has allocated to carry out Survey and Engineering Design works of transmission line component shall be initiated in the coming fiscal year. The identification of Land for Transmission Line and Sub Station will be done and land acquisition of those lands will be initiated. The installation of transmission line is expected to be started at March 2017 after the completion of the design.

• Similarly the Construction of Main Civil Works is expected to be started from March 2017 till March 2020. And the main hydro mechanical components and electro-mechanical components will be installed by September 2020.

8 HUMAN RESOURCES

The organization structure of Budhi Ganga Hydropower Project has been prepared for study phase(attached in annex 2). Total 45 positions have been approved for current fiscal year(2072/073), out of which 22 are executive staffs and 23 are support staffs. The fulfilled key personnel working in Budhi Ganga Hydropower Project are as shown in table below.
## Table 1: The existing human resources in BHP

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Name of Staff</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sanjeeb Baral</td>
<td>Project Manager</td>
</tr>
<tr>
<td>2</td>
<td>Gopi Prasad Sah</td>
<td>S.D.E. (Hydropower)</td>
</tr>
<tr>
<td>3</td>
<td>Saroj Acharya</td>
<td>S.D.E. (Hydropower)</td>
</tr>
<tr>
<td>4</td>
<td>Sanjay Kumar Pokharel</td>
<td>Section Officer</td>
</tr>
<tr>
<td>5</td>
<td>Kisan Kumar Basel</td>
<td>Account Officer</td>
</tr>
<tr>
<td>6</td>
<td>Bir bahadur bohara</td>
<td>Engineer (Hydropower)</td>
</tr>
<tr>
<td>7</td>
<td>Poonam Pandey</td>
<td>Engineer (Hydropower)</td>
</tr>
<tr>
<td>8</td>
<td>Rishikesh Basnet</td>
<td>Engineer (Hydropower)</td>
</tr>
<tr>
<td>9</td>
<td>Suraj Giri</td>
<td>Engineer (Hydropower)</td>
</tr>
<tr>
<td>10</td>
<td>Ambika Mahat</td>
<td>Engineer (Hydropower)</td>
</tr>
<tr>
<td>11</td>
<td>Praveen Devkota</td>
<td>Electrical Engineer</td>
</tr>
<tr>
<td>12</td>
<td>Mukesh Gautam</td>
<td>Electrical Engineer</td>
</tr>
<tr>
<td>13</td>
<td>Badri Sapkota</td>
<td>Non Gazetted I</td>
</tr>
<tr>
<td>14</td>
<td>Janardan Oli</td>
<td>Surveyor</td>
</tr>
<tr>
<td>15</td>
<td>Sankar Batala</td>
<td>Sub-engineer</td>
</tr>
<tr>
<td>16</td>
<td>Shiva Karki</td>
<td>Computer Operator</td>
</tr>
<tr>
<td>17</td>
<td>Jeevan Kunwar</td>
<td>Computer Operator</td>
</tr>
</tbody>
</table>

## 9 KEY ISSUES

Nepal is facing huge electricity crisis at present. Government has concluded the loan agreement with Kuwait Fund for Arab Economic Development and Saudi Fund for Development. All the stakeholders have put pressure to project team to carry out all the activities as early as possible. In this context, accelerating the project activities and execution on time is very important for project.

The project is located in far western region at Achham district which is far from Kathmandu. The development activities in this region are slow compared to others. Expectation of the
local people from the project is high. Peoples are demanding some other supplementary infrastructures from the project. In this context, executing the project on time addressing some of the demands of the community is very challenging and important too.

The land acquisition works has been delayed since long time due to establishment of new survey system in the project area as whole cadastral maps were lost during the insurgency period of Nepal. However, BHP project team has imparted its full effort to manage these activities and conclude the land acquisition and compensation distribution activity for 136Ha of land out of 217Ha of land.

10 PERFORMANCE BASED INCENTIVE SYSTEM

The role of Human Resources development is important to achieve success so Budhi Ganga Hydropower has proposed Performance Based Incentive program for its employee. The key performance area (KPA) and Key performance index (KPI) is developed for whole project period i.e. from FY 2072/073 to FY 2077/078 end (six years). Based on the developed KPI, the performance evaluation mechanism is developed. The performance incentive is proposed for Kathmandu based employee and site office based employee. In addition to this total NRs. 50,000 to NRs. 100,000 per month is proposed as a Leadership and Special Demonstration Award for Project Manager. The performance evaluation will be carried out each quarter based on the progress / performance. A performance evaluation committee is formed under the chairmanship of Secretary of Ministry of Energy. The amount required for performance based incentives and leadership and special demonstration allowance shall be managed from Government of Nepal's portion.

11 CONTACT ADDRESS

11.1 Head Office:
The address of the head office at Kathmandu is as shown below.
Budhi Ganga Hydropower Project
Kalikasthan, Kathmandu
Phone: 01-4423206
Fax no: 01-4423207
Email - info@bhp.gov.np
Website: www.bhp.gov.np
11.2 Site Office:

BHP has identified the land for the office building and camp facilities at the project site. Until the completion of the construction activities, temporary office on rent has been established at the project area. The address of the site office is as shown below.

Thanti Bazaar, Ghughurkot VDC-2, Achham
Phone No.: 097-690553, 097-690554

12 BUDGET AND PROGRAM FOR FY 2072/073

The Government has approved the budget and program for this Fiscal Year 2072/073. The Donor wise distribution of budget for particular expenditure is as below.

<table>
<thead>
<tr>
<th>SN.</th>
<th>EXPENDITURE</th>
<th>GON</th>
<th>SFD</th>
<th>KFAED</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CURRENT</td>
<td>27,003,000.00</td>
<td>-</td>
<td>2,000,000.00</td>
<td>29,003,000.00</td>
</tr>
<tr>
<td>2</td>
<td>CAPITAL</td>
<td>146,092,000.00</td>
<td>134,759,000.00</td>
<td>122,670,000.00</td>
<td>403,521,000.00</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>173,095,000.00</strong></td>
<td><strong>134,759,000.00</strong></td>
<td><strong>124,670,000.00</strong></td>
<td><strong>432,524,000.00</strong></td>
</tr>
</tbody>
</table>

The budget allocated for the program is attached in Annex -1.
Salient Features of the Project

Name of Project: Budhi Ganga Hydropower Project
District: Achham
Power House Site: Thapa gaon Village (Hattikot VDC Ward No 4) (on Left Bank of River)
Dam Site: Buddha Bagar (In between Babla VDC Ward No 3 and Kuskot VDC Ward No 5)
Latitude: 81°14'00"E-81°17' 50" E
Longitude: 29° 15' 30"N-29° 18' 35"N
Name of the River: Budhi Ganga River
Type of Scheme: Run-of the River with Daily Pondage (6 hrs Peaking)
Installed Capacity: 20 MW

Accessibility
Nearest Market: SanfeBagar, Achham
Power House Site: Near Thanti Bazar of Ghughurkot VDC, approximately 5 Km from SanfeBagar (Just down side of motorable road)
Dam Site: Near Buddha Bagar of Babla VDC, approximately 13 Km from SanfeBagar (Just down side of motorable road)

Powerhouse
Type: Surface (L = 30 m, W = 26 m, H = 14 m)
Installed Capacity: 20 MW (2 X 10 MW)
Gross Head: 90 m
Net Head: 83.2 m
Type of Turbine: Francis (Vertical Axis)

Hydrology
Design Discharge: 27.63 m³/sec
95 % Dependable Flow: 7.34 m³/sec
Compensation Flow: 0.96 m³/sec

Poundage Reservoir
Storage required for 6 hours peaking: 0.236 Million m³
Minimum Operating Level: 712 m
Full Supply Level: 717 m
Pondage Fetch from Weir Site 3.0 Km
Pondage Surface Area 8.4 ha (0.084 Sq. km) (168 Ropani)

**Intake Structure**
- Number of Intake Opening 2
- Number of Intake Tunnel 2
- Intake Tunnel Length 57 m
- Diameter of Intake Tunnel 2.5 m

**Head Race Tunnel**
- Type: Circular ad Horseshoe
- Length 5.6 Km
- Diameter
  - Concrete Lined 3.9 m
  - Shortcrete Lined 5.1 m

**Transmission**
- Voltage 132 kV
- Length of TL 96.41 Km
- Sub-Station Lamki, Kailali District
- TL Route Sanfe – Mangalsen – Punyapato – Guttu – Kuene – Malchana - Lamki (13 Km west from Chisapani Bridge at Karnali between Kohalpur and Attariya)
- Alternate Connection At Dipayal Substation (Attariya – Dipayal 66 kV TL) (High Voltage Drop – 31 %)

**Energy Generation**
- On Peak Firm Energy 36.139 GWh
- Off Peak Firm Energy 44.58 GWh
- Secondary Energy 25.57 GWh
- Average Energy 106.28 GWh

**Energy Benefit**
- Firm Peak Energy Benefit US$ 2.72 million
- Firm Off Peak Energy Benefit US$ 1.97 million
- Secondary Peak Energy Benefit US$ 1.11 million
**Cost and Economic Parameter (Price level 1997)**

<table>
<thead>
<tr>
<th>Description</th>
<th>Excluding TL</th>
<th>Including TL</th>
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<tbody>
<tr>
<td>Total Project Cost</td>
<td>42.07 million US$</td>
<td>50.64 million US$</td>
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<tr>
<td>Per KW Cost</td>
<td>2103 US$</td>
<td>2532 US$</td>
</tr>
<tr>
<td>Pay Back Period</td>
<td>5.12 Years</td>
<td>6.12 Years</td>
</tr>
<tr>
<td>B/C Ratio</td>
<td>1.43</td>
<td>1.20</td>
</tr>
<tr>
<td>IRR</td>
<td>16.09 %</td>
<td>13.77 %</td>
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</tbody>
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**Access Road**

<table>
<thead>
<tr>
<th>Description</th>
<th>Length</th>
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</thead>
<tbody>
<tr>
<td>Head Works Site</td>
<td>0.650 Km</td>
</tr>
<tr>
<td>Power House Site</td>
<td>1.980 Km</td>
</tr>
</tbody>
</table>
Annex -1
Approved Budget for FY 2072/073
Annex - 2

Organization Structure of BHP