

# DORDI KHOLA HYDROPOWER PROJECT

## LAMJUNG, NEPAL



## Monthly Progress Report

November 2016



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***Himalayan Power Partner Limited***  
***Energy Sector Research, Development & Consulting Services***

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## 1 Introduction

**Dordi Khola Hydropower Project** is a Run-of-River type hydroelectric project with generating capacity of 27 MW in Lamjung. The project is being developed by Himalayan Power Partner Ltd. (HPPL) Kathmandu, Nepal.

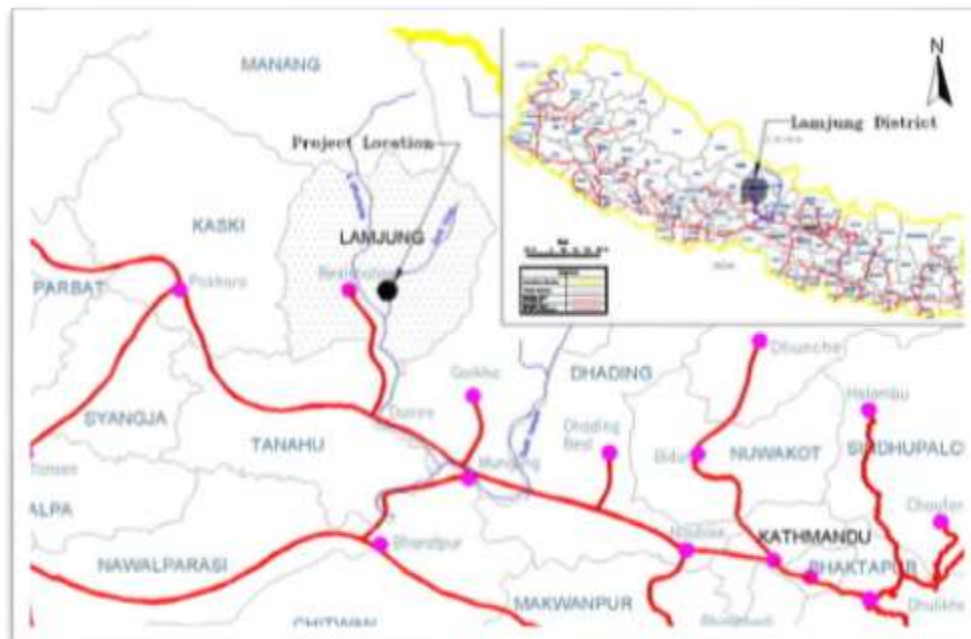
## 2 Project Development Milestones

- Survey License Issued : 26 May 2005
- Grid Connection Agreement : 7 July 2010
- IEE Approved : 4 October 2010
- Generation License Obtained : 7 July 2011
- PPA Signed : 15 June 2012
- Detailed Project Report Completed : August 2013
- Facility Agreement Signed : 7 November 2013
- Construction Works Started : April 2014
- Required Commercial Operation Date (RCOD) : 15 June 2017

## 3 Project Description

### 3.1 Location and Access

The whole project area lies in Chiti, Dhodeni and Bansar VDCs in Lamjung district in western Nepal. It is connected from Kathmandu by 170 km all weather metallic roads.



### 3.2 Project Features

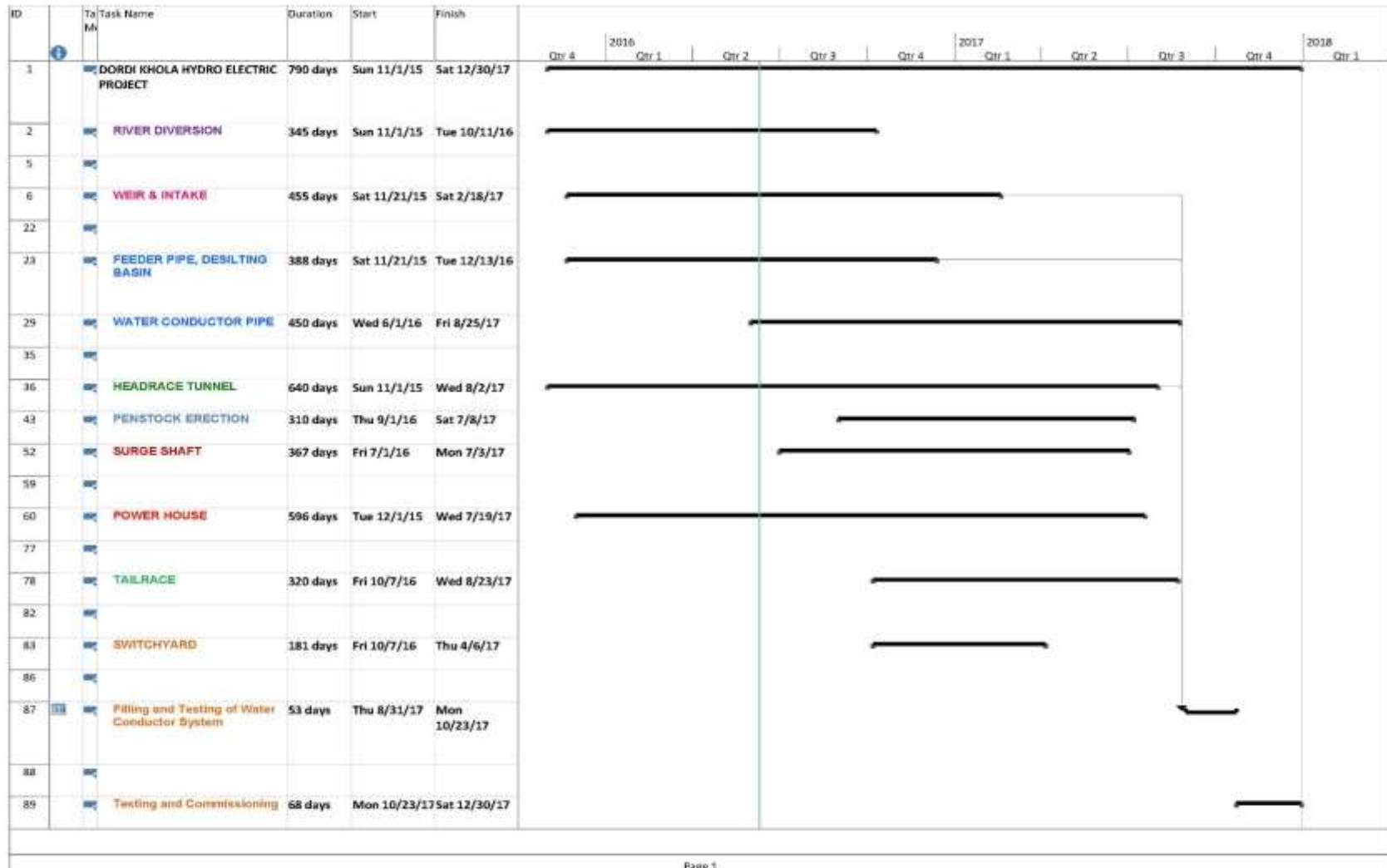
- Gross Head : 212.0 m
- Design Discharge : 15.28 m<sup>3</sup>/sec
- Installed Capacity : 27.0 MW
- Total Annual Energy : 148.697GWh
- Total Annual Contract Energy : 142.319GWh
  - Dry Season Energy* : 21.367 GWh
  - Wet Season Energy* : 120.952 GWh
- Power Purchase Agreement (PPA) Rate :
  - Dry Season Energy : 8.40/unit
  - Wet Season Energy : 4.80/unit
  - Price Escalation : @ 3% 8 times
- Water Ways
  - Closed Conduit/Steel pipe (Ø2.65m) : 3237 m
  - Headrace Tunnel (Ø3.3m) : 2662 m
  - Penstock Pipe (Ø2.3m) : 700 m
  - Tailrace : 330 m
- Powerhouse Type : Surface
- Turbine Type : Horiz. Francis (3x9 MW)
- Grid Connection Point : Udipur Hub/ Lamjung
- Transmission Line
  - Voltage Level : 132 kV Single Circuit
  - Length : 1.2 km

### 3.3 Project Cost and Financial Indicators

Total Cost	: NRs. 3,595 million
Total Capitalized Cost (Including IDC/Bank Commission)	: NRs. 4,235 million
NPV	: 1,396 Million
IRR	: 14.35 %
IRR on Equity	: 18.29%



### 3.5 Project Construction Schedule



## 4 Progress

### 4.1 Financial Progress

#### 4.1.1 Funding Arrangement

- **Facility agreement**

Facility Agreement to provide Term Loan of amount NPR 3,170 million for construction of the project and working capital of amount 99 million was concluded with Bank Consortium led by Prime Commercial Bank Ltd. on 7 November 2013.

#### 4.1.2 Financial Progress

Total project cost, funding arrangement and provisional expenses/disbursement up to November 15, 2016 (End of Kartik 2073) including mobilization advance and advance payment to the contractors is given in following table:

*Figure in NPR '000*

SN	Expense/Funding Categories	Project Cost	Expenses			Progress %
			Up to Ashoj 2073	Kartik 2073	Up to Kartik 2073	
1	Project Development Cost/Pre-construction	102,980	102,976	-	102,976	100.00
2	Engineering, Administration and Management	145,459	107,998	1,686	109,685	75.41
3	Preparatory Works	153,988	75,834	17	75,852	49.26
4	Civil Works	1,627,625	369,274	4,100	373,374	22.94
5	Hydro-mechanical Works	702,630	197,389	-	197,389	28.09
6	Electro-mechanical Equipment	736,337	88,419	-	88,419	12.01
7	Transmission Line/Power Evacuation	74,126	169	-	169	0.23
8	Environmental Mitigation, Social Support and Land Acquisition	51,490	51,725	560	52,286	101.54
9	IDC, Bank Commission & Fee	640,782	47,159	-	47,159	7.36
	<b>Total</b>	<b>4,235,417</b>	<b>1,040,945</b>	<b>6,364</b>	<b>1,047,309</b>	<b>24.73</b>

## 4.2 Physical Progress

### 4.2.1 Civil Works

#### Surface Works/ Rasuwa Construction Co.

- Head Works

The works at headworks are continuing by increasing equipment as well as manpower to speed up the construction work so as to meet the target of completing right part of the weir structure including intake and all other HM works within 15<sup>th</sup> of Push. The work groups are working in parallel from different fronts separately. The progresses as of November month, are as follows.

- 1) Completed upstream apron slab for blocks 2 and 3 and the protection works of placing concrete blocks and gravel packing is going on.
- 2) The right bank shear wall at stilling basin has been raised to the final level. Rebar placing at the breast wall above upper beam seal of undersluice gate portion is completed and concreting will be done soon.
- 3) The form work and rebar placing at the divide wall is going on.
- 4) The Khola crossing structure at pagi khola is going on. Concreting of base slab has completed and wall will be raised soon with required embedded metal parts for feeder pipe crossing.
- 5) The downstream wing wall of the bridge has been raised up to final level and upstream wing wall raising will be continued with required height and bank protections up to high flood level.
- 6) The construction of downstream slope protection structures along feeder pipe alignment and desilting basin is going on.
- 7) The intake base slab along with the embedded metal parts trashrack frames, gate and stoplog frames has been completed.

All the structures of headworks are scheduled to complete by February 2016.



- **Desilting Basin**

The base concreting of desilting basin and rebar placing of first initial block has been completed. The structural concrete will be poured soon.



Construction activities at desilting Basin Structure

- **Water conductor Pipe Alignment**

For the bend details of the water conductor pipe the final alignment is being reverified and surveyed. The same details will be provided to the HM contractor for the fabrication of bends. There are some critical stretches along the WCP alignment where protection works will be necessary. In these stretches the protection structures are being identified and designed. The workshop for the fabrication of the water conductor pipe has already been established and pipe is being fabricated now. The installation of the fabricated pipe will be start soon.

- **Power House**

The powerhouse foundation excavation work is still continued with blasting since big boulders are encountering throughout the area and the progress speed is not so satisfactory also because of social issues connected with blasting. The deepest required level has been expected to reach within the month of Mangshir. Further after reaching the level at 550m, SRT will be performed for the design of earth mat.





## Underground Civil Works/Tunnel/EIB

- Excavation from Inlet

The excavation work was being halted since the beginning of monsoon period due to the monsoon season, poor access road and lack of construction materials & equipment after reaching at 200 m from inlet portal. Due to the poor geological condition and water seepage there had been collapse from the crown. After having a consultation with expert, the clearance and advancing of the tunnel is going on. The face is being excavated by heading and benching method now. The same condition with difficulties is expected further up to 15 m meters after having observation by the consultant.



Rectification and further advancing from Inlet

- Excavation from Outlet

The advancing of tunnel is going on with steel ribs support due to unfavorable geological condition and already reached up to chainage 187 m. The rock mass condition is still not so favorable so as to avoid steel rib supporting. Due to frequent breakups of deployed equipment the progress is coming not so satisfactory yet. The contractor has been instructed to deploy good conditioned new equipment at soonest possible and put backup equipment so that no stoppage of works occur. A patch of fresh rock has been observed and hopefully from 3-4m the rock quality will improve.



Tunnel Excavation from Outlet. @CH 187 m

## 5.2.2 Hydro-mechanical Works

The embedded metal parts, frames of trashrack, intake gates have been fabricated in the contractor's factory and are already delivered to the project site and frames of gate, trashrack at the intake have been erected. The design approval of gates of desilting basin is also provided to 3MW and accordingly fabrication is going on in such a way that civil works will not be disturbed. The workshop of HM contractor has been established and fabrication of pipes are going on. As soon as the civil works along the WCP alignment give access, the HM contractor will start the erection of feeder pipes and WCP.



HM Workshop and Pipe Rolling /welding

## 5.2.3 Electro-Mechanical Works

The process of custom clearance of the already dispatched equipment such as Generators, LAVT, LGT Panels etc. is going on and soon will be transported to the yard prepared at the powerhouse site. FAT of other equipment as per the approved ITPs are going on and on behalf of HPPL the representative from Entura is inspecting all these tests.

## 5.2.4 Transmission Line/Power Evacuation

Grid connection agreement with Nepal Electricity Authority was concluded to evacuate the generated power in proposed Udipur Hub by 1.2 km 132 kV single circuit Transmission Line. Construction of Udipur Hub and transmission line along the Marsyangdi Corridor by NEA is delayed and expected to be complete by 2018. Therefore, process is under way to change grid connection point from Udipur Hub to Middle Marsyangdi Switchyard at Siudibar to ensure power evacuation after completion of the project. Study of an alternative contingency plan for power evacuation was also conducted by the Project to arrange interconnection with Upper Marsyangdi-'A' HEP transmission line, which passes nearby Dordi power house.

## 5.2.5 Environmental Mitigation, Social Support and Land Acquisition

- Environmental mitigation

**Geo-environmental Unit** in the project site has been already established to address environmental mitigation works. A nursery is established at power house site for application of bio-engineering and slope stability works. Bio-engineering and slope stability works are going on along water conductor/service road alignment.



Bio-engineering Works  
Along WCP alignment

- **Social support**  
Social support to local communities in project affected areas such as construction/ improvement of local roads, drinking water schemes, support to community schools, rural electrification etc. are going on under this heading.
- **Land acquisition**  
Land acquisition for headworks, power house and along the pipe line alignment almost completed.

## 5.2.6 Summary of Physical Progress

(up to November 2016)

SN	Project Headings	Physical Progress %	
		Target	Achievement
1	Preparatory Works	95.00	95.00
2	Civil Works	34.75	28.94
3	Hydro-mechanical Works	59.41	50.72
3	Electro-mechanical Equipment	36.13	36.13
4	Transmission Line/Power Evacuation	10.00	0.00
5	Environmental Mitigation and Land Acquisition	90.00	85.00
	<b>Total Weighted Physical Progress</b>	<b>42.99</b>	<b>38.25</b>

# Annex-1: Project Organization Chart

