

DORDI KHOLA HYDROPOWER PROJECT

LAMJUNG, NEPAL



Monthly Progress Report

August 2016



Himalayan Power Partner Limited

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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.

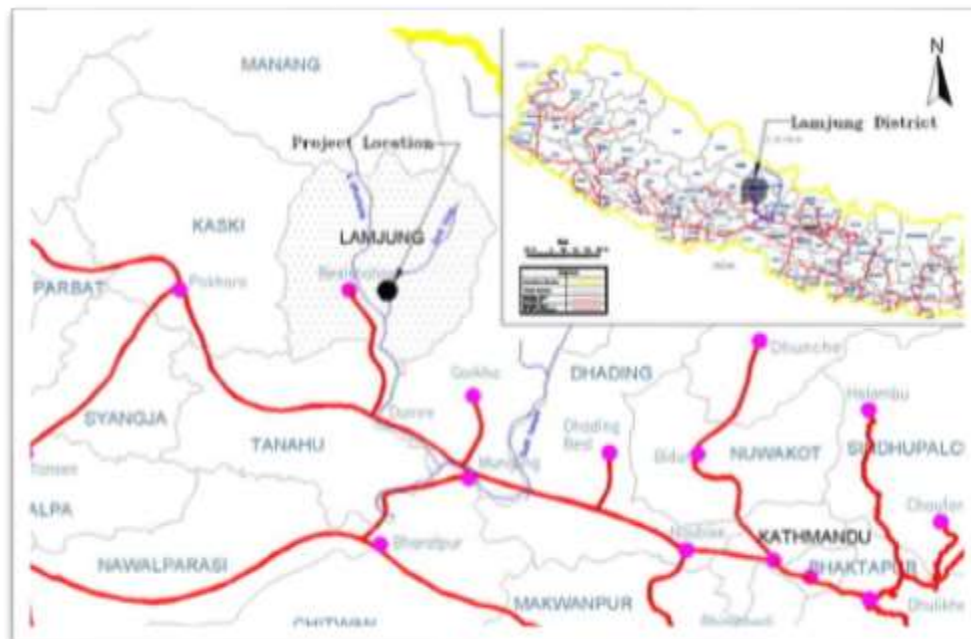
2 Project Development Milestones

- 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.



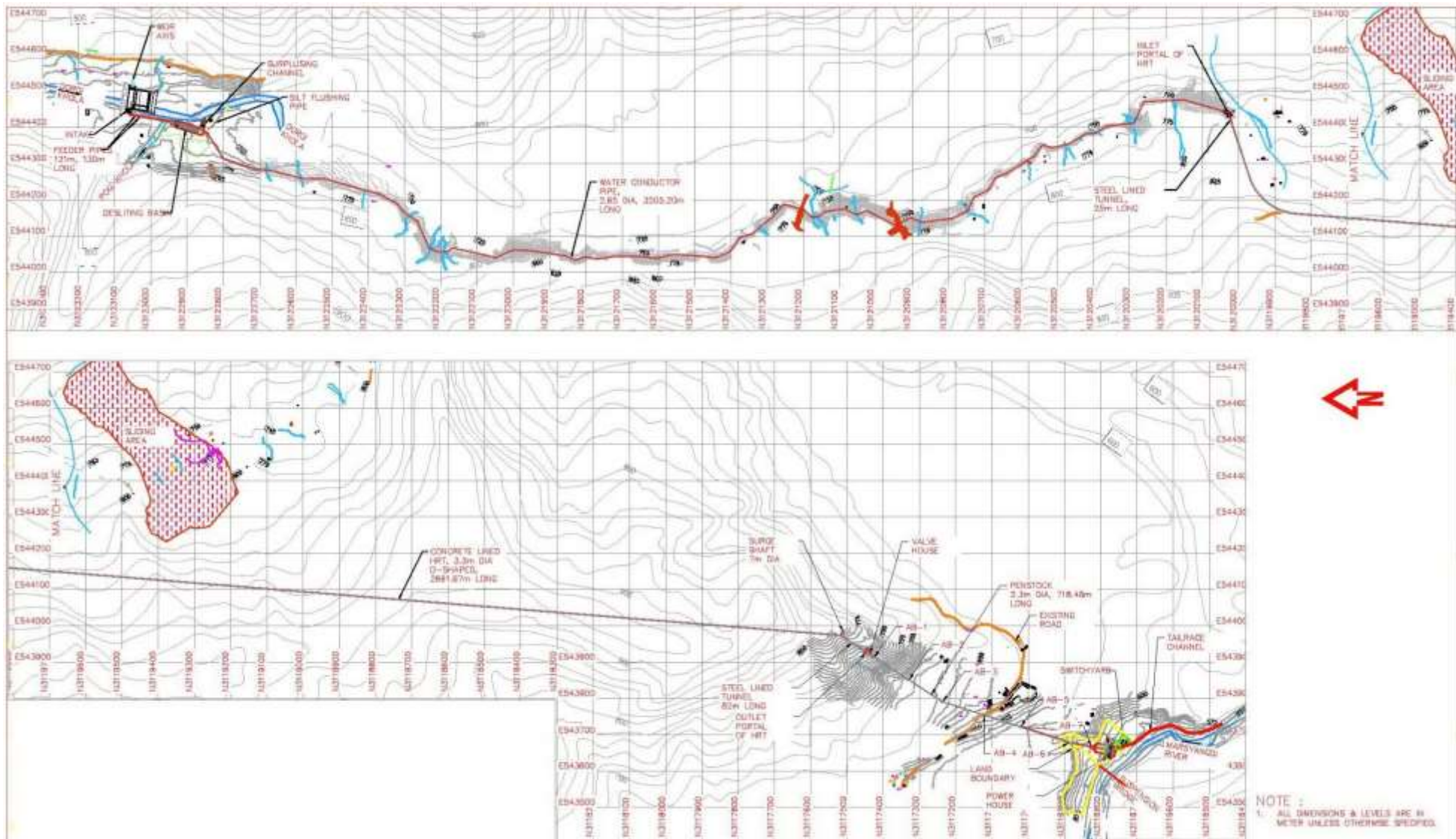
3.2 Project Features

- Gross Head : 212.0 m
- Design Discharge : 15.28 m³/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

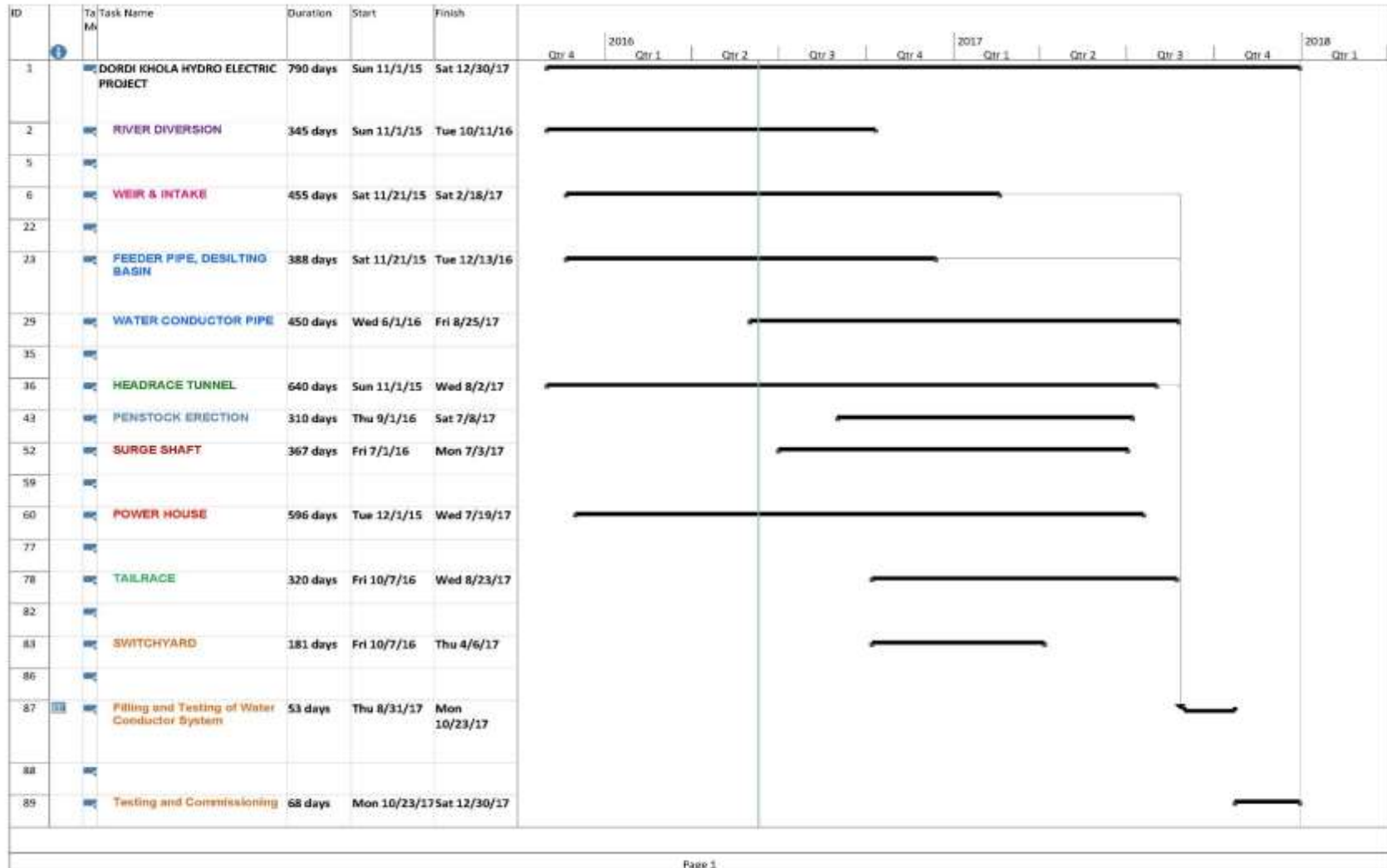
3.3 Project Cost and Financial Indicators

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%

3.4 General Project Layout



3.5 Project Construction Schedule



4 Progress

5.1 Financial Progress

5.1.1 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.

5.1.2 Financial Progress as of August 16, 2016

Total project cost, funding arrangement and provisional expenses/disbursement up to August 16, 2016 (End of Shrawan 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/Disbursement			Progress %
			Up to Asadh 2073	Shrawan 2073	Up to Shrawan 2073	
1	Project Development Cost/Pre-construction	102,980	102,976	-	102,976	100.00
2	Engineering, Administration and Management	145,459	101,028	1,755	102,783	70.66
3	Preparatory Works	153,988	72,471	67	72,538	47.11
4	Civil Works	1,627,625	302,683	14,681	317,364	19.50
5	Hydro-mechanical Works	702,630	197,389	-	197,389	28.09
6	Electro-mechanical Equipment	736,337	64,873	-	64,873	8.81
7	Transmission Line/Power Evacuation	74,126	170	-	170	0.23
8	Environmental Mitigation, Social Support and Land Acquisition	51,490	50,400	1,221	51,621	100.25
9	IDC, Bank Commission & Fee	640,782	40,949	-	35,949	5.61
	Total	4,235,417	932,938	17,724	950,662	22.45

Fund Arrangement as per Facility Agreement

1	Consortium Bank Term Loan	3,170,000	215,664	-	215,664	6.80
2	Equity investment from shareholders	1,065,417	717,274	17,724	734,998	68.99
	Total	4,235,417	932,938	17,724	950,662	22.45

5.2 Physical Progress

5.2.1 Civil Works

Surface Works/ Rasuwa Construction Co.

- Head Works

The discharge at the Dordi Khola has raised and frequent raining at the upstream part of the catchment area is inviting the floods since middle of the June. Hence, the construction works progress at the headworks are being impacted and further progress has not been achieved since June 2016. The wing wall just downstream of the bridge and intake cut off wall have been raised up to the level of 762.0 m. As the discharge on Dordi Khola is increasing, big boulders have been placed just upstream of the intake structure to protect from the flood. The main stream is flowing from the previously diverted part of the river. The construction works will be resumed at the weir site only after this monsoon period. Overall physical progress up to August 2016 of headworks is about 20%.



Stoppage of works at HW due to Floods



- **Desilting Basin**

The desilting basin area is still not affected by the flood of Dordi Khola and the concreting work is in progress. M15 concreting of the base part of desilting basin is going on. The excavation works and lean concreting (PCC) work are completed. Physical progress up to August 2016 of Desilting Basin is about 25%.



M15 concrete works at the base of desilting basin

- **Water conductor Pipe Alignment**

The levelling along the water conductor pipe alignment has almost completed, however, due to almost everyday raining the side slopes are being affected by occurring small landslides at different places. Bioengineering application is adopted for slope stabilization and greenery along the cut slopes of water conductor pipe/service road alignment. Overall physical progress up to July 2016 of WCP is about 70%.

- **Power House**

The excavation work at the powerhouse area is still going on, however, due to the presence of large boulders, the progress is not satisfactory. The large boulders encountered during excavation are being removed by using explosives and blasting. The excavated level has been reached up to 555.0 m. Since the reached level is below the flood level of Marsyangdi River, the seepage water is disturbing in the progress of excavation. For natural dewatering purpose, excavation along the tailrace canal has been started.



Powerhouse Excavation in progress

Underground Civil Works/Tunnel/EIB

- Excavation from Inlet

Due to the start of monsoon season the access road to the site is damaged and ultimately impacting in the progress of the tunnel excavation. The lack of construction materials stocking and frequent break down of the deployed equipment and poor geological conditions are the main cause of unsatisfactory progress. Progress achieved up to July 15, 2016 is only 200m. Because of high seepage, saturated phyllite rock mass clay containing shear zone and improper supporting system within the standup time, over breaking of the crown continuing. Saturated rockmass of phyllite has flown in to the tunnel forming a cavity above the crown. This flow has been protected with the sand bags temporarily until the advancing of tunnel with proper methodology can be applied. For this an expert geologist has visited the site and he recommended some methodology which will be applied soon for further advancing the tunnel from inlet.



- Excavation from Outlet

Excavation from outlet side has been started from 31 July 2016. Dedicated 11kVA electricity line up to outlet portal is installed to operate electrical boomer. The rock mass quality is found more or less satisfactory for excavation however, it contains thin layers of phyllite with quartz veins. The face is still dry and no indication of seepage water found till date. By the end of August the tunnel advancing from out let has reached up to 51.78m. The tunnel is advancing with steel ribs support.



5.2.2 Hydro-mechanical Works

- **Procurement of Steel Plates**

Steel plates required (3308.80 MT) for hydro-mechanical works was procured from M/S Jindal Steel & Power Limited, India in June 2015 and are being transported to the site by contractor Machhapuchhre Metal & Machinery Works Pvt. Ltd.

- **Physical Progress at site**

The contractor has already mobilized at site. Construction of contractor's site camp and workshop continued. Transportation of steel plates from Birgunj Dry-Port to the site continued. Workshop drawing of gates are under review for approval.

Embedded parts of the intake structures such as gates, trashrack frames etc. are being fabricated at the factory but not being able to deliver at the site due to poor accessibility.



HM Workshop and Pipe Rolling Machine

5.2.3 Electro-Mechanical Works

Voith Hydro India is progressing its works as per the schedule provided. The design/drawing works are in the process of approval. Some parts have been already ordered and some parts are being manufactured. As per their information, the equipment/ materials will start dispatch from September. The factory testing as per inspection and testing plans have started of already manufactured equipment. The hydro test of 3 units of spiral casing have been completed in the presence of our consultant on August 22, 2016. Similarly, factory acceptance tests of 3 units of generators in the WEGS factory and electronic panels will be performed soon along with the witness of NEA's personnel and consultant. Once the tests will be succeeded and approved, they will start dispatching to Nepal.

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. The process of power evacuation is delayed due to delay in construction of Udipur Hub by NEA.

Marsyangdi Transmission Corridor Project comprises of construction of 115 km Double Circuit Transmission Line from Manang (Dharapani) to Bharatpur via Udipur. The substation component

includes the construction of 220/132 kV substation at Udipur and Markinchowk. Udipur S/S shall be constructed at land owned by NEA at Phaliyasangu Army Barrack and bay extension at Bharatpur shall be at existing land of New Bharatpur Substation at Aptari. The Project is expected to be commissioned by 2018/19.

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. At the same time a study was conducted to connect at any convenient tapping point of Bhulbhule-Middle Marsyangdi 132 kV Transmission Line by constructing an intermediate switching station as a contingency plan.

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 (195 out of 200 ropani) by July 2015.

5.2.6 Summary of Physical Progress

(up to July 2016)

SN	Project Headings	Physical Progress %	
		Target	Achievement
1	Preparatory Works	95.00	87.35
2	Civil Works	33.29	17.40
3	Hydro-mechanical Works	56.51	48.97
3	Electro-mechanical Equipment	27.10	27.10
4	Transmission Line/Power Evacuation	15.00	0.00
5	Environmental Mitigation and Land Acquisition	90.00	85.00
	Total Weighted Physical Progress	39.73	29.80

It was assumed that the project will delay by six months due to earthquake of April 25 and May 12 2015. Targets are based on revised project completion date of December 31, 2017.

Annex-1: Project Organization Chart

