

# LOWER LIKHU HYDROPOWER PROJECT

## SALIENT FEATURES

<b>0</b>	<b>Current status</b>	
0.1	Last Update	Supplementary report 2011
0.2	Generation licence issued on	1/2/2073
0.3	PPA	Under Progress
	Connection agreement	Under progress
<b>1</b>	<b>GENERAL</b>	
1.1	Project location :	Saipu and Bijulikot VDC's of Ramechhap District and Tarkerabari of Okhaldunga District
	Zone :	Janakpur Zone and Sagarmatha Zone
	Development region :	Central Development Region
1.2	Nearest road-head	Headworks of the project site (constructed by Likhu IV HP)
1.3	Climate :	Sub-tropical
	Average temperature:	Maximum : 36.3 °C in May
		Minimum : 4.3°C in January
<b>2</b>	<b>LOCATION (the boundary points of the project area):</b>	
	<b>Longitude</b>	<b>Latitude</b>
	86° 15' 38" E	27° 25' 50" N
	86° 13' 17" E	27° 22' 47" N
	86° 13' 17" E	27° 22' 47" N
	86° 13' 17" E	27° 25' 50" N
<b>3</b>	<b>METEOROLOGY AND HYDROLOGY</b>	
3.1	Average annual rainfall	1796 mm
3.2	Catchment area at intake	755 km <sup>2</sup>
3.3	Annual mean flow	44.6 m <sup>3</sup> /s
3.4	Maximum mean monthly flow	408.24 m <sup>3</sup> /s (July)
3.5	Minimum mean monthly flow	4.07 m <sup>3</sup> /s (April)
3.6	Design discharge	29.75 m <sup>3</sup> /s (40% exceedance flow)
3.7	90% firm flow	9.52 m <sup>3</sup> /s
<b>4</b>	<b>PROJECT FEATURES</b>	
4.1	Location	Saipu VDC
	Longitude	86° 15' 00" E
	Latitude	27° 25' 10" N
4.2	Weir	
	Type	Boulder lined
	Crest elevation, m	725
	Length, m	47

	Undersluice	
	Numbers	2
	B x H, m	6.0 x 10.4 (each)
4.3	Intake	
	Type	Side intake
	No. of opening	3
	B x H, m	4.5 x 2.85 (each opening)
4.4	Gravel trap	
	Type	Surface
	L x B x H, m	8.0 x 4.5 x 6.0
4.5	Settling basin	
	Type	Surface
	Numbers	3
	L x B x H, m	120 x 12.5 x 8.0 (each basin)
4.6	Headrace Pipe	
	Diameter, m	3.75
	Thickness, mm	8 – 10
	Length, m	1285
4.7	<b>Headrace Tunnel</b>	
	Type	Inverted D-shape
	Length, m	3500
	Diameter, m	5
4.8	<b>Surge Tank</b>	
	Height, m	31 (from invert)
	Diameter, m	15.4
4.9	<b>Penstock</b>	
	Vertical and horizontal shaft Length, m	336
	Exposed pipe	
	Diameter, m	3.75
	Thickness, mm	8 – 25
4.10	<b>Power house</b>	
	Type	Semi-surface
	Location	Bijulikot VDC
	Length x Width x Height, m	27.3 x 22.0 x 24.47
4.11	<b>Tailrace Culvert</b>	
	Type	Open
	Length, m	145
	Height, m	3.5
	Width, m	5
4.12	<b>Turbine</b>	
	Type	Francis
	Numbers	2
4.13	<b>Switchyard and transmission line</b>	

	Switchyard type	Outdoor, conventional
	Transmission line length, km (Khimti or Likhu IV Substation)	27/10
	Voltage level and circuit, kV	132 and single circuit
<b>5</b>	<b>Power and Energy</b>	
	a. Head-water level, m	725
	b. Tail-water level, m	607
	c. Gross head, m	118
	d. Net head at design flow, m	108.52
	e. Net head at lowest flow, m	116.33
	f. Installed capacity, MW	28.1
	g. Dry energy, GWh	27.78
	h. Wet energy, GWh	133.77
	i. Average annual gross energy, GWh	161.54
<b>6</b>	<b>Project development cost</b>	
	Project development cost, not including financing	3,882 Mill. NPR
	Project development cost including financing	4,669 Mill. NPR
	Cost per KW (including financing)	2,215 US Dollar (1 USD = 75 NPR)
<b>7</b>	<b>Financial Parameters</b>	
	Depreciation period (years)	30 years from RCOD
	Construction period (years)	4
	Revenue generating period (years)	30
	Proposed average energy tariff (NPR/kWh)	5.85 at base year
	Energy tariff escalation (per annum)	3%
	Escalation period (years)	15
	NPV-Equity (Million NPR)	38
	Internal rate of return (IRR) of the project	13.88%
	IRR-Equity	16.93%
	Benefit cost ratio	1.37
	Debt Service Coverage Ratio (DSCR , year 1	1.37
	The Annual Debt Service Coverage Ratio (ADSCR)	1.1