

# BHOTEKOSHI-5 HYDROELECTRIC PROJECT, BH-5 (62 MW)

## SALIENT FEATURES

SN	FEATURES	CHARACTERISTICS
<b>GENERAL</b>		
1	Name of Project	Bhotekoshi-5 Hydroelectric Project (BH-5)
2	Type of the Scheme	Cascade (MBKHEP-102MW)
3	Gross Head	146.77m
4	Net rated Head	136.01m
5	Installed Capacity	62MW
6	Average Annual Energy after Outage	339.098GWh

### PROJECT LOCATION

1	Latitude	27°45'33" to 27°49'08" N
2	Longitude	85°51'49" E to 85°54'14" E
3	Project Area	Sindhupalchowk, Province-3
4	Intake Site	Jammu-9, Bahrabise Municipality
5	Powerhouse Site	Mankha-8, Balefi Rural Municipality
6	Project Access	75 km from Kathmandu (Arniko Highway)

### TECHNICAL INFORMATION

<b>1</b>	<b>Hydrology</b>	
	Catchment Area (MBKHEP)	2284 Km <sup>2</sup>
	Design Discharge (Q42.5)	50.8 m <sup>3</sup> /s
	Design flood at headpond (1 in 100 Years)	1387 m <sup>3</sup> /s
	Design flood at tailrace (1 in 100 Years)	1544 m <sup>3</sup> /s

SN	FEATURES	CHARACTERISTICS
2	<b>Diversion Weir</b>	No diversion weir
3	<b>Siphon Intake</b>	Tailrace of MBKHEP. BH-5 HEP will provide gate with clear opening of 4.4 m X 4.4 m
	Bed Level	905.01 masl
4	<b>Siphon</b>	
	Type	Box Culvert
	Clear Opening	4.4 x 4.4 m <sup>2</sup>
	Length	87.80 m
	No. of Vertical Bends	4
	No. of Horizontal Bends	3
5	<b>Settling Basin</b>	No settling Basin
6	<b>Approach Culvert</b>	
	Length	71.09 m
	Internal dimension	
	Width	4.40 m
	Height	4.40 m
7	<b>Headpond</b>	
	Length	54.23 m
	Clear Width	12 m
	Clear Height	14.35 m
	Free Board	1.56 m
	Working water level at Head pond	916.77 masl
	Head Pond invert level at HRT inlet	903.30 masl
	Top level of head pond walls	919.20 masl
9	<b>Emergency Spillway</b>	
	Crest level (concrete)	916.20 masl
	Crest level (rubber dam)	916.77 masl
	Length	308.13 m
	Width	10 m
	Depth	4.65 m
	Gradient	1 in 1200
10	<b>Headrace Culvert</b>	
	Shape	Rectangular
	Length	14.23 m
	Dimension	5.2 x 5.2 m <sup>2</sup>
	Invert level	903.30 masl

SN	FEATURES	CHARACTERISTICS
11	<b>Headrace Tunnel</b>	
	Shape	Horse-shoe type
	Total Length	7458.55 m
	Excavation Diameter	6.3 m
	Finished Diameter	Varies from (5.1 to 6.1) m
	Gradient	1:425
	Rock trap (LXWXD)	20 x 8 x 5 m <sup>3</sup>
12	<b>Adit Tunnel</b>	
	Shape	D-shaped
	Excavation section size	4.2 x 4.2 m
	Length	676.5 m
	Gradient	1 in 240
13	<b>Surge Tunnel</b>	
	Shape	Horse-shoe shaped
	Finished Diameter	5.20 m
	Up surge Level	935.00 masl
	Down surge Level	898.00 masl
	Top Level including freeboard	940.00 masl
14	<b>Butterfly Valve at Outlet Portal</b>	
	Butterfly valve diameter (at outlet portal)	4 m
	Air valve size	Two (Size to be provided by HM supplier)
15	<b>Steel Penstock Pipe</b>	
	Type	Circular (Steel)
	Diameter	4 m
	Length of Penstock Tunnel	110.40 m
	Length of Surface Penstock Pipe before bifurcation	322.35 m
	bifurcation length	300 m
	Steel thickness	22.35 m
	Ultimate tensile stress of steel	14 to 36 mm
		510 N/mm <sup>2</sup>
16	<b>Powerhouse</b>	
	Type	Surface
	Size	43.78 x 18.80 m <sup>2</sup>
	Height from machine floor	20.11 m
	Control Building size	24.62 X 10.1 m <sup>2</sup>
	No. of units	2

SN	FEATURES	CHARACTERISTICS
17	<b>Tailrace</b>	
	Type	Box culvert
	Tail water level	769.94 masl
	Size	6.0 x 4.68 m <sup>2</sup>
	Slope	1 in 1200
18	<b>Turbine</b>	
	Type	Vertical shaft Francis Turbine
	No. of units	2
	Rated output capacity	33 MW
	Peak Efficiency	94%
	Speed	375 rpm
19	<b>Governor</b>	
	Type	Electric governor
	Adjustment for speed drop	Fully automatic hydraulic system
20	<b>Generator</b>	
	No of units	2
	Efficiency	97%
	Voltage	11 kV
	Power Factor	0.85
	Rated output per unit	37.367 MVA
21	<b>Transformer</b>	
	Type	Outdoor, 3 Phase, 50Hz
	Rated Capacity	35 MVA
	Voltage ratio	132kV/11kV
	No of units	Two
	Vector Group	Ynd11
	Efficiency	99%
22	<b>Transmission Line</b>	
	Voltage Level	132 kV, Double circuit
	Length	4 Km
	Conductor Type	ASCR "BEAR"
	From	Powerhouse
	To	NEA Proposed Barhabise substation
23	<b>Project Access Road</b>	
	Class	District Rural Road Class "A" (DDRA)
	Length to reach	
	Adit Tunnel	0.9 Km
	Surge Portal	1.2 Km

SN	FEATURES	CHARACTERISTICS
----	----------	-----------------

### CURRENT STATUS OF THE PROJECT

1	Feasibility Study	Completed
2	Detailed Project Report	Completed
3	EIA	Approved from DOED, awaiting approval from Ministry of Forests and Environment
4	PPA and PPA Rate	Completed. NRs. 4.8 /kw during wet season (6 months) &
5	Land Acquisition	NRs. 8.4/kw during dry season (6 months) Already initiated

### DEVELOPMENT MODALITY

1	Development modality	Foreign & Local Joint Venture
2	Role of Foreign Partner	Owner
3	Role of Local Developer	Owner
4	Development Period	
	a. Pre-Construction Period	9 months
	b. Financial Closure	8 months (Initiated with Global IME Bank)
	c. Construction Period	48 months
	d. Concession Period	30 years

### INDICATIVE FINANCIALS

1	Total Project Cost (including Interest During Construction)	104.1 Million USD
2	Interest Rate (including hedging cost)	10%
3	Project IRR	14 %
4	Equity IRR	1.66

### CONTACT DETAILS

<p><b>PADAM GURUNG</b>  <b>DIRECTOR, KALIKA ENERGY LTD.</b>            Phone: 9851036851            Email: pdm@kalikagroup.com</p>	<p><b>SAJAN JUNG PANDEY</b>  <b>HYDROPOWER ENGINEER, KALIKA ENERGY LTD.</b>            9801083663, sjp@kalikagroup.com            Kalika Tower            P.O.Box:21534, Baluwatar Kathmandu, Nepal            Phone: +977-1-4439152/3/4            Fax: +977-4439155 Email: info@kalikagroup.com            Website: <a href="http://kalikagroup.com/">http://kalikagroup.com/</a></p>
--	---