PROJECT SALIENT FEATURES

Name of the Project	Lower Chirkhwa Khola Hydropower Project
Location	Sadananda Municipality, Bhojpur
Location of the Project	27^0 22' 00" to 27^0 23' 31" N 87^0 06' 32" to 87^0 08' 30" E
Installed Capacity	4.06 MW
Hydrology	
Name of River	Chirkhwa Khola
Catchment Area at Intake	42.34 km^2
Catchment Area at Powerhouse	xxx km^2 (Cascade Project of UCHP)
Design 100 yrs. Flood at Intake	228.12 m^3/sec
Design 100 yrs. Flood at PH	xxx m^3/sec
Downstream Release	N/A (Cascade Project of UCHP)
40% Dependable Flow ($Q_{40\%}$)	2.35 m^3/sec (2.14+10% overload)
Power Development	
Type of Power Generation	Run-of-river
Turbine Discharge	2 x 1.175 m3/sec (including 10% overload)
Total Gross Head	232.72 m
Net Head at Design Discharge	219.89 m
Average Annual Energy	25.10 GWh
Dry Energy	4.23 GWh
Wet Energy	20.87 GWh

Project Structures	
Connecting Canal	
Type	Rectangular Box type
Length	9.0 m

Width	1.5 m
Height	1.65 m
NWL	EL 586.94
Longitudinal Slope	1:700
Head-pond Tank	
Type	Rectangular Box type (Semi surface)
Length	20.0 m (Total)
Width	7.0 m
Height	Varies (1.20m to 4.2m)
Invert slope	1:20
NWL	EL 586.92
Overflow Spillway Width	8.0 m
Overflow Water Level	EL 587.30
River Crossing	
Type	Overhang bridge type
Support System	Steel structure
Length	16.0 m (Clear span)
Diameter of Pipe Crossing	1200 mm
Pipe Invert Level at Crossing	EL.583.67
Headrace Pipe	
Type	Circular steel pipe (Exposed)
Length	3245 m
Pipe diameter	1200 mm
Pipe thickness	5 mm
Slope of Tunnel	1 in 700
Surge Tank	
Type	Circular tank (Semi surface)
Diameter	7.0 m
Height	12.5 m
Storage capacity (Full supply)	155 m3
Max. Storage capacity	390 m3

Penstock Pipe	
Before Bifurcation	
Type	MS Circular
Number	1 nos.
Pipe Diameter	1000 mm
Length	1100 m
Thickness	10mm to 22mm
After Bifurcation	
Type	MS Circular
Number	2 nos.
Pipe Diameter	800 mm
Length	12 + 12 m
Thickness	22 mm
Powerhouse	
Type	Semi Underground
No. of Units	2
Size (L x B x H)	33 x 15 x 11 m
Turbine CL Level	EL.354.20
Tailrace	
Type	RCC Box/Rectangular
Tailrace Water Level	EL 350.40
Length	40.0 m
Size (W x H)	1.5 m x 1.65 m
Discharging River	Chirkhwa Khola
Transmission Line	
Transmission Voltage	33 KV (Double circuit)[Combine)
Transmission Length	14.2 km
Substation	Tumlingtar Sub-station
Turbine	
Type	Pelton (Horizontal)
Units	2 Nos.

Rated flow per Unit	1.07 m3/s (+10% overload)
Turbine efficiency	91%
Rate speed	600 RPM
CL Level	EL 354.00
Generator	
Type	Synchronous, 3-phase
Units	2 Nos.
Rated Voltage	6.6 KV
Rated Speed	600 RPM
Frequency	50 Hz
Power factor	0.85
Generator efficiency	96.5%
Excitation System	Brushless or Static
Number of Poles	10
Voltage regulation	10%
Rotor and Stator Insulation	Class F
Power Transformer	
Type	3-Phase
Units	One Nos.
Rated Capacity	5300 KVA
Rated Voltage (Primary)	6.6 KV
Rated Voltage (Secondary)	33 KV
Frequency	50 Hrz
Power factor	0.85
Efficiency	99%
Type of Cooling system	ONAN (Oil natural Air natural)
Access Road	
Powerhouse	Construction of road up to Powerhouse 60m from Existing Road.
Headwork	Already accessed
Project Cost	731,532,128.00

Financial Parameters	
Net Present Value	907,163,809.00
B/C Ratio	1.50
FIRR	15.94%
Pay Back Period	6.19
Construction Period	24 months