

220KV GIS and Pothead yard of 240
MW Heo Hydro Electric Project,
Arunachal Pradesh.



ISO: 9001, 14001,
& 45001

Bid Document
Sec-II: Information for Bidders

SEC-II: INFORMATION FOR BIDDERS

220KV GIS and Pothead yard of 240 MW Heo Hydro Electric Project, Arunachal Pradesh.	 ISO: 9001, 14001, & 45001	Bid Document Sec-II: Information for Bidders
---	--	---

2	PROJECT PROFILE.....	1
2.1	GENERAL DESCRIPTION OF THE PROJECT	1
2.2	LOCATION OF THE PROJECT	1
2.3	ACCESS TO THE PROJECT SITE.....	1
2.4	ACCESS PERMIT TO THE PROJECT AREA	1
2.5	EXISTING AND PROPOSED ROADS IN THE PROJECT AREA	2
2.6	GENERAL CLIMATIC CONDITION OF THE PROJECT AREA.....	2
2.7	POWER EVACUATION:	2
2.8	MATERIALS.....	2
2.9	LOCAL FACILITIES AND SERVICES IN THE PROJECT AREA.....	2
2.9.1	<i>Availability and Employment of Labour.....</i>	2
2.9.2	<i>Power Supply:.....</i>	3
2.9.3	<i>Medical Services:</i>	3
2.9.4	<i>Water Supply:</i>	3
2.9.5	<i>Communication</i>	3
2.9.6	<i>Land for Contractor's accommodation, installation and storage area.....</i>	3
2.10	SALIENT FEATURES	4

220KV GIS and Pothead yard of 240 MW Heo Hydro Electric Project, Arunachal Pradesh.	 ISO: 9001, 14001, & 45001	Bid Document Sec-II: Information for Bidders
---	--	---

2 PROJECT PROFILE

2.1 GENERAL DESCRIPTION OF THE PROJECT

The proposed Heo Hydro Electric Project is a Run of the River Hydro Electric Project on the Yarjep River which is a right bank tributary of the Siyom river. This project involves utilizing a gross head of 211 m. The flow is diverted from the river toward a tunnel by a barrage. The barrage is located on Yarjep river near Purying village. The project envisages 16 m high barrage, a 3.55 km long circular finished head race tunnel (HRT). A surface powerhouse will be constructed to accommodate three Francis Turbines with vertical synchronous generators to generate 240 MW. Total catchment area of the project is 1065 sq. km. The standard Project flood (SPF) and probable maximum flood (PMF) are 3200 and 3900 cumecs, respectively. The Project is designed with a small reservoir, which involves a submergence of 8.4 Ha.

It is to be noted that the Heo HEP Turbine discharge enters into Tato-I water conductor system from the Heo HEP tail pool. Therefore, Heo HEP and Tato-I HEP establishes operational relationship of Master and Slave.

The Heo Hydro Electric Project is designed to utilize a net head of 201.8 Metres and a discharge of 130.25 cumec to generate 240 MW of power using 3 nos. Vertical Turbine Hydro Generating units of rated capacity 80 MW each. The Design Energy of the project is 1000.2 Million Units.

2.2 LOCATION OF THE PROJECT:

The Heo Hydro Electric Project is located in Shi Yomi district of Arunachal Pradesh. The nearest road head is Hiri which is about 29 km from Mechuka and 151 km from Aalo Town. The project Barrage is located 4.5 km downstream of the confluence of the Sae Chhu with the Yarjep, and about 29 km downstream of Mechuka. The proposed barrage site is located between 94°16'31"E longitude and 28°32'20"N latitude near Hiri/Purying villages. Proposed Power house site is located between 94°18'43"E longitude and 28°32'32"N latitude near Gapo/Meying villages. The nearest road heads are Gapo and Hiri villages which are linked to Mechuka and Tato villages.

2.3 ACCESS TO THE PROJECT SITE:

For Heo project the nearest Broad-Gauge railhead is at Silapathar (approx. 297 km) in Assam. Another broad-gauge railhead is at Gogamukh, which is presently serving the under- construction Lower Subansiri project.

Guwahati, Assam, the largest city of North-East India, is about 770 km from the Project Area. Guwahati is well connected by road, rail and air with the rest of the country and its airport caters to some international flights as well. Other airports near the project area are at Pasighat & Donyi Polo Airport (Hollongi- Itanagar) in Arunachal Pradesh and Dibrugarh & North Lakhimpur in Assam.

Bidders are required to verify the various road distances for access to the Project Site prior to submission of Bid.

2.4 ACCESS PERMIT TO THE PROJECT AREA:

For Indian other than native of Arunachal Pradesh, Inner Line Permit is required for entering into any part of Arunachal Pradesh. Inner line Permits are issued by the Secretary (Political), Government of Arunachal Pradesh, Itanagar and respective Deputy Commissioner and Additional Deputy

Commissioner of the Districts. These can also be obtained from Resident Commissioner's office/Liaison Offices located at New Delhi, Kolkata, Guwahati, Shillong, Dibrugarh, Tezpur, North Lakhimpur, Jorhat. ILP can be obtained online at www.arunachalilp.com. Foreign nationals require a Protected Area Permit (PAP) for entering into Arunachal Pradesh.

2.5 EXISTING AND PROPOSED ROADS IN THE PROJECT AREA:

Construction and maintenance of the approach roads from existing Tato-Mechuka Road to Barrage site and Powerhouse site is within the scope of the EPC contractor for Civil and HM Works.

The EPC contractor for Civil and HM Works shall construct and maintain permanent roads including bridges/culverts from the left abutment of the main river crossing bridge to Power house and From power house to Adits of valve house and Surge shaft.

Haul roads to various work sites such as quarry sites, dumping area, etc. as well as other temporary service roads to be constructed and maintained by the EPC contractor for Civil and HM Works as per requirement. Bridges/culverts required for such temporary roads shall also be constructed and maintained by the contractor.:

2.6 GENERAL CLIMATIC CONDITION OF THE PROJECT AREA:

The topography of the state is very rugged and is full of hill ranges and deep gorges with steep terrains which break into wide chaos of spurs and ridges. The project area catchment altitude varies from 1386 m to 4500 m. The average annual rainfall varies from 2000 mm to 2700 mm. The area experiences heavy precipitation during the monsoon. The climate is cool during winter and occurrence of frost over large tracts is observed in the high hill ranges. The climate over the foot hill is warm and sub-tropical. Temperature varies from 5 degree to 25 degree Celsius on the hills and from 12 degree to 32 degree Celsius on the foot hills.

2.7 POWER EVACUATION:

Power generated from Heo HEP is proposed to be evacuated through 220 kV transmission line to a common pooling point in the region. To evacuate power from Hydro Power Projects being developed in Arunachal Pradesh, the Central Electricity Authority is preparing a comprehensive Master Plan. For evacuation of power from Siang basin, two pooling points have been proposed. Power from the Siyom Basin Hydro Projects, namely Pauk (145 MW), Heo (240 MW), Tato-I (186 MW), Hirong (500 MW), Tato-II (700 MW), and Naying HEP (1000 MW) will be fed to the proposed 400/220kV Kaying Pooling Station. The combined power from Naying PP is proposed to be evacuated to 400 kV Gogamukh Pooling Station for onward transmission.

2.8 MATERIALS:

The Employer will not issue any material for execution of the work. The Contractor shall make his own arrangements for all materials, consumables etc. for completion of the works, within his quoted amount.

2.9 LOCAL FACILITIES AND SERVICES IN THE PROJECT AREA:

2.9.1 Availability and Employment of Labour:

No skilled labour is available locally and generally comes to Arunachal Pradesh from the neighbouring states and rest of the country. The Contractor shall be expected to employ skilled local Indian personnel for supervisory work as far as possible. In order to minimize problems arising from the employment of

labour, as well as from the transport and construction activities and other consequences of their activities, the Contractor must ensure close liaison and good relations at all times with the local authorities and the populace of the project area. The Contractor shall have to make their own arrangements for the accommodation of all workers in the project.

The Contractor shall be required to obtain labour licenses for the employment of labour from the concerned statutory authorities.

2.9.2 Power Supply:

The responsibility of arranging power for the work shall lie in bidder's scope. Grid power is currently not available in the project area. Therefore, the requirement would have to be met by installing diesel generating sets and the bidder shall quote their prices accordingly.

The bidder is requested to note that while it is not binding on NEEPCO for supply of power from the national or state grid or otherwise at any stage of construction of the project, there is a possibility that grid power may be available for project construction works in future. As and when grid power is available, grid power availed by the contractor shall be metered jointly including Employer and recovery shall be affected @ Rs. 30.00 per Unit which shall include grid power price per unit. Non-availability of power however, would not entitle the Contractor to make any claims whatsoever either for time extension or extra payments.

As and when grid power is available, the same shall be made available at 33 KV at one point in each location, viz Power House and Barrage site. The Contractor shall make his own network at required voltage levels for the work sites, complying with all statutory regulations. Contractor shall provide and install all the necessary transformers, switchgears, wiring, fixtures, electric poles, bulbs, (proper fencing wherever required) and other temporary equipment for further distribution and utilization of energy for power and lighting and shall remove the same on completion of the work. NEEPCO will not be responsible for any inconvenience caused due to the failure of power supply and no compensation for delay in works on this account will be entertained.

2.9.3 Medical Services:

NEEPCO presently doesn't have any medical facilities of its own in the project. The bidders are required to enquire nearby available medical facilities, if any and shall make their own arrangement of medical services at Project Site as per requirement.

2.9.4 Water Supply:

Water for construction purposes and potable water of suitable quality shall have to be arranged by the Contractor at his own cost.

2.9.5 Communication:

Currently, Airtel is the only mobile & internet service provider in the project area. The Contractor shall make his own arrangements for internal telephone communication as well as for internet facilities.

2.9.6 Land for Contractor's accommodation, installation and storage area:

Land for contractor's accommodation, installation, storage area, etc. will be provided by NEEPCO.

2.10**SALIENT FEATURES:**

The Salient Features of the Heo HEP as envisaged are listed below. The bidder is requested to note that the ratings / parameters given herein may undergo minor changes. While quoting for the contract, the bidder is expected to keep sufficient leeway to accommodate such minor changes.

However, the bidder must note that any departure / deviation from the parameters/ratings given below must have advance approval from NEEPCO.

Sl. No.	Item Description	Particulars / Ratings
1.00	LOCATION	
1.01.	State	Arunachal Pradesh
1.02.	District	Shi-Yomi
1.03.	Village	Hiri /Puring
1.04.	Access Road	Tato-Mechuka Road
1.05.	Geographical Coordinates of Barrage Site	
1.05.01.	Longitude	94°16'31"E
1.05.02.	Latitude	28°32'20"N
1.06.	Geographical Coordinates of Power House Site	
1.06.01.	Longitude	94°18'43"E
1.06.02.	Latitude	28°32'32"N
2.00	HYDROLOGY	
2.01.	Catchment area at the water intake (km ²)	1065
2.02.	River	Yarjep River
2.03.	Average Annual Rainfall (mm)	2621 mm
2.04.	Min-Max temperature (°c)	1°c - 40°c
2.05.	Min-Max humidity (%)	39% - 100%
2.06.	Probable Maximum Flood (m ³ /s)	3900
2.07.	Standard Project Flood (m ³ /s)	3200
2.08.	Glacial Lake Outburst Flood (GLOF) (m ³ /s)	820
3.00	BARRAGE	
3.01.	Length of Barrage	86.0 m
3.02.	HFL	1400.0 m
3.03.	FRL	1400.0 m
3.04.	Average river Bed Level	1386.0 m
3.05.	Max. Height of Barrage above River bed level	16.0 m
3.06.	Bridge Deck Level	1402.0 m
3.07.	Design Flood (SPF)	3200 m ³ /sec
4.00	SPILLWAY	
10.01.	Type	Gated
10.02.	No. of Bays	Minimum 5 Nos.
10.03.	Size of Gate	As per Design Requirement but not less than 11.5 m (W) x 12.0 m (H)
10.04.	Type of Gate	Radial gates
10.05.	Energy Dissipation arrangement	Stilling Basin Type
5.00	POWER INTAKE	
5.01.	Length	31.0 m



Sl. No.	Item Description	Particulars / Ratings
5.02.	FRL	1400.0 m
5.03.	MDDL	1398.0 m
5.04.	Number and Size of Trash rack	Minimum 6 nos. each of size not less than 4 m (W) x 15 m (H)
5.05.	Number and Size of Intake Gates	Service and Emergency Gates 2 nos. each of size not less than 9.0 m (W) x 6.5 m (H)
5.06.	Type of Gates	Vertical lift gates
6.00	HEAD RACE TUNNEL	
6.01.	Length	3550 m
6.02.	Shape (Finished)	Circular / Modified Horse Shoe
6.03.	Diameter	Minimum 6.5 m
6.04.	Design discharge	130.25m ³ /s
7.00	SURGE SHAFT	
7.01.	Type	Restricted Orifice
7.02.	Diameter (m)	Minimum 13.5 m
8.00	PENSTOCK PROTECTION VALVE HOUSE	
8.01.	Type	Underground
8.02.	Clear Length of Valve House incl. Service Bay	19.50 ± 1.5 m
8.03.	Clear distance between inner finished face of upstream and downstream Crane beam column	9.00 ± 0.5 m
8.04.	Height	17.25
8.05.	Number of Valves	1
8.06.	Type of Valve	Butterfly
8.07.	Valve Internal Diameter	5.75 + 0.25 m
9.00	HIGH PRESSURE TUNNEL	
9.01.	Number	1
9.02.	Type	Underground Steel lined
9.03.	Internal Diameter	Minimum 5.75 m
9.04.	Length of HPT	376 m (approx.)
10.00	UNIT PRESSURE TUNNEL	
10.01.	Number	3
10.02.	Type	Underground Steel lined
10.03.	Diameter (m)	Minimum 2.75
10.04.	Length (m)	Average 25 m each
11.00	POWER HOUSE	
11.01.	Type	Surface
11.02.	Size of power house Machine Hall:	
11.02.01.	Distance from A Line to B Line	4.40 + 0.5 m
11.02.02.	Distance from B Line to D Line	19.60 + 1.5 m
11.02.03.	Distance from D Line to E Line	15.00 + 0.5 m
11.02.04.	Length of Machine Hall	85.50 + 1.5 m
11.02.05.	Elevation of Machine Centre Line	El 1184.80 + 1.0 m
11.02.06.	Machine Centre Line Elevation to DT Line Bottom Elevation	8.00 + 0.5 m
11.02.07.	Machine Centre Line Elevation to Service Bay Floor Elevation	8.50 + 0.5 m
11.02.08.	Machine Centre Line Elevation to MIV Gallery Floor Elevation	4.00 + 0.25 m

Sl. No.	Item Description	Particulars / Ratings
11.02.09.	Service Bay Floor Elevation to Crane Beam Top Elevation	11.00 + 0.5 m
11.02.10.	Clear Height of Bottom Chord of Roof Truss from EOT Crane Beam Top Elevation	4.50 + 1.0 m
11.02.11.	No. of Floors between MIV Floor Level and Generator Floor	2
11.02.12.	Total No. of Floors in Machine Hall	4
11.03.	Size of GIS & Transformer Hall:	
11.03.01.	Length of GIS & Transformer Hall	85.50 + 2.5 m
11.03.02.	Width of GIS & Transformer Hall	15.00 + 0.5 m
11.03.03.	First Storey / Transformer Floor Elevation	Same as Service Bay Floor Elevation
11.03.04.	First Storey Height	9.50 + 0.5 m
11.03.05.	Second Storey Height	12.00 + 0.5 m
11.04.	Bench & Floor at upstream of E Line	
11.04.01.	Length	Length of GIS & Transformer Building + Clearance required for DG Shed on left side of building
11.04.02.	Width	12.00 + 0.5 m
11.04.03.	Elevation	Service Bay Floor level \pm Slope for Drainage
11.05.	Tail Pool	
11.05.01.	Type and Shape	Open air
11.05.02.	Walls Top Elevation	El 1194.30 + 0.5 m
11.05.03.	Floor Elevation	El 1177.50 + 0.5 m
11.05.04.	Normal Tail Water level	El 1189.0 m
11.05.05.	Number of draft-tube gates	3
11.05.06.	Size of draft Tube gates	As per design requirement but not less than 7.0m (W) x 3.95 m (H)
12.00	TURBINE	
12.01.	Type	Francis vertical
12.02.	Number	3
12.03.	Rated Output	81.22 MW
12.04.	Head (m):	
12.04.01.	Gross Head	211.0 m
12.04.02.	Net head	201.8 m
13.00	GENERATOR	
13.01.	Type	Vertical Shaft Synchronous Generator Suspended Type
13.02.	Number	3
13.03.	Rated Output	94.12 MVA
13.04.	Synchronous Speed	300 rpm
13.05.	Power Factor	0.85
13.06.	Frequency	50 Hz
13.07.	Generation Voltage	11 kV
14.00	GENERATOR STEP UP TRANSFORMER	
14.01.	Number	10 (including one spare)
14.02.	Type	Single Phase, Oil Insulated Type
14.03.	Capacity/ Rating	34.67 MVA
14.04.	Voltage	11 kV / 220/ $\sqrt{3}$ kV
15.00	POTHEAD YARD	

220KV GIS and Pothead yard of 240 MW Heo Hydro Electric Project, Arunachal Pradesh.



ISO: 9001, 14001,
& 45001

Bid Document
Sec-II: Information for Bidders

Sl. No.	Item Description	Particulars / Ratings
15.01.	Number of outgoing lines	2
15.02.	Size	86 m x15 m (Approx)
15.03.	No. of Bays	4 (including space for 2 future Bays)
16.00	GAS INSULATED SUBSTATION	
16.01.	Voltage	220 kV
16.02.	Type	Double Bus
16.03.	No. of 220 kV bays	8 (3 Generating bays, 2 outgoing bays, 1 bus coupler bay, 1 Bus Reactor Bay, 1 Station Transformer Bay)
16.04.	Provision for spare bays	2 nos. in GIS area