

Procurement of Transformers for
Tato-I Hydro Electric Project (186
MW), Arunachal Pradesh



ISO: 9001, 14001,
& 45001

Bid Document
Sec-II: Information for Bidders

SEC-II: INFORMATION FOR BIDDERS

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INFORMATION FOR BIDDERS

1. ABOUT NEEPCO

North Eastern Electric Power Corporation (NEEPCO) was established in 1976 as a Government of India-owned company under the Companies Act of 1956 to undertake the development of electric power in North Eastern India covering all aspects such as the investigations, planning, design, construction, operation and maintenance of Hydroelectric and Gas Based Projects. NEEPCO is a Mini Ratna (Category-I) Schedule-‘A’ CPSE under the administrative control of the Ministry of Power with 100% shareholding by the NTPC Ltd. The authorized share capital of the Corporation is INR 5000 Crores. To date, the Corporation has commissioned 7 Hydro, 3 Gas-Based, and 1 Solar Power Stations. In addition, the Corporation is contemplating taking up implementation work for several hydro projects in the North-eastern Region for which Tato-I HEP is one such project.

2. NEED OF THE PROJECT

Comparing the projected growth of peak power demand, energy requirement anticipated and increase in the generating capacity on the basis of new projects proposed and/or under construction/consideration, it is evident that there is need to provide additional power to the National Grid. New schemes have to be taken up immediately and implemented to derive timely benefits. The most important source of power in the North Eastern region is the hydroelectric power located in Arunachal Pradesh and other sister states.

The power from hydro projects in the north eastern region would be in excess of the demand in the region and can be exported for utilization in other regions of the country. Presently there is availability of transmission systems beyond the North-eastern power region for dispersal of power as the five power regions of the country are in the process of greater integration within a national grid.

Implementation of the 186 MW Tato-I project would certainly help in supplying the much-needed power to the area as well as to the rest of the country.

3. ABOUT TATO-I HYDRO ELECTRIC PROJECT

Tato-I hydroelectric project is proposed for development on the Yarjep River, a right bank tributary of Siyom River in Shi Yomi District of Arunachal Pradesh. The project envisages the construction of a diversion weir, intake channel from the weir to the tail pool of Heo Power House, Head Race Channel from Heo Tail Race Basin to HRT Inlet, Escape Channel, Head Race Pipe (HRP), a 3.754 km long modified horseshoe Head Race Tunnel of diameter 6.5 m, a 16.0 m dia Surge Shaft, Surface Valve House, Underground steel lined Pressure Shaft, Surface Power House Complex for housing the MIVs, the Machine Hall, the Transformer & GIS hall and pot head yard and Tail race channel.

4. SCOPE OF WORK

The Scope works under the Contract covers

i. GENERATOR STEP-UP TRANSFORMERS (GTSU)

The Scope of works under the Contract covers Design, Manufacture, Quality Assurance, Quality Control, Shop Assembly, Shop Testing, Packing, Supply, Transportation up to site, including Transit Insurance during transportation as well as intermediate storage if necessary, delivery, handling and storage at site, Erection, Testing and Commissioning of Ten (10) nos. Single phase, 27 MVA, 11/220kV, OFWF Generator Transformers along with their associated auxiliaries, spare parts for 5 years trouble free operation of the transformers, special tools and tackles as per the Schedule of Requirements and as described in Technical Specification of the Bid Documents.

The transformers shall be of core and oil immersed type and suitable in all respects for operation on the system and under the conditions specified in this specification.

The contractor shall coordinate and cooperate fully with Civil Contractor and other contractors involved in carrying other works at the site.

The Contractor shall supply all information and details for Civil design of the transformer hall including embedded parts of the equipment foundations as per relevant practice and relevant IS or equivalent codes.

Exclusion:

- i. All kind of civil works like construction of soak pit, cable trenches, rail, firewall, and foundations for transformers are excluded from the scope of the Contract. However, supply of foundation bolts & other embedded parts, foundation drawings and other specification for the finalization of civil drawing where ever required shall be under the scope of contract.
- ii. Laying of earth mat is excluded from this scope of contract. However, earthing connection from the over ground riser and providing design details for finalization of Powerhouses earthing system shall be included in the scope of this contract.
- iii. Supply of cable tray is excluded from the scope of contract. However, the contractor shall coordinate with the Powerhouse contractor for their requirement.

(ii) Distribution Transformers

The Scope of works under the Contract covers design, manufacture, supply, transportation up to site, handling and storage at site, erection, testing and commissioning of following Distribution Transformers (Oil & Dry Type) complete with associated accessories and fittings, as specified and suitable for indoor mounting, spare parts for 5 years trouble free operation, special tools and tackles as per the Schedule of Requirements and the Technical Specification of the Bid Documents.

1. 5000 kVA 220/33 kV, 3 phase Station Service Transformer (SST)- 1 no. (Oil Type)
2. 160 kVA 33/0.433 kV, 3 phase Auxiliary Transformers (AT)- 2 no. (Oil Type)
3. 630 KVA, 11 kV/ 0.433 kV Unit Auxiliary Transformers (UAT)- 3 nos. (Dry Type)
4. 1500 kVA 33/0.433 kV, 3 phase Station Auxiliary Transformer (SAT) – 2 no. (Dry Type)

The transformers shall be designed, manufactured and tested in conformity with the latest issue of IS 2026 / IEC 76 and / or BS 171 and with this Specification where it differs from IEC 76. Tap changers shall be tested to IEC 214. The transformer and associated auxiliaries and equipment shall be designed to facilitate operation, maintenance and repairs. All apparatus shall be so designed to ensure satisfactory operation under such sudden variations of load and voltage as may be met with under operating conditions on the system, including those due to short circuit. The adequate consideration for temperature rise, insulation level as per LOV study, clearances at higher altitude (greater than 1000 metres) and ambient temperature shall be taken care by the Contractor.

Marshalling Box and other auxiliaries, as required also form part of the scope / offer.

Exclusion:

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3. Supply of cable tray is excluded from the scope of contract. However, the contractor shall coordinate with the Powerhouse contractor for their requirement.

The Distribution Transformers supplied under the Contract shall be designed & manufactured either by the Contractor himself or the Contractor may outsource from other reputed transformer manufacturers. In case of outsourcing by the Contractor, the selected vendor shall possess adequate experience in the design, manufacturer, supply, erection, testing and commissioning of transformers of similar class and rating. The Contractor shall submit the vendor's credentials and shall obtain prior approval from the Purchaser before engaging such vendor.

5. PROJECT AREA

The Tato-I H.E. Project is located near Tato Town in the Shi Yomi district of Arunachal Pradesh. The nearest roadhead is the Gapo village, which is about 37 km from Mechuka and 143 km from Aalo Town. The project intake is located near the Heo HEP Powerhouse. The proposed intake site is located between 94°18'43''E longitude and 28°32'32''N latitude near Meying village. The proposed Powerhouse site is located on the left side of the river between 94°21'31''E longitude and 28°31'53''N latitude near the Heyo village.

6. ACCESS TO THE PROJECT

The project is named after the Tato village, which is at a distance of 146 km from Aalo, an important town in the Shi Yomi district. Guwahati, Assam, the largest city of North-East India, is around 770 km from Tato. 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 in Arunachal Pradesh and Dibrugarh/North Lakhimpur in Assam. The nearest Broad-Gauge railhead is at Silapathar, which is 332 km from Tato. Another broad-gauge railhead is at Gogamukh, which is presently serving the under-construction Lower Subansiri project.

7. ACCESS PERMIT TO THE PROJECT AREA

For Indians other than natives of Arunachal Pradesh, an ILP (Inner-line Permit) is required to enter any part of Arunachal Pradesh. The ILP is issued by the designated authorities of the Arunachal Pradesh Government. The ILP can be obtained online at www.arunachalilp.com.

8. ACCESS ROAD WITHIN PROJECT AREA

NEEPCO shall provide an approach road up to the weir and Power House location.

9. GENERAL CLIMATIC CONDITIONS

The climate of the state is dominated by the Himalayan system characterized by a wide altitudinal range. The monthly average temperature during the winter months ranges from 10 to 12 degrees Celsius and 15 to 20 degrees Celsius during summer. The maximum temperature during summer may go up to 33 degrees Celsius.

The year can be divided into four seasons. The winter season extends from December to February, the pre-monsoon season from March to May, the Southwest monsoon season from June to September, and the post-monsoon or transition period during October and November.

The state also falls in one of the heaviest rainfall zones in the country. The annual rainfall spreads over 8–9 months and varies from 1,000 mm in the higher reaches to 3,500 mm in the foothills

10. TOPOGRAPHY AND PHYSIOGRAPHY

Arunachal is a land of lush green forests, deep river valleys, and beautiful plateaus. The land is mostly mountainous with the Himalayan range along the northern borders crisscrossing other mountain ranges running North-South. These divide the state into six river valleys: the Kameng, the Subansiri, the Siang, the Dibang, the Lohit, and the Tirap. All these are fed by snow from the Himalayas as well as by countless rivers and rivulets.

The project area is bounded between latitude N 28°31'53" and N 28°32'32" & between longitudes E 94°18'43" and E 94°21'31". The area is mountainous and the hill slopes are very steep. As is characteristic of Arunachal Pradesh, the vegetative cover on the mountain slopes is very dense and rich. Rainfall in the project area is heavy and most of it occurs from May to September. The topography of the district is mountainous. The northern part of it falls within higher mountain zone consisting of a mass of tangle peaks and valleys. The foothill range which lies in Southern part has hills of low altitude. The rocky and high hills and mountains with beautiful green valleys decked with wooded forest and drained by innumerable rivulets and rivers flowing from upper elevations presents a splendid view of scenic beauties and diversities

11. GEOLOGY AND GEOTECHNICAL ASSESSMENT

Surge shaft and Powerhouse complex

The surge shaft to the powerhouse is located primarily in colluvial terrain interspersed with intermittent rock outcrops. The surface powerhouse will be established on migmatitic gneiss bedrock, while the short tail race channel will sit in river terrace material, where drill hole reveals a 12.5m thickness of this material. The bedrock, consisting of migmatitic, augen, and banded gneiss, is fresh and jointed.

The area behind the powerhouse is covered with colluvium, ranging from 2 to 8m in thickness with significant rock exposure downstream from the powerhouse and on the hill slopes. These exposures indicate **shallow** colluvium coverage. The rock foliation generally dips at N310/29 and includes joint sets, with no major shear zones observed near the surge shaft or powerhouse.

A dormant slide zone is identified more than 300m above the surge shaft, between elevations of 1600m and 2130m. This zone's debris chute lies upstream, spreading extensively about 400m upstream of the powerhouse and continuing for about 1500m along the river's left bank.

The open to sky surge shaft and the pressure shaft would be excavated in bedrock of migmatitic gneisses.

Subsurface conditions are anticipated to be mostly in the Fair to Good rock classes (Q: 4-40), with potential patches of Poor (Q: 1-4) and Very Poor (Q: 0.1-1) classes due to sheared or fractured rock.

The adits (Adit-2 and Adit-3), although beginning in colluvial areas, will proceed through rock outcrops with variable rock quality expected along their lengths.

12. SEISMICITY AND SEISMOTECTONICS

The project site is situated in the Shi Yomi district of Arunachal Pradesh, a region classified within Seismic Zone V according to the Indian Standard Criteria for Earthquake Resistant Design of Structures IS: 1893-Part I, 2002. This zone, the highest risk category on the Seismic Zoning Map, aligns with Intensity IX on the MSK scale (1964). The IS code emphasizes the need for detailed, site-specific studies to determine design earthquake parameters, considering the local seismotectonics, site response, and the seismogenic potential of tectonic elements, alongside a historical review of seismic activity.

A comprehensive site-specific seismic study for the Pauk Hydroelectric Project (HEP) upstream of Tato-1 HEP within the Yarjep cascade has been conducted by the Department of Earthquake Engineering at IIT Roorkee (Indian Institute of Technology). This project, located approximately 8.3 km upstream from the Tato-I, shares similar geotectonic, geomorphological, and lithological characteristics, as well as common seismogenic sources.

Given the geographical proximity, structural similarities, and the absence of distinct tectonic distinctions within the same geotectonic block, the seismic analyses and findings from the Pauk HEP are deemed applicable to the Tato-I HEP. Consequently, a horizontal seismic coefficient of 0.24g has been adopted for the design of the Tato-I H. E. project.

13. CATCHMENT CHARACTERISTICS

The Yarjep basin belongs to the Brahmaputra catchment area. It is located on the top west corner of the Shi Yomi district, 180 km from Aalo. The Yarjep River originates from the mountain chain constituting the Indo-China border with elevations comprised between 4000m and 4500 m altitude and joins the Siyom River at Tato village, 40 km downstream of Mechuka. The Siyom River joins the Siang River (Origination of the Brahmaputra) at Pangin, 74 km upstream of Pasighat. The Yarjep catchment is part of the Siyom River system in Arunachal Pradesh, Northeastern India. The basin is bounded on the north by Eastern Himalaya, on the west by Abore Hills and Subansiri Basin, and on the east by Mishmi Hills. All these mountains surround the catchment basin with an almost continuous range of high elevations comprised between 3500 m and 4500 m. The total drainage area of Yarjep up to its confluence with Siyom River near Tato is 1222 km² which is about 48% of total drainage area drained by Siyom River (Total 2560 km², 1338 km² of Siyom and 1222 km² of Yarjep) at the location of confluence of Siyom and Yarjep Rivers. The length of the Yarjep River up to the confluence with the Siyom River is about 80 km, and its average slope is 28.0 m/km. In the vicinity of the water intake, the river slope is about 1 m in 24 m i.e. 41 m/km.

In the catchment area of the project. Mechuka station is only one where long term and reliable rainfall data are available. The higher elevation ranges are not accessible either due to absence of the tracks or for military reasons. The rainfall data indicated that the level of precipitation of Mechuka vary from 2000 mm up to 2700 mm with an average at around 2500 mm per year.

14. MUCK DISPOSAL AREAS

The spoil from the various construction sites would be disposed off at designated sites in a controlled and orderly manner. All measures would be adopted to ensure that the dumping of muck does not cause injury or inconvenience to the people or the property around the area. The

spillage of muck into the river at any site would be prevented by making suitable retaining structures to retain the muck pile.

15. MATERIALS

The Corporation will not issue any material such as steel plate, reinforcement and/or structural steel, cement, P.O.L., explosives etc., for execution of the work. The Contractor shall make their own arrangements for all materials, consumables etc. for completion of the works, within their quoted prices.

16. LOCAL FACILITIES AND SERVICES IN THE PROJECT AREA

16.1 AVAILABILITY AND EMPLOYMENT OF THE 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

16.2 POWER SUPPLY

The responsibility of arranging power for the work shall lie in bidder's scope. The possibility for availability of Grid Power for the work is very remote. Therefore, the requirement would have to be met only by installing diesel generating sets. It is not binding on NEEPCO for supply of power from Grid or otherwise.

At present Grid supply is not available and therefore the Contractor is required to make DG arrangement and in future if the grid supply is arranged, NEEPCO shall provide grid power to the Contractor on recoverable basis @ Rs. 30.00 per Unit. Non-availability of power however, would not entitle the Contractor to make any claims whatsoever either for time extension or extra payments.

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

16.3 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 arrangements for medical services at the Project Site as per requirement.

16.4 EDUCATIONAL FACILITIES

NEEPCO presently doesn't have any educational facilities of its own in the project. However, there is a Govt. Secondary School at Tato Township. Besides, there is also a private school run by a Catholic Missionary at Tato Township. Renowned educational institute like R. K. Mission is located in Aalo Town, which is 140 KM away from Tato.

16.5 WATER SUPPLY

There are several streams in and around the project area and Tato Township. Water for construction purposes and potable water of suitable quality shall have to be arranged by the Contractor at his own cost.

16.6 COMMUNICATION

BSNL & Airtel are the two mobile service providers in the project area. The service is presently satellite based and strength of the service is not adequate for accessing internet. Laying of Optical Fibre Cables (OFC) by Airtel is in progress. Once laying of OFC is completed, mobile and internet services will improve. The Contractor is recommended to make his own arrangements for internal telephone communication.

16.7 LAND FOR THE CONTRACTOR'S ACCOMMODATION, INSTALLATION AND STORAGE AREA

Land for site installations and quarters etc. will be provided by NEEPCO.

End of the Chapter "*Information to the Bidders*"