

# **ETALIN HYDRO ELECTRIC POWER COMPANY LTD. (EHEPCL)**



## **ETALIN HYDROELECTRIC POWER PROJECT (3097 MW)**

### **ARUNACHAL PRADESH, INDIA**

#### **PRE-QUALIFICATION DOCUMENT (INTERNATIONAL COMPETITIVE BIDDING)**

**FOR**

#### **ETALIN/PACKAGE-6**

**EPC EXECUTION OF CIVIL WORKS OF THE POWERHOUSE COMPLEX CONSISTING OF 1.65KM OF HRT, SURGE SHAFT, BUTTERFLY VALVE CHAMBER, PRESSURE SHAFTS ALONG WITH STEEL LINING, POWERHOUSE CAVERN, TRANSFORMER HALL CAVERN, DOWNSTREAM EXPANSION CHAMBER TAILRACE TUNNEL. AS WELL AS HYDROMECHANICAL WORKS RELATED TO THE POWERHOUSE OF TANGON LIMB. EXCLUDING CONSTRUCTION OF ROADS & BRIDGES, ADITS, MAT'S AND EXCAVATION OF POWERHOUSE CAVERN AND TRANSFORMER HALL CAVERN.**

**JULY, 2014**



**PRE-QUALIFICATION INVITATION DOCUMENT  
(INTERNATIONAL COMPETITIVE BIDDING)**

**FOR**

**ETALIN/PACKAGE-6**

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# **PART-1**

## **INVITATION FOR PRE-QUALIFICATION**

**ETALIN HYDRO ELECTRIC POWER COMPANY LTD. (EHEPCL)****INVITATION FOR PRE-QUALIFICATION****INTERNATIONAL COMPETITIVE BIDDING**

Ref. No.: EHEPCL/PQ-001/2014/Package 6

Date: 18.07.2014

The Etalin Hydro Electric Power Project is being developed in Dibang Valley district of Arunachal Pradesh, India. The project envisages utilization of waters of Dri and Tangon rivers for hydropower generation. The two rivers are tributaries of Dibang river and meet near Etalin village. Downstream of the confluence, the river is called Dibang which forms a major tributary of the Brahmaputra.

The proposed installed capacity of the scheme on Dri is estimated at 1842 (307 x 6) MW and that for the scheme on Tangon at 1228 (307 x 4) MW. Riparian flows from both the limbs have also been proposed to be utilized for power generation of 27 MW (19.6 MW on Dri and 7.4 MW on Tangon). The total installed capacity of the project is 3097 MW.

The entire catchments of both Dri and Tangon are within the Indian Territory and the main Dibang river flows throughout its length within the state of Arunachal Pradesh. Thus, there are no interstate or international aspects involved with the development of the project.

The development rights of the project have been accorded to ETALIN HYDRO ELECTRIC POWER COMPANY LTD. herein after referred to as "EHEPCL" / "Owner", a joint venture company of Jindal Power Ltd. (JPL) and Hydro Power Development Corporation of Arunachal Pradesh Ltd. The JV intends to develop the project on Build, Own, Operate and Transfer (BOOT) basis. The project was initially identified by Central Electricity Authority (CEA) and pre-feasibility studies for the project were carried out by National Hydroelectric Power Corporation (NHPC). Subsequently, the project scheme was developed in detail and financially evaluated in the Detailed Project Report (DPR) which was scrutinized by the Central Electricity Authority (CEA) and other statutory organizations. The Techno Economic Clearance (TEC) for the project was accorded by CEA on 12<sup>th</sup> July' 2013 vide their letter no: 2/ARP/26/CEA/2010-PAC/3885-3917.



The Owner intends to implement the Project on split Engineering, Procurement & Construction (herein after referred to as EPC) basis for which it invites Pre-Qualification Applications on International Competitive Bidding (ICB) basis for the following works/contracts under the Project:

**ETALIN/Package-6:** EPC execution of Civil Works of the Powerhouse Complex consisting of 1.65km of HRT, Surge Shaft, Butterfly Valve Chamber, Pressure Shafts along with steel lining, Powerhouse cavern, Transformer hall cavern, Downstream Expansion Chamber, Tailrace Tunnel as well as Hydro-mechanical works related to the Powerhouse of Tangon limb. Excluding construction of Roads & Bridges, Adits, MATs and excavation of Powerhouse cavern and Transformer hall cavern.

**Estimated Completion Time: 60 months**

**Brief Scope of Work:**

- i) Overall planning, design and engineering of all civil and HM structures of the Project covered under the package.
- ii) Design, manufacturing, transportation, supply, erection, testing & commissioning of Hydro-mechanical works covered under the package.
- iii) Excavation of Powerhouse, Transformer Hall , Adits, MAT and draft tubes would be executed under separate package and hence is not covered in the present scope.

Pre-Qualification (herein after referred as "PQ") is open to EPC Contracting Company / unincorporated Joint Venture(s) from any Country Complete PQ document can be viewed / downloaded online through website [www.jindalpower.com](http://www.jindalpower.com) (herein after referred to as "Website"). Last date for submission of PQ Application is 26.08.2014 (15:00 Hrs IST). Subsequent amendments and/or extension of date, if any, for submission of PQ documents shall be posted only on the Website. A non-refundable fee of INR.100,000/- or USD 1,750 shall be payable as processing fee, at the time of submitting the PQ Application. The non-refundable fee is to be paid in the form of a Demand Draft in favour of "Etalin Hydro Electric Power Company Ltd." payable at New Delhi, India.



Submission of Applications for Pre-Qualification along with all the required documents, information and prescribed processing fee must be received, in sealed envelope, on or before 26.08.2014 (15:00 hrs IST). The envelope must be clearly marked "Application for Pre-Qualification for ETALIN/Package-6 of Etalin Hydroelectric Power Project (3097 MW)".

Late/ incomplete applications, applications without requisite documents and applications without the requisite processing fee are liable to be rejected.

Only pre-qualified Companies/Joint Ventures will be invited to participate in the Bid. EHEPCL reserves the right to reject any or all Applications without assigning reason thereof and without any refund of processing fee.

Applicants in their own interest are advised to visit the Project site, to apprise themselves adequately to the extent required for preparation and submission of Application, well in time. After completion of pre-qualification process, the Owner intends to call for submission of Bids from the pre-qualified Applicants, for which Bid document shall be issued to prequalified Companies/JVs free of cost.

### **Whom to Contact**

For any further information on the Pre-Qualification Document, the Applicants may contact the Office of the Etalin Hydro Electric Power Company Ltd.

### **Contact Person**

Mr. M.C.Bhardwaj  
Etalin Hydro Electric Power Company Ltd.  
Tower-B, 2<sup>nd</sup> Floor  
Plot No – 02, Sector-32  
Gurgaon – 122001  
Haryana, India  
Phone- +91- 124-6612223  
Mail Id: etalin.pq@jindalsteel.com



# **PART-2**

## **INSTRUCTIONS TO APPLICANTS**



## INSTRUCTIONS TO APPLICANTS

### 1.0 SCOPE OF TENDER

1.1 ETALIN HYDRO ELECTRIC POWER COMPANY LTD. (EHEPCL), hereinafter referred to as "EHEPCL" / "Owner" intends to implement Etalin Hydro Electric Power Project (3097 MW) located in Dibang Valley district of Arunachal Pradesh, India, invites Pre-Qualification Applications.

1.2 The Owner invites Applications from Companies / Joint Ventures on an International Competitive Bidding basis (ICB) for pre-qualification for the following EPC package of the Project.

Package No.	Details of Works	Period of Completion
ETALIN/ Package-6	EPC execution of Civil Works of the Powerhouse Complex consisting of 1.65km of HRT, Surge Shaft, Butterfly Valve Chamber, Pressure Shafts along with steel lining, Powerhouse cavern, Transformer hall cavern, Downstream Expansion Chamber, Tailrace Tunnel as well as Hydro-mechanical works related to the Powerhouse of Tangon limb. Excluding construction of Roads & Bridges, Adits, MATs and excavation of Powerhouse cavern and Transformer hall cavern.	60 Months

1.3 General information on the location, transportation and communication facilities, access to site, project layout, geology, hydrology, salient features etc. are given at **Appendix-A**, "Information for Applicants".

1.4 Pre-Qualification is open to EPC Contracting Companies and unincorporated Joint Venture(s) of Companies from any country that shall hereinafter be referred to as 'Applicants'.

1.5 For any clarification on the Pre-Qualification Document, the Applicant shall send the request to the Owner through electronic mail/post. The Owner may respond to such request for clarifications, received earlier than 15 days prior to the deadline for submission of Application.





- 1.6 Before the deadline for submission of Application, amendments may be issued by the Owner to amend, supplement various provisions in the Pre-qualification Document. Any amendments issued by the Owner shall become part of the Pre-qualification Document and shall be uploaded only on the Website. To give prospective applicants reasonable time to take an amendment into account in preparing their PQ documents, the Owner may extend as necessary the deadline for submission of the Application,

The Applicants are advised to visit the Website regularly for any such updates, clarifications etc. The Applicants are advised to submit their queries, clarifications etc. through e-mail as well as hard copy.

The clarifications shall be updated on the Website only. The Applicants may re-visit the Website prior to submission of PQ for any such details

**1.7 Applicant to inform himself fully:**

**a) Local Conditions**

It is imperative for each Applicant to fully inform himself of all Indian as well as local conditions, factors and legislation that may have any effect on their submissions for pre-qualification and execution of the work. No request will be considered for clarifications from the Owner regarding such conditions, factors and legislation.

**b) Site Conditions**

- 1.b.1 The Applicant is advised to visit and examine the Site where the works are to be executed, facilities are to be installed and its surroundings and obtain for itself on its own responsibility all information in this regard. The costs of visiting the site shall be at the Applicant's own expense.

- 1.b.2 The Applicant and any of its personnel or agents will be granted permission by the Owner to enter upon its premises and lands for the purpose of such inspection, but only upon the express condition that the Applicant, its personnel and agents will release and indemnify the Owner and its personnel and agents from and against all liability in respect thereof and will be responsible for death or personal injury, loss of



or damage to property and any other loss, damage costs and expenses incurred as a result of such inspection.

- c) The Applicant shall be deemed prior to submitting his PQ to have:
- 1.c.1 satisfied itself as to the means of communication with and access to and through the Site, the accommodation it may require and the precautions and the times and methods of working;
  - 1.c.2 satisfied itself as to the nature of the work, time required for complete execution of work and materials necessary for the execution of the Works;
  - 1.c.3 obtained for itself all necessary information as to the risks, contingencies and all other circumstances ;
  - 1.c.4 inspected and examined the Site and its surroundings and carried out such surveys as it considers necessary
- d) For site visit the Applicant are requested to contact the undersigned:
- |  |   |
|--|---|
| Mr.V.B. Gupta<br>Head (Projects)<br>Etalin Hydro Electric Power Company Ltd<br>District: Dibang Valley,<br>Arunachal Pradesh,<br>India<br>Phone No. : +91-3801-278283<br>E-mail: vinod_gupta@jindalsteel.com | Mr.M.M. Madan<br>President (Hydro)<br>Etalin Hydro Electric Power Company Ltd<br>3 <sup>rd</sup> Floor, Tower-A,<br>Plot No-02, Sector-32,<br>Gurgaon -122001<br>Haryana, India<br>Phone No.: +91- 124 6616019<br>E-mail : mm.madan@jindalsteel.com |
|--|---|

## 1.8 Method of applying

- 1.8.1 The Applicant shall necessarily furnish the Letter of Application and also fill up all the relevant Application Forms enclosed as Appendix-B herewith in Pre-Qualification Document. The details shall be typed or written in indelible ink and shall be signed by a person or persons duly authorized and holding Power of Attorney for signing the PQ documents on behalf of the Applicant. A certified copy of the Power of Attorney shall accompany the application. All pages of the PQ document shall be signed by the person or persons duly authorized to sign the PQ document on behalf of the Applicant as stated above.



- 1.8.2 In case of a Joint Venture, the Applicant is required to enclose the original copy of Undertaking from each Partner along with the Application, as per Annex-1 to Form 2A of Appendix B. Further, the Application made by a Joint Venture, shall be signed by the authorized representatives of all the Joint Venture partners. Certified copy(ies) of the Power of Attorney issued to such Authorized representatives by legally Authorized persons of all partner Companies of the Joint Venture shall accompany the Application.

## 2.0 SUBMISSION OF APPLICATIONS

- 2.1 The PQ Application shall be prepared in one (01) original, with one soft copy in CD and three (03) copies. The original and copy sets shall be clearly marked Original and Copy-1, Copy-2, Copy-3 respectively on the front cover of each set. In the event of discrepancy between original and copy, the original shall prevail.

- 2.2 Applications for Pre-Qualification in a sealed envelope shall be submitted in one Original, with one Soft copy in CD and three hard copies to:

Mr. M.C.Bhardwaj

Etalin Hydro Electric Power Company Ltd.

Tower-B, 2<sup>nd</sup> Floor

Plot No – 02, Sector-32

Gurgaon – 122001

Haryana, India

Phone- +91- 124-6612223

Mail Id: etalin.pq@jindalsteel.com

- 2.3 The envelope and the contained Application should be clearly marked:

**"Application for Prequalification for ETALIN/Package-6 of Etalin Hydro Electric Power Project (3097 MW)".**

The name, mailing address, email id and telefax number of the Applicant shall be clearly indicated on the envelope.



- 2.4 A non-refundable fee of INR.100,000/- or USD 1,750 shall be payable as processing fee, at the time of submitting the PQ Applications. The non-refundable fee is to be paid in the form of a Demand Draft in favour of “Etalin Hydro Electric Power Company Ltd.” payable at New Delhi, India.
- 2.5 Late Application(s), incomplete Application(s), Application(s) without supporting requisite document(s) and Applications without the requisite processing is (are) liable to be rejected.
- 2.6 All the costs and expenses incidental to the Applicant towards preparation of PQ document, discussions, conferences, meetings, if any, including any discussions, technical and other presentation including any demonstrations, site visit etc. shall be to the account of the Applicant only and the Owner shall bear no liability whatsoever on such costs and expenses
- 2.7 The PQ prepared by the Applicant and all correspondence and documents related to the application of this package, exchanged by the Applicant and the Owner shall be written in English language only, provided that any printed literature furnished by the Applicant may be written in another language, as long as such literature is accompanied by a translation in English language in which case, for purposes of interpretation of the document, the translation shall govern. Each page of the Translation shall be duly self-certified by the Applicant.
- 2.8 The Owner is also inviting PQ proposals for other packages of the Etalin Project. The Applicant may submit their PQ applications for one or more work package(s). However, the Applicants capability shall be evaluated for each package(s) separately as well as in combination so as to assess their competence to bid for one or more packages. Applicant, if desires to participate in other packages as well, has to submit a separate application as per requirement of the individual Package.
- 2.9 The Applicant should clearly indicate new design features/ new technologies used by them in the previous/ existing job executed by them which are relevant to the scope prescribed herein.
- 2.10 The Applicant shall confirm that it does not anticipate a change in Ownership/Control during the proposed period of execution of work (If such a change is anticipated, the scope and effect thereof shall be defined by the Applicant in its PQ Application).



- 2.11 The Applicant shall submit complete information that it has an established project management organization covering the areas related to engineering of equipment/systems, interface engineering, procurement of equipments and the necessary field services required for successful completion of work covered in the scope.
- 2.12 The Applicant is expected to examine all documents submitted by them. Failure to provide information which is essential to evaluate the Applicant's credentials, or failure to provide timely clarification or substantiation of the information supplied may result in rejection of the Application.
- 2.13 A Company/Joint Venture of such companies/ member of a Joint Venture may submit only one Application for the package under consideration. If a Company/Joint Venture/ member of a Joint Venture submits more than one Application singly or in a Joint Venture, all Applications where such Company is participating will be rejected. This however, will not apply in respect of Sub-Contractor(s) who may be proposed by one or more than one Company/Joint Venture. A Company submitting an Application individually or as a member of a Joint Venture cannot be a Sub-Contractor of another Applicant. The Applicant, if desires to participate in other package(s) as well, has to submit separate application as per requirement of the Package(s).
- 2.14 The Applicant has the option of sending PQ Application by courier or registered post or submitting it in the person and shall ensure that it reaches to the Owner by the date and time stipulated. Submission by Fax/Telex/e-mail will not be accepted.
- 2.15 Deadline for submission of PQ application**
- a) PQ Application must be received by the Owner at the address specified above not later than 26.08.2014, 15:00 Hrs (IST). In the event of the specified date for submission of PQ Application being declared a holiday for the Owner, the Application will be received, up to the appointed time on the next working day.
- b) The Owner may, at its discretion, may extend this deadline for submission by amending the documents, in which case all rights and obligations of the Owner and Applicants will thereafter be subject to the deadline as extended.



- c) Any PQ Application received by the Owner after the submission deadline prescribed by the Owner, is liable to be rejected.

### **3.0 QUALIFICATION CRITERIA**

- 3.1 The pre-qualification will be subject to Applicant's fulfillment of the Qualification Criteria set and stipulated hereunder, substantiated by authentic and relevant information, documents and details in the prescribed formats (Appendix-B). Additional information in support of their claims of achievements may be furnished by Applicant in any form of their device and design translated in English.
- 3.2 The Applicants should have proven experience as EPC contracting Companies and/or unincorporated Joint Venture(s) of Companies in execution of any project with responsibility for Planning, Design & Engineering, Civil and Hydro-Mechanical works of type, magnitude and nature similar to the items listed under at Para 3.3.1 hereunder. Only such experienced and capable entities shall apply for Pre-qualification.
- 3.3 The pre-qualification will be based on applicant fulfilling criteria set forth hereunder as the minimum:

#### **3.3.1 Technical Criteria**

##### **3.3.1.1 Planning, Design & Engineering Services**

a) General Experience

Experience in Planning, Design & Engineering of three Hydroelectric Projects for a period of at least five (05) years in preceding ten (10) years, as Owner's/EPC Contractor's Consultant or as a member of EPC consortium out of which one project should be of minimum 600 MW. Out of the three projects, at least one project of minimum 300 MW should be completed.

b) Specific Experience

Experience in detailed Design & Engineering of the following components in a completed hydropower project during the last fifteen (15) years:



- (i) Engineering of pressure tunnels of minimum 8m finished dia.
- (ii) Appurtenant hydraulic structures associated with powerhouse such as surge shaft, pressure shaft etc.

### 3.3.1.2 Civil Works:

a) General Experience

Experience, as prime contractor or as partner in a joint venture, of executing major underground structure works in a Hydropower Project for a period of at least five (05) years in preceding fifteen (15) years.

b) Specific Experience

Experience of executing in the last twenty (20) years, the following components in ongoing/completed project(s):

**1. Tunnel**

- (i) Completion of a lined pressure tunnel of minimum finished diameter of 9m and 1km. long with average heading/full face excavation progress of at least 50m per month from one face for 500 m length.
- (ii) Average concrete lining (overt) progress of minimum 100m per month from one tunneling face in a tunnel of minimum 9m finished diameter.

**2. Shafts**

- (i) Construction of two surge shafts, out of which one shall be complete with minimum diameter and height of 16m and 75m respectively;
- (ii) Construction of three pressure shafts, out of which one shall be complete with minimum diameter and design head of 3.5m and 200m respectively;



### 3.3.1.3 Hydro-Mechanical Works

(a) General Experience:

Experience as contractor or as partner in a joint venture of executing large Hydro-Mechanical contract(s) valuing US Dollar 25 million or more in last ten (10) years.

(b) Specific Experience

Successful completion of the following Hydro-Mechanical works in the preceding fifteen (15) years:

- (i) Design, manufacture, supply, erection, testing and commissioning of Vertical lift gate having  $A \times H \geq 950$  and  $H \geq 25$  m

Where;

"A" denotes an area (Clear width by clear height) for one gate in  $m^2$ .

'Clear Width' denotes distance between inner faces of two opposite piers.

'Clear Height' denotes the vertical height between the sill to centre line of top seal.

"H" denotes the normal design head at the bottom of the gate in metre.

- (ii) Experience of 2 works in Design, Manufacture, Fabrication, Erection, Testing and commissioning embedded type Steel Liner, of which one should have been completed successfully in the preceding 15 years and one of the Steel Liners should satisfy the following parameters:

$D \times H \geq 1350$ , and Head  $\geq 200$  m





Where:

“D” Denotes an inside diameter in meter of a steel liner, at the place where a maximum value of DxH is attained.

“H” Denotes a design head at the place mentioned above.

The total tonnage completed in a project should not be less than 4000 MT.-with an annual progress of 1000 MT

The steel plates should be pressure vessel quality.

**NOTES:**

- 1 Average progress per month shall be the average of progress achieved in a period of 12 months (continuous, including monsoon).
- 2 It shall not be necessary for an applicant to meet each of the sub-criteria (denoted as (i), (ii), etc.) from the same example/project.
- 3 Communication address of the concerned Project Authority/Employer with fax, telephone, and e-mail address shall be attached for each of the references, shown as meeting the criteria.

**3.3.2 Financial Criteria**

**3.3.2.1 Turnover**

Average Annual Construction Turnover of the Applicant (collectively by this tender partners in case of a Joint Venture) for the preceding five (05) financial years shall be atleast the amount specified hereunder:

**US\$ 35 Million**

Note : Sub-Contractor's turnover shall not be considered.

**3.3.2.2 Profitability**

The Applicant's should have earned 'Profit before Taxes' in three (03) years out of the preceding five (05) financial years. However, if losses are reported in two (02)



years, it should not be in two consecutive years prior to the date of submission of the Applications.

### 3.3.2.3 Net Worth

The Net Worth of the Applicant should be positive and not less than the amount of its Equity Share Capital including Share premium in atleast four (04) of immediately preceding five (05) financial years. The minimum networth requirement is considered as **US\$ 18 million** as on end date of last Financial Year preceeding the application submission date for which audited financial statements are available

The Net Worth shall be calculated based on subscribed and paid up Share Capital plus Share Premium plus Free Reserves plus Unallocated Balance/ Surplus amount of Profit and Loss account, less (a) Expenses not written off, (b) Accumulated losses in Profit and Loss Account, if not reduced from reserves and surplus. The Revaluation Reserves, Capital Reserves and amount of intangible assets like goodwill etc. will not be taken into account while calculating the Net Worth..

### 3.3.2.4 Working Capital

The minimum working capital (current assets minus current liabilities) is considered as **US \$ 9 Million**.

For this purpose current assets and current liabilities will be considered as classified in the audited balance sheet for the year immediately preceding the date of opening of Application(s). In case current assets and/or current liabilities are not classified separately in audited Balance Sheet, a certificate from Statutory Auditor/Certified Public Accountant carrying out the Statutory Audit, for current assets and/or current liabilities, as the case may be, clearly defining the items considered for the same, should be enclosed. However, trade payables shall be a part of current liabilities. If the Working Capital calculated from the audited Balance Sheets is negative then such working capital shall be treated as zero. In case there is a shortfall in the Working Capital as per this, the unutilized Cash Credit Limits sanctioned to the Applicant by the Banks / Financial Institutions of international repute shall be considered to meet the shortfall. The statement displaying cash credit limits should not be more than three months old as on the last date for submission of application.



The working capital requirements should be satisfied by individual partner's of Joint Venture in proportion to their participation share in Joint Venture.

In case of Applicant associating sub-contractor(s), the Applicant shall meet the working capital requirement.

### 3.3.2.5 Bid Capacity

The available Bid Capacity of the Applicant at the time of submission of PQ, calculated as under should not be less than the estimated cost of the work:

$$\text{Available Bid Capacity} = 2.0 \times A \times N - B,$$

Where; A = Maximum value of works executed in any one year during last five (05) years

N = Number of years prescribed for completion of the Subject contract Package i.e. 60/12 = 5 Years.

B = Value of existing commitments (as on submission date) and ongoing works to be completed in the next 'N' years. The Applicant shall submit documentary evidence together with a certificate from its statutory auditors in support of establishing 'A' and 'B' above, along with their Application. The provision as above for bid capacity shall be the qualification criteria. However, details as mentioned above shall be required to be re-submitted by the bidder and shall be reassessed at the time of evaluation of Technical/Price Bid invited from prequalified bidders and if Bid Capacity is found falling short of requirement as per above norms, the Award of work shall not be placed on such Company/JV.

#### **Notes:**

1. For conversion to US\$, the exchange rate at the end of the respective accounting year shall be considered.
2. Other income shall not be considered for arriving at Annual Construction Turnover.
3. The Applicant's financial evaluation viz a viz the requirement as stipulated above shall be done on the basis of duly printed (offset) Annual Report for the immediately preceding five (05) years submitted by the Applicant along with the application.



Further, standalone audited Annual Financial Statement of Applicant shall be forming part of the Annual Report.

In case, Applicant has not submitted the above mentioned Annual Report along with Application, then a certificate from CEO / CFO /Head of Finance of the Applicant shall be submitted mentioning that the requirement of Annual Report as per governing law of country is not mandatory. In such cases duly notarized copies of Audited Printed Annual Financial Statement (Balance Sheet, Profit & Loss Statement, Cash Flow Statement, Auditor's Report thereon including all relevant Schedules / Annexure etc.) for the immediately preceding five (05) years shall be submitted by the Applicant along with the Application.

4. In case where audited financial results for the immediately preceding year are not available/audited, then applicant shall furnish unaudited accounts & declaration to this effect duly certified by Statutory Auditor/Certified Public Accountant (CPA).
5. The Applicant shall further provide Statutory Auditor's/Certified Public Accountant's certificate specifying the Construction Turnover, Profitability, Working Capital and Net Worth of the Applicant (calculated as per above laid down criteria) as on the closing date of the immediately preceding five (05) Financial Years.
6. Wherever, the Annual Report / duly notarized copies of Audited Printed Annual Financial Statement are in language other than English then copy duly translated & printed in English language and certified by approved / recognized English Translator (copy of approval/recognition of Translator to be attached) and Self-Certified by the Applicant shall be submitted along with Application.
7. In addition to above, wherever audited printed Annual Financial Statement contain turnover pertaining to other activities besides construction turnover of Applicant and breakup of construction turnover is not directly available from such financial statements, then statement of account depicting the construction turnover for that year duly certified by their Statutory Auditor/Certified Public Accountant carrying out the statutory audit shall also be enclosed with the Application.
8. For the Purpose of compliance to the stipulated turnover criteria given at Financial Criteria, the construction turnover from Joint Ventures(s)/ proposed JV partner (s) as declared by all partners shall also be considered. The proportionate JV Turnover



shall be certified by their statutory Auditor if that is not appearing in the Audited Financial Statement.

#### **4.0 NATURE OF APPLICANTS:**

##### **4.1 Joint Venture Applicants**

In case of an Application from a Joint Venture, it shall comply with the following minimum qualifying requirements:

- (i) All the partners in a Joint Venture shall appoint one Lead Partner and all the partners should be incorporated legal entities, as an agency, company or society.
- (ii) The number of partners in the Joint Venture including the Lead Partner shall not exceed three (03).
- (iii) The Lead Partner of the Applicant (Joint Venture) shall fully meet the following:
  - General Experience criteria specified at para 3.3.1.2 above, and
  - Average annual construction turnover more than 50% of criteria specified in para 3.3.2.1 above, and
  - Specific Experience requirement as specified in para 3.3.1.2 b) 2
- (iv) The other partner(s) shall individually meet the following requirements:
  - One or more of the Technical Criteria given under para 3.3.1 (viz. Planning, Design & Engineering, Civil works and HM works) other than that to be met by the Lead Partner as specified under 4.1 (ii) above, and
  - Average Annual Construction/Consultancy Turnover as the case may be, shall not be less than 20% of criteria, specified under Financial Criteria.



- (v) The Specific Experience for each component to be met individually by the Lead Partner or other partner, as the case may be, and not collectively.
- (vi) All the partners of the Joint Venture should individually fulfill the Net Worth and Profitability criteria.
- (vii) The Joint Venture proposed should collectively satisfy, as a whole, the requirements specified above.
- (viii) The 'Bid Capacity' and "working capital" requirements should be satisfied by individual partners of Joint Venture in proportion to their participation share in Joint Venture.
- (ix) Lead partners of the Joint Venture/Consortium should have at least 50% participation share

#### **4.2 Applicant's Capability associating Sub-Contractor**

In case the Applicant does not have all requisite specific experience and also does not wish to enter into a Joint Venture or wants to restrict the joint venture partnership, he can associate sub-contractor(s) for specified activities in which he does not have the relevant experience

Specific Experience of a Sub-Contractor, if proposed to be associated by the Applicant, shall be evaluated subject to the fulfillment of the following requirements and also the Applicant submitting additional information for the proposed Sub-Contractor(s) in Form 7.

##### **4.2.1 The Applicant himself to fully meet at least the following:**

- General Experience criteria specified under para 3.3.1.2 above, and
- Financial Criteria as specified under para 3.3.2 above, and
- Specific Experience criteria specified in para 3.3.1.2 b) 2; and
- The number of Sub-Contractor(s) not to exceed 3 (three)



4.2.2 The proposed Sub-Contractor(s) shall individually meet the following:

- Sub-Contractor(s) shall meet Technical Criteria mentioned under para 3.3.1 relevant to its proposed scope of work, other than that to be met by the Applicant as per clause 4.2.1. above.

4.2.3 The Applicant and his proposed Sub-Contractor(s) should collectively satisfy, as a whole, the Technical Criteria specified under para 3.3.1.

4.2.4 The Sub-Contractor so proposed shall be financially sound. Annual Reports along with audited Balance sheets for immediately preceding five (05) financial years shall be submitted. In case where audited financial results for the immediately preceding year are not available/audited, then applicant shall furnish unaudited accounts & declaration to this effect duly certified by Statutory Auditor/Certified Public Accountant.

4.2.5 The Applicant shall further provide Statutory Auditor's/Certified Public Accountant's certificate specifying the Construction Turnover (Construction Consultancy turnover in case of Planning, Design and Engineering Consultant), Profitability, Working Capital and Net Worth of the Applicant (calculated as per above laid down criteria) as on the closing date of the immediately preceding five (05) Financial Years.

4.2.6 The Applicant and his sub-contractor(s) should submit separate undertakings that the Applicant/sub-contractors shall be responsible for execution of that item of work for which they claim to have specific construction experience.

## **5.0 APPLICATIONS BY MERGED/AQUIRED/SUBSIDIARY COMPANIES**

In case of an Applicant Company, formed after merger and / or acquisition of other companies, past experience and other antecedents of the merged / acquired companies will be considered for qualification of such Applicant Company provided such Applicant Company continues to own the requisite assets and resources of the merged / acquired companies needed for execution and successful implementation of the work package put to tender. Similarly, if the Applicant Company is a Subsidiary Company and applies for pre-qualification on the unconditional technical and financial strength of the Parent / Holding Company, the same shall be considered provided the Parent / Holding Company commits to sign a Separate Agreement with



EHEPCL (as per Application Form-8A) confirming full support for the technical and financial requirements of the Subsidiary Company and commits to take up the work itself in case of non-performance by the Subsidiary Company in the event of award of the work to the Applicant Subsidiary Company. An undertaking by the Parent / Holding Company to this effect shall be submitted along with the Pre-qualification Application (as per Application Form 8). A subsidiary company intending to pre-qualify on the strength of Parent / Holding Company shall not be allowed to participate as a 'Sub-Contractor' except for Design & Engineering and E&M works contractors.

For the purpose stated herein above in this clause, 'Parent Company' shall mean the 'Holding Company' owning majority (more than 50%) shares of such Applicant (Subsidiary) Company. Similarly by extensions of this interpretation, if "A" is owned by a 'Holding Company' "B" which in turn is owned by another 'Holding Company' "C", then "C" is construed as the 'Parent Company' of "A" as well as and so on. An apex 'Parent Company' may own number of independent Subsidiary / Group Companies and if any of these Subsidiary / Group Company commits assured support and unhindered access to its assets and resources to another Subsidiary / Group Company (Applicant in this case) under the same apex 'Parent Company' then experience and other credentials of such Subsidiary / Group Company shall be considered for Pre-qualification of the Applicant Subsidiary Company provided such commitment is evident / authorized and guaranteed by the apex 'Parent Company'.

In case Applicant Company (Subsidiary Company) gets qualified and awarded the work package, the Parent / Holding Company will be required to furnish an additional performance bank guarantee of value equivalent to (5%) five percent of the Contract Price or portion of work (where the Subsidiary Company is Joint Venture Partner) as the case may be, in addition to normal Performance Bank Guarantee to be submitted by the Applicant Company to the Employer besides entering into a separate Agreement as mentioned in Form 8A of the document. The experience of subsidiary companies of the Parent / Holding Company will be considered experience of the Parent / Holding Company.

However, in case the proposed partner/sub-contractor for Planning, Design & Engineering works and Electromechanical works of dam toe power house does not meet financial requirements by himself then for fulfillment of financial criteria,





financial evaluation vis-à-vis the requirement as stipulated above shall be done on the basis of consolidated printed Annual Report for the immediately preceding five (05) years of the Parent Company/Apex Parent Company submitted by the Applicant along with the Application.

## 6.0 LOCAL REPRESENTATION

a) Foreign Applicants, if they have in India a local representation/Indian Agent, shall indicate the name of such person or firm and also shall furnish the following information:

- i) The precise relationship between the Applicant and his Indian Agent.
- ii) The mutual interests which the Applicant and the Indian Agent have in business of each other.
- iii) Any payment which the Indian Agent receives in India or abroad from the Applicant whether as a commission for the Contract or as a general retainership fee.
- iv) Indian Agent's Income Tax Permanent Account Number.
- v) Applicant's Income Tax Permanent Account Number.
- vi) All services to be rendered by the Indian Agent whether of general nature or in relation to the particular Contract.
- vii) Details of their Registered Office in India

Any other technical data and further information or details, the Applicant wishes to submit in addition to the details asked for above as well as descriptive catalogues and drawings etc. may be enclosed along with above information.

b) If the Applicant gives any wrong or misleading information and/or conceal any material fact/ information which can impact the decision of the Owner, the Owner hereby reserves the right to reject such proposal.



The proposal submitted shall become the property of the Owner with no obligation to return the same to the Applicant.

## **7.0 DISQUALIFICATION / INELIGIBILITY OF APPLICANT**

Even though the applicant(s) meet the pre-qualification criteria, they shall be disqualified if they have:

- a) been involved in the Corrupt or Fraudulent or collusive or coercive Practices; and/or
- b) made misleading or false representation(s) in the forms, statements and attachments submitted in proof of the qualification requirements; and/or
- c) Record of poor performance such as abandoning the works, termination of its awarded work, serious litigation history, or financial failures etc.

The Applicant /any member partner of the JV / Consortium shall not have been declared ineligible for poor performance / failure issued by the Govt. of India / State Govt. / Govt. Deptt. / PSU / World Bank / Asian Development Bank. A declaration to this effect shall be submitted by the applicant

## **8.0 QUALITY ASSURANCE**

The Applicant should have its own Quality Assurance System for carrying out its regular business activities conforming to international standards such as ISO or equivalent. Details of Applicant's Quality Assurance System shall be provided in Form No. 6. In case of Joint Venture and Sub-contractors, the above details of each separate entity need to be provided.

## **9.0 LITIGATION HISTORY**

The Applicant shall provide accurate information in Form-9 about any litigation or arbitration resulting from contracts completed or ongoing under its execution over the last ten (10) years. In case of consistent history of awards against the Applicant or any partner of a Joint Venture may result in rejection of PQ Application.



## 10.0 GENERAL

- 10.1 In case of a Joint Venture Applicant, the composition of the Joint Venture and role and responsibility of each constituent, the proposed participation share of each partner along with items of work to be executed by each partner shall be brought out as per the requirement of Appendix-B, Form 2A hereto. An undertaking shall be submitted by each partner of the Joint Venture in the format attached as Annex-1 to Form 2A. The Joint Venture Agreement, to be submitted along with Techno-commercial bid, shall be on the lines of the format attached as Annex-2 to Form 2A.
- 10.2 In the event of the Contract being awarded to an Applicant in association with Sub-Contractor(s), each Sub-Contractor shall be responsible for execution of that item of work for which it claims to have Specific Experience. An undertaking to this effect shall be furnished by each such Applicant in the format attached as Form 7. In all such cases, separate undertaking from each of the proposed Sub-Contractors, shall accompany the PQ Application.
- 10.3 An Applicant proposing to associate Sub-Contractor(s) shall be required to submit an Undertaking (along with their PQ application) as per the Form-7 with the proposed Sub-Contractor(s) to ensure their association for the successful performance and completion of that work. The Joint deed of Undertaking as per Form-7A shall be submitted along with the PQ Application, duly initialed, by the Applicant and the proposed Sub-Contractor. The deed shall be subsequently signed on non-judicial stamp paper and submitted with the bid. Further, in case of award, these Sub-Contractor(s) will be required to furnish an additional performance bank guarantee of value equivalent to 2.5% of their portion of work value in addition to Contract Performance Bank Guarantee to be submitted by the qualified Applicant. Change of the proposed Sub-Contractor(s) after award of works shall be allowed only in exceptional circumstances, with prior approval of the Owner.
- 10.4 Applicant or any of the partners in case of a Joint Venture or one of his proposed Sub-Contractor claiming to have past experience by virtue of being a partner of a Joint Venture (which executed a particular work in the past), shall make their presentations in Prequalification Forms 2, 3, 3A, 3B, 3C and 5 for such experience. The specific construction experience of such Sole Applicant/JV partner/ Sub-Contractor(s) shall be considered as per their role and scope of work in such



Joint Venture(s) for which they will have to adduce documentary evidence of their role and scope of work in aforesaid Joint Venture Contract(s).

- 10.5 If the performance of the Applicant or any of the partners of Joint Venture/ Sub-Contractors, in a current /past contract for any major work is unsatisfactory, the Applicant is liable to be disqualified.
- 10.6 Subsidiary Companies will not be pre-qualified as sub-contractors on the basis of experience of their Parent Company except for Planning, Design and Engineering Consultancy firms and Electro-mechanical works contractors. In these cases the Parent/Holding Company shall submit a written undertaking as per the attached format given in Form 8; evincing its full support for the technical and financial requirements of the Subsidiary Company and further commit to take up the work itself and shall be fully responsible to complete the same, in case of non-performance/ unsatisfactory work by the subsidiary company in the event of award of the work to the applicant Subsidiary Company. In case of award of work, the Parent/Holding Company of the proposed Subsidiary Company shall enter into an agreement with EHEPCL/Owner as per the format attached as Form 8A before signing of the main Contract.
- 10.7 Owner's Right to Accept or Reject Applications

The Owner without incurring any liability to Applicant(s) for whatsoever and without assigning any reasons thereof reserves the right to:

- (a) amend the Scope of Work, to be tendered
- (b) reject or accept any application including on account of national defence, and security considerations.
- (c) cancel the pre-qualification process and /or reject any/all Applications.

The Owner will not entertain or be liable for any claim for cost and expenses in relation to the preparation of PQ to be submitted. The Owner will neither be liable for any such actions nor be under any obligation to inform the applicant of the ground of his decision.



- 10.8 Only those Applicants who have been Pre-qualified under this procedure will be informed and further invited to submit their Techno-commercial bid.
- 10.9 The Owner, solely at its own discretion, reserves the right to consider the deviations in above Pre-qualifying criteria.
- 10.10 The Owner may impose certain restrictions on the foreign companies, participating in any form, and their employees in view of national Security, in the project situated in the sensitive region and border areas. The Owner shall obtain clearance of Govt. of India regarding security implications prior to pre-qualifications of such company.



# **APPENDIX-A**

## **INFORMATION FOR APPLICANTS**



## 1.0 PREAMBLE

Jindal Power Limited (JPL), the major stake holder of Etalin Hydro Electric Power Company Ltd., is India's leading integrated power utility company in the private sector. At present, JPL has operational power generation capacity of 2437MW in thermal sector, with another 2400MW (4 x 600MW) of thermal power plant capacity under execution. Project portfolio (15,660MW) is in various stages of operation, implementation and planning.

JPL has signed agreements for developing 6100MW Hydro Electric Projects in Arunachal Pradesh, India. The hydro power portfolio of the company includes 3097MW Etalin HEP, 680MW Attunli HEP, 1800MW Kamala HEP and 22MW Anonpani Small HEP

## 2.0 PROJECT OVERVIEW

### 2.1 General

The development rights of Etalin project have been accorded to Etalin Hydro Electric Power Company Ltd. (EHEPCL), a joint venture company of Jindal Power Ltd. (JPL) and Hydro Power Development Corporation of Arunachal Pradesh Ltd. The JV intends to develop the project on Build, Own, Operate and Transfer (BOOT) basis. The project was initially identified by CEA and pre-feasibility studies for the project was carried out by NHPC. Subsequently, the project scheme was developed in detail and financially evaluated in the Detailed Project Report (DPR) which was scrutinized by the Central Electricity Authority (CEA) and other statutory organizations. The Techno Economic Clearance (TEC) for the project was accorded by CEA on July 12, 2013 vide their letter no: 2/ARP/26/CEA/2010-PAC/3885-3917.

The Project is located in Dibang Valley district of Arunachal Pradesh and envisages utilization of waters of Dri and Tangon rivers for hydropower generation. The two rivers are tributaries of Dibang river and meet near Etalin village. Downstream of the confluence, the river is called Dibang which forms a major tributary of the Brahmaputra.



The Etalin project is located upstream of Dibang project and is the largest hydroelectric project presently being developed in the country. The Project is designed as a run-of-the-river scheme having diurnal pondage by constructing diversion dams on Dri and Tangon rivers and diverting the water through two separate waterway systems to utilize the available heads in a common powerhouse located at the confluence.

The proposed installed capacity of the scheme on Dri is estimated at 1842 (307 x 6) MW and that for the scheme on Tangon at 1228 (307 x 4) MW. Riparian flows from both the limbs have also been proposed to be utilized for power generation of 27MW (19.6MW on Dri and 7.4MW on Tangon). Hence, the total installed capacity of the project is 3097MW.

The entire catchments of both Dri and Tangon are within the Indian territory and the main Dibang river flows throughout its length within the state of Arunachal Pradesh. Thus, there are no interstate or international aspects involved with the development of the project.

## 2.2 Details of Proposed Scheme

The Etalin Hydroelectric project consists of two independent headworks and water conductor systems (one each on Dri and Tangon rivers), and a common underground powerhouse complex. The project is planned as a run-of-the-river scheme with sufficient storage for meeting daily peak hour energy generation requirements.

A brief description of project components (as per the approved DPR) is given hereunder. All civil structures upstream of the powerhouse are independent for each limb of the project.

### **Dri Limb**

- Four nos. 10.9m diameter circular diversion tunnels, three on the right bank of 338m, 461m, 594m length and one 692m long for left bank with upstream and downstream coffer dams.





- 101.5m high concrete gravity dam with top at El. 1047.0m and deepest foundation level at El. 945.5m; the existing average riverbed level at the dam axis is El. 968m.
- Intake structure.
- 11.3m diameter circular shaped 10.722km long concrete lined Headrace Tunnel.
- Restricted orifice type vertical Surge Shaft, 26m in diameter & 132m high.
- Three 5.6m diameter pressure shafts which emanate from the surge shaft and bifurcate to form six unit pressure shafts of 4m diameter, each. The shafts are about 512m long, out of which 377m is in vertical drop (in two parts, separated by a horizontal limb at about mid-height).

### **Tangon Limb**

- Three nos., 11.5m diameter circular diversion tunnels with upstream and downstream coffer dams.
- 80.0m high concrete gravity structure with top at El. 1052.0m and deepest foundation level at El. 972m; the existing average riverbed level at the dam axis is El. 1003m.
- Intake structure.
- 9.7m diameter circular shaped 13.045km long concrete lined Headrace Tunnel.
- Restricted orifice type vertical Surge Shaft, 21m in diameter & 137m high.
- Two 5.6m diameter pressure shafts which emanate from the surge shaft and bifurcate to form four unit pressure shafts of 4m diameter, each. The shafts are about 512m long, out of which 377m is in vertical drop.



### **Common Powerhouse**

A common Underground Powerhouse, 352m (L) x 23.5m (W) x 59.73m (H), accommodates six units of 307MW each for Dri limb in one machine hall and four units of 307MW each for Tangon limb in another machine hall, with a control room in the middle.

### **Common Transformer Hall**

A common Underground Transformer Hall, 349.6m (L) x 16.5m (W) x 24.8m (H) accommodates 19 single phase transformers for Dri limb and 13 single phase transformers for Tangon limb.

### **Tailrace Tunnels**

The main TRT for Dri limb is of 11.3m diameter while that of the Tangon limb is of 9.5m diameter. Both tailrace tunnels are circular in shape.

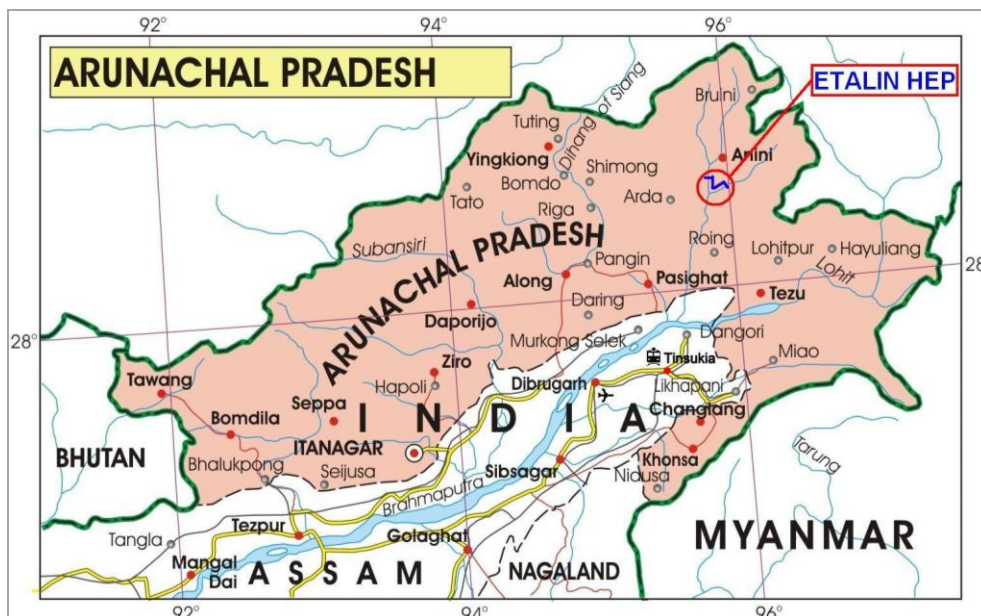
### **Dam-toe Powerhouses**

The dam-toe powerhouses provided to use the riparian discharges are located on the left bank of the rivers, just at the toe of the two dams. They are surface structures and house one vertical axis Francis turbine in each case.

## **2.3 Accessibility**

The project is located in Dibang Valley district of Arunachal Pradesh, a large, sparsely populated state situated in the North-Eastern part of India. Anini, the headquarter of Dibang Valley district is around 240km from Roing, an important town in the area and district headquarter of Lower Dibang Valley district. Roing is at about 110km from Tinsukia, the nearest railhead to the project. The nearest airport is at Dibrugarh, about 60km from Tinsukia.

Figure-1 shows the location of the Project on the map of Arunachal Pradesh.



**Figure-1: Project Location**

Etalin village can be reached by a single lane road which connects Roing to Anini via Hunli. The road crosses a high altitude Mayodia pass (El. 2665m) between Roing and Hunli and is frequently blocked by ice and snow during peak winter months.

Roing is connected to Tinsukia via NH-37 and a district road. The road crosses river Lohit at Dhola Ghat, about 50km from Roing. Distance from Dhola Ghat to Tinsukia is 60km. Various alternatives are available to reach project site. The contractor may choose/decide the best alternative to transport the construction material/equipment. Project's equipment and material can also be transported to Tinsukia by rail or to Dhola Ghat by waterway. A bridge is also under construction at Lohit river connecting Dhola and Sadiya Ghats. Personnel can travel to Dibrugarh by air and reach the project site by road via Tinsukia. A helipad is available at Anini.

Access route to project is shown in Figure-2.

**Figure-2: Project Access**



The other alternative motorable route is available from Tinsukia-Rupai-Namsai-Wakro- Tezu-Shantipur-Chapakhowa-Roing (300 km).

The diversion structure on Dri limb is located near Eron village, around 22km from Etalin, along Etalin-Anini road. The diversion structure on Tangon limb is located near Avonli village, which 17km from Etalin along Etalin-Maliney road.

## **2.4 Infrastructure, Project Roads & Bridges**

Elaborate infrastructure works are required for constructing Etalin project.

A single lane road leads to the powerhouse site and Dri and Tangon limbs of project. The road is maintained by BRO. To execute the various civil works, roads would be required for linking various work sites to other sites and to job facility areas. The project roads will be at a workable gradient (a grade of 1:15). These roads would be connected to the existing roads in the area or to other project roads. The proposed road network is envisaged to be about 50km long.

Eight numbers of permanent and temporary bridges would be constructed to cross the waterways falling in the alignments of the roads.

## **2.5 Construction Power**

There is no grid power available in the region. Therefore the contractor has to make its own arrangements of power supply.

## **2.6 Climatic Condition**

The Project area falls in Climatic Zone III and experiences significant rains during monsoons. Rainfall generally occurs from May to October while the months of November to February are generally dry. Significant rains are also seen during March and April in some years. Yearly rainfall averages between 2000 and 4000mm and relative humidity is quite high; average of 90% in a year. Temperature varies widely during the year and decreases rapidly with altitude; in the higher reaches the temperature may fall to as low as 2°C in winter months. Summer temperature in the foothills rises up to 45°C.



## 2.7 Hydrology

The catchment area of Etalin project up to the proposed dam site on Dri limb is 3685km<sup>2</sup> and the catchment area up to the dam site on Tangon limb is 2573km<sup>2</sup>.

EHEPCL has installed three gauge and discharge measurement sites as well as an all-weather station in the project area, but this data is understandably only for a short period. Long term stage and discharge data is available at

- Elopa, CA of about 11666km<sup>2</sup>; data for 8 years (1998-2005), and
- Munli, CA of about 11276km<sup>2</sup>, for about 8 years (2002-2008/09)

Both these stations are on Dibang river, downstream of the project. Reliable long term rainfall data is available at Roing and Jiagaon, also downstream of the project area. The available data has been checked for consistency and useful data has been identified. Using the above data and various correlations, reconstruction of long term flow series has been carried out at Elopa.

The observed data at Elopa has also been used and a complete series from the period from 1986 to 2008/09 has been developed at Elopa. The Elopa series has been appropriately transposed to the dam sites of Dri and Tangon limbs of the project.

Hydrological studies of the project have been concurred by Central Water Commission as part of approval of the DPR.

## 2.8 Physiography

Physiographically the state Arunachal Pradesh could be divided into four distinct domains namely:

- Himalayan ranges
- Mishmi Hills
- Naga Patkai ranges
- Brahmaputra plains



The Himalayan ranges in Arunachal Pradesh are the eastern most part of the Great Himalayan ranges and occurs as a gigantic crescent with its convex side towards south and extends from Eastern border of Bhutan to Dibang and Lohit valleys in the east, abutting against Mishmi hills. They are divided into following four parallel linear zones:

- (a) Tethys or Tibetan Himalaya to the North.
- (b) Higher Himalaya
- (c) Lesser or lower Himalaya
- (d) Sub Himalaya to the South.

Lesser Himalayan hill ranges lying between the Higher Himalayas in north and Sub Himalayan in south are of lesser height with elevation ranging from 2500 to 4000m. The width is about 80-90km. The southern limit with Sub Himalaya is defined by Main boundary fault.

## 2.9 Geology

Regionally, the area of the proposed project is located on the eastern limb of the Eastern Syntaxial Bend (ESB) in eastern part of Arunachal Pradesh that exposes rocks ranging in age from Proterozoic to Tertiary and recent deposits.

The project area located in the Dri and Tangon valleys exposes the Mishmi Group of rocks, comprising dominantly diorite – granodiorite – granite (Mishmi Diorite - Granodiorite – Granite complex) with occasional bands of mafic rocks and schists, and biotite gneisses, metamorphosed to medium to high grade.

### **Dri Limb**

The selected dam site is suitably characterized by a straight course of river with a gentle and narrow valley for more than 200m length. Rock exposures comprising of granodioritic gneiss with minor shear/ fracture zones at places have been observed on both the abutments up to dam top level. Beyond that level minor patches of thin overburden are occasionally seen on the left abutment. The thickness of overburden



in the riverbed at the site varies between 10.5m and 19.5m. The deepest bedrock level is at El. 945.5m in the riverbed along the proposed dam axis. There are no significant shear zones, traversing the rock mass either in the riverbed or in the abutments.

The headrace tunnel (HRT) is expected to encounter granodiorite gneiss and biotite as tunneling media. A considerable length is also expected to encounter calcareous quartzite/marble bands, with thickness of individual bands being up to 230m.

### **Tangon Limb**

At the selected dam site, bedrock is exposed on steep left abutment right from riverbed level and extends up to road level located about 200m above riverbed and beyond that. The right abutment is disposed at moderately steep angle and is covered by overburden comprising fluvial deposits up to El. 1060m and slope wash deposits above that.

Bedrock exposed at the site generally includes granodioritic/diorite gneiss belonging to Lohit Granodioritic Complex, biotite gneiss and quartzite which grades into calcareous quartzite and impure marbles belonging to Ithun Formation that represents meta sedimentary. The deepest foundation rock level is encountered at EL 972.0m in the riverbed.

The HRT is expected to encounter bedrock comprising granodiorite gneiss and biotite gneiss with occasional silica and pegmatite veins.

The proposed powerhouse complex is located within the hill between Tangon and Dri rivers near their confluence. The rock mainly comprises of granodiorite, diorite, calcareous quartzite, biotite gneiss with pegmatite veins; minor shear seams are present occasionally. Bedrock is traversed by four prominent sets of discontinuities.

## **2.10 Seismicity of the Project Area**

The project area lies in the Seismic Zone V as per Seismic Zoning Map of India as incorporated in Indian Standards. The zone is broadly associated with a seismic intensity of IX on Modified Mercalli Scale (MM scale).



State Remote Sensing Application Centre – Itanagar, on the basis of satellite imagery interpretation have traced out a number of lineaments within the vicinity of project area

Site specific seismic studies for the project have been carried out by IIT, Roorkee. The maximum credible earthquake (MCE) that can occur in the area has been estimated to be of magnitude 8.5 occurring along the Lohit thrust.

## 2.11 Environmental Aspects

A detailed Environment Impact Assessment (EIA) study as per Terms of Reference approved by Ministry of Environment and Forest (MoEF), Government of India has been conducted for studying different effects of the construction of dam on physical, biological and social environments and based on the recommendations, various Environmental Management Plans (EMPs) have been formulated.

The submergence areas at FRL is 83.66 Ha along Dri and 36.50 Ha along Tangon river.

Dibang Valley district where the project is located is entirely hilly and covered mostly by forests which are almost 52% of the total geographical area of the valley. The Tangon valley is characterised by dense Tropical Evergreen, Tropical Semi-evergreen and Sub-tropical forests at lower elevations and Pine, Temperate Broadleaved, Temperate Conifer and Alpine Forests at higher elevations.

The project area harbours large number of plant species which include Angiosperms, Gymnosperms, Pteridophytes, Lichens and Bryophytes. Most of the project area is covered with dense forests, which serve as an excellent habitat for various faunal members. The water quality of Dri and Tangon rivers is found to be excellent.

Among the fish, Snow Trout (*Schizothorax richardsonii* Family: Cyprinidae) and *Glyptothorax pectinopterus* (Family: Sisoridae) commonly known as River cat are frequently found in the tributaries of Tangon and Dri rivers. *Barilius tileo*, *Megarasbora elanga* and *Lepidocephalichthys annandalei* have also been reported from the Dibang river. The project study area comes under 4 circles, i.e. Etalin, Anini, Karonli and Anelin, with 40 census villages with a total population of 2213 belonging





to 442 households. The study area is dominated by the Idu Mishmi tribe. Farming is the main occupation in the area and a few habitants are in Government and private jobs. Jhum cultivation is the main occupation of the farmers in area and it has been practiced since long. Majority of people in study area are dependent on this field of agriculture for their livelihood.

Total land requirement of the project is 1143.09 Ha (apart from 35.50 Ha notional area for underground covering HRT, Desilter and adit works. Total human population likely to be affected by the acquisition of land is 1146.



## SALIENT FEATURES (As per approved DPR)

District and State Dibrang Valley District, Arunachal Pradesh

### A. Dam Complex & Water Conductor – Dri Limb

#### Location

- Coordinates
  - Dam Site 28° 42' 24"N, 95° 51' 52"E
  - Powerhouse 28° 36' 40"N, 95° 51' 51"E

#### Hydrology

- Catchment Area 3685 sq km
- Design Flood (PMF) 11,811m<sup>3</sup>/s
- Glacial Lake Outburst Flood (GLOF) 1,170m<sup>3</sup>/s
- River Diversion Flood 4,805m<sup>3</sup>/s
- Ecological release 30.64m<sup>3</sup>/s

#### Reservoir

- Full Reservoir Level (FRL) EI 1045m
- Minimum Draw Down Level (MDDL) EI 1039m
- Gross Storage at FRL 21.97 MCM
- Gross Storage at MDDL 17.37 MCM
- Live Storage 4.6 MCM
- Submergence Area 83.32 Ha

**Diversion Tunnels**

- Number 3 on Right bank & 1 on Left bank
- Diameter 10.9m Circular shape
- Inlet Invert / Outlet Invert EI 975.0 m / EI 964.0m
- Length 338m, 461m, 594m & 692m
- Slopes 1 in 30.73, 1 in 41.91, 1 in 53.96 and 1 in 62.92,
- Number and size of Gates in each tunnel 2 Nos, 4.45m (W) x 10.9m (H)
- Hoist Arrangement and Capacity 110MT, Electrically operated Rope Drum Hoist

**Coffer Dam (Upstream)**

- Type Concrete face with plum core
- Top level 993m
- Average river bed elevation 973m
- Top width 6.5m
- Length at top 140m

**Coffer Dam (Downstream)**

- Type Random fill with downstream sealing layers
- Top level EI 975m
- Average river bed elevation EI 966m
- Top width 5.0m
- Length at top 70m
- Upstream / downstream slope 1 in 1.5

**Gravity Dam**

- Average river bed level around 968m
- Top of Dam El 1047m
- Length at top 213.7m
- Foundation level (Deepest) El 945.5m
- Height above deepest foundation 101.5m
- Number of Blocks 14

**Lower Spillway**

- Number 7
- Crest elevation El 990m
- Gate Type and Size Radial gates; 6.1m (W) x 12.6m (H)
- Hoist Type and Capacity Twin Hydraulic cylinders, 2x175 MT
- Stop Log Gates 1 No., 7 units, 6.1m (W) x 2.585m (H)
- Hoist Type and Capacity Gantry Crane, 35 MT

**Energy Dissipation Arrangement**

- Type Trajectory Bucket
- Bucket radius 49.0 m
- Lip angle 30°
- Bucket Invert level El. 973.0m

**Auxiliary Spillways**

- Number 2
- Crest elevation EI 1041m
- Size (including free board of 200mm) 5.0 x 4.2m
- No. of Gates 3 (2 Service & 1 Emergency)
- Hoist Type and Capacity Gantry Crane operating Stoplog units

**Intake**

- Number 2
- Invert elevation EI 1021m
- Gate opening size 7.0 x 7.5
- Total width of trash rack arrangement 49m
- Length of trash rack arrangement 16.24m
- Length of inlet tunnel (including transition) 41.1m
- Number of Gates 2 – Service Gate  
2 – Emergency Gate (Bulk Head)
- Hoist Arrangement and Capacity Rope Drum Hoist, 45 MT for bulk head Rope Drum Hoist, 80 MT for Intake Gate

**Headrace Tunnel**

- Number 1
- Diameter & Shape 11.3m Circular shape
- Length 10722m
- Slope 1 in 227.16
- Design discharge 480.3 m<sup>3</sup>/s



- Velocity 4.79m/s
- Number of intermediate adits 4
- Length of intermediate Adits 301, 740, 355 and 267 m

**Surge Shaft**

- Number and type 1, Restricted orifice type
- Diameter 26.0m
- Orifice Dia 5.5m
- Height 132m
- HRT invert at Surge shaft EI 970.0m
- Top of Surge shaft 1102m
- Maximum surge level EI 1100.5m
- Minimum surge level EI 990.9m
- Length of Surge shaft bottom tunnel 51 m  
(including transitions)

**Pressure Shaft**

- Number 3
- Diameter 5.6m
- Length 49.2, 26.6, 49.2m
- Design discharge 160.1 m<sup>3</sup>/s each
- Steel Liner 28mm, ASTM 537 Class II

**Unit Pressure Shaft**

- Number 6
- Diameter 4.0m
- Length 512m each



- 
- Height of vertical drop 195 and 182m
  - Design discharge 80.05 m<sup>3</sup>/s
  - Steel Liner 22 to 40mm, ASTM 537 Class II  
40 to 44mm, ASTM 517 Grade F
  - Intermediate Adit level & length EI 775.0m; 313m

**Butterfly Valve (BFV) Chamber**

- Dimension 131m (L) x 10m (W) x 20m (H)
- Number of BF Valves 6 Nos
- BFV diameter 4.0m
- BFV Centerline elevation EI 972.0m
- Floor Invert elevation EI 968.0m

**Draft Tube**

- Invert level EI 578.47m
- Size (Start / End) 1 No. – 11.53m (W) x 3.04m (H) /  
2 No. - 6.5m (W) x 5.5m (H)
- Length 22.82m
- Slope 1 in 10

**Draft Tube Tunnel**

- Numbers 6
- Size and type D-Shape, 6.6m
- Length (including transition) 99m
- Slope 1 in 12

**Downstream Surge Chamber**

- Dimension 165 (L) x 13 (W) x 46 (H)
- Invert level EI 589.0m
- Gate operation level EI 621.0m
- Maximum Surge level EL 619.7m
- Minimum Surge level EL 597.4m
- Draft Tube Gate – Number and Size 6, 6.2 x 6.2m
- Hoist Arrangement and Capacity Rope Drum Hoist, 40 MT

**Tailrace Tunnel****Link TRT(s)**

- Number 3 / 1
- Diameter 6.6m / 9.5m Modified Horse shoe
- Length 85m, 60m, 86m / 52m
- Invert at downstream surge chamber EI 589.0m

**Main TRT**

- Number 1
- Diameter 11.3m circular shape
- Length (including transition) 555m
- Invert level (Start / End) EI 589.83 m / EI 595.18 m
- Slope 1 in 102

**TRT Downstream Transition**

- Size - Start / End 11.3m D-shape /  
11.3(w) x 8.0 (h) D-shape





- Length 50m
- Bottom slope 1 in 8

### TRT Outfall

- Invert level EI 601.4m
- Transition - size 1 No - 11.3(w) x 8.0 (h) D-shape to  
3 No – 6.0(w) x 8.0 (h) Rectangle
- Transition - length 9m
- Minimum TWL EI 603.0m
- Normal TWL EI 605.6m
- Maximum TWL EI 613.3m
- TRT Outfall Gates 3 Nos, 6.0m (W) x 8.0m (H)
- Gate Operating platform EI 615.0 m
- Hoist Arrangement and Capacity Rope Drum Hoist, 45 MT

## B. Dam Complex & Water Conductor – Tangon Limb

### Location

- Coordinates
  - Dam Site 28°39'18"N, 96°00'07"E
  - Powerhouse 28°36'40N, 95°51'51" E

### Hydrology

- Catchment Area 2573 sq km
- Design Flood (PMF) 10,218 m<sup>3</sup>/s
- River Diversion Flood 3,670 m<sup>3</sup>/s
- Glacial Lake Induced Flood (GLOF) 2143 m<sup>3</sup>/s
- Ecological release 19.52 m<sup>3</sup>/s

**Reservoir**

- Full Reservoir Level (FRL) EI 1050m
- Minimum Draw Down Level (MDDL) EI 1040m
- Gross Storage at FRL 6.15 MCM
- Gross Storage at MDDL 3.21 MCM
- Live Storage 2.94 MCM
- Submergence Area 36.12 Ha

**Diversion Tunnel**

- Number 3 (on Left bank)
- Diameter 11.5m Circular shape
- Inlet Invert / Outlet Invert EI 1010.0 m / EI 1002.0m
- Length 368m, 490m and 631m
- Slopes 1 in 46.05, 1 in 61.27, 1 in 78.87
- Number and size of Gates in each tunnel 2 nos, 5.0m (W) x 11.5m (H)
- Hoist Arrangement and Capacity 90 MT, Electrically operated Rope Drum Hoist

**Coffer Dam (Upstream)**

- Type Concrete face with plum core
- Top level EI 1028.5m
- Average river bed elevation EI 1006m
- Top width 6.5m
- Length at top 93m
- Upstream / downstream slope Vertical; 1 in 0.9 Stepped

**Coffer Dam (Downstream)**

- Type Random fill with downstream sealing layers
- Top level EI 1010m
- Average river bed elevation EI 1001m
- Top width 5.0m
- Length at top 75m
- Upstream / downstream slope 1 in 1.5

**Gravity Dam**

- Average river bed level EI 1003m
- Top of dam EI 1052m
- Length at top 184.1m
- Foundation level (Deepest) EI 972m
- Height above deepest foundation 80m
- Number of blocks 12

**Lower Spillway**

- Number 6
- Crest elevation EI 1018m
- Gate Type and Size Radial gates; 7.9m (W) x 13.37m (H)
- Hoist Type and Capacity Twin Hydraulic cylinders, 2 x 150 MT
- Stop Log Gates 1 No., 8 units, 7.9m (W) x 2.44m (H)
- Hoist Type and Capacity Gantry Crane, 35 MT

**Auxiliary Spillway**

- Number 1
- Crest elevation El 1046m
- Size (including free board of 200mm) 5.0 x 4.2m
- Hoist Type and Capacity Gantry Crane operating Stoplog units

**Energy Dissipation Arrangement**

- Type Trajectory Bucket
- Bucket radius 30.0 m
- Lip angle 30°
- Bucket Invert level EL 1001.5 m

**Intake**

- Number 3
- Invert elevation El 1027.5m
- Gate opening size 6.0 (w) x 5.75 (H)
- Total width of trash rack arrangement 74.0m
- Diameter of Inlet tunnel 6.0m Modified horse shoe
- Length of inlet tunnel 925m, 851m & 777m
- Number of Gates 3 – Service Gate  
3 – Emergency Gate
- Hoist Arrangement and Capacity Rope Drum Hoist, 30 MT for Emergency Gate; Rope Drum Hoist 55 MT for Intake Gate

**Desilting Basin**

- Number and Type 3, Underground Duffore type
- Size 18.5m (W) x 26.5m (H)



- 
- |   |   |
|---|---|
| • Length  | 350m  |
| • Particle size removal                             | 0.2mm   |
| • Design discharge per basin                        | 128.08 m <sup>3</sup> /s                            |
| • Outlet gate, Number and size                      | 3 Nos, 4.5m (W) x 5.5m (H)                          |
| • Hoist arrangement and capacity                    | Rope Drum Hoist, 45 MT                              |
| • Design discharge per flushing duct                | 21.34 m <sup>3</sup> /s                             |
| • Flushing duct size (upto SFT Gate chamber)        | 3 Nos - 2.0m (W) x 2.7m (H)                         |
| • Flushing duct size (SFT Gate chamber to Main SFT) | 3 Nos - 2.0m (W) x 3.55m (H)                        |
| • Silt Flushing Tunnel (SFT) size                   | 5.0m (W) x 5.7m (H)                                 |
| • Length of flushing tunnel                         | 515m  |
| • Outlet level of flushing tunnel                   | El 999.55m  |
| • Flushing Duct Gate, Number & Size                 | 6 Nos, 2.0m (W) X 2.7m (H) (2 Gates in Each Tunnel) |
| • Gate Hoist arrangement and capacity               | Hydraulic Hoist, 190 MT                             |

**Headrace Tunnel**

- |                                |                           |
|--------------------------------|---------------------------|
| • Number                       | 1                         |
| • Diameter & Shape             | 9.7m Circular shape       |
| • Length                       | 13045m                    |
| • Slope                        | 1 in 235.13               |
| • Design discharge             | 320.2 m <sup>3</sup> /s   |
| • Velocity                     | 4.34m/s                   |
| • Number of intermediate adits | 5                         |
| • Length of Adits              | 555, 370, 530, 417 & 366m |

**Surge Shaft**

- Number and type 1, Restricted orifice type
- Diameter 21.0m
- Orifice diameter 4.25m
- Height 137m
- HRT invert at Surge shaft EI 970.0m
- Top of Surge shaft EI 1107.0m
- Maximum surge level EI 1104.9m
- Minimum surge level EI 984.0m
- Length of Surge shaft bottom tunnel (including transitions) 46 m

**Pressure Shaft**

- Number 2
- Diameter 5.6m
- Length 46m and 46m
- Design discharge 160.1 m<sup>3</sup>/s each
- Steel Liner 28mm, ASTM 537 Class II

**Unit Pressure Shaft**

- Number 4
- Diameter 4.0m
- Length 512m each
- Height of vertical drop 377m
- Design discharge 80.05 m<sup>3</sup>/s
- Steel Liner 25 to 40mm, ASTM 537 Class II  
40 to 46mm, ASTM 517 Grade F
- Intermediate Adit (Level, Length) EI 775m, 422m

**Butterfly Valve (BFV) Chamber**

- Dimension 85.6 (L) x 10 (W) x 20 (H)
- No. of BF Valves 4 Nos
- BFV diameter 4.0m
- BFV Centerline elevation EI 972.0m
- Floor Invert elevation EI 968.0m

**Downstream Surge Chamber**

- Dimension 110(L) x 13 (W) x 46 (H)
- Invert level EI 589.0m
- Gate operation platform level EI 621.0m
- Maximum Surge level EL 619.6m
- Minimum Surge level EL 597.6m
- Draft Tube Gate – Number and Size 4 Nos, 6.2m x 6.2m
- Hoist Arrangement and Capacity Rope Drum Hoist, 40T

**Tail Race Tunnel (TRT)****Link TRT(s)**

- Number 2
- Diameter 6.7m Modified Horse shoe
- Length 81m and 99m
- Invert at downstream surge chamber EI 589.0m

**Main TRT**

- Number 1
- Diameter 9.5m circular shape
- Length (including transitions) 544m
- Invert level (Start / End) EI 589.83 m / EI 595.18 m



- Slope 1 in 99.45

**TRT Downstream Transition**

- Size - Start / End 9.5 m D-shape /  
9.5(w) x 8.0 (h) D-shape
- Length 50m
- Bottom slope 1 in 8

**TRT Outfall**

- Invert at Outfall gate EI 601.4m
- Transition - size 1 No – 9.5(W) x 8.0 (H) D-shape to  
2 No – 6.0(W) x 8.0 (H) Rectangle
- Transition - length 9m
- Minimum TWL EI 603.0m
- Normal TWL EI 605.6m
- Maximum TWL EI 613.3m
- Gate Operating Platform EI 615.0m
- TRT Outfall Gates 2 Nos, 6.0m (W) x 8.0m (H)
- Hoist Arrangement and Capacity Rope Drum Hoist, 45 MT

**C. Powerhouse Complex****Underground Powerhouse**

- Dimensions 352(L) x 23.5(W) x 59.73 (H)
  - Installed Capacity 3070 MW
- |                                | <b>Dri Limb</b> | <b>Tangon Limb</b> |
|--------------------------------|-----------------|--------------------|
| • Number of Units              | 6 x 307 MW      | 4 x 307 MW         |
| • Turbine centerline elevation | EI 595.0m       | EI 595.0m          |
| • Maximum gross head           | 447.0m          | 442.0m             |
| • Maximum net head             | 446.9m          | 441.9m             |





- 
- |                     |           |           |
|---------------------|-----------|-----------|
| • Minimum net head  | 413.40m   | 415.90m   |
| • Rated Net Head    | 420.00m   | 420.00m   |
| • Service bay level | EI 610.0m | EI 610.0m |

**Main Access Tunnel (MAT)**

- |                              |                              |
|------------------------------|------------------------------|
| • Size and type              | D-Shape, 8.0m (W) x 8.0m (H) |
| • Length (Dri / Tangon Limb) | 474m / 779m                  |

**Transformer Hall**

- |                           |                                   |
|---------------------------|-----------------------------------|
| • Dimension               | 349.6m (L) x 16.5m (w) x 24.8m(H) |
| • Transformer floor level | EI 610.0m                         |
| • GIS floor level         | EI 622.0m                         |

**Draft Tube Tunnel**

- |            |               |
|------------|---------------|
| • Diameter | 6.2m, D-shape |
| • Length   | 98.5m         |

**Turbine**

- |                        |                               |
|------------------------|-------------------------------|
| • Numbers & Type       | 10 Nos, Vertical Axis Francis |
| • Rated Turbine Output | 311.68 MW                     |
| • Rated head           | 420.0m                        |
| • Speed                | 250 rpm                       |
| • Rate discharge       | 80.05 m <sup>3</sup> /s       |

**Generator**

- |                 |                            |
|-----------------|----------------------------|
| • Number & Type | 10 Nos, Semi Umbrella Type |
| • Output        | 341.11 MVA                 |
| • Nominal speed | 250 rpm                    |



- Voltage/Frequency 17.5 kV, 50 Hz
- Power factor 0.9

**Transformer**

- Type ODWF
- Rating 17.5 kV, 400/ $\sqrt{3}$  kV, 125 MVA
- Phase Single

**Switchyard**

- Type Gas Insulated Switchyard (GIS)
- Location Above transformer hall

**Pothead Yard**

- Size 234m (L) x 60m (W) and 120m (L) x 45m (W)
- Bench Elevation EI 725m
- Nominal Voltage Class 400kV

**Power Benefits**

- 50% Dependable Energy 13, 694.3 MU
- 90% Dependable Energy 12, 846.8 MU
- Design Energy (@ 95% Plant availability) 12, 766.8 MU

**D. Dri Dam-toe Powerhouse****Operating Levels**

- Full Reservoir Level EI. 1045m
- Minimum Draw Down Level EI. 1039m

**Intake Structure**

- Number of Intake 1
- Block Number 4
- Nearest Abutment Left
- Invert level of intake El. 1030m
- Size of Trash Rack Opening 17.00m (H) x 6.0m (W)
- Size of Gate 4.675m (H) x 2.8m (W)
- Hoist Capacity Rope Drum Hoist Capacity 18T
- Design Discharge 30.64 m<sup>3</sup>/s

**Penstock**

- Number and Diameter 1 No, 2.8m
- Thickness of Liner 10mm
- Type of Steel ASTM A537 CI-2
- Length of Penstock 108.6m
- Design Discharge through Penstock 30.64 m<sup>3</sup>/s

**Surface Powerhouse**

- Dimensions 20m (L) x 20m (W) x 40.7m (H)
- Installed Capacity 19.6 MW
- Number of Units 1 x 19.6 MW
- Elevation of Turbine Runner Center Line 964.8m
- Design Discharge 30.64 m<sup>3</sup>/s
- Maximum Gross Head 77.8m
- Min. Gross Head 71.0m
- EOT Crane capacity (Powerhouse) 80 MT

**Turbine**

- Number and Turbine Type 1 Nos, Vertical Axis Francis
- Turbine Rated Output 20 MW
- Rated Head 72.5m
- Rated Speed 300 rpm

**Generator**

- Number & Type 1 Nos, Suspended Type
- Rated Capacity 21.8 MVA
- Generation voltage 11 kV
- Power factor 0.9

**Transformer**

- Type ONAN
- Rating 11/66 kV, 24 MVA
- Phase 3 –phase

**Switchyard**

- Max. voltage 72.5 kV
- Rated Voltage Class 66 kV
- Rated Continuous Current 191 A

**Draft Tube Gate**

- Type of Gate Vertical Lift Slide Type
- Gate Size 5.5m (W) x 3.1m (H)
- Hoist Type Rope drum hoist, Capacity 15T

**Tailrace Duct**

- Length 39.7m
- Duct shape Rectangular
- Duct size 5.5m (W) x 3.5m (H)
- Outlet sill elevation El. 965.8m
- Normal Tailwater Level 968.0m
- Maximum Tailwater Level 980.7m
- Minimum Tailwater Level 967.2m

**Power Benefits**

- 90% Dependable Energy 172 MU
- Design Energy (@ 95% Plant availability) 163 MU

**E. Tangon Dam-toe Powerhouse****Operating Levels**

- Full Reservoir Level El. 1050m
- Minimum Draw Down Level El. 1040m

**Intake Structure**

- Number of Intake 1
- Block Number 2
- Nearest Abutment Left
- Invert level of intake, El. 1034m
- Size of Trash Rack Opening 18.00m (H) x 5.38m (W)
- Size of Gate 4.01m (H) x 2.4m (W)
- Design Discharge 19.52 m<sup>3</sup>/s

**Penstock**

- Number and Diameter 1 No, 2.4m
- Thickness of Liner 10mm
- Type of Steel ASTM A537 CI-2
- Length of Penstock 68.50m
- Design Discharge through Penstock 19.52 m<sup>3</sup>/s

**Surface Powerhouse**

- Dimensions 19m (W) x 32m (L) x 36.35m (H)
- Installed Capacity 7.4 MW
- Number of Units 1 x 7.4 MW
- Elevation of Turbine Runner Center Line 998.3m
- Design Discharge 19.52 m<sup>3</sup>/s
- Maximum Gross Head 49.0m
- Min. Gross Head 38.5m
- EOT Crane capacity (Powerhouse) 32 MT

**Turbine**

- Number and Turbine Type 1 Nos, Vertical Axis Francis
- Turbine Rated Output 7.55 MW
- Rated Head 43m
- Rated Speed 375 rpm

**Generator**

- Number & Type 1 Nos, Suspended Type
- Rated Capacity 8.22 MVA



- Voltage/Frequency 11 kV
- Power factor 0.9

**Transformer**

- Type ONAN
- Rating 11/66 kV, 9MVA
- Phase 3 –phase

**Switchyard**

- Max. voltage 72.5 kV
- Rated Voltage Class 66 kV
- Rated Continuous Current 72 A

**Draft Tube Gate**

- Type of Gate Vertical Lift Slide Type
- Gate Size 4.0m (W) x 2.5m (H)
- Hoist Type Rope drum hoist Capacity 10T

**Tailrace Duct**

- Length 27.9m
- Duct Shape and Size Rectangular, 4m (W) x 3m (H)
- Outlet sill elevation El. 999.85m
- Normal Tailwater Level El. 1001.5m
- Maximum Tailwater Level El. 1013.5m
- Minimum Tailwater Level El. 1001.0m



### **Power Benefits**

- 90% Dependable Energy 65 MU
- Design Energy (@ 95% Plant availability) 62 MU



**DRAWINGS**

<b>DRAWING NO.</b>	<b>TITLE</b>
<b>CIVIL DRAWINGS</b>	
<b>LAYOUTS</b>	
Plate-1	PROJECT LOCATION - PLAN
Plate-2	PROJECT LAYOUT - PLAN
Plate-3	DRI LIMB: HEADWORKS LAYOUT - PLAN
Plate-4	TANGON LIMB: HEADWORKS LAYOUT - PLAN
Plate-5	TANGON LIMB: DESILTING BASIN LAYOUT - PLAN
Plate-6	POWER HOUSE : LAYOUT - PLAN
Plate-7	DRI LIMB: WATER CONDUCTOR - LONGITUDINAL SECTION (SHEET 1 OF 2)
Plate-8	DRI LIMB: WATER CONDUCTOR - LONGITUDINAL SECTION (SHEET 2 OF 2)
Plate-9	TANGON LIMB: WATER CONDUCTOR - LONGITUDINAL SECTION (SHEET 1 OF 3)
Plate-10	TANGON LIMB: WATER CONDUCTOR - LONGITUDINAL SECTION (SHEET 2 OF 3)
Plate-11	TANGON LIMB: WATER CONDUCTOR - LONGITUDINAL SECTION (SHEET 3 OF 3)



# **APPENDIX-B**

## **PRE-QUALIFICATION FORMS**



*[Letterhead paper of the Applicant, or lead Partner responsible for a Joint Venture]*

**LETTER OF APPLICATION**

Date: .....

**Etalin Hydro Electric Power Company Ltd. (EHEPCL).**

.....

Sirs,

1 Being duly authorized to represent and act on behalf of <Name of Applicant \*1> ..... (hereinafter "the Applicant"), and having reviewed and fully understood all the prequalification information provided, the undersigned hereby apply to be prequalified by yourself as bidder for the following contract(s) under Etalin H.E. Project (3097 MW).

ETALIN/Package-6: EPC execution of Civil Works of the Powerhouse Complex consisting of 1.65km of HRT, Surge Shaft, Butterfly Valve Chamber, Pressure Shafts along with steel lining, Powerhouse cavern, Transformer hall cavern, Downstream Expansion Chamber, Tailrace Tunnel as well as Hydro-mechanical works related to the Powerhouse of Tangon limb. Excluding construction of Roads & Bridges, Adits, MATs and excavation of Powerhouse cavern and Transformer hall cavern.

2 Attached to this letter are copies of original documents defining:

- A. the Applicant's legal status;
- B. the principal place of business and registered office address; and
- C. the place and date of incorporation.

3 You and your representatives are hereby authorized to conduct any inquiry or investigations to verify the statements, documents, and information submitted in connection with this application, and to seek clarification from our bankers and clients regarding any financial and technical aspects. This Letter of Application will also

---

<sup>\*1</sup> *In case of Joint Venture, list all partners of the Joint Venture.*



serve as authorization to any individual or authorized representative of any institution referred to in the supporting information, to provide such information deemed necessary and requested by yourselves to verify statements and information provided in this application, or with regard to the resources, experience, and competence of the Applicant.

- 4 You and your representatives may contact the person(s) indicated in the Application Form-1 for further information. The undersigned is (are) fully Authorized to act on behalf of the Applicant.
- 5 This application is made in the full understanding that:
- A. Any information submitted with this pre-qualification can be verified by you at any time or any stage of the tendering process;
  - B. You without assigning any reasons thereof reserve the right to:
    - i. amend the scope of works to be tendered; and
    - ii. reject or accept any Application, and
    - iii. cancel the Pre-qualification process, and/or reject any/all Applications.
  - C. You and your personnel and agencies shall not be liable for any such actions at Clause 5A and B above and shall be under no obligation to inform the Applicant of the grounds for them.
  - D. Mere filing of this Application for pre-qualification does not create any legal right in our favour for allocation of final work contract to us. We have gone through all the terms & conditions of the Pre-qualification document and undertake to be abiding by the same. This Application shall be construed and interpreted in accordance with Indian Laws only. The Courts in New Delhi (India) shall have sole and exclusive jurisdiction on all the matters/dispute between the parties. Any dispute arising under this Application shall be referred to arbitration in accordance with Arbitration and Conciliation Act, 1996. Venue of arbitration shall be Delhi. The decision of the arbitrator shall be final and binding upon the Parties. The language of arbitration shall be English.



**APPLICANTS WHO ARE NOT JOINT VENTURES SHOULD DELETE PARAS. 6 AND 7 AND APPLICANTS WHO DO NOT WISH TO ASSOCIATE A SUB-CONTRACTOR SHOULD DELETE PARA 8.**

- 6 Appended to this application, we give details of the participation of each party, including the responsibilities for execution of the contract.
- 7 We confirm that in the event of our bidding for the Project, the Bid as well as any resulting contract will be legally binding on all Partners, jointly and severally.
- 8 We also confirm that we shall be submitting the Joint Deed of Undertaking with our Sub-Contractor(s) at the time of submission of Techno-commercial bid.
- 9 The undersigned declare that the statements made and the information provided in the duly completed application are complete, true, and correct in every detail.

Signature	Signature	Signature
_____	_____	_____

Name _____	Name _____	Name _____
------------	------------	------------

For and on behalf of (Name of Applicant or Lead Partner of a Joint Venture)	For and on behalf of (Name of Partner-1 JV)	For and on behalf of (Name of Partner-2 JV)
---	--	--

**Notes:**

- a. *Certified copy(ies) of the Power of attorney(ies) for signatory(ies) should be attached to this letter.*
- b. *Words indicated in italics in this letter form should be omitted in the Applicant's letter.*

**APPLICATION FORM - 1**

PAGE \_\_\_ OF \_\_\_ PAGES

**GENERAL INFORMATION**

All individual firms (including sub- contractor) and each Partner of a Joint Venture applying for pre-qualification are requested to complete the information in this form.

The Applicant may propose sub-contractor(s) as per the Instructions.

1.	Name of firm	In case of Joint Venture:	<input type="checkbox"/> Lead Partner <input type="checkbox"/> Partner <input type="checkbox"/> Sub-Contractor		
2.	Head office address	Country:			
3.	Telephone Fax Email	Contact Person(s) Name Title/Position			
4.	Place of incorporation/ registration Date				
5.	Legal status of firm	Field of specialty in business			
6.	Nationality of majority of owners or share-holders	Number of management executives  Persons			
	Number of present permanent employees:	(unit: persons)			
7.	Name of Country Home country Overseas branch 1 Overseas branch 2 All other branches	Civil Engineers	Other Engineers	Non- Engineers	



8.	Quality assurance system in head office	Certified by:
9.	Office/Agent or representative in India Name Address Telephone	(if exists)  Fax & Email

Date: \_\_\_\_\_

Authorized Signatory \_\_\_\_\_



**APPLICATION FORM – 2**

PAGE \_\_\_ OF \_\_\_ PAGES

**SOLE APPLICANT /JOINT VENTURE RECORD**

Name of Company (Sole Applicant) or Partner of a Joint Venture

Use a separate sheet for each Partner of a Joint Venture

**Financial Data**

FISCAL YEAR	CONSTRUCTION TURNOVER (Currency)/Eq. US\$	PROFITABILITY (Currency)/Eq. US\$	NETWORTH (Currency)/Eq. US\$	WORKING CAPITAL (Currency)/Eq. US \$
1.				
2.				
3.				
4.				
5.				

Date: \_\_\_\_\_

Authorized Signatory \_\_\_\_\_

Note : For conversion to US\$, the exchange rate at the end of the respective accounting year shall be considered.



**APPLICATION FORM – 2A**

PAGE \_\_\_ OF \_\_\_ PAGES

**JOINT VENTURE SUMMARY**

In case of Joint Venture, this form is requested to be filled and attached to Form 2

**1. Members of Joint Venture**

Names of all Partners of a Joint Venture		Proposed Participation Share (%) *	Proposed Scope of Work
Lead Partner			
Partner-1			
Partner-2			

\* - Indicate participation in terms of responsibility in respect of planning, designing, deployment of key personnel and execution of the works of the lead partner of the Joint Venture and of each of the Joint Venture partners.

**2 Summary of Financial Data**

Total value of annual turnover, in terms of work billed to clients, in US\$ equivalent converted at the rate of exchange at the end of the period reported:

		<b>Annual Turnover/Net Worth/Profitability (US\$ equivalent) and Working Capital – Summary</b>				
Partner	Form 2 Page no.	DD.MM.YY TO DD.MM.YY	DD.MM.YY TO DD.MM.YY	DD.MM.YY TO DD.MM.YY	DD.MM.YY TO DD.MM.YY	DD.MM.YY TO DD.MM.YY
Lead Partner						
Partner-1						
Partner-2						
	Total					

***(Separate tables for summarizing Turnover, Networth, Profitability and Working Capital may be generated)***

Date: \_\_\_\_\_

Signature  
by Lead PartnerSignature  
Partner-2Signature  
Partner-3



**Annex-1 to Form 2A**

**FORM OF UNDERTAKING BY EACH PARTNER OF JOINT VENTURE**

To,

Etalin Hydro Electric Power Company Ltd.,

Sir,

**Sub: Pre-qualification under International Competitive Bidding vide PQ Notice No..... dated.....issued by Etalin Hydro Electric Power Company Ltd. (“EHEPCL”).**

With reference to the above, ....., a Company incorporated under the laws of ....., on date ..... and having its registered office at ..... has submitted its application for qualification for the said Pre-qualification. We have expressed our intention to form an unincorporated Joint Venture/ consortium with ..... as the Lead Partner/Other Partner for execution of EPC Contract (“CONTRACT”) for Civil works ETALIN/Package-6 for Etalin Hydro Electric Project of 3097 MW capacity located in Dibang Valley District in the State of Arunachal Pradesh, India. Our proposed Scope of Work shall be as mentioned herein below:

.....  
.....

If we are pre-qualified along with ..... as the Lead Partner/Other Partner, we hereby undertake to form an unincorporated Joint Venture along with the lead partner and submit our bid for the contract for performing our Scope of Work as defined above. Further if the Contract is awarded to the unincorporated Joint Venture, we undertake to enter in to appropriate Contract along with the lead Partner with EHEPCL and perform the said Contract.

Further, we understand and undertake that our joint venture configuration shall meet the requirements stipulated in the format attached herein.

Thanking You,  
Yours faithfully,  
For .....

Authorized Signatory

Note: To be submitted by each of the Partner on company letter head with a copy of Power of Attorney.



**Annex-2 to Form 2A**

**FORM OF JOINT VENTURE AGREEMENT**

*(This format is for information and to be submitted along with the Bid)*

**(To be executed on Non Judicial stamp paper of appropriate value as applicable in India)**

This Joint Venture Agreement made and entered into on this ..... day of ..... 20... .

**BY AND BETWEEN**

..... **Name of the Lead Partner)** a Company incorporated under the laws of ..... **(Name of the Country)** with its Head/Registered Office at ..... **(Address of the Head/Registered Office)\*** and a place of business in ..... **(Address of place of business)** hereinafter referred to as “The Lead Partner” which expression unless otherwise repugnant hereto includes its successors, administrators, and permitted assigns thereof, represented by Mr. .... **(Name of Authorized signatory(ies)).**

**AND**

..... **Name of the other Partner)** a Company incorporated under the laws of ..... **(Name of the Country)** with its Head/Registered Office at ..... **(Address of the Head/Registered Office)\*** and a place of business in ..... **(Address of place of business)** hereinafter referred to as Partner-1 which expression unless otherwise repugnant hereto includes its successors, administrators, and permitted assigns thereof, represented by Mr. .... **(Name of Authorized signatory (ies)).**

**AND**

..... **Name of the other Partner)** a Company incorporated under the laws of ..... **(Name of the Country)** with its Head/Registered Office at ..... **(Address of the**



Head/Registered Office)\* and a place of business in ..... (Address of place of business) hereinafter referred to as Partner-2 which expression unless otherwise repugnant hereto includes its successors, administrators, and permitted assigns thereof, represented by Mr. .... (Name of Authorized signatory (ies)).

All and/or each of them hereinafter referred to as "the Parties" or "The Lead Partner or Partner-1 or Partner-2" as the case may be.

WITNESSETH:

WHEREAS Etalin Hydro Electric Power Company Ltd. (EHEPCL), a Company incorporated under the Companies Act, 1956 having its Registered Office at ....., India, (hereinfter called the "Owner" which expression shall include its successors, executors and permitted assigns) has solicited bids from parties pre-qualified on the basis of Global Invitation for Pre-qualification vide PQ Notice No. .... dated ..... for the execution of ETALIN/Package-6: EPC execution of Civil Works of the Powerhouse Complex consisting of 1.65km of HRT, Surge Shaft, Butterfly Valve Chamber, Pressure Shafts along with steel lining, Powerhouse cavern, Transformer hall cavern, Downstream Expansion Chamber, Tailrace Tunnel as well as Hydro-mechanical works related to the Powerhouse of Tangon limb (Excluding construction of Roads & Bridges, Adits, MATs and excavation of Powerhouse cavern and Transformer hall cavern) for Etalin Hydro Electric Project of 3097 MW capacity located in Dibang Valley district in the State of Arunachal Pradesh, India (hereinafter referred to as "the Works") and the above Parties are one of the pre-qualified parties.

(\* strike out whichever is not applicable)

WHEREAS the Parties are interested in jointly preparing and submitting a Bid for ETALIN/Package -6 of the Project as an unincorporated Joint venture.

Article 1.0 PURPOSE OF THIS AGREEMENT

1.1 The purpose of this Agreement is to define the principles of collaboration among the Parties to:

Prepare and submit Bid to the Owner for the ETALIN/Package-6: EPC execution of Civil Works of the Powerhouse Complex consisting of 1.65km of HRT, Surge Shaft, Butterfly Valve Chamber, Pressure Shafts along with steel lining, Powerhouse cavern, Transformer hall cavern, Downstream Expansion Chamber, Tailrace Tunnel as well as Hydro-mechanical works related to the



**Powerhouse of Tangon limb (Excluding construction of Roads & Bridges, Adits, MATs and excavation of Powerhouse cavern and Transformer hall cavern) for Etalin Hydro Electric Power Project** as an unincorporated Joint Venture.

- Negotiate and sign Contract in case of award.
- Provide and perform the Works in accordance with the Contract.

**1.2 NAME**

For the purpose of participating in the Bid, the name of the Joint Venture shall be “.....”.

**Article 2.0 LEGAL RELATIONSHIP OF THE PARTIES**

2.1 This Agreement shall not be construed as establishing or giving effect to any legal entity such as, but not limited to, a company, a partnership, etc. It shall relate solely towards the Owner for bid submission for **ETALIN/Package-6: EPC execution of Civil Works of the Powerhouse Complex consisting of 1.65km of HRT, Surge Shaft, Butterfly Valve Chamber, Pressure Shafts along with steel lining, Powerhouse cavern, Transformer hall cavern, Downstream Expansion Chamber, Tailrace Tunnel as well as Hydro-mechanical works related to the Powerhouse of Tangon limb (Excluding construction of Roads & Bridges, Adits, MATs and excavation of Powerhouse cavern and Transformer hall cavern) for Etalin Hydroelectric Power Project** and related execution of Works to be performed pursuant to the Contract and shall not extend to any other activities.

2.2 The Parties shall be jointly and severally responsible and bound towards the Owner for the performance of the Works in accordance with the terms and conditions of the Bid document and/or Contract.

**Article 3.0 LEADERSHIP**

..... (Name of the Lead Partner) shall act as Leader of the Joint Venture. As such, it shall act as the coordinator of the combined activities of the Parties and shall carry out the following functions:



- 3.1 To ensure the technical, commercial and administrative co-ordination between the Parties for submission of the Bid to the Owner.
- 3.2 To lead the contract negotiations with the Owner.
- 3.3 The Lead Partner is authorized to receive instructions and incur liabilities for and on behalf of any or all Parties.
- 3.4 In case of an award of Contract, act as channel of communication between the Owner and the Parties to execute the Contract

**Article 4.0 SCOPE OF WORK AND SERVICE OF EACH PARTY**

The Scope of Work to be performed by each Party shall be as herein below:

**4.1 Scope of Work and Service:**

The Scope of Work and service for each Party shall be as follows:

4.1.1 ..... (**Name of Lead Partner**) shall be responsible for the following (Define the scope of Works):-

- 
- 
- 
- 

4.1.2 ..... (**Name of Partner-1**) shall be responsible for the following (Define the scope of Works):-

- 
- 
- 
-



4.1.3 ..... (**Name of Partner-2**) shall be responsible for the following (Define the scope of Works):

- 
- 
- 

We all the Partners confirm that in the event of failure of any of the partner(s) to complete/fulfill its (their) responsibility, all the partners shall be jointly and severally legally responsible for the same

**4.2 Participation Share of each Partner**

Lead Partner	..... %
Partner-1	..... %
Partner-2	..... %

**4.3 Capital Contribution to be made by each Party for the Works**

Lead Partner	..... %
Partner-1	..... %
Partner-2	..... %

**4.4 Financial Commitment of each Party in terms of Contract Value**

Lead Partner	..... %
Partner-1	..... %
Partner-2	..... %



**Article 5.0**

All bills shall be raised in the name of ..... (Name of Joint Venture as appearing in Article 1.2 above) and the Payment shall be made in the name of the Joint Venture.

**OR\***

The bills will be raised by the respective Party and the payments shall be made in the name of each Party proportionate to the financial commitment of each Party as defined under Article 4.4 above.

*(\* strike out whichever is not applicable)*

**Article 6.0 SECURITIES**

Securities in the form of Bank Guarantees, required under the Bid document and/or Contract shall be provided in the name of the Lead Partner of Joint Venture.

**Article 7.0 LIABILITY**

**7.1 LIABILITY OF THE PARTIES WITH RESPECT TO CLAIMS OF THE OWNER**

Each of the Parties shall be jointly and severally liable to the Owner for the Performance of the Work under the terms of the Contract.

**Article 8.0 DURATION OF THE AGREEMENT**

- a) This Agreement is valid until end of Defect Liability Period of the Contract and full and final settlement of all accounts and disputes, if any, between the Parties and the Owner

**IN WITNESS WHEREOF**, this agreement executed on the ..... day of ..... (month) 20... by the duly authorized representatives of the parties hereto.





**FOR AND ON BEHALF OF M/S \_\_\_\_\_**

(Lead Partner)

Name:

Seal:

**FOR AND ON BEHALF OF M/S \_\_\_\_\_**

(Other Partner)

Name:

Seal:

Note: This form shall be initialed by all the partners (who intend to qualify as a JV) while submitting the Application and the same shall be executed and submitted with the Bid in case the parties are pre qualified to Bid.

**APPLICATION FORM – 3**

PAGE \_\_\_ OF \_\_\_ PAGES

**TECHNICAL EXPERIENCE RECORD**

Name of the Company (Sole Applicant); each Partner of a Joint Venture and/or Sub-Contractor(s):

On a separate page, using the format of Form-3A, 3B and 3C, the Company (Sole Applicant); each Partner of a Joint Venture and/or Sub-Contractor(s) is requested to list all contracts of a similar nature and complexity to the contract for which the Applicant wishes to qualify. The value should be based on the currencies of the Contract(s) converted to US\$, at the date of substantial completion and present day value for current Contract(s).

The experience should include the details meeting the Technical Criteria listed under Para 3.3.1 in a chronological order.

The information in Form-3A/B/C to be summarised in the table form as shown below:

**Summary – Experience of Similar Nature and Complexity:**

Name of Project (Reported on Form-3A, 3B and 3C)	Country	Name of Contract	Contractor's role (Lead Partner of Joint Venture or otherwise)	Contract value in million US\$*	Year of start - Year of schedule completion/ actual completion	Page Reference Nos. of detailed data sheets
1.						
2.						
3.						
4.						
5.						

Date \_\_\_\_\_

Authorized Signatory \_\_\_\_\_

\* i) Exchange rate as on date of award of Contract.

ii) Mention exchange rate adopted.

NB : To attach detailed data sheet to substantiate experience.

**APPLICATION FORM – 3A**

PAGE \_\_\_ OF \_\_\_ PAGES

**PLANNING, DESIGN AND ENGINEERING**

(Ref: 3.3.1.1)

S. No.	Particulars of Hydroelectric Projects where Consultancy Provided	Project Particulars			Page Reference No. of data sheets
		Name and Address of Client, Location of Project etc.	Installed Capacity (MW)	Start Date-End Date	
a)	Names of three (03) hydroelectric projects where the firm has provided planning, design and engineering services for a period of at least five (05) years in preceding ten (10) years				
b)	Experience in detailed design and engineering in the last fifteen (15) years of following components in a completed project:	<b>Name of structure and Project which has been designed by the firm along with start and completion year</b>			
i.	Pressure tunnels of minimum 8m finished dia.				
ii.	Appurtenant hydraulic structures such as surge shaft, pressure shaft etc				

(Indicate the page reference Nos. of the detailed data sheets for the given examples)



APPLICATION FORM – 3B

PAGE \_\_\_ OF \_\_\_ PAGES

**CIVIL WORKS**

(Reference 3.3.1.2)

**SUMMARY OF FULFILMENT OF PREQUALIFICATION CRITERIA FOR EXPERIENCE**

S. No.	PQ Criteria	Details of works in which the Applicant meets the PQ criteria	Reference (Page No.)
a)	<u>General Experience</u> Experience, as prime contractor or as a partner in a joint venture, of executing major civil structure works in a Hydropower Project for a period of at least five (5) years in preceding fifteen (15) years.		
b)	<u>Specific Experience</u> Experience of executing in the last twenty (20) years, the following components in ongoing/ completed hydropower project(s):		
1.	<b>Tunnel</b>		
(i)	Completion of a lined pressure tunnel of minimum finished diameter of 9m and 1000m long.		
(ii)	Average heading/full face excavation progress of 50 m per month for at least 500m from one tunneling face in a tunnel of minimum 9m finished diameter.		
(iii)	Average Concrete lining progress of minimum 100m per month from one tunneling face in a tunnel of minimum 9m finished diameter.		
2	<b>Shafts</b>		
(i)	Construction of two surge shafts, out of which one shall be complete with minimum diameter and height of 16m and 75m respectively.		
(ii)	Construction of three pressure shafts, out of which one shall be complete with minimum diameter and height of 3.5m and 200m respectively		



APPLICATION FORM – 3C

PAGE \_\_\_ OF \_\_\_ PAGES

**HM WORKS**

(Reference 3.3.1.3)

**SUMMARY OF FULFILMENT OF PREQUALIFICATION CRITERIA FOR EXPERIENCE**

S. No.	PQ Criteria	Details of works in which the Applicant meets the PQ criteria	Reference (Page No.)
a)	<u>General Experience</u> Experience as contractor or as partner in a joint venture of executing large Hydro-Mechanical EPC contract(s) valuing US Dollar 25 million or more in last ten(10) years.		
b)	<u>Specific Experience</u> Successful experience for the following hydro-mechanical items and/or works in the preceding fifteen (15) years.		
(i)	Successful experience in Design, manufacture, supply, erection, testing and commissioning of Vertical lift gate having $A \times H \geq 950$ and $H \geq 25$ m in preceding 15 years:		
(ii)	Having experience of two works in Design, Manufacture, Fabrication, Erection, Testing and commissioning embedded type Steel Liner, of which one should have been completed successfully in the preceding 15 years, satisfying the following parameters: <ul style="list-style-type: none"><li>• A value of <math>D \times H \geq 1350</math>, and</li><li>• Head <math>\geq 200</math> m</li><li>• The total tonnage (executed in any project should not be less than 4000 MT) with annual progress of 1000 MT.</li><li>• The used steel should be pressure vessel quality.</li></ul>		



APPLICATION FORM – 4

PAGE \_\_\_ OF \_\_\_ PAGES

**CURRENT CONTRACT COMMITMENTS / WORKS IN PROGRESS**

Name of the Company (Sole Applicant); Partner of a Joint Venture and/or Sub-Contractor(S)

Applicants should provide information on their current commitments on all contracts that have been awarded, or for which a letter of intent or acceptance has been received, or for on going works / contracts.

Name of contract	Description of works	Stipulated date of completion	Contract Value (equivalent US\$)*	Value of outstanding work (US\$ equivalent)*	Estimated completion date
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

\* i) Exchange rate as on date of award of Contract.

ii) Mention exchange rate adopted.

Date \_\_\_\_\_

Authorized signatory \_\_\_\_\_

**APPLICATION FORM – 5**

PAGE \_\_\_ OF \_\_\_ PAGES

**FINANCIAL DATA**

Name of the Company (Sole Applicant) and Partner of a Joint Venture.
--

Applicants, including each Partner of a Joint Venture, should provide financial information to demonstrate that they meet the requirements stated in the Instructions to Applicants. Each Applicant or Partner of a Joint Venture must fill in this form. If necessary, use separate sheets to provide complete banker information. A copy of the audited balance sheets should be attached.

<b>Banker</b>	Name of banker		
	Address of banker		
	Telephone	Contact name and title	
	Fax/ email		

Summarize actual assets and liabilities in US \$ equivalent (at the rates of exchange current at the end of each year) for the previous five (5) years. Based upon known commitments, summarize projected assets and liabilities in US \$ equivalent for the next two years.

Financial information in US\$ equivalent	Actual : Previous five years					Projected : Next two years	
	1	2	3	4	5	1	2
1. Total assets							
2. Current assets							
3. Total liabilities							
4. Current liabilities							
5. Profits before taxes							
6. Profits after taxes							

(Attach audited financial statements for the last five years (for the individual applicant or each partner of a Joint Venture). The figures quoted must be appropriately flagged in the financial statements to identify them. Adopted exchange rates to be specified alongwith their source). Firms may submit their balance sheets certified by a CEO / CFO/ Head of Finance, and supported by copies of tax returns, if audits are not required by the laws of their countries of origin.

Date \_\_\_\_\_

Authorized Signatory \_\_\_\_\_



**APPLICATION FORM – 6**

PAGE \_\_\_ OF \_\_\_ PAGES

**QUALITY ASSURANCE**

Name of the Company (Sole Applicant); Partner of a Joint Venture and/or Sub-contractor(s):

Applicant should provide the information on quality assurance system and a typical set up of his organization.

- A. Description on Applicant's Quality Assurance System
- B. Organisation Chart
  - Base Office (Design office/Procurement office/Manufacturing unit, as the case may be)
  - Site
- C. Narrative Description of Organisation Chart
- D. Description of Relationship between Base Office and Site Management

Date \_\_\_\_\_

Authorized Signatory \_\_\_\_\_





APPLICATION FORM – 7

PAGE \_\_\_ OF \_\_\_ PAGES

LETTER OF UNDERTAKING

No: .....

Date:.....

To,

**Etalin Hydro Electric Power Company Ltd. (EHEPCL)**

.....

Dear Sirs,

We, M/s..... having registered office at .....do hereby undertake that in case Contract for execution of Work .....(Name of Work) is awarded to M/s ..... (“Applicant”), we shall execute the “.....” being a part of the Work (the components of the Work for which the Applicant has proposed to associate the sub-contractor), as sub-contractor to M/s..... (Name of the Applicant) and we shall be responsible for successful completion of the portion of Work covered under our scope in the sub-contract with the Applicant

We do hereby also confirm that we are not participating as a partner of a Joint Venture against the above Invitation to Bid.

Yours faithfully,

For & on behalf of M/s. ....

(Name & Address of the Sub-Contractor)

Authorized Signatory

(Office Seal)

Station:

Date:

**Note: This letter of authorisation should be on the letterhead of the Sub-Contractor and should be signed by a person having the Power of Attorney, copy of which shall be enclosed.** The above letter shall be uniformly applicable to all Applicants proposing a sub-contractor for any of the Planning, Design & Engineering/ Civil Works/HM Works. The same shall be executed and submitted along with **PQ Application.**



**APPLICATION FORM – 7A**

PAGE \_\_\_ OF \_\_\_ PAGES

**PROFORMA OF JOINT UNDERTAKING BY THE SUB-CONTRACTOR AND THE EPC BIDDER/CONTRACTOR**

(To be executed on Non Judicial stamp paper of appropriate value as applicable in India)

THIS DEED OF UNDERTAKING is executed on this ..... day of Two Thousand and ..... by M/s. ...., a Company incorporated under the laws of ..... and having its Registered Office at ..... (hereinafter called the “Sub-Contractor” which expression shall include its successors, executors and permitted assigns), and M/s....., a Company incorporated under the laws of ..... having its Registered Office at ..... (hereinafter called the “Contractor” which expression shall include its successors, executors and permitted/ assigns) in favour of **Etalin Hydro Electric Power Company Ltd. (EHEPCL)**, a Company incorporated under the Companies Act, 1956 having its Registered Office at ....., India, (hereinafter referred to as the ‘Owner’ which expression shall unless repugnant to the subject or context or meaning thereof include its successors, administrators, executors and permitted assigns);

WHEREAS the “Owner” has invited Bids vide its Invitation No. .... for EPC execution of Etalin Hydroelectric Project, ETALIN/Package-6.

AND WHEREAS ITB Clause No. ..., Section ..., of ..., Vol.–... (*reference of tender clause to be mentioned, when executed*) forming part of the Bid Documents inter-alia stipulates that a Bidder may associate Sub-Contractor for certain component of Works in which the Bidder does not have the relevant experience provided the proposed Sub-Contractor has been pre-qualified for a particular component and that the Bidder alongwith its Sub-Contractor shall be jointly and severally bound and responsible for the successful performance of the component Works proposed to be executed by the Bidder alongwith its Sub-Contractor in the event the bid submitted by the Bidder is accepted by the Owner resulting in a Contract (hereinafter referred to as the “Contract”).

AND WHEREAS the Bidder has submitted its Bid to the Owner vide Reference No. .... dated ..... based on the association of the Sub-Contractor.



NOW THEREFORE THIS UNDERTAKING WITNESSETH as under:

- 1.0 In consideration of the award of Contract by the Owner to the Bidder (hereinafter referred to as the “Contractor”) we, the Sub-Contractor and the Contractor do hereby declare that we shall be jointly and severally bound to the Owner, for the successful performance of the sub-contracted portion of Works. The details of proposed sub-contracted portion of Work and the time schedule is enclosed hereto as Annexure “A”.
- 2.0 Without in any way affecting the generality and total responsibility in terms of this Deed of Undertaking, the Sub-Contractor in particular hereby agrees to deploy and depute its technical personnel, equipment, manpower and/or other resources on continual basis throughout the construction period of the proposed sub-contracted Works and to discharge the obligations of the Sub-Contractor under the Contract in accordance with the Annexure “A” hereto.
- 3.0 Notwithstanding anything contained, it is hereby clarified that the responsibility for carrying out the entire Scope of Work under the Contract shall vest with the Contractor.
- 4.0 Apart from the Contractor’s Performance Guarantee, the Sub-Contractor shall furnish as security, an unconditional and irrevocable Contract Performance Guarantee from its Bank in favour of the Owner in a form acceptable to the Owner. The value of such guarantee shall be equivalent to 2.5% of value of the sub-contracted Works as identified in the Contract awarded by the Owner to the Bidder/Contractor and it shall be an additional guarantee for faithful performance/compliance of this Deed of Undertaking in terms of the Contract. The guarantee shall be unconditional, irrevocable and valid till the Completion Certificate as provided in the Contract is issued by the Owner. The Bank Guarantee amount shall be payable to the Owner on demand without any reservation or demur.
- 5.0 We, the Sub-Contractor and the Bidder/Contractor agree that this Undertaking shall be irrevocable and shall form an integral part of the Contract and further agree that this Undertaking shall continue to be enforceable till it is discharged by the Owner. It shall become operative from the Effective Date of the Contract.



6.0 This Deed of Undertaking shall be construed and interpreted in accordance with the laws of India and the Courts in Delhi shall have exclusive jurisdiction in all matters arising under the Undertaking. Any dispute arising under this Undertaking shall be referred to arbitration in accordance with Arbitration and Conciliation Act, 1996. Venue of arbitration shall be Delhi. The decision of the arbitrator shall be final and binding upon the Parties. The language of arbitration shall be English.

IN WITNESS WHEREOF, the Sub-Contractor and the Bidder/Contractor have through their Authorized Representatives executed these presents and affixed Common seals of their respective Companies, on the day, month and year first above mentioned.

WITNESS

		For Sub-Contractor
1.	..... (Signature)  (Name in Block Letter) (Office Address)	Signature of Authorized (Representative)  Name ..... Common Seal of Company .....
		For Bidder/Contractor
2.	..... (Signature)  (Name in Block Letter) (Office Address)	Signature of Authorized (Representative)  Name..... Common Seal of Company .....

Note: The above proforma shall be uniformly applicable to all Applicants proposing a Sub-Contractor for any of the Planning, Design & Engineering/ Civil/ HM Works. The same shall be initialed by the Applicant and the proposed Sub-Contractor while submitting the Application and the same shall be executed and submitted with the Bid. The Bank issuing BG should be an Indian Scheduled Bank and the BG should be enforceable in India.



**ANNEXURE “A” TO APPLICATION FORM – 7A**

PAGE \_\_\_ OF \_\_\_ PAGES

**DETAILS OF SUB-CONTRACT WORK**

S.No.	Particulars of Sub-contract portion of work	Contract Value**	Time for Completion
		--	
		--	
		--	

*(Each Sub-Contractor shall fill in the above details and attach to the Joint Undertaking)*

**WITNESS**

1. ....  
 (Signature)  
  
 (Name in Block Letter)  
 (Office Address)

For Sub-Contractor

Signature of Authorized  
 (Representative)  
  
 Name .....  
 Common Seal of Company  
 .....

2. ....  
 (Signature)  
  
 (Name in Block Letter)  
 (Office Address)

For Bidder/Contractor

Signature of Authorized  
 (Representative)  
  
 Name.....  
 Common Seal of Company

\*\* Contract value and time of completion should be confirmed by means of an amendment to this Annexure “A” to Application Form 7A during bid submission.



APPLICATION FORM – 8

PAGE \_\_\_ OF \_\_\_ PAGES

**UNDERTAKING FROM PARENT/HOLDING COMPANY**

**(On the letter head of Parent/Holding Company)**

No: .....

Date:.....

To,

Etalin Hydro Electric Power Company Ltd.

\_\_\_\_\_  
\_\_\_\_\_

**Sub:** Pre-qualification under International Competitive Bid vide PQ Notice No..... dated.....issued by Etalin Hydro Electric Power Company Ltd. (“EHEPCL”).

We, M/s..... (Name of the Parent/Holding Company) having registered office at ..... (Address of the Parent/Holding Company) do hereby undertake that in the event contract for work ..... (Name of work) is awarded to M/s ..... (Name of the Subsidiary company) who is participating in your Pre-qualification process as a Joint Venture partner/sub-contractor, along with ..... (mention name of the Lead Partner/EPC Contractor). we shall provide the full support for technical and financial requirements for ..... (the scope of work of subsidiary company) and we shall be responsible for the successful completion of the scope of services/works of M/s..... (Name of the Subsidiary company).

In case the Applicant, M/s ..... (Name of Subsidiary company) is pre-qualified and awarded the Contract for execution of the Work, we hereby undertake to enter into an agreement with EHEPCL on the lines of the format enclosed herein before execution of the main Contract Agreement between EPC Contractor and EHEPCL.



We do hereby also confirm that we are not participating either as a sole Applicant or as a partner of a Joint Venture against the above Invitation for Prequalification.

Yours faithfully,

For & on behalf of M/s. ....

(Name & Address of the Parent/Holding Company) (Office Seal)

Station:

Date:

Enclosed: Format of Parent/Holding Company Agreement

**Note:** *This Letter of undertaking should be submitted alongwith PQ Application and should be on the letterhead of the Parent/Holding Company. It should be signed by a person competent and having the Power of Attorney to bind the Parent/Holding Company. Power of Attorney in favour of this person to do so together with the authority of its executant be enclosed with this Letter of Undertaking.*



**APPLICATION FORM – 8A**

PAGE \_\_\_ OF \_\_\_ PAGES

**PARENT/ HOLDING COMPANY AGREEMENT**

THIS AGREEMENT IS MADE on this the ..... day of ..... between EHEPCL, a company incorporated under the laws of India and having its registered office at ..... (herein after referred to as the 'Owner' which expression shall unless repugnant to the subject or context or meaning thereof include its successors, administrators, executors and assigns) of the one part; and ..... (name of Parent/Holding Company) a company organized and existing under the laws of ..... and having its Principal Office at ..... (Hereinafter referred to as the "Parent/Holding Company" of the Joint Venture Partner/Sub-Contractor M/s ..... which expression shall unless repugnant to the subject or context or meaning thereof include its respective successors, administrators, executors and assigns) of the other part;

WHEREAS the Owner intends to award a Contract on ..... for the execution of ..... (name of work package) for ..... H.E. Project in the State of Arunachal Pradesh, India (hereinafter referred to as the "Contract") to ..... (name of the Joint venture or Sole Contractor), a Company incorporated under the Companies Act, 1956 having its Registered Office at ....., India, (hereinafter referred to as the 'EPC Contractor' which expression shall unless repugnant to the subject or context or meaning thereof include its successors, administrators, executors and permitted assigns);

WHEREAS on the Parent/Holding Company's commitment to provide full support for technical and financial requirements and be responsible and liable for successful completion of the Work of M/s ..... (name of Subsidiary Company, hereinafter referred to as the "Subsidiary")] on the Contract being awarded to the EPC Contractor;

And whereas, in consideration of the aforesaid commitment, the Parent/Holding Company hereby enters into this agreement with the Owner for providing full support for technical and financial requirements to its Subsidiary and be responsible and liable for successful performance and completion of the woks described in the said Contract on the following terms and conditions:





NOW THEREFORE THE PARTIES HERETO HEREBY AGREE AND THIS AGREEMENT WITNESSETH AS FOLLOWS:

1. In this Agreement except where the context otherwise requires, the following expressions shall have the meaning hereinafter respectively assigned to them:
2. "Contract" shall mean the Contract to be entered into between the Owner and the EPC Contractor for the execution of the Work described therein of the ..... Hydroelectric Project in the State of ..... in India based on the Letter of Intent dated ..... Issued by the Owner
3. The Parent/Holding Company hereby agrees to ensure due and faithful performance of the obligations and liabilities by Subsidiary under the Contract/Sub-Contract 9as the case may be) and remain responsible to irrevocably and unconditionally provide full technical and financial support to Subsidiary for completion of the works covered under the Contract/Sub-Contract. The provisions of Contract/Sub-Contract shall mutatis-mutandis apply to the Parent/Holding Company.
4. In the event of breach and/ or failure on the part of the Subsidiary to perform or fulfill any of its obligations and liabilities under the Contract/Sub-Contract, the Owner may at its discretion call upon the Parent/Holding Company and the Parent/Holding Company shall be obliged to execute and perform or cause to be executed and performed and to satisfy the obligations and liabilities of the Subsidiary under the Contract/Sub-Contract in accordance with the terms and conditions thereof.
5. It is agreed that the obligations undertaken by the Parent/Holding Company hereunder shall be performed by it notwithstanding any difference or dispute between the Owner and the EPC Contractor or between the EPC Contractor and the Sub-Contractor pending before any court, tribunal, arbitration or any other authority or forum.
6. This Agreement shall come into force and effect immediately and shall remain in force and effect till the date of expiry of the Defects Liability Period by the Owner pursuant to the Conditions of the Contract.



7. This Agreement shall be interpreted and be governed under the Laws of India. The Courts in Delhi shall have exclusive jurisdiction in all matters arising under the Undertaking. Any dispute arising under the Undertaking shall be referred to arbitration in accordance with Arbitration and Conciliation Act, 1996. Venue of arbitration shall be Delhi. The decision of the arbitrator shall be final and binding upon the Parties. The language of arbitration shall be English.

IN WITNESS WHEREOF THE PARTIES HERETO HAVE PUT THEIR HANDS HEREUNTO ON THE..... DAY ..... MONTH AND .....YEAR FIRST ABOVE WRITTEN AT ....., INDIA.

For and on behalf of the Owner  
(through authorized representative)

For and on behalf of the Parent/  
Holding Company  
(through duly authorized representative)

Witnesses:

Witnesses:

1.

2.

Note : This agreement format shall be initialed and enclosed with the Undertaking as a token of acceptance of its terms & conditions by the Parent/Holding Company. The agreement shall be executed and submitted before signing of the EPC Contract. The Agreement will come in to force once the Contract is signed.



LITIGATION HISTORY

Name of the construction company (sole Applicant); Partner of a Joint Venture and/or Sub -contractor(s):

Applicant, including each of the partners of a Joint Venture, shall provide information on any history of litigation or arbitration resulting from contracts executed in the last ten years or currently under execution. A separate sheet should be used for each partner of a Joint Venture.

Year	Contract Identification	Contract Value (in Eq. US \$)	Value of disputed amount (in Eq. US \$)	Arbitration Award Value if settled in contractor's favour (in Eq. US \$)	Reasons for disputes



**APPLICATION FORM – 10**

PAGE \_\_\_ OF \_\_\_ PAGES

**ADDITIONAL INFORMATION**

Name of the Construction Company (Sole Applicant); partner of a joint venture and/or sub-contractor(s):

*Add any further information that the Applicant considers to be relevant to the evaluation of application for prequalification. If the Applicant wishes to attach other documents, list them below.*



APPLICATION FORM – 11

PAGE \_\_\_ OF \_\_\_ PAGES

**LIST OF APPLICATION FORMS**

Name of the Company (Sole Applicant); Partner of a Joint Venture and/or Sub-contractor(s):

*Indicate total number of pages for each Form submitted with application.*

Form No.	Title	Nos. of Pages
	Letter of Application	
1	General Information	
2	Sole Applicant/Joint Venture Record	
2A	Joint Venture Summary alongwith Undertaking by each Partner of JV and format for JV Agreement	
3 (incl. 3A, 3B, & 3C)	Technical Experience Record	
4	Current Contract Commitments/Works in Progress	
5	Financial Data	
6	Quality Assurance	
7	Letter of Undertaking by the Sub-Contractor (including format for Joint Deed Undertaking and its Annexure "A")	
8	Undertaking from Parent/Holding Company (including Parent company agreement format)	
9	Litigation History	
10	Additional Information	
11	List of Application Forms	

Date \_\_\_\_\_

Authorized Signatory \_\_\_\_\_