



Ref: NREDCAP/WE/PSP-IV/2023

Date: 22.02.2023

CORRIGENDUM-I

INVITATION OF EOI FOR PREPARATION OF FEASIBILITY REPORTS (FR) AND DETAILED PROJECT REPORTS (DPR) FOR PROPOSED PUMPED HYDRO STORAGE POWER PROJECTS - PHASE-IV.

Further to the Tender Notice No. NREDCAP/WE/PSP-IV/2023 dated 16.02.2023, the details mentioned in the tender document published in www.eprocurement.in and NREDCAP website www.nredcap.in, Scope of Work under para no 5.3 and Payment Schedule and Terms under para no. 5.7 may be read as follows,

5.3. Scope of Work:

The consultant will be required to work with the officers authorized by NREDCAP for successful completion of all activities required.

The scope of work mentioned hereunder is only an indicative and not exhaustive. The consultant shall carryout all studies, surveys, designs, works, etc required for completion of the Detailed Project Reports in full shape as per CEA guidelines, standards, practices, etc and obligations enshrined in this document, unless specifically excluded. The scope includes **Preparation of Feasibility Report and Detailed Project Report** including Topographical/ Geological Investigations, EIA/EMP studies, R&R studies and any other studies/investigations for obtaining all clearances from Statutory Authorities of Government of India, Government of Andhra Pradesh, and all other institutions as required for implementing Pumped Storage Project. All studies for Feasibility Report and DPR shall comply with the guidelines of CEA, CWC, CSMRS, GSI, etc., The scope of work is further detailed covering the following aspects to facilitate more clarity on scope of contract:

A. Site Visit, data collection, inception repots, Feasibility Report:

- i. The consultant shall collect relevant information, documents and drawings from authorities concerned. He shall also collect or obtain various data with reference to various infrastructure requirements and all other information required for preparation of the Report.
- ii. The consultant shall study the alternate location (different layouts) for establishment of Pumped storage project (PSP) and select most economical location. The consultant



shall also study the possibilities for establishment of surface powerhouse, economics of installing variable/adjustable speed units before finalization of layout. The feasibility report shall be submitted with all these details including installation of adjustable speed machines, to enable finalization of the layout of scheme and type of machines to be adopted for the PSP.

B. Topographical Survey:

- i. The Topographical Survey includes taking cross sections of the river/ stream, reservoirs data (seasonal maximum and minimum discharges, capacity, etc), grid survey for possible locations of the HRT, powerhouse, switchyard, intake channel, Tail race channel, TRT, dumping areas for muck disposal, colony, office accommodation, and all other miscellaneous structures and facilities required for power project.
- ii. After completion of the topographical survey, detailed report along with drawings of cross sections, River grid survey, contour map at minimum interval of 1.0 m or below as per requirement, etc shall be submitted. The consultant shall also attend the office of NREDCAP for detailed discussions and for finalizing the provisional layout of the project.

C. Geological Investigations & Testing in accordance with MOWR guidelines:

- i. Investigations by the method of drilling at all project components shall be carried out. Depth of drilling shall be as per MOWR guidelines.
- ii. Geological and geotechnical investigations shall focus on rock mass characterization, Strength and deformation properties, In-situ stresses, Geological structure and features, Geo-hazards and Hydro-geologic characterization.
- iii. Geophysical Survey: Seismic refraction and electric resistivity surveys to be conducted at the dam site and its surroundings, intake, switchyard area and at other locations needed. Permeability and Grout ability tests in overburden and bed rock areas and other locations wherever required shall be conducted in accordance with IS code.
- iv. The consultant shall conduct site specific seismic studies and reports included in the DPR.
- v. The above-mentioned investigations with regard to topographical and geological



investigations are only tentative and additional investigations if any have to be carried out as required by the CWC/CEA/GSI during scrutiny and approval of DPR.

- vi. After completion of the Geological Investigations, detailed report containing lithology and results of various tests conducted and remarks and recommendations of the qualified geologist shall be submitted.
- vii. The consultants shall then attend the office of NREDCAP for detailed discussions and to finalize the layout of the project.

D. Hydrology: The following activities shall be done:

- i. The input data for project planning i.e., discharges, quantity, seasonal variations, etc and possible water availability in lower reservoir & upper reservoir shall be measured or estimated with reference to the collected data. The consultant shall invariably install gauge station on stream based pumped schemes and collect the data for at least one year (covering all seasons) and then estimate the available water and extrapolate for the life of the project.
- ii. Area of submergence- capacity, MWL, FRL, MDDL & DSL of reservoir for long term operation shall be arrived.
- iii. Evaporation and Sedimentation studies, water tightness and effect on adjoining areas of reservoirs shall be calculated/analysed.
- iv. Silt Analysis shall be carried out.
- v. Frequency Analysis and Diversion of flow during construction.
- vi. Preparation of Tail water rating Curves/ River rating curve.
- vii. Other facilities for reservoirs shall also be discussed.

E. Power potential studies:

- i. Optimization of storage capacity of reservoirs, FRL, MDDL of Upper and lower reservoirs.
- ii. Type of pump-turbines i.e., fixed speed or adjustable speed.
- iii. Fixation of optimum capacity, size & number of units, calculation of energy generation, calculation of pumping energy and determination of installed capacity.
- iv. Hydraulic studies & fixation of components.
- v. Estimating the possibility of additional generation during Monsoon (When there is no pumping).
- vi. Operating criteria of the project in generating and pumping modes.
- vii. Availability of pumping energy for pumping operation over a year.
- viii. Cycle efficiency of the scheme.



- ix. Alternatives, if any for establishment of Pumped storage scheme without affecting the existing structures, if any available at site.
- x. Deficit/Requirement of Peak Power in the regional/ National Grid and its average tariff for past 5- 10 years and future potential of the proposed period of generation of the project.
- xi. Availability of off-peak power in the regional/ National Grid for pumping period for pumping back the water into upstream reservoir and its tariff for the past 5-10 years.
- xii. Viability of the project on the Peak and Off peak tariffs.
- xiii. Better fit of the project in the increasing renewable energy component in the regional/national grid like using the project as an energy storage type (like battery) for the surplus solar power or other renewable power in the grid or through a dedicated renewable energy project, etc.,
- xiv. Effect of the plant on the generation potential of the existing generating stations during construction of the project and later.
- xv. Optimal/Better fit of the chosen ratings of the generating units/adjustable speed units to match the ramping and coasting down curves of the solar power generation in the grid.

F. Design of Civil Structures:

- i. Design of Power House, Head Race Tunnel & Tail Race Tunnel, Pressure shaft/Penstocks, Surge Shafts, selection of Tunnel alignment, size, shape & velocity, rock support system, location and design of construction Audits, other access Audits, access roads and other related civil structures and recommendations.
- ii. Design of Barrage/Weir in reservoirs to facilitate the required storage for pumping, Reservoir Area-Capacity-elevation curve, sediment volumes, flood surcharge head, free board for waves and camber.
- iii. Design of River diversions: Diversion tunnel/coffer dam, its location, type and its economical aspects.

G. Preparation of site plans for finalization of layout of power house and study various alternatives for power house complex such as Surface/ Underground/Partial underground etc., and accordingly finalize the entire plant layout in detailed manner;

H. Design Philosophy and system description:

I. Drawing of conceptual plan for Intake structure, Penstock/intake tunnel, Power House and



- Tailrace;
- J. Additional Structural studies - Design of various components as required;
 - K. Preparation of drawings;
 - L. Design of Hydro-Mechanical Equipment;
 - M. Design of E&M Equipment and layout as required for the preparation of DPR;
 - N. Transmission Planning of Power i.e., drawl of electric power required for the plant, evacuation of electric power generated by the plant along with all Communication Facilities required for regular operation of the plant, data communication through SCADA systems, etc.
 - O. Preparation of construction equipment planning;
 - P. Financial analysis including return on investment, cost benefit analysis, levelised tariff, etc with assumptions and limitations considered;
 - Q. Regular Plant operation and maintenance along with associated costs and man power requirement and their management.
 - R. Miscellaneous studies as per requirement to be carried out and incorporated in DPR;
 - S. Writing of various chapters of DPR as per CEA norms;
 - T. Project implementation planning and schedule;
 - U. Project Organization and Infrastructure facilities such as approach roads during construction, power requirement, workshops, administrative and residential buildings, etc.;
 - V. Studies and identification of site for dumping areas nearby the project site for dumping excavated muck;
 - W. Estimation of quantities for civil and E&M works and Cost estimates duly following the CEA/CWC Norms.
 - X. Environmental Studies: Required Studies shall be carried out as per the MOEF&CC notification dt. 14.09.2016, Land Acquisition Act, 2013, Forest Conservation Act, 1980 and other relevant statutory Acts to obtain the Environmental Clearance, Forest Clearance, TEC from CEA and other clearances from the statutory agencies to implement the project.



These works include preparation of documents for MoEF duly carrying out EIA/EPM studies, Social impact assessment studies, R&R scheme, bio- diversity studies, etc.

- Y. To prepare and submit the forest diversion application as per “Forest Conservation Act 1980” and scope of work encompasses up to obtaining Forest Clearance (Stage I & II) from MoEF&CC by submitting necessary documentation including undertaking DPGS survey, map of Forest Plots, obtaining clearances from all stages of forest proposal, preparing forest mitigation plan, obtaining NOC from concerned authorities under the Forest (Rights) Act 2006, preparation of Compensatory Afforestation maps or any other digital map required, DGPS survey map to the concerned administration authorities.

Note:

1. The hydraulic physical modelling of Dam/Powerhouse is not contemplated by NREDCAP. Similarly, the sedimentation analysis of the existing reservoirs are not contemplated by NREDCAP. However, the bidder shall include the sedimentation analysis of the proposed reservoirs in the report. If the authorities insist for these excluded items to be studied and incorporated in the report during the clearances stage, the consultant shall arrange the same at additional cost duly obtaining the prior approval of NREDCAP for such additional commitment.
2. The In-situ rock mechanic tests (i.e., hydro-fracture tests, shear tests, deformation modulus tests, etc.,) as required for obtaining clearances shall be arranged by the consultant as a part of consultancy work. However, if these tests are necessitated as associated tests for drift exploration, then NREDCAP will consider for extra payment, which will mutually be discussed and agreed.
3. EIA &EMP shall be carried out through NABET accredited consultants as per the requirement of common TOR approved by MoEF & CC.
4. The consultant shall submit the required documents to the statutory authorities duly carrying out all necessary additional works, such as presentation of all material to the authorities, attending to the meetings and discussions, liasoning/pursuing with them, revisions to the DPR as per suggestions/recommendations of these authorities, conducting public hearings at various stages, etc.
5. The consultant shall submit sufficient hard copies, say 15 copies, of all important reports at various stages of study i.e., draft feasibility study report, EIA&EMP reports, R&R Planning reports, draft DPR, etc., along with soft copy. After completion of the entire study,



the consultant shall submit 30 copies per site of the final DPR incorporating all modifications along with soft copy. The soft copy shall be in the word format (for write up), excel format (for data), CAD drawings (for drawings, layouts, etc.,).

6. All permissions required for obtaining the studies at site are to be obtained by the consultant. NREDCAP will provide necessary letters, informing the authorities that the consultant is the authorized person on behalf of NREDCAP to make studies. The consultant may note the following activities included in the contract:

- Follow up actions with regard to resolving all queries raised by the Statutory Organizations for the Government of India in respect of acceptance and examination for concurrence of DPR as well as assist in obtaining all requisite statutory clearances for the implementation of the project;
- For Co-ordination of all the activities as a nodal agency for the process of preparation of FR/DPR;
- Surveys and Investigations – Necessary Survey and Investigation in co-ordination with agencies of Government of India shall be done for preparation of FR/DPR. EIA/EMP studies shall be undertaken in conformity with the latest guidelines of MoEF&CC for obtaining final environmental clearance.

5.7. PAYMENT SCHEDULE AND TERMS

The following payment schedule may be noted by the bidder, with reference to the items mentioned in price schedule (Table-6-1). The NREDCAP will consider release of the payments upon completion of relevant portion of work and submission of invoices along with other documents as per the EoI and work order:

Sl. No	Item	Description	% of Payment
I	Preparation of Feasibility Reports		
1	Item I	Submission of topographical survey	25%
2		Submission of draft feasibility report	50%
3		Submission of final feasibility report and go ahead for preparation of DPR.	25%
			100%



II	Preparation of Detailed Project Report as per the scope mentioned in the bid documents (till the end of final DPR, but before the stage of obtaining clearances).		
4	Item -II	Completion and submission of Geological mapping.	15%
5		Completion and submission of Geo-Physical Surveys.	15%
6		Completion and submission of Geo-Technical investigations (Drilling & Drifting) and laboratory testing on monthly basis against the completed works/ running bills.	30%
7		Submission of EIA&EMP reports, R&R plan, etc.,	15%
8		Submission of draft DPR.	15%
9		Receipt of Techno-Economic Clearance.	10%
			100%
III	Obtaining clearances from the statutory authorities including revision of DPR if required.		
10	Item III	On submission of ToR	15%
11		After Public hearing	15%
12		On receipt of clearance from respective agencies /department	50%
13		On closing of Contract on Completion of all activities	20%
			100%
IV	Forest Land Diversion		
14	Item IV	Conducting of DGPS survey and on submission of online application (Form A)	5%
15		On obtaining Forest land map approvals from PCCF	15%
16		On submission of online application Diversion of forest Land	15%
17		On obtaining Environmental Clearance for the project	20%
18		On recommendations from PCCF on diversion of forest land	15%
19		On obtaining Stage -I clearance	20%
20		On obtaining Stage - II clearance	10%
			100%

The remaining Terms and conditions are unaltered.

Sd/-
VC & Managing Director