

MINUTES OF THE 21st MEETING OF THE EXPERT APPRAISAL COMMITTEE FOR RIVER VALLEY AND HYDROELECTRIC PROJECTS HELD ON 23RD DECEMBER, 2021 FROM 02:30AM – 5:00PM THROUGH VIDEO CONFERENCE.

The 21st meeting of the re-constituted EAC for River Valley & Hydroelectric Projects organized by the Ministry of Environment, Forest and Climate Change, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi, was held on 23rd December, 2021 through video conference, under the Chairmanship of Dr. Uday Kumar R.Y. The list of Members present in the meeting is at **Annexure**.

Agenda No. 21.1

Confirmation of the minutes of 20th EAC meeting

The minutes of the 20th EAC (River Valley Hydroelectric Project) meeting held on 14th December, 2021 were confirmed.

Agenda No. 21.2:

Yerravaram Pumped Storage Hydro Electric Project (1200MW) in an area of 297.69ha located at village Ganagula, Tehsil Koyyuru, District Visakhapatnam, Andhra Pradesh by M/s New and Renewable Energy Development Corporation of Andhra Pradesh Ltd. (NREDCAP) – Terms of Reference - reg.

[Proposal No. IA/AP/RIV/243855/2021; F. No. J-12011/24/2021-IA. I (R)]

21.2.1: The proposal is for grant of Terms of Reference (ToR) to Yerravaram Pumped Storage Hydro Electric Project (1200MW) in an area of 297.69 ha located at village Ganagula, Tehsil Koyyuru, District Visakhapatnam, Andhra Pradesh by M/s New and Renewable Energy Development Corporation of Andhra Pradesh Ltd. (NREDCAP).

21.2.2: The details of the project submitted by project proponent and ascertained from the document submitted are mentioned below:

- i. The proposed project is pumped storage being developed by M/s New and Renewable Energy Development Corporation of Andhra Pradesh Limited (NREDCAP) is the State Nodal Agency for development of renewable power in the state of Andhra Pradesh.
- ii. The Yerravaram Pumped Storage Hydro Power Project (YPSH) reservoirs are constructed across small Stream/Nallah in the mountain ridges of the Dharkonda reserve forest between the Yerravaram village and Ganagula village flowing into the Thandava Reservoir of Vishakhapatnam district. Yerravaram village is located in Goulgonda Taluk while Ganagula Village is located in Koyyuru Taluk of Visakhapatnam district in Andhra Pradesh, India.
- iii. The Yerravaram PSP has proposed upper & lower reservoir for the pumped storage scheme with Full Reservoir Levels (FRLs) of 500 m and 273m, Minimum Draw Down Level (MDDL) of 472.0 m and 442 m respectively.
- iv. Upper reservoir and Lower reservoir will be constructed newly. There will be storage land required for Upper & lower reservoirs. Also, the land required is for the construction of power house complex and its appurtenant works viz., Intake structure, penstocks, powerhouse, Tail Race Channel etc. The land required for the construction of various components is about 379 Ha including storage by formation of Yerravaram PSP reservoirs. Based on assessment of

environmental impacts, management plan has to be formulated for slope Treatment, compensatory afforestation and other environmental issues. Detailed EIA studies will be carried out at DPR stage.

- v. The geographical coordinates of the proposed upper reservoir are at 651438.545 E & 1962033.867 N and that of lower reservoir are at 649008.40 E and 1960087.22N.
- vi. The upper reservoir is located to have potential to create sufficient pondage by providing RCC dam. The gross storage in the upper reservoir at FRL (EL. 500.00 m) and MDDL (EL. 472.00 m) are 0.457 TMC (13.06 MCM) and 0.05 TMC (1.48 MCM) respectively. The live storage of upper reservoir is 0.41 TMC (11.58 MCM). The maximum height of the dam is about 62 m for deepest river bed.
- vii. The lower reservoir is located near village Ganagula to have potential to create sufficient Pondage by providing RCC dam. The gross storage in the lower reservoir at FRL (EL. 273.00 m) and MDDL (EL. 242.00 m) are 0.48 TMC (13.75 MCM) and 0.075 TMC (2.17 MCM) respectively. The live storage of lower reservoir is 0.41 TMC (11.58 MCM). The maximum height of the dam is about 59 m from deepest river bed.
- viii. The live storage capacity for pumped storage scheme required is 11.58 MCM (0.406 TMC) and a gross storage capacity of upper reservoir is about 0.45TMC & lower reservoir is 0.481TMC.
- ix. The Storage Capacity of PSP is 8700 MWH. This Project comprises of 4 units of 300 MW each. The Project will generate 1200 MW by utilizing a design discharge of 584.68 Cumec with rated head of 231.10 m for 7.25 hr. The Yerravaram PSP will utilize 1380 MW to pump 0.41 TMC of water to the upper reservoir in 9.50 hours at a cycle conversion efficiency of 79.66%.
- x. Annual energy generation by Yerravaram PSP in Turbine mode is 2911.16 MU, Annual energy consumption by Yerravaram PSP in Pump mode is 3864.85 MU.
- xi. **Project Component:** The present proposal consists of the following components:
 - a) Upper Reservoir and Lower Reservoir with RCC Dam
 - b) Upper Intake.
 - c) HRT
 - d) Penstock
 - e) Powerhouse and Transformer Cavern
 - f) Surge Chamber
 - g) Tailrace Tunnel
 - h) TRT outlet
 - i) TRT Intake/Lower Intake
- viii) **Land requirement:** For the development of Yerravaram PSP, total land would be required for the construction of proposed activities is approximately 297.69 ha, out of this, 275.66 ha Forest land, 22.03 ha private land.
- ix) **Ecological Sensitive Area, if any within 10km of project site:** There is no National Park, Wildlife sanctuary, Biosphere reserve, Tiger/elephant corridor, Critically Pollute Area present in the 10 km study area of the project site.

- xii. **Muck Dumping area:** Excavated material from surface and underground works of tunnel and powerhouse will also be utilised for processing of aggregates for concrete. Thus about 24 Lakh cum of excavated muck will be safely dumped in the designated muck dumping yard to mitigate the environmental hazard. An area of 39 Ha has been earmarked downstream of the existing reservoir area.
- xiii. **Seismicity:** The project area is located in the Southern part of the Visakhapatnam district in the state of Andhra Pradesh. As per the seismic map zone of India, the Project area lies in the seismic zone-II.
- xiv. **R&R:** Ganugala, Pedamakavaram & Ramarajupalem villages are nearby villages which will be influenced by the project activities. Kitabhu villages comprising of about 8 households will be submerged by formation of Lower Reservoir. As per information available till date, all the land in the project area belongs to the local farmers, state government and forest department. R&R plan would be framed in consultation with the Project Affected Persons (PAPs), Project Authorities and the State Government. R & R Plan would be drafted according to the NPRR 2007 and the policy of State Government.
- xv. **Inter State Aspect:** All the project components of the proposed PSP are within the state of Andhra Pradesh and the submergence due to construction of upper & lower reservoirs also lies within the state of Andhra Pradesh.
- xvi. **Project Cost and Benefits:** The total estimated cost of the project including direct and indirect charges excluding Interest during construction is **INR 460754.16** Lakhs (4607.54 Crore).
- xvii. **Status of other statutory clearances:** The proposed project involves diversion of 275.66 ha of forest land. The project does not require CRZ clearance/ Wildlife Clearance. The forest clearance is yet to be applied.

xviii. **ALTERNATIVE SITE STUDIES:**

Alternative Study for Location of Upper Dam and Lower Dam mentioned below:

Two Dam Sites for upper reservoir are compared for selection of best dam site.

- Dam Site UR-1
- Dam Site UR-2

Detailed comparative study has been carried out considering Topographical features, geological setup, reservoir capacity and found that dam site UR-1 is economically more feasible than UR-2. In view of above dam site UR-1 for upper reservoir is selected. Considering latest topographical survey, geological setup and reservoir capacity of upper reservoir, dam site LR is selected for lower reservoir for further study.

Alternative Study for Location of Power house mentioned below:

Based on the alternative study for dam site as explained above, the dam site UR-1 & LR is found more suitable for the development of the Yerravarm PSP.

Following alternative of power houses were studied:

Surface power house in the open pit Feasibility of surface power house is studied, but found not suitable mainly due to following reasons:

- Excavation of more than 100 m deep power house pit adjacent to the lower reservoir.
- Possibility of very high seepage through the reservoir charged rock mass. Considering this fact more shifting of power house in downstream side is not feasible.

- Constructability and operation issue related to dewatering of seepage flow.
- Larger quantities of excavation muck and slope stabilisation measures.
- Limited space available between lower reservoir boundary and the toe of the hill and therefore possibility of destabilisation of hill slope for deep excavations.

21.2.3: The EAC during deliberations noted the following:

EAC in the present meeting (21st meeting) deliberated on the information submitted (Form 1, PFR, etc.) and noted that the proposed upper and lower reservoirs of Yerravaram Pumped Storage hydro Power Project (YPSP) to be constructed newly across Nallah/Stream near Ganagulu village flowing into the Thandava reservoir.

The EAC also noted that the proposed project will generate 1200 MW by utilizing a design discharge of 584.68 Cumec with rated head of 231.10 m for 7.25 hr. and utilize 1380 MW to pump 0.41 TMC of water to the upper reservoir in 9.50 hours.

Total land required for the construction of proposed activities is approximately 297.69 ha, out of this, 275.66 ha Forest land, 22.03 ha private land. EAC suggested that non-essential forest land for the project is reduced and minimum forest land to be diverted for proposed project.

Since, the major land area for proposed project is forest land, therefore, EAC Members were concerned about the impact on ecosystem due to diversion /deforestation of forest land. The EAC opined that the Forest itself act as a renewable resources and development of another renewable energy resource at the cost of Forest ecosystem needs to be assessed comprehensively. Therefore, a comprehensive study of Forest cover and loss of ecosystem due to deforestation from expert agency is required for comprehensive assessment of anticipated environmental consequences and sustainability of the project in terms of environmental sustainability of the area. There after Environmental Cost Benefit Analysis will be done with a holistic approach in terms of loss of Forest ecosystem / water availability and its anticipated impacts on environment.

21.2.4 *The EAC after detailed deliberation on the information submitted and as presented during the meeting **recommended** the proposal for grant of Standard ToR for conducting EIA study for construction of Yerravaram Pumped Storage Hydro Electric Project (1200MW) in an area of 297.69ha located at village Ganagula, Tehsil Koyyuru, District Visakhapatnam, Andhra Pradesh by M/s New and Renewable Energy Development Corporation of Andhra Pradesh Ltd (NREDCAP) under the provisions of EIA Notification, 2006,as amended along with the following additional/specific ToR:*

[A] Environmental Management and Biodiversity Conservation

- Environmental Cost Benefit Analysis shall be done in terms of loss of Forest ecosystem due to diversion of Forest land/loss of biodiversity and its impacts on productivity of the ecosystem, water availability, water uses for generation of hydro power and Ecological flows in the small stream/Nallah and Thandava River in consultation with ICFRE.*
- PP shall identify private land for use of project facilities (such as muck disposal land, batching and crushing plant) so that forest area can be reduced to bare minimum and accordingly, submit Forest Clearance proposal for diversion of Forest land shall be submitted.*

- iii. *Scope of watershed development in the 10 km radius of the project shall be studied in consultation with Indian Council of Agriculture Research (ICAR) and accordingly a detailed Water Shed Development Plan shall be prepared and incorporated in EIA/EMP report.*
- iv. *A study shall be carried out on impact of project activity on the aquatic and terrestrial ecosystem, within project area classifying the impact zones (highly impact/low impact zone) based on seasonal variations and covering the aspects related to impacts on aquatic ecosystem/primary productivity due to quantity of water to be lifted for power generation and thermal stratification. Accordingly, Environment Management plan shall be prepared.*
- v. *Baseline data as mentioned in Standard ToR shall be collected for preparation of EIA/EMP report along with soil characteristics which shall be studied at minimum 10 locations. The ground water level at 10 locations shall be measured in project area in all three seasons.*
- vi. *Fisheries Management Plan shall be prepared along with other Environmental Safety Measures for small stream/Nallah, Thandava Reservoir and Thandava River shall be incorporated in the EIA/EMP report.*
- vii. *Undertaking regarding water allocated to this scheme shall not be diverted to other purpose such as lift irrigation scheme etc.*
- viii. *Environmental matrix during construction and operational phase needs to be submitted.*
- ix. *Matrix formulated on the basis of detailed study and field survey of flora and Fauna methodology used shall be mentioned in the EIA report.*
- x. *Endemic plant and animal species found in the area concerned shall be provided instead listing entire endemic species found in the State.*
- xi. *Details of Flora and Fauna reported in submergence area, No.s of tree along with their density and nomenclature required to be cut for reservoir creation and other project component.*
- xii. *Ground water depth in project vicinity area to be collected and to be incorporated in EIA/EMP report.*
- xiii. *Impact along with measures on aquatic ecosystem due to quantity of water to be lifted for power generation be incorporated in EIA/EMP report.*
- xiv. *Impact of Project activities (specially blasting and drilling) on the aquatic and terrestrial ecosystem, within study area to be studied and be incorporated in EIA/EMP report.*
- xv. *Project impact on avi fauna shall be studied and incorporated in EIA/EMP report.*

[B] Socio-economic Study

- (i) *Declaration by the project proponent by way of affidavit that “No” Inter-state issue / policies issue is involved with any state in the project.*
- (ii) *All the tasks including conducting public hearing shall be done as per the provisions of EIA Notification, 2006 and as amended from time to time. Public hearing issues raised and compliance of the same shall be incorporated in the EIA/EMP report in the relevant chapter. Statement on the commitments (activity-wise) made during public hearing to facilitate the discussion on the CER in compliance of the Ministry’s OM F.No.22-65/2017-IA.III dated 30th September, 2020 shall be submitted.*
- (iii) *Tentative no. of project affected families shall be identified and accordingly appropriate Rehabilitation & Resettlement plan shall be prepared.*

[C] Disaster Management

- (i) *Details of quantity of muck generation component wise (Excavation in tunnels, pressure shaft and powerhouse etc.) and disposal site/ transportation to be provided.*
- (ii) *Pre-DPR Chapters viz., Hydrology, Layout Map and Power Potential Studies duly approved by CWC /CEA shall be submitted.*
- (iii) *Techno-economic viability of the project must be recommended from CEA/CWC.*

[D] Miscellaneous

- (i) *A detailed study shall be carried out about the fulfilling the entire power requirement to pump the water from the lower reservoir to the proposed upper reservoir from renewable sources and shall be incorporated in EIA/EMP.*
- (ii) *Both capital and recurring expenditure under EMP shall be submitted.*
- (iii) *The PP should submit the photograph of monitoring stations & sampling locations. The photograph should bear the date, time, latitude & longitude of the monitoring station/sampling location. In addition to this PP should submit the original test reports and certificates of the labs which will analyze the samples.*
- (iv) *Inter-state issues shall be examined in consultation with CWC.*
- (v) *Arial view video of project site shall be recorded and to be submitted.*

The meeting ended with vote of thanks to the Chair.

ATTENDANCE LIST

Sr. No.	Name & Address	Role	Attendance
1.	Dr. Uday Kumar R.Y.	Member (Chairman)	P
2.	Dr. A. K. Malhotra	Member	P
3.	Shri Amrendra Kumar Singh	Representative of (CWC)	P
4.	Shri Yogendra Pal Singh	Member Secretary	P

APPROVAL OF THE CHAIRMAN

Fwd: draft MOM of the 21st:EAC meeting held on 23.12.2021-reg.

1 message

Yogendra Pal Singh <yogendra78@nic.in>
To: geetdeepbisht <geetdeepbisht@gmail.com>

From: udaykumary@yahoo.com
To: "Yogendra Pal Singh" <yogendra78@nic.in>
Sent: Wednesday, January 5, 2022 8:21:46 PM
Subject: Re: Fwd: draft MOM of the 21st:EAC meeting held on 23.12.2021-reg.

Dear Yogendra ji,
I approve the final minutes of 21st EAC meeting held on 23-12-21. for further action.

-Udayakumar

Sent from Yahoo Mail for iPhone

On Wednesday, January 5, 2022, 5:10 PM, Yogendra Pal Singh <yogendra78@nic.in> wrote:

Dear Sir,

Since no comments received from the EAC members, the draft MOM of 21st EAC meeting held on 23.12.2021 may kindly be approved.