

Minutes of the 29th meeting of the Expert Appraisal Committee for River Valley and Hydroelectric Projects held on 05th December, 2019 at Teesta Hall, 1st Floor, Vayu WING, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi-3.

The 29th meeting of the re-constituted EAC for River Valley & Hydroelectric Projects was held on 05.12.2019 with the Chairmanship of Dr. S.K. Jain in the Ministry of Environment, Forest & Climate Change at Teesta Meeting Hall, 1st Floor, Vayu, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi-3. The following members were present:

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| 1. Dr. S.K. Jain | - Chairman |
| 2. Shri Sharvan Kumar | - Representative of CEA |
| 3. Shri N.N. Rai | - Representative of CWC |
| 4. Dr. J.A. Johnson | - Representative of WII |
| 5. Dr. D.M. More | - Member |
| 6. Dr. S.R. Yadav | - Member |
| 7. Dr. S. Kerketta | - Member Secretary |

Shri Chetan Pandit, Dr. Vijay Kumar, Dr. A.K. Sahoo, Dr. Govind Chakrapani and Dr. (Mrs.) Poonam Kumria could not present due to pre-occupation. The deliberations held and the decisions taken are as under:

Item No. 29.0 Confirmation of the minutes of 28th EAC meeting.

The Minutes of the 28th EAC (River Valley & Hydroelectric Projects) meeting held on 28.11.2019 were confirmed.

Item 29.1 Cumulative Impact Assessment and Carrying Capacity Study of Hydroelectric projects in Sutlej River Basin in Himachal Pradesh including less than 10 MW projects- reconsideration of the draft report.

Cumulative Environmental Impact Assessment (CEIA) study for 38 HEP in Sutlej River Basin, Himachal Pradesh (H.P) was presented in the 91st EAC (RV & Hydro) meeting held on 08.02.2016 by Indian Council of Forestry Research and Education (ICFRE), Dehradun along with its partner institutions viz. Department of Hydro and Renewable Energy formerly Alternate Hydro Energy Center (DHRE), IIT, Roorkee; Directorate of Coldwater Fisheries (DCFR), ICAR, Bhimtal and Salim Ali Center for Ornithology and Natural History (SACON), Coimbatore.

Scope of the Study:

- To provide optimum support for various natural processes and allowing sustainable development.
- Assess the stress load due to varied HEP activities.
- To envisage a broad framework of environment action plan to mitigate the adverse impact on environment.

Objective:

- To identify potential impacts due to HEP, critical ecosystems, and pre-existing impacts.
- Explicitly identify the receiving system thresholds on the valued ecosystem components (VECs);
- Develop links with other regional scale planning activities for sustainable development.

In that meeting, the EAC suggested to include the following in the CEIA study:

- All HEPs <10 MW in Sutlej basin be also included in the CEIA study. List of such all HEP in Sutlej basin be procured from Directorate of Energy, Department of Energy, Government of H.P. for purpose to include in the CEIA study of Sutlej basin. (Director, IA Division, MoEF&CC).
- The proposed Luhri Stage-I, II & III hydroelectricity project be also included in the CEIA study instead of Luhri project (775 MW) conducted before. (Director, IA Division, MoEF & CC).
- Factors determining riparian distance between two cascading projects presented will be relooked considering the slope than altitude. In addition, EAC suggested for logical framework to calculate the distance between two cascading hydroelectric projects and apply the same to the individual project under study.
- Recommendation for dropping of the any project should be based on scientific and logical reasoning framework supported with index methodology. For this EAC advised that index methodology developed by NEHU could be referred.
- Review the depth range (m) provided for fish.
- For assessing the Environmental Flow Requirement (EFR) fish is not the only criteria, thus other important criteria will be used for calculating the EFR methodology.
- Critical habitat for wildlife fall within any specific project will be included in the report.

The study report was re-submitted to MoEF&CC on November 2018 and detailed presentation was made in the 21st EAC (RV & Hydro) meeting held on 28.01.2019. A total of additional 116 HEPs (including <10 MW HEPs and Luhri HEP Stage-I, II & III) were studied, thus CEIA study included a total of 153 HEP (37 previous and 116 additional study). The following observations were made by the EAC after detailed deliberations:

- EFR is required to be relooked and need to be revisited based on the river cross sections at important places and water depth requirement specific to the fish species and other uses, in the diverted river stretch due to the hydroelectric project. As lower stretch of the Sutlej river is having high fish abundance and catch, river being flat compared to middle and upper Sutlej river stretch may require different EFR for hydroelectric projects falling therein.
- Land Use / Land Cover changes with respect to snow cover area class should be rechecked and verified for the variation shown in the change detection for snow cover area.
- Occurrence of Golden Mahseer in lower stretch of Sutlej River has been reported by Department of Zoology, Punjab University, Chandigarh / Department of Fisheries, Punjab Govt. The presence/absence of Golden Mahseer in lower stretch of Sutlej River (i.e. reservoir of Kol dam and its upstream) should be rechecked and documented appropriately in the study report. The presence/absence of two endemic fish species reported from Spiti Valley may also be taken into account in the study report.
- The exact locations / stretches of the fish breeding and spawning sites as mentioned in the report should be marked on a map and highlighted and details be given in the report.
- Draft Guidelines of CWC regarding longitudinal connectivity has not yet been finalized or approved by GoI. Therefore, such references and exercise to be avoided.
- The HEPs of below 10 MW/25 MW capacity proposed to be dropped based on their location in core or buffer zone of Protected Areas and their ESZ shall be relooked in terms of threat to the wild life (terrestrial faunal groups like mammals, reptiles, amphibians, birds, butterflies, etc.) on habitat, migration routes, breeding sites, plants, fish, etc. due to hydroelectric project. The recommendations presented should be consolidated and specific. The recommendation regarding hydroelectric projects proposed to be dropped should be supported with scientific data.
- The mammals like Snow Leopard, Common Leopard and birds like Monal, Cheer Pheasant, etc. are also of conservation concern as per IWPA, IUCN. This should be taken into consideration in the study report.
- Data inventory and revival of natural springs in H.P may be collected from secondary sources.

- Fish species listed to be revisited, important species such as Mahseer, Dipticus, *schistura sp.* are missing. Also requested to check species valid names.
- E-flow recommended for downstream area is 20% is inadequate in the contest of presence of migratory species like *I. dero*, *I. dyochelius* and mahseer. It needs to be revisited according to the species need.
- Endemic bird species and threatened mammals species in the project area need to be included.

Subsequently, the revised report along with the compliance to the above observations was presented before the 29th EAC meeting held on 05.12.2019 at New Delhi. *Dr. S.K. Jain, Chairman, EAC (RV & Hydro) conveyed that as he had also contributed some technical inputs in the study reports, Dr. D.K. More was requested to Chair the meeting.*

Brief of Study Report:

A total of 153 HEP consisting of 23 large HEP (>25 MW) and 130 small HEP (< 25 MW) in Sutlej River and its tributaries extending from Kol Dam to Shipki La and Khab to Kunzum Pass were undertaken for the study. Ten HEP exist on main Sutlej River while 143 HEP are distributed in 78 tributaries of Sutlej River. There are 23 large HEP (\geq 25 MW), 130 small HEP (< 25 MW) in 71 Khads/Gads/Nallas of sub-tributaries/tributaries of the Sutlej river. Among large HEP, 10 HEP are on main Sutlej river and 13 HEP are on major tributaries like Spiti (04 HEP), Baspa (01 HEP), Tidong (02 HEP), Kashang (03 HEP), Wanger Gad (01 HEP) and Sorang (02 HEP). Luhri HEP Stage-I, II and III are envisaged in cascading manner downstream of Rampur HEP to Sunni.

Of the total 153 HEP; 28 are commissioned having total installed capacity (IC) of 4346.90 MW (18,591.55 MU annual generation); 18 HEP are in advanced stage of construction having 983.1 MW IC (4,239.80 MU annual generation); and 107 HEP are identified/proposed/under various stages of development having IC of 3282.70 MW (10,580.75 MU annual generation). As per the components identified in terms of river length affected, the planned 10 HEP on main Sutlej River will affect 177.35 km of the river length; of which 52.65 km will be submerged due to reservoirs and 124.70 km will be diverted due to run-off-river resulting into significant alteration to the free flowing riverine ecosystem of Sutlej River. In terms of annual generation for per m of head available in the river, storage based scheme showed high electricity generation for each m of head viz. 23 MU (Kol Dam). SHEP showed low electricity generation for each m of head available in the river gradient as they carry low discharge. Annual generation per MW of IC of the power plant showed highest generation of 8.06 MU per MW of installed capacity for Titang project (0.9 MW); while Jhangi Thopan Powari HEP (960 MW) with lowest electricity generation of 2.21 MU Per MW of IC. Annual generation per unit of diverted discharge indicated the energy value for diverted quantity of water from the river showed highest electricity generation as 49 MU per m³ of water for Kashang II and III; against the project Nogli last with low energy generation of 0.46 MU per m³ of water.

With reference to Cumulative Impact Assessment, three level approach and methodology was adopted, which include (i) basin level, (ii) project level and (iii) socioeconomic level using network analysis, matrices, GIS, mathematical impact models, mathematical indexing, check-listing and expert's opinion. The CEIA conducted for 153 HEP, include 37 large HEP (IC >10 MW) and 116 small HEP (IC <10 MW); of which majority (107 HEP) of the projects are under development that include identified, allotted and only few have conducted EIA study (Luhri Stage I and II). A holistic approach was adopted to characterize the potential impacts on ecosystems; valued ecosystem and social components. In case of Social Impact Assessment Index, the village socioeconomic data from the sample surveyed households that fall within the influence zone of 2 km for small HEP and 5 km areal distance for large HEP were considered. Detailed information was not available for the project affected villages or families in the DPR of small HEPs which were not made part of this study.

Six Ecological aspects are grouped in the CEIA study viz. Ecosystem structure & function, biodiversity, ecosystem vulnerability (Sutlej basin is vulnerable to earthquake, landslide and flood as external environmental drivers and thus for ecosystem vulnerability secondary sources of information were used), hydrology, livelihood and dependency on natural resources. These indicators identified were ranked using numerical value based on the impact at various level and were subjected to principal component analysis for each project. The challenges and uncertainties in the data due to non-availability of various data for most of the aspects resulted in significantly high variations between the components used in CIA & CCS for each project developed using 22 identified indicators under 6 selected Valued Ecosystem Component (VEC). However, few components such as protected area, forest area affected and river length affected showed a distinct value. Thus, only those valued ecosystem components such as forest cover, flora and fauna diversity, richness and aquatic ecology were subjected to further cumulative impact for each project using rank values having a scale of 10 to 0 to aggregate the value numerically. In case of aquatic ecology, where the No Fish Zone to zero; low to 5, moderate to 7.5 and significant to 10.

There are 10 protected areas of which, Daranghati WLS, Kibber WLS, Lippa Asrang WLS, Pin Valley NP and Rupi Bhaba WLS and Majathal WLS fall under Key Biodiversity Areas (IUCN, 2016) that provide habitat for unique assemblage of flora and fauna. Considering the importance of the above parameters, indicators were identified and used for ranking, projects located within protected area were given a value of 10; projects within ESZ zone but outside the boundary of protected area are given a value of 5 and for projects outside the ESZ a value of zero. For pristine or undisturbed area, projects within the protected areas or otherwise completely undisturbed areas were assigned a value of 10 and other projects were assigned proportionately lower value. Forestland requirement for the project development is available only for 17 projects out of 153, as majority of proposed project are small HEP and are in the initial stage of allotment. Therefore, this criterion could not be used in the impact ranking. Social un-acceptance ranking is based on stakeholder's consultation and people's perception during socioeconomic survey. HEP located in the Spiti and Kinnaur areas were strongly opposed by the locals and therefore, a value of 10 were assigned to those projects that fall within that zone. The baseline information generated during field surveys such as forest type, biodiversity value, Key Biodiversity Area, etc., was used. Projects impacts were valued based on following components:

1. Located within the protected area or in the vicinity of protected areas
2. Located in pristine or undisturbed area
3. River length affected by project per MW of IC
4. Forest area affected by project per MW of IC
5. Social un-acceptance of project based on local inputs gathered during the survey

The projects in the higher zone were given 50% weightage and the remaining 50% is given to project specific impacts.

Recommendations:

- 1. Based on the project ranking and detailed impact assessment, the following recommendations have been made:**
 - i. Namkan (2.25 MW) falls within the ESZ of Pin Valley National Park and core zone of Cold Desert Biosphere – This HEP shall be subjected for statutory clearance from appropriate authority of MoEF & CC, GoI. If necessary, the IC be modified suitably; otherwise project components would be relocated.
 - ii. Berang (1.5 MW) HEP falls within buffer zone of CDBR - This SHEP has been recommended subject to the statutory clearance from appropriate authority of MoEF & CC, GoI.

- iii. Lara Sumta (48 MW); Sumte Kothang (62 MW) HEP fall within transition zone of Cold Desert Biosphere Reserve (CDBR)- **recommended for preclusion** considering the rich floral & faunal biodiversity that are specific to the Trans Himalayan region having unique socio-cultural value.
- iv. Barakhamba (45 MW), Himani Chamunda Thingri (9.5 MW) and Kaachrang (5.0 MW) and Angyara (1.50 MW) fall within Rupi Bhaba Wildlife Sanctuary, of which Barakhamba (45 MW), Himani Chamunda Thingri (9.5 MW) and Kaachrang (5.0 MW) are **recommended for preclusion**.
- v. Five small HEPs, namely Shushang (1.0 MW), Khargola (2.5 MW), Shailpya (2.4 MW), Gor Galang (2.20 MW), Mangsa Garang (2.4 MW) are located along the border of Rakchham WLS boundary. These HEPs shall be subjected for statutory clearance from appropriate authority of MoEF & CC, GoI.
- vi. Dogali (2.0 MW), Ratadori (1.8 MW) fall in the core zone and Gartada (0.25 MW), Darkali (2.5 MW) and Kotagad (3.5 MW) in the ESZ of Dharanghati WLS - These SHEP shall be subjected for statutory clearance from appropriate authority of MoEF & CC, GoI.
- vii. Kot-II (0.50 MW), Sovari (0.90 MW), Kheuncha (0.50 MW) and Chaunda-II (2.2 MW) falls in the Key Biodiversity Area - These projects have been recommended as least priority.

2. Distance to be maintained between two consecutive HEPs:

Maintaining the distance between two successive projects in cascade is required for re-aeration process, which brings oxygen back into the water. The study area was divided into four altitude zones (above msl), viz. High (above 2000 m), Medium (2,000 m to 1,000 m), Low (1,000 to 500 m) and Lower (less than 500 m) based on the river slope as there was a considerable variation of river slope/gradient between these zones. Length required for oxygen rejuvenation varied between 100 m to 500 m for different zones. The drop in river bed level corresponding to these lengths in each zone was worked out and based on this analysis the following criteria suggested for maintaining minimum distance between hydropower projects in cascade:

River Reach	Gradient	River Longitudinal Slope	Distance (m) for re oxygenation, if required	Recommended distance (m) between two projects
High	0.013 or steeper	1 in 77 or steeper	Up to 100	500
Medium	0.013-0.006	1 in 77 - 1 in 150	100 - 200	500
Low	0.006 - 0.004	1 in 150 - 1 in 250	200 - 300	1000
Lower	0.004 - 0.002 or milder	1 in 250 - 1 in 400 or milder	300 - 500	1000

Providing distance between two consecutive projects will require reduction /revision in head for based on the above criteria. A total of 18 proposed projects such as Jangi Thopan Powari (960 MW), Shongtong Karacham (450 MW), Youngthang Khab (261 MW), Tidong II (60 MW), Ani IV (5.0 MW), Balan Sarogi (2.0 MW), Kaachrang (5.00 MW), Upper Sumej II (2.0 MW), Lower Sumej (5.0 MW), Kareri (5.00 MW), Kurpan III (14.6 MW), Upper Kurmi (5.0 MW), Khanderi (2.0 MW), Nind (3.0 MW), Himani Chamunda Thingri (9.50 MW), Hurba II (3.0 MW), Bagh Garehna (2.0 MW) and Raura Top (2.5 MW) are to be revisited. The reduction/revision in the head of proposed HEP will consequently contribute to reduction of 152.54 MW in the IC proposed and are computed to be 1,644.06 MW instead of the proposed capacity (1,796.6 MW).

3. Environmental Flow

Release of environmental flow (E-Flow) is to ensure the downstream of the diversion structure to sustain ecology and environment in the project area. It is made mandatory for adhering to the stipulated E-flow by HP Government for each existing and new hydro project. In the present study the E-flow for the 26 HEP were calculated based on the requirement of water for the aquatic life for which the cross sections were made available. The hydraulic characteristics (e.g. depths and velocities) within a habitat vary relative to life history needs of fish. The flows that provide good habitat will vary with the requirements of the species and with the morphology of the stream. Assessment of suitable depth and velocity requirement of the existing fish fauna varied depending on fish species and their life stages. In the present study, the criteria for determine hydraulic characteristics (depth and velocity) are based on intensive sampling at different location of the Sutlej basin for the hydrological parameters and presence / absence of aquatic life including fish. The desirable depth and velocity range for the native fish should be as close to its preferred aquatic environment for survival and propagation. Thus EFR for fish and no-fish stream stretch are recommended as given below:

- I. **EFR requirements for No-fish zone** - in all months: Minimum 15% of (mean lean season i.e. mean flow in the month of December, January & February) for 90% dependable year (Actual flow-design discharge) of the SHP or 15% of (mean lean season as (i) above, whichever is more. However, for main stem of the river this is 20% (mean lean season i.e. mean flow in the month of December, January & February) for 90% dependable year.
- II. **EFR requirements for No-fish zone** - in December, January, February and March-20% of the mean lean season flow (mean of 90% dependable year flow in the months of Dec, Jan and Feb).
- III. **EFR requirements for No-fish zone** - April, May October and November-20% of the actual inflow (of 90% dependable year).
- IV. **EFR requirements for No-fish Zone** - June, July, August, September-20% of the minimum flow (or 90% of dependable year) or (Actual flow-project design discharge) whichever is more. It is recommended that the actual depth of water of recommended EFR discharges shall be based on the river cross-sections and is sufficient for required depth of water for aquatic life.

In addition, the general recommendations cover the implementation and monitoring of various environmental parameters. Considering the number of projects proposed and implemented, it is further recommended to involve expert institution in planning and implementation. Also recommended for implementation of integrated management of catchment area treatment plan, muck management, disaster management, road construction either gad/khad or sub basin/basin wise to avoid duplication or overlapping and better implementation for effective management.

EAC Deliberations & Recommendation

The findings based on 21st EAC observations viz. Environmental Flow Requirements (EFR) based on river cross sections; Riparian distance between two cascade projects; Land Use / Land Cover changes *w.r.t.* snow cover; Endemic bird species & threatened mammal's species in the project area; proximity of HEPs of below 10 MW/25 MW capacity from core or buffer zone of Protected Areas and their ESZ; Status of Golden Mahseer in study area; endemic fish species reported from Spiti valley and important fish breeding and spawning sites along with recommendations were presented by the consultant in detail. The point wise compliance of the EAC observations is annexed.

After detailed deliberations, in the 29th EAC accepted the recommendations of the study report and requested for submission of the Executive Summary and the Final report at the earliest. Besides, the EAC also suggested certain observations on the report submitted and the compliance made against each of observation are discussed:

Sl. No.	Compliance of suggestions made by the 21 st EAC
1.	<p>Suggestion:</p> <p>EFR is required to be relooked and need to be reworked based on the river cross sections at important places and water depth requirement specific to the fish species and other uses, in the diverted river stretch due to the hydroelectric project.</p> <p>As lower stretch of the Sutlej river is having high fish abundance and catch, river being flat compared to middle and upper Sutlej river stretch may require different EFR for hydroelectric projects falling therein.</p> <p>Compliance:</p> <p>The river cross sections of Sutlej river and its tributaries for twenty-six (26) HEP locations along downstream of diversion/dam location of the projects. The detail of (1) Jangi Thopan Powari, (2) Karchham Wangtoo, (3) Nathpa Jhakri, (4) Rampur, (5) Luhri stage-I, (6) Luhri stage-II, (7) Luhri stage-III, (8) Shongtong Karchham, (9) Kol Dam, (10) Kashang-I, (11) Baspa-II, (12) Wanger Homte, (13) Masrang Selti, (14) Rakchad, (15) Jeori, (16) Nanti, (17) Jogini, (18) Rala, (19) Manglad, (20) Tidong-I, (21) Tidong-II, (22) Roura, (23) Behna I, (24) Umli, (25) Sumej and (26) Kurmi were made available by power producers, Department of Energy, Govt. of HP and SJVN Ltd.</p> <p>As per the observation of EAC, the discharge (shown in Para 5.6 Assessment of Environmental Flows, Table 5.6.1 Environmental flow requirement for projects in Sutlej river basin) and corresponding depth for EFR in the lean period (Para-5.4.6.1 Adequacy of depth of flow vis-à-vis requirements of fish species table 5.46 of the Final Report Oct. 2015) of Chapter 5 (Table-5.6.118) of the report were compared with the depth and discharge obtained from river cross sections at that particular location.</p>
2.	<p>Suggestion:</p> <p>Land Use / Land Cover changes with respect to snow cover area class should be rechecked and verified for the variation shown in the change detection for snow cover area.</p> <p>Compliance:</p> <p>The AWiFS data for August 2011 to May 2012 and April, October and December 2015 and January- June, October and November 2016 were used by NRSC. The data with respect to snow cover class was re-checked and found that the error in the change detection for snow cover area may be due non availability of AWiFS data for May-Sept., 2015 and variations in precipitation data from normal.</p>

<p>3.</p>	<p>Suggestion:</p> <p>Occurrence of Golden Mahseer in lower stretch of Sutlej river has been reported by Department of Zoology, Punjab University, Chandigarh/Department of Fisheries, Punjab Govt. The presence/absence of Golden Mahseer in lower stretch of Sutlej river (i.e. Koldam reservoir and its upstream) should be rechecked and documented appropriately in the study report.</p> <p>The presence/absence of two endemic fish species reported from Spiti valley may also be taken into account appropriately in the study report.</p> <p>Compliance:</p> <p>Mahseer (<i>Tor putitora</i>) was not recorded during present investigation from the study area of Sutlej river i.e. upstream of Kol dam to Kunjum.</p> <ul style="list-style-type: none"> ▪ Dua, 1993 and Sugunan, 1995 have reported that the migration of this species was affected due to the construction of Bhakra dam on Sutlej river. ▪ Mahseer is reported from lower stretch of river Sutlej near Nangal wetland, which is located on the boundary of Himachal Pradesh and Punjab (Rawal <i>et al.</i>, 2013). <p>References</p> <ol style="list-style-type: none"> 1. Dua, A., 1993. Fisheries in Gobindsagar. Fishing Chimes, 13 (9): 53-54. 2. Sugunan, V.V., 1995. Reservoir fisheries of India. FAO Fisheries Technical Paper. No. 345. Rome, FAO. 423 p. 3. Rawal, Y.K., Kaur A. and Kaur A., 2013. Analysis of length-weight relationship and condition factor of <i>Tor putitora</i> (Hamilton) and <i>Labeo dero</i> (Hamilton) from Nangal Wetland, Punjab, India. IJSR, 2(8): 268-271. <p>During the present investigation two species namely <i>Schizothorax richardsonii</i> and <i>Triplophysa stoliczkae</i> were recorded from the study area of the Spiti valley.</p> <ul style="list-style-type: none"> • Earlier studies on River Spiti, Lahaul-Spiti area have also recorded the same species. • These species are not endemic to Spiti as these are also reported from other trans Himalayan region (Sharma and Dhanze, 2013). <p>References</p> <p>Sharma, I., and Dhanze, R., 2013. Ecology of the River Spiti, Lahaul-Spiti (Himachal Pradesh), India. IJFAS, 3(2):131-141.</p>
<p>4.</p>	<p>Suggestion:</p> <p>The exact locations / stretches of the fish breeding and spawning sites as mentioned in the report should be marked on a map and highlighted and details be given in the report.</p>

	<p>Compliance:</p> <p>As per the suggestion, the major breeding and spawning ground of major fish species such as Snow trout, Barils and Garra has been depicted on the map.</p> <p>Chapter 6, Section 6.3.5.4, page 759 to 762 of the report Vol.-I of Part-II.</p>
5.	<p>Suggestion:</p> <p>Draft Guidelines of CWC regarding longitudinal connectivity has not yet been finalized or approved by GoI. Therefore, such references and exercise to be avoided.</p> <p>Compliance:</p> <p>The reference on draft guidelines regarding longitudinal connectivity has been removed from the report. However, the approved guidelines are now available on the CWC web site. The same may be considered wherever required.</p>
6.	<p>Suggestion:</p> <p>The mammals like Snow Leopard, Common Leopard and birds like Monal, Cheer Pheasant, etc. are also of conservation concern as per IWPA, IUCN. This should be taken into consideration in the study report.</p> <p>Compliance:</p> <p>There are eight species of birds reported to be endemic to Western Himalayas namely, Himalayan quail, Western Tragopan, Cheer Pheasant, White Cheeked Tit, White-Throated Tit, Tytler’s Leaf Warbler, Kashmir Nuthatch and Spectacled Finch (Thakur & Negi, 2015).</p> <p>The present additional study conducted was for short duration, it was not possible to conclusively confirm the presence/ absence of many of these endemic and migratory birds in the project locations solely from the primary data collected.</p> <p>However, based on the primary field data and secondary sources of information generated and the inherent importance of the protected areas designated for maintaining the biodiversity and conservation for the important species of the area, the impact assessment was made. Accordingly, preclusion of HEPs has been suggested.</p> <p>Chapter 10 Section 10.2.4 page 1389 to 1396 of the report Vol.-II Part-II</p>
7.	<p>Suggestion:</p> <p>Data ‘Inventory and revival of natural springs in Himachal Pradesh’ may be collected from secondary sources.</p> <p>Compliance:</p> <p>The mammals like Snow Leopard, Common Leopard and birds like Monal, Cheer Pheasant, etc. are also of conservation concern as per IWPA, IUCN have been already duly taken into consideration in the study report while assigning scores for cumulative assessment of the HEP sites.</p>

	Chapter 6, Section 6.2.5, page 711 to 716 of the report Vol.-I and Part-II and Annexure 6.2
8.	<p>Suggestion:</p> <p>Fish species listed to be revisited, important species such as Mahseer, <i>Diptychus</i>, <i>Schistura sp.</i> are missing. Also requested to check species valid names.</p> <p>Compliance:</p> <p>The Principal Scientific Officer from the office of Himachal Pradesh Council for Science Technology and Environment (HIMCOSTE), Govt. of H.P., Shimla was contacted for data "Inventory and revival of natural springs in Himachal Pradesh". They informed that no such report available in the Library of HIMCOSTE and/or; no such study has been conducted so far. Further, it was conveyed that the study of Inventory of natural springs of Himachal Pradesh has been proposed and is yet to be initiated.</p> <p>Executive Summary Section 11.4, Para II, page XV of the report.</p>
9.	<p>Suggestion:</p> <p>The HEPs of below 10 MW/25 MW capacity proposed to be dropped based on their location in core or buffer zone of Protected Areas and their ESZ shall be relooked in terms of threat to the wildlife (terrestrial faunal groups like mammals, reptiles, amphibians, birds, butterflies, etc.) on habitat migration routes, breeding sites, plants, fish, etc. due to construction of hydroelectric projects. The recommendations presented should be consolidated and specific. The recommendation regarding hydroelectric projects proposed to be dropped should be supported with scientific data.</p> <p>Compliance:</p> <p>A total of 22 species belonging to family Cyprinidae, Nemacheilidae, Sisoridae, Balitoridae, Cobitidae and Salmonidae were recorded from the study area of Sutlej River i.e. upstream of Kol dam to Kunjum.</p> <p>Mahseer was not recorded from the study area as described under - EAC Compliance Sl. No. 3)</p> <p><i>Diptychus sp.</i> and <i>Schistura sp.</i> were not recorded during the entire study period covering all seasons from the studied stretch of the river. The earlier studies have reported the presence of <i>Diptychus sp.</i> from the Leh-Laddakh region of the trans Himalayan region (Sivakumar, 2008). As suggested the valid names of the species has been checked and the same has been incorporated in the main report.</p> <ol style="list-style-type: none"> 1. Sivakumar, K., 2008. Species richness, distribution pattern and habitat use of fishes in the trans-Himalayas, India. <i>Electronic Journal of Ichthyology</i>, 1: 31-42. <p>Chapter 6, Section 6.3.5.2, page 755 to 758 of the report Vol.-I of Part-II</p>

<p>10.</p>	<p>Suggestion:</p> <p>E-flow recommended for downstream area is 20% is inadequate in the contest of presence of migratory species like <i>I. dero</i>, <i>I. dyochelius</i> and mahseer. It needs to be revisited according to the species need.</p> <p>Compliance:</p> <p>Mahseer (<i>Tor putitora</i>) has not been recorded during present investigation. Habitat requirement for coldwater fish species were thoroughly reviewed with existing literature in India and elsewhere (Section 6.3.5.6 and Table 6.3.20 of Vol.-I, Part-II). Accordingly, the estimated depth, velocity and minimum water requirement both during the normal and migration period were arrived incorporating the baseline data generated and used for the present study that are specific to Sutlej river basin in Himachal Pradesh (Section 6.3.5.6 of Vol.-I, Part-II).</p> <p>The depth of water corresponding to recommended EFR discharge worked out based on percentage of inflow in the actual river cross sections that are generally higher than the depth of water recommended for fish movement as discussed above. The actual depth of water of recommended EFR discharge based on the river cross-sections is sufficient for required depth of water for aquatic life and its corresponding EFR. Hence, recommended that EFRs are in order for the species specific to the basin.</p>
<p>11.</p>	<p>Suggestion:</p> <p>Endemic bird species & threatened mammals species in the project area need to be included.</p> <p>Compliance:</p> <p>Rare Endemic and threatened species in the project area are detailed in the Chapter 6, Section 6.2.5, Page Nos. 711-715). Endemic fauna is discussed under section 6.2.6.1 (page 719). No additional endemic or threatened species were recorded during the additional study of <10 MW HEPs study. Threatened species information for all the 153 project sites are given in the Table 3, Annexure - 6.2 of Vol.-III Part-II.</p>

Based on the cumulative impacts assessment, following recommendations have been derived:

- 1. The total number of HEPs recommended, precluded, considered after modification as brought out in the Satluj RBS has been accepted by the EAC.**

The details of these HEPs is as follows:

a. Hydroelectric project located in and around Cold Desert Biosphere Reserve:

- i. The commissioned Rongtong (2.25 MW) HEP is located in the transition zone of CDBR.
- ii. Proposed Lara Sumta (48 MW) and Sumte Kothang (62 MW) HEPs fall within transition zone of CDBR.
- iii. Proposed Berang (1.5 MW) fall within buffer zone of CDBR. The SHEP shall be subjected to regulatory norms and statutory clearance from appropriate authority.

- iv. Proposed Namkan (2.25 MW) HEP is located in the ESZ of Pin valley National Park. The SHEP shall be subject to regulatory norms and statutory clearance from appropriate authority.
- v. Proposed/under development Barakhamba (45 MW), Himani Chamunda Thingri (9.5 MW) and Kaachrang (5 MW) falls in Rupi Bhaba WLS.
- vi. Proposed Shushang (1.0 MW), Khargola (2.5 MW), Shailpya (2.4 MW), Gor Galang (2.20 MW), Mangsa Garang (2.4 MW) are located at border of Rakchham WLS boundary assessed to have cumulative impact. However, these SHEP shall be subjected to regulatory norms and statutory clearance from appropriate authority.
- vii. Proposed Dogali (2.0 MW), Ratadori (1.8 MW) fall in the core zone and Gartada (0.25 MW), Darkali (2.5 MW) and Kotagad (3.5 MW) in the eco-sensitive zone of Dharanghati WLS assessed to have cumulative impact; these SHEP shall be subjected to regulatory norms and statutory clearance from appropriate authority.
- viii. Proposed Kot-II (0.50 MW), Sovari (0.90 MW), Kheuncha (0.50 MW) and Chaunda-II (2.2 MW) falls in Key Biodiversity Area assessed to have cumulative impact. These SHEP shall be given least priority as far as possible.

b. Hydroelectric project recommended for Preclusion

- i. Lara Sumta (48 MW) and Sumte Kothang (62 MW) HEPs fall within transition zone of Cold Desert Biosphere Reserve (CDBR)-considering the importance flora and natural resources on which the community depends and the socio-cultural value, it is **Recommended for preclusion** of these projects having total installed capacity of 110 MW.
- ii. Barakhamba (45 MW) HEP falls in Rupi Bhaba Wildlife Sanctuary - Considering the importance of reach flora, fauna and the habitat it is **recommended for preclusion**.
- iii. Himani Chamunda Thigri (9.5 MW) HEP falls in Rupi Bhaba Wildlife Sanctuary- Considering the importance of reach flora, fauna and the habitat, **it is recommended for preclusion**.
- iv. Kaacharang (5.0 MW) HEP fall in Rupi Bhaba Wildlife Sanctuary - Considering the importance of reach flora, fauna and the habitat, it is **Recommended for preclusion**.

2. Distance Maintained Between Two Consecutive Projects

Distance between two consecutive projects is recommended in 18 proposed HEPs for re-aeration process. Such revision will consequently contribute to reduction of 152.54 MW in the installed capacity proposed and the revised IC would be 1644.06 MW instead of the proposed capacity (1796.6 MW). The HEPs are given in the below table:

Impact of maintaining the distance between two consecutive HEPs

S. No.	Project Name	IC (MW)	Proposed Head (m)	Modified Head (m)	Revised IC (MW)
1.	Jangi Thopan Powari	960	295	277	901
2.	Shongtong Karacham	450	129	111	387
3.	Youngthang Khab	261	187	175	244
4.	Tidong II	60	595	564	57
5.	Ani IV	5.0	166	152	4.58
6.	Balan Sarogi	2.0	65	51	1.57
7.	Kaachrang	5.0	142	125	4.40

8.	Upper Sumej II	2.0	72	54	1.50
9.	Lower Sumej	5.0	155	133	4.29
10.	Kareri	5.0	119	96	4.03
11.	Kurpan III	14.6	267	252	13.78
12.	Upper Kurmi	5.0	186.4	146	3.93
13.	Khanderi	2.0	35.52	15	0.82
14.	Nind	3.0	150	129	2.58
15.	Himani Chamunda Thingri	9.5	239	207	8.23
16.	Hurba II	3.0	142	118	2.49
17.	Bagh Garehna	2.0	163	145	1.78
18.	Raura Top	2.5	640	277	1.08
Total		1796.6			1644.06
Reduction identified in the those above projects that are identified					

3. EFR Using Water Depth in River Cross Section

As per the observation of 21st EAC meeting dated 28.01.2019, the discharge and corresponding depth for EFR in the lean period were compared with the depth and discharge obtained from river cross sections. For computation of discharge and corresponding depth for EFR, river cross-sections of 26 HEPs covering the main stream of river Sutlej having both existing/planned large, medium or small scale hydropower projects was used. It is seen that the depth of water corresponding to recommended EFR discharge worked out based on percentage of inflow in the actual river cross sections are generally higher than the depth of water recommended for fish movement. From the results, it can be concluded that the actual depth of water of recommended EFR discharge based on the river cross-sections is sufficient for required depth of water for aquatic life and its corresponding EFR.

The HEPs having Installed Capacity <5 MW for which the Project details were not available need not to be revisited for maintaining minimum e-flow. However, these projects shall be governed by the Notification of the HP Government on minimum release at the downstream of barrage/dam and also the NGT Order dated 09.08.2017. It is further mentioned that the quantum of e-flows, whichever is higher shall be followed. The recommended of EFRs for recommended projects to be implemented in Satluj river basin is provided in Table (Annexure-I).

- HEPs that are coming within the ESZ area shall be governed by the ESZ Notification and are to be strictly adhered to the stipulations of the Notification. In case, there is any modification/s proposed, viz. the location of the Power House, etc. the same may be undertaken with prior consultation with the State Government and MoEF&CC. The minimum e-flow in such cases shall be decided based on fresh modeling or by the Notification of the HP Government on minimum release downstream of barrage/dam and the NGT Order dated 09.08.2017, whichever is higher.
- The challenges and uncertainties in the data due to non-availability of various data for most of the aspects resulted in significantly high variations between the components used in CIA for each project developed using 22 identified aspects under 6 selected VEC. However, few components such as protected area, forest area affected and river length affected showed a distinct value **protected area & pristine area, undisturbed, forest area, river length affected by project per MW of installed capacity social un-acceptance.**

6. All the 153 HEPs were subjected to ranking for the above parameters with the value between 0-10 to aggregate the value mathematically using valued ecosystem components such as forest type, flora, fauna & avian diversity, richness and aquatic diversity and river length affected by project per MW. In addition, the projects in the higher zone were given 50% weightage and the remaining 50% is given to their project specific impacts and cumulative impacts.

Annexure-I

Calculation of Water Depth for corresponding EFR calculated through actual river cross sections at Different Project Sites

S. No.	Water Depth and EFR recommended						Calculation of Water Depth for corresponding EFR calculated through river cross sections		
	Name of Project	Fish occurrence	Depth Range (m)	Minimum Depth (m)	EFR (m ³ /s)	Average (Dec-Jan-Feb) Inflow (%)	River	Q=AV (m ³ /s)	Depth from corresponding discharge (D) (m)
1	Jangi Thopan P	Nil	NA	NA	6.63	20	Sutlej	10.40	1.35
2	Karchham Wangtoo	Rare	0.2-0.3	0.15	12.13	20	Sutlej	12.16	0.46
3	Nathpa Jhakri	Occasional	0.2-0.3	0.15	12.4	20	Sutlej	12.65	0.50
4	Rampur	Frequent	0.3-0.4	0.3	14.55	20	Sutlej	14.25	0.33
5	Luhri-I	Frequent	0.3-0.4	0.3	14.93	20	Sutlej	14.90	0.27
6	Luhri-II	Frequent	0.3-0.4	0.3	14.93	20	Sutlej	14.88	1.27
7	Luhri-III	Frequent	0.3-0.4	0.3	15.14	20	Sutlej	15.29	0.97
8	Kol Dam	Abundant	0.3-0.4	0.3	25.03	20	Sutlej	25.01	0.70
9	Shongtong Karcham	Nil	NA	NA	13.52	20	Sutlej	13.69	0.14
10	Baspa-II	Frequent	0.2-0.3	0.2	1.86	20	Baspa	1.82	0.76
11	Tidong-I	Rare	0.2-0.3	0.15	0.99	20	Tidong Khad	0.99	0.20
12	Tidong II*	Nil	NA	NA	0.86	20	Tidong Khad	0.84	0.22
13	Wanger Homte	Nil	NA	NA	0.66	20	Wanger Gad	0.67	0.09
14	Masrang Selti	Nil	NA	NA	0.67	20	Kashang Khad	0.75	0.11
15	Kashang-I*	Nil	NA	NA	0.47	20	Kashang Khad	0.49	0.03
16	Rakshad	Nil	NA	NA	0.17	16	Salring Khad	0.19	0.07
17	Jeori	Nil	NA	NA	0.22	20	Manglad Khad	0.23	0.03
18	Nanti	Nil	NA	NA	0.43	20	Nanti Khad	0.45	0.12
19	Jogni	Nil	NA	NA	0.38	15	Nogli Gad	0.60	0.13
20	Rala*	Nil	NA	NA	0.29	20	Panwi Khad	0.29	0.05
21	Manglad	Nil	NA	NA	0.25	20	Manglad Khad	0.26	0.03
22	Roura-II*	Nil	NA	NA	0.27	20	Raura Gad	0.28	0.06
23	Behna I	Occasional	0.20-0.30	0.2	0.8	20	Anni Gad	0.83	0.15
24	Umli	NIL	NA	NA	0.41	20	Kurpan Khad	0.42	0.08
25	Sumej*	NIL	NA	NA	0.09	19	Sechi Khad	0.09	0.06
26	Kurmi	NIL	NA	NA	0.12	16	Nanti Khad	0.3	0.03

*(Steep Slope i.e. 1:6 or steep)

Item No. 29.2 Jakhol Sankri Hydro Electric Project (44 MW), in district Uttarkashi, Uttarakhand by M/s SJVNL-reg. reconsideration of EC. Proposal No. IA/UK/RIV/41642/2016, No. J-12011/07/2016-IA.I (R)

Project proponent along with the consultant M/s WAPCOS, the PP presented the proposal before the EAC and *inter alia*, provided the following:

The Jakhol Sankri Hydro Electric Project (44 MW) is proposed on river Supin (a tributary of River Tons), near village Jakhol in District Uttarkashi of Uttarakhand. The project envisages construction of a 7.2 m high (from average river bed level) barrage, which will divert water through a 6.6 km long, 3.0 m diameter HRT to an underground powerhouse. Two units of 22 MW each shall be installed for generation of 166.19 MU of electricity per annum. This is a run-of-the-river scheme. The catchment area of the project is 268.20 km².

At present Jakhol Sankri Hydro Electric Project (JSHEP) is the only hydropower project proposed under development on river Supin. Since, there is no project proposed upstream of this project, there is no impact on the flow volume or the flow pattern as far as JSHEP is concerned. Downstream of the proposed JSHEP is Naitwar Mori HEP (60 MW) on river Tons which is presently under construction. Hydrological analysis has been conducted on the basis of water years. The JSHEP catchment is a part of the bigger catchment of Tons at Tuini located downstream. The proportion of snow bound area is higher in case of the upper catchment (JSHEP). Some of the flow figures characterizing the flow pattern of the river at the project site are given in the table below:

Flow Pattern of Supin at Jakhol:

Characteristic Flow	Value in Mm ³
Average annual flow	359.72
Maximum annual flow	667.96- Year 1990-91
Minimum annual flow	214.07- Year 2000-01
Av. Monsoon flow (July-Oct.)	205.98
Av. Non-monsoon flow (Remaining months)	153.74
Maximum 10-daily discharge	65.24 m ³ /s
Minimum 10-daily discharge	1.56 m ³ /s

PP informed EAC that MoEF & CC accorded ToR for IC of 51 MW on 11.01.2011. Accordingly, EIA/EMP report was prepared. However, due to June, 2013 floods in Uttarakhand, Hon'ble Supreme Court in its judgment dated 13.08.2013 directed MoEF & CC not to take up any new project for both EC & FC in Uttarakhand till further orders. Further, Hon'ble Supreme Court vide its order dated 24.11.2015, clarified that its judgment dated 13.08.2013 is not applicable to three projects of SJVN limited in Uttarakhand including JSHEP. Taking into account the same, the project capacity was revised to 44 MW. However, the location of barrage site and powerhouse site remain unchanged.

Accordingly, EAC in its 92nd meeting held during 28-29 March, 2016 recommended the ToR for 44 MW project. Revised ToR was issued vide letter dated 07.06.2016. Uttarakhand Environment Protection and Pollution Control Board organized the public Hearing for JSHEP on 01.03.2019 at Khand Vikas Adhikari Office, Mori, Uttarkashi and Chaired by the Additional District Magistrate, Uttarkashi. The Regional Officer and Assistant Scientist represented UEPPCB. The National Board has recommended the proposed project for Wildlife clearance on 21.09.2016. GoUK issued the TEC Clearance on 03.06.2019. PP submitted the EIA/EMP report to the MoEF&CC on 27.06.2019.

EAC observed that earlier Public Hearing was scheduled on 12.06.2018; however, PH could not be completed because of the protest against the proposed project. Subsequently, on 01.03.2019 PH was held at Vikas Khand Karvalaye Parisar, district Uttarkashi. EAC took the cognizance of the complaint received from the Matu Jan Sanghtan in the Ministry on the issue of Public Hearing. EAC further observed that proposed project is near to GPV Wildlife Sanctuary/ National Park and project was recommended in the 39th meeting of Standing Committee of National Board of Wildlife (SC-NBWL).

Total land requirement is 39.088 ha, out of which, 24.317 ha is forestland including Civil Soyam land and 14.771 ha is private land. Total submergence area is about 3 ha. An underground powerhouse is proposed with 2 units of 22 MW capacities each. About 216 families (average size 6 persons per family) in 4 villages are likely to be affected by this project. The total cost of project is about Rs. 477.15 crores. Forest Clearance, Stage I is under process.

There are 216 families who may lose land. There are 6 project-affected villages in Tehsil Mori of District Uttarkashi namely Dhara, Jakhol, Sunkundi, Pawn Malla, Pawn Talla and Sawani. Whereas the private land is to be acquired in four villages, in village Jakhol & Sawani entire land to be acquired is Government Land. The R&R plan has been devised in line with the "Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013". SIA study is complete and the District Magistrate has approved the report on 26.06.2019. Notification under Section 11 is issued on 27th June, 2019.

Environment baseline status has been collected during 2017 for three seasons (winter: January 2017, Pre-Monsoon June 2017 and Monsoon in September 2017). Average PM₁₀ levels are between 42.0 to 55.0 µg/m³. Average PM_{2.5} levels are to be found between 14.0 to 27.0 µg/m³. The highest values of NO_x observed during winter, pre-monsoon and monsoon season. The maximum SO₂ levels were 10.7, 11.1 and 10.0 µg/m³ are 6.2, 7 and 7 µg/m³ in the winter, pre-monsoon and monsoon season, respectively. Ambient air quality is good in the area. The noise level in winter and pre-monsoon seasons ranged from 36.6 to 38.1 dBA and 38.4 to 40.3 dBA, respectively. The daytime equivalent noise level in monsoon season at various sampling stations ranged from 36 to 38 dBA. The noise levels were well within the permissible limit. There are no major sources of organic pollution loading in the basin. The total hardness in various water samples was 24-44 mg/l, 21-42 mg/l and 20-44 mg/l in winter, pre-monsoon and monsoon seasons, respectively. The low calcium and magnesium levels are responsible for soft nature of water. The total hardness level in the water is well below the permissible limit of 200 mg/l. The low EC and TDS values indicate the lower concentration of cations and anions. The BOD and COD values were very low. Level of heavy metal in the water of the project area is found to be below the permissible limit used for drinking purposes.

The forests in the project area fall in the Tons Forest Division. As per "Revised Survey of Indian Forest type" by Champion & Seth (1968), following forest types have been observed: Sub-tropical chir pine forest, Banj Oak forests (*Quercusleucotricophora*, Moru oak forest (*Quercus floribunda*), Moist deodar forest (*Cedrus deodara*), Western mixed coniferous forest, Moist Temperate Deciduous Forest. The fauna of the study area consists mostly of species with zoo-geographic affinities of Palearctic, Indo-Malayan and indigenous species. Mammals (Wild Boar, Jackal, Rhesus Macaque, Yellow throated marten, Barking deer, etc.) Birds: White-cheeked Bulbul, Indian Myna, Hoopoe, Spotted Forktail, etc. Butterflies: Small copper, Common Sailor, Common leopard, etc. As per secondary data sources, total 9 species of reptiles and 4 species of amphibians has been recorded from the area. However, no such species was encountered except the Rock agama and skinks. Fishes: A total of 6 species (*Schizothorax richardsoni*, *Schizothorax progastus*, *Garra gotyla gotyla*, *Barilius bendelisis*, *Paraschistura montana* and *Glyptothorax pectinopterus*) were found close to the

confluence of Tons and Supin River at downstream site of powerhouse under the area of JSHEP. No fish was found at other sites. PP presented the anticipated environment impacts due to proposed project such as diversion of forest land, deforestation, effect on wildlife, Erosion, silting, loss of trees, effects on reservoir periphery due to impoundment, Impact on Fishes, Impact on health due to pondage, vector borne diseases, etc., Muck generation, Quarrying activities, Construction activities, air and water pollution, noise pollution, scarring of land and submitted the corresponding environment management plan as a mitigation measures.

Project benefits include addition of 166.19 MU of energy in the northern grid, Generation of clean electricity, Social upliftment of project affected persons, improved facilities w.r.t schools, dispensaries, medical facilities, banking, telecommunication, road network, etc., Local area development (infrastructural/community development) in project Panchayat.

Earlier proposal was considered by the EAC in the 25th meeting held on the 19.07.2019. EAC after detailed deliberation on the information as presented and submitted to the Ministry had deferred the project for want of following information:

- i. Details of the public hearing issues raised along with the compliance shall be submitted.
- ii. PP is required to submit clarification from the State Pollution Control Board that whether Public Hearing was conducted following the procedure mentioned in the appendix V of EIA Notification and as amended thereof along with the justification for conducting PH distant from the project site.
- iii. Possibility of subsidized electricity demanded by the locals should be explored.
- iv. Environmental Matrix during construction/operational phase needs to be submitted.
- v. Environmental Management Plan with budget breakup (Capital as well as recurring) shall be submitted.
- vi. Fund allocation for CER shall be made as per Ministry's O.M. No. 22-65/2017-IA.III dated 1st May, 2018 for various activities therein.
- vii. The details of activities with budget allocation under CER shall be submitted and incorporated in EIA/EMP report.
- viii. Consolidated EIA/EMP report is to be submitted as per the generic structure (Appendix III) given in the EIA Notification, 2006.
- ix. Content of the summary EIA be made as per the Appendix III A of EIA Notification and therefore should be submitted in the EIA report.
- x. An undertaking as part of the EIA report from Project proponent, owning the contents (information and data) of the EIA report with the declaration about the contents of the EIA report pertaining to a project have not been copied from other EIA reports before grant of EC.
- xi. Fish species availability needs to be reviewed as Supin River has good number of Rainbow trout.
- xii. Details of plant species of gymnosperm found in the area are to be included in plantation program.
- xiii. Criteria taken into account for selection of threatened species is to be detailed out.
- xiv. QCI & NABET Accredited certificate of the consultant for the period during which baseline data and other EIA/ EMP studies carried out.

PP submitted the above information to the Ministry on 09.10.2019. Accordingly, proposal was listed in the agenda of the 28th EAC meeting. Project proponent along with the consultant M/s WAPCOS made the detailed presentation on the information as sought by the EAC in 25th meeting. EAC observed and noted further the following from the information submitted and as presented before the committee:

- Clarification from the state pollution control Board that whether Public Hearing was conducted following the procedure mentioned in the appendix V of EIA Notification and as amended thereof along with the justification for conducting PH distant from the project site. EAC noted that the location for public Hearing was finalized by SPCB in consultation with Dist. Magistrate.
- Possibility of subsidized electricity demanded by the locals has been explored by the PP. PP informed that each PAF shall be provided 100 units of free electricity per month for 10 years after commissioning of the project. Further, solar lights can be provided at community places as per societal need under CSR provisions.
- PP submitted the of Environmental Management Plan with budget breakup.
- PP also submitted that the following fund allocation for CER shall be made as per Ministry's

Vide O.M. No. 22-65/2017-IA-III, dated 1st May, 2018, the various activities therein to be carried out are as follows (**Amount in Rupees Lakh**):

S. No.	Particular	Per school	For 5 schools
A.	Construction/Up-gradation of schools in Study Area		
1.	Construction of new Hostel/Hall	-	150
2.	Furniture & Fixtures and equipment	10.0	50.0
3.	Improvement of drinking water facilities	3.0	15.0
4.	Purchase of school bus ×2 Nos.	30.0	60.0
	O&M cost of Rs. 8.75 lakh for 2 school buses (for 10 years including escalation @ 10% per annum)	-	139.45
	Total	43.0	414.45
B	Scholarships to students in the Study Area		
1.	Scholarship for School going students (50 Students @Rs. 600 per month for 12 years)		43.2
2.	Scholarship for meritorious Students-College/higher education		
	(a) Fees/course material (@ Rs. 10,000/year to 20 students for 4 years)		8.0
	(b) Hostel expenses (@Rs.5,000/year to 20 students for 4 years)		4.0
	Total		59.2
C	Improvement of Public Health Facility		
		Cost (Rs. in lakhs)	Cost for 02 PHSCs (Rs. in Lakhs)
1.	Furniture, Beds and other items	8.5	17.0
2.	Up-gradation of Medical laboratory	15.0	30.0
3.	Up-gradation of operation theatre (labor room)	8.0	16.0
4.	Purchase of 2 mobile clinic vans	40.0	40.0
	O&M cost of Rs. 8.75 lakh for 2 Vans (for 10 years including escalation @ 10% per annum)	-	139.45
	Total		242.45

- PP submitted the consolidated the Consolidated EIA/EMP report, the summary EIA be made as per the Appendix III A of EIA Notification and an undertaking as part of the EIA report from Project proponent.

EAC after detailed deliberation on the information as presented and submitted to the Ministry deferred the project for want of following information:

1. Environmental matrix during construction/operational phase needs to be submitted.
2. As suggested by the committee, Environmental Management Plan with budget breakup (Capital as well as recurring) shall be submitted.
3. Detailed status of Stage I FC to be submitted.

PP submitted the above information to the Ministry on 29.11.2019. Accordingly, proposal was listed in the agenda of the 29th EAC. Project proponent along with the consultant M/s WAPCOS made the detailed presentation on the information as sought by the EAC in 28th meeting. EAC observed and noted following from the information submitted and as presented before the committee:

- PP presented the detailed Environmental matrix during construction/operational phase.
- PP submitted the following Environmental Management Plan with budget breakup for both Capital as well as recurring:

S. No.	Management Plan	Total Cost	Capital Cost	Recurring Cost	Remarks
1	Compensatory Afforestation	351.84			To be deposited in CAMPA and SFD
	a. Afforestation		106.99		
	b. NPV		231.00		
	c. Cost of trees		13.85		
Total		351.84	351.84		
2	Biodiversity Conservation	372.65			
A	Habitat improvement for avi-fauna, Costs of nets, wooden boxes, installation, etc. (CC) Salary for one skilled person for 5 years (RC) @ Rs 15000/month with 10% escalation every year	32.00	10.00	15.00	~ Rs 1.80 lakhs /y
	Repair and maintenance (CC) Contingencies (RC)		2.00	5.00	
B	Eco-development works	30.00	30.00		
C	Establishment of herbal park	75.00	75.00		
D	Wildlife Protection Plan	235.65			
	Anti-poaching kits		25.00		

	Infrastructure		75.00		
	Survey equipment and vehicle		75.00		
	Check posts		25.00		
	Salary for 8 guards @Rs 8000/month for 4 years with 10% escalation every year			35.65	~ Rs 7.68 lakhs/yr
	Total (A + B + C + D)	372.65	317.00	55.65	
3.	Catchment Area Treatment Plan	680.00			To be deposited in CAMPA
a)	Biological treatment measures		361.20		
b)	Soil & water Conservation works		126.3		
c)	Research, Training		60.00		
d)	Forest Protection		52.50		
e)	Wildlife Management		80.00		
	Total	680.00	680.00		
4.	Fisheries Management Plan	105.88			Although recurring, but one-time payment to be made to state Fisheries Department.
a)	Cost for development of hatchery		25.20		
b)	Cost for fish food, brooders, training, maintenance, travel, salary, etc. for 4 years with 10% escalation every year		80.68		
	Total	105.88	105.88		
5.	Public Health Delivery System for 4 years	142.3			
a)	Dispensary - salary for doctors, nurses, attendants, etc. @ Rs 14.52 lakhs/y			85.30	~Rs 18.38 lakhs/y
b)	Drugs, medicine etc. @ Rs 3.86 lakhs/y				
c)	Vehicles, furniture, etc.		35.00		
d)	Infrastructure		22.00		
	Total	142.30	57.00	85.30	
6.	Env. Management in Labour Camps	490.43			
A	Solid waste management				

	Truck, preparation of landfill site, waste collection hand carts	22.30	22.30		
	Salary for 6 persons @ Rs 5000/month for 4 years including 10% escalation	16.70		16.70	~ Rs 3.6 lakh/year
B	Sanitation facilities (Community latrines etc.)	95.00	95.00		
C	Provision for free fuel distribution	356.43			
	Annual requirement @ 1 cylinder per 5 persons per month with 10% escalation every year for 4 years			76.80 84.48 92.93 102.22	~ Rs 89 lakh /year
	Total (A+B+C))	490.43	117.30	373.13	
7.	Muck Management Plan	421.00			
a)	Engineering measures		290.00		
b)	Biological measures		131.00		
	Total		421.00		
8.	Restoration & landscaping of construction sites and road construction/repair/widening areas	370.00			
a)	Creation of viewpoints, garden complex, etc.		100.00		
b)	Clearing & grubbing		40.00		
c)	Construction of breast walls, CWD, etc., drainage system, roadside plantation, etc.		230.00		
	Total		370.00		
9.	Greenbelt Development Plan	30.00	30.00		Through SFD
10.	Control of air pollution	66.80			
	Repair of roads during construction		30.00		Repair of roads
	3 traffic managers @ Rs 12000 pm for 4 years including 10% escalation per year			20.10	~ Rs 4.32 lakhs /year
	5 sweepers @ Rs 6000 pm for 4 years including 10% escalation per year			16.70	~Rs 3.6 lakhs /year
	Total		30.00	36.80	
11	Control of noise pollution	11.00			

	Construction of acoustic enclosure for DG sets		11.00		
	Total		11.00		
12	Control of water pollution	10.00	10.00		
13	Public Awareness Programme	50.00	50.00		
14	R&R Plan	1369.13	293.45	1075.68	~90.72 lakhs/annum
15.	Livelihood Plan	192.64			
a)	Purchase of goat and sheep		51.84		
b)	Training in artificial insemination		50.00		
c)	Grant for establishment of a Natural Breeding Centre		30.00		
d)	Other expenses		50.00		
e)	Training & Skill development		10.80		
	Total		192.64		
16	CER	716.10			
a)	Construction and up-gradation of schools		414.45		
b)	Scholarship to students			59.20	~ Rs 6.6 lakhs/year
c)	Improvement in public health facility		103.00	139.45	~ Rs 8.75 lakhs/year
	Total		517.45	198.65	
17.	LADP	240.00	240.00		
18	DMP	60.00	60.00		
19	M&E of social aspects	30.00		30.00	~ Rs 7.5 lakhs/year
20	Purchase of Meteorological Instruments and Noise Meter	15.00	15.00		
21	Implementation of Environmental Monitoring Programme during construction	45.60		45.60	~ Rs 11.40 lakhs/year
	GRAND TOTAL	5770.00	3899.19	1870.00	
22	Implementation of Environmental Monitoring Programme @ Rs 18.60 lakhs per year during operation				~ Rs 18.60 lakhs/year
a)	Water quality			2.60	

b)	Ecology			5.00	
c)	Riverine fisheries			6.00	
d)	Incidence of water related disease			5.00	
	Total			18.60	

- PP submitted the status of Stage I Forest Clearance and informed to the EAC that the proposal was taken up in the REC meeting, Regional Office (MoEF&CC, Dehradun) on September 09, 2019 with few observations.
- EAC further observed that PP has submitted the point-wise reply to the representations received in the Ministry on the Public Hearing issues.

EAC deliberated on the information provided in the EIA/EMP by the PP, documents submitted in support of additional information sought in the earlier meetings and response submitted to the representations received in the Ministry on Public Hearing issues. EAC after detailed deliberation, **recommended the proposal for grant of Environmental clearance** with the following additional conditions:

- Stage I Forest Clearance shall be submitted to the Ministry before issuance of Environmental Clearance to the project.
- Necessary permission to be obtained for quarrying construction materials for the project as per the EIA Notification, 2006 and subsequent amendments thereof.
- Solid waste generated, especially plastic waste, etc. should not be disposed of as landfill material. It should be treated with scientific approach and recycled. Use of single-use plastics may be discouraged.
- Land acquired for the project shall be suitably compensated in accordance with the law of the land with the prevailing guidelines. Private land shall be acquired as per provisions of Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013.

Item No. 29.3 Shanti Sagar Standalone Pumped Storage Project, District: Davanagere, Karnataka by Cerulean Energy Solutions Private Limited- reg. Fresh ToR. Proposal No. IA/KA/RIV/124992/2019, File No. J-12011/19/2019-IA-1 (R)

Project proponent along with the consultant (M/s. R.S. Envirolink Technologies Pvt. Ltd. (RSET), NABET Accredited Consultant Organization, 403, Bestech Chambers, Block-B, Sushant Lok Phase I, Sector 43, Gurugram, Certificate No: NABET/EIA/1619/SA075) made the detailed presentation on the proposal and *inter alia*, provided the following information:

Cerulean Energy Solutions Private Limited proposes to develop Standalone Pumped Storage Project (PSP) in Arasanaghatta and Basavarajpur (village), Channagiri (Tehsil) of Davanagere (District) in the state of Karnataka.

The total capacity of proposed PSP is 270 MW (1,620 MWH, based on 6-hour operation per day) and envisages non-consumptive utilization of 0.254 TMC of water from existing Shanti Sagar Reservoir by re-circulation. The project involves creation of new upper reservoir, whereas the existing Shanti Sagar Reservoir will be used as lower reservoir. The proposed scheme involves construction of rock fill embankment (upper reservoir) 56.0 m in height for gross storage

of 0.279 TMC water. Water conductor system consists of two numbers of independent penstocks, which connect the powerhouse located at about 513 m from intake structure. As such, the proposed project will generate 270 MW (2x135 MW) by utilizing design discharge of 325.05 cumecs with rated head of 96.0m. Total estimated cost of the project is Rs. 1347.63 Crores.

The existing Shanti Sagar reservoir will be utilized as a lower reservoir to enable Shanti Sagar Standalone PSP to operate as a peak station. The FRL & MDDL of existing Shanti Sagar reservoir is at EL 610.00 m and EL 605.00 m, respectively. Water will be pumped to the proposed upper reservoir through TRC. The proposed Shanti Sagar Standalone PSP upper reservoir is located at about EL 670.00 m and the FRL and MDDL of this reservoir is at EL 723.00 m & EL 690.00 m, respectively. The live storage of the proposed reservoir is kept for 0.254 TMC. Two independent pressure shaft / penstock of 6.5 m diameter will feed 2 units of 135 MW each. The length of the pressure shaft up to powerhouse location shall be 513m. The pressure shaft is designed to withstand the internal pressure from water and external pressure from rock. Rock participation factor is considered in the design of pressure shaft. The penstock/pressure shaft consists of Steel Lined-Circular 287.00m long surface type and 94.00m height Vertical Pressure Shaft followed by 132.00 m long Horizontal Pressure shaft. A tailrace channel of approximately 815 m long will discharge the flow in to existing Shanti Sagar reservoir after power generation.

Total land required for construction of various components, including infrastructure facilities and muck disposal area is estimated to be around 112.88 ha, involving 97.88 ha of forestland and 15.00 ha of non-forest land. The details are tabulated below:

Table: Area Statement of Proposed Standalone PSP:

Sr. No.	Project Components	Forest (ha)	Non-Forest (ha)
1.	Upper Reservoir	55.67	0.00
2.	Approach Road to Upper Reservoir, Approach Road to VPS & Powerhouse	2.92	0.00
3.	Adits	0.76	0.00
4.	WCS, PH, TRC	13.42	0.00
5.	Job Facilities	0.00	15.00
6.	Muck Disposal	25.00	0.00
7.	Magazine	0.10	0.00
Sub-total		97.88	15.00
Total Area		112.88	

Forest Clearance: Online application will be submitted subsequently thereby seeking forest diversion for around 97.88 ha. Alongside, other statutory clearances (as applicable) from State as well as Central government will be obtained post completion of Detailed Project Report.

Project benefits: Pumped storage hydropower is a modified use of conventional hydropower technology to store and manage energy or electricity by moving water between an upper and lower reservoir. Currently, pumped storage round-trip or cycle energy efficiencies exceed 80%, comparing favorably to other energy storage technologies and thermal technologies. This effectively shifts, stores, and reuses energy generated until there is corresponding demand for system reserves and variable energy integration. This shifting can also occur to avoid transmission congestion periods, to help more efficiently manage transmission grid, and to avoid potential interruptions to energy supply. This is important because many of the renewable energy resources being developed (e.g., wind and solar) are generated at times of low demand and off-peak energy demand periods are still

being met with fossil fuel resources, often at inefficient performance levels that increase the release of greenhouse gas emissions.

Further, pumped storage projects are critical to the national economy and overall energy reliability because it is:

- Least expensive source of electricity, not requiring fossil fuel for generation
- An emission-free renewable source
- Able to shift loads to provide peaking power without requiring ramp-up time like combustion technologies
- Often designated as a “black start” source, able to restore network interconnections if a power blackout occurs
- Balancing grid for demand driven variations
- Balancing generation driven variations
- Voltage support and grid stability

Apart from this, proposed PSP will also benefit the local community by creating employment opportunities and will result in upliftment of livelihood and socio-economic conditions.

EAC deliberated on the information submitted (Form 1, PFR, .kml file, etc.) and as presented in the meeting and observed that instant project being the Pump storage project and standalone in nature and upper reservoir is located away from all existing natural water systems and have no/negligible catchment area therefore CAT Plan, RIM treatment, L-section of river and Environmental flow study for the upper reservoir will not be required under EMP. PP also submitted in the Form 1 that there is no Protected Area notified under the Wild Life (P) Act, 1972; Critically Polluted areas as identified by the CPCB constituted under the Water (P) Act 1974; Eco-sensitive areas as notified within 10 km of the Project boundary.

After detailed deliberation on the information submitted and as presented, the EAC recommended for grant of **Standard ToR** to the proposed project with the following **additional ToR conditions**:

1. Land acquired for the project shall be suitably compensated in accordance with the law of the land with the prevailing guidelines. Private land shall be acquired as per provisions of Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013.
2. The project involves diversion of about 97.88 ha of forestland. Forest clearance shall be obtained as per the prevailing norms of Forest (Conservation) Act, 1980.
3. Application to obtain prior approval of Central Government under the Forest (Conservation) Act, 1980 for diversion of forest land required should be submitted as soon as the actual extent of forest land required for the project is known, and in any case, within six months of issuance of this letter.
4. 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.
5. An undertaking as part of the EIA report from Project proponent, owning the contents (information and data) of the EIA report with the declaration about the contents of the EIA report pertaining to a project have not been copied from other EIA reports.
6. Funds allocation for Corporate Environment Responsibility (CER) shall be made as per O.M. No. 22-65/2017-IA.III dated 01.05.2018 for various activities therein.

7. The details of funds allocation and activities for CER shall be incorporated in EIA/EMP report.
8. Consolidated EIA/EMP report is to be submitted as per the generic structure (Appendix III & IIIA) given in the EIA Notification, 2006.
9. Conservation plan for the Scheduled I species, if any, in the project study area shall be prepared and submitted to the Competent Authority for approval.
10. Pre-DPR Chapters viz., Hydrology and Layout Map and Power Potential Studies duly approved by CWC/CEA.
11. Details of discharge monitoring and E-flow from the existing Shanti Sagar reservoir to be submitted.
12. Dam break analysis and Disaster Management Plan be prepared and submitted in the EIA/EMP report.
13. Environmental matrix during construction and operational phase needs to be submitted.
14. Both capital and recurring expenditure under EMP shall be submitted
15. Solar energy utilization as well as wind energy utilization studies on water losses be performed.

Item No. 29.4 Sukhpura Standalone Pumped Storage Project, District: Chittorgarh, Rajasthan by M/s Greenko Energies Private Limited- reg. fresh ToR. Proposal No. IA/RJ/RIV/125003/2019, File No. J-12011/20/2019-IA-1 (R)

Project proponent along with the consultant (M/s. R S Envirolink Technologies Pvt. Ltd. (RSET), NABET Accredited Consultant Organization, 403, Bestech Chambers, Block-B, Sushant Lok Phase I, Sector 43, Gurugram, Certificate No: NABET/EIA/1619/SA075) made the detailed presentation on the proposal and *inter alia*, provided the following information:

Greenko Energies Pvt. Ltd. proposes to develop Standalone Pumped Storage Project (PSP) in Sukhpura, Gorakia, Nahargarh, Pratappura and Khema Ka Kheda (V), Rawatbhata (T) of Chittorgarh district in the state of Rajasthan. The Sukhpura Standalone PSP will comprise of two reservoirs, which are to be constructed newly upper & lower reservoirs). The upper reservoir is proposed to be located on flat / gradually sloping land which is suitable for creating the desired gross storage capacity of 2.53 TMC by doing excavation up to the desired level. Out of 2.53 TMC, the live storage capacity is 2.43 TMC and the dead storage capacity is 0.1 TMC by keeping FRL & MDDL at EL 607.00 m and EL 580.00 m respectively. For creating this storage, it is proposed to construct Rockfill embankment for the average height of around 33 m (with maximum height of 40 m) for the length of 8,786 m.

Similarly, the lower reservoir is proposed to be located in the gorge portion which is suitable for creating the desired gross storage capacity of 2.48 TMC in which the live storage capacity is 2.43 TMC and dead storage capacity is 0.05 TMC by keeping FRL and MDDL at EL 425.00 m and EL 395.00 m, respectively. For creating this storage, it is proposed to construct Rockfill embankment for the average height of 29 m (with maximum height of 38 m) for the length of 1,688 m. This Project is standalone in nature and both the reservoirs are located away from all existing natural water systems and have no/negligible catchment area. Water will be lifted one time from existing nearby Rana Pratap Sagar reservoir / Brahmani Nadi and will be stored in the reservoirs to be constructed and used cyclically for energy storage and discharge. Evaporation losses, if any will be recouped periodically from Brahmani Nadi. This Project envisages non-consumptive re-utilization of 2.43 TMC of water for recirculation between two proposed reservoirs. The geographical coordinates of the proposed upper reservoir are at longitude 75°23'40.22" E and latitude is 24° 59' 57.76" N and that of lower reservoir are at longitude 75° 23' 10.24" E and latitude 25° 0' 15.54" N. Proposed rating of

Pumped Storage Project is 5040 MW. Water conductor system consists of sixteen numbers of independent penstocks that connects the powerhouse located at about 850 m from intake structure. The proposed project will generate 5040 MW (16x315 MW) by utilizing design discharge of 3162.87 cumecs with rated head of 178.50 m. The water from powerhouse out fall is let back to the newly proposed lower reservoir through Tailrace Tunnel / Channel.

The Sukhpura Standalone PSP is proposed between two reservoirs i.e. Sukhpura Standalone PSP upper and lower reservoir (both are to be constructed newly) and one-time water will be pumped from nearby existing Rana Pratap Sagar reservoir / Brahmani Nadi to fill up the proposed reservoir. Secondly since these two reservoirs are not located across any stream, no Specific hydrological studies are required to be carried out. The upper and lower reservoir does not have any catchment area and hence the inflow from rainfall is negligible.

PP further submitted that either the existing Rana Pratap Sagar reservoir or the Brahmani Nadi will be utilized to pump the required quantum of water to the proposed Sukhpura Standalone PSP upper reservoir. The catchment area of Rana Pratap Sagar reservoir is 956 km². The length and height of dam is 1143 m & 53.80 m, respectively. The gross storage and live storage capacity of Rana Pratap Sagar reservoir is 55.31 TMC and 102.33 TMC respectively. The FRL & MDDL of existing Rana Pratap Sagar reservoir is at EL 352.81 m and EL 343.00 m respectively. Similarly, the Brahmani Nadi is the tributary to Chambal river and as per the information given by Times of India in online, rain water flowing in Brahmani Nadi goes untapped as it gets mixed with the water of Chambal river which eventually meets Yamuna in Uttar Pradesh. According to an estimate, every monsoon about 355 million m³ of surplus is available in the Brahmani Nadi. Based on the above, the requirement of water will be pumped to the proposed upper reservoir by establishing a separate pumping system either from existing Rana Pratap Sagar reservoir or from the Brahmani Nadi.

The proposed PSP is located around 2 km (NW) from the notified boundary of Mukundara Tiger Reserve and around 6.3 km (NW) from Bhainsrodgarh WLS. Total land required for construction of various components, including infrastructure facilities and muck disposal area is estimated to be around 857.30 ha, involving 735.49 ha of forestland and 121.82 ha of non-forest land. Total estimated cost of the project is Rs. 20,030.20 Crores. The details are tabulated below.

Table: Area Statement (Ha) of Proposed Standalone PSP

Sr. No.	Project Components	Forest (ha)	Non-Forest (ha)
1.	Reservoirs	350.09	0.00
2.	Approach Road to Reservoirs	324.43	55.32
3.	Approach Road to Intake & VPS	5.97	1.40
4.	Adit	0.98	0.00
5.	WCS, PH, TRC	54.02	0.00
6.	Job Facilities	0.00	25.00
7.	Muck Disposal Area	0.00	40.00
8.	Magazine	0.00	0.10
Sub-total		735.49	121.82
Total Area		857.30	

Online application will be submitted subsequently thereby seeking forest diversion for around 735.49 ha. Wildlife Clearance from Standing Committee of National Board of Wildlife (NBWL) will be obtained based on the proximity of project (within 10 km) from Protected Areas and absence of notified ESZ boundaries. Other statutory clearances (as applicable) from State as well as Central government will be obtained after post completion of DPR.

Project benefit: Pumped storage hydropower is a modified use of conventional hydropower technology to store and manage energy or electricity by moving water between an upper and lower reservoir. Currently, pumped storage round-trip or cycle energy efficiencies exceed 80%, comparing favourably to other energy storage technologies and thermal technologies. This effectively shifts, stores, and reuses energy generated until there is corresponding demand for system reserves and variable energy integration. Further, pumped storage projects are critical to the national economy and overall energy reliability because it's:

- Least expensive source of electricity, not requiring fossil fuel for generation
- An emission-free renewable source
- Able to shift loads to provide peaking power without requiring ramp-up time like combustion technologies
- Often designated as a “black start” source, able to restore network interconnections if a power blackout occurs
- Balancing grid for demand driven variations
- Balancing generation driven variations
- Voltage support and grid stability
- Apart from this, proposed PSP will also benefit the local community by creating employment opportunities and will result in upliftment of livelihood and socio-economic conditions.

EAC deliberated on the information submitted (Form 1, PFR, .kml file etc.) and as presented in the meeting and observed that instant project being the Pump storage project and standalone in nature and upper and lower reservoir is located away from the existing natural water systems have no/negligible catchment area therefore CAT Plan, RIM treatment, L-section of river and Environmental flow study will not be required under EMP. EAC further observed that Water will be lifted one time from existing nearby Rana Pratap Sagar reservoir / Brahmani Nadi and will be stored in the reservoirs to be constructed and used cyclically for energy storage and discharge. Evaporation losses, if any will be recouped periodically from Brahmani Nadi.

After detailed deliberation on the information submitted and as presented, the EAC recommended for grant of **Standard ToR** to the proposed project with the following **Additional ToR conditions**:

1. Land acquired for the project shall be suitably compensated in accordance with the law of the land with the prevailing guidelines. Private land shall be acquired as per provisions of Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013.
2. The project involves diversion of about 735.49 ha of forestland. Forest clearance shall be obtained as per the prevailing norms of Forest (Conservation) Act, 1980.
3. Application to obtain prior approval of Central Government under the Forest (Conservation) Act, 1980 for diversion of forest land required should be submitted as soon as the actual extent of forest land required for the project is known, and in any case, within six months of issuance of this letter.
4. 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.

5. An undertaking as part of the EIA report from Project proponent, owning the contents (information and data) of the EIA report with the declaration about the contents of the EIA report pertaining to a project have not been copied from other EIA reports.
6. Funds allocation for Corporate Environment Responsibility (CER) shall be made as per O.M. No. 22-65/2017-IA.III dated 01.05.2018 for various activities therein.
7. The details of funds allocation and activities for CER shall be incorporated in EIA/EMP report.
8. Consolidated EIA/EMP report is to be submitted as per the generic structure (Appendix III & IIIA) given in the EIA Notification, 2006.
9. Conservation plan for the Scheduled I species, if any, in the project study area shall be prepared and submitted to the Competent Authority for approval.
10. Pre-DPR Chapters viz., Hydrology and Layout Map and Power Potential Studies duly approved by CWC/CEA.
11. Details of discharge monitoring and E-flow study of the Brahmani river shall be carried out along with the study on sudden water flow in the Brahmani river.
12. Dam break analysis and Disaster Management Plan be prepared and submitted in the EIA/EMP report.
13. Environmental matrix during construction and operational phase needs to be submitted.
14. Both capital and recurring expenditure under EMP shall be submitted.
15. As the Bhainsrodgarh Wild Life Sanctuary and Mukundra Tiger Reserve are located within 10 km of the project boundary, NBWL clearance shall be obtained.

Item No. 29.5 Mhaismal Standalone Pumped Storage Project, District: Aurangabad, Maharashtra by M/s Greenko Energies Pvt. Ltd.-reg. Fresh ToR. Proposal No. IA/MH/RIV/124899/2019, File No. J-12011/21/2019-IA.I(R)

Project proponent along with the consultant (M/s. R S Envirolink Technologies Pvt. Ltd. (RSET), NABET Accredited Consultant Organization, 403, Bestech Chambers, Block-B, Sushant Lok Phase I, Sector 43, Gurugram, Certificate No: NABET/EIA/1619/SA075) made the detailed presentation on the proposal and *inter alia*, provided the following information:

Greenko Energies Private Limited (GEPL) proposes to develop Standalone Pumped Storage Project (PSP) in Mhaismal and Abdulpur (V), Khultabad (T) of Aurangabad (D) in the state of Maharashtra.

The Mhaismal Standalone PSP Project (800 MW) will comprise of two reservoirs i.e. Mhaismal Upper reservoir (to be constructed newly) and Mhaismal Lower Reservoir (to be constructed newly). This Project is a standalone in nature and both the reservoirs are located away from all existing natural water systems and have no/negligible catchment area. Water will be lifted one time from existing nearby reservoir and will be stored in the reservoirs to be constructed and used cyclically for energy storage and discharge. Evaporation losses, if any will be recouped periodically from the nearby reservoir. This Project envisages non-consumptive re-utilization of 0.58 TMC of water for recirculation between two proposed reservoirs. The live storage capacity of Upper reservoir and Lower reservoir is 0.58 TMC. The gross storage capacity of upper reservoir is 0.61 TMC and that of Lower reservoir is 0.62 TMC. The geographical coordinates of the proposed upper reservoir are at longitude 75°12'26.34" East and latitude is 20°04'47.93" North and that of lower reservoir are at longitude 75°12'28.5" East and 20°05'22.80" North.

The proposed scheme involves construction of rock fill embankments of 27.0 m in height (upper & lower reservoirs). The gross storage capacity of upper and lower reservoirs is 0.61 TMC

and 0.62 TMC, respectively. Water conductor system consists of four numbers of independent penstocks, which connects the powerhouse located at about 666 m from intake structure. Intake structure will be equipped with four vertical-axis reversible Francis type units, each composed of a Synchronous Generator (2 Nos.), generator/motor (DFIM - 2 Nos.) and a pump/turbine having generated/pumping capacity of four units of 200 MW /224 MW, respectively. As such, the proposed project will generate 800 MW by utilizing design discharge of 739.68 cumecs with rated head of 125.0 m.

Depending upon actual Peak demand capacity and peaking duration requirement of State Government / Central utility, Project configuration can be changed to 600MW for 8 hours by keeping overall daily storage capacity same. The peak demand capacity and peaking duration requirement will be studied prior to completion of DPR and accordingly final configuration either of two i.e. 600 MW for 8 hours or 800 MW for 6 hours will be adopted. However, the proposed upper reservoir capacity and water utilization will remain same in both cases.

The Mhaismal Standalone PSP is proposed between two reservoirs i.e. Mhaismal Standalone PSP upper and lower reservoir (both are to be constructed newly) and one-time water will be pumped from existing nearby reservoir to fill up the proposed reservoir. Secondly since these two reservoirs are not located across any stream, no Specific hydrological studies are required to be carried out. The upper reservoir does not have any catchment area and the lower reservoir is having very negligible catchment area and hence the inflow from rainfall is negligible.

Total land required for construction of various components, including infrastructure facilities and muck disposal area is estimated to be around 337.14 Ha, involving 70.07 Ha of forestland and 267.07 Ha of non-forest land. The details are tabulated below.

Table: Area Statement of Proposed Standalone PSP:

Sl. No.	Project Components	Forest (ha)	Non-Forest (ha)
1.	Upper Reservoir	0.36	147.74
2.	Lower Reservoir	53.81	70.49
3.	Approach Road to Upper Reservoir	0.23	1.60
	Approach Road to VPS	2.22	0.62
	Approach Road to Powerhouse	1.71	0.05
4.	Adit	0.36	0.00
5.	WCS, PH, TRC	11.39	6.48
6.	Job Facilities Area	0.00	15.00
7.	Muck Disposal area	0.00	25.00
8.	Magazine	0.00	0.10
Sub-total		70.07	267.07
Total Area		337.14	

Online application will be submitted subsequently thereby seeking forest diversion for around 70.07 ha. Alongside, other statutory clearances (as applicable) from State as well as Central government will be obtained after post completion of DPR. The total cost of the project is estimated to Rs. 3,909.03 Crores.

Project benefit: Pumped storage hydropower is a modified use of conventional hydropower technology to store and manage energy or electricity by moving water between an upper and lower

reservoir. Currently, pumped storage round-trip or cycle energy efficiencies exceed 80%, comparing favorably to other energy storage technologies and thermal technologies. This effectively shifts, stores, and reuses energy generated until there is corresponding demand for system reserves and variable energy integration. This shifting can also occur to avoid transmission congestion periods, to help more efficiently manage transmission grid, and to avoid potential interruptions to energy supply. This is important because many of the renewable energy resources being developed (e.g., wind and solar) are generated at times of low demand and off-peak energy demand periods are still being met with fossil fuel resources, often at inefficient performance levels that increase the release of greenhouse gas emissions. Further, pumped storage projects are critical to the national economy and overall energy reliability because it's:

- Least expensive source of electricity, not requiring fossil fuel for generation
- An emission-free renewable source
- Able to shift loads to provide peaking power without requiring ramp-up time like combustion technologies
- Often designated as a “black start” source, able to restore network interconnections if a power blackout occurs
- Balancing grid for demand driven variations
- Balancing generation driven variations
- Voltage support and grid stability

Apart from this, proposed PSP will also benefit the local community by creating employment opportunities and will result in upliftment of livelihood and socio-economic conditions. PP also submitted in the Form 1 that there is no Protected Area notified under the Wild Life (P) Act, 1972; Critically Polluted areas as identified by the CPCB constituted under the Water (P) Act 1974; Eco-sensitive areas as notified within 10 km of the Project boundary. EAC deliberated on the information submitted (Form 1, PFR, .kml file, etc.) and as presented in the meeting and observed that instant project being the Pump storage project and standalone in nature and upper/lower reservoir is located away from the existing natural water systems have no/negligible catchment area therefore CAT Plan, RIM treatment, L-section of river and Environmental flow study will not be required under EMP. EAC further observed that water will be lifted one time from existing nearby reservoir and will be stored in the reservoirs to be constructed and used cyclically for energy storage and discharge. Evaporation losses, if any will be recouped periodically from the nearby reservoir.

After detailed deliberation on the information submitted and as presented, the EAC recommended for grant of **Standard ToR** to the proposed project with the following **Additional ToR conditions**:

1. Land acquired for the project shall be suitably compensated in accordance with the law of the land with the prevailing guidelines. Private land shall be acquired as per provisions of Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013.
2. The project involves diversion of about 70.07 ha of forestland. Forest clearance shall be obtained as per the prevailing norms of Forest (Conservation) Act, 1980.
3. Application to obtain prior approval of Central Government under the Forest (Conservation) Act, 1980 for diversion of forest land required should be submitted as soon as the actual extent of forest land required for the project is known, and in any case, within six months of issuance of this letter.
4. 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.

5. An undertaking as part of the EIA report from Project proponent, owning the contents (information and data) of the EIA report with the declaration about the contents of the EIA report pertaining to a project have not been copied from other EIA reports.
6. Funds allocation for Corporate Environment Responsibility (CER) shall be made as per O.M. No. 22-65/2017-IA.III dated 01.05.2018 for various activities therein.
7. The details of funds allocation and activities for CER shall be incorporated in EIA/EMP report.
8. Consolidated EIA/EMP report is to be submitted as per the generic structure (Appendix III & IIIA) given in the EIA Notification, 2006.
9. Conservation plan for the Scheduled I species, if any, in the project study area shall be prepared and submitted to the Competent Authority for approval.
10. Pre-DPR Chapters viz., Hydrology and Layout Map and Power Potential Studies duly approved by CWC/CEA.
11. Disaster Management Plan be prepared and submitted in the EIA/EMP report.
12. Environmental matrix during construction and operational phase needs to be submitted.
13. Both capital and recurring expenditure under EMP shall be submitted.

Item No. 29.6 MP 30 Gandhi Sagar Standalone Pumped Storage Project, District Neemuch, Madhya Pradesh Greenko Energies Pvt. Ltd.-reg. Fresh ToR. Proposal No. IA/MP/RIV/124890/2019, File No. J-12011/22/2019-IA.I(R)

Project proponent along with the consultant (M/s. R.S. Envirolink Technologies Pvt. Ltd. (RSET), NABET Accredited Consultant Organization, 403, Bestech Chambers, Block-B, Sushant Lok Phase I, Sector 43, Gurugram, Certificate No: NABET/EIA/1619/SA075) made the detailed presentation on the proposal and *inter alia*, provided the following information:

Greenko Energies Pvt. Ltd. proposes to develop Standalone Pumped Storage Project (PSP) in Khemla Block (V), Rampura (T) of Neemuch (D) in the state of Madhya Pradesh. The MP 30 Gandhi Sagar Standalone PSP Project will comprise of two reservoirs i.e. Gandhi Sagar lower reservoir (already existing) and MP 30 Gandhi Sagar Upper Reservoir (to be constructed newly). This scheme envisages non-consumptive re-utilization of 1.07 TMC of water of Gandhi Sagar reservoir by recirculation. The water in Gandhi Sagar reservoir (existing lower reservoir) will be pumped up and stored in the proposed Standalone Pumped Storage Project of MP 30 Gandhi Sagar Upper reservoir and will be utilized for power generation. The gross storage capacity of Gandhi Sagar reservoir is 258.47 TMC. The Geographical co-ordinates of the proposed MP 30 Gandhi Sagar Standalone Pumped Storage Project component of upper reservoir is at latitude 24°31'19.90" North and Longitude is 75°31'8.54" East and that of Gandhi Sagar lower reservoir (existing) are 24°31'5.40" North and 75°32'5.28" East.

Total capacity of the proposed PSP is 1360 MW (8160 MWH, based on 6-hour operation per day). The proposed scheme involves construction of rock fill embankment (upper reservoir) - 33.0 m in height, for gross storage of 1.12 TMC water. Water conductor system consists of eight numbers of independent penstocks, which connects the powerhouse located at about 621 m from intake structure. As such, the proposed project will generate 1360 MW by utilizing design discharge of 1391 cumecs with rated head of 113 m. A surface Power house having an installation of Eight nos. reversible Francis turbine each of 170MW capacity (4 units of fixed speed and 4 units of variable speed turbines) operating under a rated head of 113.00 m in generating mode and 122.00 m in pumping mode. Tailrace channel of about 1056.00 m long is connecting to the Existing Gandhi Sagar reservoir.

Depending upon actual Peak demand capacity and peaking duration requirement of State Government / Central utility, Project configuration can be changed to 1020MW for 8 hours by keeping overall daily storage capacity same. The peak demand capacity and peaking duration requirement will be studied prior to completion of DPR and accordingly final configuration either of two i.e. 1360 MW for 6 hours or 1020 MW for 8 hours will be adopted. However, the proposed upper reservoir capacity and water utilization and the MWH generated will remain same in both cases.

Total land required for construction of various components, including infrastructure facilities and muck disposal area is estimated to be around 282.46 ha, involving 69.63 ha of forestland and 212.83 ha of non-forest land. The details are tabulated below:

Table: Area Statement of Proposed Standalone PSP

Sr. No.	Project Components	Forest (ha)	Non-Forest (ha)
1.	Upper Reservoir	2.92	199.66
2.	Approach Road to Upper Reservoir	0.00	4.49
3.	Approach Road to VPS & Powerhouse	4.26	0.18
4.	Adit	0.81	0.00
5.	Penstock, PH & TRC	21.49	8.50
6.	Job Facilities	15.05	0.00
7.	Muck Disposal	25.00	0.00
8.	Magazine	0.10	0.00
	Sub-total	69.63	212.83
	Total Area	282.46	

The proposed PSP is located around 1.8 km (South) from the notified eco-sensitive boundary of Gandhi Sagar Wildlife Sanctuary (S.O. 4029(E), dated 5th December 2016). Online application for forest clearance will be submitted subsequently thereby seeking forest diversion for around 69.63 ha. Alongside, other statutory clearances (as applicable) from State as well as Central government will be obtained after post completion of DPR. Water Resource Department, Govt. of Madhya Pradesh, has accorded in-principal approval for lifting 36.58 Million cumecs water from Gandhi Sagar Reservoir on non-consumptive basis. Total estimated cost of the project is Rs. 6,054.06 Crores.

Project benefit: Pumped storage hydropower is a modified use of conventional hydropower technology to store and manage energy or electricity by moving water between an upper and lower reservoir. Currently, pumped storage round-trip or cycle energy efficiencies exceed 80%, comparing favorably to other energy storage technologies and thermal technologies. This effectively shifts, stores, and reuses energy generated until there is corresponding demand for system reserves and variable energy integration. This shifting can also occur to avoid transmission congestion periods, to help more efficiently manage transmission grid, and to avoid potential interruptions to energy supply. This is important because many of the renewable energy resources being developed (e.g., wind and solar) are generated at times of low demand and off-peak energy demand periods are still being met with fossil fuel resources, often at inefficient performance levels that increase the release of greenhouse gas emissions.

Further, pumped storage projects are critical to the national economy and overall energy reliability because it's:

- Least expensive source of electricity, not requiring fossil fuel for generation
- An emission-free renewable source
- Able to shift loads to provide peaking power without requiring ramp-up time like combustion technologies
- Often designated as a “black start” source, able to restore network interconnections if a power blackout occurs
- Balancing grid for demand driven variations
- Balancing generation driven variations
- Voltage support and grid stability

Apart from this, proposed PSP will also benefit the local community by creating employment opportunities and will result in upliftment of livelihood and socio-economic conditions. EAC deliberated on the information submitted (Form 1, PFR, kml file etc.) and as presented in the meeting and observed that the water in the Gandhi Sagar reservoir (existing lower reservoir) will be pumped up and stored in the proposed Standalone Pumped Storage Project of MP 30 Gandhi Sagar Upper reservoir and will be utilized for power generation. EAC further observed that instant project being the Pump storage project and standalone in nature and upper reservoir is located away from the existing natural water systems and have no/negligible catchment area therefore CAT Plan, RIM treatment, L-section of river and Environmental flow study will not be required under EMP.

After detailed deliberation on the information submitted and as presented, the EAC recommended for grant of **Standard ToR** to the proposed project with the following **Additional ToR conditions**:

1. Land acquired for the project shall be suitably compensated in accordance with the law of the land with the prevailing guidelines. Private land shall be acquired as per provisions of Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013.
2. The project involves diversion of about 69.63 ha of forestland. Forest clearance shall be obtained as per the prevailing norms of Forest (Conservation) Act, 1980.
3. Application to obtain prior approval of Central Government under the Forest (Conservation) Act, 1980 for diversion of forest land required should be submitted as soon as the actual extent of forest land required for the project is known, and in any case, within six months of issuance of this letter.
4. 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.
5. An undertaking as part of the EIA report from Project proponent, owning the contents (information and data) of the EIA report with the declaration about the contents of the EIA report pertaining to a project have not been copied from other EIA reports.
6. Funds allocation for Corporate Environment Responsibility (CER) shall be made as per O.M. No. 22-65/2017-IA.III dated 01.05.2018 for various activities therein.
7. The details of funds allocation and activities for CER shall be incorporated in EIA/EMP report.
8. Consolidated EIA/EMP report is to be submitted as per the generic structure (Appendix III & IIIA) given in the EIA Notification, 2006.
9. Conservation plan for the Scheduled I species, if any, in the project study area shall be prepared and submitted to the Competent Authority for approval.
10. Pre-DPR Chapters viz., Hydrology and Layout Map and Power Potential Studies duly approved by CWC/CEA.

11. Dam break analysis and Disaster Management Plan be prepared and submitted in the EIA/EMP report.
12. Environmental matrix during construction and operational phase needs to be submitted.
13. Both capital and recurring expenditure under EMP shall be submitted.
14. Certificate from the Chief Wild Life Warden that all the project components are outside the notified eco-sensitive zone of Gandhi Sagar Wildlife Sanctuary.
15. Impact of developmental activity/project on the wildlife habitat within 10 km of the project boundary shall be studied.

Item No. 29.7 Upper Kolab Pumped Storage Project (2x160 MW) in District-Koraput, Odisha by M/s OHPL-reg. ToR. Proposal No. IA/OR/RIV/120950/2019, File No. J12011/16/2019-IA.I(R)

Project proponent along with the consultant (WAPCOS Limited) made the detailed presentation on the proposal and *inter alia*, provided the following information:

The Upper Kolab Pumped Storage Project is planned in the vicinity of existing Upper Kolab Hydro Electric Project on river Kolab. The dam is under operation with a storage capacity of 935 MCM. The water from Kolab river after power generation passes through a tailrace channel 900 m length with a bed width of 25 m. The tail channel discharges the flow into a small stream Sati Nalla on which an earthen dam is constructed and the reservoir so formed is known as Satiguda pond. The storage of this pond is 1.5 MCM. The pond has been created for regulated flow of water for meeting downstream irrigation required.

The proposed (2x160) 320 MW pumped storage scheme shall utilize water from the existing Upper Reservoir and the Lower Reservoir proposed near existing Satiguda Reservoir and Tail Race channel of the existing/operation at Upper Kolab Project.

The project has been proposed for installation of (2x160 MW) 320 MW HEP with an annual energy generation of 506.60 MU. The Upper Kolab PSP project envisages Reservoir construction of 19 m high zoned earthen dam composed of central impervious core for creation of independent lower reservoir; 6.75 m circular with Bell-mouth power intake approach channel; 4132 m long and 6.75 m diameter Head Race Tunnel terminating in surge shaft; A 90.00 m high 15.00 m dia. Surge shaft/tank; One no. 5.75 m dia. Pressure shaft, length 345 m bifurcating into two penstocks; 10.00 m x 40 m wide typical Tail Tunnel Surge Chamber accommodating Draft tube gates as well as Gate for D/S surge chamber; An underground power house having 2 nos. reversible Francis turbine each of 160 MW capacities operating under a rated head of 253.66 m in generating mode and 279.66 m in pumping mode; 1683.75 m. (approx.) long tail race tunnel connecting to tail race channel to carry the power house releases back to reservoir; Transformer Hall equipped with step up transformer and Open switchyard.

The upper reservoir is already operational. About 70 ha of land shall come under submergence in the Lower Reservoir. The total land to be acquired for the project is 162.7 ha. As per the present level of investigation out of 162.7 ha land, about 94.20 ha is forestland and 68.5 ha non-forestland. Forest clearance for Topographical survey accorded by PCCF, Odisha and DFO, Jeypore. The ownership status of the land to be acquired shall be finalized as a part of Detailed Project Report, which is under preparation. About 70 ha of land would get converted into a reservoir due to construction of Lower Reservoir. The existing forest or agricultural land will be converted in to quiescent water body.

Project benefit:

- As per the present level of investigation Annual energy generation in 90% dependable year 506.60 MU.
- Generation of employment in construction and operation phase of the project.
- Upliftment of socio economic status of the surrounding area.
- Underground water recharge of the surrounding area of the lower reservoir.

EAC deliberated on the information submitted (Form 1, PFR, .kml file, etc.) and as presented in the meeting and after detailed deliberation on the information submitted and as presented, the EAC recommended for grant of **Standard ToR** to the proposed project with the following **Additional ToR conditions**:

1. Land acquired for the project shall be suitably compensated in accordance with the law of the land with the prevailing guidelines. Private land shall be acquired as per provisions of Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013.
2. The project involves diversion of about 94.20 ha of forestland. Forest clearance shall be obtained as per the prevailing norms of Forest (Conservation) Act, 1980.
3. Application to obtain prior approval of Central Government under the Forest (Conservation) Act, 1980 for diversion of forest land required should be submitted as soon as the actual extent of forest land required for the project is known, and in any case, within six months of issuance of this letter.
4. 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.
5. An undertaking as part of the EIA report from Project proponent, owning the contents (information and data) of the EIA report with the declaration about the contents of the EIA report pertaining to a project have not been copied from other EIA reports.
6. Funds allocation for Corporate Environment Responsibility (CER) shall be made as per O.M. No. 22-65/2017-IA.III dated 01.05.2018 for various activities therein.
7. The details of funds allocation and activities for CER shall be incorporated in EIA/EMP report.
8. Consolidated EIA/EMP report is to be submitted as per the generic structure (Appendix III & IIIA) given in the EIA Notification, 2006.
9. Conservation plan for the Scheduled I species, if any, in the project study area shall be prepared and submitted to the Competent Authority for approval.
10. Pre-DPR Chapters viz., Hydrology and Layout Map and Power Potential Studies duly approved by CWC/CEA.
11. Dam break analysis and Disaster Management Plan be prepared and submitted in the EIA/EMP report.
12. Environmental matrix during construction and operational phase needs to be submitted.
13. Both capital and recurring expenditure under EMP shall be submitted.
14. Certificate from the Chief Wild Life Warden that all the project components are outside the notified eco-sensitive zone of Gandhi Sagar Wildlife Sanctuary.
15. Impact of developmental activity/project on the wildlife habitat within 10 km of the project boundary shall be studied.

Item No. 29.8 Balimela Pumped Storage Project in district Malkangiri, Odisha by M/s OHPC-reg. ToR, Proposal No. IA/OR/RIV/120536/2019, File No. J-12011/18/2019-IA.I(R)

Project proponent along with the consultant (WAPCOS Limited) made the detailed presentation on the proposal and *inter alia*, provided the following information:

The proposed Balimela Pumped Storage Project (2x250 MW) is located in the Malkangiri District of state Odisha. The proposed Balimela Pumped Storage project envisages utilization of water of existing Balimela Reservoir. The proposed Balimela Pumped Storage Project is located near existing Balimela Hydro Electric Project near Balimela village in Malkangiri tehsil, Malkangiri district, Odisha. The project falls in the area bounded by Lat. N 18° 13' to 18° 11' and Long. E 82°05' to 82°06'. The water released from Machhkund Power House and the inflow from intermediate catchment between Machhkund-Balimela Dam is to be impounded by an earthen dam known as Chitrakonda Dam. The water released from the Balimela reservoir shall be stored in downstream reservoir by construction of an Rockfill dam to act as lower reservoir. An Underground Power House (UGPH) will be located in between two reservoirs. Both the reservoirs are interconnected through water conductor and the generator and turbines installed at the powerhouse in between the reservoirs.

The project comprises of exiting Upper Reservoir with a 70 m height x1823 m long and 10m width, Earthen Fill Gravity Dam, with gross storage of 3610 million m³ at FRL 462.10 m; Proposed Lower Reservoir with a 59.6 m high x 699 m long and 10 m width, Rockfill Dam, for gross storage of 21.291 million m³ at FRL 255.68 m; 1 no. x Power Intake, Horizontal type with anti-vortex Louvre with intake invert level at EL 422.19 m, to carry design discharge of 315.0 m³/s each; 1nos. steel lined Headrace Tunnel, 7.86 m dia. x 1307 m length which is followed by 2 Unit Pressure Shaft 5.56 m diameter x 94 m long; Main Access Tunnel, D-shaped, 8 m x 8.5 m size; Underground Power House: 24 m(W) x 55 m (H)x 112 m (L) to accommodate 2x250 MW Power Units, coupled with Transformer Cavern: 18 m(W) x 22.5m (H) x 87 m (L); 2 nos. of draft tube tunnels of length 106 m and 5.56 m dia.; 1nos Circular shaped, concrete lined Tailrace Tunnel, 9.45 m diameter x 585 m length to carry the power house releases.

As per the present level of investigations, the total land required for various appurtenances is 249 ha, out of which, about 234 ha forestland, 15 ha Non-Forest land. About 85 ha of land shall come under submergence at FRL for Lower Reservoir. Additional land is to be acquired for dam, water conductor system, powerhouse and other project appurtenances work out to be 164 ha. The breakup of the cost estimates (in lakhs) for Option-I (Considered all 2 machines are Fixed Speed Machines) and Option-II (Considered 1 (One) machine are Variable Speed machine + 1 (One) machine are Fixed Speed Machine) at January 2019 price levels in lakhs are Rs. 2,36,006.00 and Rs. 2,41,377.00, respectively.

Project benefit: The scheme would afford an annual peaking period energy generation of 1095 GWh with design energy generation of 1040.25 GWh (95% capacity availability). The project would provide 500 MW of 6 hours daily peaking capacity benefits. The sale rate applicable in the first year and levelised tariff for off peak energy rate 1 Re/KWh is indicated below:

	Option-I (2 fixed)	Option -II (1 fixed + 1 Variable)
Levelised Tariff	Rs. 6.12	Rs. 6.24
First Year Tariff	Rs. 6.65	Rs. 6.77

PP submitted in the Form 1 that there is no Protected Area notified under the Wild Life (Protection) Act, 1972; Critically Polluted areas as identified by the CPCB constituted under the Water (Prevention and Control of Pollution) Act, 1974; Eco-sensitive areas as notified within 10 km of the Project boundary.

EAC deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and after detailed deliberation on the information submitted and as presented, the EAC recommended for grant of **Standard ToR** to the proposed project with the following **Additional ToR conditions**:

1. Land acquired for the project shall be suitably compensated in accordance with the law of the land with the prevailing guidelines. Private land shall be acquired as per provisions of Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013.
2. The project involves diversion of about 234 ha of forestland. Forest clearance shall be obtained as per the prevailing norms of Forest (Conservation) Act, 1980.
3. Application to obtain prior approval of Central Government under the Forest (Conservation) Act, 1980 for diversion of forest land required should be submitted as soon as the actual extent of forest land required for the project is known, and in any case, within six months of issuance of this letter.
4. 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.
5. An undertaking as part of the EIA report from Project proponent, owning the contents (information and data) of the EIA report with the declaration about the contents of the EIA report pertaining to a project have not been copied from other EIA reports.
6. Funds allocation for Corporate Environment Responsibility (CER) shall be made as per O.M. No. 22-65/2017-IA.III dated 01.05.2018 for various activities therein.
7. The details of funds allocation and activities for CER shall be incorporated in EIA/EMP report.
8. Consolidated EIA/EMP report is to be submitted as per the generic structure (Appendix III & IIIA) given in the EIA Notification, 2006.
9. Conservation plan for the Scheduled I species, if any, in the project study area shall be prepared and submitted to the Competent Authority for approval.
10. Pre-DPR Chapters viz., Hydrology and Layout Map and Power Potential Studies duly approved by CWC/CEA.
11. Dam break analysis and Disaster Management Plan be prepared and submitted in the EIA/EMP report.
12. Environmental matrix during construction and operational phase needs to be submitted.
13. Both capital and recurring expenditure under EMP shall be submitted.

Item No. 29.1 Any other Item with the permission of the Chair.

Vote of Thanks to the EAC and MoEF&CC.


As the tenure of the present EAC will be completing on 16.12.2019, the present meeting is the last meeting. Accordingly, Dr. S.K. Jain, Chairman-EAC thanked all the Committee members for successfully conducting 29 meetings in River Valley Project Sector since its constitution in a cordial manner. The Chairman has also expressed gratitude to all the concerned officers in the MoEF&CC

for their kind support and to Dr. S. Kerketta, Member Secretary for organising meetings and co-ordinating with members throughout the tenure of the Committee. At the end, Chairman also thanked Dr. C. Palpandi, Dr. S. Prabhu, Shri N. Subrahmanyam, Dr. Mohit Saxena, all are Scientist C, Dr. P.V. Subba Rao, Consultant, Shri Manmeet Singh Choudhury, Consultant and Shri Sarvesh Narwal, ASO, Shri Nitin Tewari, LA, Shri Bhram Pal Singh, MTS for extending the technical and logistic support.

As there was no item left, the meeting ended with vote of thanks to the Chair.

Subject: Re: Draft MoM of 29th EAC (RVP)- reg
To: Dr S Kerketta <s.kerketta66@gov.in>
Cc: S Kerketta <suna1466@rediffmail.com>

Date: 12/24/19 06:20 PM
From: Sharad Jain <s_k_jain@yahoo.com>
Reply-To: Sharad Jain <s_k_jain@yahoo.com>

 Draft_MoM_29th EAC RVP_20.12.2019.docx (154kB)

Dear Dr Kerketta,

I have edited the minutes and made minor changes. The material in table on page 16 is beyond the margins and this is to be addressed.

Regards,

Sharad K Jain / शरद कुमार जैन
Director
National Institute of Hydrology, Roorkee, India
Tel: +91 1332 272106/ 98970 18550

On Monday, 23 December, 2019, 12:11:38 pm IST, Dr S Kerketta <s.kerketta66@gov.in> wrote:

Sir,

PFA for kind approval. It is being sent after circulating to all the members. Dr. More only gave his comments.

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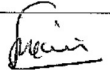
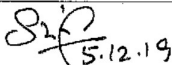
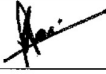
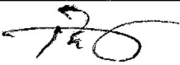

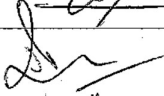
regards,

Dr. S. Kerketta
Director- IA (Thermal, River Valley & HEP)
MoEF&CC, New Delhi
Phone: 011-24695314 (O), 26113096 (R)

LIST OF MEMBERS

**29th MEETING OF RE-CONSTITUTED EXPERT APPRAISAL COMMITTEE (EAC) FOR
RIVER VALLEY & HYDROELECTRIC PROJECTS**

DATE : 05th December 2019
TIME : 10:30 am onwards
VENUE : Teesta Hall, Vayu Block, Indira Paryavaran Bhawan, New Delhi

Sl.No.	Name of Member	Signature
1.	Prof. Sharad Kumar Jain, Chairman	
2.	Shri. Sharvan Kumar, Member	 5.12.19
3.	Shri N. N. Rai, Member	
4.	Dr. J.A.Johnson, Member	Abs
5.	Dr. AK Sahoo, Member	Abs
6.	Dr. Vijay Kumar, Member	Abs
7.	Prof. Govind Chakrapani, Member	Abs
8.	Dr. Chetan Pandit, Member	Abs
9.	Dr. Dinkar Madhavrao More, Member	
10.	Prof. R.K. Kohli, Member	Abs
11.	Prof. S.R. Yadav, Member	
12.	Dr. Jai Prakash Shukla, Member	
13.	Dr. Poonam Kumria, Member	Abs
14.	Dr. Kerketta, Member Secretary Director (IA-1)	