Minutes of the 86th Meeting of the Expert Appraisal Committee for River Valley and Hydroelectric Projects held on 24-25th August, 2015 at Brahmaputra Meeting Hall, 1st Floor, Vayu Wing, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi – 110003.

The 86th Meeting of the Expert Appraisal Committee (EAC) for River Valley and Hydroelectric Projects was held during 24-25th August, 2015 at Brahmaputra Meeting Hall, 1st Floor, Vayu Wing, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi – 110003. The meeting was chaired by Shri Alok Perti, Chairman. Dr. S. Sathyakumar and Dr. A. Lingaraju, Members could not attend the meeting. The list of EAC members and officials/consultants associated with various projects and who attended the meeting is at Appendix.

The following Agenda items were taken-up in that order for discussions:

1st day (24.08.2015)

Agenda Item-2.1 Kanhar Barrage (Interstate) Project in Garhwa District, Jharkhand & Balarampur District of Chhattisgarh by M/s. Water resources Department, Government of Jharkhand -- for consideration of TOR.

The project proponent made a detailed presentation on the project. It was noted that the project is Interstate project between Chhattisgarh and Jharkhand and as per the agreement on sharing of Kanhar waters between Bihar (now Jharkhand), M.P (now Chattisgarh) and U.P. dated 20.2.192, the Bihar State (now Jharkhand) is mandate to utilize its share of 0.43 MAF of water from Kanhar. The project envisages construction of 8 m high gated barrage on river Kanhar to divert 0.43 MAF water for providing irrigation facility in 53,283 ha area in Garhwa District of Jharkhand. Total land requirement is about 1517.20 ha. Out of which 456.12 ha is forest land (of this 404.40 ha in Jharkhand + 51.72 ha in Chhattisgarh). Total submergence area is about 172.30 ha. There is no Wildlife Sanctuary/National Park/Eco-sensitive Zone within 10 km radius study area. The total estimated cost of the project is 1745.47 Crores

It was informed that a Writ Petition (PIL) No.4663/2009 has been filed in the Hon`ble High Court of Jharkhand, Ranchi which is in favour of the project. The PIL has been filed for a direction upon the respondents to immediately construct a barrage for the entire area of the District of Garhwa across the river Kanhar. In this regard, a High Power Committee headed by the retired Judge of the High Court has been constituted in which Secretary, Water Resources Department, Government of Jharkhand, Technical Experts of the various departments and officials from CWC, Petitioner and a Senior Member of the Bar, are the members. The committee is meeting every month on regular basis to monitor the progress made in the project. The meeting is regularly attended by almost all the representatives of concerned states and elected members. The EAC suggested that a copy of the High Power Committee and its proceedings be submitted to Ministry for record purpose.

After detailed deliberations, the EAC recommended for scoping clearance for the project with the following additional TORs to be followed in the EIA study:

(i) Project Proponent has to submit the clearance/NOC from Department concerned of the Chhattisgarh State Government for utilization of their land which will be submerged due to construction of barrage.

(ii) Project Proponent has to submit the clearance/NOC from Department concerned of the Bihar State Government as 0.43 MAF share was originally allotted to Bihar as per the Agreement of sharing of Kanhar Water, 1982.

(iii) Information on the 10-daily flow basis for the 90% & 75% dependable year the flow intercepted at the barrage, the environmental flow and other flow releases at downstream of the barrage and spillway shall be included in the EIA report.

(iv) Hydrological studies/data as approved by CWC shall be utilized in the preparation of EIA/EMP report. Actual hydrological annual yield may also be given in the report.

(v) R&R Plan is to be formulated as per new Act, 2013 which came into force w.e.f. 1.1.2014**.** Plan will also incorporate community development strategies.

(vi) FC application form has to be submitted by an early date to appropriate authority but not later than 6 months from the date of issue of the TOR for this project. IA Division of MoEF &CC shall be informed when such Application is submitted.

(vii) Public Hearings needs to be conducted in both Chhattisgarh and Jharkhand States also as per the provisions of EIA Notification, 2006.

Agenda Item-2.2 Development of Command Area and Canal System in North Bihar proposed to be brought under Irrigation through Sapta Kosi High Dam Multipurpose Project and Sun Kosi Storage-cum-Diversion Barrage by M/s. Sapta Kosi Sun Kosi Investigation, Government of Nepal & Government of India – for consideration of TOR.

The project proponent made a detailed presentation on the project. It was noted that the project envisages construction of 51 m high Rock-fill dam across river Kosi in District Dhakuta District of Nepal about 60 km upstream of India-Nepal Boarder. Dam and appurtenances are proposed to be constructed in Nepal territory. However, canal network shall extend in India for providing irrigation facility in 7.72 lakh hectares of area in 13 District of Bihar. Separate EIA study for Nepal territory is being planned as per the extant rules of Government of Nepal. The scope of the EIA study is limited for canal network in Indian Territory. The total estimated cost of the project is about 1233178 lakhs.

The committee mentioned that details of the Nepal portion and necessary agreements between Nepal & India have not been provided. The committee was informed that the Ministry earlier granted TOR clearance for this project on 21.10.2008. The validity has been expired. The EAC suggested that a copy of the TOR may be collected from the Ministry and based on this the project authorities may apply for an extension or for fresh scoping/TOR clearance. Detailed progress of EIA/EMP made so far has to be submitted also.

On receipt of response to the above observation, the proposal may be reconsidered by the EAC.

Agenda Item-2.3 Luhri Stage-I HEP (219 MW) Project in Shimla District of Himachal Pradesh by M/s. Satluj Jal Vidyut Nigam Lts - For consideration of ToR.

The project proponent made a detailed presentation on the project. The environmental clearance for this project was granted on 19.8.2013 for 612 MW capacity. The project envisages construction of 86 m high concrete gravity dam across the river Satluj to generate 612 MW of hydropower. This is a run-of-the river scheme. The total land requirement is about 380.3175 ha. Out of this, 271.1577 ha is forest land & 109.1598 ha is private land. An underground powerhouse is proposed with 3 units of 196 MW each & a dam-toe powerhouse of 24 MW to meet environmental flow requirement at downstream of the project. A total of 468 Project affected families are likely to be affected due to this project. The total estimated cost of the project is about 7137.02 Crores and will be completed in 8 years.

The project was earlier considered by EAC in its meeting held on 20-21st July, 2015. The proponent informed that the original Luhri HEP (612 MW) project had to be re-designed to address the technical issues raised by CWC regarding design of Surge Shaft. In addition, Government of Himachal Pradesh had also desired to explore the possibility of executing Luhri project as a multi-staged project to address numerous representations from local inhabitants and other stakeholders regarding 38 Km long head race tunnel (HRT) proposal in the original project. In view these issues, the project has been re-designed & 38 Km long HRT has been completely eliminated. The redesigned scheme envisages construction of two powerhouses of 200 MW and 19 MW each at the toe of the dam proposed at Nirath within the same reservoir levels.

The revised scheme for amendment in environmental clearance from 612 MW to 219 MW has completely changed the scope of the original scheme proposed earlier. Therefore, the committee desired that a fresh application seeking scoping clearance may be submitted by SJVN Ltd for conducting fresh EIA/EMP study for the revised scheme. Accordingly, the project proponent submitted application for Scoping/TOR clearance for Luhri hydroelectric power project for 219 MW capacity.

The committee noted that the project envisages construction of 86 m high concrete gravity dam across the river Satluj to generate 219 MW of hydropower. This is a run-of-the river scheme. The total land requirement is about 120.21 ha. Out of this 65.87 ha is forest land & 54.34 ha is private land. A surface dam-toe powerhouse is proposed on the right bank with 3 units of 66.67 MW capacity each & a dam-toe powerhouse is proposed on the left bank of the river of 2 x 9.50 MW capacity each. A total of 767 Project affected families are likely to be affected due to this project. There is no Wildlife Sanctuary/National Park/Eco-sensitive Zone within 10 km radius study area. An ancient Surya Narayan Temple is located near dam site. The total estimated cost of the project is about 2274 Crores.

EAC after detailed deliberations recommended for a fresh study for 3 seasons (pre-monsoon, monsoon and monsoon covering 1 calendar year) with the following additional TORs:

(i) Cumulative Impact Assessment Study of Satluj Basin has been awarded by the Government of Himachal Pradesh to ICFRE. The study also includes Luhri HEP in its original form and capacity and therefore, the guidelines issued by MoEF & CC based on the outcomes of the study shall be implemented by the project proponent

(ii) Environmental flow will be 20% of average of four consecutive lean months of 90% dependable year, 30% of the average monsoon flow. The flow for remaining months will be in between 20-30%, depending on the site specific requirements.

(iii) Muck disposal sites should be selected at least 30 m away from the bank corresponding to HFL of river/stream and shall be shown including location, quantity of muck to be deposited off vis-à-vis the total area for dumping in a clear map.

(iv) Biodiversity study shall be carried-out by associating a reputed organization as recommended by WII, Dehradun or by ICFRE, Dehradun. The list of Institutes is available on MoEF & CC portal.

(v) Compensation for land acquisition, R & R plan and other benefits shall be in accordance with the relevant Act in this regard, as applicable.

(vi) An ancient Surya Narayan Temple is located near dam site. The clearance/NOC from the organization/department concerned shall have to be obtained.

(vii) The original Luhri HEP (612 MW) project has been redesigned and M/s. SJVN Ltd has taken-up to develop the project in 3 stages, the project proponent shall have to apply for cancellation of environmental clearance (EC) accorded to Luhri HEP project for 612 MW capacity by submitting all requisite documents to the Ministry.

(viii) Fresh ToR shall be issued only upon cancellation of the original EC.

(ix) The present modified proposal is in lieu of earlier 612 capacity HEP for which EC has been already granted.

Agenda Item-2.4 Ken Betwa Link Project Phase-I in Districts Panna & Chhatarpur, Madhya Pradesh by M/s. Water Resources Department, Government of Madhya Pradesh & M/s National Water Development Agency (NWDA), Government of India – for consideration of Environmental Clearance

The project proponent made a detailed presentation on the project. It is noted that the project envisages construction of 77 m high and 2031 m long composite dam across river Kenr near village Daudhan in the District Chhatarpur in Madhya Pradesh to irrigate 6.35 lakh ha area of land, drinking water purposes and generation of 78 MW hydropower. The project comprises of two powerhouse of 2 x 30 MW & 3x6 MW each, two tunnels of 1.9 Km long upper level, 1.1 Km long tunnel lower level &. A 221 Km long Ken-Betwa link canal has been proposed on the left bank of the river. The project will provide irrigation facilities for 6,35,661 ha of area in Panna, Chhattarpur, Tikamgarh Districts, Madhya Pradesh and Banda, Mahoba and Jhansi Districts in Uttar Pradesh. The culturable command area (CCA) is 5,15,215 ha. Total submergence area is 9000 ha out of which 5258 ha is forest land (includes 4141 ha Panna Tiger

Reserve). A total of 10 villages consisting of 1585 families are likely to be affected by this project. Panna Tiger Reserve falls within 10 Km radius of the project. The total cost of the project is about Rs. 9393 Croes and proposed to be completed in 9 years.

The Committee noted that based on the approved monthly flow series for the 75% dependable year, the e-flows have been calculated. The Ken River is a non-perennial river and the 75% dependable year (1988-89) monsoon season (June-September) run-off is 6541.56 MCM. The average non-monsoon/non-lean season (October-January) run-off is 9.11 MCM, whereas there is no run-off during lean season from February to May. Out of the total run-off at Daudhan dam site is 2266 MCM of water is earmarked for proposed upstream utilization and the monthly distribution pro-rata basis. The total regeneration from upstream uses has been assessed is 442 MCM. On the basis of this,month-wise 75% dependable net flow has been estimated. The 75% net dependable run-off during monsoon season is 4348.96 MCM out of this 30% monsoon run-off is 1304.69 MCM. The average non-monsoon/non-lean season run-off is 368.54 MCM and 30% of non-monsoon run-off is 110.56 MCM and this will be ensured during operation of the project. The average lean season run-off is 36.51 MCM and 20% of this lean season run-off is 7.30 MCM and this will be ensured through releases from reservoir. The outlets in the dam body for maintaining e-flows will be provided in the middle of the structure below MDDL. These outlets will be provided with control gates/valves to maintain the required releases of water (e-flows) during different seasons. The system will be connected to a sensor/flow meter for online measurement/verification through a display board. Proper instrumentation will be undertaken to accomplish this. The e-flow are presented below:

Table: Environmental Flows for Daudhan Dam

Sl. No	Season	Average in flow (MCM)	% of inflow	Average EF to the downstream (MCM)
1	Lean Season (February - May)	36.51	20	7.30
2	Non-mosoon and Non-lean season (October - January)	368.54	30	110.56
3	Monsoon season (June - September)	4348.96	30	1304.69

The environmental aspects covering catchment area, Submergence area and Project influence area i.e. area within 10 km radius from main project components have been considered. The baseline data has been collected covering physico-chemical aspects, Biological aspects and Socio-economic aspects. Three season data has been collected for air, noise, water, soil and ecological aspects. Impacts during construction and operation phases have been assessed and mitigation measures suggested minimizing the anticipated impacts.

Other salient features of the project and EIA/EMP were report as under:

The public hearings for the project was conducted on 23.12.2014 at Government School Ground, Silone Village Chhatarpur District & on 27.12.2014 at Forest Guest House, Hinnota Village in Panna District of Madhya Pradesh and about 1200 people including DM, SDM, affected villagers, political leaders and others attended the public hearing. Job opportunities to PAFs, compensation for land, R&R benefits as per the Right to Fair Compensation for LATRR 2013, infrastructure facilities in resettlement colonies, water availability for the existing downstream projects after the construction of Daudhan dam, locally available labour for construction of the project, water availability to Ken Ghariyal Sanctuary etc. The project proponent has complied all the issues raised by the public pertaining to them.

The total catchment area of River Ken at Daudham dam is 19,633 Sq.km. Out of this directly draining catchment area is in 30 sub-watersheds having a total area of 2413.67 Sq.km categorized as very high and high priorities will treated with both biological and engineering measures. The Catchment Area Treatment (CAT) Plan proposed in the EMP shall be implemented in consultation with Madhya Pradesh State Forest Department. An amount of Rs.272.58 Crores have been allocated for this purpose.

The project is likely to generate 12.3 Mm^3 of muck due to excavation. Out of which 7.38 Mm^3 is to be utilized for construction purpose and remaining will be dumped in designated disposal sites. The muck disposal sites should be reclaimed/ restored with vegetation once capacity is utilized. An amount of Rs.29.53 Crores have been allocated for this purpose

The compensatory afforestation programme is proposed in 10,856 ha of forests land which is double the forest land diverted for the project and will be implemented in consultation with State Forest Department. An amount of Rs.3061 Crores have been allocated for this purpose**.** Since, a part of Panna Tiger Reserve core area is coming under submergence, Biodiversity Conservation and Management Plan has also been proposed with State Forest Department. An amount of Rs.27.47 Crores lakhs have been allocated for this purpose.

Central Inland Fisheries Research Institute (CIFRI) has conducted a special study. As per CIFRI, Fishery development and management plan is proposed for the conservation fish in river. Under this programme development of Mahsheer hatchery has been proposed and stocking of Daudhan & Rangwan reservoirs, upstream/ downstream of the river will be done. The plan will be implemented in consultation State Fisheries Department. An amount of Rs. 14.09 Crores have been allocated for this purpose.

The command area of Daudhan Reservoir is spread over in 2 districts of Madhya Pradesh. Therefore, one demonstration plot of 500 ha each in the proposed command area of Daudhan reservoir in Panna and Chhatarpur Districts as well as 1 demonstarion plant in Jhansi District of Uttar Pradesh through link canal are identified for pressurized/Sprinkler irrigation system. The district-wise distribution of location identified for laying demonstration plots for pressure piped irrigation is as follows:

The EMP has been prepared based on predicted impact, actual requirement and incorporating suggestions of local people, stakeholders with the details as under:-

Sl. No.	Environmental Management Plan	Cost (Rs. Lakhs)
1	Catchment Area Treatment Plan	27258.52
2	Command Area Development	31180.74
4	Compensatory Afforestation, NPV for territorial forest & National Park	306096.08
5	Bio-diversity Management Plan	2747.44
6	Fisheries Conservation and Management Plan	1409.72
7	Surface and Ground Water Management Plan	6340.00
8	Rehabilitation and Resettlement Plan including Land Cost, Land Compensation and LADP/ TDP	125768.00
9	Tourism Development Plan	577.50
10	Muck Disposal Plan	2953.00
11	Disaster Management Plan	140.00
12	Public Health Delivery System	2160.00
13	Environment Monitoring Plan	688.50
Total		**5073.00 Crores**

The committee was informed that the Ministry while granting TOR, clearly mentioned that the project site is within the Panna Tiger Reserve and therefore, the NWDA is required to obtain necessary clearance from NBWL & National Tiger Conservation Authority for the Ken-Betwa Link Phase-I project. The project proponent requested NTCA for clearance for the K-B Link Project Phase-I. NTCA suggested for a detailed study for assessing the impact of the project due to habitat change having effect like corridor loss and loss of migratory path for wildlife including birds, impacts on breeding grounds of species and on access of animals to food and shelter and impact on animal distribution. Accordingly, 4 member committee was constituted consisting 1 member each from NTCA, WII, NWDA and Director, Panna Tiger Reserve (Deptt. of Forests, GOMP). The committee carried out a detailed study and suggested the following:

- The committee constituted by NTCA has recommended that WII will prepare Land Scape Management Plan (LMP) as a mitigation measures in Panna Tiger Reserve.

- As per recommendations, Four Satellite Core areas will be developed, consisting of two Wild Life sanctuaries each in UP (Ranipur & Mahavir Swami) and MP (Nauradehi & Rani Durgawati). Apart from this MP has agreed to convert 60 sq km of Buffer Area of Panna Tiger Reserve to core area and required Budget provision will be made in the project.

- Govt. of UP has agreed in principle for the inclusion of above two Wild Life Sanctuaries.

- Only about 41.4 sq km which is 7.5% of the Panna Tiger Reserve area (576 sq km) will be submerged in one corner of protected area however dam/reservoir will create new avenues for betterment of Wildlife.

- Panna Tiger Reserve (PTR) is facing acute shortage of water and due to creation of reservoir, its water regime will improve to a great extent.
- This will create new pasture land in submergence area after water is receded.
- 40% of the submerged area will be open for pasture land in the month of December and 60% open area will be available in the month of February.
- Herbivores population will be greatly improved, which will help in increase of Tiger Population.
- Increase in Herbivores population will also be helpful for Vulture population.
    - There is no threat to Vulture population because only 3% habitat of vulture will be submerged and 97% of habitat will be more than 100 m above HFL.
    - Construction of dam will help Ken Ghariyal sanctuary situated in the downstream because of more ecological flow of water round the year from this dam. Otherwise at present, Ken river is dry for more than six months in downstream.
    - Due to heavy flood in Ken River, smaller Ghariyal used to be washed away. But due to dam, these will be conserved in a better way.

The project proponent informed that the State Wildlife Board considered the K-B link project for clearance in its meetings held on 11.8.2015 and sought additional information.

After detailed deliberations, EAC sought clarification/additional information on the following:

(i) Status of NBWL clearance and as to whether the application has been forwarded from State Government and as to what are the recommendations of NTCA/Chief Wildlife Warden, Government of Madhya Pradesh. Detailed Wildlife Conservation & Management Plan proposed for Panna Tiger Reserve/ Ghariyal Sanctuary.

(ii) Impact due to habitat change having effect like corridor loss and loss of migratory path for wildlife including bird and impact on the breeding grounds of species and on access of animals to food and shelter

(iii) Impact on animal distribution especially on tigers.

(iv) A proper mechanism/feature is to be provided in the planning and design of dam to ensure a longitudinal connectivity for non-disruptive biota movement and sediment transportation. This is to be explained.

(v) Plan for greenbelt development & reservoir rim treatment plan has to be furnished

(vi) Status of submission of Stage-I forest clearance application for the project.

(vii) Since, the submergence area is very large (about 9000 ha), the micro climatic change conditions in project be brought-out clearly.

(viii) There are about 7 representations received from various NGO Groups with respect to Ken-Betwa project. Project Proponent was handed over copies of these representations received from these NGOs, and was requested to submit a detailed response..

EAC noted that in this project the Panna Tiger Reserve was being affected very significantly and that all aspects of this project in relation to this disturbance to the reserve need to be studied and assessed more carefully. EAC also noted that the Land Scape Management Plan (LSMP) is being prepared by WII for the mitigation measures to be taken up in the Panna Tiger Reserve/ Ghariyal Sanctuary. Since many of the members of the EAC are from expert organizations which are responsible for the preparation of the LSMP there could be some conflict of interest. In fact one the member's had sought opinion on this and he was advised to recluse himself when this project is discussed. Under the circumstances it will be appropriate that a second opinion from a non-government expert is obtained. EAC should dwell on this in the next meeting and select the external expert for the purpose.

EAC concluded that on receipt of compliance of the observations made, in various representations received by the MOEF&CC, by the project proponent and on obtaining a second opinion on the LSMP from an external expert the project will be reviewed and reconsidered again for Environmental Clearance.

Agenda Item 2.5 Mago Chu HEP (96 MW) project in District Tawang of Arunachal Pradesh by M/s. SEW Mago Chu Power Corporation Ltd. - for Reconsideration of Environmental Clearance.

The project proponent made a detailed presentation on the project. Mago Chu HEP is proposed on Mago Chu river (tributary of Tawang River) in Tawang District of Arunachal Pradesh. The project envisages construction of 20.5 m high barrage at 3.1 km upstream of the confluence of Mago Chu & Nyukcharong Chu. The project is a run-of-the-river scheme. The catchment area at barrage site is 830 Sq. km. Total land requirement is about 33.24 ha, which is unclassified State Forest (USF) land. Total submergence area is 2.42 ha which is riverbed. An underground powerhouse is proposed on the right bank of the river with 3 units of 32 MW capacity each. No family is directly affected by his project in terms of private land acquisition and loss of property. Surface land required for the project is 26.71 ha which unclassified state forest (USF) land belongs to Rho & Yuthembu Village communities. Land compensation will be as per Revenue Authority/District Administration. No family will lose their homestead. There is no wild life sanctuary, national park, eco-sensitive zone within 10 km radius study area. The estimated project is about Rs. 879.12 crores and the project will be completed in 42 months.

The Scoping/TOR Clearance was accorded on 23.2.2010 and the validity has been extended up to 21.2.2015. Public hearing was conducted on 4.2.2015 at Indoor Stadium, Jang, Tawang District of Arunachal Pradesh. About 190 people including ASM, GB Lamas, affected villagers, political leaders and other attended the public hearing.

The project was considered by EAC in it's the 84th meeting held on 3-4th June, 2015. The EAC made certain observations and sought additional information on the following:

(i) Tawang sub-basin study has been completed, but the same is yet to be examined by the EAC and accepted by the Ministry. Further, the said project not being the first in the basin, the proposal for grant of EC needs to be looked into by the Ministry in terms of the OM dated 28th May, 2013.

(ii) Due to provision/designing of dam toe power houses, actual power generation will be 1.2 MW more i.e. 97.2 MW. As such, the project proponents need to inform Central Electricity Authority (CEA) in this regard, and seek a clearance for the revised capacity.

(iii) There is no protected area in the form of National Park or Wild Life Sanctuary within 10km radius of the said project, and as such, the project proponents have not made any request for grant of Wild life clearance or the permission from Standing Committee of NBWL. However, it was suggested to obtain a clarification in this regard from the State Forest / Wild Life Department.

(iv) The required downstream releases (after meeting design discharges) of 30%, 25% & 20% during monsoon, non-monsoon and lean months are to be ensured. These would be further revised as per the recommendations and acceptance of Twang sub-basin study in this regard.

(v) Public hearing needs to be conducted also to cover the area identified for compensatory afforestation programme to assess the environmental impacts.

(vi) The project proponents need to prepare a comprehensive plan for identification/mapping of skills in the project area in order to impart training to local population for their employment and thus to explain the positive impact of the project.

(vii) The project proponent must submit response to the various issues raised by SANDRP in their representation submitted to this Ministry.

The project proponent mentioned that Cumulative Impact Assessment of proposed HEPs and determination of Basin Carrying Capacity has been carried-out by Department of Botany, North Eastern Hill University, Shillong. The report has been submitted to Government of Arunachal Pradesh in May, 2015. A copy of the report was endorsed to SEW by GOAP. Further processing of the Tawang Basin Report and final approval by MOEF&CC is likely to take time. Considering the fact that SEW Mago Chu Power Corporation Ltd. is ready to accept and implement the final approved recommendations of the Tawang Basin Study.

The committee noted that the average non-monsoon/non-lean run-off is 34.93 cumec and 25% of non-monsoon run-off is 8.73 cumec and this will be ensured during operation of the project based on real-time observed data. The average lean season (December- March) run-off is 10.35 cumec and 20% of lean season release would be 2.07 cumec. The following e-flows have been mentioned for the project:

Table: Environmental Flows for Mago Chhu HEP

Season	Avg. inflow (m^3/s)	% of Inflow	Avg. e-flow to the downstream(m^3/s)
Lean (December – March)	10.35	20	2.07
Non-Monsoon/ Non-Lean	34.93	25	8.73

(October, November– April, May)			
Monsoon (June- September)	529.58 MCM	30	158.87 MCM

The committee agreed for the required downstream releases, however, it was mentioned that during monsoon, non-monsoon/non-lean and lean seasons, e-flow requirement should be as per the recommendations and acceptance of Twang sub-basin study

Regarding, the proposal of toe generation, the project proponent confirmed that the installed capacity of Mago Chu HEP will be 96 MW. There will be no additional dam-toe generation of 1.2 MW and has been dropped. Therefore, clearance from CEA is not required.

The project proponent has also clarified that there is no protected area i.e. National Park/Wild Life Sanctuary within 10 km radius of the said project, and as such, grant of Wild life clearance/ or the permission is not required. A certificate issued by the DFO, Tawang in this regard has been submitted to Ministry/Committee.

State Pollution Control Board has conducted public hearing of Mago Chu HEP on 4.2.2015 as per the provisions of EIA Notification 2006. There is no such provision under EIA Notification 2006 & its amendment that public hearing needs to be conducted for compensatory afforestation programme. However, compensatory afforestation programme will be implemented in consultation with Forest Department, Government of Arunachal Pradesh

The details worked-out in supporting technical education and further training to 20 local students and finally employing them in the project has been submitted. The EAC suggested for increase in the EMP budget of Rs.3605.20 lakhs proposed originally. Proponent agreed to increase the EMP to 3830.2 lakhs by increasing the LADP component to Rs. 225 lakhs.

After detailed examination and discussing adequately the compliance of the committee observations, the EAC recommended for environmental clearance for the project with the following conditions:

(i) All commitments made during the Public Hearing should be implemented fully by the project proponent.

(ii) The downstream releases (after meeting design discharges) of 30%, 25% & 20% during monsoon, non-monsoon and lean months are to be ensured. These would be further revised as per the recommendations and acceptance of Twang Basin study in this regard.

(iii) The environmental flow shall be on a continuous basis and should be released through unregulated means at the downstream of the project.

Agenda Item 2.6 Nyukcharong Chu HEP (96 MW) project in District Tawang of Arunachal Pradesh by M/s. SEW Nyukcharong Chu Power Corporation Ltd. - for Reconsideration of Environmental Clearance.

The project proponent made a detailed presentation on the project. Nyukcharong Chu HEP is proposed on Nyukcharong Chu river (tributary of Tawang River) in Tawang District of

Arunachal Pradesh. The project envisages construction of 22 m high barrage at 2.3 km upstream of the confluence of Mago Chu & Nyukcharong Chu. The project is a run-of-the-river scheme. The catchment area at barrage site is 2040 Sq. km. Total land requirement is about 36.83 ha, which is unclassified State Forest (USF) land. Total submergence area is 1.72 ha which is riverbed. An underground powerhouse is proposed on the left bank of the river with 3 units of 32 MW capacity each. No family is directly affected by his project in terms of private land acquisition and loss of property. Surface land required for the project is 29.41 ha which unclassified state forest (USF) land belongs to Rho & Yuthembu Village communities. Land compensation will be as per Revenue Authority/District Administration. No family will lose homestead land. There is no wild life sanctuary, national park, eco-sensitive zone within 10 km radius study area. The estimated project is about Rs. 995.90 crores and the project will be completed in 42 months.

The Scoping/TOR Clearance was accorded on 23.2.2010 and the validity has been extended up to 21.2.2015. Public hearing was conducted on 2.2.2015 at Indoor Stadium, Jang, Tawang District of Arunachal Pradesh. About 151 people including ASM, GB Lamas, affected villagers, political leaders and other attended the public hearing.

The project was considered by EAC in it's the 84th meeting held on 3-4th June, 2015. The EAC made certain observations and sought additional information on the following:

(i) Tawang sub-basin study has been completed, but the same is yet to be examined by the EAC and accepted by the Ministry. Further, the said project not being the first in the basin, the proposal for grant of EC needs to be looked into by the Ministry in terms of the OM dated 28th May, 2013.

(ii) Due to provision/designing of dam toe power houses, actual power generation will be 1.2 MW more i.e. 97.2 MW. As such, the project proponents need to inform Central Electricity Authority (CEA) in this regard, and seek a clearance for the revised capacity.

(iii) There is no protected area in the form of National Park or Wild Life Sanctuary within 10km radius of the said project, and as such, the project proponents have not made any request for grant of Wild life clearance or the permission from Standing Committee of NBWL. However, it was suggested to obtain a clarification in this regard from the State Forest / Wild Life Department.

(iv) The required downstream releases (after meeting design discharges) of 30%, 25% & 20% during monsoon, non-monsoon and lean months are to be ensured. These would be further revised as per the recommendations and acceptance of Twang sub-basin study in this regard.

(v) Public hearing needs to be conducted also to cover the area identified for compensatory afforestation programme to assess the environmental impacts.

(vi) The project proponents need to prepare a comprehensive plan for identification/mapping of skills in the project area in order to impart training to local population for their employment and thus to explain the positive impact of the project.

(vii) The project proponent must submit response to the various issues raised by SANDRP in their representation submitted to this Ministry.

The project proponent mentioned that Cumulative Impact Assessment of proposed HEPs and determination of Basin Carrying Capacity has been carried-out by Department of

Botany, North Eastern Hill University, Shillong. The report has been submitted to Government of Arunachal Pradesh in May, 2015. A copy of the report was endorsed to SEW by GOAP. Further processing of the Tawang Basin Report and final approval by MOEF&CC is likely to take time. Considering the fact that SEW Mago Chu Power Corporation Ltd. is ready to accept and implement the final approved recommendations of the Tawang Basin Study.

The committee noted that the average non-monsoon/non-lean run-off is 32.05 cumec and 25% of non-monsoon run-off is 8.01 cumec and this will be ensured during operation of the project based on real-time observed data. The average lean season (December- March) run-off is 20 cumec and 20% of lean season release would be 4 cumec. The following e-flows have been mentioned for the project:

Table: Environmental Flows for Nyukcharong Chhu HEP

Season	Avg. inflow (m^3/s)	% of Inflow	Avg. e-flow to the downstream(m^3/s)
Lean (December – March)	20	20	4
Non-Monsoon/ Non-Lean (October, November– April, May)	32.05	25	8.01
Monsoon (June- September)	665.91 MCM	30	199.77 MCM and minimum of 12.62 cumecs at any time

The committee agreed for the required downstream releases, however, it was mentioned that during monsoon, non-monsoon/non-lean and lean seasons, e-flow requirement should be as per the recommendations and acceptance of Twang sub-basin study

Regarding, the proposal of toe generation, the project proponent confirmed that the installed capacity of Nyukcharong Chu HEP will be 96 MW. There will be no additional dam-toe generation of 1.2 MW and has been dropped. Therefore, clearance from CEA is not required.

The project proponent has also clarified that there is no protected area i.e. National Park/Wild Life Sanctuary within 10 km radius of the said project, and as such, grant of Wild life clearance/ or the permission is not required. A certificate issued by the DFO, Tawang in this regard has been submitted to Ministry/Committee.

State Pollution Control Board has conducted public hearing of Nyukcharong Chu HEP on 2.2.2015 as per the provisions of EIA Notification 2006. There is no such provision under EIA Notification 2006 & its amendment that public hearing needs to be conducted for compensatory afforestation programme. However, compensatory afforestation programme will be implemented in consultation with Forest Department, Government of Arunachal Pradesh

The details worked-out in supporting technical education and further training to 20 local students and finally employing them in the project has been submitted. The EAC suggested for increase in the EMP budget of Rs.4043.39 lakhs proposed originally. Proponent agreed to increase the EMP to 4268.39 lakhs by increasing the LADP component to Rs. 225 lakhs.

After detailed examination and discussing adequately the compliance of the committee observations, the EAC recommended for environmental clearance for the project with the following conditions:

(i) All commitments made during the Public Hearing should be implemented fully by the project proponent.

(ii) The downstream releases (after meeting design discharges) of 30%, 25% & 20% during monsoon, non-monsoon and lean months are to be ensured. These would be further revised as per the recommendations and acceptance of Twang Basin study in this regard.

(iii) The environmental flow shall be on a continuous basis and should be released through unregulated means at the downstream of the project.

Agenda Item 2.7 New Melling HEP (90 MW) project in District Tawang of Arunachal Pradesh by M/s. SEW Mago Chu Power Corporation Ltd. - for Reconsideration of Environmental Clearance.

The project proponent made a detailed presentation on the project. New Melling Chu HEP is proposed on Mago Chu river (tributary of Tawang River) in Tawang District of Arunachal Pradesh. The project envisages construction of 20.5 m high barrage at 8.23 km upstream of the confluence of Mago Chu & Nyukcharong Chu. The project is a run-of-the-river scheme. The catchment area at barrage site is 805 Sq. km. Total land requirement is about 29.34 ha, which is unclassified State Forest (USF) land. Total submergence area is 4.56 ha which is riverbed. An underground powerhouse is proposed on the right bank of the river with 3 units of 30 MW capacity each. No family is directly affected by his project in terms of private land acquisition and loss of property. Surface land required for the project is 24.17 ha which unclassified state forest (USF) land belongs to Rho & Yuthembu Village communities. Land compensation will be as per Revenue Authority/District Administration. No family will lose their homestead. There is no wild life sanctuary, national park, eco-sensitive zone within 10 km radius study area. The estimated project is about Rs. 938.02 crores and the project will be completed in 42 months.

The Scoping/TOR Clearance was accorded on 23.2.2010 and the validity has been extended up to 21.2.2015. Public hearing was conducted on 3.2.2015 at Indoor Stadium, Jang, Tawang District of Arunachal Pradesh. About 190 people including ASM, GB Lamas, affected villagers, political leaders and other attended the public hearing.

The project was considered by EAC in it's the 84th meeting held on 3-4th June, 2015. The EAC made certain observations and sought additional information on the following:

(i) Tawang sub-basin study has been completed, but the same is yet to be examined by the EAC and accepted by the Ministry. Further, the said project not being the first in the basin, the proposal for grant of EC needs to be looked into by the Ministry in terms of the OM dated 28th May, 2013.

(ii) Due to provision/designing of dam toe power houses, actual power generation will be 1.2 MW more i.e. 97.2 MW. As such, the project proponents need to inform Central Electricity Authority (CEA) in this regard, and seek a clearance for the revised capacity.

(iii) There is no protected area in the form of National Park or Wild Life Sanctuary within 10km radius of the said project, and as such, the project proponents have not made any request for grant of Wild life clearance or the permission from Standing Committee of NBWL. However, it was suggested to obtain a clarification in this regard from the State Forest / Wild Life Department.

(iv) The required downstream releases (after meeting design discharges) of 30%, 25% & 20% during monsoon, non-monsoon and lean months are to be ensured. These would be further revised as per the recommendations and acceptance of Twang sub-basin study in this regard.

(v) Public hearing needs to be conducted also to cover the area identified for compensatory afforestation programme to assess the environmental impacts.

(vi) The project proponents need to prepare a comprehensive plan for identification/mapping of skills in the project area in order to impart training to local population for their employment and thus to explain the positive impact of the project.

(vii) The project proponent must submit response to the various issues raised by SANDRP in their representation submitted to this Ministry.

The project proponent mentioned that Cumulative Impact Assessment of proposed HEPs and determination of Basin Carrying Capacity has been carried-out by Department of Botany, North Eastern Hill University, Shillong. The report has been submitted to Government of Arunachal Pradesh in May, 2015. A copy of the report was endorsed to SEW by GOAP. Further processing of the Tawang Basin Report and final approval by MOEF&CC is likely to take time. Considering the fact that SEW Mago Chu Power Corporation Ltd. is ready to accept and implement the final approved recommendations of the Tawang Basin Study.

The committee noted that the average non-monsoon/non-lean run-off is 33.88 cumec and 25% of non-monsoon run-off is 8.47 cumec and this will be ensured during operation of the project based on real-time observed data. The average lean season (December- March) run-off is 10.05 cumec and 20% of lean season release would be 2.01 cumec. The following e-flows have been mentioned for the project:

Table: Environmental Flows for New Meling HEP

Season	**Avg. inflow (m^3/s)**	**% of Inflow**	**Avg. e-flow to the downstream(m^3/s)**
Lean (December – March)	10.05	20	2.01
Non-Monsoon/ Non-Lean (October, November– April, May)	33.83	25	8.47
Monsoon (June- September)	513.64 MCM	30	154.08 MCM total and minimum of 9.73 cumecs at any time

The committee agreed for the required downstream releases, however, it was mentioned that during monsoon, non-monsoon/non-lean and lean seasons, e-flow requirement should be as per the recommendations and acceptance of Twang sub-basin study

Regarding, the proposal of toe generation, the project proponent confirmed that the installed capacity of New Melling HEP will be 90 MW. There will be no additional dam-toe generation of 1.2 MW and has been dropped. Therefore, clearance from CEA is not required.

The project proponent has also clarified that there is no protected area i.e. National Park/Wild Life Sanctuary within 10 km radius of the said project, and as such, grant of Wild life clearance/ or the permission is not required. A certificate issued by the DFO, Tawang in this regard has been submitted to Ministry/Committee.

State Pollution Control Board has conducted public hearing of New Melling HEP on 3.2.2015 as per the provisions of EIA Notification 2006. There is no such provision under EIA Notification 2006 & its amendment that public hearing needs to be conducted for compensatory afforestation programme. However, compensatory afforestation programme will be implemented in consultation with Forest Department, Government of Arunachal Pradesh

The details worked-out in supporting technical education and further training to 20 local students and finally employing them in the project has been submitted. The EAC suggested for increase in the EMP budget of Rs.3254.72 lakhs proposed originally. Proponent agreed to increase the EMP to 3479.72 lakhs by increasing the LADP component to Rs. 225 lakhs.

After detailed examination and discussing adequately the compliance of the committee observations, the EAC recommended for environmental clearance for the project with the following conditions:

(i) All commitments made during the Public Hearing should be implemented fully by the project proponent.

(ii) The downstream releases (after meeting design discharges) of 30%, 25% & 20% during monsoon, non-monsoon and lean months are to be ensured. These would be further revised as per the recommendations and acceptance of Twang Basin study in this regard.

(iii) The environmental flow shall be on a continuous basis and should be released through unregulated means at the downstream of the project.

Agenda Item-2.8 Jeera Irrigation Project in Odisha by M/s. Water Resources Department, Government of Odisha – For reconsideration of extension of validity of TOR

The project proponent made a detailed presentation on the project. This is a medium irrigation project with a culturable command area (CCA) of 4800 ha. The project on completion will provide irrigation to 4320 ha of land in Khariff season and 1520 ha in Rabi season thereby improving the socio-economic condition of the people of the area. The project

is planned across Jeera river which is an interstate river having 187 Sq. Km. of basin area. Out of this interstate basin, 99 Sq. Km lies in Chhatishgarh and 88 Sq. Km of basin area lies in state of Odisha. Government of Odisha submitted to Central Level stating that Chhattisgarh is within 10 Km of the proposed project area. Therefore, the project was considered by EAC at that time as per EIA Notification, 2006 (General Conditions apply).

The project was earlier considered by EAC in its meetings held on 10-11th Dec, 2013 and 20-21st July, 2015. While considering the project, the EAC had noted that the validity of the TOR for the project has expired and public hearing was held one day after expiry of the validity of TOR. Therefore, EAC advised Water Resources Department, Government of Odisha to submit application with justification seeking extension of the validity of TOR to enable reconsideration of the proposal by the EAC.

The EAC observed that Government of Odisha submitted compliance report instead of asking for validation of TOR. The EAC noted that under the extant rules validity of TOR can still be extended and therefore requested them to immediately first apply for seeking extension of the validity of TOR and thereafter they may revise the EIA/EMP and compliance report and submit to Ministry for consideration in the next EAC meeting. The Odisha Government informed they would submit the application on this day itself.

The Committee noted that the project proponent had submitted the application for extension of validity of TOR on 21.7.2015. The project proponent made a detailed presentation for reconsideration of extension of validity of TOR for one year beyond the presently stipulated validity period of 4 years for River valley and HEP Projects. The project proponent also explained that the TOR was issued for this project on 30.9.2010 with validity period 2 years ending on 30.9.2012 and since 29.9.2012 was a public festival day for the State and 30.9.2012 was happened to a Sunday, the Odisha State Pollution Control Board (OSPCB) shifted the public hearing meeting to next day i.e. 1.10.2012. Hence no lapse has been made on part of OSPCB by shifting one day to conduct the public hearing in the next day i.e. 01.10.2012.

The EAC noted that the request made by the project proponent was reasonable and genuine, agreed for extension for the validity of TOR up-to 30.9.2015 based on the justification presented by the project proponent.

Thereafter the project proponent mentioned that the EIA & EMP report has already been revised and compliance report was made available to the members. After due consideration of the project proponent's proposal, EAC allowed them to make a presentation of the EIA & EMP of the project.

The committee enquired about the water availability in the project should clearly depict the utilization by various needs i.e. irrigation & drinking water etc and the downstream spills can be spelt out numerically. The project proponent explained that during the period of simulation of reservoir from 1973-2005, the average annual inflow was 7263 ha-m (72.63 MCM) out of which 3695 ha-m (32.95 MCM) will be utilized for irrigation purpose & 144 ha/m (1.44 MCM) will be used for drinking water purpose, whereas 3402 ha-m (34.02 MCM)

of water spilled to the downstream. It was also clarified that low reservoir capacity to avoid submergence, resulted in such a high order of spill from the reservoir.

As per the latest norms, during monsoon season 30% of the average flow and during lean period, a minimum of 20% of the average flow will be discharged into the river. The EAC suggested that this aspect needs to be established through the reservoir simulation study and the yield hydrology appraised to CWC. The computations and justification should constitute a part of the EIA&EMP report. The project proponent clarified that after accounting for the 20% riparian rights which in this instant case becomes a de facto release to the downstream, The average spill during the monsoon season is in the order of 43% as against the ecological flow requirement of 30% during monsoon period.

The project proponent explained that the muck in the Head works will be mostly generated from Earth Dam base stripping and foundation excavation of spillway and Total Muck to be disposed of was in the order of 2.35 lakh m^3. The same will be disposed-off in 2 selected area in Urduna & Duanpalli villages located at a distance of 2 km from the project site.

It was clarified that only 10% of the command has been surveyed in detail for planning as per CWC guideline and on completion of the execution of the distribution system, the Command Area Development (CAD) will be taken-up by Odisha Command Area Development Authority. A provision has been made in the estimate of the DPR amounting to Rs. 58.52 lakhs, which will be augmented in due course at the time of implementation of the project. Pressurized/Drip irrigation system will be implemented in an area of 530 ha, earmarked for growing vegetables as per the proposed cropping pattern in association with Horticulture Department of the State after formulation of Water User Associations in the designated areas.

It was also explained that the method proposed by SLUSI (Soil and Land Use Survey of India) has been adopted for computation of SYI. The satellite data of LISS-IV MX (Multi Spectral) of IRS-P6 on date of pass of 1st April 2015 has been used to prepare the latest land use and land cover scenario. The SYI values obtained for various micro watersheds range from 1196 to 978. The CAT plan comprising of gully plugging, check dams and plantation measures has been prepared depending upon the requirement and suitability of different micro watersheds. A provision of Rs. 189 lakhs has been provided for CAT Plan activity.

The R&R policy amounting to Rs 1910 lakhs has been approved by MOTA during March 2015. It was prepared as per the RR policy 2006 for the 230 PAFs, who are loosing their lands. However, during final appraisal of the project at CWC, after obtaining all clearances, the R&R policy will be updated as per the recently adopted R&R policy of 28.7.2014 incorporating the fourth biennial revision of rehabilitation grants.

It was explained that the fish species are predominantly cyprinids, whose need for migration for breeding and feeding is met in early monsoon. Adequate spill in the flood spells would meet their requirement. The requirement of flushing release to the downstream was exhibited through hydrographs. It was explained that through hydrographs of flood events that spills in the monsoon months for the 76% dependable year, mimic the natural flow pattern. It

was explained that due to relatively small storage capacity of the reservoir, the spill through the spillway of the project will be adequate. A provision of Rs. 109 lakhs has been made for this purpose.

A total provision of Rs.28.28 Crores has been made for implementing the Environment Management Plan (EMP) against the total project cost of Rs.123.79 Crores.

After detailed deliberations, the Committee observed the following:

(i) Extension for the validity of TOR up-to 30.9.2015 based on the justification presented by the project proponent.

(ii) As the Jeera river is not perennial, the environmental flow release of 30% in monsoon and 20% in the lean season proposed in the project appears to be adequate

(iii) Fishery Management Plan may be relooked keeping in view of the native species available in the river. A scientific institute/academic institution may be involved in the preparation of management plan

(iv) Detailed command area/catchment area plan has to be prepared and explained in EIA/EMP report

(v) Muck utilization/disposal details along with plan have to be prepared and submitted

~~(vi)~~ As the project is located very close to Sambalpur & Bargarh township, provision for water sports /eco-tourism needs to be envisaged and necessary budgetary provision will have to be made in the EIA & EMP report. Though, Govt. of Odisha agreed to make a provision of Rs.700 lakh for the same, this has to reflected properly in the EIA/EMP report. The project authority may consult Chief, Water Sporting Council of India, ~~who is Odisha itself.~~in this connection.

(vii) Committee observed that Govt. of Odisha has prepared the modified EIA&EMP report in-house. However, a list of experts/personnel/institutions who have rendered consultancy initially in the project has to be furnished and mentioned in the EIA/EMP report.

On receipt of response to the above observations/comments and updated EIA/EMP report, the proposal may be reconsidered by the EAC.

Agenda Item-2.9 Chintalapudi Lift Irrigation Scheme in West Godavari District of Andhra Pradesh by M/s. Water Resources Department, Government of Andhra Pradesh – for consideration of TOR.

The project proponent made a detailed presentation on the project. It was noted that the project envisages construction of 36 m high & 4500 m long dam across river Godavari in West Godavari District of Andhra Pradesh about 25.50 km upstream of Akhanda Godavari Right Bank of river to provide irrigation facility in 80,939 ha of area benefitting 231 villages. The lift irrigation scheme envisages pumping of 15.50 TMC of water from river Godavari in 2 packages. About 109.606 MW power is required to pump the water. Total land requirement is about 3989.04 ha. Out of which 2704.59 ha is forest land and 1282.45 ha is revenue land. The total estimated cost of the project is about 1701 Crores.

The committee mentioned that the cost-benefit ration of the project should be worked out. Based on this economic viability of the project may be brought. The power requirement has been mentioned as 109.606 MW for lifting the water from the river for providing the irrigation facility appeared on very high-side. The source of meeting power requirements is not available. Therefore, the committee suggested that detailed cost-benefit analysis, assured supply for meeting the requirements and feasibility of the project may be studied and report may be submitted for further examination before considering the project for scoping clearance.

The committee received a representation from SANDRP against the project. The project proponent must submit response to the various issues raised by SANDRP in their representation. A copy was handed over to project proponent for compliance. On receipt of response to the above observation, the proposal may be reconsidered by the EAC.

Agenda Item 2.10 Chango Yangthang HEP (180 MW) Project in Kinnaur District of Himachal Pradesh by M/s. Chango Yangthang Hydro Power Ltd – For extension of validity of TOR

The project proponent made a presentation for extension of the validity of TOR. Chango Yangthang HEP is a run-of-the-river project that will be using the water of Spiti River and is located in Kinnaur District of Himachal Pradesh. The project envisages construction of a 23 m high dam across to generate 180 MW capacity of hydropower. Total submergence area is 53 ha. An underground powerhouse is proposed on the right bank of the river with 3 units of 60 MW each.

The Scoping/TOR clearance for this project was accorded on 8.2.2013 with a validity period of 2 years. The project proponent informed that the preparation of DPR is completed and CEA has given concurrence to the project on 31.3.2014 and also mentioned that EIA/EMP reports are in completion stage. After finalising the draft EIA/EMP report, these will be submitted to Himachal Pradesh State Pollution Control Board for conducting Public Hearing. In order to complete the remaining activities including Public Consultation process and submission of final EIA/EMP reports to Ministry for final appraisal, requested extension of TOR. There is no change in any of the project parameters.

The EAC noted that the request made by the project proponent was reasonable and genuine. Keeping in view the pending works, EAC recommended 2 years extension of validity of TOR for Chango Yangthang (180 MW) project i.e. from 8.2.2015 to 8.2.2017. If the project proponents were unable to conduct public hearing and finalize EIA/EMP reports, and submit it to MoEF & CC for appraisal within the stipulated extension period, a fresh request would have to be made for scoping/TOR clearance.

Agenda Item-2.11 Etalin (3097 MW) in Dibang Valley District of Arunachal Pradesh by M/s Etalin Hydro Electric Power Company Limited

The project proponent made a detailed presentation on the project. The project (3097 MW) is located in Dibang Valley District of Arunachal Pradesh. The project envisages two independent head-works and water conductor systems (one each on Dri & Tangon Rivers) with a common underground powerhouse complex. Project envisages two dams of 101.50 m high &

80 m high on Dri & Tangon Rivers respectively from deepest foundation level. The common underground powerhouse is proposed near the confluence of Dri & Tangon rivers with 6 units of 307 MW capacity each and 4 units of 307 MW capacity each respectively. The riparian releases are ensured through 2 dam-toe powerhouses, one each in Dri and Tangon limbs with capacity of 19.60 and 7.40 MW respectively. Thus, the total Installed Capacity (IC) of Etalin HEP works out to 3097MW {(6x307) + (4x307) + 19.60 + 7.40}.

The project was earlier considered by EAC in its meetings held on 26-27th February, 2015 and 23-24th April, 2015. The project proponent mentioned that all clarification and compliance to issues raised in representation were clarified to committee during April, 2015 EAC meeting. It was also mentioned that the following e-flow recommendations were made in the project:

Table – E-flow release for Dri Limb & Tangon Limb

Project	Lean Season (December – March)	Monsoon Season (June – September)	Non-monsoon/ Non-lean (April-May & October-November)
For Dri Limb	30 cumec	50 cumec	35 cumec
For Taangon Limb	20 cumec	38 cumec	27 cumec

The committee agreed with the study carried out by CIFRI on release of minimum environmental flows & its recommendations. However, EAC deliberated upon the pending Cumulative Impact Assessment (CIA) study for Dibang Basin. It was noted that in accordance with MoEF & CC's circular dated 28.5.2013, the condition for carrying-out Cumulative Impact Study of a basin shall be stipulated at the ToR stage itself and not during the EC process. The Cumulative Impact Study has not been envisaged in the ToR of the project awarded by MoEF & CC in April, 2013. It was also noted that the CIA study, TOR has been issued in November, 2013 and MoEF & CC has taken over the study and awarded to M/s RS Envirolink Technologies Ltd. in March 2015. Considering the above, the project cannot be delinked with Dibang Basin study with the grant of Environment Clearance of Etalin HEP and will have to wait the outcome and recommendations of study.

Agenda Item-2.12 Tawang River Basin Study Report in Arunachal Pradesh conducted by North Eastern Hill University (NEHU) by Department of Power, Government of Arunachal Pradesh

This Ministry has made Carrying Capacity Study and Cumulative Impact Assessment for river/river basin as a mandatory requirement to consider environment and forest clearance of individual HEPs. These Studies come out, inter alia with the findings as to how many hydropower projects of which capacity and locations; can be taken up in a cascade development manner keeping in view environmental sustainability, minimum loss of biodiversity, as well as ecological integrity of a river/river basin on the backdrop of a given

environmental setup of a river basin. Thus, such basin studies serve as an important decision making tool for the Ministry in so far as consideration and grant of EC&FC for HEPs are concerned.

The Government of Arunachal Pradesh has conducted the carrying capacity study of Tawang river basin through NEHU, Shillong and the report was received in June, 2015. The Government of Arunachal Pradesh has submitted the report to this Ministry in August, 2015 and subsequently the report, was finally considered by the EAC in its meeting held during 24/25 August, 2015. The EAC has accepted the recommendation of the Report and following are the major recommendations of the Study Report:-

The concerns raised by different organizations were considered and discussed by the committee in detail. The submission of the NEHU on different issues are as follows, which was taken note of by the EAC:

- **Concern on conservation of Black-necked crane, and destruction of wintering habitat of Black-necked crane by Nyamjang Chu project:**

  In the light of the submission of NEHU, the committee discussed the conservation measures for the Black-necked crane and its wintering habitat at Nyamjang Chu Project site, and concluded that the E-flow data computed for Nyamjang Chu project in NEHU draft report (September 2014 version) should be included along with the mitigation measures suggested. A separate study on the E-flow requirement for protection of the habitat of Black-necked crane and for the conservation of the Black-necked crane would be commissioned by the MoEF & CC to WII, Dehradun for taking a final decision on Nyamjang Chu Project.

- **Concerns on methods followed for biodiversity survey:**

  NEHU explained that the biodiversity survey was carried out by the established scientists from the respective disciplines, many of whom are authorities in their own field. The sampling design for vegetation survey was correct considering the extent of area under each component at each project site, and structure and composition of the vegetation. Similarly, considering the fact that EIA study is a rapid assessment study which is to be completed within a specified time limit, the approaches and methods followed by the animal scientists including camera trapping were found to be satisfactory. The committee appreciated the enormous amount of primary data collected by the respective scientists for the data deficient area like Tawang. The report has extensively used reliable secondary data available for the region.

- **Concerns on impact of ancillary activities on environment:**

  The NEHU explained that ancillary activities including construction of roads, tunnels and other construction activities including the production of muck and its disposal have been adequately considered in the report.

- **Concerns on difference between the draft report and the final report:**

  It was explained by the Consultant that justification for the difference between the draft report (September 2014 version) and the final report (June 2015 version) has been given at

page number VIII-1 of the final report. The committee was satisfied with the justification given in the report for the changes made in the final report. The committee members unanimously agreed with the report where upper elevation limit for HEPs (except micro-hydels) has been fixed at 3200 m. The basis on which the elevation limit has been fixed for Eastern Himalaya is scientific and acceptable.

- **No Public Hearing organized about the Basin Study:**

  It was explained by the Consultant that extensive consultation at village level covering both influenced and impacted villages did take place during the period of report preparation. Therefore, public consultation at a common platform was not essential.
- **Individual and Cumulative impact of peaking releases through HEPs in Tawang and downstream Bhutan not studied under hydrology:**

  It was explained by the Consultant that since the downstream of Tawang river falls beyond the international boundary in Bhutan territory, it is not feasible to conduct the downstream impact study within a short span of time. In view of this, the committee did not find the downstream impact assessment study essential for Tawang river basin.

- **Non-inclusion of 2 hydel projects viz., 7.5 MW Khanteng Nallah and 3 MW Shayro Nalla HEP:**

  It was explained by the Consultant that since these two HEPs were not included in the scope of the basin study, the report has no bearing on this matter. However, the committee opined that it would take up the issue relating to these two projects when the cases are presented to the committee in future.
- **Phasing of the projects:**

  It was explained by the Consultant that the phasing has been done based on the skilled population to be brought from outside. The data used are based on actual requirement of the developers. It may be mentioned that majority of the work force for the projects would be from the local community. Thus, the phasing proposed in the final report was accepted by the committee.

Overall, the committee appreciated the report for its novel approach of SCIA Index and generation of primary data. Although certain aspects such as change in silt regime and greenhouse gas emissions could have been added to the report, given the time and geographical constraints of the basin, the committee did not find it essential to be included. The committee accepted the Tawang river basin study report in its present form (with minor modifications as mentioned in the minutes) and recommended the following:

1. Based on the cumulative impact assessment, assessed E-flow and outcome carrying capacity studies conducted by NEHU, the following projects are recommended to be implemented in Tawang river basin subject to the statutory clearance of the individual projects:

   - Nykcharong Chu (96 MW), Tawang–I (600 MW), Tawang–II (800 MW), Nyamjang Chu (780 MW), Jaswantgarh Stage–I (4.5 MW) and Paikangrong Chu (2.4 MW). Rho (93 MW), Mago Chu (96 MW), New Melling (90 MW), Tsa Chu-I Lower (77.2 MW), and Tsa chu-II (67 MW).

2. Tsa Chu-I (43 MW) and Thingbu Chu (60 MW) has not been recommended due to the following reasons:

(i) The projects having standardized cumulative socio-economic impact assessment (SCIA) index of more than 1.0 will not be implemented. Tsa Chu-I had SCIA index of 1.06 and Thingbu Chu had SCIA index of 1.03.

(ii) Projects at elevation of more than 3200 m asl will not be implemented (except micro-hydels). Tsa Chu-I project has been proposed at an elevation of 3295 m asl. Therefore, Tsa Chu-I has been discarded under this criterion in addition to high SCIA index.

(iii) Projects not having the prescribed E-flow will not be implemented. Thingbu Chu does not qualify under this criterion in addition to the high SCIA index.

3. For finalizing the E-flow of Nyamjang Chu HEP and addressing the conservation issues of Black-necked crane, a study is to be commissioned to Wildlife Institute of India (WII) or equivalent by the MoEF&CC. The recommended E-flow to be maintained by different projects are as follows:

Table 1: Seasonal E–flow recommended for 11 HEPs in Tawang river basin.

Sl. No	**Name of HEP**	**Capacity (MW)**	**Recommended environmental flow in discharge (cumecs)**			**Recommended environmental flow in percentage of 90% dependable flow**		
			Lean	**Monsoon**	**Non–Monsoon**	**Lean**	**Monsoon**	**Non–Monsoon**
1	Tawang–II	800	10	26	13	25	18	20
2	Tawang–I	600	7.6	20	10	27	18	20
3	Rho	93	7.6	20	10	27	18	20
4	Nykcharong chu	96	6	13	10	30	30	27
5	Mago chu	96	5	10	8	70	20	53
6	New Melling	90	3	10	7	50	20	50
7	Tsa chu–I	43	5	10	6	25	25	17
8	Tsa chu–I Lower	77.20	5	10	6	25	25	17
9	Thingbu chu	60	1	2	1	100	30	100
10	Tsa chu–II	67	5	10	6	25	25	15
11	Nyamjang chu*	780	10	23	10	70	30	30

* Recommended based on only one season study. Therefore, the E-flow values for Nyamjang Chu project are to be finalized by a four season study to be undertaken by WII or equivalent. For the two proposed micro-hydels viz. Jaswantgarh and Paikangrong the E-flow has not been estimated.

4. Mitigation measures to be taken up by all the individual projects:

i. To address the impact on river ecosystem and associated faunal diversity, it was recommended that strict management and regulatory options be adopted for pollution control. E–flow needs to be strictly maintained to minimize the impact on faunal species.

ii. To address the impact of muck generated through the construction of tunnels and the impact of muck disposal on land and water resources, appropriate technical and structural interventions are to be made. While using the muck dumps, it has to be made mandatory to keep the disposal limit within the capacity of the site so that the muck does not spill into the river bed.

iii. To mitigate the impacts of noise due to drilling, tunnelling, blasting and vehicular movements on the faunal groups, use of high–tech equipments is mandatory. Adoption of suitable managerial, ecological and technical interventions is a must to minimize the impact of noise pollution.

iv. To mitigate the impacts of unregulated vehicular movement in the forest areas, appropriate measures that include strict management decisions on regulated vehicular movement is to be taken.

v. To mitigate the impacts of influx of population and pressure on the local natural resources, appropriate regulatory mechanism has to be in place.

vi. To minimize the impact of invasion alien species (IAS), the existing identified IAS should be weeded out and adequate measures should be taken to avoid introduction of new IAS through appropriate quarantine measures. An appropriate policy to regulate the introduction of IAS needs to be formulated by the Government of Arunachal Pradesh.

vii. Afforestation programmes using dominant native tree species and woody shrubs are to be undertaken to compensate the floral and faunal losses in the project areas. The activities planned under compensatory afforestation and catchment area treatment and biodiversity management plan in the report should be strictly followed.

viii. To mitigate the possible impacts due to seismicity,safety criteria are to be followed in design of the barrage as recommended in the report.

ix. For fish migration, fish ladder at all the project sites should be a part of barrage design. Prescribed e–flow must be ensured at all project sites, and regulatory steps to minimise the pollution close to zero discharge should be taken.

x. In addition to the recommendations made above and project specific recommendations made below, all the activities/interventionssuggested in the report under biodiversity and development plan at landscape/district levels would be mandatory for the individual projects. The specific activities recommended in the landscape level plan those fall within the 10 km radius of the projects should be taken up by the respective proponents.

5. Specific measures to be taken up by the individual projects:

Tsa Chu-I Lower and Tsa Chu-II

To mitigate the impacts on high elevation ecosystems, appropriate sites for different project components are to be selected in such a manner that no damage to forest and biodiversity is

caused. A sanctuary of at least 40 ha area is to be established in the degraded areas surrounding the projects to conserve the biodiversity.

Nykcharong Chu and Rho

To mitigate the impacts on biodiversity and forest cover, the construction activities should be planned in such a way that no existing forests and habitats of the biodiversity are destroyed. The ancillary construction activities should be relocated to save the old growth forests (e.g., colony site of Rho project).

New Melling and Mago Chu

Adequate measures must be taken to prevent landslide hazards.To mitigate habitat deterioration of the edible algae (*Presiola crispa*), adequate care must be taken to minimise the disturbance to the species' habitats and recommended e-flow should be strictly followed.

Tawang-I

Adequate care must be taken to save the existing tourist spot (Nuranang falls)from the adverse impacts of barrage construction. Religious sites are to be left undisturbed.

Tawang-II

The habitats for birds are to be protected. The host plant species must be planted under various afforestation programmes, and artificial nest boxes must be installed in sufficient number. No religious sites should be disturbed.

Nyamjang Chu

Considering the possible submergence of pastureland near the barrage site that might threaten the livelihood of pastoralist community, it is essential that the design of the barrage should be so adjusted that the pasture land does not come in the submergence zone. In addition, an appropriate land must be procured in consultation with the pastoral communities of Zimithang village and provided to them. At least 10 ha of *Hippophae rhamnoides* must be planted to compensate the species loss.

The catchment area of Taksang Chu in Panchen valley is rich in biodiversity/wildlife. If water from this tributary of Nyamjang Chu is diverted, the availability of water for the wildlife could be crucial. Any disturbance to the catchment could affect the wildlife populations adversely. Therefore, the proposed diversion of water from Taksang Chu is not allowed. Taksang Chu should be allowed to flow freely.

A number of villages in the downstream region of proposed Nyamjang Chu barrage are dependent on river for various goods and services. Therefore, adequate waterflow must be ensured for this downstream region. The lateral flow from 18 stream/streamlets must be allowed naturally. This would also help in maintaining the biodiversity in the downstream areas.

The proposed barrage site is close to the wintering habitat of the threatened black–necked crane. Therefore, it is very important to strictly adopt some mitigation measures for the protection of its wintering ground to ensure the long term survival of this endangered species.

The project proponent should take several mitigation measures to protect the habitat of the threatened bird. This should include a wide range of measures ranging from maintaining prescribed E–flow, restricting the construction activities during winter months and minimising the noise pollution. A detailed study on black-necked crane habitat requirement/ wintering vis-a-vis E-flow at Nyamjang Chu project barrage site and overall conservation of Black-necked crane would be commissioned to WII, Dehradun by MoEF & CC.

Agenda Item-2.13 Kangtangshiri HEP (66 MW) Project in West Siang District of Arunachal Pradesh by M/s Kangtangshiri Hydro Power Pvt. Ltd - For reconsideration of Environmental Clearance.

The project proponent made a detailed presentation on the project. The project is located on Yargyap Chu river (a tributary of Siyom river) about 10 Km downstream of Mechuka town in West Siang District of Arunachal Pradesh. The project envisages construction of a 22 m high barrage across river Yargyap Chu to generate 80 MW of hydropower. The catchment area of the project is 810 Sq.km. The total land requirement is about 37.21 ha, out of which 18.56 ha (including 5 ha river bed) is forest land, 16.05 ha is non-forest land and about 2.7 ha for underground construction is also to be acquired for the project. Total submergence area is 9.5 ha. (Of which 3.8 ha is forest land + 4.5 ha is river bed + 1.2 ha is non-forest area). An underground powerhouse is proposed on the left bank of the river with 2 units of 40 MW each. 60 families are likely to be affected due to this project by losing their land. No family is likely to lose homestead. The NRRP, 2007 & R&R Policy, 2008, Government of Arunachal Pradesh will be followed for compensation of project affected families. There is no National Park/Wildlife Sanctuary/Historical place within 10 Km radius of the project area.

The Scoping Clearance was accorded to this project on 20.10.2010 by MoEF & CC for 80 MW installed capacity and validity of TOR extended up to 19.10.2013. Both Hydrology & Power Potential of the Project have been approved by CWC vide letter No. 2/ARP/31/CEA/2010-PAC/4709-11 dated 21.6.2011 and CEA by vide letter No. 2- ARP/31/CEA/2010-PAC/620-21 dated 16.11.2011 respectively.

This project was earlier considered by EAC in its meetings held on 11-12th November, 2013 and 20-21st January, 2015. The replies to issues raised by EAC as well as SANDRP were discussed. The proponent was asked to further elaborate their reply on which EAC expressed satisfactory. After detailed discussions, the EAC recommended the project for Environmental Clearance (EC) subject to the following conditions:

- Project proponent shall prepare the R&R Plan for PAFs as per the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013, which has come into effect since January 1, 2014. The R&R Plan is to be prepared within a period of 3 months from date of issue of EC and will be presented before EAC, failing which the EC will be kept in abeyance till the issue of R & R is cleared.

- A multi-disciplinary committee under the Chairmanship of Secretary Environment, State Government of Arunachal Pradesh, for monitoring the implementation of

Environmental Management Plan will be set up. The District Magistrate and a representative from Ministry of Environment & Forests, Government of India shall also be part of this Multi-Disciplinary Committee. The Committee noted the revised EMP cost of Rs. 24.50 crore.

- Confirmation from CEA on revised installed capacity of 66 MW is required. The EC shall be issued only on receipt of confirmation from CEA.

The Project Proponent submitted the compliance to all observations and the same was considered by EAC. Following have been emerged:

(i) **Rehabilitation and Resettlement Plan**

R&R plan based on new LAR&R Act, 2013 has been prepared. Revised R&R plan has been estimated as Rs. 1993.35 lakhs against the R&R Plan cost Rs 385.60 lakhs provided earlier.

(ii) **A Multidisciplinary Committee**

A multidisciplinary committee for implementation of Environmental Management/ safeguards during construction and operation time will be set-up to execute EMP in the project

(iii) **Confirmation on revised installed capacity**

- Vide the Govt. of India Gazette notification no S.O-490 (E) dated 28.1.2014, the limit of estimated cost of HEPs to be submitted to the CEA, MoP, Govt. of India for concurrence for projects falling under category of Para-2 has been amended from Rs 500 Crores to 1000 Crores. Project cost is less than Rs 1000 Crores, Techno Economic Clearance (TEC) shall be obtained from the State Government. Government of Arunachal Pradesh has engaged AHEC, IIT, Roorkee as consultant for Techno Economic appraisals of DPRs.

- Government of Arunachal Pradesh also agreed to give Appraisal of DPR of Kangtangshiri HEP by AHEC, IIT, Roorkee vide letter No. CE (M) /HPD/W-33/2014-15/Pt-I/2013 dated 05.03.2015.

- In the meantime, EAC reviewed the Siang River Basin Study Report in its meeting held on 3-4th July, 2015 and recommended to adopt the release of Environmental Flows as recommended in the Siang River Basin Study Report. As per the recommended release of environmental flow for Kangtangshiri HEP is 20% of average flow in all seasons (lean season, pre & post monsoon and monsoon seasons).

- MoEF & CC has conveyed the recommendations of Siang River Basin Study to Govt. of Arunachal Pradesh vide letter No.J-12011/22/2010-IA.I dated 20.03.2015. Accordingly, the power potential chapter was revised and found that there is a possibility to increase the capacity from 66 MW to 75 MW.

- Based on the Siang River Basin Study, the power potential has been revised and submitted to AHEC, IIT, Roorkee for examination & approval. AHEC, IIT Roorkee examined the proposal and approved the installed capacity of 75 MW vide letter No. AHEC/C-816/1086, dated 27.4.2015. After the installed capacity finalised by DPR consultant, PP approached Govt. of Arunachal Pradesh for revision of installed capacity of the project as 75 MW and GOAP conveyed NOC vide letter No. CE (M)/HPD/W-64/2009-10 dated 5.8.2015.

- The Environmental Management Plan Cost has been revised from Rs. 4067.97 lakhs to Rs. 4382.66 lakhs. The details are presented below:

Sl. No.	Item	Cost Earmarked (Rs. lakhs)	Revised Cost (Rs. lakhs)
1	Compensatory Afforestation, and Bio-diversity conservation	115.30	129.76
2	Catchment Area Treatment	700.00	700.00
3	Fisheries Management	97.32	150.00
4	Public health delivery system	141.90	172.00
5	Environmental Management in labour camp	194.70	220.00
6	Muck management	107.50	150.00
7	Restoration and Landscaping of construction sites	20.00	50.00
8	Environmental Management in road construction	45.00	60.00
9	Greenbelt development	10.00	50.00
10	Air pollution control	27.00	40.00
11	Water pollution control	15.00	40.00
12	Resettlement and Rehabilitation Plan	1993.35	2000.00
13	Energy Conservation measures	20.00	40.00
14	Local Area Development Plan (Excluding area developmental activities under R&R)	304.00	304.00
15	Environmental Monitoring during construction phase	180.90	180.90
16	Disaster Management Plan	96.00	96.00
	Total	**4067.97**	**4382.66**

The EAC expressed satisfaction on replies and revision made in the EMP cost. After detailed deliberations, the EAC recommended Environmental Clearance (EC) with revised capacity of 75 MW for Kangtangshiri HEP project subject to all the recommendations made in the Siang River Basin Study.

Agenda Item- 2.14 Tagurshit HEP (74 MW) Project in West Siang District of Arunachal Pradesh by M/s L & T Arunachal Hydro Power Ltd – For reconsideration of Environmental Clearance (EC)

The project proponent made a detailed presentation on the project. Tagurshit HEP

project is proposed on the River Tagurshit (a tributary of Siyom River) near Tado-gitu village in District West Siang of Arunachal Pradesh. The Project envisages construction of 40 m high dam (from the river bed level) across River Tagurshit to generate 74 MW of Hydropower. This is a run-of-river scheme. The total land requirement for the project is 39.7 ha and entire land is unclassified forest land. The total catchment area of the project is 191.7 Sq.km. Total submergence area is 2.49 ha. A surface powerhouse is proposed on the right bank of river with 3 units of 24.67 MW capacity each. A total of 96 families are likely to be affected due to this proposed project. The families will lose their land partially and no lose of homestead. Therefore, no displacement of people involved in the project as there is any habitation. The estimated project is about Rs. 556.82 crores and the project will be completed in 4 years.

The project was earlier considered by EAC in its meeting held on 23-24th April, 2015. The committee noted that based on the approved 10 daily flow series for the 90% dependable year, the e-flows have been calculated. The project proponent informed that that environmental flow releases to the downstream in different seasons has been recommended & approved by the earlier EAC committee during the 55th & 56th meetings held on 10th February & 31st March, 2012. The Environmental Flows to be released in various seasons is given in following Table:

Table: Environmental Flows for Tagurshit HEP

Season	Avg. Inflow (cumec)	% of Inflow	Avg. EF releases (cumec)
Lean (December – March)	4.21	20	0.84
Non-Monsoon Non-Lean (October, November– April, May)	12.28	21	2.58
Monsoon (June- September)	25.52	23	5.76

After detailed deliberation EAC sought clarification/additional information on the following:

- The committee noted the e-flow calculations based 10 daily flow series for the 90% dependable year and the e-flows values prescribed to this project by earlier EAC. However, the committee suggested that all recommendations of Siang River Basin Study, especially in respect of e-flow, minimum free flowing stretch between the two projects etc shall be complied with and incorporated in the EIA/EMP reports.
- The project proponent has to formulate R&R Plan based on the provisions /guidelines as given in the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013. The various activities like educational, health and infrastructural facilities will be developed under local area development plan (LADA). The provisions made in these activities are very meagre and should be considerably enhanced at least 4 times.
- The total amount proposed for implementation of Environmental Management Plan (EMP) is Rs.47.55 Crores & details are given in Table. The committee suggested enhancing the cost estimates of EMP and revised EMP has to be submitted.
- The project proponent must submit response to the various issues raised by SANDRP in their representation submitted to this Ministry. A copy was handed over

to project proponent for compliance.

The Project Proponent submitted the compliance to all observations and the same was considered by EAC. Following have been emerged:

(i) The E-flows considered in the project was 20% in lean season, 21% in non-monsoon/ non-lean season & 23% in monsoon season. The Siang River Basin Study recommended 20% in lean season 25% in non-monsoon/non-lean season & 30% in monsoon seasons for Tagurshit HEP. The project proponent informed that a HEC-RAS model was set-up for flow simulation study consists of a river reach, upstream boundary and downstream boundary. The reach of Tagurshit HEP from diversion site up-to its confluence with the first stream was represented in model by 5 (five) surveyed cross- sections. Normal depth was used as the downstream boundary for the model set-up. In order to have independent results of water depth, the downstream boundary was applied at cross-section no. 4 placed at 100 m downstream of the study reach i.e. 100 m downstream of cross-section no. 0 located at the dam site. The study concluded the following:

Lean Season

- The depth of flows for recommended E-flows in lean season was found to be lower than the recommended depths for Mahaseer & Snow Trout which is 0.5 m & 0.4 m respectively. However, 50% of pre-project was being maintained at some of the sections with the recommended 20% of releases as E-flows.

Monsoon Season

- In monsoon season, the minimum depth requirement for trout is 100 cm. The depth of flow in some of the sections was lower than the prescribed depth of 100 cm for some of the section even for 100% discharge. Even in pre-project scenario, the depth ranged from 0.69-1.27 m. Thus, Tagurshit Nallah is not a natural habitat of trouts. However, the depth of flows more 50% of pre-project depth at some of the sections was being maintained with the recommended 23% of releases as E-flows.

Non-monsoon/Non-lean season

- In the non-monsoon/non-lean season, the minimum depth requirement for snow trout is 65-70 cm. In the pre-project scenario too, the average depth is only 73 cm. Thus, with recommended release of 25% of average flow in non-monsoon non-lean season, the depth ranged from 0.18 to 0.34 m. However, close to 50% of the pre-project depth can be maintained with 21% release as proposed in the DPR.

Two quantitative criteria have been set in the Siang River Basin Report for an objective assessment of e-flows for the projects in Siang basin. With respect to the first criterion regarding minimum depth, it comes out from the study carried out that the concerned stretch downstream of the Tagurshit dam may not be a natural habitat for trout fish, because even the pre-project level depths barely meet the criterion in all the 3 seasons. The second criterion, which states that reduction in water depth and flow width should not be more than 50% of pre-project levels, is being met at some of the sections by the E-flows recommended at the time of ToR clearance by MoEF. Since, the project site is

not the natural habitat of trout, hence the flow release suggested as a part of ToR approval are adequate.

The EAC concluded that the recommendations of the Siang River Basin Study Report cannot be diluted & E-flows as suggested for Tagurshit HEP in the Siang Basin Report shall be applicable. These are:

- Monson Season - 30 %
- Lean Season - 20%
- Non-monsoon/non-lean season - 25%

It was informed that R&R Plan based on the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 already incorporated in the Volume-II of EMP Report. The LADP cost was enhanced up-to 4 times i.e. from Rs. 5.18 Crores to Rs. 20.84 Crores. The details are given as below:

Sl. No.		**Budget (Rs. lakh)**
1.	Educational Facilities	1044.0
2.	Health Care facilities	340.0
3.	Construction of Community toilets	400.0
4.	Other infrastructural facilities	300.0
	Total	**2084.00** **say Rs. 20.84 Crores**

The Environmental Management Plan Cost has been revised from Rs. 47.55 Crores to Rs.63.22 Crores. The details are presented below:

Sl. No.	**Item**	**Cost Earmarked (Rs. lakh)**	**Revised Cost (Rs. lakh)**
1.	Compensatory Afforestation and Bio-diversity conservation	317.00	317.00
2.	Catchment Area Treatment	852.00	852.00
3.	Fisheries Management	265.00	265.00
4.	Public health delivery system	256.00	256.00
5.	Environmental Management in labour camp	692.00	692.00
6.	Muck disposal Plan	124.00	124.00
7.	Restoration and Landscaping of construction sites	161.00	161.00
8.	Environmental management in road construction	138.00	138.00
9.	Greenbelt development	8.00	8.00
10.	Air pollution Control	121.00	121.00
11.	Noise control measures	25.00	25.00
12.	Water pollution control	20.00	20.00
13	Energy Conservation measures	100.00	100.00
14.	Resettlement & Rehabilitation Plan	911.30	911.30
15.	Local Area Development Plan	518.00	2084.00
16.	Disaster Management Plan	105.50	105.50

17.	Environmental Monitoring during construction phase	142.10	142.10
	Total	**4755.90 say Rs. 47.55 Crore**	**6321.90 say Rs.63.22 Crore**

After detailed discussions, the EAC recommended the project for Environmental Clearance (EC) subject project subject to all the recommendations made in the Siang River Basin Study and also submission of the following information:

(i) Submission of revised project features as per the E-flows suggested for Tagurshit HEP in the Siang River Basin Report, if any

(ii) Resubmit the reply to the issues raised by SANDRP.

3. **Any other item with the permission of Chair**

Agenda Item-3.1 Cumulative Impact and Carrying Capacity Study of Subansiri sub-basin including downstream impacts

1.0 The above report was last considered by EAC during 27-28th January, 2015. The Consultants, namely, M/s IRG SSA has prepared the report. EAC observed, inter alia, that the report has not incorporated HEPs of capacity less than 25 MW in the basin. Therefore, EAC asked the Consultants to submit a modified report including HEPs of less than 25 MW capacity as well as incorporating the other comments of EAC observed during the meeting. The report has been accordingly modified by the consultants and resubmitted. The modified report was presented before the Expert Appraisal Committee (EAC) for River Valley and Hydroelectric Power Projects held on August 24-25th 2015.

2.0 Scope of Study

Subansiri river basin falls within elevation range from 4500 m to 112 m. Scope of study includes total 28 projects (11,282.7 MW) proposed/ Planned with capacity more than 25MW. Out of 28 projects considered for basin study, 18 HEPs (11,274 MW) are of capacity more than 25 MW and 10 HEPs (8.7 MW) less than 25 MW capacity. Total length of River Subansiri upto confluence with Brahmaputra (25 kms downstream of Jorhat), Assam is 326 km. The total catchment area up to the confluence with the Brahmaputra is about 37,000 sq. km. out of which 14,000 sq. km. is in Tibet (40%) and the rest (60%) lies in India (21,800 sq. km. in Arunachal Pradesh and 1,200 sq. km. in Assam). Major tributaries of Subansiri are River Kamla and Kurung. The consultants made detailed presentation and explained the following.

3.0 Methodology for various parameter adopted for assessing Cumulative Impact & Carrying Capacity Study of Subansiri Sub-basin are as follows:

(i) E-flow

Environmental flow has been estimated by using HEC-RAS model to assess flow scenarios for all proposed/ planned HEPs and on the basis of modeling environmental flow have been recommended project wise. The flow scenario of 90% dependable year series of the each hydro electric project has been used and the average discharge of leanest four months, monsoon four months and non lean non monsoon four months have been computed. The

flow parameters *i.e.* water depth, velocity of flow and top width of river has been assessed for 10%, 15%, 20%, 30%, 40%, 50% and 100% release of respective average of the three season's flows of each hydroelectric project to estimate the environmental flow release during the lean, monsoon and non lean non monsoon periods. E-flow for all individual HEPs have been proposed accordingly.

(ii) Free flow stretch

Norm of free flowing stretch of 1 km between FRL of the downstream HEP and TWL of upstream HEP has been considered. The project which did not conform to this norm was recommended to be dropped/ redesigned.

(iii) Biodiversity and ecological aspects

Biodiversity and ecological aspects including aquatic fauna have been considered. Avoidance of forest loss has been considered especially in Upper Subansiri district which shows negative change in forest cove and also decline of 7 sqkm loss of forest cover as per State of Forest Report, 2013 (Forest survey of India). Therefore, due consideration has been given to minimize forest loss and for making recommendations for HEPs in Upper Subansiri District Migratory and threatened fauna including fish and dolphin have been considered for recommending E-flows for their sustenance.

4.0 Following are the other recommendations contained in the report :

(i) Projects recommended for Redesigning

- 2 projects namely Oju-I (700 MW) and Oju-II (1000 MW) have been recommended to be merged as Oju (1878 MW). The merger will keep the left bank of main stem of River Subansiri (location of earlier proposed Oju II) forest intact and also avoid loss of 4.05 sq.km forest due to earlier proposed development of Oju-II HEP. The merger of Oju-I (700 MW) and Oju-II (1000 MW) will also help in maintaining 1 kms free flowing stretch of 1 kms.
- 1 project namely Naba (1000 MW) has been recommended, subject to the condition, that it meets requirement of free flowing stretch of 1 km by bringing down FRL suitably.

(ii) Projects recommended for Dropping

- 1 project namely Niare (800 MW) has not been recommended to be dropped as it doesn't meet requirement of free flowing stretch of 1 km. This will also help to avoid loss of 5 Sq.km of forest due to proposed development of Niare HEP.
- 1 Project namely Tammu (55MW) has also been recommended to be dropped as it doesn't meet the requirement of minimum environment flow.

5.0 The recommendations of Report was generally accepted by EAC, subject to submission of the following by the Consultants:

a) Project wise and season wise assessed E-flow, predominant aquatic species, minimum depth, velocity, top water width at downstream required for different predominant aquatic species, in a tabular form. These are at **Annexure-I.**

b) Total river length, main river and tributaries separately, no. of HEPs proposed/ planned river wise, affected river length both due to formation of reservoir as well as diversion through tunneling, free flowing river length between two HEPs and total free flow stretch available after construction of HEPs. These details are at **Annexure-II**.

c) The criteria of 1Km free flowing reach should be scientifically examined by Consultants and findings to be included in the report.

6.0 Major recommendations of the Study are as under:

a) Out of 28 planned HEPs, 2 HEP projects (Niare HEP (800 MW) and Tammu HEP (55 MW)) have been recommended for dropping and 3 HEP projects (Oju-I HEP (700 MW), Oju-II HEP (1000 MW) and Naba HEP (1000 MW)) have been recommended to be redesigned as they do not meet requirement of free flowing stretch of 1 km between two adjacent HEPs.

b) Minimum free flow stretch of 1 km is to be maintained between two adjacent HEPs.

c) Project wise minimum E-flow for leanest four months, monsoon four months and non lean non monsoon four months have been recommended and to be maintained.

d) Details of 28 HEPs are given below:

Projects above 25 MW			
Sr. No.	**Name**	**Installed Capacity (MW)**	**Altitude (m)**
1.	Oju-I HEP	700*	2275
2.	Oju-II HEP	1000*	1889
3.	Niare HEP	800	1560
4.	Naba HEP	1000	1180
5.	Mili HEP	75	4395
6.	Sape HEP	38	1365
7.	Chomi HEP	80	1135
8.	Chela HEP	75	1004
9.	Kurang I & II HEP	330	840
10.	Tamen HEP	175	320
11.	Tago – I HEP	55	1028
12.	Subansiri Lower HEP	2000	241
13.	Subansiri Middle (Kamala HEP)	1728	317

14.	Subansiri Upper HEP	2000	537
15.	Nalo HEP	360	925
16.	Dengser HEP	552	675
17.	Tammu HEP	55	300
18.	Neypin HEP	32	2092
19.	Hiya HEP	41	1044
Project less than 25 MW			
20.	Pange MHP @Hake Tari	2	586
21.	Taksing MHS	0.1	2426
22.	Jette Koro MHS @ Bora Rupok	0.05	933
23.	Jugdin Nallah MHS	1	910
24.	Kush MHS @ Sangram	2	899
25.	Payu MHS @ Koloriang	0.5	1755
26.	Kidding MHS	0.5	673
27.	Pagu MHS @ Palin	2	1230
28.	Fure MHP @ Damin	0.05	774

Annexure-I

Projects in main stem of River Subansiri

Sr. No.		Lean Environmental Flow Release (EFR)					Pre-monsoon and Post-monsoon Environmental Flow Release (EFR)					Monsoon Environmental Flow Release (EFR)					Predominant aquatic fauna	Recommendation
		EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth		
			(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		
1	Oju-I	**20%**	7.5	7.68	126.11	118.44	**20%**	13.04	13.21	206.67	186.02	**20%**	20.51	17	294.33	264.78	Migratory sp. *Schizothorax richardsoni*, Non migratory sp. *Garra gotyla gotyla, Naemachellus botia botia*, *Channa punctatus, Schizothorax richardsoni*, *Barilius bendelisis, Labeo dero, Mastacembelus armatus*, 50 cms depth for fish (including mahseer and trout) will be maintained in lean season	It's the first project (more than 25 MW) in the cascade development in main stem of Subansiri The free stretch between the earlier proposed Oju-I (with installed capacity of 700 MW) and Oju-II (with installed capacity of 1000 MW) works out to be less than 1 km which is not desirable from environmental angle. Hence the Oju I and II have been recommended to be merged as one

Sr. No.		Lean Environmental Flow Release (EFR)					Pre-monsoon and Post-monsoon Environmental Flow Release (EFR)					Monsoon Environmental Flow Release (EFR)					Predominant aquatic fauna	Recommendation
		EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth		
			(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		
																		project Oju only. Project is recommended as it meets environment flow and free flowing stretch of 1 km
2	Oju-II	**20%**	16.22	13.41	85.1	79.55	**20%**	24.2	19.42	139.49	129.89	**20%**	32.03	25.31	199.62	197.48	Migratory sp. *Schizothorax richardsoni*, Non migratory sp. *Garra gotyla gotyla, Naemachellus Botia botia*, *Channa punctatus, Barilius bendelisis, Labeo dero, Mastacembelus armatus*	Same as above

Sr. No.		Lean Environmental Flow Release (EFR)					Pre-monsoon and Post-monsoon Environmental Flow Release (EFR)					Monsoon Environmental Flow Release (EFR)					Predominant aquatic fauna	Recommendation
		EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth		
			(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		
3	Niare	**20%**	8.76	7.56	123.6	118.6	**20%**	13.42	11.84	206.5	191.19	**20%**	18.51	16.4	298.5	286.7	Migratory sp. *Schizothorax richardsonii, Schizothorax esocinus* Non migratory sp. *Botia rostrata* 50 cms depth for fish (including mahseer and trout) will be maintained in lean season	With the merger of Oju I and Oju II , the distance between FRL and TWL of Oju and Niare is 0.88 km i.e. less than 1 km. Project is not recommended as it doesn't meet free flowing stretch of 1 km.
4	Nalo	**20%**	13.35	12.32	116.08	107.12	**20%**	21.64	18.72	188.08	139.9	**20%**	30.49	24.6	266.12	247.14	Migratory sp. *Tor Tor, Tor putitora, Tor progeneius Neolissochilus hexagonolepis* Non migratory sp. *Garra kempi, ,Amblyceps Arunchalensis, Amblyceps*	Project is recommended as it meets environment flow requirement

Sr. No.		Lean Environmental Flow Release (EFR)					Pre-monsoon and Post-monsoon Environmental Flow Release (EFR)					Monsoon Environmental Flow Release (EFR)					Predominant aquatic fauna	Recommendation
		EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth		
			(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		
																	Apangi, Botia rostrata 50 cms depth for fish (including mahseer and trout) will be maintained in lean season	
5	Dengser	**20%**	17.6	15.02	105.07	95.29	**20%**	27.28	20.88	168.07	158.74	**20%**	35.05	25.87	236	221.75	Migratory sp. *Schizothorax richardsonii, Schizothorax esocinus* Non migratory sp. *Garra kempi, Botia rostrata*	Project is recommended as it meets environment flow requirement

Sr. No.		Lean Environmental Flow Release (EFR)					Pre-monsoon and Post-monsoon Environmental Flow Release (EFR)					Monsoon Environmental Flow Release (EFR)					Predominant aquatic fauna	Recommendation
		EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth		
			(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		
6	Subansiri Upper	**20%**	20.89	18.85	156.79	139.84	**20%**	33.02	27.05	246.79	227.38	**20%**	44.44	37.07	343.16	**326.29**	Migratory sp. *Tor Tor Tor putitora, Tor progeneius, Neolissochilus hexagonolepis* Non migratory sp. *Amblyceps Arunchalensis, Amblyceps Apangi, Aborichthys kempi, Botia rostrata* 50 cms depth for fish (including mahseer and trout) will be maintained in lean season	Project is recommended as it meets environment flow requirement

Environmental flow release and recommendations
Projects in tributaries of River Subansiri

Sr. No.		Lean Environmental Flow Release (EFR)					Pre-monsoon and Post-monsoon Environmental Flow Release (EFR)					Monsoon Environmental Flow Release (EFR)					Predominant aquatic fauna	Recommendation
		EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth		
			(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		
1	Subansiri Middle	**20%**	20.93	17.78	149.5	155.58	**20%**	28.83	20.9	213.2	235.72	**20%**	34.16	24.55	289.67	314.56	Migratory sp. *Tor Tor, Tor putitora, Tor progeneius, Neolissochilus hexagonolepis* Non migratory sp. *Garra kempi,* *Amblyceps Arunchalensis, Amblyceps Apangi, Aborichthys kempi, Botia rostrata* 50 cms depth for fish (including mahseer and	Project is recommended as it meets environment flow requirement

Sr. No.		Lean Environmental Flow Release (EFR)					Pre-monsoon and Post-monsoon Environmental Flow Release (EFR)					Monsoon Environmental Flow Release (EFR)					Predominant aquatic fauna	Recommendation
		EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth		
			(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		
																	trout) will be maintained in lean season	
2	Kurung-I & II	**20%**	25.02	17.48	118.82	117.18	**20%**	30	20.98	168.55	169.53	**20%**	33.83	24.15	218	218.37	Migratory sp. *Tor tor, Tor putitora, Tor khudri* Non migratory sp. *Labeo dero, Labeo dyocheilus, Schizothorax plagiostomu*. 50 cms depth for fish (including mahseer and	Project is recommended as it meets environment flow requirement

Sr. No.		Lean Environmental Flow Release (EFR)					Pre-monsoon and Post-monsoon Environmental Flow Release (EFR)					Monsoon Environmental Flow Release (EFR)					Predominant aquatic fauna	Recommendation
		EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth		
			(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		
																	trout) will be maintained in lean season	
3	Mili	**20%**	13.46	10.68	70	64.54	**20%**	17.93	13.76	96.57	92.38	**20%**	21.74	16.3	121.36	113.05	Migratory sp. *Tor tor, Tor putitora, Tor progeneius, Neolissochilus Hexagonolepi,Schizothorax richardsonii Schizothorax esocinus* Non migratory sp. *Garra kempi, Botia rostrata*	Project is recommended as it meets environment flow requirement

Sr. No.		Lean Environmental Flow Release (EFR)					Pre-monsoon and Post-monsoon Environmental Flow Release (EFR)					Monsoon Environmental Flow Release (EFR)					Predominant aquatic fauna	Recommendation
		EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth		
			(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		
																	50 cms depth for fish (including mahseer and trout) will be maintained in lean season	
4	Sape	**20%**	10.87	10.14	73.37	68.56	**20%**	15.06	13.88	101.81	92.98	**20%**	19.02	17.09	128.63	120.07	Migratory sp. *Tor Tor, Tor putitora, Tor progeneius, Neolissochilus Hexagonolepi,Schizothorax richardsonii Schizothorax esocinus* Non migratory sp. *Garra kempi,*	Project is recommended as it meets environment flow requirement

Sr. No.		Lean Environmental Flow Release (EFR)					Pre-monsoon and Post-monsoon Environmental Flow Release (EFR)					Monsoon Environmental Flow Release (EFR)					Predominant aquatic fauna	Recommendation
		EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth		
			(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		
																	Botia rostrata 50 cms depth for fish (including mahseer and trout) will be maintained in lean season	
5	Chomi	**20%**	24.55	16.6	80.93	74.43	**20%**	29.18	19.07	110.47	105.97	**20%**	32.25	21.39	139.13	138.37	Migratory sp. *Tor Tor, Tor putitora, Torprogeneius, Neolissochilus Hexagonolepis, Schizothorax richardsonii Schizothorax esocinus*	Project is recommended as it meets environment flow requirement

Sr. No.		Lean Environmental Flow Release (EFR)					Pre-monsoon and Post-monsoon Environmental Flow Release (EFR)					Monsoon Environmental Flow Release (EFR)					Predominant aquatic fauna	Recommendation
		EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth		
			(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		
																	Non migratory sp. *Garra kempi, Botia rostrata* 50 cms depth for fish (including mahseer and trout) will be maintained in lean season	
6	Chela	**20%**	22.34	17.07	68.64	65.18	**20%**	28.82	19.85	95.93	93.29	**20%**	33.06	22.12	121.86	121.86	Migratory sp. *Tor Tor, Tor putitora, Tor progeneius, Neolissochilus Hexagonolepis, Schizothorax richardsonii Schizothorax*	Project is recommended as it meets environment flow requirement

Sr. No.		Lean Environmental Flow Release (EFR)					Pre-monsoon and Post-monsoon Environmental Flow Release (EFR)					Monsoon Environmental Flow Release (EFR)					Predominant aquatic fauna	Recommendation
		EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth		
			(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		
																	esocinus Non migratory *Garra kempi, Botia rostrata* 50 cms depth for fish (including mahseer and trout) will be maintained in lean season	
7	Hiya	**20%**	9.45	8.73	58.33	54.72	**30%**	15.53	11.5	95.22	73.11	**30%**	18.9	13.66	120.67	97.61	Migratory sp. *Tor Tor, Tor putitora, Tor progeneius, Neolissochilus Hexagonolepis, Schizothorax richardsonii*	Project is recommended as it meets environment flow requirement

Sr. No.		Lean Environmental Flow Release (EFR)					Pre-monsoon and Post-monsoon Environmental Flow Release (EFR)					Monsoon Environmental Flow Release (EFR)					Predominant aquatic fauna	Recommendation
		EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth		
			(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		
																	Schizothorax esocinus Non migratory sp. *Garra kempi, Botia rostrata* 50 cms depth for fish (including mahseer and trout) will be maintained in lean season	
8	Nyepin	**20%**	9.07	8.33	56.57	51.21	**30%**	14.56	11.43	89.86	62.76	**35%**	19	13.95	120	87.5	Migratory sp. *Tor Tor,* *Tor putitora, Tor progeneius, Neolissochilus hexagonolepis,* *Schizothorax richardsonii*	Project is recommended as it meets environment flow requirement

Sr. No.		Lean Environmental Flow Release (EFR)					Pre-monsoon and Post-monsoon Environmental Flow Release (EFR)					Monsoon Environmental Flow Release (EFR)					Predominant aquatic fauna	Recommendation
		EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth		
			(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		
																	Schizothorax esocinus Non migratory sp. *Garra kempi, Botia rostrata* 50 cms depth for fish (including mahseer and trout) will be maintained in lean season	
9	Tammu	**30%**	28.8	19.93	50.33	40.87	**55%**	44	23.94	90	58.05	**60%**	49	26.85	120	75.64	Non migratory sp. *Danio aequipinnatus, D. devario, Puntius chola, Bagarius bagarius Badis badis, Mastacembelus*	Environment flow computation for Tammu indicates 55% flow in pre and post monsoon season and 60% release in monsoon.

Sr. No.		Lean Environmental Flow Release (EFR)					Pre-monsoon and Post-monsoon Environmental Flow Release (EFR)					Monsoon Environmental Flow Release (EFR)					Predominant aquatic fauna	Recommendation
		EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth	EFR	Top width	50% of Pre-project flow width	Flow depth	50% of Pre-project flow depth		
			(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		(m)	(m)	(cm)	(cm)		
																	armatus 50 cms depth for fish (including mahseer and trout) will be maintained in lean season	Project is not recommended as it doesn't meet environment flow requirement

Annexure-II

Gradient Analysis

Sr. No.	HEP Locations - Subansiri		Distance	Cumm Dist	Altitude	River length affected	Dist Bet. FRL & TWL (Km)
	From	To					
1.	From Entry	Oju-1	19.93		2275		
2.	Oju-1	Oju-2	9.75	0.00	1889	11.39	0.35
3.	Oju-2	Niare	10.86	9.75	1560		0.53
4.	Niare	Naba	14.27	20.61	1180	7.13	0.64
5.	Naba	Nalo	19.49	34.88	925	12.32	2.04
6.	Nalo	Dengser	9.07	54.37	675	9.90	3.44
7.	Dengser	Upper Subansiri	51.66	63.44	537	14.91	1.54
8.	Subansiri Upper	Subansiri Lower	92.33	115.10	241	40.94	48.36
9.	Subansiri Lower			207.43	112	46.83	
Sr. No.	**HEP Locations - Kamla**		**Distance**	**Cumm Dist**	**Altitude**	**River Reach Affected**	**Dist Bet. FRL & TWL (Km)**
	From	**To**					
1.	From Start	Confluence	142.38	0.00	4000		
2.	Confluence	Subansiri Middle (Kamala HEP)	8.79	142.38	317		
3.	Subansiri Middle (Kamala HEP)	Confluence	36.82	151.17	310	30.84	
4.	Confluence			187.99	182		
Sr. No.	**HEP Locations - Kurung**		**Distance**	**Cumm Dist**	**Altitude**	**River Reach Affected**	**Dist Bet. FRL & TWL (Km)**
	From	**To**					
1.	From Start	Mili	33.70	0.00	4395		
2.	Mili	Sape	8.59	33.70	1365	5.61	1.55
3.	Sape	Chomi	14.48	42.29	1135	3.54	2.24
4.	Chomi	Chela	10.50	56.77	1004	13.9	2.98
5.	Chela	Kurang Dam I – II	39.17	67.27	840	9.02	6.56
6.	Kurang Dam I & II	Confluence	39.14	106.44	693	31.82	
7.	Confluence			145.58	317		
Sr. No.	**HEP Locations - Payam**		**Distance**	**Cumm Dist**	**Altitude**	**River Reach Affected**	**Dist Bet. FRL & TWL (Km)**
	From	**To**					
	From Start	Nyepin	28.21	0.00	2092		
	Nyepin	Hiya	13.43	28.21	1044	9.30	5.17
	Hiya	Confluence	12.45	41.64	883	9.01	
	Confluence			54.09	638		

Note: Total River Length affected due to interventions = 27.63% (197.31 Kms of 714.09 Kms) inclusive of Main River Stem and Tributaries.

Agenda Item-3.2 Dibang and Kameng Basin Studies – Revision in Time Frame to complete the Studies – Reg.

The MoEF &CC has brought the matter before the EAC to have technical discussions with a view to find a suitable methodology where time frame to complete the basin studies can be reduced without compromising on the quality of work. The matter was discussed in presence of the Consultants, who have been assigned the task of study on behalf of MoEF & CC. While WAPCOS is conducting Kameng basin study, RS Envirolink Technologies Pvt. Ltd. is conducting Dibang basin study. They have been engaged by CWC, Ministry of Water Resources and now these study have been handed over to MoEF&CC.

(i) MoEF &CC informed the EAC that as per the OM dated 28 May, 2013, carrying capacity study has become a pre-requisite for considering EC/FC cases for individual projects of any river basin. Therefore, it is important that CIA/Carrying capacity studies are completed as early as possible and requested EAC to look into the matter of reducing the overall time frame without compromising the quality of the outcome and output. Dibang and Kameng river basin studies have been awarded recently and as per the terms, 12 months baseline data collection needs to be done and entire studies to be completed in 18 months period. The Ministry further informed that a meeting was held with BSI, ZSI and CWC to understand the data availability and whether such data available with them can be used for basin studies and baseline data collection can be optimised /done away with. ZSI and BSI have confirmed that they have substantial amount of published as well as un-published data, which can be shared for the study. The Consultants engaged for the purpose of the studies can review the suitability of the data. Hydrological data is always provided by the CWC and they will provide full support to the study.

With this background, EAC discussed the matter as follows:

(i) EAC inquired about the engagement of Consultants for the basin study with respect to matter of conflict of interest as some Consultants are also engaged in some of the EIA studies for individual hydropower projects in the basin. WAPCOS and RSET have confirmed that they are engaged in EIA studies of several hydropower projects in their respective basins and the matter was highlighted while the proposal was submitted to CWC as part of techno-commercial tendering process and this was not a pre-bid condition. MoEF &CC informed that they have verified this issue with CWC and they have confirmed that this was not a pre-bid condition. EAC discussed the matter in detail and observed that these are objective studies and recommendations are based on technical findings. All the recommendations have to be justified with substantial data back-up and scientific analysis. Technical committee will evaluate the report in detail and do not see any possibility of Consultants giving any undue favour to any Developers. In fact earlier experience of working in the basin will be helpful to make objective analysis due to Consultants familiarity with the region. EAC also observed that the ToR of the studies do not offer discretionary and arbitrary authority to the Consultants that can be used to extend favour or punishment to any proponents. However, it was agreed that representative of Delhi University (DU) and North Eastern Hill University (NEHU) may be invited when these

reports would be appraised. Also, Basin study shall be followed by EIA/ EMP which will determine eligibility for EC/ FC.

(ii) Regarding the study to be based on secondary data sourced from authentic studies carried out by BSI and ZSI, EAC observed that there should not be any issue with quality of data provided by BSI and ZSI. This data will be very useful for defining the basin level setup. However, such data may not be site specific as will be needed for the study. For this purpose, EIA studies carried out in the basin in the recent time can also be used for sourcing the project specific data. EAC also observed that consultants should take the responsibility of defining the baseline to meet the study requirement and they should supplement BSI/ZSI data with data from other secondary sources as well. Further, EAC recommended that one season data should be collected by consultants as per the terms of reference issued earlier for these studies and since monsoon is critical season for such studies, the field data can be collected in the month of September itself. This would reduce the time frame of the study from 21 months to 12 months without compromising on the quality of the study.

(iii) For hydrological data, which is critical for basin study for the purpose of environment flow assessment, downstream impact study, etc.; long term discharge series is used and same is available from CWC only and same shall be used for the study.

EAC concluded on this with the following observations/recommendations:

- The matter of conflict of interest is settled, keeping in view the objective assessment required for the study and evaluation of the report by experts.
- The study should involve collection of one season primary baseline data for monsoon season for terrestrial and aquatic ecology..
- Study should be completed in 12 months period.
- Representative of DU & NEHU shall be also invited in the EAC when these reports will come up for appraisal.
- Details of aspects to be covered as a part of Environmental Quality Monitoring to be conducted as a part of EIA studies for individual projects in the basin.
- Impacts to be assessed as a part of EIA studies for individual projects in the basin.
- Key Aspects to be covered as a part of Environmental Management Plan to be covered as a part of EIA studies for individual projects in the basin.

The meeting ended with vote of thanks to Chair

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