Annex-VIII

6/21/2021

COST - BENEFIT ANALYSIS

Name of the Project: Kamala Hydro Electric Project (1800 MW)

Source Guidelines : Handbook of Forest published in 2019

Table B: Estimation of cost of forest diversion

S. No.	Parameters	Remarks	Applicability in Kamala HEP	Amount (in Rs. Crores)
1	Ecosystem services losses due to proposed forest diversion.	Economic value of loss of eco-system services due to diversion of forests shall be the net present value (NPV) of the forest land being diverted as prescribed by the Central Government (MoEF&CC). Note: In case of National Parks the NPV shall be ten (10) times the normal NPV and in case of Wildlife Sanctuary the NPV shall be five (5) times the normal NPV or otherwise prescribed by the ministry or any other competent authority.	**Cost of NPV (as per DPR submitted in CEA) (EMP not yet finalized)**	**299.81**
2	Loss of animal husbandry productivity, including loss of fodder.	To be quantified and expressed in monetary terms or 10% of NPV applicable whichever is maximum	10% of NPV : Rs. 29.98 Crores	**29.98**
3	Cost of human resettlement.	To be quantified and expressed in monetary terms as per approved R&R plan	R&R Plan has not been finalized, since SIA is yet to be firmed up. R&R Plan shall be finalized in consultation with District Adminstration and Project Affected Families. Presently, as per DPR submitted in CEA, the R&R cost is estimated as Rs. 150 Crores.	**150.00**
4	Loss of public facilities and administrative infrastructure (Roads, building, schools, dispensaries, electric lines, railways, etc.) on forest land, which would require forest land if these facilities were diverted due to the project.	To be quantified and expressed in monetary terms on actual cost basis at the time of diversion.	Shall be finalized after detailed property survey by District Adminstration.	**0.00**
5	Possession value of forest land diverted	30% of environmental costs (NPV) due to loss of forests or circle rate of adjoining area in the district should be added as a cost component as possession value of forest land whichever is maximum	30% of NPV	**89.94**
6	Cost of suffering to oustees.	The social cost of rehabilitation of oustees (in addition to the cost likely to be incurred in providing residence, occupation and social services as per R&R plan) be worked out as 1.5 times of what oustees should have earned in two years had he not been shifted.	SIA Report is yet to be firmed up by the District Adminstration.	**0.00**
7	Habitat Fragmentation Cost.	While the relationship between fragmentation and forest goods and services is complex, for the sake of simplicity the cost due to fragmentation has been pegged at 50% of NPV applicable as a thumb rule.	50% of NPV	**149.91**
8	Compensatory Afforestation and soil & moisture conservation cost.	The actual cost of compensatory afforestation and soil & moisture conservation and its maintenance in future at present discounted value.	**Presently as per DPR submitted in CEA, the Compensatory Afforestation cost is estimated as Rs. 26.20 Crores.**	**26.20**
9	Loss of value of timber, fuel wood and minor forest produce on an annual basis, including loss of man-hours per annum of people who derived livelihood & wages from the harvest of these commodities	Loss of value of timber as per species - wise and diameter class wise abstract of the trees to be felled.	**Shall be known after Terrestrial Ecological Survey**	**0.00**
10	Other Losses as predicted in EMP, CAT Plan etc.	Environmental loss mitigation cost for: a) Biodiversity Conservation & Management Plan b) Fishery Conservation & Management Plan c) Solid Waste Management Plan d) Public Health Delivery System e) Energy Conservation Measures f) Muck Disposal Plan g) Landscaping and Restoration Plan of Quarry & Working Areas h) Reservoir Rim Treatment i) Mitigation Measures for Air & Water Environment j) Disaster Management Plan k) Environmental Monitoring Programme l) Catchment Area Treatment Plan	**Cost for these are presently taken as per DPR submitted in CEA, which shall be updated after finalization of EIA EMP**	**272.10**
11	Cost of the project as per approved DPR		Project Cost as per DPR submitted in CEA is Rs. 17469.56 Crores (Without Flood Moderation). However it also includes the NPV, therefore, net cost shall be Project cost - NPV = 17469.56 -299.81 = Rs.17169.75 Crores	**17169.75**
		Total Losses		**18187.69**

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COST - BENEFIT ANALYSIS

Name of the Project: Kamala Hydro Electric Project (1800 MW)

Source Guidelines : Handbook of Forest published in 2019

Table C: Existing guidelines for estimating benefits of forest-diversion in CBA

S. No.	Parameters	Remarks	Applicability in Kamala	Amount (in Rs. Crores)
1	Increase in productively attribute to the specific project.	To be quantified & expressed in monetary terms avoiding double counting.	Out of the total land requirment of 3279 Ha, there is no non-forest area. As such, the project components are to be provisioned in forest area. The project components/facilities are therefore planned in a way to reduce transportation of materials, clubbing the facilities etc. to optimize the land requirement. This also increased productivity, as facilities are provided nearer to the project components thereby reducing time cycle of execution. The cost effect cannot be quantified separately , however, the overall effect is in reducing the cost and time of the project, which already has been considered in economic benefits. Apart from it, employment shall be given to the local population and from Arunachal Pradesh in general, as per the State hydro Policy, thereby reducing the similar number of personnel's, which could have been sourced from outside the state.	0.00
2	Benefits to economy due to the specific project.	The incremental economic benefit in monetary terms due to the activities attributed to the specific project.	**As per DPR submitted in CEA;** 1. **Free Power @ 12% to State Govt.** from Commercial Operation Date (COD) equivalent to **869.99 MU per year** 2. **Free Power @ 1%of the deliverable energy @ 72.50 MU per year, of the project earmarked for Local Area Development Fund** aimed at providing regular stream of revenue for income generation & welfare schemes, creation of additional infrastructure for the PAFs. 3. Energy corresponding to 100 units of electricity to be provided free of cost every month to every Project Affected Family for a period of ten years from the date of commissioning (shall be known only after finalization of R&R Plan) 4. Power injection in grid 6307.45 MU per year for 35 years @ LT of Rs. 5.25 Rs/unit 5. Estimated life of 35 years as per regulatory comission regulations. 6. LEVELISED UNIT RATE OF ELECTRCITY AFTER DISCOUNTING := Rs. 5.25/Unit	133217.70
3	No. of population benefited due to specific project	As per the Detailed project report	**Such benefits of intangible nature cannot be quantified.** **As per DPR submitted in CEA;** It is estimated that project shall employ **3000 workers including technical persons, during construction phase** of 7.5 years of the project. **The total population directly and indirectly benifited would be 12000 persons** During **operation phase , it is estimated that 228 person**s would be employed **.** Apart from this, project will be directly benefitting quite a few project affected families (which can be known after the finalization of R&R Plan) in terms of increased healthcare, employment opportunities, better infrastructure, water supply, electricity supply, sanitation education and skill development leading to much better living standards than presently. R&R Plan shall include; a) Rehabilitation grant. b) Infrastructure in Re-settlement area. c) Economic Development Package which includes providing healthcare facilities, Scholarships, Marriage Support, telecommunication, education and skill development etc. d) Special Grant for PAF's . e) Monitoring and Evaluation. Since, a) and b) shall be the cost of human Rehabilitation and Resettlement and shall be considered in Losses , and Since Sr No c), d) and e) shall be for the benefits over and above the Rehabilitation and Re-settlement therefore the cost of c), d) and e) shall be considered here, which shall be known after R&R finalization.	0.00
4	Economic benefits due to of direct and indirect employment due to the project.	As per the Detailed project report.	As per DPR submitted in CEA It is estimated that project shall have Direct Employment of 228 persons during operation stage of which 183 shall be technical and balance 45 shall be Non-Technical. It is also estimated that during construction stage peak Manpower Employed shall be 3000 persons of which around 5% are assumed to be technical and balance non technical.. Since the employed persons shall mostly depend upon Local Markets and Shops to meet their daily requirements, Indirect Benefit shall be huge but can not be quantified at this stage.	1141.80
5	Economic benefits due to Compensatory afforestation.	Benefits from such Compensatory Afforestation accruing over next 50 years monetized and discounted to the present value should be included as benefits of Compensatory Afforestation. *For benefits of CA the guideline of the Ministry for NPV estimation may be consulted	To remain conservative, this benefit of Compensatory Afforestation is not considered presently.	0.00
			Total Benefits	**134359.50**

Therefore Cost Benefit Ratio of Kamala as per Latest Forest Guidelines	**7.39**

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