

ANNEXURE 7**MAGO CHU HYDRO ELECTRIC PROJECT -96 MW****COST- BENEFIT ANALYSIS -PARAMETERS FOR EVALUATION OF LOSS OF FORESTS.**

SI NO	PARAMETERS	MEDIUM & MAJOR IRRIGATION, HYDRO ELECTRIC, LARGE MINING & OTHER MISC. PROJECTS
1	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 and wages from the harvest of these commodities.	<p>The total forest land (USF) to be diverted for the Mago Chu Hydro Electric Project comes to 37.35ha only. It is assured that the felling trees/shrubs/ forest produces would be limited to the bare minimum. However, about ----- No of trees & shrubs yielding some forest produces are likely to be affected, for which royalty/compensation as assessed by the state forest department will be paid.</p> <p>No harvest is noticed in the proposed forest land (USF) to be diverted, during the last eight years. Compensatory afforestation shall be developed over double the area of surface forest land to be diverted in a manner as proposed by the state forest department.</p> <p>Also, NPV will be paid, as decided by the forest department, for which necessary undertaking is enclosed.</p>
E 2	Loss of animal husbandry productivity, including loss of fodder.	<p>NIL.</p> <p>All possible measures will be taken to increase the forest cover which shall contribute to improve the animal husbandry productivity and fodder.</p>
3	Cost of human resettlement	<p>NIL</p> <p>As there is no displacement of people from the forest area to be diverted for the project and hence no resettlement.</p>
4	Loss of public facilities and administrative infrastructure (Roads, buildings ,schools, dispensaries, electric lines	<p>Due to the construction of the barrage/impounding of reservoir, 0.542 km of the existing RWD road to Thingbu would be disturbed / submerged. Hence, it is proposed to replace the portion of the existing road that would be affected, by an alternate road of length 0.715 km with the same specifications as those of the existing RWD road. For the replacement road, an area of 0.85 ha land</p>

	,railways etc.) on forest land or which would require forest land if these facilities were diverted due to the project	is included in the diversion proposal.
5	Environment losses (soil erosion, effect on hydrological cycle, wildlife habitat, micro climate upsetting of ecological balance)	<p>To mitigate the effects of soil erosion, Catchment Area Treatment by biological and engineering measures, Green belt development in the periphery of reservoir, rehabilitation and vegetation of dumping yards etc. are proposed. Also, the land used for temporary purposes will be redeveloped after use. The amount proposed for catchment area treatment comes to Rs.206.21 lakhs. The detailed Catchment Area Treatment Plan is enclosed as Annexure 10</p> <p>Towards creation of green belt Rs. 11.15 Lakhs is proposed.</p> <p>No National Park/ Wildlife Sanctuary exist within 10 km radius of the project area.</p> <p>There are no ecologically sensitive areas around the project site. However, the forests in the vicinity serve as a habitat for wildlife. Due to human interferences, influx of labour population, impacts on wildlife may be possible.</p> <p>To avoid and minimize the negative impacts, all possible measures shall be taken keeping the Wildlife (Protection) Act (1972), Forest (Conservation) Act (1980), Environment (Protection) Act (1986), Biological Diversity Act (2002), and guidelines of State Biodiversity Conservation Strategy Action Plans (SBCSAP).</p> <p>The EMP budget includes the Forest Protection Plan of Rs.99.24 lakhs to meet the expenditure for protecting the Forests around the project.</p> <p>The workers at the project sites shall not be allowed to harvest or kill any species or extract forest produces which could cause any danger or harm to the animals and birds.</p> <p>To minimize the interference of human population with adjacent forested areas, it would be ensured that the labour colonies are set up at designated locations only, and not in other encroached areas.</p>

		<p>To ensure safety to the forest and wild life, anti-poaching measures will be practiced. It is proposed to establish forest check posts near major construction sites and labour camps which shall be operational during construction phase and thereby unauthorised persons are not allowed to enter in to the forest area.</p> <p>Thus, all possible precautionary measures shall be initiated in consultation with the forest department to minimize the environment losses such as soil erosion, effect on hydrological cycle, wildlife habitat, micro climate upsetting of ecological balance, etc. to rejuvenate various potential and degraded ecosystems, habitats etc. for maintaining ecological balance in the area.</p>
6	Suffering to oustees	NIL - No oustees

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MAGO CHU HYDRO ELECTRIC PROJECT –COST BENEFIT ANALYSIS- ANNEXURE 7A

CATEGORY OF PROPOSAL FOR WHICH COST-BENEFIT ANALYSIS IS APPLICABLE			
Sl. No	NAME OF PROPOSAL	APPLICABLE/NOT APPLICABLE	REMARKS
1	All categories of proposals involving forest land up to 20hectares in plains and up to 5 hectares in hills	Not applicable	
2	Proposal for defence installation purpose and oil prospecting (prospecting only)	Not applicable	
3	Habitation establishment of industrial units, tourist lodges /complex and other building construction	Not applicable	
4	All other proposals involving forest land more than 20 hectares in plains and more than 5 ha. In hills including roads ,transmission lines minor, medium and major irrigation projects , hydel projects mining activity, railway lines, location specific installations like micro-wave stations, auto repeater centres, T.V towers etc.	This is a hydroelectric project of installed capacity 96 MW and the total land requirement is 37.35 ha . Hence, a cost-benefit analysis is necessary to determine when diverting the forest land to non-forest use, in the overall public interests. The cost benefit analysis as per the prescribed format is enclosed in the subsequent pages.	



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MAGO CHU HYDRO ELECTRIC PROJECT -96 MW

PARAMETERS FOR EVALUATION OF BENEFIT NOT WITHSTANDING LOSS OF FORESTS.

Sl No	PARAMETERS	IRRIGATION/HYDEL PROJECTS & OTHERS
1	Increase in productivity attributable to the specific project	<p>The project with an installed capacity of 96 MW can add 404.42 MU Units of clean energy to the national grid annually, estimated based on flows of 90% dependable year. This shall be equivalent to, revenue of Rs. 201.40Crores per year at present Levellised Tariff of Rs 4.98 /kWh. Of this, 12% of power generated of value Rs. 24.17Crores goes to the Government of Arunachal Pradesh (GOAP) and 1% of power generated of value Rs. 2.01Cr is to be contributed for local area development. Hence the project when completed is a direct source of revenue for the GOAP and local area. Due to the availability of adequate clean power of good quality, so many industries shall come in the state increasing the overall productivity. Further, infrastructure like roads, eco- tourism, communications etc. will also develop to boost the overall economy of the Arunachal Pradesh.</p>
2	Benefits to economy	<p>The proposed project will have long term beneficial effect on area, region and the Country. Various benefits of the proposed project are:</p> <p>Power benefit: Installation of 96 MW (3 x 32 MW) would afford an annual energy generation of 404.42 GWh, which will contribute in reducing the gap between demand and supply of power in the state and country especially in peak demand time.</p> <p>Free power: For 40 years of project concessionaire period, 12% of the power generated will be provided to the State free of cost and 1% power generated towards local area development.</p> <p>Improvement in socio-economic condition: Benefits on social infrastructure in terms of the Employment potential</p> <ol style="list-style-type: none"> 1. Economic development

		<div>2. Development of basic amenities and other infrastructure</div> <div>3. Better quality of life</div> <div>4. Improvement in environmental components</div> <div>Fishery development:It is proposed for remodelling and up-gradation of the existing mini trout hatchery at Nuranang in Tawang District with a view to producing sufficient trout fish seeds for releasing in the stream for further propagation and to supply to other districts.</div> <div>Tourism development: Construction of barrage along with other developments like green belt, eco-park, access roads, etc. would definitely add value to the tourism & recreation potential of the area as well as of state.</div> <div>After 40 years, the project will be transferred to GOAP and the full annual generation of 404.42 MU goes to the Government of Arunachal Pradesh. This is very much advantageous to the local area and the state.</div>								
3	No of population benefited	The entire population of 49977 people of Tawang District primarily and nearby districts in general are benefited from this project.								
4	Employment potential	<div>It is proposed to reserve the following categories of posts in the project to the local tribal people, subject to the incumbents fulfilling the job requirements:</div> <table><tr><td>Managerial /Professional Post</td><td>25%</td></tr><tr><td>Ministerial/Clerical Post</td><td>50%</td></tr><tr><td>Skilled Jobs</td><td>25%</td></tr><tr><td>Unskilled Jobs</td><td>75%.</td></tr></table> <div>Direct and indirect employment opportunities during construction phase will significantly contribute in uplifting quality of life of people of the region. During operation phase also, local people will get employment opportunity in operation, maintenance and auxiliary activities.</div>	Managerial /Professional Post	25%	Ministerial/Clerical Post	50%	Skilled Jobs	25%	Unskilled Jobs	75%.
Managerial /Professional Post	25%									
Ministerial/Clerical Post	50%									
Skilled Jobs	25%									
Unskilled Jobs	75%.									

5	Cost of acquisition of facility on non-forest land wherever feasible	The area proposed to be acquired comes under USF. No facilities are existing in the proposed forest area to be diverted for the project.
6	Loss of (a) agriculture & (b) animal husbandry production due to diversion of forest land	NIL.
7	Cost of rehabilitating the displaced persons as different from compensatory amounts given for displacement	<p>NIL – No family or homestead is being directly affected by the project.</p> <p>There is no displacement from the forest area to be diverted for the project and hence there would be no resettlement.</p> <p>However, various welfare measures under Local Area Development Plan would be taken up in the project affected villages , which will include:</p> <ol style="list-style-type: none"> 1. Provision of Community Hall & Welfare Centre 2. Provision for Sanitation facilities 3. Cultural Promotion and Support for Construction of Religious Places 4. Link Roads and Accessibility 5. Drinking water supply support and enhancement 6. Setting up of Recreation Facilities 7. Awareness campaign in the project area 8. Economic Development 9. Sponsoring Self-Help Groups 10. Telecommunication Facilities 11. Provision for Eco-tourism facility <p>The above activities have been formulated based on outcomes of community consultation, conducted</p>

		by Additional Deputy Commissioner (ADC), Jang in September, 2013 and will be finalized jointly by District Administration and the Project Proponent in consultation with respective village Communities. The total amount proposed for local area development is Rs.988.50Lakhs.
8	Cost of supply of free fuel-wood to workers residing on or near forest area during the period of construction.	<p>The fuel required by the labour for cooking purpose is proposed to be met from LPG and electricity for domestic purpose (lighting, heating in the camps).</p> <p>In labour camps, community kitchen is proposed with LPG facilities.</p> <p>Pressure cookers will be provided to the local labour families from the nearby villages/areasto initiate energy conservation in the locality. A provision of Rs.106Lakhs has been made for alternate fuel arrangements.</p> <p>Presently the local people are using firewood for cooking, warming rooms etc. Once the project is commissioned, electricity will be available and the local people may use it for all the above purposes, which will result in protecting the forest from any further destruction.</p>

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COST BENEFIT ANALYSIS

Name of project : **Mago Chu Hydro Electric Project**

Installed capacity: **96MW**

Annual generation: 404.42 MU = 404420000 Units (kWh)

Levellised tariff : Rs 4.98 /kWh

Monetary return of the project for 50 years by sale of energy = Rs. 404420000 x 4.98 x 50 =1007005.8 lakhs

Environmental Loss for a period of 50 years;

Total requirement of surface forest land as per **Annexure 2 = 31.48ha**

As per Annexure-IV (b) of Forest Conservation Rules 2003, Environment loss value per hectare of fully stocked forest (density 1.0) for a period of 50 years =126.74 lakhs. Considering average density of the forest land in question as 0.80,

Cost Benefit ratio= Monetary return from the project for 50 years/Environmental loss for 50 years

= Rs. 1007005.8lakhs/ (126.74x0.80x31.48) lakhs =1:315.50Say 1:315I.e.**Cost Benefit ratio =1:315**

This is very much advantageous to the State and the country. For a period of 40 years SEW Mago Chu Power Corporation will be operating the project contributing 12% free power to the State and 1% free power for local area development. After 40 years, the project will be transferred to GOAP and the full annual generation of 404.42 MU goes to the Government of Arunachal Pradesh.

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