

**Name of Project: - 62.9 Km Bhanupali-Bilaspur-Beri New Railway Line project in the State of Himachal Pradesh. (Phase-IV, From km 52.015 to km 62.900)**

**Cost Benefit Ratio Chart**

Sr. No.	Particulars	Amount in Lac (Rs.)	Remarks
1	<b>Total cost (Investment incurred)</b>		
(A)	Construction Cost of the Project	116625.63	Estimated cost from Ch. Km 52.015 to km 62.900
(B)	N.P.V. amount to be deposited @ Rs 10,05,210/- per Ha for 6.91 hectare and @ Rs.10,05,210/- per Ha for 5.13 hectare (Tunnel/Notional area)	95.24	As per details from forest division Bilaspur
(C)	Compensatory afforestation Substitute / Alternative plantation cost to be Deposited – for 6.91 ha. affected Forest land. Total area required for CA = 2 x 6.91= 13.82 ha. i.e., 14 ha. Cost of CA = 32.05 lac	32.05	
(D)	Environmental losses; (Soil erosion, effect on hydrological cycle, wildlife habitat, microclimate upsetting of ecological balance) Density of forest area = 0.25 (Avg). Value per hectare = Rs. 31.68 lac (@ Rs.126.74 lac per hectare for density 1.0). Forest land = 6.91 ha. Environmental loss = 31.68 × 6.91 = Rs. 218.90 Lac	218.90	
(E)	Cost of supply of free fuel-wood to workers residing in or near forest area during the period of construction. Construction period – 5 years Number of labours at peak time – 800 Nos. Per head cost of fuel – Rs. 20 per day Total cost = Rs. (800×20/100000) × 365 × 5 in lac	292	
(F)	Cost of Greenhouse gas emitted during construction – 4.17 lac ton CO <sub>2</sub> is likely to be emitted due to the use of construction materials; Monetary value as per Certified Emission Reduction (CER) rates @ Rs. 367.89/tCO <sub>2</sub> = 4.17 × 367.89	1534.10	
(G)	Other cost if any – (For 0.5 ha. @ Rs. 1.42 lac per ha. for road side / blank patches plantation, etc = 0.5 × 1.42 lac)	0.71	
	<b>Total cost</b>	<b>118798.63</b>	

  
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2	Benefits from km 52.015 to km 62.900 of Railway line. Taking age of Railroad as 100 Years	Estimated benefits / per year in Rs lac	Total benefit during the life of the created development in Rs lac
2.1	<p>Direct Economic Benefits -</p> <p>a) from Passenger traffic – for proposed running of intercity express train between New Delhi - Beri</p> <p>Benefit @ fare Rs. 426 per passenger for 51830 passengers annually for AC Class = Rs. 2,20,79,580.</p> <p>Benefit @ fare Rs. 127 per passenger for 6,73,790 passengers annually for II Class = Rs. 8,55,71,330.</p> <p>Benefit @ fare Rs. 112 per passenger for 65700 passengers annually for Unreserved Class = Rs. 73,58,400.</p> <p>Total benefits = Rs. (2,20,79,580+8,55,71,330+73,58,400) = Rs. 11,50,09,310.</p> <p>Pro rata basis benefits per year for 10.885 Km = Rs. 11,50,09,310 x 10.885/62.900 = Rs. 19902644.50/</p> <p>(Cost for 95 years i.e. excluding construction period of 5 years.)</p>	199.02	18906.90
	<p>b) Benefit for proposed running of 2 pairs of MEMU between Nangal Dam to Beri.</p> <p>Benefits @ fare Rs. 14 for 1000 passenger per day per MEMU annually</p> <p>Total benefit = Rs. (14 x 1000 x 2 x 365) = Rs. 1,02,20,000</p> <p>Pro rata basis benefits per year for 10.885 km = Rs. 1,02,20,000 x 10.885/62.900 = Rs. 1768596.18</p> <p>(Cost for 95 years i.e. excluding construction period of 5 years.)</p>	17.69	1680.55
	<p>c) Goods traffic – Anticipated inward goods traffic like coal, gypsum, Iron core, fly ash, Sugar, Wheat, Rice etc.</p> <p>Benefit of Inward traffic @ Rs. 833.37 lac per year.</p> <p>Anticipated Outward goods traffic like Cement, Maize, and Vegetable etc.</p> <p>Benefit of Outward traffic @ Rs. 1411.16 lac per year.</p> <p>Pro rata basis benefits per year for 10.885 km = Rs. (1411.16+833.37) x 10.885/62.90 = Rs. 388.42 lac</p> <p>(Cost for 95 years i.e. excluding construction period of 5 years.)</p>	388.42	36900
	<b>Total direct benefits</b>		<b>57487.45</b>

  
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2.2	<b>Social Benefits:-</b>		
	<b>a. Direct Employment -</b> Benefit of employing labours (permanent) for annual maintenance and operation staff. Manpower employed = 80 no @ Rs. 40000 per month (average) Cost of 95 years i.e. excluding construction period of 5 years (as the total project from km. 38.300 to km 52.015 will be completed in 5 years)	384	36480
	<b>b. Direct Employment (during construction period) = 800 Nos. @ Rs. 20000 per month (average).</b> Cost for 5 years of construction period.	1920	9600
	<b>c. Indirect employment due to business development e.g. market, tourist, transportation etc. = 320 ( 4 times of direct employment assumed ) @ 10000/- per month for a period of 95 years (as the total project from km. 38.300 to km 52.015 will be completed in 5 years))</b>	384	36480
	<b>d. Social upliftment of each class of society in entire project area = 6596 persons from villages in project area @ Rs. 8000 per month for a period of 95 years. Rs 8000 per month is extrapolated from Gross National Income per capita assuming 2.5% of it may be contributed due to the project (Source-Human Development report, 2015 by UNDP). Productivity is likely to increase due to improvement in educational and health facility and most importantly mobility and accessibility. (1320 family will be benefitted by assuming 5 persons per family)</b>	1267.20	120384
	<b>Total Social benefits</b>		<b>202944</b>

2.3	<b>Ecological Benefits</b> Railway will provide an alternate and reliable mode of transport with lesser pollution. Saving of carbon emissions compared to existing route (by NH-205) will be 223.8 tCO <sub>2</sub> per year. Rate of carbon credit @ 367.89 CO <sub>2</sub> Rs. /tonne CO <sub>2</sub> . Hence savings of CO <sub>2</sub> in monetary terms for 95 years.	0.82	77.9
			77.9
	<b>Total Benefits</b>		<b>260509.35</b>
	<b>Cost-Benefit Ratio = Benefits/Investment =</b>	<b>2.19</b>	

  
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**Parameter for Evaluation of loss of Forests:-**

The parameters for the evaluation of 'costs' incurred due to a project for which a cost-benefit analysis must be done is provided in the guidelines to this Act, issued by MoEF.

**Nature of Proposal: - Linear Diversion of Forest Land for Railway Project.**

SL.No.	Parameters	Roads, Tr. Lines & Railway Line
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 their livelihood and wage from the harvest of these commodities.	Nil (There would be loss of timber to some extent but compensatory afforestation shall be done as decided by the forest department.)
2	Loss of animal husbandry productivity including loss of fodder	Nil
3	Cost of human resettlement	Nil
4	Loss of public facilities and administrative infrastructure (Roads, Buildings, Schools, Dispensaries, Electric lines, Railways etc.) on forest land. Or which would require forest land if these facilities were diverted due to the project.	There would not be any loss of facilities falling along the proposed alignment. However any unforeseen facility shall be relocated without interrupting existing facilities. RUB shall be provided across road crossings within the Railway ROW along with temporary diversion of road.
5	Environmental losses; (Soil erosion, effect on hydrological cycle, wildlife habitat, microclimate upsetting of ecological balance.)	Density of forest area = 0.25 Value per hectare = 31.68 lac (@ 126.74 lac per hectare for density 1.0) Forest land = 6.91 ha. Environmental loss = Rs 218.91 Lac
6	Suffering to oustees	Nil

  
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**Parameter for Evaluation of Benefit, notwithstanding loss of Forests:-**

The parameters for the evaluation of 'benefits' provided by a project for which a cost-benefit analysis must be done is provided in the guidelines to this Act, issued by MoEF.

**Nature of Proposal: - Linear Diversion of Forest Land for Railway Project.**

SL.No.	Parameters	Roads, Tr. Lines & Railway Line
1	Increase in productivity attributable to the specific project.	Tangible= Rs 120292.80Lac Non Tangible =Mobility is difficult and time taking in mountainous regions. The new rail link from Bhanupali to Beri will thus save time, fuel and people's energy. Saving of time and fuel itself shall help indirectly in increasing the productivity of the commercial and industrial activities for which transportation shall take place along the Railway line.
2	Benefits to economy.	Tangible = Rs 57487.67Lac Non Tangible =Improving the accessibility shall help in regional economic development.
3	No. of population benefited	6596 persons from Km. 52.015 to Km. 62.900. All those travelling by the rail can save on fuel and time, reducing pollution and carbon emission. For those residing on the region will be less exposed to air pollution than if a road would have been built.
4	Employment potential	Rs. 82560 lac (Direct Employment during operation = Rs. 36480 lac (80x40,000x12x95) + Direct Employment during construction = Rs. 9600 lac (800x20,000x12x5) + Indirect Employment = Rs. 36480 lac (320x10,000x12x95)). i.e. in above formula:- Benefit= Person x Salary x Total months in a year x Total Year
5	Cost of acquisition of facility on non-forest land wherever feasible	Nil
6	Loss of (a) agricultural & (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.	Nil
8	Cost of supply of free fuel-wood to workers residing in or near forest area during the period of construction.	Construction period – 5 years Number of labours at peak time - 800 Per head cost of fuel – Rs. 20 per day. Total cost – Rs. 292 lac

  
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