

## COST BENEFIT ANALYSIS

**Project Details:** POWERGRID had undertaken and evolved the various elements of this transmission scheme in consultation with CEA keeping in view the present and future load requirement of Southern Region. Southern Region is facing a huge power deficit which has arisen mainly due to - (i) delay/deferment of many anticipated generation projects (for example - Krishnapattam UMPP (4000 MW), Cheyyur UMPP (4000 MW), Udangudi TPS, IPP projects in Nagapattanam/Cuddalore area (3000 to 4000 MW), Kundankulam APP (2000MW), Kalpakkam PFBR (500 MW), East coast project in Srikakulam (1320 MW), Gas based projects in Vemagiri (about 3000 MW) etc.) and (ii) non-availability of gas for existing gas projects in Southern Region. Therefore, to facilitate the import of power into Southern region and considering the long distance, it has been proposed that power be transferred over HVDC system along with the associated A.C Transmission system at 400 kV level. Accordingly,  $\pm 800$  KV 6000 MW HVDC link with terminals at Raigarh & Pugalur along with VSC based 2000 MW HVDC link between Pugalur and North Trichur (Kerala) has been proposed. This 1838 Kms Long Line Traverses through the states of Chhattisgarh, Maharashtra, Telangana, Andhra Pradesh, Tamil Nadu and Kerala.

**Forest involvement:** Diversion of 429.802 Ha of forest land for construction of  $\pm 800$  KV Raigarh-Pugalur HVDC Transmission line (part-III) under Chandrapur & Gadchiroli Forest division in the state of Maharashtra.

- Total length of the transmission line passing through Zudpi Jungle & RF area = 67.39 Kms and the division wise length of forest are as follows  
 Wadsa Forest Division = 51.420 Kms  
 Brahmapuri Forest Division = 6.840 Kms  
 Chandrapur Forest Division = 8.316 Kms  
 Central Chanda Forest Division = 0.814 Kms
- Total forest area proposed for diversion = 432.679 Ha and the division wise area are as follows  
 Wadsa Forest Division = 328.78 Ha  
 Brahmapuri Forest Division = 46.229 Ha  
 Chandrapur Forest Division = 52.821 Ha  
 Central Chanda Forest Division = 4.849 Ha

**Parameters for evaluation of loss of Forests (as per Form VI-b of MoEF Handbook)**

S.N.	Parameters	Roads, Tr. Lines & Railway lines
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.	Loss of value of timber is negligible since there will be minimum felling of trees for construction of transmission line in hilly terrain where enough ground clearance is available. Moreover, the minimum no. of trees required to be felled will be in possession of the State Forest Deptt. For which the operational cost/timber extraction cost will be borne by PGCIL. In addition to this Net Present Value (NPV) will be paid against the value of timber, fuel wood etc of the proposed land for diversion. Since construction of transmission line doesn't deprive people from earning of livelihood in forest area, hence loss of man-hours of people is also not applicable. Overall, it is assumed that there will be negligible loss of value of timber, fuel wood, minor forest produce etc due to construction of the transmission line in over the forest area.
2.	Loss of animal husbandry productivity, including loss of fodder	Not applicable. Productivity of livestock will not be affected due to construction of the transmission line.
3.	Cost of human resettlement	Since there is no displacement of people due to the project hence there would be no cost of human resettlement.
4.	Loss of public facilities and for administrative infrastructure (roads, diversion, Building, schools, dispensaries, electric lines, Railways etc) on forest land, or which would require forest land if these facilities were diverted due to project	Not applicable, since these facilities are not available inside the proposed forest area.
5.	Environmental losses: (soil erosion, effect on hydrological cycle, wildlife habitat, microclimate upsetting of ecological balance)	Environmental losses are quantified as follows Total forest area proposed for diversion (under Wadsa, Brahmapuri, Chandrapur & central Chanda forest division) = 432.679 Ha Environmental value of one hectare of fully stocked forest (density 1.0) for a period of 50 years is = 126.74 Lakhs Considering density of the proposed RF = 0.8 Therefore, total environmental loss for a period of 50 years is worked out as $= 126.74 \text{ Lakhs} \times 0.8 \times 432.679 \text{ ha}$ $= 43870.19 \text{ Lakhs}$
6.	Suffering to oustees/dwellers	Not applicable since there will be no displacement of people.
	<b>TOTAL LOSS (Calculated for 50 years)</b>	<b>Rs 43870.19 Lakhs</b>



**Parameters for evaluation of loss of Forests (as per Form VI-c)**

S.N.	Parameters	Roads, Tr. Lines & Railway Lines
1.	Increase in productivity attributable to the specific project	The project will enable availability of electricity in abundance by which the people Of various states will be directly benefited. This will accelerate industrialization in the state and the same will directly generate maximum employment opportunities in these areas and boosting project will have the potential for Temporary employment generation for local peoples of Appx. 10 lakhs man-days for a period of 3 years. The direct monetary return of the project is calculated as below the table
2.	Benefits to economy	
3.	No. of population benefited	
4.	Employment potential	
5.	Cost of Acquisition of facility on non-forest land wherever feasible	No land acquisition takes place due to the project
6.	Loss of (a) agriculture & (b) animal husbandry production due to diversion of forest land	There will be no negative impact on agriculture and animal husbandry production due to the project.
7.	Cost of rehabilitating the displaced persons as different form compensatory amounts given for displacement.	There will be no project displaced persons requiring rehabilitation.
8.	Cost of supply of free fuel wood to workers residing in or near forest area during the period of construction	Not applicable.

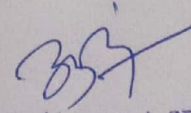
**~ Monetary return of the Project for 50 Years.**

Discription	Unit	Calculation for MH Portion
1. PROJECT COST	Rs (Crore)	739.20
2. BENEFITS FROM PROJECT		
a. Capacity of line (Power Transfer Capacity)	MW	6000
b. Load Factor	%	95%
c. Line Loss	%	2.50%
d. Line Availability	%	97.50%
e. Average cost of energy transfer per unit	Rs per KWH	0.2
f. KWH per year	KWH/Year	=6000 X 1000 X 0.95 X 24 X 365 X 0.975
	KWH/Year	48683700000
g. Transmission charges/Cost of supply per year	0.2*KWH/Year	9736740000
	Rs(Lakhs)	= Rs. 9736740000
h. Transmission Charges against power transfer in 50 Years	Rs(Lakhs)	486837000000
Net Benefit from Transmission system in 50 years	Rs (Crore)	48683.7

The benefit from this transmission line is more than 973.674 Cr. per year to the nation or Rs. 48683.70 Cr in fifty years if flow of power is continued through this transmission system whereas the cost of project including the compensation against forest area involved, Environmental losses, interest during construction and other misc. expenditure is 1177.9 Cr. (Rs. 739.20. + 438.70 Cr.) which is very less in compared to profit from the transmission line project.

Cost Benefit Ratio = Monetary return of the Project for 50 (Fifty) years/  
Cost of Project including Environmental loss for a period of 50 (Fifty) years  
= Rs. 48683.70 Cr.: Rs. 1177.90 Cr.  
= ~41: 1

**COST BENEFIT RATIO = 41: 1**

  
 Arun Kumar / अरुण कुमार  
 DGM उप महाप्रबंधक  
 Powergrid पावरग्रिड  
 Bramhapuri ब्रम्हपुरी