



**NUMALIGARH
REFINERY
LIMITED**
A GOVERNMENT OF INDIA UNDERTAKING
CIN : U11202AS1993GOI003893



Annexure-G

COST BENEFIT ANALYSIS
Paradip Numaligarh Crude Oil Pipeline Project

Table-A: Estimation of cost of Forest diversion

Sl. No.	Parameters	Value	Remarks
1	Ecosystem service losses due to purposes forest diversion	23 .851 lakh	Enclosed in Annexure - A
2	Loss of Animal husbandry productivity including loss of fodder	2.385 lakh	10% of NPV value is taken
3	Cost of human resettlement	Nil	
4	Loss of public facilities and administrative infrastructure (Roads, building, schools, dispensaries, electrics lines, railway etc) on forest land, which would require forest land if these facilities were diverted due to the project.	Nil	
5	Possession value of forest land diverted	1382.025 lakh	<p>30% of NPV value is taken or circle rate of adjoining area in the district.</p> <p>Possession value of forest land will be (considering 30% of NPV) = $0.3 \times 23.851 = 7.155$ lakh</p> <p>a) Per hectare land rate in district Jagatsinghpur is approx. 733.88 lakh.</p> <p>So possession value of forest land (as per average BMV rate) = $1.524 \text{ ha.} \times 733.88 \text{ lakh} = 1118.433$ lakh</p> <p>b) Per hectare land rate in district Kendrapada is approx. 23.72 lakh</p> <p>So possession value of forest land (as per average BMV rate) = $0.610 \text{ ha} \times 23.72 \text{ lakh} = 14.47$ lakh.</p>

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			<p>c) Per hectare land rate in district Bhadrak is approx. 6.92 lakh So possession value of forest land (as per average BMV rate) = 0.337 ha. X 6.92 lakh = 2.332 lakh</p> <p>d) Per hectare land rate in district Balasore is approx. 6.92 lakh So possession value of forest land (as per average BMV rate) = 1.445 ha X 170.79 lakh = 246.79 lakh</p> <p>So total possession value of forest land (as per average BMV rate) = (a+b+c+d) = 1382.027 lakh. So considered amount (Maximum one) is Rs. 1382.025 lakh*</p>
6	Cost of suffering out trees	Nil	
7	Habitat fragmentation cost	11.923 lakh	50% of NPV value is taken
8	Compensatory afforestation and soil and moisture conservation cost	27.412 lakh	<p>Compensatory afforestation and soil and moisture conservation cost. Rate of Compensatory afforestation Rs.3.5 /ha CA land = 3.916x2= 7.832 ha. Total cost= CA land area x rate of Compensatory afforestation = 7.832 ha. x 3.50 lakh = 27.412 lakh</p>
	Total cost in monetary terms	1447.596 lakh	

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

Sl. No.	Parameters	Result(Rs.in lakh)	Remarks
1	Increase in productively attribute to the specific project	102000.00lakh	Enclosed in Annexure-A
2	Benefits to economy due to specific project	102.00 lakh	
3	No. of population benefits due to specific project	300	
4	Economy benefits due to direct and indirect employment due to project	10919.80 lakh	
5	Economy benefits due to compensatory afforestation	772.607 lakh	
	Total(2+4+5)	113794.407 lakh	

Cost benefit Ratio: Total Benefit / Total Loss = 113794.407: 1435.381 = 1:79

Annexure -A

EVALUATION OF LOSS OF FORESTS

Loss of value of Timber, fuel wood and minor forest produce on an annual basis, including loss of man-hour per annum of people who derived livelihood and wages from the harvest of these commodities.

Only one time loss of vegetation occurs during construction and there is no loss of man hours.

Considering the NPV of 6.26 lakh per hectare the total loss of timber, fuel wood and minor forest produce for 3.916 ha of forest may be calculated as 3.916 X 6.26 =24.514 lakh

EVALUATION OF BENEFITS

1. Increase in productively attributable in the project

- Increase in productivity attribute in the project for 50 years (To be quantified and expressed in monetary terms)
- To maintain project IRR at 10 %a onetime VGF will be provided, subject to maximum of **Rs. 102000 lakh.**

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2. Benefits to economy due to specific project.

It is assumed that there will be over all benefit to economy on account of reduction in petroleum product price @ 1 % of the total project IRR will be =1 % of Rs.102000 lakh = **Rs.102 Lakh**

3. No. of population benefitted due to specific project.

- There will be no direct recruitment for this project.
- Indirect employment may be generated through service providers engaged by NRL for the project.

Possible indirect employment may be considered as follows:

Sl. No.	Department	No. of Indirect employment (a)	No. of days in a year (b)	No. of persons /year {(a x b)/365}
1	Civil & Construction	20	180	10{i.e. 1800/365}
2	Pipeline	40	300	33{i.e. 12000/365}
3	Installation & Opera-			48
4	Security			209
Total				300

4. Economic benefits due to direct and indirect employment due to project.

a) Indirectly employed manpower in Installation & Operation has a cost of Rs. 200 lakh / year in terms of Salary. Therefore, for 50 years
= **Rs.10000 lakh**(i.e.Rs.200 lakh X 50 years)

b) Cost of other indirectly employed manpower (Total 252 nos.)Unskilled/semi unskilled worker in terms of Salary and Wages @ Rs. 500/day (average) for 2 years = Rs 919.80 lakh (i.e. 252.0 X Rs 500 X 365 days X 2 years)

Total Cost (a+b) = Rs.10919.80 lakh.

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5. Economic benefit due to Compensatory Afforestation.

The Compensatory Afforestation will be done in 7.832 ha. of degraded forest land, which is down the line would be having a density of minimum 0.8. The ecological value for a 50 years period of density of 1.0 is 126.74 lakh per hectare (As per Forest Conservation Act 1980). By considering minimum 0.8 density, the ecological gain for this project would be
= 126.74lakhX0.8X7.832= **Rs.794.102 Lakh**

Date:

Place: Paradip

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