

Full title of the Project: Diversion of Forest Land for construction of Bhavali Pumped Storage Project (1500MW) in Thane & Nasik Districts of Maharashtra State
File No.: FP MH/HYD/153240/2022
Date of Proposal: 06/03/2022

(Sr. No. 10 of Checklist)

COST BENEFIT ANALYSIS

COST BENEFIT ANALYSIS FOR BHAVALI PUMPED STORAGE PROJECT

Name of Project:

Bhavali Pumped Storage Project (1500 MW), Maharashtra State

Project Proponent:

JSW Energy PSP Two Limited, Mumbai

Area of the Project:

The proposal involves surface as well as underground components. The certain Surface Components have overlaps with other Surface Components. Similarly, few underground Components have overlaps with other Underground Components. The certain Underground Components also have overlaps with the Surface Components. An analysis of an effective area involved in the proposal has been carried out and shown in the table annexed hereto as Annexure- I.

About 275.00 Ha. (Includes 243.74 Ha. Forest Land) in Igatpuri & Shahapur Tehsils of Nasik & Thane Districts, respectively.

Cost of the Project:

Rs. 9058.09 Cr.

Expected Project Life:

50 Years

Computations for Net Present Value (NPV) of Forest Land proposed for diversion:

Sr. No.	Eco- Value Class	Density Class	Area (In Ha.)	Rate of NPV (In Rs.)	NPV (In Rs.)
1	Eco- Class I Tropical Moist Deciduous Forest	Open Forest (OF)	73.850	11, 16, 900.00	8, 24, 83, 065.00
2	Eco- Class I Tropical Moist Deciduous Forest	Dense Forest (DF)	107.600	14, 36, 670.00	15, 45, 85, 692.00
3	Eco- Class I Tropical Moist Deciduous Forest	Dense Forest (DF)	62.290	14, 36, 670.00	8, 94, 90, 174.30
Grand Total			243.740 Say: 243.74		32, 65, 58, 931.30 Say: 32.66 Cr.

COST OF FOREST DIVERSION:

Sr. No.	Parameters	MoEF&CC Guidelines	Statistics for Bhavali PSP	Total Cost (Rs.in Cr.)
1	Ecosystem Services losses due to proposed forest diversion	Ecosystem Services losses due to proposed forest diversion shall be the NPV of the Forest Land being diverted as prescribed by the MoEF&CC	The NPV of the Forest Land proposed to be diverted for the project is: NPV = Rs. 32.66Cr. Ecosystem Services losses = NPV = Rs. 32.66Cr.	32.66
2	Loss of Animal Husbandry productivity, including loss of fodder	To be quantified & expressed in monetary terms or 10% of NPV applicable, whichever is maximum	The NPV of the Forest Land proposed to be diverted for the project is: NPV = Rs. 32.66Cr. Loss of Animal Husbandry productivity, including loss of fodder = 10% of NPV = Rs. 3.266 Cr.	3.266
3	Cost of human re-settlement	To be quantified and expressed in monetary terms as per approved R&R Plan	The proposed project involves construction of upper and lower reservoirs. Based on the studies carried out, the project will involve in acquiring small portion of private land. Detailed socio-economic analysis of the people, property loss likely to be impacted by the construction of the project is planned in DPR stage.	NIL
4	Loss of Public Facilities and Administrative Infrastructure (Road, Buildings, Schools, Dispensaries, Electric Lines, Railway, 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	The project does not envisage loss of public facilities and administrative infrastructure which would require Forest Land if these facilities were diverted due to the project.	NIL
5	Possession Value of the Forest Land diverted	30% of the Environmental Costs (NPV) due to loss of forests or Circle Rates of adjoining area in the district should be added as a cost component as possession	The NPV of the Forest Land proposed to be diverted for the project is: NPV = Rs. 32.66Cr.	9.798

		value of the Forest Land, whichever is maximum:	Possession Value of the Forest Land diverted (PV) is: PV= 30% of NPV Rs. 9.798 Cr.	
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.	The project does not envisage displacement of any individual or settlement or rehabilitation of oustees. However, the detailed socio-economic analysis of the people, property loss likely to be impacted by the construction of the project is planned in DPR stage.	NIL
7	Habitat Fragmentation Cost	While the relationship between fragmentation and forest goods & 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.	The NPV of the Forest Land proposed to be diverted for the project is: NPV = 32.66 Habitat Fragmentation Cost (HFC) = 50% of NPV HFC = Rs. 16.33 Cr.	16.33
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.	The actual cost of Compensatory Afforestation and Soil & Moisture Conservation and its maintenance in future at present discounted value is: Rs. 0.0829 Cr. per Ha. = 243.74 x 0.0829 = 20.21 Cr.	20.21
Total				82.264

BENEFITS OF FOREST DIVERSION:

Sr. No.	Parameters	MoEF&CC Guidelines	Statistics for Bhavali PSP	Total Benefits (Rs. in Cr.)
1	Increase in productivity attribute to the specific project	To be quantified & expressed in monetary terms avoiding double counting.	<p>The Bhavali PSP (1500 MW) would contribute planned peak power generation, there would be direct revenue to the State of Maharashtra and the Government of India.</p> <ul style="list-style-type: none"> • Total energy generation units: 4044.06 MU • Total energy consumption: 5120.53 MU 	84550

			<ul style="list-style-type: none"> • Rate of saleable energy: Rs. 7.98/- per Unit • Rate of pumping energy: Rs. 3.0/- per Unit • Cost of saleable net energy: Rs. 1691 Cr. per Annum 	
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.	<p>Power is among the most critical components of infrastructure development; crucial for the economic growth and welfare of developing nations like India. The existence and development of adequate infrastructure is essential for sustained growth of the economy. Investment in hydel project, which produces the cheapest, cleanest and environment friendly energy, brings in several benefits to Agriculture, Industry, commerce, health, education, environment, etc. sectors.</p> <p>The Incremental Economic Benefits, in monetary terms, due to the activities attributed to this project are hereby worked out on the basis of statistics published by the RBI & World Bank for India for FY 2019-20. The details are furnished below:</p> <ol style="list-style-type: none"> i. Gross Investment Rate of India (GIR)= 27.3% ii. Growth Rate of India, which is GDP= 8.68% which <p>Therefore, the ICOR= GIR/ GDP $= 27.3/ 8.68 = 3.14$</p> <p>The Increment to Output would be: $= \text{Investment/ ICOR}$ $= 9050 \text{ Cr.} / 3.14 = 2882.17 \text{ Cr.}$</p>	2882.17
3	No. of population benefited due to specific project.	As per the detailed Project Report.	<p>The project falls within territorial limits of Kothale, Kalbhonde & Jamunde villages. The all villages having total population of 2819 (2011 Census Data) The Work Profile of these villages are as under:</p> <p>About 1619 workers engaged in Main Work (Employment or Earning more than 6 Months), 429 were cultivators (Marginal activity providing livelihood for less than 6 months-owner or co-owner) while 330 were Agricultural labourer.</p>	2819 + nos.

			<p>The entire population of these villages will be directly & fully benefitted from the extant project. The other surrounding Revenue Villages in the Nasik & Thane District will also have access to the resources and infrastructure facilities developed for the project.</p> <p>The people not only from the State, but also from the country will have privilege to draw the socio- economic benefits from the project and its ancillary activities, during pre- construction, construction, operational and maintenance periods till the validity of O & M life of the project.</p> <p>The benefits considered under this category, though worth millions of Rupees, cannot be expressed in monetary term as they depend on the State/ National Policies and other circumstances, prevailing from time to time. The detailed facts & figures of population likely to be benefitted by the construction of the project are to be worked out at DPR stage.</p>	
4	Economic benefits due to direct and indirect employment due to the project	As per the detailed Project Report.	<p>The all villages having total population of 2819 (2011 Census Data) will be directly & fully benefitted from the extant project.</p> <ol style="list-style-type: none"> 1. For at least 8 months direct employment: $2819 \times 8 = 22552$ Man-days per Annum $22552 \times 1200 = \text{Rs. } 2,70,62,400.00$. Per Annum. Say Rs. 2.71 Cr. Per Annum 2. The people from the other part of the State/ Country, having special skills, expertise will have privilege to draw the economic benefits from the project and jobs ancillary to it, during pre-construction, construction, operational and maintenance periods till the validity of O & M life of the project. 	135.50 + "n" no. of employment benefits.

			The benefits considered under this category, though worth millions of Rupees, cannot be expressed in monetary term as they depend on the State National Policies and other circumstances, prevailing from time to time	
5	Economic benefits due to Compensatory Afforestation	Benefits from such CA accruing over next 50 years monetized and discounted to the present value should be included as benefits of CA. *For benefits of CA, the guidelines of the Ministry for NPV estimation may be consulted.	Forest Land proposed for diversion: 243.74 Ha. The CA will be done on equivalent area i. e. 243.74 Ha. and about 2, 70, 795 trees will be planted. The NPV rate considered for the land is Rs. 11, 16, 900.00 per Ha.	27.22
Total				90413.89

BENEFIT/ COST RATIO:

Total Benefit (Rs. In Cr.)	Total Cost (Rs. In Cr.)	B/C Ratio
90413.89	Cost of Forest Diversion: 82.264 - Standard Project Cost: 9058.09 Total: 9140.354	9.89: 1

Date: 06/02/2025
Place: Mumbai
Office Seal:



 (Lalit Parab)
 Authorized Signatory
 JSW Energy PSP Two Limited, Mumbai