Full title of the Project	:	Construction of Shahpur (1800 MW) Pumped Storage Project by M/s Greenko Energies Private Limited, in Hanumanthkhera, Mungawali villages, G.P-Subhdhara; Baint Village, G.P-Bichi; Sahjanpur, Ballarpur Villages, G.P-Kasba Nonera; Kaloni, Shahpur Villages, G.P-Mundiyar; Tehsil-Shahbad; Baran District, Rajasthan.
Proposal no	:	**FP/RJ/HYD/121439/2021**
Date of Proposal	:	03-02-2021
Diversion Area	:	407.8227 Ha

The proposed Shahpur (1800 MW) Pumped Storage Project (PSP) envisages project components like Upper & Lower Embankment/Reservoir, Powerhouse, Muck dumping, Construction camps and Colony etc. The total land required for the project is about 624.1702 Ha, out of total land requirement, 407.8227 Ha is forest land, which is proposed to be diverted for non-forest purposes from Mundiyar A, Nonera A, Santora Blocks of Shahbad Range, Baran Division in Baran District, Rajasthan. As per the FCA guidelines, Cost Benefit Analysis has to be prepared for project feasibility and calculation of the same is furnished below.

Details of calculation of Cost - Benefit analysis:

S.No	Description	Details
1	Project	Shahpur (1800 MW) Pumped Storage Project
2	Forest Land required (Ha)	407.8227

Component wise Breakup (Ha)-Shahpur-PSP				
S. No	**Component**	**Forest Land**	**Non-Forest**	**Total**
1	Road Upper Reservoir to NH-76	0.0000	8.2050	8.2050
2	Upper Reservoir	110.2062	159.6100	269.8162
3	Job Facilities Area	0.0000	15.0000	15.0000
4	Magazine (Explosive Storage Facility)	0.0000	0.1000	0.1000
5	Road From Upper Reservoir to Lower Reservoir	3.7775	0.0000	3.7775
6	WCS & Powerhouse	57.2250	0.0000	57.2250
7	Lower Reservoir	230.5140	0.0000	230.5140
8	Pumping Alignment	2.2800	0.0000	2.2800
9	Road from Lower Reservoir to BT Road	3.8200	2.7375	6.5575
10	Approach Road Lower Reservoir to Muck Disposal Are	0.0000	0.6950	0.6950
11	Proposed Muck Disposal Area	0.0000	30.0000	30.0000
Total		**407.8227**	**216.3475**	**624.1702**

Table-A: Category of proposals for which Cost Benefit Analysis are applicable

Sr. No.	Nature of Proposal	Applicable / Not applicable	Remarks
01	All categories of proposals involving forest land up to 20 hectares in plains and up to 5 hectares in hills	Not Applicable	NIL
02	Proposal for defense installation purposes and oil prospecting (prospecting only)	Not Applicable	NIL
03	Habitation, establishment of industrial units, tourist lodges / complex and other building constructions.	Not Applicable	NIL
04	All other proposals involving forest land more than 20 Ha in plain and more than 5 ha in hills including roads, transmission lines, minor medium and major irrigation projects, hydel projects, mining activities, Railway lines, location specific installation like Micro-wave station, auto repeater centre, TV towers, etc.	Applicable	These are cases where a Cost benefit analysis is necessary to determine when diverting the forest land to non-forest use is in the overall public interest.

Table B: Estimation of Cost of Forest Diversion:

S. No	Parameters	Cost in Rs. Lakhs	Remarks
1	Ecosystem services losses due to proposed forest diversion.	3906.941	Economic value of loss of eco-system services due to diversion of forests shall be the net present value (NPV) of the forest land being diverted (407.8227 Ha) as prescribed by the Central Government (MoEF & CC). * NPV is considered as 9.58 L/Ha
2	Loss of animal husbandry productivity including loss of fodder.	390.6941	Maximum of: 1. (a) Estimated Quantity of fodder / grasses in M.T = Average production fodder per grasses in M.T per Ha x Area Applied diversion. Based on the assumption that on closer an area can yield an average 2 to 4 MT of grass per ha. i.e. 3 x 407.8227 = 1223.47 MT. (Average fodder is 3 MT/Ha is considered) (b) Value or loss of fodder (Rs) =

S. No	Parameters	Cost in Rs. Lakhs	Remarks
			Estimated quantity x Market price = 1223.47 MT x Rs.5000/MT= Rs.61.17 Lakhs) 2. Considered 10% NPV which is maximum: Rs 3906.941 Lakhs x 0.1 (10%) = Rs. 390.6941 Lakhs Hence Rs 390.6941 Lakhs is considered as Loss of animal husbandry productivity including loss of fodder.
3	Cost of human resettlement.	Nil	--
4	Loss of public facilities and administrative infrastructure (Roads, building, schools, dispensaries, electric lines, railways 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.	3221.799	Maximum of i. 30% of environmental costs (NPV) due to loss of forests (3906.941x 0.30 = Rs 1172.082 lakhs) ii. Circle rate of adjoining area is taken as Rs. 7.90 Lakhs/Ha, accordingly (7.90 x 407.8227 Ha=Rs 3221.799 Lakhs) Hence Rs 3221.799 Lakhs is considered as possession value of forest land diverted.
6	Cost of suffering to Oustees.	Nil	Not applicable, there is no Displacement of people.
7	Habitat Fragmentation Cost.	1953.471	The cost due to fragmentation has been pegged at 50% of NPV applicable as thumb rule i.e. 3906.941x 0.50 = Rs. 1953.471 Lakhs
8	Compensatory afforestation and soil & moisture conservation cost.	9502.2689	Sum of i. Treatment cost for compensatory afforestation i.e. 407.8227 Ha @ 6 L/Ha = Rs 2446.936 Lakhs ii. Purchase Cost of Land for C.A = 407.8227 Ha @17.30/Ha = 7055.333 Lakhs.

S. No	Parameters	Cost in Rs. Lakhs	Remarks
			Hence, Rs 9502.2689 Lakhs has been considered towards Compensatory afforestation and soil & moisture conservation cost.
	Total	**18975.1746**	

Table C: Estimation of Benefits of Forest Diversion:

SNo	Parameters	Remarks	Benefits (in lakhs)
01	Increase in productivity attribute to the proposed project	The Shahpur (1800 MW) Pumped Storage Project would contribute planned peak power generation, there would be direct revenue to the State and the Nation. Further, the overall improvement of the infrastructure like Roads, Industries, Eco-tourism, Communication etc. would boost up the economy of the State and improve the standard of living of people. The project is proposed to generate Revenue of 1974 Cr/Year	7,81,700*
02	Benefits to economy due to the Project	Power/energy is one of the prime requirements for the overall development of a State and Nation. Since, Green power is the cleanest, cheapest and environmentally friendly source of energy; development of project will facilitate the emergence of industries, trade and commerce and would thereby bring more and more economic development in the State & Country. The establishment of more industries and production units due to improved power supply in the State will directly boost the overall economy of the State & the country at large.	--
03	No. of population Benefited due to the Project	Direct Employment during Construction-5800, Operation-200 The completion of project will directly and indirectly benefit the population residing in Baran District as well as State and the Country.	--
04	Economic benefits due to direct & indirect employment due to the Project	Benefits due to direct employment, during the construction phase, employment will be generated for skilled and unskilled manpower. About 3600 persons will be employed during the peak time of construction. The local people will also get the opportunity to carry out contract works subject to their work capability / expertise. After completion of the Project, during operation of the project about 300 people will be employed for routine operation and maintenance of roads and other structures.	--
05	Economic	Benefits from Compensatory Afforestation (CA) accruing over	--

SNo	Parameters	Remarks	Benefits (in lakhs)
	benefits due to Compensatory Afforestation	next 50 years and discounted to Present Value.	
		Total Benefits	**7,81,700.00**

* Total net benefit for 99 Years is Rs 7,81,700 Lakhs (7817 Cr) @ 4% net profit on gross revenue (197400*0.04*99)

Cost of the Economic benefits due to direct & indirect employment is not considered.

Calculation of Cost Benefit Ratio:

Total Benefits (As per Table C: Estimation of benefits of Forest Diversion) =Rs. 7,81,700 Lakhs
Total Cost (As per Table B: losses of forests) = Rs. 18975 Lakhs

Hence, Benefit/ Cost Ratio = 41.19

Thus, the project gives positive Benefit/ Cost Ratio. The monetary returns of the Project are positive over the environmental losses.

Date: 04.08.2023

Name: Gopi Krushna N

Gopi Krushna N
Deputy General Manager (DGM)
Authorised Signatory
Greenko Energies Private Limited

Place: Hyderabad

Authorized Signatory