

MINUTES OF THE 30TH MEETING OF THE EXPERT APPRAISAL COMMITTEE (EAC) ON ENVIRONMENTAL IMPACT ASSESSMENT (EIA) OF RIVER VALLEY AND HYDROELECTRIC PROJECTS HELD ON 1ST JULY, 2022

The 30th Meeting of the EAC (River Valley and Hydroelectric Projects) organized by the Ministry of Environment, Forest & Climate Change, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi was held on 1st July, 2022 through video conference under the Chairmanship of Dr. Uday Kumar R.Y. The list of Members participated in the meeting is at **Annexure**.

Agenda Item No. 30.1:

Confirmation of the Minutes of the 29th EAC meeting

The Minutes of the 29th EAC (River Valley and Hydroelectric Projects) meeting held on 15th June, 2022 were confirmed.

Agenda Item No. 30.2:

Sukhpura Standalone Pumped Storage Project (5040 MW), District Chittorgarh (Rajasthan) by M/s Greenko Energies Private Limited – Amendment in Terms of Reference - reg.

[Proposal No. IA/RJ/RIV/278826/2022; F. No. J-12011/20/2019-IA.I (R)]

30.2.1 The proposal is for amendment in Terms of Reference granted by the Ministry vide letter dated 28.02.2020 in favour of M/s Greenko Energies Private Limited to the project for Sukhpura Standalone Pumped Storage Project (5040 MW), at District Chittorgarh (Rajasthan).

30.2.2 The project proponent has submitted proposal for amendment in ToR with the details as under:-

Para No. – TOR letter	Details as per ToR granted Sukhpura Standalone Pumped Storage Project (5040MW)	Amendment sought Sukhpura Off-Stream Closed Loop Pumped Storage Project (2560MW)	Justification
Subject	Sukhpura Standalone Pumped Storage Project (5040 MW), District: Chittorgarh, Rajasthan by M/s Greenko Energies Private Ltd.	Sukhpura Off-Stream Closed Loop Pumped Storage Project (OCPSP) 2560 MW, Sukhpura village, District Chittorgarh, Rajasthan by M/s Greenko Energies Private Ltd.	Originally, Pre-feasibility report for Sukhpura Pumped Storage Project was prepared for the installed capacity of 5040 MW with 6
3	Greenko Energies Pvt. Ltd. proposes to develop Standalone Pumped Storage Project (PSP) in Sukhpura, Gorakia, Nabargarh, Pratappura and Khema Ka Kheda (V), Rawatbhata (T) of	Greenko Energies Pvt. Ltd. proposes to develop Off-Stream Closed Loop Pumped Storage Project (OCPSP) in Sukhpura, Gorakia, Nabargarh, Pratappura and Khema Ka Kheda (V),	hours storage capacity. As per 5040 MW, for the finalized parameter of FRL and MDDL of upper reservoir, the head variation in

	<p>Chittorgarh district in the state of Rajasthan.</p> <p>This Project envisages non-consumptive re-utilization of 2.43 TMC of water for recirculation between two proposed reservoirs.</p> <p>The geographical coordinates of the proposed upper reservoir are at longitude 75°23'40.22" E and latitude is 24° 59' 57.76" N and that of lower reservoir are at longitude 75° 23' 10.24" E and latitude 25° 0' 15.54" N. Proposed rating of Pumped Storage Project is 5040 MW.</p>	<p>Rawatbhata (T) of Chittorgarh district in the state of Rajasthan.</p> <p>This Project envisages non-consumptive re-utilization of 1.176 TMC of water for recirculation between two proposed reservoirs.</p> <p>The geographical coordinates of the proposed upper reservoir are at longitude 75°23'43.98" E and latitude is 24° 59' 56.09" N and that of lower reservoir are at longitude 75° 23' 6.47" E and latitude 25° 0' 18.18" N. Proposed rating of Pumped Storage Project is 2560 MW.</p>	<p>upper reservoir was 27m. However, as per E&M manufacturer requirement, the head variation of upper reservoir was required to be limited to 20m for operational requirements. For the 20m variation, the area required for upper reservoir becomes 472 Ha (as against 350 Ha) whereas area available is around 371 Ha only. Therefore, for maintaining the required operational requirement of equipment reduction in capacity of project was essentially required.</p>
4	<p>The upper reservoir is proposed to be located on flat/ gradually sloping land which is suitable for creating the desired gross storage capacity of 2.53 TMC by doing excavation up to the desired level.</p> <p>Out of 2.53 TMC, the live storage capacity is 2.43 TMC and the dead storage capacity is 0.1 TMC by keeping FRL & MDDL at EL 607.00 m and EL 580.00 m respectively. For creating this storage, it is proposed to construct Rockfill embankment for the average height of around 33 m (with maximum height of 40 m) for the length of 8,786 m.</p>	<p>The upper reservoir is proposed to be located on flat/ gradually sloping land which is suitable for creating the desired gross storage capacity of 1.57 TMC by doing excavation up to the desired level.</p> <p>Out of 1.57 TMC, the live storage capacity is 1.23 TMC and the dead storage capacity is 0.34 TMC by keeping FRL & MDDL at EL 607.00 m and EL 587.00 m respectively. For creating this storage, it is proposed to construct Rockfill embankment for the average height of around 32 m (with maximum height of 39 m) for the length of 5,746 m.</p>	
5	<p>Similarly, the lower reservoir is proposed to be located in the gorge portion which is able for creating the desired gross</p>	<p>Similarly, the lower reservoir is proposed to be located in the gorge portion which is able for creating the desired</p>	

	<p>storage capacity of 2.48 TMC in which the live storage capacity is 2.43 TMC and dead storage capacity is 0.05 TMC by keeping FRL and MDDL at EL 425.00 m and EL 395.00 m, respectively. For creating this storage, it is proposed to construct Rockfill embankment for the average height of 29 m (with maximum height of 38 m) for the length of 1,688 m.</p>	<p>gross storage capacity of 1.45 TMC in which the live storage capacity is 1.176 TMC and dead storage capacity is 0.27 TMC by keeping FRL and MDDL at EL 415.00 m and EL 397.00 m, respectively. For creating this storage, it is proposed to construct Rockfill embankment for the average height of 18 m (with maximum height of 28 m) for the length of 1,926 m.</p>	
6	<p>Water conductor system consists of 16 nos. each of 939m long and 7.0m dia. surface circular steel lined Penstock/ Pressure Shaft (ie. consisting of 700 m long surface penstock, 111 m long vertical pressure shaft and 128 m long Horizontal pressure shaft) to feed 16 units of 315 MW. A surface Power house having an installation of Sixteen nos. reversible Francis turbine each of 315 MW capacity (14 units of fixed speed and 2 units of variable speed turbines) operating under a rated head of 178.50 m in generating mode and 189.50m in pumping mode. The water from powerhouse out fall is let back to the newly proposed lower reservoir through Tailrace Tunnel/ Channel.</p>	<p>Water conductor system consists of total 8 Nos. of independent Penstocks. 1 no. bifurcated in to 2 nos. near powerhouse each of 817.07 m long and 7.0m dia. surface circular steel lined Penstock/ Pressure Shaft (ie. consisting of 517.94 m long surface penstock from Intake to Vertical Pressure Shaft, 133.51 m long vertical pressure shaft and 115.61 m long Horizontal pressure shaft) to feed 9 units (7 x 320 MW + 2 x 160 MW). A surface Power house having an installation of 9 nos. reversible Francis turbine 7 of 320 MW capacity and 2 of 160 MW operating under a rated head of 187 m in generating mode and 196 m in pumping mode. The water from powerhouse out fall is let back to the newly proposed lower reservoir through Tailrace Tunnel/ Channel.</p>	
7	<p>The proposed PSP is located around 2 km (NW) from the notified boundary of Mukundara Tiger Reserve and</p>	<p>The proposed PSP is located around 2 km (NW) from the notified boundary of Mukundara Tiger Reserve</p>	

	<p>around 6.3 km (NW) from Bhainsrod garh WLS.</p> <p>Total land required for construction of various components, including infrastructure facilities and muck disposal area is estimated to be around 857.30 ha, involving 735.49 ha of forestland and 121.82 ha of non-forest land. Total estimated cost of the project is Rs. 20,030.20 Crores.</p>	<p>and around 6.3 km (NW) from Bhainsrod garh WLS. ESZs have been notified for both the protected areas, and the proposed PSP is located around 0.80 km from ESZ boundary of Mukundara Tiger Reserve and around 5.42 km from ESZ boundary Bhainsrod garh WLS.</p> <p>Total land required for construction of various components, including infrastructure facilities and muck disposal area is estimated to be around 815.0771 ha, involving 678.5318 ha of forestland and 136.5453 ha of non-forest land. Total estimated cost of the project is Rs. 13,654.08 Crores.</p>	
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Also, the comparative statement with reference to earlier proposal and revised proposal is as under:

Details	Original Sukhpura Standalone Pumped Storage Project (5040MW)	Revised Sukhpura Off-Stream Closed Loop Pumped Storage Project (2560MW)
District	Chittorgarh	Chittorgarh
Village	Sukhpura	Sukhpura
Geographical Co-Ordinates		
Sukhpura Standalone PSP Upper Reservoir - (Now Proposed)		
Latitude	24° 59' 57.76" N	24°59'56.09"N
Longitude	75°23'40.22"E	75°23'43.98"E
Sukhpura Standalone PSP Lower Reservoir - (Now Proposed)		
Latitude	25° 0' 15.54" N	25°0'18.18"N

Longitude	75° 23' 10.24" E	75°23'6.47"E
Access to Project Site		
Airport	Maharana Pratap Airport (6Km from Dabok)	Maharana Pratap Airport, Udaipur (222Km from project site)
Rail head	Mandalgarh railway station	Mandalgarh Railway Station 70Km from Project site
Road	NH27 (Mandalgarh - Salawatiya Road)	NH-9A (Bhilwara - Modak Road)
Port	Deendayal	Kandla (752Km from project site)
Project Type	Standalone Pumped Storage Project	Off-Stream Closed Loop Pumped Storage Project
Storage Capacity	30240 MWH	15437 MWH
Rating	5040 MW	2560 MW
Peak operation duration	6 Hours	6.03 Hours
Sukhpura Upper Reservoir - (Proposed)		
Live Storage	2.43 TMC	1.23 TMC
Dead Storage	0.10 TMC	0.34 TMC
Gross Storage	2.53 TMC	1.57 TMC
Upper Reservoir - (Proposed)		
Top of Embankment	EL +610.00 m	EL +610.00 m
Full Reservoir level (FRL)	EL +607.00 m	EL +607.00 m
Min. Draw Down Level (MDDL)	EL +580.00m	EL +587.00m
Type	Rock fill Embankment with central clay core	Rock fill Embankment with Central Clay Core
Max. Height of Rockfill Embankment	40.00 m	39 m
Avg. Height of Rockfill Embankment		32 m
Length at the top of Rockfill Embankment	8786 m	5748 m
Top width of the Rockfill Embankment	10.0 m	10.0 m

Type of Power Block	Concrete Gravity Structure	Concrete Gravity Structure
Height of Power Block	58.80 m	45 m
Length at the top of Power Block	470.0 m	239 m
Top width of the Power Block	10.0 m	10.0 m
Sukhpura Lower Reservoir – (Proposed)		
Live Storage	2.43 TMC	1.176 TMC
Dead Storage	0.05 TMC	0.27 TMC
Gross Storage	2.48 TMC	1.45 TMC
Lower Reservoir – (Proposed)		
Top Bund Level (TBL)	EL +428.00 m	EL +418.00 m
Full Reservoir level (FRL)	EL +425.00 m	EL +415.00 m
Min. Draw Down Level (MDDL)	EL +395.00m	EL +397.00m
Type	Rock fill Embankment with central clay core	Rock fill Embankment with Central Clay Core
Max. Height of Rockfill Embankment	38 m	28 m
Avg. Height of Rockfill Embankment	--	18 m
Length at the top of Rockfill Embankment	1688 m	1926 m
Intake Structure		
Type	Diffuser Type	Diffuser Type
No. of Vents	16 nos.	3 nos.
Size of Each Intake	25.00 m (W) x 10.20 m (H) including piers	24.00 m (W) x 10.40 m (H) including piers
Length of each Intake	37.50 m (covered with RCC slab at top up to Intake Gate)	36.82 m (covered with RCC slab at top up to Intake Gate)
Elevation of Intake centre line	EL +567.82 m	EL +575.00 m
Elevation of Intake bottom	EL +564.32 m	EL +571.50 m

Design Discharge of each Intake (Turbine mode)	197.68 Cumec	191.69 Cumec
Trash rack type	Vertical with inclination of 15o	Vertical with inclination of 15o
Size of Trash Rack	3 nos. of 7.33 m (W) x 10.56 m (H) for each unit	3 nos. of 7.00 m (W) x 10.77 m (H) for each unit
Numbers & Size of Intake Service Gate	16 Nos. – 5.80 m (W) x 7.0 m (H) with Rope drum Hoist	8 Nos. – 5.80 m (W) x 7.00 m (H) with Independent Rope drum Hoist
Numbers & Size of Intake Emergency Gate	2 Nos. – 5.80 m (W) x 7.0 m (H) with Moving Gantry	4 Nos. – 5.80 m (W) x 7.00 m (H) with Moving Gantry
Penstock/Pressure Shafts		
Type	Circular	Circular
Number of Penstock	16 Nos.	Total 8 Nos. of independent Penstocks. 1 no. bifurcated in to 2 nos. near powerhouse
Diameter of Penstock	7.0 m dia.	7.00 m dia.
Length of Penstock / Pressure Shaft	939 m Length of surface penstock from Intake to	817.07 m Length of surface penstock from Intake to
	Vertical Pressure Shaft – 700 m Length of Vertical Pressure Shaft – 111 m Length of Horizontal Pressure Shaft – 128 m	Vertical Pressure Shaft – 517.94m Length of Vertical Pressure Shaft – 133.51m Length of Horizontal Pressure Shaft – 115.61m
Design Discharge of each Penstock	197.68 Cumec	191.69 Cumec
Velocity in the Penstock	5.14 m/sec	4.98 m/sec
No. of Branch Pressure Shaft	--	2
Diameter of Branch Pressure Shaft	--	4.9m
Length of Branch Pressure Shaft	--	81 m
Design Discharge of each Branch Pressure Shaft	--	95.84 Cumec

Velocity in the Branch	--	5.08 m/sec
Pressure Shaft		
Powerhouse		
Type	Surface Powerhouse	Surface Powerhouse
Centre line of Unit	EL 360.00 m	EL 367.00 m
Dimensions including Service Bay	L 400.00m x B 25.50 m x H 51.90 m	L 253.00m x B 25.50 m x H 51.20 m
Size of Service bay	40 m (L) x 25.50 m (W)	40 m (L) x 25.50 m (W)
Service bay level	El. 374.20 m	El. 381.20 m
Size of Unloading Bay	20 m (L) X 24.0 m (W)	20 m (L) X 24.0 m (W)
Unloading Bay Level	El. 398.20 m	El. 405.20 m
Tail Race Tunnel		
Type	Concrete Lined – Circular	Concrete Lined – Circular
No. of Tunnel	16 Nos.	9 Nos. (7nos. for large units + 2nos. for smaller units)
Dia. of Tunnel	8 m	8.0 m for larger unit & 6.0m for smaller unit
Length of Tunnel	155.00 m	203.48 m
Design Discharge	197.68 Cumec	191.69 Cumec each for larger units and 95.84 Cumec each for smaller units
Tail Race Outlet		
Type	Inclined	Diffuser Type
No. of Outlet	16 Nos.	9 Nos. (7nos. for large units + 2nos. for smaller units)
Elevation of Outlet Centre line	EL +372.77 m	EL +386.10 m for Larger Units and EL +385.10m for Smaller Unit
Elevation of Outlet bottom	EL +368.44 m	EL +382.10 m
Trash rack Type	Vertical with inclination of 15°	Vertical with inclination of 15°
Size of Trash rack	3nos. of 6.10 m (W) x 20.12 m (H) for each unit	3 nos. of 6.67 m (W) x 11.23 m (H) for each Larger unit 3 nos. of 5.0 m (W) x 7.51 m (H) for each Smaller unit

Size of each Outlet	--	23.00 m (W) x 10.85 m (H) including piers for Large Units 18.00 m (W) x 7.25 m (H) including piers for Smaller Units
Length of each Outlet	--	32.49 m for Larger units and 25.99m for Smaller Units (covered with RCC slab at top up to Intake Gate)
Tailrace outlet Service Gate	16 nos. of 6.60 m (W) x 8.00 m (H)	7 nos. of 6.60 m (W) x 8.00 m (H) for Larger Units and 2 nos. of 4.95m (W) x 6.0m(H) for Smaller Units with Independent Hydraulic Hoist
Tail Race outlet Emergency Gate	1 No. – 6.60 m (W) x 8.0 m (H) with Moving Gantry	4 nos. of 6.60 m (W) x 8.00 m (H) for Larger Units and 1 nos. of 4.95m (W) x 6.0m(H) for Smaller Units with Moving Gantry
Electro Mechanical Equipment		
Pump Turbine	Francis type, vertical shaft reversible pump-turbine	Francis type, Vertical Saft reversible pump- turbine
Total No of units	16 nos. (16 X 315 MW)	9 nos. (7 X 320 MW + 2 x 160 MW)
Centreline of Unit	EL +360.00 m	-
Total Design Discharge (Turbine Mode)	3162.87 Cumec	1533.51 Cumec
Rated Net Head in Turbine Mode	--	187.00 m
315 MW Turbines		--
Total No. of units	16 nos. (16 X 315 MW) 14 Units Fixed + 2 Units Variable	--
Turbine Capacity	315 MW	--
Turbine Design Discharge	197.68 Cumec for each unit	--
Rated Head in Turbine Mode	178.5 m	--
Pump Capacity	330 MW	--
Rated Head in	189.50 m	--

Pumping Mode		
Synchronous speed	166.67 rpm	--
Generator-Motor		--
Type	Three phase, alternating current Synchronous/asynchronous generator motor semi umbrella type with vertical shaft	--
Number of units	16 nos. (16 X 315 MW)	--
Rated Capacity	Generator – 315 MW Pump Input – 330 MW	--
Rated Voltage	21 KV	--
Power Transformer		--
Type	Outdoor Single-Phase Power transformers with Off-Circuit tap changer (OCTC)	--

30.2.3 The EAC after detailed deliberation on the information submitted and as presented during the meeting **recommended** the proposal for amendment in ToR as proposed by the project proponent subject to compliance of following additional ToR:-

[A] Environmental Management and Biodiversity Conservation:

- i. *Impact zone decided prior to base line data generation and accordingly, sampling location shall be finalized. Baseline data as mentioned in Standard ToR shall be collected for preparation of EIA/EMP report along with soil characteristics which shall be studied at minimum 10 locations. The ground water level at 10 locations shall be measured in project area in all three seasons.*
- ii. *A study shall be carried out on impact of project activity on the aquatic and terrestrial ecosystem, within project area classifying the impact zones (highly impact/low impact zone) based on seasonal variations and covering the aspects related to impacts on aquatic ecosystem/primary productivity due to quantity of water to be lifted for power generation and thermal stratification. Accordingly, Environment Management plan shall be prepared.*
- iii. *Sampling locations be located to cover villages situated near the reservoir, around boundary of forest area and around Bhainsrodgarh Wild Life Sanctuary & Mukundara Tiger Reserve for collection of baseline data and data to be incorporated in EIA/EMP report.*
- iv. *Identify the sand mining/quarrying sites in submergence area and downstream of reservoir.*
- v. *River bank protection plan all along the submergence need to be prepared and incorporated in EIA/EMP.*

- vi. *Scope of watershed development in the 10 km radius of the project shall be studied in consultation with Govt. institutions/Indian Council of Agriculture Research (ICAR)and accordingly a detailed Water Shed Development Plan shall be prepared and incorporated in EIA/EMP report.*
- vii. *Matrix formulated on the basis of detailed study and field survey of flora and Fauna methodology used shall be mentioned in the EIA report.*
- viii. *Endemic plant and animal species found in the area concerned shall be provided instead listing entire endemic species found in the State.*
- ix. *Details of Flora and Fauna reported in submergence area, Nos. of tree along with their density and nomenclature required to be cut for reservoir creation and other project component.*
- x. *Project impact on avi-fauna shall be studied and incorporated in EIA/EMP report.*
- xi. *Possibility impact assessment on the fish diversity based on the hydrological alteration at the water drawing sources (river /reservoir) shall be studied.*

[B] Socio-economic Study

- xii. *Declaration by the project proponent by way of affidavit that “No” Inter-state issue / policies issue is involved with any state in the project.*
- xiii. *Statement on the commitments (activity-wise) made during public hearing to facilitate the discussion on the CER in compliance of the Ministry’s OM F.No.22-65/2017- IA.III dated 30th September, 2020 shall be submitted.*
- xiv. *Tentative no. of project affected families shall be identified and accordingly appropriate Rehabilitation & Resettlement plan shall be prepared.*

[C] Muck Management / Disaster Management

- xv. *Details of quantity of muck generation component wise and disposal site along with transportation plan and its monitoring to be provided.*
- xvi. *Details of Muck Management plan prepared along with estimated cost incorporated in EIA/EMP report.*
- xvii. *Techno-economic viability of the project must be recommended from CEA/CWC*

[D] Miscellaneous.

- xviii. *Undertaking need to submitted regarding no activities has been yet on the project site and water allocated to this scheme shall not be diverted to other purpose.*
- xix. *The photograph should bear the date, time, latitude & longitude of the monitoring station/sampling location. In addition to this PP should submit the original test reports and certificates of the labs which will analyze the samples.*
- xx. *Arial view video of project site shall be recorded and to be submitted.*

- xxi. *Certificate from State Government for allocation of water be submitted along with EIA/EMP report.*
- xxii. *All other ToR mentioned in the earlier TOR letter dated 28.02.2020 shall remain unchanged.*

Agenda Item No. 30.3:

Teesta Low Dam – I & II (Combined) Hydro-Electric Project 71 MW (2x30+1x11MW) in an area of 170 ha in Triveni town, Tehsil Rangli Rangliot, District Darjeeling, West Bengal by M/s West Bengal State Electricity Distribution Company Limited – Reconsideration for grant of Terms of Reference - reg.

[Proposal No. IA/WB/RIV/219929/2021;F. No. J-12011/11/2021-IA.I (R)]

The EAC noted that based on recommendations of EAC, the site visit was conducted by the Sub-committee. The Site visit report is yet to finalized by the sub-committee of the EAC. The proposal shall be considered by the EAC as and when sub-committee submit the site visit report.

The EAC therefore **deferred** the proposal.

ATTENDANCE

Sr. No.	Name & Address	Role	Attendance
1.	Dr. Uday Kumar R.Y.	Chairman	P
2.	Dr. N. Lakshman	Member	P
3.	Dr. A. K. Malhotra	Member	P
4.	Shri Ashok Kharya	Representative of CWC	P
5.	Shri Yogendra Pal Singh	Member Secretary	P
6.	Dr. Saurabh Upadhyay	Scientist C, MoEF&CC	P

APPROVAL OF THE CHAIRMAN

Fwd: Draft MOM of the EAC (RVHEP) 30th meeting held on 01.07.2022 for perusal and comments-reg Inbox x



Yogendra Pal Singh via nic.in
to me ▾

10:51 AM (8 minutes ago) ☆ ↶ ⋮

From: udaykumarry@yahoo.com
To: "Yogendra Pal Singh" <yogendra78@nic.in>
Sent: Sunday, July 17, 2022 11:07:21 PM
Subject: Re: Draft MOM of the EAC (RVHEP) 30th meeting held on 01.07.2022 for perusal and comments-reg

Dear Yogendra ji,

I approve the minutes of EAC (RVHEP) 30th meeting.

With Warm Regards
Udaykumar R.Y

Dr. Udaykumar R.Y, *SMIEEE*
Director (In-Charge) and Professor (HAG),
Dept. of EEE
NITK, Surathkal
Mangalore - 575 025, Karnataka, India