

MINUTES OF THE 42ND MEETING OF THE EXPERT APPRAISAL COMMITTEE FOR RIVER VALLEY AND HYDROELECTRIC PROJECTS HELD ON 23RD FEBRUARY, 2023 FROM 10:30 AM – 05.30 PM THROUGH VIDEO CONFERENCE.

The 42nd meeting of the re-constituted EAC for River Valley & Hydroelectric Projects organized by the Ministry of Environment, Forest and Climate Change, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi, was held on 23rd February, 2023 through video conference, under the Chairmanship of Dr. A. K. Malhotra. The list of Members present in the meeting is at **Annexure**.

Agenda Item No. 42.1

Confirmation of the minutes of 41st EAC meeting held on 15th February, 2023

Agenda Item No. 42.2

Shahpur Pumped Storage Project (1800 MW) in an area 624.905 ha located at Kaloni, Baint and Mungawali villages, Shahabad Tehsil, District Baran, (Rajasthan) by M/s Greenko Energies Private Limited – Environmental Clearance (EC) – reg.

[Proposal No. IA/RJ/RIV/416873/2023; F. No. J-12011/02/2020-IA.I]

42.2.1 The proposal is for grant of Environmental Clearance to Shahpur Pumped Storage Project (1800 MW) in an area 624.905 ha located at Kaloni, Baint and Mungawali villages, Shahabad Tehsil, District Baran, (Rajasthan) by M/s Greenko Energies Private Limited.

42.2.2 The details of the project submitted by project proponent and ascertained from the document submitted are mentioned below:

- i. The Shahpur (1800 MW) is a Pumped Storage Project (PSP) comprising of two reservoirs i.e. Upper Reservoir and Lower Reservoir. Both reservoirs are proposed to be newly constructed and none of the proposed reservoirs are located on any river course
- ii. Location: Proposed Shahpur Pumped Storage Project (PSP) is located near Kaloni, Baint, Mungawali, Hanumatkhera, Balarpur, Shahpur villages, Baran District of Rajasthan. It envisages creation of upper reservoir & lower reservoir which are located away from all existing natural river systems and have negligible catchment areas. The Geographical co-ordinates of the proposed upper reservoir are at longitude 77° 10' 55.78"E and latitude is 25° 11' 25.21"N and that of proposed lower reservoir are 25°11'4.00"N and 77° 11' 50.00"E.
- iii. It involves construction of rockfill embankment with avg height of 24.5 m for the length of 5309 m for creation of Shahpur PSP upper reservoir with 1.21 TMC gross capacity and construction of rockfill embankment with avg height of 26.5 m for the length of 2937 m for creation of Shahpur PSP lower reservoir with 1.05 TMC gross capacity. Total 6 numbers of Independent Head Race Pipe / Pressure Shaft with one pressure Tunnel bifurcating into two-unit pressure tunnel convey water between Lower and Upper reservoirs. Surface Power/Pump House will be located at about 830 m from the intake structure and shall be equipped with six vertical shaft reversible Francis type units composed each of a generator/motor and a turbine/pump having generating/pumping capacity of 300 & 150 MW/330 & 165MW.

iv. Shahpur Standalone Pumped Storage Project envisages construction of:

- Upper & Lower reservoirs consists of Rockfill Asphalt faced embankment with average height of 24.5 m & 26.5 m for creation of reservoir.
- 6 No. of Independent Head Race Pipe / Pressure Shaft with one pressure Tunnel bifurcating into two unit pressure tunnel each of 830 m long (includes top surface penstock of 663 m length, Vertical Pressure Shaft of length 72 m and horizontal pressure shaft of 95 m length) and 7.5 m dia. circular steel lined pressure shaft to feed each unit of 300 MW.
- A surface Powerhouse having an installation of five nos. of 300MW and two nos. of 150 MW reversible Francis turbine capacity operating under a rated head of 154.73 m & 154.41 in Turbine mode, 162.56 & 163.21 m in pumping mode.
- 5 Nos. of each 830m long 8.5 m dia. and 2 Nos. of 6.2 m dia Tail Race Tunnels lead water from powerhouse to outlet structure.
- Outlet Structure with transition followed by 140 m wide and FSD of about 6.8 m Tail race channel 717 m long connecting to the proposed lower reservoir.

v. The salient features of the project are given:

1		Name of the Project	Shahpur Standalone Pumped Storage Project (5 x 300 MW + 2 x 150 MW)
2		Location	
	a	Country	India
	b	State	Rajasthan
	c	District	Baran
	d	Village near Powerhouse	Shahpur
3		Geographical Co-Ordinates	
	a	Shahpur Standalone PSP Upper Reservoir- (Now Proposed)	
		Latitude	25°11'25.21"N
		Longitude	77°10'55.78"E
	b	Shahpur Standalone PSP Lower Reservoir - (Now Proposed)	
		Latitude	25°11'40.00"N
		Longitude	77°11'50.00"E
4		Access to Project Site	
	a	Airport	Gwalior Airport – 200 km from project site
	b	Railway Station	Baran Railway Station, 77 km from project site
	c	Road	NH 76 – 6Kms

	d	Port	Kandla Port - 980 km from project site
5		Project	
	a	Type	Standalone Pumped Storage Project
	b	Storage Capacity	10800 MWH
	c	Rating	1800 MW
	d	Peak Operation Duration	6 hours
6		Shahpur Standalone PSP – Upper Reservoir	
	a	Live Storage	1.01 TMC (28.60 MCM)
	b	Dead Storage	0.20 TMC (5.66 TMC)
	c	Gross Storage	1.21 TMC (34.28 TMC)
7		Upper Reservoir	
	a	Full Reservoir level (FRL)	EL 507.00 m
	b	Min. Draw Down Level (MDDL)	EL 490.00 m
	c	Top Bund Level (TBL)	EL 510.00 m
	d	Type of Embankment	Asphalt Faced Rockfill Embankment
	e	Max. Height of Embankment	30 m
	f	Average Height of Embankment	24.5 m
	g	Length at the top of Embankment	5309 m
	h	Top width of the Embankment	10.0 m
	i	Type of Power Block	Gates with Concrete Breast Walls
	j	Top Level of Power Block	510.00 m
	k	Maximum Height of Power Block	38.5 m
	l	Length at the top of Power Block	162.0 m
	m	Top width of Road at Power Block	10.0 m
8		Shahpur Standalone PSP - Lower Reservoir	
	a	Live Storage	1.01 TMC (28.32 MCM)
	b	Dead Storage	0.05 TMC (1.42 MCM)
	c	Gross Storage	1.05 TMC (29.74 MCM)
9		Lower Reservoir	
	a	Full Reservoir level (FRL)	EL 349.00 m
	b	Min. Draw Down Level (MDDL)	EL 328.00 m
	c	Top Bund Level (TBL)	EL 352.00 m

	d	Type of Embankment	Asphalt Faced Rockfill Embankment
	e	Average Height of Embankment	26.5 m
	f	Length of Embankment	2937 m
10		Intake Structure	
	a	Type	Diffuser Type
	b	No. of Vents	3 nos.
	c	Size of Each Intake	24.00 m (W) x 11.2 m (H) including piers 38.98 m (covered with RCC slab at top
	d	Length of each Intake	up to Intake Gate)
	e	Elevation of Intake center line	EL 476.30 m
	f	Elevation of Intake bottom	EL 472.55 m
	g	Design Discharge of each Intake (Turbine mode)	220.04 cumec for 300 MW Unit and 220.50 cumec for 150 MW Units
	h	Trash rack type	Vertical with inclination of 15°
	i	Size of Trash Rack	3 nos. of 7.00 m (W) x 11.60 m (Inclined Height) for each unit
	j	Numbers & Size of Intake Service Gate	6 nos. of 6.20 m (W) x 7.50 m (H)
	k	Numbers & Size of Intake Emergency Gate	1 set – 6.20 m (W) x 7.50 m (H) with Moving Gantry Crane
11		Head Race Pipe /Pressure Shafts	
	a	Type	Finished steel lined - circular
	b	Number of Head Race Pipe /Pressure Shaft	Total 6 No. of Independent Head Race Pipe / Pressure Shaft with one pressure Tunnel bifurcating into two unit pressure tunnel
	c	Diameter of Horizontal Pressure Tunnel	7.5 m
	d	Diameter of unit Pressure Tunnel	5.3 m
	e	Length of Head Race Pipe /Pressure Shaft	830 m (6 nos.) Length of Head Race Pipe from Intake to Vertical Pressure Shaft - 663 m Length of Vertical Pressure Shaft - 72 m Length of Horizontal Pressure Tunnel - 95m
	f	Length of Unit Pressure Tunnel	About 50 m each
	g	Design Discharge of each Headrace Pipe / Pressure	220.04 cumec for 300 MW unit and 220.50 cumec for 150 MW units

		Shaft	
	h	Design Discharge of each unit Pressure Tunnel	110.25 cumec
	i	Maximum velocity in the Head Race Pipe / Pressure shaft	4.99 m/sec
	j	Maximum velocity in the Unit Pressure Tunnel	4.99 m/sec
12		Powerhouse	
	a	Type	Surface Pit Type Powerhouse
	b	Centre line of Unit	EL 298.0 m
	c	Dimensions (Excluding service bay)	196.166 m (L) x 28.5 m (W) x 61.5 m (H)
	d	Size of Service Bay	40 m (L) x 28.5 m (W)
	e	Service Bay Level	EL 313.72 m
	f	Size of Unloading Bay	25m (L) x 28.5 m (W)
	g	Unloading Bay Level	EL 336.70 m
13		Tail Race Tunnel	
	a	Type & Shape	Concrete Lined – Circular
	b	Number of Tunnels	7 Nos.
	c	Dia. of Tunnel for 300 MW Unit	8.50 m
	d	Dia. of Tunnel for 150 MW Unit	6.20 m
	e	Length of the Tunnel	179 m for 8.5 m dia as well as for 6.2 m dia
	f	Design Discharge for 300 MW Unit	220.04 cumec
	g	Design Discharge for 150 MW Unit	110.25 cumec
14		Tail race Outlet	
	a	Type	Diffuser Type
	b	No. of Outlet	7 Nos.
	c	Size of each outlet	For 300 MW Unit - 24.00 m (W) x 12.50 m (H) including piers For 150 MW Unit - 18.00 m (W) x 9.0 m (H) including piers
	d	Length of each Outlet	31.40 m (covered with RCC slab at top upto Intake Gate)
	e	Elevation of outlet center line	For 300 MW Unit - EL + 315.30 m For 150 MW Unit - EL + 314.15 m
	f	Elevation of Outlet bottom	EL + 311.05 m for 300 MW as well as 150MW unit
	g	Trash rack Type	Vertical with inclination of 15°

	h	Size of Trash rack	For 300 MW Unit - 3 sets of 7.0 (W) x 12.94 m (Inclined Height) for each unit For 150 MW Unit - 3 sets of 5.0 (W) x 9.32 m (Inclined Height) for each unit
	i	Tailrace outlet Service Gate	5 nos. of 6.00 m (W) x 8.50 m (H) and 2 nos. of 4.20 m (W) x 6.20 m (H)
	j	Tail Race outlet Emergency Gate	1 set - 6.00 m (W) x 8.50 m (H) 1 set- 4.20 m (W) x 6.20m (H) with one common Gantry Crane
15		Tailrace Channel	
	a	Type	Trapezoidal shape with concrete lined
	b	Bed Width	140.0 m
	c	Length of channel	717 m
	d	Full Supply Depth	6.8 m
	e	Bed Slope	1:6400
	f	Side Slope	1H:6V
16		Electro-Mechanical Equipment	
	a	Pump Turbine	Francis type, vertical shaft reversible pump-turbine
	b	Total No of units	5 nos. (5 X 300 MW) + 2 nos. (2x150 MW)
	c	Total Design Discharge (Turbine Mode)	1320.70 cumec (5 x 220.04 cumec + 2 x 110.25 cumec)
	d	Rated Net Head in Turbine mode	154.73 m for 300 MW unit and 154.41 m for 150 MW unit
	I	300 MW Turbines	
	a	Total No of units	5 Units (All fixed Speed)
	b	Turbine Design Discharge	220.04 cumec
	c	Pump Capacity	330 MW
	d	Rated Pumping Head	162.56 m
	e	Rated Pump Discharge	190.96 cumec
	f	Synchronous Speed	187.50 rpm
	II	150 MW Turbines	
	a	Total No of units	2 Units (All Fixed Speed)
	b	Turbine Design Discharge	110.25 cumec
	c	Pump Capacity	165 MW

	d	Rated Pumping Head	163.21 m
	e	Rated Pump Discharge	95.10 cumec
	f	Synchronous Speed	250.00 rpm
	III	Generator-Motor	
	a	Type	Three (3) phases, alternating current synchronous generator motor semi umbrella type with vertical shaft
	b	Number of units	5 Units (5 x 300 MW) and 2 Units (2x150 MW)
	c	Rated Capacity	Generator – 300 MW & 150 MW Pump Input – 330 MW & 165 MW
	d	Rated Voltage	18.0 kV
	IV	Main Power Transformer	
	a	Type	Outdoor Single-Phase Power transformers with On Load Tap Changer (OLTC)
	b	Number of units	23 Nos. i.e., 3 nos. per unit & 2 no spare
	c	Rated Capacity of each unit	16 no. (3x5 Working +1 Spare) of Single Phase, 18 kV/400kV, 123 MVA and 7 no. (2 x 2 Working + 1 spare) of Single Phase, 18 kV/400kV, 62 MVA
	d	Rated Voltage	Primary – 18.0 kV; Secondary - 400 kV adjustable range of the secondary voltage: +10% in steps of 1.25%
17		400 KV Gas Insulated Switchgear	
	a	Type of GIS	Indoor Type
	b	No. of GIS units	1 No.
	c	Location	Inside GIS building above ground
	d	Scheme	Double Bus Scheme with coupler and sectionalizer
18		Power Evacuation	
	a	Voltage Level (kV)	400 kV
	b	No. of Transmission Lines	One no. 400 kV double circuit transmission lines
	c	Conductor	Quad Moose
			One 400 kV Double Circuit Transmission Line of length 75 km (approx.) from PSP will be connected to 400/765 kV PGCIL

	d	Total Length	substation at New Shivpuri of Madhya Pradesh State for evacuation of stored power during generating mode and for supply of power during pumping mode.
19		Estimated Cost (Rs in Cr)	
	a	Civil & Other works	4782.91
	b	E&M Works including Transmission	3096.20
	c	IDC & Others	1842.65
		Total Project Cost with IDC	9721.76

- vi. **Land Requirement:** For the development of Shahpur Pumped Storage Project (PSP), both Private & Forest land would be acquired for construction of project components, reservoir area, muck dumping, construction camps and colony, etc. Total land requirement has been worked out as 624.905 ha. Out of which 413.900 ha is forest land, 211.005 ha is Non-forest.

Land Requirement of Shahpur Pumped Storage Project

S. No	Component	Forest Land	Non-Forest	Total
1	Road Upper Reservoir to NH-76	6.0775	2.8625	8.9400
2	Upper Reservoir	110.2062	159.6100	269.8162
3	Job Facilities Area	0	15	15
4	Magazine (Explosive Storage Facility)	0	0.1000	0.1000
5	Road From Upper Reservoir to Lower Reservoir	3.7775	0	3.7775
6	WCS & Powerhouse	57.2250	0	57.2250
7	Lower Reservoir	230.5140	0	230.5140
8	Pumping Alignment	2.2800	0	2.2800
9	Road from Lower Reservoir to BT Road	3.8200	2.7375	6.5575
10	Approach Road Lower Reservoir to Muck Disposal Area	0	0.6950	0.6950
11	Proposed Muck Disposal Area	0	30	30
Total Land Requirement (in ha.)		413.9002	211.0050	624.9052

- vii. **Public Consultation:** Public Hearing for Shahpur Pumped Storage Project was conducted by Rajasthan State Pollution Control Board (RSPCB). Publications of notice for public hearing were given in state/national level Hindi newspaper "Rajasthan Patrika", "Baran Bhaskar", "Dainik Paintra" and "Dainik Bhaskar" dated 20.01.2021 and

English newspaper “Times of India” dated 20.01.2021. Details of location and time of meetings are given in following table.

District	Date/ Time	Venue
Baran	22.02.2021/ 11:00 am	Near Anganbadi Pathshala, Village Kaloni, Tehsil Shahabad, District Baran, Rajasthan

viii. **Muck Disposal Areas:** The total quantity of muck likely to be generated from excavation including construction of roads is about 13.31 Mcum. However, after the utilization of muck for different project components and considering the swell factor of 40% for excavated material, the total quantity of muck to be disposed is worked out as 6.48 Mcum.

ix. **Study Period:** The project is entirely located in Shahbad Tehsil of Baran district of Rajasthan. The study area delineated as per the ToR, cover Baran district of Rajasthan and only a very small part of area Guna district of Madhya Pradesh.

The field surveys for the collection of primary data commenced from March 2020 and were completed in December 2020 covering pre-monsoon/summer, monsoon, and winter seasons to collect data/ information on terrestrial ecology and physical environment parameters. Pre-monsoon season studies were completed before the nation-wide lockdown due to Covid19 from 24th March 2020 lasting till May 31, 2020. Thereafter as lockdown restrictions were slowly relaxed, field data collection work resumed for monsoon season towards the end of July. The winter season was covered during November and December, where interaction with local communities and a socio-economic survey was also carried out as restrictions were lifted. Entire baseline data collection work was carried out ensuring social distancing and following government directives.

x. **R&R:** The private land identified for the project falls in two villages namely Kaloni Village and Baint Village, under Shahbad Tehsil of Baran District. The private land proposed for procurement belongs to a total of 153 land owners. All the 153 families will be losing their agricultural land only and none of the families will be losing any house or any other assets. None of them is getting displaced due to the project from the above land procurement.

xi. **Environmental Management Plan:** The costs estimated for implementation of Environmental Management Plan for Shahpur Pumped Storage Project works out to be Rs. 213.829 crore; as is summarized in Table below:

S. No.	Component of EMP	Capital Cost (Rs. in lakh)	Recurring Cost (Rs. in lakh)			Total Cost (Rs. in lakh)
			Year 1	Year 2	Year 3	
1	Compensatory Afforestation	16088.30	0.00	0.00	0.00	16088.30
2	Biodiversity Conservation & Wildlife Conservation Plan	136.75	0.00	0.00	0.00	136.75
3	Muck Dumping and Management Plan	0.00	273.34	423.00	360.00	1056.34

4	Landscaping, Restoration of Quarry and Construction Sites	0.00	15.00	50.00	100.00	165.00
5	Sanitation and Solid Waste Management Plan	240.00	28.52	28.52	28.52	325.56
6	Public Health Delivery System	115.00	45.00	50.00	50.00	260.00
7	Energy Conservation Measures	117.00	64.00	64.00	64.00	309.00
8	Labor Management Plan	75.00	20.00	25.00	25.00	145.00
9	Green Belt Development Plan	0.0	10.00	20.00	15.50	45.50
10	Pollution Mitigation Measures	0.0	20.00	20.00	10.00	50.00
11	Environmental Monitoring Program	0.0	42.00	42.00	41.00	125.00
12	Rehabilitation and Resettlement Plan	891.50	0.00	0.00	0.00	891.50
13	Local Area Development Plan	0.00	500.00	500.00	500.00	1500.00
14	Disaster Management Plan	205.00	25.00	30.00	25.00	285.00
	Total	17868.55	1042.86	1252.52	1219.02	21382.95

- xii. **Ecological Sensitive Area/Protected Areas:** Proposed project is located within newly declared Shahbad Conservation Reserve. Scoping Clearance for Shahpur Pumped Storage was accorded by MoEF&CC on April 2020, while the Shahabad Conservation Reserve was notified by Govt. of Rajasthan on 28th October, 2021. The other nearest Protected Areas to the project components are in Madhya Pradesh i.e Madhav National Park and Kuno National Park having aerial distance more than 40 km from the project site.
- xiii. **Status of other statutory clearances:** Stage-I forest clearance is yet to obtained.
- xiv. **Project benefit:** Typically, like all infrastructure projects, Shahpur PSP will generate employment opportunities during construction phase as well as operation phase. It is estimated that project would employ a workforce of about 3600 persons during the 3.0 years construction period and thereafter during project operation, permanent staff of about 300 persons will be employed.

Total project cost is Rs. 9721.76 Cr; an investment of this magnitude in the area will improve the local infrastructure in the region. An amount of Rs. 15.00 crore has been earmarked for local area development with a view to improve the quality of life of local residents in the project vicinity especially for those whose land will be acquired for the project construction.

42.2.3 The EAC during deliberations noted the following:

The EAC in the present meeting (42nd meeting) deliberated on the information submitted and as presented in the meeting by the PP along with consultant R S Envirolink Technologies Pvt. Ltd. and observed that the proposal is for Environmental Clearance to Shahpur Pumped Storage Project (1800 MW) in an area 624.905 ha located at Kaloni, Baint and Mungawali villages, Shahabad Tehsil, District Baran, (Rajasthan) by M/s Greenko Energies Private Limited. The MoEF&CC granted Terms of References vide letter dated 13th April, 2020 to the project. The application for Environmental Clearances was submitted to Ministry on 04th Feb 2023.

The project/activity is covered under category 'A' of item 1 (c) 'River Valley projects' of the Schedule to the Environmental Impact Assessment Notification, 2006, as amended and requires appraisal at Central level by the sectoral EAC in the Ministry.

The EAC noted that project cover area falls under Shahabad Conservation Reserve which acts as a buffer zone to Kuno National Park where Namibian Cheetah's Introduction Project has been undertaken by the Government of India, so Wildlife Conservation Plan should address this aspect also and forest and wildlife department should be consulted accordingly. The EAC also observed that the draft project DPR is under examination of Central Electricity Authority w.r.t. of Power Potential Studies, Project Lay Out etc.

42.2.4 The EAC after detailed deliberations deferred the proposal for want of following additional information: -

1. Pre-DPR Chapters viz., Layout Map and Power Potential Studies duly approved by CWC/CEA shall be submitted.
2. Revised Plan for providing Mobile Clinic Facility to the nearby villages particularly for project affected families throughout the project life shall be submitted.
3. The revised Wildlife Conservation Plan submitted before State Forest and Wildlife Department shall be submitted for deliberations by the EAC.
4. Detailed plan shall be submitted for:
 - a) 10m width plantation around the periphery of project boundary with native plant species.
 - b) Worst case Scenario in the event of any catastrophic event and its impact like Loss of land, farmers to be affected and crop destruction etc.
 - c) To build school recognised by concerned authority along with Maintenance of school, facilities for water and free school services for PAF
 - d) Approach road maintenance connecting to surrounding villages i.e. Kaloni, Baint and Mungawali.
 - e) Plan to install solar borewell pump to 1 such pump per 100 households.

*The proposal was **deferred** on the above lines.*

Agenda Item No. 42.3

Greenko TS01 Off-Stream Closed Loop Pumped Storage Project (750 MW) in an area of 319.50 Ha, located at Village Jhari, Tehsil Talamadugu, District Adilabad (Telangana) by M/s Greenko Energies Private Limited – Terms of Reference (TOR) - reg.

[Proposal No. IA/TG/RIV/416798/2023; F. No. J-12011/03/2023-IA.I (R)]

42.3.1 The proposal is for grant of Terms of Reference to the project for Greenko TS01 Off-Stream Closed Loop Pumped Storage Project (750 MW) in an area of 319.50 Ha, located at Village Jhari, Tehsil Talamadugu, District Adilabad (Telangana) by M/s Greenko Energies Private Limited.

42.3.2 The details of the project submitted by Project Proponent and ascertained from the document submitted are mentioned below:

- i. M/s Greenko Energies Private Limited proposes to develop Greenko TS01 Off-Stream Closed Loop Pumped Storage Project (OCPSP) in near Jhari Village, Talamadugu Tehsil in Adilabad District in the state of Telangana.
- ii. The proposed project involves creation of proposed upper reservoir are at longitude 78°20'2.76" E and latitude is 19°34'18.62" N and that of lower reservoir are at longitude 78°21'7.20" E and latitude 19°35'34.43" N. Proposed rating of Pumped Storage Project is 750 MW.
- iii. The upper reservoir is proposed to be located on natural depression which is suitable for creating the desired gross storage capacity of 0.381 TMC by doing excavation up to the desired level. Out of 0.381 TMC, the live storage capacity is 0.320 TMC and the dead storage capacity is 0.061 TMC by keeping FRL & MDDL at EL 607.00 m & EL 583.00 m respectively. It is proposed to construct rockfill embankment for the weighted average height of around 30m (with maximum height of 50m) for the length of 845 m.
- iv. The lower reservoir is proposed to be located on the natural depression which is suitable for creating the desired gross storage capacity of 0.352 TMC by doing excavation up to the desired level. Out of 0.352 TMC, the live storage capacity is 0.327 TMC and dead storage capacity is 0.025 TMC by keeping FRL and MDDL at EL 397.00m & EL 374.00m respectively. For creating this storage, it is proposed to construct rockfill embankment for the weighted average height of 26 m (with maximum height of 35m) for the length of 854 m.
- v. This Project is envisaged as Off-Stream Closed Loop Pumped Storage Project in nature and both the reservoirs are located away from all existing natural water systems and have no/negligible catchment area.
- vi. It is proposed that One-time requirement of 0.413 TMC of water will be lifted from existing nearby Waddadi River (which is located about 11 Km away from the proposed lower reservoir) and will be stored in the lower reservoir to be constructed and used cyclically for energy storage and discharge. Evaporation losses of about 0.04 TMC of water will be recouped periodically from Waddadi River based on the requirement. This Project envisages non-consumptive re-utilization of 0.320 TMC of water for recirculation among two proposed reservoirs.
- vii. The Greenko TS01 Off-Stream Closed Loop Pumped Storage Project envisages construction of:
 - Rock fill embankments of weighted average height of around 30m with maximum of 50m height in upper reservoir and weighted average height of around 26 m with maximum of 35m in lower reservoir for creation of Greenko TS01 upper & lower reservoir with 0.320 & 0.327 TMC live storage capacity respectively.
 - 45.95 m high Power Intake Structure.
 - 1 no. of 1112.63 m long and 6.10m dia. circular steel lined Penstock / Pressure Shaft (i.e., consisting of 191.98 m long Intake Tunnel, 535.14 m long surface penstock,
 - 150.76 m long vertical pressure shaft and 234.75 m long Horizontal pressure shaft up to powerhouse) to feed one unit of 300MW unit. Similarly, another one no. of 1112.63m long 7.50m dia. circular steel lined Penstock / Pressure Shaft (i.e., consisting of 191.98 m long Intake Tunnel, 535.14 m long surface penstock, 150.76 m long vertical pressure shaft and 134.75 m long Horizontal pressure shaft up to

bifurcation point) which will get bifurcated into 2 nos. near powerhouse each of 100m long in which one no. of 6.10m dia. to feed 300MW unit & another no. of 4.30 m dia. to feed 150MW unit.

- A surface Powerhouse having an installation of Two reversible Francis turbine of 300 MW capacity (Fixed speed turbine) and one reversible Francis turbine each of 150MW (Fixed speed turbine) operating under a rated head of 205.5 m in generating mode and 214.50 m in pumping mode.
- 3 nos. of Tail Race Tunnel of 254.67m long (Two nos. of 7.1m dia. for larger unit and One no. of 5.4m dia. for smaller unit).
- 42.85 m high Outlet Structure.
- 25 wide and FSD of 5.0m Tail race channel of 421.7 m long joining with the proposed lower reservoir.

viii. Salient Features of the Project are as under:

Sr. No.	Parameters	Description	
1.	a.	Storage Capacity	4515MWH
	b.	Rating	750 MW
	c.	Peak Operation Duration	6.02 Hours daily
	d.	Rated Head (Generation Mode)	205.5 m
	e.	Design Discharge (Generation Mode)	418.01Cumec
2.		Upper Reservoir (Proposed)	
	a.	Live Storage	0.320 TMC
	b.	Dead Storage	0.061 TMC
	c.	Gross Storage	0.381 TMC
	d.	Full Reservoir level (FRL)	EL + 607.00 m
	e.	Min. Draw Down Level (MDDL)	EL + 583.00 m
	f.	Top Bund Level (TBL)	EL + 610.00 m
	g.	Max Height of Embankment	50 m
	h.	Length of Embankment	845.00 m
3.		Lower Reservoir (Proposed)	
	a.	Live Storage	0.327TMC
	b.	Dead Storage	0.025 TMC
	c.	Gross Storage	0.352 TMC
	d.	Full Reservoir level (FRL)	EL + 397.00 m
	e.	Min. Draw Down Level (MDDL)	EL + 374.00 m
	f.	Top Bund Level (TBL)	EL + 400.00 m
	g.	Max Height of Embankment	35.00 m
	h.	Length of Embankment	854 .00 m
4.		RCC intake Structure	
	a.	Type	Diffuser Type
	b.	Elevation of Intake centre line	EL + 570.80 m
	c.	Elevation of Intake bottom	EL + 567.05 m
5.		Penstock /Pressure Shafts	
	a.	Type	Finished steel lined - circular
	b.	Number of Penstocks	2 No.
	c.	Diameter of penstock	7.50 m - large Penstock and 6.10m small Penstock
	d.	Length of penstock/Pressure	920.65 m

		Shaft	
6.		Powerhouse	
	a.	Type	Surface Powerhouse
	b.	Dimensions (Excluding Service Bay)	89.00m (L) x 25.50m (W) x 51.20m (H)
7.		Tail Race Channel	
	a.	Type & Shape	Concrete lined & Trapezoidal
	b.	Length of the channel	421.68 m
	c.	Bed Width	25 m
	d.	Full supply depth	5.00 m
	e.	Bed slope	1 in 4500
8.		Tailrace Outlet	
	a.	Type	Diffuser Type
	b.	Elevation of outlet centre line	EL + 363.70 m for larger units and EL+ 362.85m for smaller units.
9.		Power Evacuation	
	a.	Voltage Level (KV)	400 KV
	b.	No. of Transmission Lines	One double circuit transmission line
	c.	Total Length	One 400 KV Double Circuit transmission line with Twin Moose Conductor of length 30 KMs (appx.) from PSP will be connected to 400 KV/220 KV TSTRANSCO Substation, Yanampalli, Telangana state for evacuation of stored power during generating mode and for supply of power during pumping mode.

ix. **Alternate Layouts:**

Three alternative layouts for this scheme were studied.

Alternative – 1: Layout with Surface Powerhouse and other components of this scheme are Site – 1 Upper reservoir, Approach Channel, Intake structure, Penstock / Pressure Shaft, Tail Race Tunnel, Tail Race Outlet, Tail Race Channel and Site-1 Lower reservoir.

Alternative – 2: Layout with Surface Powerhouse and other components of this scheme are Site – 1 Upper reservoir, Approach Channel, Intake structure, Penstock / Pressure Shaft, Surge Shaft, Tail Race Tunnel, Tail Race Outlet, Tail Race Channel and Site – 2 Lower reservoir.

Alternative – 3: Layout with Surface Powerhouse and other components of this scheme are Site – 2 Upper reservoir, Approach Channel, Intake structure, Penstock / Pressure Shaft, Tail Race Tunnel, Tail Race Outlet, Tail Race Channel and Site – 2 Lower reservoir.

Alternative – 1 layout has been preferred considering the following reasons:

- The length of embankment of upper reservoir for Alternative -1 (i.e., 845 m) is less than Alternative – 3 (i.e., 3719 m). Also, the maximum height of embankment of upper reservoir for Alternative – 1 is 50 m whereas for

Alternative – 3 is 65 m. Hence, considerable cost and time can be reduced for Alternative – 1 layout.

- The area of land required for upper reservoir for Alternative – 1 is less than Alternative – 3.
 - The land requirement for upper reservoir of Alternative – 3 layout is more than Alternative – 1. On detailed assessment for Social and environmental aspects it was observed that the upper reservoir area of Alternative - 3 is in populated and cultivated area. Keeping the reservoir in this location will cause disturbance and dislocation of number of populations, social and environmental issues. Whereas in case of Alternative – 1, the entire area of upper reservoir is in forest land and no social and environmental issues are envisaged.
 - The length of Penstock for Alternative -2 (i.e., 1653.93 m) is more than Alternative – 1 (i.e., 1112.63 m) which will increase Penstock cost substantially. In addition, since the length of water conductor system is more and L/H ratio is also more than 6 in Alternative – 2, Surge shaft structure is required to be provided as an additional structure which will increase overall project cost further considerably.
 - The total area of land required in Alternative – 2 & 3 are more than Alternative – 1.
 - The forest land area required in Alternative – 2 & 3 are more than Alternative – 1.
- x. **Land Requirement:** The total land requirement for proposed project is about 319.50 Ha; out of which about 212.00 Ha is forest land and remaining about 107.50 Ha is non-forest area.
- xi. It is proposed to construct the project within a period of 3.5 years including infrastructure development which is proposed to be completed within 6 months. The total cost of the project is estimated to 4789.52 Crores.
- xii. **Inter-State Boundaries:** Maharashtra state boundary is 2.6 km from the project site.

42.4.3: The EAC during deliberations noted the following:

The EAC deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and observed that the proposal is for grant of terms of reference to the project for Greenko TS01 Off-Stream Closed Loop Pumped Storage Project (750 MW) in an area of 319.50 Ha, located at Village Jhari, Tehsil Talamadugu, District Adilabad (Telangana) by M/s Greenko Energies Private Limited.

The project/activity is covered under Category A of item 1 (c) 'River Valley projects' of the Schedule to the Environmental Impact Assessment Notification, 2006 and requires appraisal at Central level by the sectoral EAC in the Ministry.

41.4.4 The EAC after detailed deliberation on the information submitted and as presented during the meeting **recommended** for grant of Standard ToR for conducting EIA study for Greenko TS01 Off-Stream Closed Loop Pumped Storage Project (750 MW) in an area of 319.50 Ha, located at Village Jhari, Tehsil Talamadugu, District Adilabad (Telangana) by M/s Greenko Energies Private Limited., under the provisions of EIA Notification, 2006, as amended along with the following additional/specific ToR:

[A] Environmental Management and Biodiversity Conservation:

- i. Cumulative Impact of project on carrying capacity and sustainability of Reservoir/ nalahs of catchment area / due to tapping of water for filling reservoir.
- ii. 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.
- iii. 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.
- iv. Sampling locations be located to cover villages situated near the reservoir and around boundary of forest area for collection of baseline data and data to be incorporated in EIA/ EMP report.
- v. Identify the sand mining/ quarrying sites in submergence area and downstream of reservoir.
- vi. Source of construction material and its distance from the project site along with detailed transportation plan for construction material in view of the project site location in Western Ghats be submitted.
- vii. A detailed reclamation/ restoration plan of quarrying site/sites be incorporated in the EIA/EMP report.
- viii. Certificate and certified map from Chief Wildlife Warden shall be submitted mentioning that project boundary is located outside the Eco Sensitive Zone (ESZ) and no Wildlife Sanctuary falls within 10 km of Project site.
- ix. A detailed wildlife conservation plan for Schedule –I species be prepared duly approved by the Chief Wild Life Warden be submitted.
- x. In case any Wildlife Corridor is located within 10 km radius of the project site a detailed study shall be conducted to assess the impact of project on safe movement of wild animals.
- xi. Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP.
- xii. 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.
- xiii. MoU for water uses for the project shall be signed and approved by concerned authority.
- xiv. Environmental matrix during construction and operational phase needs to be submitted.
- xv. Matrix formulated on the basis of detailed study and field survey of flora and Fauna methodology used shall be mentioned in the EIA report.
- xvi. Endemic plant and animal species found in the area concerned shall be provided instead listing entire endemic species found in the State.
- xvii. Details of Flora and Fauna reported in submergence area, Nos. of tree along with their density and nomenclature of the tree species required to be felled for reservoir creation and other project component.
- xviii. Project impact on avi-fauna shall be studied and incorporated in EIA/ EMP report.

- xix. Impact assessment on the fish diversity based on the hydrological alteration at the water drawing sources shall be studied.
- xx. Stage-I Forest Clearance shall be obtained.
- xxi. Study report on impact on River Rejuvenation shall be submitted.

[B] Socio-economic Study

- xxii. Declaration by the project proponent by way of affidavit that "No" Inter-state issue/ policy issue is involved with any State in the project.
- xxiii. All the tasks including conducting public hearing shall be done as per the provisions of EIA Notification, 2006 and as amended from time to time. Public hearing issues raised and compliance of the same shall be incorporated in the EIA/ EMP report in the relevant chapter.
- xxiv. 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.
- xxv. Tentative no. of project affected families shall be identified and accordingly appropriate Rehabilitation & Resettlement plan shall be prepared.
- xxvi. Details of settlement in 10 km area shall be submitted.

[C] Muck Management/ Disaster Management

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

[D] Miscellaneous.

- xxx. Pre-DPR Chapters viz. Layout Map and Power Potential Studies duly approved by CWC I CEA shall be submitted.
- xxxi. Undertaking need to submitted on affidavit that regarding no activities has been yet on the project site and water allocated to this scheme shall not be diverted to other purpose.
- xxxii. Both capital and recurring expenditure under EMP shall be submitted.
- xxxiii. 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 analyse the samples.
- xxxiv. Arial view video of project site shall be recorded and to be submitted.
- xxxv. Detailed plan to restore wider roads and convert them into narrow upto 10m after construction of the project.

Agenda Item No. 42.4

Greenko OD01 Off-Stream Closed Loop Pumped Storage Project (1200 MW) in an area of 317.52 Ha, located at Village Talgad, Tehsil Jayapatna, District Kalahandi (Odisha) by M/s Greenko Energies Private Limited – Terms of Reference (TOR) - reg. [Proposal No. IA/OR/RIV/417086/2023; F. No. J-12011/04/2023-IA.I (R)]

42.4.1 The proposal is for grant of terms of reference to the project for Greenko OD01 Off-Stream Closed Loop Pumped Storage Project (1200 MW) in an area of 317.52 Ha, located

at Village Talgad, Tehsil Jayapatna, District Kalahandi (Odisha) by M/s Greenko Energies Private Limited.

42.4.2 The details of the project submitted by project proponent and ascertained from the document submitted are mentioned below:

- i. M/s Greenko Energies Private Limited proposes to develop Greenko OD-01 Pumped Storage Project envisaged as Off-Stream Closed Loop Pumped Storage project (OCPSP) of 1200 MW / 7344 MWH storage capacity, located in Talgad Village, Jayapatna Tehsil in Kalahandi District, Odisha.
- ii. The geographical co-ordinates of the proposed upper reservoir are at longitude 82°54'46.55" E and latitude is 19°26'32.72" N and that of lower reservoir are at longitude 82°52'44.96" E and latitude 19°27'6.63" N. Proposed rating of Pumped Storage Project is 1200 MW.
- iii. The upper reservoir is proposed to be located on natural depression which is suitable for creating the desired gross storage capacity of 0.308 TMC by doing excavation up to the desired level. Out of 0.308 TMC, the live storage capacity is 0.264 TMC and the dead storage capacity is 0.044 TMC by keeping FRL & MDDL at EL 720.00m & EL 700.00m respectively. For creating this storage, it is proposed to construct rockfill embankment for the weighted average height of around 24m (with maximum height of 38m) for the length of 446 m.
- iv. The lower reservoir is proposed to be located on natural depression which is suitable for creating the desired gross storage capacity of 0.277 TMC by doing excavation up to the desired level. Out of 0.277 TMC, the live storage capacity is 0.262 TMC and dead storage capacity is 0.015 TMC by keeping FRL and MDDL at EL 305.00m & EL 285.00m respectively. For creating this storage, it is proposed to construct rockfill embankment for the weighted average height of 21m (with maximum height of 28m) for the length of 1259 m.
- v. This Project is envisaged as Off-Stream Closed Loop Pumped Storage Project in nature and both the reservoirs are located away from all existing natural water systems and have no/negligible catchment area. It is proposed that One-time requirement of 0.323 TMC of water will be lifted from existing nearby Indravati River (which is located about 0.5 Km away from the proposed Upper reservoir) and will be stored in the upper reservoir to be constructed and used cyclically for energy storage and discharge. Evaporation losses will be recouped periodically from Indravati River. This Project envisages non-consumptive re-utilization of 0.262 TMC of water for recirculation among two proposed reservoirs.
- vi. The Greenko OD-01 Off-Stream Closed Loop Pumped Storage Project envisages construction of
 - Rock fill embankments of weighted average height of around 24m with maximum of 38m height in upper reservoir and weighted average height of around 21m with maximum of 28m in lower reservoir for creation of Greenko OD-01 upper & lower reservoir with 0.264 TMC & 0.262 TMC live storage capacity respectively.
 - 25m wide and FSD of 5.0m Approach Channel of 1820.56 m long joining with the intake structure.

- 40.35 m high Power Intake Structure.
- 1 no. of 1990.70 m long and 6.5 m dia. circular steel lined Penstock / Pressure Shaft (i.e., consisting of 590.28 m long Intake Tunnel, 246.15 m long vertical pressure shaft- 1, 291.51 m long Horizontal pressure shaft-1, 155.16 m long vertical pressure shaft-2, 368.90 m long Horizontal pressure shaft-2, 158.64 m long vertical pressure shaft-3 and 80.06 m long Horizontal pressure shaft-3 up to bifurcation point) will get bifurcated into 2 nos. near power house of 4.5m dia. of about 100m long to feed 2 units each of 300MW.
- Similarly, another one no. of 1990.70 m long and 6.5 m dia. circular steel lined Penstock / Pressure Shaft (i.e., consisting of 590.28 m long Intake Tunnel, 246.15 m long vertical pressure shaft-1, 291.51 m long Horizontal pressure shaft-1, 155.16 m long vertical pressure shaft-2, 368.90 m long Horizontal pressure shaft-2, 158.64 m long vertical pressure shaft-3 and 80.06 m long Horizontal pressure shaft-3 up to bifurcation point) which will get bifurcated in to two nos. of 4.5m dia. of about 100m long in which one no. to feed 1 unit of 300 MW and another no. will again bifurcated in to two nos. of 3.1m dia. to feed two units of 150 MW each.
- A surface Powerhouse having an installation of three reversible Francis' turbine of 300 MW capacity (Fixed speed turbine) and two reversible Francis' turbine each of 150MW (both are Fixed speed turbines) operating under a rated head of 408 m in generating mode and 423 m in pumping mode.
- 20m wide and FSD of 5.0m Tail race channel of 52 m long joining with the proposed lower reservoir.

vii. Salient Features of the Project are as under:

Sr. No.	Parameters	Description	
1.	a.	Storage Capacity	7344 MWH
	b.	Rating	1200 MW
	c.	Peak Operation Duration	6.12 Hours daily
	d.	Rated Head (Generation Mode)	408 m
	e.	Design Discharge (Generation Mode)	336.87 Cumec
2.		Upper Reservoir (Proposed)	
	a.	Live Storage	0.264 TMC
	b.	Dead Storage	0.044 TMC
	c.	Gross Storage	0.308 TMC
	d.	Full Reservoir level (FRL)	EL + 720.00 m
	e.	Min. Draw Down Level (MDDL)	EL + 700.00 m
	f.	Top Bund Level (TBL)	EL + 723.00 m
	g.	Max Height of Embankment	38.00 m
	h.	Length of Embankment	446.00 m
3.		Lower Reservoir (Proposed)	
	a.	Live Storage	0.262 TMC
	b.	Dead Storage	0.015 TMC
	c.	Gross Storage	0.277 TMC
	d.	Full Reservoir level (FRL)	EL + 305.00 m
	e.	Min. Draw Down Level (MDDL)	EL + 285.00 m
	f.	Top Bund Level (TBL)	EL + 308.00 m

	g.	Max Height of Embankment	28.00 m
	h.	Length of Embankment	1259.00 m
4.		RCC intake Structure	
	a.	Type	Diffuser Type
	b.	Elevation of Intake centre line	EL + 688.90 m
	c.	Elevation of Intake bottom	EL + 685.65 m
5.		Penstock /Pressure Shafts	
	a.	Type	Finished steel lined - circular
	b.	Number of Penstocks	2 No.
	c.	Diameter of penstock	6.5 m
	d.	Length of penstock/Pressure Shaft	1400.42 m
6.		Powerhouse	
	a.	Type	Surface Powerhouse
	b.	Dimensions (Excluding Service Bay)	141 m (L) x 25.5m(B) x 51.20 m (H)
7.		Tail Race Channel	
	a.	Type & Shape	Concrete lined & Trapezoidal
	b.	Length of the channel	52 m
	c.	Bed Width	20 m
	d.	Full supply depth	5.00 m
	e.	Bed slope	1 in 4400
8.		Tailrace Outlet	
	a.	Type	Diffuser Type
	b.	Elevation of outlet centre line	EL + 208.50 m for larger units and EL+ 207.75m for smaller units.
9.		Power Evacuation	
	a.	Voltage Level (KV)	400 KV
	b.	No. of Transmission Lines	One Double Circuit Transmission Line
	c.	Total Length	One 400 KV double circuit transmission line of length 4 KMs (app) from proposed PSP will be terminated to 400 KV PGCIL Indravati substation, Mukhiguda, Odisha for evacuation of power during turbine mode and pumping of power from grid during pumping mode.

viii. **Alternate Layouts:**

Three alternative layouts for this scheme were studied.

Alternative – 1: Layout with Surface Powerhouse and other components of this scheme are Site – 1 Upper reservoir, Intake structure, Penstock / Pressure Shaft, Tail Race Outlet, Tail Race Channel and Site-1 Lower reservoir.

Alternative – 2: Layout with Surface Powerhouse and other components of this scheme are Site – 2 Upper reservoir, Intake structure, Penstock / Pressure Shaft, Tail Race Tunnel, Tail Race Outlet, Tail Race Channel and Site – 1 Lower reservoir.

Alternative – 3: Layout with Surface Powerhouse and other components of this scheme are Site – 1 Upper reservoir, Intake structure, Penstock / Pressure Shaft, Tail Race Outlet, Tail Race Channel and Site – 2 Lower reservoir.

Alternative – 1 layout has been preferred considering the following reasons:

- The length of embankment of upper reservoir for Alternative -1 (i.e., 446 m) is less than Alternative – 2 (i.e., 911 m). Also, the maximum height of embankment of upper reservoir for Alternative – 1 is 38 m whereas for Alternative – 2 is 53m. Hence, considerable cost and time can be reduced for Alternative – 1 layout.
- The area of land required for upper reservoir for Alternative – 1 is less than Alternative – 2.
- No Social and Environmental issues are envisaged in case of Alternative – 1 layout whereas in case of Alternative – 2 layout, upper reservoir is located in habituated and cultivation area and also few roads are existing which are connecting various places which will create social and Environmental issues.
- The length of embankment of lower reservoir for Alternative -1 (i.e., 1259 m) is less than Alternative – 3 (i.e., 1581 m). Also, the maximum height of embankment of lower reservoir for Alternative – 1 is 28 m whereas for Alternative – 3 is 33m. Hence, considerable cost and time can be reduced for Alternative – 1 layout.
- The length of Penstock for Alternative -1 (i.e., 1990.70 m) is less than Alternative – 3 (i.e., 2026 m) which will increase Penstock cost to some extent.
- No Social and Environmental issues are envisaged in case of Alternative – 1 layout whereas in case of Alternative – 3 layout, lower reservoir is located in habituated and cultivation area and also few roads are existing which are connecting various places which will create social and Environmental issues.
- The total area of land required in Alternative – 2 & 3 are more than Alternative – 1.

ix. **Land Requirement:** The total land requirement for proposed project is about 317.52 Ha; out of which about 83.08 Ha is forest land and remaining about 234.44 Ha is non-forest area.

x. It is proposed to construct the project within a period of 3.5 years including infrastructure development which is proposed to be completed within 6 months. The total cost of the project is estimated to 7506.94 Crores.

42.4.3: The EAC during deliberations noted the following:

The EAC deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and observed that the proposal is for grant of terms of reference to the project for Greenko OD01 Off-Stream Closed Loop Pumped Storage Project (1200 MW) in an area of 317.52 Ha, located at Village Talgad, Tehsil Jayapatna, District Kalahandi (Odisha) by M/s Greenko Energies Private Limited.

The project/activity is covered under category A of item 1 (c) 'River Valley projects' of the Schedule to the Environmental Impact Assessment Notification, 2006 and requires appraisal at Central level by the sectoral EAC in the Ministry.

42.4.4 The EAC after detailed deliberation on the information submitted and as presented during the meeting **recommended** for grant of Standard ToR for conducting EIA study for Greenko OD01 Off-Stream Closed Loop Pumped Storage Project (1200 MW) in an area of 317.52 Ha, located at Village Talgad, Tehsil Jayapatna, District Kalahandi (Odisha) by M/s Greenko Energies Private Limited, under the provisions of EIA Notification, 2006, as amended along with the following additional/specific ToR:

[A] Environmental Management and Biodiversity Conservation:

- i. Cumulative Impact of project on carrying capacity and sustainability of Reservoir/ nalahs of catchment area / due to tapping of water for filling reservoir.
- ii. 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.
- iii. 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.
- iv. Sampling locations be located to cover villages situated near the reservoir and around boundary of forest area for collection of baseline data and data to be incorporated in EIA/ EMP report.
- v. Identify the sand mining/ quarrying sites in submergence area and downstream of reservoir.
- vi. Source of construction material and its distance from the project site along with detailed transportation plan for construction material in view of the project site location in Western Ghats be submitted.
- vii. A detailed reclamation/ restoration plan of quarrying site/sites be incorporated in the EIA/EMP report.
- viii. Certificate and certified map from Chief Wildlife Warden shall be submitted mentioning that project boundary is located outside the Eco Sensitive Zone (ESZ) and no Wildlife Sanctuary falls within 10 km of Project site.
- ix. A detailed wildlife conservation plan for Schedule –I species be prepared duly approved by the Chief Wild Life Warden be submitted.
- x. In case any Wildlife Corridor is located within 10 km radius of the project site a detailed study shall be conducted to assess the impact of project on safe movement of wild animals.
- xi. Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP.

- xii. 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.
- xiii. MoU for water uses for the project shall be signed and approved by concerned authority.
- xiv. Environmental matrix during construction and operational phase needs to be submitted.
- xv. Matrix formulated on the basis of detailed study and field survey of flora and Fauna methodology used shall be mentioned in the EIA report.
- xvi. Endemic plant and animal species found in the area concerned shall be provided instead listing entire endemic species found in the State.
- xvii. Details of Flora and Fauna reported in submergence area, Nos. of tree along with their density and nomenclature of the tree species required to be felled for reservoir creation and other project component.
- xviii. Impact assessment on the fish diversity based on the hydrological alteration at the water drawing sources shall be studied.
- xix. Stage-I Forest Clearance shall be obtained.
- xx. Study of impacts of project on water sources i.e. Indravati River.

[B] Socio-economic Study

- xxi. Declaration by the project proponent by way of affidavit that "No" Inter-state issue/ policies issue is involved with any state in the project.
- xxii. All the tasks including conducting public hearing shall be done as per the provisions of EIA Notification, 2006 and as amended from time to time. Public hearing issues raised and compliance of the same shall be incorporated in the EIA/ EMP report in the relevant chapter.
- xxiii. 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.
- xxiv. Tentative no. of project affected families shall be identified and accordingly appropriate Rehabilitation & Resettlement plan shall be prepared.
- xxv. Details of settlement in 10 km area shall be submitted.

[C] Muck Management/ Disaster Management

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

[D] Miscellaneous.

- xxix. Pre-DPR Chapters viz., Layout Map and Power Potential Studies duly approved by CWC I CEA shall be submitted.
- xxx. Undertaking need to submitted on affidavit that regarding no activities has been yet on the project site and water allocated to this scheme shall not be diverted to other purpose.
- xxxi. Both capital and recurring expenditure under EMP shall be submitted.

- xxxii. 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 analyse the samples.
- xxxiii. Arial view video of project site shall be recorded and to be submitted.
- xxxiv. No. of tress to be cut shall be studied and incorporate in EIA/EMP report.
- xxxv. The PP has to obtain clearance from inter-state aspect from the designated authorities as per procedure.
- xxxvi. Detailed plan to restore wider roads and convert them into narrow upto 10m after construction of the project.
- xxxvii. Detailed plan activities for economic upliftment of Kalahandi district shall be submitted and incorporated in EIA/EMP report.

Agenda Item No. 42.5

Astha MP Off-Stream Closed Loop Pumped Storage Project (1200 MW) at Village Navrangpura, Tehsil Maheshwar, District Khargone (Madhya Pradesh) by M/s Astha Green Energy Ventures India Private Limited – Terms of Reference (TOR) - reg.

[Proposal No. IA/MP/RIV/416641/2023; F. No. J-12011/02/2023-IA.I (R)]

42.5.1 The proposal is for grant of Terms of Reference to the project for Astha MP Off-Stream Closed Loop Pumped Storage Project (1200 MW) in an area of 348.37 Ha located at Village Navrangpura, Tehsil Maheshwar, District Khargone (Madhya Pradesh) by M/s Astha Green Energy Ventures India Private Limited.

42.5.2 The details of the project submitted by project proponent and ascertained from the document submitted are mentioned below:

- i. Astha Green Energy Ventures India Pvt Ltd. proposes to develop Off Stream Closed Loop Pumped Storage Project (OCPSP) Upper Reservoir located near Mend Mazra village of Dr. Ambedkar Nagar Tehsil in Indore District and Lower Reservoir & powerhouse near Navrangpura Village of Maheshwar Tehsil in Khargone District, Madhya Pradesh.
- ii. The total capacity of proposed PSP is 1200 MW (7272 MWH) and envisages non-consumptive utilisation of 0.336 TMC of water from existing nearby Narmada River by re-circulation and the proposed project involves creation of upper reservoir (75° 42' 08.47" E & 22° 22' 0.04" N) and lower reservoir (75° 41' 50.35" E & 22° 20' 41.58" N).
- iii. Water from nearby Narmada River and will be stored in the lower reservoir to be constructed and used cyclically for energy storage and discharge. Evaporation losses of 0.045 TMC of water will be recouped periodically from Narmada River based on the requirement.
- iv. The total land required for construction of various components including infrastructure facilities and muck disposal area is estimated to be around 348.37 Ha, involving 249.35 Ha of forest land and 99.02 Ha of non-forest land. Astha Green Energy Ventures India Pvt Ltd envisages to complete the construction of project within a period of four years at an estimated cost of INR 7633.06 Crores.
- v. The Salient features of the project is as under: -

Project details:

Name of the Proposal	Astha MP Off-Stream Closed Loop Pumped Storage Project – Madhya Pradesh
Location (Including coordinates)	The proposed project involves creation of upper reservoir are at longitude 75°42'08.47"E and latitude is 22°22'0.04"N and that of lower reservoir are at longitude 75°41'50.35"E and latitude 22°20'41.58"N.
Inter- state issue involved	No
Seismic zone	Zone -II & III (least to Moderate active)

Category details:

Category of the project	1(c) River Valley Projects
Provisions	
Capacity / Cultural command area (CCA)	1200 MW
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	Nil

Electricity generation capacity:

Powerhouse Installed Capacity	1200 MW
Generation of Electricity Annually	2521 MU
No. of Units	5 nos. (3 X 300 MW + 2 x 150 MW)
Additional information (if any)	Nil

ToR Details:

Cost of project	7633.06 Cr.
Total area of Project	348.37 Ha
Height of Dam from River Bed (EL)	Height of Embankment max-47 m & min-24 m
Length of Tunnel/Channel	573.67 m
Details of Submergence area	141.75 Ha
Types of Waste and quantity of generation during construction/ Operation	Muck from excavation, solid waste from labour colony and construction waste
E-Flows for the Project	Not Applicable, as this is Off-Stream Closed Loop Pumped Storage Project (PSP)
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then a) E-flow with TOR /Recommendation by	No

b) EAC as per CIA&CC study of RiverBasin. If not the E-Flows maintain criteria for sustaining river ecosystem.	
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Muck Management Details:

No. of proposed disposal area/ (type of land- Forest/Pvt. land)	One Location of 40 Ha in Forest Area
Muck Management Plan	Will be Provided in EIA/EMP report
Monitoring mechanism for Muck Disposal	Will be Provided in EIA/EMP report

Land Area Breakup:

Government land/Forest Land	249.35 Ha-Forest Land
Submergence area/Reservoir area	141.75 Ha-Upper & Lower reservoirs
Land required for project components	348.37 Ha- Total Land requirement
Additional information (if any)	99.02 Ha-Private Land

Presence of Environmentally Sensitive areas in the study area

Forest Land/ Protected Area/ Environmental Sensitivity Zone		Details of Certificate / letter/ Remarks
Reserve Forest/Protected Forest Land	--	Nil
National Park	--	
Wildlife Sanctuary	--	

Court case details:

Court Case	Nil
Additional information (if any)	Nil

Affidavit/Undertaking details:

Affidavit/Undertaking	Enclosed
Additional information (if any)	Nil

Miscellaneous

Particulars	Details
Project Benefits	<ul style="list-style-type: none"> Pumped storage hydropower is a modified use of conventional hydropower technology to store and manage energy or electricity by moving water between an upper and lower reservoir. Currently, pumped storage round-trip or cycle energy efficiencies exceed 80%, comparing favorably to other energy storage technologies

	<p>and thermal technologies. This effectively shifts, stores, and reuses energy generated until there is corresponding demand for system reserves and variable energy integration. This shifting can also occur to avoid transmission congestion periods, to help more efficiently manage transmission grid, and to avoid potential interruptions to energy supply. This is important because many of the renewable energy resources being developed (e.g., wind and solar) are generated at times of low demand and off-peak energy demand periods are still being met with fossil fuel resources, often at inefficient performance levels that increase the release of greenhouse gas emissions.</p> <ul style="list-style-type: none"> • Further, pumped storage projects are critical to the national economy and overall energy reliability because it's: <ul style="list-style-type: none"> ○ Least expensive source of electricity, not requiring fossil fuel for generation ○ An emission-free renewable source ○ Balancing grid for demand driven variations ○ Balancing generation driven variations ○ Voltage support and grid stability • Apart from this, proposed PSP will also benefit the local community by creating employment opportunities and will result in upliftment of livelihood and socio-economic conditions.
Status of other statutory clearances	<p>Forest Clearance: Online application seeking forest diversion for around 249.35 Ha after receipt of ToR Approval. Alongside, other statutory clearances (as applicable) from State as well as Central government will be obtained post completion of Detailed Project Report.</p>
R&R details	Details shall be evaluated during EIA/EMP Studies
Additional detail (If any)	Nil

42.5.3 The EAC during deliberations noted the following:

The EAC deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and observed that the proposal is for grant of Terms of Reference to the project for Astha MP Off-Stream Closed Loop Pumped Storage Project (1200 MW) in an area of 348.37 Ha located at Village Navrangpura, Tehsil Maheshwar, District Khargone (Madhya Pradesh) by M/s Astha Green Energy Ventures India Private Limited.

The project/activity is covered under category 'A' of item 1 (c) 'River Valley projects' of the Schedule to the Environmental Impact Assessment Notification, 2006, as amended and requires appraisal at Central level by the sectoral EAC in the Ministry.

42.5.4 The EAC after detailed deliberation on the information submitted and as presented during the meeting **recommended** for grant of Standard ToR for conducting EIA study for Astha MP Off-Stream Closed Loop Pumped Storage Project (1200 MW) in an area of 348.37 Ha located at Village Navrangpura, Tehsil Maheshwar, District Khargone (Madhya Pradesh) by M/s Astha Green Energy Ventures India Private Limited, under the provisions of EIA Notification, 2006, as amended along with the following additional/specific 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 and around boundary of forest area for collection of baseline data and data to be incorporated in EIA/ EMP report.
- iv. Details about other projects located on the river basin of river Narmada along with their longitudinal distance between two projects be submitted. In case of more than one project a detailed Cumulative Impact Assessment and Carrying Capacity study covering aspects related to impact of each project on the flow pattern of the rivers and forest and biodiversity shall be conducted through a reputed Government institute having expertise in the area.
- v. Identify the sand mining/ quarrying sites in submergence area and downstream of reservoir.
- vi. Source of construction material and its distance from the project site along with detailed transportation plan for construction material be submitted.
- vii. A detailed reclamation/ restoration plan of quarrying site/sites be incorporated in the EIA/EMP report.
- viii. Certificate and certified map from Chief Wildlife Warden shall be submitted mentioning that project boundary is located outside the Eco Sensitive Zone (ESZ) and no Wildlife Sanctuary falls within 10 km of Project site.
- ix. A detailed wildlife conservation plan for Schedule –I species be prepared duly approved by the Chief Wild Life Warden be submitted.
- x. In case any Wildlife Corridor is located within 10 km radius of the project site a detailed study shall be conducted to assess the impact of project on safe movement of wild animals.
- xi. Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP.
- xii. 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.
- xiii. MoU for water uses for the project shall be signed and approved by concerned authority.

- xiv. Environmental matrix during construction and operational phase needs to be submitted.
- xv. Matrix formulated on the basis of detailed study and field survey of flora and Fauna methodology used shall be mentioned in the EIA report.
- xvi. Endemic plant and animal species found in the area concerned shall be provided instead listing entire endemic species found in the State.
- xvii. Details of Flora and Fauna reported in submergence area, Nos. of tree along with their density and nomenclature of the tree species required to be felled for reservoir creation and other project component.
- xviii. Project impact on avi-fauna shall be studied and incorporated in EIA/ EMP report.
- xix. Impact assessment on the fish diversity based on the hydrological alteration at the water drawing sources shall be studied.
- xx. Stage-I Forest Clearance shall be obtained.
- xxi. Study of impacts of project on water sources i.e. Narmada River

[B] Socio-economic Study

- xxii. Declaration by the project proponent by way of affidavit that "No" Inter-state issue/ policies issue is involved with any state in the project. Consent from other state for drawing of water from Narmada River, if required.
- xxiii. All the tasks including conducting public hearing shall be done as per the provisions of EIA Notification, 2006 and as amended from time to time. Public hearing issues raised and compliance of the same shall be incorporated in the EIA/ EMP report in the relevant chapter.
- xxiv. 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.
- xxv. Tentative no. of project affected families shall be identified and accordingly appropriate Rehabilitation & Resettlement plan shall be prepared.
- xxvi. Details of settlement in 10 km area shall be submitted.
- xxvii. Epidemiological Survey shall be conducted in the study area and report be submitted along with EIA/EMP.

[C] Muck Management/ Disaster Management

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

[D] Miscellaneous.

- xxxi. Pre-DPR Chapters viz. Layout Map and Power Potential Studies duly approved by CWC I CEA shall be submitted.
- xxxii. Undertaking need to submitted on affidavit that regarding no activities has been yet on the project site and water allocated to this scheme shall not be diverted to other purpose.
- xxxiii. Both capital and recurring expenditure under EMP shall be submitted.
- xxxiv. 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 analyse the samples.

xxxv. Arial view video of project site shall be recorded and to be submitted.

Agenda Item No. 42.6

Manalar Pumped Storage Hydro Electric Project of capacity 1200 MW at Village Surulipatti, Taluk Uthamapalayam, District Theni (Tamil Nadu) by M/s Tamil Nadu Generation and Distribution Corporation – Terms of Reference (TOR) - reg.

[Proposal No. IA/TN/RIV/413903/2023; F. No. J-12011/05/2023-IA.I (R)]

42.6.1 The proposal is for grant of Terms of Reference to the project for Manalar Pumped Storage Hydro Electric Project of capacity 1200 MW in an area of 208.16 Ha, located at Village Surulipatti, Taluk Uthamapalayam, District Theni (Tamil Nadu) by M/s Tamil Nadu Generation and Distribution Corporation.

42.6.2 The details of the project submitted by project proponent and ascertained from the document submitted are mentioned below:

- i. The Manalar Pumped Storage Hydro Electric Project is proposed in Theni District with an installed capacity of 1200 MW (6 x 200 MW) to meet the peak hour demand of the grid. This project is located in Surulipatti village, Uthamapalayam Taluk of Theni district in Tamil Nadu. The project site is approachable from Madurai by National Highway. The nearest Broad Gauge rail head is at Theni.
- ii. Existing Manalar reservoir will be the upper reservoir of proposed project & the lower reservoir is proposed to be constructed across a tributary of Koothanachiar river near Anaigajam.
- iii. The Manalar PSHEP is proposed with 6 units of 200 MW each (with fixed speed). Rated net head for the project is about 1009.34 m & rated design discharge is about 135.15 cumec.
- iv. This project will utilize 6 x 210 = 1260 MW to pump 2.92 MCM of water to the upper reservoir in 7.27 hours. Annual energy generation by Manalar PSHEP in Turbine mode is 2496.60 MU and annual energy consumption in Pumping mode is 3174.84 MU (with 95% plant and pump availability).
- v. The estimated land requirement for the project is 208.16 Ha which includes 32.63 Ha of area coming under submergence due to lower reservoir.
- vi. The estimated project cost is RS. 9887.29 Crores at April 2022 price level. The Civil cost estimate of the project has been prepared as per CEA/CWC guidelines. Cost of E&M works is based on quotation received from reputed E&M equipment supplier. Above cost includes the JDC as well as financing cost also.
- vii. The Salient features of the project is as under: -

Project details:

Name of the Proposal	Manalar Pumped Hydro Electric Project (1200 MW)
Location (Including coordinates)	Upper Dam (Existing) Reservoir Latitude - 09°38'16.32" N Longitude - 77°20'45.44" E Lower Dam (Proposed) Reservoir Latitude - 09°41'13.56" N Longitude - 77°19'38.42" E

Inter-state issue involved	No inter-state issues.
Seismic zone	Zone II

Category details:

Category of the project	Category "A"
Provisions	Nil
Capacity / Cultural command area (CCA)	1200 MW
Attracts the General Conditions (Yes/No)	Yes
Additional information (if any)	Nil

Electricity generation capacity:

Powerhouse Installed Capacity	1200 MW
Generation of Electricity Annually	2496.60 MU
No. of Units	6 x 200 MW
Additional information (if any)	-

ToR Details:

Cost of project	Rs. 9887.29 Crore
Total area of Project	208.16 Ha
Height of Dam from Riverbed (EL)	Upper (Existing) Dam - 40 m Lower (Proposed Dam) - 32 m
Length of Tunnel/Channel	10.10 km (10103 m)
Details of Submergence area	32.63 Ha of area coming under submergence due to lower reservoir
Types of Waste and quantity of generation during construction/ Operation	Muck from excavation, solid waste from labour colony and construction waste
E-Flows for the Project	NA
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then c) E-flow with TOR /Recommendation by d) EAC as per CIA&CC study of RiverBasin. If not the E-Flows maintain criteria for sustaining river ecosystem.	No

Muck Management Details:

No. of proposed disposal area/ (type of land- (Forest/Pvt. land)	2 nos. (Forest Land)
--	-------------------------

Muck Management Plan	Will be Provided in EIA/EMP report. Muck would be disposed of at designated areas in a controlled manner to protect the environment.
Monitoring mechanism for Muck Disposal	Will be Provided in EIA/EMP report

Land Area Breakup:

Government land/Forest Land	22.96 Ha (Forest Land)
Submergence area/Reservoir area	32.63 Ha (Lower Reservoir)
Land required for project components	70.16 Ha
Additional information (if any)	47.20 a (Private Land)

Presence of Environmentally Sensitive areas in the study area

Forest Land/ Protected Area/ Environmental Sensitivity Zone		Details of Certificate / letter/ Remarks
Reserve Forest/Protected Forest Land	--	Yet to apply for Wildlife Clearance
National Park	--	
Wildlife Sanctuary	Megamalai Wildlife Sanctuary	

Court case details:

Court Case	Nil
Additional information (if any)	Nil

Affidavit/Undertaking details:

Affidavit/Undertaking	Enclosed
Additional information (if any)	Nil

Miscellaneous

Particulars	Details
Project Benefits	<ul style="list-style-type: none"> The proposed Pumped Storage Scheme (1,200 MW) envisages peak annual energy generation of 2496.60 MU. Direct and Indirect Employment Opportunities, Local Area Development

Status of other statutory clearances	Forest Clearance: Online application seeking forest diversion for around 22.96 Ha after receipt of ToR Approval. Alongside, other statutory clearances (as applicable) from State as well as Central government will be obtained post completion of Detailed Project Report.
R&R details	Details shall be evaluated during EIA/EMP Studies

42.6.3 The EAC during deliberations noted the following:

The EAC deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and observed that the proposal is for grant of Terms of Reference to the project for Manalar Pumped Storage Hydro Electric Project of capacity 1200 MW in an area of 208.16 Ha, located at Village Surulipatti, Taluk Uthamapalayam, District Theni (Tamil Nadu) by M/s Tamil Nadu Generation and Distribution Corporation.

The project/activity is covered under category 'A' of item 1 (c) 'River Valley projects' of the Schedule to the Environmental Impact Assessment Notification, 2006, as amended and requires appraisal at Central level by the sectoral EAC in the Ministry. The reservoir is located inside Megamalai Wildlife Sanctuary.

42.6.4 The EAC after detailed deliberation on the information submitted and as presented during the meeting **recommended** for grant of Standard ToR for conducting EIA study for Manalar Pumped Storage Hydro Electric Project of capacity 1200 MW in an area of 208.16 Ha, located at Village Surulipatti, Taluk Uthamapalayam, District Theni (Tamil Nadu) by M/s Tamil Nadu Generation and Distribution Corporation, under the provisions of EIA Notification, 2006, as amended along with the following additional/specific 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 and around boundary of forest area for collection of baseline data and data to be incorporated in EIA/ EMP report.
- iv. Details about other projects located on the river basin of river Koothanachiar along with their longitudinal distance between two projects be submitted. In case of more than one project a detailed Cumulative Impact Assessment and Carrying Capacity study covering aspects related to impact of each project on the flow pattern of the rivers and forest and biodiversity shall be conducted through a reputed Government institute having expertise in the area.

- v. Identify the sand mining/ quarrying sites in submergence area and downstream of reservoir.
- vi. Source of construction material and its distance from the project site along with detailed transportation plan for construction material shall be submitted.
- vii. A detailed reclamation/ restoration plan of quarrying site/sites be incorporated in the EIA/EMP report.
- viii. Certificate and certified map from Chief Wildlife Warden shall be submitted mentioning that project boundary is located outside the Eco Sensitive Zone (ESZ) and no Wildlife Sanctuary falls within 10 km of Project site.
- ix. A detailed wildlife conservation plan for Schedule –I species be prepared duly approved by the Chief Wild Life Warden be submitted.
- x. In case any Wildlife Corridor is located within 10 km radius of the project site a detailed study shall be conducted to assess the impact of project on safe movement of wild animals.
- xi. Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP.
- xii. 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.
- xiii. MoU for water uses for the project shall be signed and approved by concerned authority.
- xiv. Environmental matrix during construction and operational phase needs to be submitted.
- xv. Matrix formulated on the basis of detailed study and field survey of flora and Fauna methodology used shall be mentioned in the EIA report.
- xvi. Endemic plant and animal species found in the area concerned shall be provided instead listing entire endemic species found in the State.
- xvii. Details of Flora and Fauna reported in submergence area, Nos. of tree along with their density and nomenclature of the tree species required to be felled for reservoir creation and other project component.
- xviii. Project impact on avi-fauna shall be studied and incorporated in EIA/ EMP report.
- xix. Impact assessment on the fish diversity based on the hydrological alteration at the water drawing sources shall be studied.
- xx. Stage-I Forest Clearance shall be obtained.
- xxi. Study of impacts of project on water sources i.e. Koothanachiar river.

[B] Socio-economic Study

- xxii. Declaration by the project proponent by way of affidavit that "No" Inter-state issue/ policies issue is involved with any state in the project.
- xxiii. All the tasks including conducting public hearing shall be done as per the provisions of EIA Notification, 2006 and as amended from time to time. Public hearing issues raised and compliance of the same shall be incorporated in the EIA/ EMP report in the relevant chapter.
- xxiv. 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.
- xxv. Tentative no. of project affected families shall be identified and accordingly appropriate Rehabilitation & Resettlement plan shall be prepared.
- xxvi. Details of settlement in 10 km area shall be submitted.

- xxvii. Epidemiological Survey shall be conducted in the study area and report be submitted along with EIA/EMP.

[C] Muck Management/ Disaster Management

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

[D] Miscellaneous.

- xxxi. Pre-DPR Chapters viz., Hydrology, Layout Map and Power Potential Studies duly approved by CWC I CEA shall be submitted.
- xxxii. Undertaking need to submitted on affidavit that regarding no activities has been yet on the project site and water allocated to this scheme shall not be diverted to other purpose.
- xxxiii. Both capital and recurring expenditure under EMP shall be submitted.
- xxxiv. 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 analyse the samples.
- xxxv. Arial view video of project site shall be recorded and to be submitted.

Agenda Item No. 42.7

Phata Byung Hydro Electric Project (76 MW) in an area of 23.323 Ha, located at Village Sitapur, Tehsil Okhimath, District Rudraprayag (Uttarakhand) by M/s Lanco Mandakini Hydro Energy Private Limited – Terms of Reference (TOR) - reg.

[Proposal No. IA/UK/RIV/409698/2023; F. No. J-12011/64/2007-IA.I]

42.7.1 The proposal is for grant of Terms of Reference to the project for Phata Byung Hydro Electric Project (76 MW) in an area of 23.323 Ha, located at Village Sitapur, Tehsil Okhimath, District Rudraprayag (Uttarakhand) by M/s Lanco Mandakini Hydro Energy Private Limited

42.7.2 The details of the project submitted by project proponent and ascertained from the document submitted are mentioned below:

- i. Lanco Mandakini Hydro Energy Private Limited (“LMHEPL”) is developing 76 MW Phata Byung Hydro Electric Project in Uttarakhand on river Mandakini. It is run-of-the river scheme to harness hydropower potential of river Mandakini in the state of Uttarakhand. The project is approachable by road (200 kms along NH 109) from Rishikesh via Srinagar and Rudraprayag.
- ii. Department of Energy, Govt. of Uttarakhand accorded DPR clearance in the year of 2007 for an installed capacity of 76 MW (2 X 38 MW). The MoEF&CC granted Environmental Clearance vide letter dated 18.02.2008 and State forest department granted forest clearance vide letter dated 21-06-2008. The project has been entrusted to M/s Lanco Infratech Ltd. on EPC contract basis during the year 2008.
- iii. The Salient features of the project is as under: -

Project details:

Name of the Proposal	Phata Byung Hydro Electric Project (76 MW) (De novo EC application)
Location (Including coordinates)	Dam site: 79° 00' 28''E 30° 37' 35''N Power house site: 79° 04' 05''E 30° 33' 40''N
Inter- state issue involved	No
Seismic zone	V

Category details:

Category of the project	A
Provisions	Project is 76 MW but becomes Category A due to general conditions applicability (within 10 km of Kedarnath WLS)
Capacity / Cultural command area (CCA)	76 MW
Attracts the General Conditions (Yes/No)	Yes
Additional information (if any)	

Electricity generation capacity:

Powerhouse Installed Capacity	76 MW
Generation of Electricity Annually	Annual energy generation in 90% dependable year: 385 GWh
No. of Units	Two generating units of 36 MW each
Additional information (if any)	

ToR Details:

Cost of project	101846 lakh (Total)
Total area of Project	23.323 ha
Height of Dam from River Bed (EL)	26 m
Length of Tunnel/Channel	9.32 km
Details of Submergence area	1 ha
Types of Waste and quantity of generation during construction/ Operation	Muck from excavation, solid waste from labour colony and construction areas
E-Flows for the Project	
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then e) E-flow with TOR	Several basin level assessments have been undertaken by reputed institutes and expert bodies during 2012-2018 period – WII report (2012), EBI report (2014), HNB Garwal University (2014),

/Recommendation by f) EAC as per CIA&CC study of RiverBasin. If not the E-Flows maintain criteria for sustaining river ecosystem.	AHEC report (2011 and 2015), EB II report (2018) to name a few. E flow recommendations shall accordingly be applicable.
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Muck Management Details:

No. of proposed disposal area/ (type of land- Forest/Pvt. land)	Present case is a denovo EC application where 74% work has already been completed. 9 muck disposal sites were proposed initially, however only 4 have been utilized so far.
Muck Management Plan	Will be prepared in EIA/EMP. Muck will be disposed off at designated sites in a controlled manner to protect environment.
Monitoring mechanism for Muck Disposal	Will be provided in EIA/EMP report

Land Area Breakup:

Government land/Forest Land	21.291 ha
Submergence area/Reservoir area	1 ha
Land required for project components	23.323 ha
Additional information (if any)	

Presence of Environmentally Sensitive areas in the study area

Forest Land/ Protected Area/ Environmental Sensitivity Zone		Details of Certificate / letter/ Remarks
Reserve Forest/Protected Forest Land	--	A letter was issued by Addnl PCCF on 01/12/2007
National Park	--	
Wildlife Sanctuary	Kedarnath Wildlife Sanctuary within 10 km	

Court case details:

Court Case	NIL
Additional information (if any)	

Affidavit/Undertaking details:

Affidavit/Undertaking	Enclosed
Additional information (if any)	

Previous EC compliance and necessary approvals:

Particulars	Letter no. and date
Certified EC compliance report (if applicable)	Present case is a denovo EC application where 74% work has already been completed. Six monthly compliance reports were submitted regularly during the progress of the works.
Status of Stage- I FC	Already in place
Additional detail (If any)	
Is FRA (2006) done for FC-I	

Miscellaneous

Particulars	Details
Project Benefits	
Status of other statutory clearances	Present case is a a de novo EC application where 74% work has already been completed and Forest clearance is already in place
R&R details	No R&R as present case is a denovo EC application and R&R was completed earlier.
Additional detail (If any)	

42.7.3 The EAC during deliberations noted the following:

The EAC deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and observed that the proposal is for grant of Terms of Reference to the project for Phata Byung Hydro Electric Project (76 MW) in an area of 23.323 Ha, located at Village Sitapur, Tehsil Okhimath, District Rudraprayag (Uttarakhand) by M/s Lanco Mandakini Hydro Energy Private Limited.

The project/activity is covered under category 'B' of item 1 (C) 'River Valley projects' of the Schedule to the Environmental Impact Assessment Notification, 2006 as amended. As Kedarnath Wildlife Sanctuary located within 10 km of project boundary, therefore project requires appraisal at Central level by the sectoral EAC in the Ministry.

The EAC noted that expenditure on implementation of CAT plan does not seems in order. The IRO in its certified compliance report of existing environmental clearance has also reported certain issues need to be addressed by the PP. The project proponent has not submitted any action taken report in this regard. The EAC desired that the IRO should visit the project site and submit the current implementation status of the project along with status of implementation of CAT plan. The EAC will also visit the site to have an idea about the existing environmental conditions and level of protection and conservation efforts required for maintaining the sustainability of the ecology and environment in the present scenario.

*The proposal was **deferred** on the above lines.*

The meeting ended with vote of thanks to the Chair.

ATTENDANCE LIST

Sr. No.	Name & Address	Role	Attendance
1.	Dr. A. K. Malhotra	Chairman	P
2.	Dr. N. Lakshman	Member	P
3.	Dr. Uday Kumar R.Y.	Member	P
4.	Shri Sharvan Kumar	Member	P
5.	Shri Ashok Kumar Kharya	Representative of CWC	P
6.	Dr. A.K. Sahoo	Representative of CIFRI	P
7.	Dr. J. A. Johnson	Representative of WII	P
8.	Shri Yogendra Pal Singh	Member Secretary	P

APPROVAL OF THE CHAIRMAN

From: ajitkumarmalhotra463@gmail.com

To: "Yogendra Pal Singh" <yogendra78@nic.in>

Sent: Monday, March 20, 2023 5:03:25 PM

Subject: Re: Draft MOM of the 42nd EAC (RV&HEP) meeting held on 23.02.2023-reg

Yes I find the MoM in order.

A.K.Malhotra

