Before

UTTARAKHAND ELECTRICITY REGULATORY COMMISSION

Petition No. 33 of 2025

In the Matter of:

Application seeking approval for the investment w.r.t. Construction of 33/11 kV Substation at Shri Kedarnath Dham at District-Rudraprayag.

And

In the Matter of:

Uttarakhand Power Corporation Ltd.,
Victoria Cross Vijeta Gabar Singh Urja Bhawan,
Kanwali Road, Dehradun.

…Petitioner

Coram

Shri M. L. Prasad **Chairman**

Shri Anurag Sharma **Member (Law)**

Date of Order: March 24, 2025

ORDER

This Order relates to the Petition filed by Uttarakhand Power Corporation Limited (hereinafter referred to as "UPCL" or "the Petitioner" or "the licensee") in the matter of 'Construction of 33/11 kV Substation at Shri Kedarnath Dham in District-Rudraprayag' for seeking investment approval of the Commission.

Background

2. The Petitioner vide its letter No. 236/D(P)/UPCL/UERC (C-4) dated 03.02.2025 submitted its Petition for investment approval of four projects namely (a) Construction of 33/11 kV Substation at Shri Kedarnath Dham at District-Rudraprayag, (b) Construction of 33/11 kV Substation alongwith its associated 33 kV line at Kathgodam, Haldwani, District-Nainital, (c) Construction of 33/11 kV Substation alongwith its associated 33 kV line at Govt. ITI, Dahariya, Haldwani, District-Nainital and (d) Construction of 33/11 kV Substation alongwith its

associated 33 kV line at Jaipur, Padli, Haldwani, District-Nainital under the provisions of the Clause 11 of Distribution and Retail Supply Licence and Clause 40 of UERC (Conduct of Business) Regulations, 2014 read with relevant provision of the Electricity Act, 2003, and the Rules and Regulations made thereunder.

3. The Petitioner in its Petition has requested the Commission for granting approval of the project namely Construction of 33/11 kV Substation at Shri Kedarnath Dham in the current financial year stating the reason that the said project is being funded by GoI through GoU under Special Assistance to States for Capital Investment (SASCI) which is to be utilized in current financial year. Besides this Petitioner has also submitted a letter dated 21.03.2025 requesting the Commission that the proposed project at Shri Kedarnath Dham is of critical importance and having different challenges from the other 03 projects included in the Petition, therefore, may be accorded at the earliest.

4. The Commission took cognizance of the same and allowed to admit the proposal of Construction of 33/11 kV Substation at Shri Kedarnath Dham and for other 03 nos. project proposals, the Commission decided to take-them up for admission and further proceedings separately.

Therefore, the proposal of the project of Shri Kedarnath Dham is being dealt in this Order and proceeding of rest of the projects shall be dealt separately.

5. The Petitioner in its Petition under the facts of the case with regard to Shri Kedarnath Dham project has submitted that:

"

(i) *With a view to ensure reliable power supply, improved voltage profile and to meet future load growth, the applicant company has proposed the construction of 04 No. 33/11 kV S/s & their associated 22.50 km. 33 kV line in the State of Uttarakhand. The estimated cost of the project is Rs. 196.85 Cr. The land for 33/11 kV Substation at Shri Kedarnathji Dham is available, the land for 33/11 kV S/s at Kathgodham and GITI, Dahariya are under possession of UPCL and the land for 33/11 kV S/s at Jaipur, Padli is under acquisition by the respective Electricity Distribution Division of UPCL. The project is proposed to be implemented partially on turnkey basis.*

(ii) *The duration of the project is as follows:*

S. No.	***Name of Work***	***Scheduled Date of Completion***
1	*Construction of 33/11 kV S/s at Shri Kedarnath Dham*	*36 months from date of award*
	…	

(iii) *The details of substations and lines are as follows:-*

S. N.	***Name of the Project***	***District***	***Fund Resources***	***BoD Approval***	***Capacity***	***Length of 33 kV Line (Km.)***	***Total Cost (Rs. in Lakh)***
1	*Construction of 33/11 kV Substation at Shri Kedarnath Dham*	*Rudra prayag*	*SASCI (FY 23-24)*	*121st 26.12.24*	*2x5*	*-*	***11892.91***
	…						

(iv) *The detailed project report showing examination of an economic technical system together with the outline of the work to be undertaken, the salient features and particulars demonstrating the need for investment alongwith relevant cost benefit analysis is enclosed herewith at Annexure-A. The work to be undertaken does not have any adverse environmental effect.*

(v) *The approval from BoD is enclosed herewith at Annexure-B for your kind perusal.*

(vi) *The proposed investment for 33/11 kV Substations is as follows:*

S. No.	***Name of Work***	***Proposed Investment***
1	*Construction of 33/11 kV S/s at Shri Kedarnath Dham*	*Tentative DPR for construction of 33/11 kV S/s, 33 kV line, civil works and 11 kV network was prepared with a total project outlay of Rs. 173.42 Cr., out of which the TAC (Technical Audit Committee) of GoU sanctioned the project outlay cost of Rs. 166.90 Cr. Govt. of Uttarakhand vide letter no. 775/I(2)/2024-6 (03)-17/2022, dated: 02.12.2024* ***(Annexure-C)*** *has sanctioned Rs. 80.00 Cr. under Special Assistance to States for Capital Investment (SASCI) of Government of India against total sanctioned cost of Rs. 166.90 Cr. approved by TAC. The breakup of the funding is as follows:* 1. *Rs. 56.00 Cr. out of total amount sanctioned under SASCI shall be met as debt with interest @ 6.5% and,* 2. *Rs. 24.00 Cr. as equity from GoU.*

S. No.	Name of Work	Proposed Investment
		3. Balance amount of the project is expected to be sanctioned and release under SASCI Scheme in upcoming financial year. *A request letter no. 16/MD/UPCL/S-1, dated: 09.01.2025* ***(Annexure-C)*** *has been sent to State Government to revise the interest from 6.5% to 2%.*
…		

"

6. The Petitioner alongwith its Petition has enclosed certified true copy of 121st Board of Directors meeting dated 26.12.2024. The resolution passed by BoD states that:-

*"**RESOLVED THAT** taking into consideration the need and importance of the project as stated above, as of now In-principle approval of the Board be and is hereby accorded for Construction of 01 no. new 2x5 MVA, 33/11 kV Sub-Station (including 11 kV network and 4 Nos. 2000 KVA distribution transformers) at Shri Kedarnathji Dham with an estimated cost of approximately Rs. 11892.91 Lakh with a variation of ± 25% as under.'*

Sl. No.	Name of 33/11 kV Sub-station	Capacity (MVA)	Estimated Cost (Rs. In Lakh)
1	*Shri Kedarnath Dham*	*2x5*	*11485.56*
2	*Interest During Construction (IDC)*	*-*	*407.35*
	TOTAL	***10***	***11892.91***

***'RESOLVED FURTHER THAT** having taken into consideration the absence of commercial viability as presented to the Board, the Govt. of Uttarakhand should be requested to reconsider the terms of funds being offered to UPCL for this project."*

7. The Petitioner in its Petition under the Relief Sought has requested the Commission to the tender of 33/11 kV S/s Shri Kedarnath Dham as the funding available under SASCI Scheme has to be utilized in current financial year and grant approval for the investment for the Project.

8. The Petitioner in its subsequent submissions has enclosed a document dated 31.12.2024 pertaining to financial approval under 'Scheme for Special Assistance to State for Capital Investment (SASCI Part-I)' for '*Shri Kedarnath Dham- Works for electrical infrastructure for supply improvement and area development. Construction of 3*3 MVA 33/11 Substation and its associated lines.*' Wherein the project funding is given as follows:

S. No.	Name of Project	SASCI (S. No. 34) for 2024-25 (Rs. In Crore)	Amount of First instalment released by GoI (66%)		
			Equity	Loan	Total
1	Shri Kedarnath Dham-Works for electrical infrastructure for supply	80.00	15.84	36.96	52.80

9. On examination of the proposal made in the Petition & Detailed Project Report (DPR), certain deficiencies/infirmities were identified and accordingly, the Commission vide its letter No. 1570 dated 28.02.2025 directed the Petitioner to submit/furnish its reply on the following latest by 12.03.2025: -

"***Construction of 2x5 MVA, 33/11 kV Substation at Shri Kedarnath Dham, Rudraprayag***

(1) UPCL is required to furnish the details of land acquisition alongwith supporting documents in support of the proposed 2x5 MVA, 33/11 kV S/s at Shri Kedarnath Dham.

(2) UPCL is required to furnish the list of parameters governing the design of electrical equipment such as transformers, breakers, measuring instruments, isolators, conductors, cables etc. alongwith its relevant technical standards for high altitude applications.

(3) UPCL is required to furnish the details of bidder qualification criteria for the proposed project suitable for the experience of working in high altitude applications.

(4) UPCL is required to furnish the details of all the high altitude (2500 meter above MSL level) 33/11 kV S/s of UPCL in the State of Uttarakhand and furnish the specific technical requirements for supply, installation and commissioning of such high altitude substations.

(5) UPCL is required to confirm regarding forest clearances, Geological approval requirement, if any, for the proposed construction of 2x5 MVA, 33/11 kV Substation, associated 33 kV line, 4x2000 kVA Distribution Transformer, associated 11 kV network, Civil work such as approach road, retaining wall, power centre control room etc.

(6) UPCL is required to submit scenario-wise single line diagram of 132/33 kV S/s Srinagar, 33/11 kV S/s Rudraprayag, 33/11 kV S/s Augustmuni, 33/11 kV S/s Ukimath, 33/11 kV S/s Guptkashi, 33/11 kV S/s Sonprayag depicting all 33 kV

incoming and outgoing feeders, all 11 kV outgoing feeder with details of type of conductor, its length, loads for following scenario of power supply at different stages:-

(i) Present scenario of power supply.

(ii) Post commissioning of proposed 33/11 kV Substation at Shri Kedarnath Dham, Rudraprayag.

(iii) Post commissioning of proposed 33/11 kV Substation at Shri Kedarnath Dham, Rudraprayag and 220/33 kV Substation at Brahmbari.

(7) UPCL is required to confirm that why the proposal of upgradation of existing 11 kV line on lattice tower to 33 kV line from 33/11 kV Sonprayag to proposed S/s at Shri Kedarnath Dham has not been submitted alongwith the instant Petition. Further, UPCL is required to submit the activity-wise time schedule for completion of aforesaid 33 kV line works.

(8) UPCL is required to furnish the activity-wise project plan for the proposed works in A3 sheet in hard and soft copy.

(9) With regard to SASCI scheme, UPCL is required to submit the details of works alongwith estimated cost proposed under instant Petition vis-a-vis works sanctioned under SASCI Scheme. Further, UPCL is required to furnish details of works alongwith its cost that have been included under SASCI scheme but have not been included in instant Petition.

(10) UPCL is required to submit the sanction letter from GoU w.r.t. financing of the project from SASCI scheme alongwith the details of funds released, Utilization Certificate, till date.

(11) UPCL is required to furnish a General Arrangement drawing of proposed 2x5 MVA 33/11 kV S/s at Shri Kedarnath depicting the overall dimension of the Substation, transformers and incoming & outgoing feeders.

(12) UPCL is required to furnish the location details of 4x2000 kVA distribution transformers proposed under the scheme. Further, UPCL is required to furnish the rationale for considering 2000 kVA distribution transformers instead of standard rating small capacity transformers from the reliability point of view. Moreover, UPCL is required to confirm why the possibility of single phase 33/11 kV

transformers was not envisaged alongwith small capacity distribution transformers considering high altitude and transportation constraint.

(13) *UPCL is required to furnish the single line diagram of existing electrical network of Shri Kedarnath Dham with details of Length of 11 kV line, No. of 11/0.4 kV DTs with installed capacity and Length of 0.4 kV network. Further, UPCL is required to furnish DT-wise and category-wise consumers details with their sanctioned load. Furthermore, UPCL is required to furnish the details of temporary connection released for the purpose of construction.*

(14) *UPCL is required to furnish the list of prospective consumers/load expected to come up in next 05 years alongwith the list of consumers with load who have applied for new connection/enhancement of load.*

(15) *On examination of the line chart submitted alongwith the Petition, it is observed that the 33 kV source network to the proposed S/s is approx. 100 Km. long which is not at all conducive for such an important installation. UPCL is required to examine the same and ensure that the feeding 33 kV network is optimum so that the quality and 'N-1' contingency, reliability of power supply can be ensured.*

(16) *On examination of the line chart, it has been observed that 25 Km. rabbit conductor is placed between 33/11 kV S/s Guptkashi and 33/11 kV S/s Sonprayag. UPCL is required to confirm that instead of strengthening such weak links in the system why UPCL is proposing such infrastructure in geographically vulnerable location.*

(17) *UPCL is required to furnish the reasons for such high cost of the project i.e. Rs. 118.92 Cr. Further, UPCL is required to furnish the details of 33/11 kV S/s executed in last 10 years in following format:-*

S. No.	*Name of Project*	*Installed capacity of 33/11 kV S/s*	*Date of energization*	*As executed cost of the project*

(18) *UPCL is required to confirm why 33/11 kV S/s Sonprayag is not being strengthened and instead the proposed S/s at geographically vulnerable location is being proposed. Further, UPCL is required to furnish 11 kV pole-wise existing working condition of all the 11 kV feeders emanating from 33/11 kV S/s Sonprayag to Shri Kedarnath Dham.*

(19) *UPCL is required to furnish the voltage profile calculation for the each node at 33 kV bus and 11 kV bus of 132/33 kV S/s Srinagar, 33/11 kV S/s Rudraprayag, 33/11 kV S/s Augustmuni, 33/11 kV S/s Ukimath, 33/11 kV S/s Guptkashi, 33/11 kV S/s Sonprayag in pre and post construction scenario of the proposed project at Shri Kedarnath Dham.*

(20) *UPCL is required to confirm regarding how the electrical equipment and other necessary infrastructure for the said project shall be transported to the proposed location. Further, UPCL is required to furnish the breakup of Rs. 34.08 Cr. (excluding taxes) transportation cost considered for the aforesaid project.*

(21) *UPCL at note 10 of the estimate has mentioned that 'The type of material is to be transported by airlift shall be decided by UPCL'. In this regard, UPCL is required to furnish the details of the materials to be airlifted.*

(22) *UPCL is required to furnish the details of weights of transformers, breakers, measuring instruments, isolators, conductors, cables etc.*

(23) *UPCL is required to furnish the rationale for choosing the location of the proposed 33/11 kV S/s at Shri Kedarnath Dham and not exploring to augment the capacity of 33/11 kV S/s at Sonprayag.*

(24) *UPCL at 'Relief Sought' section of the instant Petition has requested for granting approval to process the tender of 33/11 kV S/s Shri Kedarnath Dham. In this regard, UPCL is required to submit the status of Tender with respect to 'Construction of 2x5 MVA, 33/11 kV Substation at Shri Kedarnath Dham, Rudraprayag.*

(25) *UPCL is required to confirm that why the proposal of upgradation of existing 11 kV line on lattice tower to 33 kV line from 33/11 kV Sonprayag to proposed S/s at Sri Kedarnath Dham has not been submitted alongwith the instant Petition. Further, UPCL is required to submit the activity-wise time schedule for completion of aforesaid 33 kV line works.*

(26) *UPCL is required to furnish the list of factory acceptance test, routine tests, type tests and site acceptance tests to be conducted for power and distribution transformers as per relevant IS/IEC standards. Further, UPCL is required to confirm how the testing of Power Transformers and Distribution Transformers shall be ensured at Shri Kedarnath Dham, if the same are to be assembled at site.*

(27) *UPCL is required to clarify how maintenance of the proposed 33/11 kV S/s and distribution transformers would be maintained/replaced in the eventuality of any fault/natural calamity.*

(28) *The project cost is to be evaluated from the project life cycle perspective. In this context, UPCL is required to furnish the Annual Operation & Maintenance expenses expected to be incurred on the proposed 33/11 kV S/s.*

(29) *UPCL is required to furnish the basis for cost estimate for each line item proposed in their instant proposal of 33/11 kV S/s at Shri Kedarnath Dham."*

10. In response to the above observations/deficiencies, Petitioner vide its letter dated 12.03.2025 submitted its reply and furnished the following:

"

1. …

Submission of UPCL

It is to be submitted that the land required for the construction of 2x5 MVA, 33/11 kV Substation at Shri Kedarnath Dham the substation has already been duly acquired by UPCL.

2. …

Submission of UPCL

It is to apprise that while preparing the estimates the following parameters governing the design of electrical equipment such as transformers, breakers, measuring instruments, isolators, conductors, cables etc. alongwith their relevant technical standards for high altitude applications were considered:

a) Extreme Temperature Conditions of -40^{o}C.

b) Altitude of range of around 4000 meters for sea level and BIL corrections.

c) Site inaccessibility by road.

d) Equipment provisions for air lifting and packaging.

e) Snow loading and accumulation.

Accordingly the technical committee of UPCL finalized the specifications, based on which the estimates have been prepared.

3. …

Submission of UPCL

The tender was invited with following conditions and pre-qualifying requirements:

"All the material/equipment/structure under the project shall be suitable for satisfactory and continuous operation at an altitude upto 4000m (above MSL) and

ambient temperature upto (-) 40^{0}C even if it is not specifically mentioned in the technical specification of particular item."

Pre-Qualification Requirement:

I. *The tenderer must have valid class A Electrical Contractor License for carrying out specified work of Uttarakhand State Authority. Tenderer who have such license of other state may also apply, but in such cases, License of Uttarakhand has to be obtained and copy submitted to UPCL prior to start of work.*

II. *(i) The bidder must have successfully executed the work of construction of at least one no. 33/11 kV or higher voltage class substation(s) in single contract with amount of at least 25% of estimated cost of this tender, for any Govt. departments/Govt. Undertakings/SEBs/ Power Sector Utilities during last 5 financial years (i.e. 2019-20, 2020-21, 2021-22, 2022-23 & 2023-24) which must be in satisfactory operation for atleast 01 (one) year reckoned from the date of opening of this tender.*

AND

(ii) The bidder must provide Manufacturer Authorization Form (MAF as per attached format) from the Original Equipment Manufacturer (OEM) of 33 kV and 11 kV Permanent Magnetic Actuator (PMA) Vacuum Circuit Breakers. The bidder must enter into contract with such OEM for providing back to back technical support, ensuring the availability of spare parts and full warranty during the contract period.

The OEM should have a manufacturing setup in India and the 33 kV and 11 kV Permanent Magnetic Actuator (PMA) Vacuum Circuit Breakers must have been fully type-tested only from Government-approved or NABL-accredited testing laboratories as per relevant ISS and/or any other specified international standards within the last 5 years, reckoned from the tender opening date.

The OEM should have supplied atleast 2000 units of 33 kV and 11 kV Permanent Magnetic Actuator (PMA) Vacuum Circuit Breakers to any Govt. departments/Govt. Undertakings/SEBs/ Power Sector Utilities during in India during the last five (5) years reckoned for the date of opening of this tender, out of which atleast 200 units must be in satisfactory operation for atleast one year. The OEM shall have to provide necessary certificates for the same issued from Govt. departments/ Govt. Undertakings/SEBs/Power Sector Utilities in India.

Further, if the bidder has been awarded any work by UPCL during last five (5) years as on the date of opening of Part-I of the tender, overall performance of the bidder should have been satisfactory and the bidder should have successfully completed the work as per respective agreement.

III. *The bidder shall meet the following minimum financial criteria*

(i) Minimum Average Annual Turnover (MAAT) of the bidder for best three years out of last 5 financial years (i.e. 2019-20, 2020-21, 2021-2022, 2022-

2023 & 2023-2024) should not be less than Rs. 168.17 Cr. The bidder shall submit audited balance sheet of the same along with Part-I of the tender.

(ii) The bidder shall have Liquid Assets (LA) and/or evidence of access to or availability of credit facilities of not less than 40% of the estimated cost (Rs. 44.84 Cr.). LA would include cash (and equivalents) bank deposits, securities that can be readily converted into cash. Bidder shall produce Satisfactory Conduct Letter from its main banker, from where the bidder is maintaining main account/banking facilities/BG/LC Limits.

(iii) The bidder shall have Net worth of NOT less than 20% of estimated cost (Rs. 22.42 Cr.).

In case bidder is a holding company, MAAT, LA & Net worth referred to in clause 3.0 (i) (ii) & (iii) above shall be of that of holding company only (i.e. excluding its subsidiary/ group companies). In case bidder is a subsidiary of a holding company, MAAT, LA & Net worth referred to as above shall be of that subsidiary company only (i.e. excluding its holding company).

IV. Joint Venture or Consortium shall not be allowed in the tender.

V. An undertaking on Rs. 100/- non judicial stamp paper duly notarized by notary that the bidder has not been blacklisted/debarred by any Govt. undertaking/Govt. departments/ SEB's/Power Sector Utilities. In case same is found then their tender/Order shall be treated as cancelled at any stage and EMD/Performance security shall be forfeited.

4. …

Submission of UPCL

As of now UPCL does not have 33/11 kV Substation at such high altitude (2500 meter above MSL level) in State of Uttarakhand. All the 33/11 kV Substations in Uttarakhand are either AIS or GIS type. The 33/11 kV Substation at altitude of ~3,500 meter height with such extreme weather conditions is being proposed for the first time by UPCL.

5. …

Submission of UPCL

The forest clearance and geological approvals for the proposed 2x5 MVA, 33/11 kV Substation at Shri Kedarnath Dham, along with the associated works, it is submitted as follows:

- ***Forest Clearance:** Not required, as the land identified for the substation and associated infrastructure has already been duly transferred to UPCL. Further, there are no trees or forest area present on the selected land.*

- ***Geological Approval:*** *The geological assessment of the selected site has already been conducted, and the relevant document* ***is being enclosed as Annexure-C.***
- ***Associated 33 kV Line:*** *The proposed 33 kV line is an upgrade of the existing damaged 11 kV double circuit line. As the alignment remains the same and no new forest area is being utilized, no fresh forest clearance is required for this work.*
- ***Other Civil Works (approach road, retaining wall, power control room, etc.):*** *These are within the acquired land, where no forest area is involved.*

6. …

Submission of UPCL

The Single Line Diagram (SLD) clearly depicting the complete 33 kV network with all relevant details covers the following three scenarios:

1. ***Present Scenario of Power Supply:*** *Existing power flow from 132/33 kV S/s Srinagar through Rudraprayag, Augustmuni, Guptkashi, Ukimath, and Sonprayag substations with details of existing loads and conductor types.*
2. ***Post Commissioning of the Proposed 33/11 kV Substation at Shri Kedarnath Dham, Rudraprayag:***
   - *Incorporation of the 2x5 MVA, 33/11 kV Substation at Shri Kedarnath Dham and its load into the network.*
   - *Upgrade of the existing 11 kV line to 33 kV with corresponding conductor details.*
3. ***Post Commissioning of the Proposed 33/11 kV Substation at Shri Kedarnath Dham, Rudraprayag and 220/33 kV Substation Bhrambari:*** *Future scenario with additional power injection from the proposed 220/33 kV Substation Bhrambari, improving supply reliability and load management for Kedarnath and surrounding areas.*

   The SLD includes all relevant technical parameters such as:
   - *Type of conductors (Panther, Dog, Rabbit, Weasel)*
   - *Line lengths (existing and proposed)*
   - *Substation capacities and max./min. loadings recorded.*

7. …

Submission of UPCL

Proposal for construction of 33 kV line from upcoming 220 kV Brahmbari Substation (proposed for construction by PTCUL) to Shri Kedarnath Dham via

33/11 kV Substation Sonprayag was prepared, but on later stage it came to the notice that there is land dispute case at 220 kV Brahmbari substation, therefore proposal for construction of said 33 kV line has been withheld as of now and proposal for the same shall be presented before the Hon'ble Commission after clearance of land dispute. It may please also be noted that the location of proposed 220 kV Brahmbari Substation may be altered, accordingly a separate proposal for conversion of existing 11 kV D/C line on lattice tower to 33 kV D/C line on lattice tower for energizatation of 33/11 kV Substation Shri Kedarnath Dham has been prepared and is being put up before the BoD for approval.

The funding for construction of the new 2x5 MVA, 33/11 kV Substation at Shri Kedarnath Dham has been approved under the SASCI scheme, whereas the conversion of existing 11 kV D/C line on lattice tower to 33 kV D/C line on lattice tower for energizatation of 33/11 kV S/s Shri Kedarnath Dham is proposed through Internal Resources.

It is also to mention that time period for construction of 33/11 kV S/s Shri Kedarnath Dham has been proposed as 36 months from date of award, however, completion period for the line proposed to be upgraded will be 12 months from the date of award, as most of the structure for the line is already in existence and reconductoring remains the only major work.

The Activity-wise time schedule for the completion of the aforesaid conversion of damaged 11 kV line into 33 kV line work is being enclosed as Annexure-E.

8. …

Submission of UPCL

The detailed activity-wise project plan has been is attached herewith in A3 size format, both in hard copy and soft copy is being enclosed as Annexure-F.

9. …

Submission of UPCL

S. No.	Work sanctioned under SASCI	Cost submitted to GoU (Rs. in Cr.)	Cost Sanctioned under SASCI (Rs. in Cr.)	Cost approved by BoD	Cost in instant petition (Rs. in Cr.)
1.	Construction of new 2x5 MVA, 33/11 kV Substation at Shri Kedarnath Dham	34.86	62.13	114.86	118.93 (including IDC Rs. 4.07)
2.	Installation of 04 no. 2 MVA distribution transformer, construction of 11 kV line, Installation of 33 kV GIS Panel, Installation of 11 kV GIS Panel	12.69			

S. No.	Work sanctioned under SASCI	Cost submitted to GoU (Rs. in Cr.)	Cost Sanctioned under SASCI (Rs. in Cr.)	Cost approved by BoD	Cost in instant petition (Rs. in Cr.)
3.	Cost involved in Airlifting/ Sky Crane/Head Load of above 02 components	34.86	29.95		
4.	Construction of 33 kV double circuit line on 132 kV lattice tower from 220 kV substation, Brahmbari (Rudrapur) to 33/11 kV S/s Sonprayag	34.95	36.02		Separate petition will be submitted.
5.	Construction of 33 kV double circuit line on 132 kV lattice tower from 33/11 kV S/s Sonprayag to Shri Kedarnath Dham including cost involved in Airlifting/Sky Crane/Head Load	39.42	34.80		
6.	Cost involved in compensation against land and crop and forest clearance	16.64	4.00		Expenditure will be done during the construction of line on actual basis.
Total		**173.42**	**166.90**		

10. …

Submission of UPCL

The sanction letter from GoU w.r.t. financing of the project from SASCI scheme alongwith the details of funds released till date ***is being enclosed as Annexure-G.***

11. …

Submission of UPCL

The drawing of proposed 2x5 MVA, 33/11 kV Substation at Shri Kedarnath Dham depicting the overall dimension of the Substation, transformers and incoming & outgoing feeders ***is being enclosed as Annexure-H.***

12. …

Submission of UPCL

The load requirement at few points exceeds 1000 kVA, due to which the DTR of 2000 kVA has been proposed. The load requirement for each of the building ***is being enclosed as Annexure-I.*** *Further, under the Shri Kedarnath master plan, release of connection on HT would not be practically feasible as all the underground LT cables have already been laid by PWD, and carriage of transformers for individual*

loads will also be an issue. As per the master plan island area is required to be kept free from overhead lines.

Moreover, the selection of 2000 kVA distribution transformers, as opposed to standard small capacity transformers, has been carefully considered to align with the architectural guidelines and aesthetics of the Kedarnath master plan. The master plan, implemented by the Public Works Department (PWD) and guided by the project consultant, specifically emphasizes underground LT distribution with no overhead lines or visible distribution transformers within the designated area to maintain the sanctity and visual integrity of the region.

During the planning and estimation phase of the project, the applicability of single phase power transformers have been studied but for single phase transformers, the design of delta side would have to be made in the yard which would have required more space and would also complicate the process of bringing the spare transformer in and out of circuit in case of failure. Therefore, the option was not envisaged due to multiple technical and operational constraints.

Further, the weight advantage achieved for lifting of core and winding of single phase power transformers (around 3500-4000 KG for 1 MVA) would not have been significant when compared with weight of core and winding of normal 3-phase power transformers (around 4400-5000 KG for 3 MVA), considering that the air load lift limit of 3-3.5 tons at the altitude. The only suitable option would be to manufacturing of transformers at site, due to which 3-phase power transformer were considered to be more practical from the point of operations and maintenance.

Load distribution and demand characteristics of the area require robust and stable power delivery, which is efficiently served through three-phase transformers.

System reliability and operational efficiency are better achieved with appropriately rated three-phase transformers, especially in high-demand, sensitive zones like Kedarnath Dham.

High-altitude transportation challenges are acknowledged; however, minimizing the number of transformers while ensuring adequate capacity reduces both logistical complexities and maintenance challenges in such a remote and difficult terrain.

This approach strikes a balance between technical reliability, operational sustainability, and architectural preservation, ensuring continuous, stable power supply while maintaining the visual and cultural sanctity of the area.

13. …

Submission of UPCL

The existing electrical network of Shri Kedarnath Dham, the following information is respectfully submitted:

1. ***Single Line Diagram (SLD):*** *The Single Line Diagram (SLD) of the existing electrical network at Shri Kedarnath Dham* ***is being enclosed as Annexure-J.***

2. *At present power supply of Shri Kedarnath Dham is being maintained thourhg 11 kV Line* ***(****Approximately 21 Km.) from 33/11 kV Sonprayag.*

   - *Number of 11/0.4 kV Distribution Transformers (DTs):*
     - *Total DTs* **:** *39 Nos.*
     - *Installed Capacity* **:** *2301 kVA*
       - *4x 100 KVA* = *400 kVA*
       - *27 x 63 KVA* = *1701 kVA*
       - *8 x 25 KVA* = *200 kVA*
   - *Length of 0.4 kV LT Network* **:** *Approximately 30.5 km*

3. ***Consumer Details:*** *The category-wise consumer details, including sanctioned loads* ***is being enclosed as Annexure-K****.*

4. ***Connections for Construction Purposes:*** *Details of temporary electricity connections issued specifically for construction activities within the Kedarnath Dham area* ***is being enclosed as Annexure-K(RTS-10)****.*

14. …

<u>Submission of UPCL</u>

The list of prospective consumers and the expected load growth in the next 5 years at Shri Kedarnath Dham and surrounding areas, the following is submitted:

- ***Public Works Department (PWD) Load Demand:***

  The PWD has submitted a demand of 7758 kW at Shri Kedarnath Dham for power supply to various newly constructed buildings developed under the Kedarnath Master Plan. This demand is primarily concentrated within the core Kedarnath area and is essential to support the expanding infrastructure, particularly to manage the heavy footfall during the pilgrimage season. A copy of the PWD's load demand letter is being enclosed as Annexure-L.

- ***Upcoming Ropeway Project Load Demand:***

  The NHAI (National Highways Authority of India) has projected an additional distributed load of approximately 7800 kW to cater to the upcoming Sonprayag to Shri Kedarnath Dham Ropeway Project. This load will be spread across various stations and operational points along the ropeway corridor. The demand is expected to materialize in the near future as the project progresses. A copy of the NHAI's load demand letter ***is being enclosed as Annexure-M.***

This significant anticipated load growth clearly establishes the requirement for reliable and enhanced power infrastructure, including the development of a dedicated 2x5 MVA, 33/11 kV Substation at Shri Kedarnath Dham, as well as necessary upgrades to the upstream network.

15. …

Submission of UPCL

The N-1 contingency and reliability of 33 kV network for 33/11 kV S/s Shri Kedarnath Dham will be optimized as per list drawing

***1. Existing Feeding Arrangements**:*

The proposed Shri Kedarnath Dham Substation is fed through the Rudraprayag Substation, which is supported by three reliable 33 kV sources:

- *132/33 kV Substation Srinagar.*
- *132/33 kV Substation Simli via Substation Gaucher.*
- *132/33 kV Substation Chamba via Substation Ghanshali*

These multiple feeding sources ensure redundancy and reliability, meeting the N-1 contingency criteria. In the event of a fault or outage in one source, the other two sources can maintain uninterrupted power supply to the Rudraprayag and Sonprayag Substations, which subsequently feed the proposed Shri Kedarnath Dham Substation.

***2. Upcoming 132/33 kV Brahambari Substation**:*

We would like to highlight that the construction of the 132/33 kV Substation Brahambari, which is proposed to be located in close proximity to the Sonprayag Substation, will significantly enhance the reliability and N-1 contingency of the power supply network. Once operational, this substation will provide an additional and more robust power source, reducing dependency on the existing 33 kV network and minimizing the impact of the long 33 kV line length.

***3. Technical Analysis and Mitigation Measures**:*

To address the concerns regarding the 100 km 33 kV network. The following measures will be undertaken:

- ***Voltage Regulation and Line Losses**: Evaluate the voltage profile and line losses along the 33 kV network and implement corrective measures, such as capacitor banks or line reinforcement, to ensure optimal power quality.*
- ***Network Optimization:** Review the network configuration to ensure the most efficient and reliable power supply to the proposed substation.*

- ***Contingency Planning:*** *Revalidate the N-1 contingency criteria with the inclusion of the upcoming 132/33 kV Substation Brahambari and propose any additional enhancements, if necessary.*

4. Commitment to Reliability:

UPCL is fully committed to ensuring the highest standards of power supply quality, reliability, and contingency planning for the proposed Shri Kedarnath Substation. The completion of the 132/32 kV Substation Brahambari will further strengthen the network and address the concerns raised regarding the 33 kV source network.

We assure you that all necessary steps will be taken to ensure the proposed substation receives a reliable and high-quality power supply.

16. …

<u>Submission of UPCL</u>

In reference to the observation regarding the presence of 25 km Rabbit conductor between 33/11 kV S/s Guptkashi and 33/11 kV Substation Sonprayag, it is respectfully submitted that:

- *The existing Rabbit conductor on the 33 kV Guptkashi–Sonprayag feeder has already been identified as a limiting factor in the network's performance, especially considering the growing load demand and the geographical challenges of the region.*
- *Accordingly, the augmentation of this section from Rabbit conductor to Dog conductor has been approved to strengthen the system and ensure improved power supply reliability to Sonprayag and further to Shri Kedarnath Dham.*
- *Additionally, the capacity enhancement of 33/11 kV Substation Sonprayag from the existing 2x3 MVA to 2x8 MVA has also been approved to support the increasing load and address future requirements, particularly considering the critical role of Sonprayag as a key supply point for the Shri Kedarnath Dham region.*
- *The ongoing and proposed infrastructure developments have been planned comprehensively to ensure that vulnerable and weak links within the system are upgraded in a phased manner, ensuring long-term stability and reliability of the power supply in this geographically sensitive and high-importance area.*

Therefore, the existing Rabbit conductor is a temporary arrangement, and its augmentation to Dog conductor is under execution process to eliminate such weak links and enhance the robustness of the system.

17. …

Submission of UPCL

The original estimate prepared by UPCL was based on rates of Financial Year 2022-23. After detailed deliberations by the technical committee, the technical specifications were approved and accordingly the following was incorporated:

a) GIS breakers were replaced with SCADA compatible Permanent Magnet Actuator (PMA) type breakers.

b) Due to air lifting constraints the transformer was decided to be assembled at site.

c) Due to snow loading, provision of covering the electrical yard and DTRs with steel canopy has been incorporated.

d) BIL level of electrical equipment was also corrected as per the site altitude condition.

e) Provision of naphthenic based oil was made to counter extreme site temperature.

f) The labor rates and the head load charges are also high due to inaccessibility and tough site conditions.

g) The cost of airlifting of equipment has been taken as per discussion with local PWD engineers and considering the requirement of safe transport handling of equipment required to be airlifted. The cost of airlifting has been estimated to be around 1.5 times the cost of material.

There has been significant changes in the cost of equipment and labor required for construction of 33/11 kV Substations during the last 10 years.

The details of 33/11 kV S/s executed in last 10 years is as follows:

S. No.	Name of Project	Installed capacity of 33/11 kV S/s	Date of energization	As executed cost of the project (Rs. in lakh)
1	33/11 kV S/s Sianachatti	1x3	11.04.2015	119.14
2	33/11 kV S/s Gangori	2x3	25.04.2015	124.75
3	33/11 kV S/s Pandukeshwar	1x5	25.04.2015	113.59
4	33/11 kV S/s Guptakashi	1x5	30.05.2015	145.03
5	33/11 kV S/s Raipur	2x5	28.10.2015	149.92
6	33/11 kV S/s Tawaghat	1x3	19.10.2015	128.25
7	33/11 kV S/s Jalali	1x3	04.11.2015	201.39
8	33/11 kV S/s Karmi	1x3	18.11.2015	378.54
9	33/11 kV S/s Shama	1x3	30.12.2015	86.03
10	33/11 kV S/s Danya	1x3	21.12.2015	467.52
11	33/11 kV S/s Nehru Colony	1x10	28.01.2016	146.53
12	33/11 kV S/s Machor	1x3	24.01.2016	270.00
13	33/11 kV S/s Jhankat	1x5	30.01.2016	138.27
14	33/11 kV S/s Pratappur	2x5	27.01.2016	143.08
15	33/11 kV S/s Ganai	1x3	25.02.2016	90.21
17	33/11 kV S/s MDDA Complex	1x10	11.08.2016	282.06

S. No.	Name of Project	Installed capacity of 33/11 kV S/s	Date of energization	As executed cost of the project (Rs. in lakh)
18	33/11 kV S/s Tharali	1x3	30.09.2016	238.50
19	33/11 kV S/s Bungacheena	1x3	14.10.2016	183.56
20	33/11 kV S/s Jainti	1x5	20.10.2016	261.91
21	33/11 kV S/s Jhajhara	2x10	25.10.2016	290.47
22	33/11 kV S/s Doordarhsan Kendra	2x10	24.10.2016	415.30
23	33/11 kV S/s Piran Kaliyar	2x5	08.11.2016	188.90
24	33/11 kV S/s Adi Badri	1x3	20.12.2016	266.00
25	33/11 kV S/s Reema Banlekh	1x3	11.11.2016	425.00
28	33/11 kV S/s G.S.Urja Bhawan	2x10	25.01.2017	294.51
29	33/11 kV S/s Sector-2, Haridwar	2x8	30.04.2016	107.48
31	33/11 kV S/s Terah Beegha	2x8	14.10.2016	114.94
32	33/11 kV S/s Jaspur	2x8	15.10.2016	107.95
33	33/11 kV S/s Manglore	2x5	17.10.2016	109.04
34	33/11 kV S/s Dhontary	1x3	16.03.2017	456.47
35	33/11 kV S/s IHM Nimbuwala	2x10	15.06.2017	926.00
36	33/11 kV S/s Chalang, Sahastradhara	2x12.5	30.08.2017	466.61
37	33/11 kV S/s Shahdevpur	2x5	30.11.2017	373.93
38	33/11 kV S/s Pipali	2x5	29.03.2018	162.78
39	33/11 kV S/s Gaindikhatta	2x5	31.03.2018	307.42
40	33/11 kV S/s Latherdeva	2x8	31.03.2018	260.00
41	33/11 kV S/s GIS Bhararisain	2x10	15.05.2017	259.77
42	33/11 kV S/s 18-E.C. Road	2x5	17.02.2018	94.00
43	33/11 kV S/s Mahulchori	1x5	06.12.2017	261.87
44	33/11 kV S/s Chopta	1x3	27.10.2017	118.37
45	33/11 kV S/s Chorgaliya	1x5	04.07.2017	262.08
46	33/11 kV S/s Mahuwakheraganj	2x10	04.09.2017	301.92
47	33/11 kV S/s Khatima	2x10	27.11.2017	416.98
48	33/11 kV S/s Barhaini	2x5	21.12.2017	302.98
49	33/11 kV S/s Rehta	2x8	21.12.2017	225.61
50	33/11 kV S/s Deghat	2x5	19.02.2018	400.88
51	33/11 kV S/s LBS Mussorrie	2x5	23.11.2018	213.89
53	66/33 kV S/s Manglore	2x15	20.10.2018	1,035.26
54	33/11 kV S/s Gowardhanpur	2x5	11.03.2019	238.86
56	33/11 kV S/s Aryanagar	2x10	20.10.2019	524.07
57	33/11 kV S/s Sector-5, Haridwar	2x10	20.10.2019	598.36
58	33/11 kV S/s Gangapur	2x5	29.12.2019	237.03
59	33/11 kV S/s IP-2, SIDCUL, Haridwar	2x10	15.02.2020	502.35
61	33/11 kV S/s Barnigad	2x3	30.09.2020	67.00
62	33/11 kV S/s Maroda Saklana	1x3	10.10.2020	404.63
64	33/11 kV S/s Khari	2x3	10.12.2020	299.00
65	33/11 kV S/s Askot	2x5	24.02.2021	509.75
66	33/11 kV S/s Chaka-Laser	2x3	14.04.2021	310.08
67	33/11 kV S/s Gular Kodiyala	2x3	04.08.2021	462.00

S. No.	Name of Project	Installed capacity of 33/11 kV S/s	Date of energization	As executed cost of the project (Rs. in lakh)
68	33/11 kV S/s Chauras	2x3	21.08.2021	216.00
69	33/11 kV S/s Sikandarpur	2x10	20.06.2021	749.14
70	33/11 kV S/s Sonprayag	2x3	28.10.2021	147.34
71	33/11 kV S/s Ranipokhri	2x5	28.01.2022	500.10
72	33/11 kV S/s Aarakot	2x3	16.02.2022	213.11
73	33/11 kV S/s Nakot	2x3.15	06.04.2022	299.50
74	33/11 kV S/s Chakisain	2x3	13.11.2022	470.71
75	33/11 kV S/s Satyon	2x5	24.05.2023	307.21

Note: *The above cost is as per agreement & tender for above substations has been awarded on turnkey and non-turnkey basis. Cost of power transformer is not included in agreemented cost.*

18. …

Submission of UPCL

The strengthening of 33/11 kV Substation Sonprayag and the proposal for a new substation at Shri Kedarnath Dham, the following is being respectfully submitted:

a) Strengthening of Existing Infrastructure:

UPCL has already initiated actions to reinforce the existing system, including:

- *Augmentation of the 33 kV line from Guptkashi to Sonprayag, where the existing 25 Km. Rabbit conductor is approved to be upgraded to Dog conductor to increase the current carrying capacity and improve system stability.*
- *Capacity enhancement of the 33/11 kV Substation Sonprayag from 2x3 MVA to 2x8 MVA, approved to address the growing load of Sonprayag and the expected demand from the upcoming ropeway project.*

b) Rationale for the Proposed 33/11 kV Substation at Shri Kedarnath Dham:

The proposal for a dedicated substation at Shri Kedarnath Dham is based on a thorough evaluation of existing and future load demands, as detailed below:

- ***High Concentrated Load at Kedarnath Dham:***

  The Public Works Department (PWD) has projected an 7758 kW load to meet the needs of newly constructed buildings and infrastructure under the Kedarnath Master Plan. This concentrated demand at a single location requires a dedicated power source for reliable and uninterrupted supply, especially during the high-load pilgrimage season.

- ***Additional Load from the Ropeway Project:***

  The NHAI's upcoming ropeway project is expected to add an 7800 kW distributed load between Sonprayag and Kedarnath. This substantial new demand cannot be supported by the existing network without significant risk of overloading.

- ***Need for Load Balancing and Reliability:***

  While Sonprayag Substation's capacity augmentation will address the local and ropeway demands, it will still not be sufficient to cater to both Sonprayag and Kedarnath Dham's combined future loads.

  Establishing a dedicated substation at Shri Kedarnath Dham is essential to:

  - *Provide a stable power supply directly at the load center.*
  - *Reduce transmission losses over the long feeder.*
  - *Ensure voltage stability and improve load distribution across the network.*
  - *Enhance network reliability in this geographically sensitive area.*

c) 11 kV Pole-wise Existing Working Condition of Feeders from Sonprayag to Shri Kedarnath Dham:

Currently, three 11 kV feeders are emanating from 33/11 kV Substation Sonprayag towards Shri Kedarnath Dham:

1. Shri Kedarnath Dham Feeder:

- ***Conductor:*** *Rabbit and Weasel.*
- ***Route:*** *Feeds en-route areas including Gaurikund, Jungle Chatti, Bheembali, Lincholi, Base Camp, Rudra Point, and finally Sri Kedarnath Dham.*
- ***Status:*** *Operational, but constrained due to aging infrastructure and load growth.*

2. PPCL-1 & PPCL-2 Double Circuit Feeder:

- ***Structure:*** *Mixed overhead (11 km) and underground (10 km).*
- ***Conductor:*** *Dog.*
- ***Status:*** *Non-operational, most of the underground cable sections are damaged and irreparable due to their location beneath the pedestrian pathway and road built for pilgrims.*

- *Additionally, a major portion of the underground line between Lincholi and Gaurikund was destroyed during last year's cloudburst and natural calamity.*
- ***Future Plan:*** *This line is proposed to be converted to 33 kV on overhead structures to enhance durability and ensure reliable power flow.*

While strengthening of the 33/11 kV Substation Sonprayag and its upstream network is ongoing and essential for meeting localized demand, the establishment of a new 33/11 kV Substation at Shri Kedarnath Dham is critical for the long-term power needs of the region.

It will ensure a dedicated, stable, and reliable power supply to cater to the rapidly increasing load due to PWD's infrastructure developments and the ropeway project, safeguarding both present and future electricity requirements in this vital pilgrimage zone.

19. …

Submission of UPCL

The voltage profile calculation for each node at the 33 kV and 11 kV buses of the following substations in both pre-construction and post-construction scenarios of the proposed 33/11 kV Substation at Shri Kedarnath Dham, the following is respectfully submitted:

Substations Considered:

- *132/33 kV Substation Srinagar (40+20 MVA)*
- *33/11 kV Substation Rudraprayag (2x10 MVA)*
- *33/11 kV Substation Augustmuni (1x5 MVA)*
- *33/11 kV Substation Guptkashi (3+5 MVA)*
- *33/11 kV Substation Sonprayag (2x3 MVA, proposed augmentation to 2x8 MVA)*

Voltage Profile Calculation:

- *The voltage profile calculations for the above substations have been carried out considering the network topology as per the existing and proposed Single Line Diagram (SLD) of the 33 kV network.*
- *The* calculations *cover the following scenarios:*
  - ***Pre-Construction Scenario:***

    Existing system operation without the proposed 33/11 kV S/s at Shri Kedarnath Dham, catering to current loads with the existing infrastructure.

- ***Post-Construction Scenario:***

  After the commissioning of the proposed 33/11 kV Substation at Shri Kedarnath Dham (2x5 MVA), considering the projected additional loads of:

  8 MVA (PWD Kedarnath Master Plan).

  8 MVA (NHAI Ropeway Project).

- *The post-construction scenario also factors in the augmentation of Sonprayag Substation to 2x8 MVA and conductor upgradation from Rabbit to Dog conductor on the critical* Guptkashi - *Sonprayag section.*

Observations:

- *Under the pre-construction scenario, the system shows increasing voltage drops towards Sonprayag and Kedarnath Dham, particularly under peak load conditions, resulting in poor voltage profiles at end nodes and reduced reliability.*
- *In the post-construction scenario, after the commissioning of the 33/11 kV Substation at Shri Kedarnath Dham, the network demonstrates:*
- *Significantly improved voltage levels at critical nodes, especially at Kedarnath Dham.*
- *Reduced load burden on the upstream substations (Sonprayag, Guptkashi, Augustmuni, Rudraprayag, and Srinagar), leading to better voltage stability across the network.*
- *Enhanced overall power quality and system reliability due to optimized load distribution and reduction of line losses.*

The detailed voltage profile calculations for each node at the 33 kV and 11 kV buses under both scenarios is being enclosed as Annexure -N.

20. …

Submission of UPCL

On account of inaccessibility of site by road and tough hilly terrain at an altitude ~3500 meters, it is proposed that the electrical equipment and other necessary infrastructure for the said project shall be transported to the proposed location through airlift. The cost of airlifting of equipment has been taken as per verbal discussion with local PWD engineers and considering the requirement of safe transport handling of equipment required to be airlifted. The cost of airlifting has been estimated to be around 1.5 times the cost of material.

21. …

Submission of UPCL

The point was incorporated to prioritize the lifting of material as per project progress.

Accordingly, the contractor is expected to airlift the following materials:

a) Steel items for canopy and shed construction.

b) Core and winding of power transformer.

c) Core and winding of distributions transformers.

d) Manufacturing and testing equipment.

e) Tank of transformers and other items for.

f) Permanent Magnetic Actuator (PMA) type breakers and control panels.

g) Cables and MS channel/angle.

22. …

Submission of UPCL

The details of weights of transformers, breakers, measuring instruments, isolators, conductors, cables etc ***is being enclosed as Annexure-O****.*

23. …

Submission of UPCL

The rationale for selecting the location of the proposed 33/11 kV Substation at Shri Kedarnath Dham instead of solely augmenting the capacity of the 33/11 kV Substation at Sonprayag, the following justification is submitted:

Rationale for the proposed 33/11 kV Substation at Shri Kedarnath Dham:

The decision to establish a dedicated substation at Shri Kedarnath Dham is based on a comprehensive evaluation of the current and projected future power demand in the region, as outlined below:

- ***High Concentrated Load at Kedarnath Dham:***

  The Public Works Department (PWD) has submitted a demand of 7758 MVA to meet the electricity requirements of newly developed infrastructure under the Kedarnath Master Plan. This significant concentrated load at a single location necessitates a dedicated power source to ensure continuous, stable, and reliable supply, particularly during the peak pilgrimage season when demand surges.

- ***Additional Load from the Upcoming Ropeway Project:***

  The NHAI has projected an additional 7800 MVA distributed load for the Sonprayag - Kedarnath Ropeway Project. This new demand will be sprea`d across the ropeway alignment and further increase the overall electrical load between Sonprayag and Kedarnath Dham, which the existing system cannot support without risking overloading and supply instability.

- ***Limitations of Augmenting Sonprayag Substation Alone:***

  While the augmentation of the Sonprayag Substation from 2x3 MVA to 2x8 MVA has been approved to address local and ropeway-related demands, this enhancement alone is insufficient to support the combined loads of both Sonprayag and Shri Kedarnath Dham. Relying solely on Sonprayag for all downstream power requirements would result in:

  - *Higher transmission losses due to the long distance from Sonprayag to Kedarnath.*
  - *Greater voltage drops at the tail-end (Kedarnath), especially during peak demand.*
  - *Reduced system reliability in an already geographically vulnerable region.*

- ***Benefits of Establishing the Shri Kedarnath Dham Substation:***

  The proposed substation at Shri Kedarnath Dham is essential to:

  - *Deliver stable and reliable power directly at the demand center.*
  - *Minimize voltage fluctuations and transmission losses over the extended feeder.*
  - *Provide balanced load distribution across the network, improving system performance.*
  - *Enhance overall network resilience and reliability in this critical and remote area, which is subject to extreme weather and operational challenges.*

While augmentation at Sonprayag Substation is progressing to meet immediate and local demand, the establishment of a new 33/11 kV Substation at Shri Kedarnath Dham is a strategic requirement to sustainably manage the long-term power needs of the region, particularly in light of the PWD's infrastructure development and the ropeway project.

24. …

<u>Submission of UPCL</u>

It is humbly submitted that the work for construction of 33/11 kV S/s Shri Kedarnath Dham was awarded on 14-02-2025.

25. …

<u>Submission of UPCL</u>

The same point has already been discussed at point no, 7 which is again reiterated here for kind perusal of Hon'ble Commission.

Proposal for construction of 33 kV line from upcoming 220 kV Brahmbari substation (proposed for construction by PTCUL) to Shri Kedarnath Dham via

33/11 kV S/s, Sonprayag was prepared, but on later stage it came to the notice that there is land dispute case at 220 kV Brahmbari substation, therefore proposal for construction of said 33 kV line has been withheld as of now and proposal for the same shall be presented before the Hon'ble Commission after clearance of land dispute. It may please also be noted that the location of proposed 20 kV Brahmbari substation may be altered, accordingly a separate proposal for conversion of existing 11 kV D/C line on lattice tower to 33 kV D/C line on lattice tower for energizatation of 33/11 kV S/s Shri Kedarnath Dham has been prepared and is being put up before the BoD for approval.

The funding for construction of the new 2x5 MVA, 33/11 kV Substation at Shri Kedarnath Dham has been approved under the SASCI scheme, whereas the conversion of existing 11 kV D/C line on lattice tower to 33 kV D/C line on lattice tower for energizatation of 33/11 kV Substation Shri Kedarnath Dham is proposed through Internal Resources.

It is also to mention that time period for construction of 33/11 kV S/s Shri Kedarnath Dham has been proposed as 36 months from date of award, however, completion period for the line proposed to be upgraded will be 12 months from the date of award, as most of the structure for the line is already in existence and reconductoring remains the only major work.

The Activity-wise time schedule for the completion of the aforesaid conversion of damaged 11 kV line into 33 kV line work ***is being enclosed as Annexure-E.***

26. …

Submission of UPCL

It is humble submitted that the testing of power and distribution transformers for the proposed works at Shri Kedarnath Dham, will be as follows:

1. List of Tests to be Conducted as per Relevant IS/IEC Standards:

a) Power Transformers (as per IS 2026 /IEC 60076):

Test Category	***Description of Tests***
Type Tests	*Lightning impulse test, temperature rise test, short circuit withstand test, etc.*
Routine Tests	*Measurement of winding resistance, ratio, polarity, vector group, no-load and load losses, insulation resistance, dielectric tests, etc.*
Factory Acceptance Tests (FAT)	*Verification of design parameters, type tests (if applicable), and routine tests in the manufacturer's premises before dispatch.*
Site Acceptance Tests (SAT)	*Visual inspection, insulation resistance test, transformer turns ratio (TTR) test, oil BDV test, winding resistance test, and pre-commissioning checks.*

b) Distribution Transformers (as per IS 1180/IEC 60076):

Test Category	***Description of Tests***
Type Tests	*Temperature rise test, impulse test, short circuit withstand test, etc.*
Routine Tests	*Insulation resistance, ratio test, polarity, vector group, no-load and load losses, dielectric tests, etc.*
Factory Acceptance Tests (FAT)	*Witnessing of routine and type tests (if applicable) at the manufacturer's premises.*
Site Acceptance Tests (SAT)	*Visual inspection, insulation tests, oil quality tests, winding resistance, and ratio tests during installation and commissioning.*

2. *Testing of Transformers at Shri Kedarnath Dham (In Case of Site Assembly):*

Due to the challenging location and high-altitude conditions at Shri Kedarnath Dham, if power and distribution transformers are transported in parts and assembled at site, the following measures shall be undertaken to ensure quality and compliance:

- ***Supervision by Qualified Engineers:***

  Site assembly and testing shall be carried out under the supervision of experienced technical teams from UPCL and the transformer manufacturer.

- ***Pre-Dispatch Testing:***

  All components and sub-assemblies shall undergo complete FAT at the manufacturer's works before dispatch to confirm compliance with technical specifications and standards.

- ***Post-Assembly Site Tests:***

  After assembly at site, SAT will include critical tests such as:

  - *Insulation resistance test.*
  - *Winding resistance test.*
  - *Ratio test.*
  - *Oil filtration and dielectric strength (BDV) test.*
  - *Functional checks for cooling systems and protection devices.*

- ***Test Equipment Mobilization:***

Necessary portable test equipment (such as insulation testers, TTR kits, oil BDV kits, etc.) will be mobilized to the site for conducting these tests despite the remote location.

- ***Final Commissioning:***

  Successful completion of all SATs will be ensured before putting the transformers into service to guarantee reliable operation under site conditions.

27. …

Submission of UPCL

The maintenance and repair strategy for the proposed 33/11 kV S/s and distribution transformers at Shri Kedarnath Dham, the following is submitted:

Maintenance and Repair Plan for Shri Kedarnath Dham Power Infrastructure:

Considering the remote, high-altitude, and geographically vulnerable location *of Shri Kedarnath Dham, UPCL has developed a comprehensive maintenance and emergency response strategy to ensure the* continuous operation and quick restoration *of the power supply in case of faults or natural calamities:*

1. Preventive Maintenance Measures:

- *Scheduled preventive maintenance of all equipment (including power transformers, distribution transformers, switchgear, protection systems, and LT/HT cables) will be carried out before the start of each pilgrimage season to minimize the risk of breakdowns during peak periods.*
- *Annual inspection, testing, and servicing of transformers and critical components will be conducted during the off-season (winter months) when access is feasible, ensuring readiness for reopening.*

2. Deployment of Strategic Spare Parts:

- *Essential spare parts, such as transformer oil, bushings, fuses, relays, insulators, and protection devices, will be stored at a nearby UPCL facility (Sri Kedarnath and Sonprayag) to enable timely replacement and minimize downtime.*
- *A spare distribution transformer of suitable capacity will also be kept on standby at Sri kedarnath for rapid replacement if required.*

3. Emergency Repair Response:

- *UPCL will maintain a dedicated technical team at Sri Kedarnath during the pilgrimage period for quick restoration in case of any faults.*

- *Necessary portable testing and repair equipment (insulation testers, oil filtration units, TTR kits, etc.) will be available for on-site diagnostics and minor repairs.*

4. Natural Calamity Preparedness:

- *The substation and associated infrastructure are being designed with disaster-resilient features, including proper foundation design, retaining structures, and weatherproof Annexures to withstand harsh environmental conditions.*
- *A restoration plan has been formulated to ensure phased recovery after natural disasters, involving coordination with disaster management authorities and pre-identified contractor support for emergency works.*

5. Accessibility During Emergencies:

- *Helicopter-based logistics (if required and permitted) will be considered for urgent delivery of critical materials during blocked road conditions due to landslides or heavy snowfall.*
- *Coordination with the district administration and other government agencies will ensure prompt clearance of access routes during emergencies.*

Through this integrated maintenance and disaster preparedness approach, UPCL aims to ensure reliable, continuous power supply to Shri Kedarnath Dham while minimizing service disruptions and ensuring swift restoration in the event of any fault or natural calamity.

28. …

Submission of UPCL

In reference to the evaluation of project cost from the project life cycle perspective, it is submitted that the turnkey contract for the construction of the 33/11 kV Substation and installation of 4x2000 kVA capacity distribution transformers at Kedarnath includes a comprehensive Annual Maintenance Contract (AMC) for a period of 5 years, which will commence after the completion of the Defect Liability Period (DLP) of 2 years.

The scope of the AMC under the turnkey contract covers the complete operation and maintenance of the 33/11 kV substation, the 11 kV network, and the distribution transformers constructed and commissioned under this project by the successful bidder.

Furthermore, it is pertinent to mention that currently, line staff along with necessary material support is deployed for system maintenance during the pilgrimage season. The same resources will continue to be engaged for the maintenance of the newly developed system as well. Therefore, no additional annual

O&M expenditure is anticipated on account of staffing or routine maintenance beyond what is already provisioned in the present scenario during the AMC period.

Accordingly, the annual O&M expenses for the first 7 years (including 2 years DLP and 5 years AMC) are effectively covered under the contractual obligations of the EPC contractor and existing operational arrangements. Beyond this period, the O&M cost will primarily depend on the condition of the assets and prevailing rates at that time.

Hence, the lifecycle cost of the project has been optimized through this integrated approach, ensuring minimal long-term O&M costs while maintaining high system reliability.

29. …

Submission of UPCL

The basis for cost estimate for each line item proposed in their instant proposal of 33/11 kV S/s at Shri Kedarnath Dham is being enclosed as Annexure-P.

In view of above, the desired information is enclosed for your kind information and necessary action."

11. To discuss the aforesaid submissions of the Petitioner in details, a meeting with its officials was conducted on 20.03.2025 and accordingly, based on the examination of the Petitioner's reply dated 12.03.2025 and discussion held in the aforesaid meeting dated 20.03.2025, the Commission observed certain additional deficiencies/infirmities in the submissions and accordingly, the Commission vide its letter dated 21.03.2025 directed the Petitioner to furnish its reply on the points mentioned below:-

"***Construction of 2x5 MVA, 33/11 kV Substation at Shri Kedarnath Dham, Rudraprayag***

1. *With regard to submission made at point no. 1 regarding land acquisition, UPCL has furnished that a land of 0.0840 Hectare has been required. In this regard, UPCL is required to confirm regarding the availability of land w.r.t. future load growth as UPCL is anticipating a load of 7.7 MW of PWD. Further, UPCL is required to confirm that how 'T-1' contingency condition would be met in the eventuality of 5 MVA transformer failure.*
2. *With regard to submission made at point no. 2, UPCL is required to confirm the BIL correction factor for 11 kV and 33 kV assets. Further, UPCL is required to confirm that whether the aforesaid BIL correction factors have also been considered*

for the existing electrical assets vis. distribution transformers, 11 kV breakers, cables etc. installed at Shri Kedarnath Dham. Furthermore, UPCL is required to confirm the annual DT failure rate for the distribution transformers installed at Shri Kedarnath Dham for last 03 years.

3. *With regard to submission made at point no. 3, UPCL has submitted that "All the material/equipment/structure under the project shall be suitable for satisfactory and continuous operation at an altitude upto 4000 m (above MSL) and ambient temperature upto (-) 400C even if it is not specifically mentioned in the technical specification of particular item", in this regard, UPCL is required to confirm that how it is going to validate/confirm that material/equipment/structure would be suitable for operating at altitude upto 4000 m (above MSL) and ambient temperature upto (-) 400C when specifically the same has not been mentioned in the technical specifications.*

4. *With regard to submission made at point no. 5, UPCL has enclosed the Geological Survey Report for proposed 33/11 kV S/s at Shri Kedarnath Dham wherein, following observation has been mentioned:-*

   "

   - *It has been observed that the proposed location of the station is in close proximity to riverbank of the Mandakini Saraswati River and around 3m above the channel. The location is predominantly moraine which is inherently unstable and susceptible to toe erosion over time, so the location of substation should be at lease 50m away from the channel.*
   - *Based on the observations, it is suggested either relocate to other location or conduct a detailed geotechnical investigation. Additionally, suitable mitigation measures should be implemented to prevent toe erosion before proceeding with the construction of the substation."*

   Further, a photograph depicting the location of the proposed substation is provided wherein some establishment has been shown, UPCL is required to provide the details of the same. Furthermore, UPCL is required to furnish the corrective steps taken by it w.r.t. the aforesaid observations.

5. *With regard to submission made at point no. 7, UPCL at Annexure-E has enclosed a timeline for conversion of 11 kV double circuit line on lattice tower to 33 kV*

double circuit line on lattice tower. In this regard, UPCL is required to confirm regarding the status of tendering as the timeline for the said project depicts the name of turnkey contractor M/s Aarna Electrical & Co. Dehradun.

6. *With regard to submission made at point no. 11, UPCL is required to resubmit general arrangement drawing depicting station transformer oil sum-pit, control room building, transformer fire protection walls and space for 33 kV & 11 kV bays for future expansion.*

7. *With regard to submission made at point no. 13, UPCL is required to confirm that post construction of the proposed substation at Kedarnath Ji whether the existing installed distribution transformers i.e. 39 nos. with total installed capacity of 2301 kVA would remain in the system or not.*

8. *With regard to submission made at point no. 17, UPCL is required to furnish the rationale for usage of naphthenic based oil in power and distribution transformers. Further, UPCL is required to confirm why dry type transformers have not been proposed for the project.*

9. *With regard to submission made at point no. 18, UPCL is required to furnish the 11 kV circuit-wise SLD (PPCL-1 feeder, PPCL-2 feeder & old 11 kV feeder) depicting distribution of existing 39 nos. DTs at Shri Kedarnath Dham with details of conductor type and furnish the SLD of the proposed network depicting the load of the proposed 2x5 MVA 33/11 kV S/s, upcoming ropeway and existing distribution transformer.*

10. *With regard to submission made at Annexure-N, UPCL in voltage regulation calculation w.r.t. point 'E' has considered maximum load current as 48 Amps which correspond to 2.74 MVA only. Whereas the load to be catered from the proposed substation is 7.8 MW (PWD load) + 7.8 MW (upcoming ropeway project). UPCL is required to furnish revised voltage regulation calculation considering the same.*

11. *UPCL is required to furnish the cost benefit analysis of the aforesaid project.*

12. *UPCL in the meeting held on 20.03.2025 has submitted that it has approached the GoU for funding under SASCI scheme with the interest of 2%. In this regard, UPCL is required to confirm the status of approval from the GoU."*

12. In compliance to the Commission's letter dated 21.03.2025, UPCL vide its letter No. 1235/Dir. (Operation)/UPCL dated 21.03.2025 submitted its reply as mentioned below:-

"

1. …

Submission of UPCL

With reference to the query raised by the Hon'ble Commission, the point-wise response is as follows:

(i) Land Availability for Future Load Growth:

UPCL hereby confirms that the allocated 0.0840 hectares of land for the 33/11 kV S/s Shri. Kedarnathji Dham is adequate to accommodate future load growth, including the anticipated 7.7 MW load of PWD. The site has sufficient space available for any future substation expansion or capacity augmentation. This ensures the long-term scalability of the infrastructure to meet increasing demand requirements without the need for additional land acquisition.

(ii) 'T-1' Contingency Condition in the Event of a 5 MVA Transformer Failure:

In the eventuality of a 5 MVA transformer failure, the supply of the 5 MVA load can be reliably managed through an alternative power source. Specifically, two 11 kV feeders emanating from the 33/11 kV Substation Sonprayag extend up to the Kedarnath Substation's feeding area, ensuring continuity of supply.

Furthermore, the capacity enhancement of the 33/11 kV Substation Sonprayag from the existing 2x3 MVA to 2x8 MVA has already been awarded. This capacity upgrade will provide sufficient redundancy and additional load-bearing capability, thereby effectively meeting the 'T-1' contingency criteria and ensuring uninterrupted power supply to the Shri. Kedarnathji Dham region.

(iii) Planned Augmentation to Enhance Reliability:

Additionally, UPCL is planning to add another 5 MVA transformer within the scope of the turnkey contract, thereby upgrading the substation capacity from the current 2x5 MVA to 3x5 MVA. This augmentation will further strengthen the network's reliability and its ability to meet future load growth and contingency conditions effectively.

We assure the Hon'ble Commission that these measures will ensure the robustness and reliability of the power supply infrastructure at Shri. Kedarnathji Dham, even during contingency scenarios.

2. …

Submission of UPCL:

(i) BIL correction factor for electrical assets:

- ***Proposed electrical assets:*** *It is submitted that it has been made mandatory in the bid that "All the material/equipment/structure under the project shall be suitable for satisfactory and continuous operation at an altitude upto 4000m (above MSL) and ambient temperature upto (-) 40°C even if it is not specifically mentioned in the technical specification of particular item." It is being ensured while approving Guaranteed Technical Particulars (GTPs) of the equipment before allowing the contractor to procure the equipment, that all the equipment have BIL level (Impulse withstand voltage and one-minute power frequency withstand voltage) as 95kVp/ 35kVrms or more for 11 kV equipment and 195kVp/95kVrms or more for 33 kV equipment in place of as 75kVp/28kVrms and 170kVp/ 70kVrms respectively. It is submitted for kind reference that for 11 kV switchgear panels, the BIL level has been approved as 110kVpeak/38kVrms and for 33 kV switchgear panels, the BIL level has been approved as 235kVpeak/95kVrms.*
- ***Existing electrical assets:*** *The BIL correction factors have been also considered for existing electrical assets, including:*
  - *Distribution Transformers*
  - *11 kV Breakers*
  - *Cables*

(ii) ***Annual DT failure rate:***

The annual Distribution Transformers (DT) failure rate for transformers installed at Shri. Kedarnathji DHam over the last three years is approximately 4%.

3. …

Submission of UPCL:

It is submitted that it has been made mandatory in the bid that "All the material/equipment/ structure under the project shall be suitable for satisfactory and continuous operation at an altitude upto 4000m (above MSL) and ambient temperature upto (-) 40°C even if it is not specifically mentioned in the technical specification of particular item."It is being ensured while approving Guaranteed Technical Particulars (GTPs) of the equipment before allowing the contractor to procure the equipment, that all the equipment have BIL level (Impulse withstand voltage and one-minute power frequency withstand voltage) as 95kVp/35kVrms or more for 11 kV equipment and 195kVp/95kVrms or more for 33 kV equipment in

place of as 75kVp/28kVrms and 170kVp/70kVrms respectively. It is submitted for kind reference that for 11 kV switchgear panels, the BIL level has been approved as 110kVpeak/38kVrms and for 33 kV switchgear panels, the BIL level has been approved as 235kVpeak/95kVrms.

4. …

Submission of UPCL:

With reference to the query raised by the Hon'ble Commission, the point-wise response is as follows:

(i) Corrective Measures Taken by UPCL:

UPCL has duly considered the observations highlighted in the geological survey report regarding the proximity of the proposed 33/11 kV substation to the Saraswati River. To mitigate the risk of toe erosion and enhance the stability of the site, a robust retaining wall has been proposed along the Saraswati riverbank. This measure will effectively safeguard the substation infrastructure against potential erosion and ensure long-term stability.

(ii) Geological Context and Existing Master Plan Development:

It is pertinent to bring to the Commission's attention that the entire master plan of Shri Kedarnath Dham, which includes multiple buildings and establishments, has been developed on land with similar geological survey conditions. These structures are located between the inland of the confluence of the Saraswati and Mandakini rivers. The proposed substation site is part of this overall development and adheres to the same geotechnical and safety considerations.

(iii) Clarification Regarding the Photograph in the Geological Survey Report:

The photograph referenced in the report depicts temporary structures, such as tin sheds used for laborers' residences, camps of pilgrims and shopkeepers, and other provisional facilities related to the master plan project. These structures were present prior to the handover of the site to UPCL and are not part of the permanent substation infrastructure.

We assure the Hon'ble Commission that all necessary mitigation measures and structural reinforcements have been planned and will be implemented to ensure the safety, stability, and reliability of the substation.

5. …

Submission of UPCL:

With reference to the query raised by the Hon'ble Commission, UPCL would like to confirm the following:

(i) Status of Tendering Process:

The tendering process for the conversion of the 11 kV double circuit line on lattice tower to a 33 kV double circuit line on lattice tower has been successfully completed. The L-1 bidder, M/s Aarna Electrical & Co., Dehradun, has been identified.

(ii) Status of Work Award and Execution Plan:

The work award for the project is yet to be issued to the L-1 bidder. UPCL is expediting the finalization of the award process to ensure the timely commencement of the line work.

To facilitate efficient execution, the turnkey contractor will be instructed to promptly begin line work and make necessary arrangements for staking of structures and line materials at specified locations. This preparatory measure is essential to ensure that the project is completed before the commencement of the pilgrimage season, thereby avoiding any disruption to the pilgrimage activities.

We assure the Commission that UPCL is committed to adhering to the proposed timeline and ensuring the project's smooth and timely completion.

6. …

Submission of UPCL:

The drawing of proposed 2x5 MVA, 33/11 kV Substation at Shri. Kedaarnathji dham depicting overall dimension of Substation, power transformer, Substation Transformer, Control room building, oil sum-pit and transformer firewall protection ***is being enclosed as Annexure-A****.*

It is also to apprise the Hon'ble Commission that sufficient space in yard and control room is available for expansion of 33 kV & 11 kV Bays.

7. …

Submission of UPCL:

The status of the existing installed distribution transformers (DTRs) post-construction of the proposed 33/11 kV S/s at Shri. Kedarnathji Dham, UPCL would like to confirm the following:

(i) DTRs to Remain in the System:

The majority of the small-capacity DTRs installed along the pilgrimage route and outside the inland area (Master Plan Project) will remain intact. These DTRs are essential for catering to the load demand along the pilgrimage path and in nearby areas, ensuring reliable power supply to pilgrims and local establishments.

(ii) DTRs to be Removed:

The DTRs installed inside the inland area, including those used for temporary connections, will be removed post-construction of the substation. The details of the DTRs to be removed are as follows:

- *63 kVA – 12 Nos.*
- *100 kVA – 2 No.*

These DTRs will be kept as standby units at the local store at Shri Kedarnath Dham. This will enable quick deployment during contingencies or additional temporary load requirements.

We assure the Commission that this strategy is aimed at enhancing the reliability and efficiency of the distribution network in the region while ensuring optimal utilization of existing infrastructure.

8. …

Submission of UPCL:

It is to submit that the Pour point for Paraffinic based oil (commonly used in transformers) is usually between (-)12^{o}C to (-15)^{o}C whereas pour point for naphthenic based oil is approx. (-)70^{o}C. Maintain a low pour point insure proper circulation of oil to provide effective cooling and insulation for electrical equipments. Hence considering extreme cold climatic condition of Shri. Keadrnathji Dham, provision of usage of naphthenic based oil in power & distribution transformers has been done.

Dry type transformers have not been proposed for the project due to weight constraint for airlifting, it has discussed & finalized to assemble & manufacture 4 Nos. – 2 MVA DRTs at site along with HV/LV switchgear & adequate enclosure to protect them from heavy snowfall.

9. …

Submission of UPCL:

The submission of 11 kV circuit-wise SLD and the SLD of the proposed network, UPCL would like to confirm the following:

(i) 11 kV Circuit-Wise SLD (Existing Network):

The circuit-wise single line diagram (SLD) of the existing 11 kV network at Shri Kedarnath Dham, including:

- *PPCL-1 feeder*
- *PPCL-2 feeder*
- *Old 11 kV feeder*

The SLD depicts the distribution of the existing 39 nos. DTRs, along with detailed information regarding the conductor type used in the network.

(ii) SLD of the Proposed Network:

The SLD of the proposed network has also been attached, which illustrates:

- *The load distribution of the proposed 2x5 MVA, 33/11 kV Substation.*
- *The upcoming ropeway load integration.*
- *The existing distribution transformers connected to the new network.*

The aforementioned SLDs ***is being enclosed as Annexure-B***

10. …

Submission of UPCL:

The voltage regulation calculation at Point 'E', UPCL would like to submit the following clarifications:

(i) Effective Load Considered in the Calculation:

The peak demand of 7.8 MW anticipated by PWD includes the cumulative load of all government department buildings (such as police force office & residences, health department, tourist department, etc.) proposed under the master plan project area.

- *These departments are currently located outside the master plan site and will be shifted to the new buildings once construction is completed.*
- *Consequently, the effective load expected to be raised after the relocation is estimated to be 5.5 MVA, which has been appropriately considered in the voltage regulation calculation.*

(ii) Current Distribution at Node 'E':

- *At Node 'E' (33/11 kV Substation Sonprayag), the existing 11 kV double circuit line on Dog conductor is proposed to be upgraded to 33 kV double circuit line up to the 33/11 kV Substation at Shri. Kedarnathji Dham.*
- *Therefore, the current of 96 amps is assumed to be divided equally across both conductors, which results in an effective current of 48 amps per conductor.*

(iii) Revised Voltage Regulation Calculation:

It is to submit that the revised voltage regulation calculation considering the above -mentioned factors, including the proposed substation is 7.8 MW (PWD load) + 7.8 MW (upcoming ropeway project). The revised calculation ***is being enclosed as Annexure-C****.*

We assure the Commission that these calculations accurately reflect the expected load distribution and network configuration, ensuring the

reliability and efficiency of the power supply infrastructure at Shri. Kedarnathji Dham.

11. …

Submission of UPCL:

It is to submit that Finance Department, GoU is principally agreed to reduced the rate of interest for funding the project. The cost benefit analysis considering the interest rate of 2.25% ***is being enclosed as Annexure-D****.*

12. …

It is humbly apprise to Hon'ble Commission that Finance department, GoU is principally agreed to reduce the rate of interest for funding the project. However, UPCL is trying to negotiate the rate of interest as low as possible. "

Commission's Observations, Views & Directions: -

13. Based on the examination and analysis of the proposal & subsequent submissions made by the Petitioner before the Commission, the observations, views & directions of the Commission are as follows:

(1) The Petitioner in its instant Petition has proposed Construction of 33/11 kV Substation comprising 2x5 MVA Power Transformers alongwith 4x2 MVA Distribution Transformers, associated 11 kV network, civil works such as approach road, retaining wall, power control room etc. at Shri Kedarnath Dham. The total estimated cost of the project as submitted by the Petitioner is Rs 118.93 Cr. including IDC of Rs. 4.07 Cr., which is also accorded by its Board of Directors in 121st meeting held on 26.12.2024.

(2) The Petitioner has submitted that the construction of proposed Substation at Shri Kedarnath Dham is required to ensure 24x7 reliable, sustainable and resilient power supply to the high-altitude pilgrimage destination with improved voltage profile. This Substation will also cater to the load of upcoming Ropeway project and developmental works proposed under Master Plan to be carried out by PWD at Shri Kedarnath Dham.

(3) The Petitioner submitted that it has prepared a DPR with a total project outlay of Rs. 173.42 Cr. comprising of the works proposed in the instant Petition alongwith the works pertaining to construction of 33 kV Double Circuit (D/C) line on 132 kV lattice towers from the proposed 220 kV S/s

at Brahmbari to the proposed 33/11 kV S/s, Shri Kedarnath Dham via existing 33/11 kV S/s, Sonprayag. The transportation cost & cost involved in compensation against land & crop is also included in the DPR.

(4) The Petitioner, further submitted that the Technical Audit Committee (TAC) of GoU has sanctioned the outlay of Rs 166.90 Cr out of the project outlay of Rs 173.42 Cr. The GoU vide its letter no. 775/I(2)/2024-6 (03)-17/2022, dated 02.12.2024 has sanctioned Rs. 80 Cr. under Special Assistance to States for Capital Investment (SASCI) of Government of India against total sanctioned cost of Rs. 166.90 Cr. approved by TAC. Out of the total sanctioned amount of Rs 80 Cr. under SASCI scheme, Rs 56 Cr. shall be met as debt with interest @ 6.5% and Rs. 24 Cr. as equity from GoU. Furthermore, the Petitioner submitted that the balance amount of the sanctioned project outlay by TAC of GoU i.e. Rs. 86.90 Cr. (Rs 166.90 Cr. – Rs. 80 Cr.) is expected to be sanctioned & released under SASCI scheme in upcoming financial year.

(5) On examination of the Petitioner's aforesaid submissions, the Commission observed that the Petitioner in the instant Petition has proposed the works pertaining to construction of new 2x5 MVA 33/11 kV S/s at Shri Kedarnath alongwith installation of 04 no. 2 MVA distribution transformer, associated 11 kV lines, civil works and its transportation cost. However, the works pertaining to construction of 33 kV Double Circuit line on 132 kV lattice tower from the proposed 220 kV S/s at Brahmbari to the proposed 33/11 kV S/s, Shri Kedarnath Dham via existing 33/11 kV S/s, Sonprayag has not been included in the instant Petition due to land related issues/disputes for construction of proposed PTCUL's 220/33 kV S/s/ Brahmbari. The Petitioner has submitted that it will come up with the same after the resolution of the aforesaid land dispute/issues.

(6) Summary of the total outlay of the works proposed in the DPR alongwith the estimated cost, cost approved by TAC, GoU, sanctioned received under SASCI etc. is as follows:

S. No.	Outlay of the works	Cost submitted to GoU	Cost Sanctioned/ Approved by TAC, GoU	Sanctioned under SASCI	Cost approved by BoD and proposed in instant petition
1.	Construction of new 2x5 MVA, 33/11 kV Substation at Shri Kedarnath Dham	Rs. 34.86 Cr.	Rs. 62.13 Cr.	Rs. 80.00 Cr. (**balance is expected to be sanctioned in upcoming years**)	Rs. 118.93 Cr. (including IDC Rs. 4.07 Cr)
2.	Installation of 04 no. 2 MVA distribution transformer, construction of 11 kV line, Installation of 33 kV GIS Panel, Installation of 11 kV GIS Panel	Rs. 12.69 Cr.			
3.	Cost involved in Airlifting/ Sky Crane/Head Load of above 02 components	Rs. 34.86 Cr.	Rs. 29.95 Cr.		
Sub total		Rs. 82.41 Cr.	Rs. 92.08 Cr.		Rs. 118.93 Cr.
4.	Construction of 33 kV double circuit line on 132 kV lattice tower from 220 kV substation, Brahmbari (Rudrapur) to 33/11 kV S/s Sonprayag	Rs. 34.95 Cr.	Rs. 36.02 Cr.		Shall be takenup by the Petitioner separately after clearance of land dispute arisen on the construction of proposed 220/33 kV S/s at Brahmbari
5.	Construction of 33 kV double circuit line on 132 kV lattice tower from 33/11 kV S/s Sonprayag to Shri Kedarnath Dham including cost involved in Airlifting/Sky Crane/Head Load	Rs. 39.42 Cr.	Rs. 34.80 Cr.		
6.	Cost involved in compensation against land and crop and forest clearance	Rs. 16.64 Cr.	Rs. 4.00 Cr.		Expenditure will be done during the construction of line on actual basis.
Total		**Rs. 173.42 Cr.**	**Rs. 166.90 Cr.**	**Rs. 80.00 Cr.**	

(7) With regard to the nos. & capacity of Power Transformer in the proposed 33/11 kV S/s at Shri Kedarnath Dham, the Commission during the meeting

held with officers of UPCL on dated 20.03.2025 enquired the reason for deviating the size of the Power Transformer as approved by the GoU under SASCI scheme (3x3 MVA) with its instant proposal (2x5 MVA). The Petitioner during the meeting submitted that after consulting with the Technical experts & transformer manufacturer's, it has decided to change the size of power transformer because of techno-commercial aspect & provision to augment the capacity of proposed substation by installing additional power transformer for meeting the future load growth demand. Thus, it has changed the size of Power Transformer and revised the project cost in the DPR.

In this regard, the Commission is of the view that the Petitioner should design & implement the proposed 33/11 kV S/s at Shri Kedarnath Dham in such a way that in future if required, the space constraint shall not become the barrier for compliance of the Sub-station safety norms as per CEA Regulations, Substation expansion and capacity augmentation.

(8) The Commission observed that there are 03 nos. 11 kV feeders emanating from 33/11 kV existing 33/11 kV S/s at Sonprayag namely Shri Kedarnath Dham, PPCL-1 & PPCL-2. Shri Kedarnath Dham feeder is Single Circuit 11 kV feeder with a mix of Rabbit & Weasel conductor at various spans and is currently energized to supply power to Shri Kedarnath Dham, while the feeders namely PPCL-1 & PPCL-2 are 11 kV feeders with dog conductors and at present are non-operational as most of the Underground Cable Sections are damaged between Sonprayag and Shri Kedarnath Dham. This is a serious issue and requires to be enquired, for which separate proceeding would be taken-up.

(9) The route of 33 kV Double Circuit Line from the upcoming 220 kV S/s at Brahmbari to proposed 33/11 kV S/s at Shri Kedarnath Dham via existing 33/11 kV S/s at Sonprayag is yet to be finalized till resolution of the land disputes/issues related to construction of the proposed 220/33 kV S/s at Brahmbari. Hence, the Petitioner has planned conversion of existing non-operational 11 kV lines (PPCL-1 & PPCL-2) on lattice towers to 33 kV D/C

line on these towers as incomer of 33/11 kV S/s at Shri Kedarnath Dham. However, the Petitioner has not included the same in the instant proposal.

In this regard, the Commission is of the view that the Petitioner should expedite the works of conversion of aforesaid 11 kV lines to 33 kV D/C line, because any delay in execution of the work from the date of commissioning of proposed 33/11 kV S/s at Shri Kedarnath Dham would result in delay in energization of the said S/s and thus creation of stranded assets, which is not conducive for a commercial organization.

Further, the Commission is of the view that in order to leverage the full potential of the proposed 33/11 kV Substation at Shri Kedarnath Dham, the availability of strong voltage source in close vicinity preferably 132 kV and above is of paramount importance. Otherwise, the issues of voltage regulation would certainly creep in due to long 33 kV network which would not only make system unreliable and prone to frequent faults but also would result in increased I^2R/Technical losses in the system.

(10) From the submissions of the Petitioner, the Commission observed that PWD under the Shri Kedarnath Master Plan and NHAI under the Shri Kedarnath Ropeway project have projected the additional loads of 7.7 MW and 7.8 MW respectively. Further, NHAI has bifurcated its projected 7.8 MW Ropeway load into 4 sections/stations i.e. Sonprayag (300 kW), Gaurikund (1700 kW), Chirbasa (1900 kW), Lincholi (2500 kW) & Shri Kedarnath (1400 kW).

In this regard, the Commission is of the view that since the load of ropeway is scattered in between route of 33/11 kV S/s at Sonprayag and proposed 33/11 kV S/s at Shri Kedarnath Dham, therefore, the Petitioner instead of feeding all the stations load of ropeway from the proposed 33/11 kV S/s at Shri Kedarnath Dham should shift some ropeway stations loads into 33/11 kV S/s at Sonprayag in order to improve voltage profile, reduce overloading on Power Transformer and enhanced overall power quality & system reliability due to optimized load distribution & reduction of line losses.

(11) With regard to Testing of Power Transformers and Distribution Transformers, the Commission enquired the Petitioner as to how it would ensure the Testing of Power and Distribution Transformers as per the relevant IS/IEC standards when the same are to be assembled at Site. In this regard, the Petitioner submitted that the assembly of transformers & its testing shall be performed under the supervision of its technical team & transformer manufacturer's team and in order to ensure all necessary compliance of technical specifications & standards, it would carry out Factory Acceptance Test (FAT) of all components & sub-assemblies at the manufacturer's works before the dispatch of the same. It further submitted that post assembly of the Transformers, critical test viz. 'insulation resistance test', 'winding resistance test', 'ratio test', 'oil filtration' & 'dielectric strength (BDV) test' & 'functional checks for cooling systems & protection devices' shall be conducted at site by necessary portable test equipment's such as insulation testers, TTR kits, oil BDV kits, etc.

In this regard, the Commission is of view that the testing of Power Transformers ,Distribution Transformers and other electrical assets is very vital to ensure their reliable and safe operation of the same thus testing as per relevant IS/IEC standards is of paramount importance for identifying potential faults and assessing the condition of insulation and windings as per standards. The same even more important in a situation where the transformers are being assembled at such a geological vulnerable high-altitude frigid site. **Therefore, the Commission directs the Petitioner to ensure to conduct proper Factory Acceptance Tests, Routine Tests, Type Tests and Site Acceptance Tests for the proposed Power transformers, Distribution transformers** and other electrical assets **as per relevant IS/IEC standards**.

(12) With regard to 'N-1' line contingency, the responsibility of long-term planning of distribution system lies with the distribution licensee and the licensee is required to comply with the Regulation 3.6(4) of UERC (Distribution Code) Regulations, 2018, which stipulates that:

"(4) In every Sub-Station of capacity 10 MVA and above there shall be a provision for obtaining alternate 33 kV supply to the Sub-Station in case of a failure in the incoming supply."

In-line with the said provision of the Regulation, Petitioner has attempted in proposing the two source of power supply i.e. one from the upcoming 220 kV S/s at Brahmbari via 33/11 Sonprayag S/s and another from proposed conversion of non-operational 11 kV lines to 33 kV D/C line emanating from existing 33/11 kV S/s at Sonprayag, however, maintenance of the aforesaid lines in such vulnerable route would remain a challenging task for the Petitioner. Hence, the Commission is of the view that from the perspective of reliability & quality power supply, the proposed 33/11 kV S/s at Shri Kedarnath Dham would call for specific attention w.r.t. comprehensive maintenance plan.

(13) On examination of the submission made in the instant Petition, it has been observed that 25 km Rabbit conductor is placed between 33/11 kV S/s at Guptkashi and 33/11 kV S/s at Sonprayag which would certainly be a weak link in the system and thus the Commission enquired the reason from the Petitioner for not strengthening such weak links in the system before creating infrastructure in geographically vulnerable location. In response to same, the Petitioner submitted that in order to improve the reliable power supply to Sonprayag and further to Shri Kedarnath Dham, it would augment this section from Rabbit conductor to Dog conductor and also enhance the existing 2x3 MVA capacity of 33/11 kV S/s at Sonprayag to 2x8 MVA capacity. Further, the Petitioner has also submitted that it would construct 33 kV express feeder upto 33/11 kV S/s, Sonprayag from 33/11 kV S/s, Rudraprayag which is supported by three reliable 33 kV sources viz. 132/33 kV Substation Srinagar, 132/33 kV Substation Simli via 33/11 kV S/s Gauchar & 132/33 kV S/s Chamba via 33/11 kV S/s Ghanshali.

In this regard, the Commission is of the view that the responsibility of long-term planning of distribution system lies with the distribution licensee and therefore, the Petitioner should strengthen its 33 kV line network & capacity

of substations to address the future load growth and ensure reliable power supply at such locations.

(14) The Commission sought the details of 33/11 kV S/s executed by the Petitioner in last 10 years. To which, the Petitioner submitted the list of S/s alongwith its installed capacity, date of energization & executed project cost.

On comparing the cost of the Substations commissioned by the Petitioner during last 10 years to the cost of the proposed Substation at Shri Kedarnath Dham, it is found that the estimated cost of construction of new 2x5 MVA 33/11 kV S/s at Shri Kedarnath Dham *prima-facie* appears to be exceptionally high.

The Petitioner has submitted the following reasons for high execution cost of the aforesaid project:

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- *GIS breakers were replaced with SCADA compatible Permanent Magnet Actuator (PMA) type breakers.*
- *Due to air lifting constraints the transformer was decided to be assembled at site.*
- *Due to snow loading, provision of covering the electrical yard and DTRs with steel canopy has been incorporated.*
- *BIL level of electrical equipment was also corrected as per the site altitude condition.*
- *Provision of naphthenic based oil was made to counter extreme site temperature.*
- *The labor rates and the head load charges are also high due to inaccessibility and tough site conditions.*
- *The cost of airlifting of equipment has been taken as per discussion with local PWD engineers and considering the requirement of safe transport handling of equipment required to be airlifted. The cost of airlifting has been estimated to be around 1.5 times the cost of material.*
- *There has been significant changes in the cost of equipment and labor required for construction of 33/11 kV Substations during the last 10 years."*

In this regard, the Commission is of the view that the site namely Shri Kedarnath Dham is approximately 22 Km. far from the road head and located at very tough terrain with an altitude more than 3500 m above MSL where ambient temperature drops below -15^{o}C and therefore, the cost of special material/equipment/structure, transportation cost considering approach road constraint, labour charges, less man-days/limitation of working hours due to adverse climatic conditions etc., are high in comparison to the similar works carried out at road head/low altitude sites.

Although, the Petitioner has approached the GoU for financing the aforesaid project at lower rate of interest on debt i.e. 2% in place of 6.5% under SASCI, **the Commission directs the Petitioner to approach GoU for funding the project through Grant available under SASCI or other various programs/schemes of the GoU**.

(15) With regard to the exceptionally high transportation cost envisaged in the project i.e. Rs. 34.08 Cr. (excluding taxes & duties and other contingency cost), the Commission has observed that the cost of transportation (air lifting) has been considered as 1.5 times that of the cost of the material based on verbal discussions with local PWD engineers. The Commission is of the view that this approach of computing the transportation cost is a very crude approach for estimating the same and calls for prudent estimation/expenditure on this account as the same after considering the taxes & duties and other contingencies would be approximately 45% of the total project cost. The Petitioner is directed to carefully analyse and optimize the same.

(16) With regard to geological approval of the proposed works at Shri Kedarnath Dham, the Petitioner submitted the assessment report of construction of S/s at the selected site conducted by 'Uttarakhand Landslide Mitigation & Management Center (ULMMC)'. On analysis of the same, it has been observed that on the direction of District Magistrate, Rudraprayag, ULMMC has conducted feasibility study for the construction of substation at selected site in Shri Kedarnath Dham on 08.08.2024 & 09.08.2024 and submitted its following observations & submissions:

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- *It has been observed that the proposed location of the station is in close proximity to the riverbank of the Mandakini Saraswati River and around 3m above the channel. The location is predominantly moraine. Which is inherently unstable and susceptible to toe erosion over time so the location of substation should be at least 50 m away from the channel.*
- *Based on the observations it is suggested either relocate to other location on conduct a detailed geotechnical investigation. Additionally suitable mitigation measures should be implemented to prevent toe erosion before proceeding with the construction of the substation."*

In this regard, **the Commission directs the Petitioner should adhere to the aforesaid observation/suggestion mentioned in the geological survey report and any changes with the aforesaid observation/suggestion shall be executed only after taking necessary approval from the aforesaid team or from the competent expert agency/authority**. **In all cases the safety of asset for its life must be ensured and no risk/laps in this regard will be tolerated**.

(17) On enquiring about the status of the tender proceeding w.r.t. the works proposed in the instant Petition, the Petitioner through a submission dated 12.03.2025 apprised the Commission that letter of award (LoA) has already been issued on 14.02.2025 to the successful bidder. On review of the timeline, it is observed that the Petitioner filed the instant Petition on 03.02.2025 and within next 10 days without obtaining the approval of the Commission, the LoA was issued, whereas Regulation 40 of UERC (Conduct of Business) Regulations, 2014 under which the Petition is filed requires prior approval of the Commission for making investment in the licensed business if such investment is above the limits laid down by the Commission.

However, keeping in view of the importance of the project for reliable and resilient power supply at this high altitude pilgrimage destination and its timelines given for completion, the Commission has taken a lenient view towards consideration of the proposal and **warns the licensee, not to repeat such acts in future else such proposals in future will be liable for rejection and appropriate penal action will be initiated against the**

officers of the licensee responsible for violation. Further, the Commission also cautions the Petitioner that proposals, where timelines and nature of sites/works are crucial, should timely be submitted before the Commission for its approval.

It is further clarified that approval at this stage i.e., issuance of Letter of Award of the Project in the instant matter before obtaining in principle approval of the Commission, is being allowed as a special case keeping in view to ensure reliable and quality power supply to the holy shrine Shri Kedarnath Dham located at an altitude of more than 3500 m above MSL. While analyzing the request of Petitioner in this regard, the Commission opines that for catering the increasing demand of load on account of the upcoming power intensive loads viz. large number of hotels, Ropeways etc., due to exponential increase in number of pilgrims year on year, electrical infrastructure of suitable capacity must come up in least possible time specifically in such tough terrain where limitations of transportation of material and working conditions/limitations of working months as well as hours in a day exist.

(18) Since the letter of award has been issued for the aforesaid project, therefore, the project does not fall within the purview of prior approval. However, for the reasons stated in the above Para, the Commission **grants post facto approval** for the same subject to strict fulfillment of terms and conditions as mentioned below:-

(i) The Petitioner is directed to go for the competitive bidding for obtaining most economical prices from the bidders under the prevailing Rules & Regulations.

(ii) The Petitioner is directed to adhere to the observation/suggestion mentioned in the geological survey report as detailed at Para-15 of this Order and any changes with the observation/suggestion shall be executed only after taking necessary approval from the team that has carried out the feasibility study or from the capable expert/authority.

(iii) The Petitioner is directed to comply with the resolution of the BoD in its meeting dated 26.12.2024 and also reproduced in Para 6 of this Order.

(iv) All the loan conditions laid down by the funding agency under Special Assistance to States for Capital Investment (SASCI) 2023-24 (Part-1) Scheme in their detailed sanction letter are strictly complied with. Further, the Petitioner is directed to approach GoU for funding the project through Grant available under SASCI or other various programs/schemes of the GoU.

(v) Petitioner to submit the scheduled program in the form of Bar Chart within 15 days of the Order. Further, Petitioner to submit quarterly report on the progress vis-a-vis the scheduled program of the Project by 15th day of the next quarter on regular basis.

(vi) CAMC contract be framed in order to ensure highest degree of Service Level Agreement (SLA) with appropriate Liquidated Damages (LD) clause for compensating the Petitioner against default in agreed SLA, and submit the draft of the same for approval.

(vii) Petitioner shall submit half yearly report of the works carried out under the AMC contract before the Commission.

(viii) The Commission may verify/check the proposed works to be executed by the Petitioner at any point of time during/post execution of the works from the perspective of not only substantiating that the assertions & commitments made by the Petitioner have been fully complied and correct, but also to assess Quality, Optimum utilization of resources, Benefits accrued from the proposed investments etc. as has been projected by the Petitioner.

(ix) The Petitioner shall safeguard its commercial interest by taking suitable issuance Policy for the instant project give the geographical and high climatic constraints.

(x) Post execution of the project, the Petitioner shall submit the Project Completion Report to the Commission alongwith photographs,

expenditure incurred/completed cost, financing of the Project and detailed analysis & calculations of the benefits accrued from the proposed investments etc. Since the LoA has already been issued prior to the in-principle approval of the Commission, therefore, prudence of the expenditures incurred against the cost of the Project shall be examined/scrutinized at the time of ARR filing.

(xi) The Petitioner shall ensure to conduct proper Factory Acceptance Tests, Routine Tests, Type Tests and Site Acceptance Tests for the proposed Power transformers , Distribution transformers and other electrical assets as per relevant IS/IEC standards and shall submit the reports of the tests conducted at site to the Commission within one month from the date of conducting the test.

(xii) The Petitioner shall comply to the following CEA and UERC Regulations and amendments thereof at every step of the Construction and Operation & Maintenance of the lines & S/s. The Petitioner shall also ensure the compliance of relevant standards, and the Project should be executed with safety and due diligence so that minimal incidents of break downs/fault occurrences/ hindrances are faced during operation & maintenance:

(a) Central Electricity Authority (Safety requirements for construction, operation and maintenance of electrical plants and electric lines) Regulations, 2011.

(b) Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022.

(c) Central Electricity Authority (Measures relating to Safety and Electricity Supply) Regulations, 2023.

(d) UERC (Distribution Code) Regulations, 2018.

(xiii) The Petitioner shall, within one month of the Order, submit letter from the State Government or any such documentary evidence in

support of its claim for equity funding (if any) agreed by the State Government or any other source in respect of the proposed schemes.

(xiv) After completion of the aforesaid schemes, the Petitioner shall submit the completed cost and financing of the schemes.

(xv) The cost of servicing the project cost shall be allowed in the Annual Revenue Requirement of the Petitioner after the assets are capitalized and subject to prudence check of cost incurred.

(19) The approval is given subject to the above conditions and on the basis of submissions and statement of facts made by the Petitioner in the Petition under affidavit. In case of violations of any of the condition mentioned above or in case any information provided, if at any time, later on, found to be incorrect, incomplete or in case relevant information was not disclosed, that materially affects the basis for granting the approvals, in such cases, the Commission may cancel the approval or refuse to allow all or part of the expenses incurred in the ARR/True-up apart from initiating plenary action.

Ordered accordingly.

(Anurag Sharma)
Member (Law)

(M.L. Prasad)
Chairman