UTTARAKHAND ELECTRICITY REGULATORY COMMISSION

Petition No. 42 of 2025

In the Matter of:

Petition for Investment Approval for Revised DPR of "Procurement of 500 MVA 400/220 kV transformer along with NIFPES & construction of 400 kV and 220 kV (AIS) bays alongwith transformer plinth for erection, testing & commissioning of 500 MVA 400/220 kV transformer and its associated work at 400 kV substation Kashipur."

And

In the Matter of:

Power Transmission Corporation of Uttarakhand Limited (PTCUL)
'Vidyut Bhawan', Near ISBT, Majra,
Dehradun.

.....**Petitioner**

Coram

Shri M.L. Prasad **Chairman**
Shri Anurag Sharma **Member (Law)**

Date of Order: **May 19, 2025**

ORDER

This Order relates to the Petition filed by Power Transmission Corporation of Uttarakhand Ltd. (hereinafter referred to as "PTCUL" or "the Petitioner") vide letter No. 1807/Dir.(Operations)/PTCUL dated 26.10.2024 seeking Investment Approval for "Procurement of 500 MVA 400/220 kV transformer along with NIFPES & construction of 400 kV and 220 kV (AIS) bays alongwith transformer plinth for erection, testing & commissioning of 500 MVA 400/220 kV transformer and its associated work at 400 kV substation, Kashipur" under Para 11 of Transmission Licence. [Licence No. 1 of 2003].

1. Background

1.1 In the aforesaid Petition, the Petitioner has submitted the following proposal for investment approval:

Particulars	Transformer Capacity (in MVA)	Total Project Cost as per DPR (including IDC (in Rs. Crore)
Procurement of 500 MVA, 400/220 kV transformer along with NIFPES & construction of 400 kV and 220 kV (AIS) bays alongwith transformer plinth for erection, testing & commissioning of 500 MVA, 400/220 kV transformer and its associated work at 400 kV substation, Kashipur.	500 MVA (400/220 kV)	77.07

1.2 The Petitioner has submitted a copy of the extract of Minutes of 94th meeting of the Board of Directors (BoD) of PTCUL held on 26.09.2024, wherein the Petitioner's Board has approved the Corporation's aforesaid proposal with debt equity ratio of 70:30.

1.3 To justify the need for the proposed work in the aforesaid Petition, the Petitioner has submitted that:

(i) 400/220/132 kV substation, Kashipur is one of the largest substations of PTCUL in Kumaon zone of Uttarakhand which was commissioned in year 2005-06. It caters the power to approximately whole of Kumaon region and partially to Garhwal region also.

(ii) At present there are 02 nos. 315MVA, 400/220KV transformers of ABB make, and the substation meets the load requirement of outgoing substations of the region. The present maximum running load of the substation is approximately 92.00% of the installed transformer load capacity.

(iii) Since the individual load has gone more than 50% on each transformer, as per guidelines of NRLDC installation of additional Transformer is required to meet T-2 Contingency.

(iv) Also, after 9-time extension of tender for procurement of new 315 MVA Transformer and its associated bay, no firm has participated till date so after the instructions from higherups to procure 500 MVA Transformer instead of 315 MVA a fresh DPR has been prepared for kind information and necessary action.

(v) Keeping in view the exponential growth in load demand in recent times as well as to meet the T-2 contingency condition of transformers, the complete system strengthening of 400 kV Substation Kashipur is required on urgent basis.

1.4 The Petitioner in its Petition has mentioned that the estimated cost proposed in the DPR has been prepared on the basis of the PTCUL's SoR 2024-25.

1.5 The Petitioner in its Petition has enclosed the Bar chart for the project with an execution period of 20 months from the date of award of the contract. Further, the Petitioner under the financial analysis has projected an IRR of 14.38% with breakeven in the 10th year of operations.

1.6 On preliminary examination of the aforesaid proposal submitted by the Petitioner, certain deficiencies/shortcomings were observed as mentioned below, which were communicated to the Petitioner vide Commission's letter No. 139 dated 28.04.2025. In reply to the deficiencies raised by the Commission, the Petitioner has submitted its reply vide letter no. 865/Dir. (Operations)/PTCUL dated 02.05.2025. The queries raised by the Commission and subsequent clarification submitted by the Petitioner is as follows:

Query 1:	PTCUL has already been accorded the investment approval for installation of additional 315 MVA back in February, 2017, though the same could not be procured and installed and PTCUL has informed that they had published the tender various times but no firm had participated. PTCUL is required to justify the long delay of more than 7 years and for the purpose has to inform the date wise activities and also that how they came back with revised proposal after such a long period of 7 years and was the additional capacity really required that time because 7 years has been passed without installing the same.
Reply 1:	**(a) <u>Regarding Procurement of 315 MVA,400/220 kV transformer at Kashipur</u>** • For the procurement of 315 MVA, 400/220 kV Transformer at 400 kV substation, Kashipur e-tender was invited on 28.09.2017 through EPC. Proposal for award the work was

	put up before 72nd BoD meeting and tender was scrapped by the Board. It was decided in the Planning & implementation committee (PIC) to procure the transformers through manufacturer instead of EPC. • Further tender was floated on 08.04.2022, only one bidder has submitted its e-bid after made 13 extensions. Due to less participation in the bid, tender was further scrapped on dated 30.11.2022. • Again, the tender was floated on 20.12.2022, after 07 extensions, again only one bid was received. After evaluation of the financial bid, the value of the L-1 bidder was found 58.55% higher than the original estimated cost and 43.98% above w.r.t revised estimated cost. The tender was scrapped on 15.07.2023 due to high bid value. • 4th time for the Procurement of 315 MVA 400/220 kV Transformer along with NIFPES and Construction of 400 kV and 220 kV (AIS) Bays along with transformer plinth for erection, testing and commissioning of 315 MVA 400/220 kV Transformer was floated on 18.12.2023. After 13 Nos. of extensions, No bid was received and the tender was scrapped on 24.08.2024. **(b) <u>Regarding Procurement of 500 MVA, 400/220 kV transformer in place of 315 MVA,400/220 kV transformer at Kashipur</u>** • Government of Uttarakhand has approved the work as Detailed Transmission and Distribution Network Planning of Uttarakhand vide letter no. 553 dt. 02.09.2024 in proposed increasing capacity of existing substation to Meet T-1 Contingency and load growth envisaged in line with 20th Electric Power Survey of CEA released on Nov. 2022. • Chief Engineer (O&M), Kumaon Zone vide N&O dated 21.09.2024 intimated that the load demand in Kashipur and nearby area has been increased exponentially. To meet the

	load growth, installation of 500 MVA transformer instead of 315 MVA transformer was proposed for the procurement. • DPR for Procurement of 500 MVA 400/220 kV transformer along with NIFPES & construction of 400 kV and 220 kV (AIS) bays and its associated work at 400 kV substation, Kashipur, amounting to Rs. 77.07 Cr was approved in the 94th BOD held on 26.09.2024 at agenda item no. 94.56. • To increase the TCC limit of the Transmission network at 400 kV substation, Kashipur 500 MVA TF is most urgent to be installed. Date-wise activities is enclosed**.**
Query 2:	PTCUL has submitted that the maximum running load of the 400 kV substation, Kashipur is approximately 92% of the installed transformer load capacity and for the purpose has attached the table mentioning the month wise current loading. In this regard, PTCUL is required to submit the details of such instances, ensuring that simultaneous operational parameters of both the transformers are reported, along with the commentary (like Gas Plants were running or were off etc.) since beginning of overloading.
Reply 2:	Attached.
Query 3:	PTCUL has proposed the installation of a 500 MVA transformer in conjunction with 2x315 MVA transformer at 400/220 kV substation, Kashipur to meet the T-2 Contingency. As is evident new 500 MVA transformer needs to function in parallel with the existing 315 MVA transformers, PTCUL is required to submit how will they ensure full utilization of the new transformation capacity while working in parallel, further details are required as to how the voltage ratios and phase angles are matched for avoiding any circulating currents in the system and also the comparison of percentage impedances of new and existing transformers. PTCUL is required to submit the overall calculations explaining the prospective scenario of load sharing in parallel operation between the existing and proposed transformer, as they have different capacities.

Reply 3:	In parallel operation, Transformers share the total load proportionally to their MVA ratings. This means a larger Transformer will typically carry a larger portion of the load. At 400 kV Kashipur, proposed 500 MVA transformer is planned to be run in parallel with existing 2x315 MVA transformers Factors like polarity, voltage ratio, phase sequence shall be kept same in the subject case however there may be slightly variation in per unit impedance of transformers. Loading of transformers running in parallel may be calculated as **Loading on the transformers-1 (MVA1)=[(MVA1 / %Z) / ((MVA1 / %Z1)+ (MVA2 / %Z2))]X MVA (total)** At current scenario, 400 kV Kashipur has 2x315 MVA 400/220/33 kV transformers having % Impedance at normal tap (tap 9) are 11.736 and 11.66 between HV & MV respectively. Now since 500 MVA transformer needs to function in parallel with the existing 2x315 MVA transformers to meet out T-1 condition, the load that will be available in T-1 condition is 630 MVA (As per CEA guidelines, the size and number of interconnecting transformers (ICTs) at a substation shall be planned in such a way that the outage of any ICT (single three phase unit or bank of three single-phase units) does not overload the remaining ICT(s) or the underlying transmission system). Considering % impedance of 500 MVA transformer at normal tap with same voltage ratio be 12%, the loading pattern will be as below in different cases:- Case 1. Loading in Normal Conditions a) 315 MVA transformer 1 = [(315/11.736)/{(315/11.736)+(315/11.66)+(500/12)}]*630 =177 MVA b) 315 MVA transformer 2 = [(315/11.66)/{(315/11.736)+(315/11.66)+(500/12)}]*630 =178 MVA

	c) 500 MVA transformer = [(500/12)/{(315/11.736)+(315/11.66)+(500/12)}]*630 =275 MVA Case 2. Outage of 315 MVA Transformer 1(T-1 Conditions) a) 315 MVA transformer 2 = [(315/11.66)/{(315/11.66)+(500/12)}]*630 =247.80 MVA b) 500 MVA transformer = (500/12)/{(315/11.66)+(500/12)}]*630 =382.20 MVA Case 3. Outage of 315 MVA Transformer 2(T-1 Conditions) a) 315 MVA transformer 1 = [(315/11.736)/{(315/11.736)+(500/12)}]*630 =246.85 MVA b) 500 MVA transformer = [(500/12)/{(315/11.736)+(500/12)}]*630 =383.15 MVA Case 4. Outage of 500 MVA Transformer(T-1 Conditions) a) 315 MVA transformer 1 = [(315/11.736)/{(315/11.736)+(315/11.66)}]*630 =314 MVA b) 315 MVA transformer 2 = [(315/11.66)/{(315/11.736)+(315/11.66)}]*630 =316 MVA
Query 4:	As new transformer is proposed to be added, PTCUL is required to submit the Bus Capacity (Main Bus and Transfer Bus) of the substation mentioning the name of the conductors and their capacities and also assessment of them under prospective full load conditions. Also mention the ratings of the instrument transformers.
Reply 4:	At present at 400 kV substation, Kashipur has following bus capacity:- a) 400 kV Bus A&B (one & half Breaker)- ACSR Quad Moose

	b) 220 kV main bus-ACSR Quad Moose c) 220 kV Transfer bus –ACSR twin moose load if all 3 transformers are in parallel = 315+315+500=1130 MVA Full load current in 220 kV Bus=2966 Amp Current carrying of ACSR Moose at 750C = 836 A Current carrying of quad Moose at 750C =4* 836 A =3344 Amp Further, quad moose bus bar at 400 kV can cater approx. 2300 MVA power. **Hence selected quad moose main bus is sufficient to cater the load.** Transfer bus comes in picture when there is outage of main bus breaker, here in subject case considering outage of 500 MVA transformer main breaker outage, Full load current in 220 kV side of 500 MVA transformer=1312 Amp **Hence selected twin moose of transfer bus is sufficient to cater the load.**
Query 5:	Since with the installation of additional transformer the fault level of the substation will increase, PTCUL is required to submit the details of earthing capabilities of the substation and associated equipment with respect to the fault level as per the standards. (Also provide standards with respect to same).
Reply 5:	At 400 kV Substation present fault level capacity is 21069.32MVA & 30410 Amp copy enclosed, the associated equipment like circuit breaker is designed for rapture current 50 KA / 63 KA as per CEA design standard.
Query 6:	PTCUL has proposed the construction of 400 kV and 220 kV bays for the proposed transformers. In this regard, PTCUL is required to submit the information regarding the availability of space with the plot plan of 400 kV substation, Kashipur.
Reply 6:	Yes, sufficient space for construction of 400 kV and 220 kV bays are available at 400 kV substation Kashipur. The 400 kV Substation layout plan is enclosed.

Query 7:	PTCUL in its Petition submitted that after the augmentation of the substation, the exponential load growth of the system can be met. In this regard, PTCUL is required to submit the details of load growth calculated for the Kashipur substation in the next 03 years at 220 kV and 132 kV level along with the basis of calculation and matching with UPCL projection.
Reply 7:	The proposed load growth plan as informed by UPCL as well as augmentation/construction of new substation is submitted by PTCUL.
Query 8:	PTCUL in its Petition has submitted the Load Flow Study as Exhibit-1 and Exhibit-II considering the no generation scenario for M/s Sravanthi and M/s Gama Gas Power Plants with no analysis/observations included in the report, In this regard, PTCUL is required to: a. Submit the major analysis/ observations of the submitted Load Flow Study in Exhibit-I and Exhibit-II in the form of a technical report. b. List down the major differences between Exhibit-I and Exhibit-II, as both represent the normal condition of power flow of the Kashipur area in the above report.
Reply 8:	a. Technical Report on submitted Load Flow Study in Exhibit-I and Exhibit-II is enclosed. b. Major differences between Exhibit-I and Exhibit-II are as follows: 1. Exhibit-I is for Existing scenario. In this scenario 2x315 MVA transformer at 400 kV Kashipur was considered. As per load flows in Exhibit-I, T-1 contingency is not being fulfilled at 400 kV substation, Kashipur. 2. Exhibit-II is for Future scenario. In this scenario 2x315 + 1x500 MVA transformer at 400 kV Kashipur was considered. As per load flows in Exhibit-II, T-1 contingency is being fulfilled at 400 kV substation, Kashipur.

Query 9:	PTCUL has submitted the Bar Chart for the activities schedule for the completion of the project. In this regard, PTCUL is required to revise the Bar Chart as per the current progress of the proposal.
Reply 9:	Revised Bar chart is enclosed .

2. Commission's Observations, Views and Directions:

2.1. Based on the submissions made in the Petition and subsequent submissions of the Petitioner, the Commission observed that:

2.1.1 The Petitioner failed to execute the Investment Approval for procurement and installation of additional 315 MVA transformer at 400/220 kV substation, Kashipur accorded by the Commission back in February, 2017. The Petitioner cited the reason of lack of participation of bidders in the tender despite repeated extensions, however, PTCUL was unable to explain the prolonged period of inaction of their part as they issued the tender only in 2022 after initially floating it in 2017. In the current proposal, the Petitioner has revised the transformer capacity from 315 MVA to 500 MVA with the justification that the capacity of 500 MVA transformer is required in place of earlier proposed 315 MVA transformer due to the load growth envisaged in line with 20th electric power survey of CEA released in November, 2022 and to meet the T-1 contingency for the substation. In this regard, the Commission is of the view that, as the initial proposal for a 315 MVA transformer could not materialized, although we are not scrutinizing the reasons/delay, which in any case is prolonged, however considering the interviewing delay, the revised proposal of procurement and installation of 500 MVA transformer addresses the need to accommodate anticipated load growth and fulfill the "T-1 contingency" condition, which ensures the grid's reliability even if one major component fails. Hence, the revised proposal to procure and install a 500 MVA transformer seems justified.

2.1.2 Further the petitioner has tried to justified the proposal stating that with the current proposal of installation of an additional 500 MVA transformer at 400 kV substation in Kashipur, they intend to increase the Total Transfer Capability (TTC) limit of PTCUL's transmission network, as it provides greater flexibility to import power from outside the State. In this regard, the

Commission is of the view that the loading of transformers at 400/220 kV substation in Kashipur has already reached upto 92% of their rated capacities during periods when M/s SEPL and M/s GIPL gas power plants are non-operational, which ultimately limits the power handling capacity of the State's transmission network. During the high demand season, such limitation of TTC poses serious challenges to the Distribution Utility in withdrawing the power from the inter-State network. Considering the present load status and the upcoming load growth in future years the Total Transfer Capability (TTC) of State's Transmission Network is an important aspect and installation of 500 MVA transformer would serve the purpose for longer period and will also provide comfort to the Distribution Licensee in managing their power requirement especially during certain peculiar situations including when the gas plants in Kahsipur area are not operating and demand is met by drawl from inter-State Transmission Network. Hence, the revised proposal of procurement and installation of 500 MVA transformer at 400/220 kV in Kashipur seems reasonable and justified.

2.1.3 The Commission vide its letter dated 28.04.205 has queried PTCUL with regard to the technical feasibility of installing a 500 MVA transformer at 400 kV substation, Kashipur i.e. fault level of the substation and parallel operation of the different capacities of transformer (existing 2x315 MVA transformer with new 500 MVA transformer), the Petitioner has submitted that the present fault level capacity of 400 kV Kashipur substation is 21069.32 MVA and 30410 Ampere and the associated equipment like circuit breaker is design for rapture current of 50 KA/63 KA as per the CEA design. Also, w.r.t. parallel operation of the transformers, the Petitioner further submitted that the Z impedance rating, Voltage rating, phase sequence and other technical parameters will be designed in such a manner that almost no resultant circulating current will flow and also the capacity of transformer be utilized upto its maximum rated capacity. Further, PTCUL submitted that their existing Bus Capacity, Transfer Bus Capacity, Ratings of Instrument Transformers etc. are all sufficient and does not require any enhancement or replacement for accommodating this additional 500 MVA transformer. In this regard, the Commission is of the view that the technical feasibility submitted

by the Petitioner for the installation of proposed additional 500 MVA transformer at 400 kV substation, Kashipur seems to be reasonable. The Petitioner has provided a reasonable justification which appears proper and accordingly the query raised gets resolved. There appears to be no technical difficulty in operating the proposed TFR in parallel operating with the existing TFR.

2.1.4 The Petitioner has considered the Price Contingencies @ 6.8%, Contingency @ 3% and Project Overheads @ 5% in the DPR. In this regard, in order to maintain uniformity with recent investment approvals, **the Commission has not considered Price Contingencies @ 6.8% and instead it has calculated the total project cost by considering the contingency @ 3% and project overheads @ 5% based on the past practice of the Commission.**

Further as the issue of SoR revisions is presently under deliberation before the Commission, the rates considered in SoR of FY 2024-25 cannot be considered as final and accordingly the estimates based on these rates are also provisional in nature. Hence, the Commission after finalization on the issue of SoR, based upon its finding shall carry out the strict prudence check of the cost incurred and financing thereof in accordance with the conditions of Licence and MYT Regulations at the time of scrutiny of ARR.

2.2. The Commission hereby grants in-principle approval for the investment of Rs 70.83 Crore only as per the table given below with the direction that the Petitioner should go ahead with the aforesaid works subject to the fulfilment of the conditions mentioned below:

Particulars	Total Project Cost as per DPR (including IDC) (in Rs. Crore)	Cost considered by the Commission (including IDC) (in Rs. Crore)
Procurement of 500 MVA, 400/220 kV transformer along with NIFPES & construction of 400 kV and 220 kV (AIS) bays alongwith transformer plinth for erection, testing & commissioning of 500 MVA, 400/220 kV transformer and its associated work at 400 kV substation, Kashipur.	77.07	70.83

(i) All the loan conditions as may be laid down by the funding agency in their detailed sanction letter are strictly complied with.

(ii) The Petitioner shall, within one month of the Order, submit a letter from the State Government or any such documentary evidence in support of its claim

for funding agreed by the State Government or any other source in respect of the proposed projects.

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

(iv) 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 and subject to the decision in SoR matter, stated above.

2.3. The Investment approval for the project titled "Augmentation of 400 kV substation, Kashipur from 2x315 MVA to 3x315 MVA transformer capacity, including associated 400 kV and 220 kV bays" was accorded by the Commission vide Order dated 07.02.2017. PTCUL has now requested investment approval for a new proposal titled "Procurement of 500 MVA 400/220 kV transformer along with NIFPES, and construction of 400 kV and 220 kV (AIS) bays, including transformer plinth, for erection, testing & commissioning of the 500 MVA 400/220 kV transformer and associated works at 400 kV Substation Kashipur". **In this regard, since the Petitioner did not act upon the earlier approval granted by the Commission, the Order dated 07.02.2017 is hereby revoked.**

2.4. 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, therefore, violations of the condition and in case any information provided, if at any time, later on, is found to be incorrect, incomplete or relevant information was not disclosed, and which materially affects the basis for granting the approvals, in such cases the Commission may cancel the approval or refuse to allow the expenses incurred in the ARR/True-up apart from initiating plenary action.

Ordered accordingly.

(Anurag Sharma)
Member (Law)

(M.L. Prasad)
Chairman