

Before

UTTARAKHAND ELECTRICITY REGULATORY COMMISSION

Petition No. 15 of 2015

Petition No. 16 of 2015

In the Matter of:

Approval of Capital Investments under Para 11 of the Transmission and Bulk Supply Licence for investment for:

- (i) Strengthening of 132 kV network comprising the works of **(a)** Extension of 220 kV Sub-station (S/s) Piran Kaliyar **(b)** Construction of 132 kV LILO of Bhagwanpur-Chudiyala at Piran Kaliyar.
- (ii) Construction of 220 kV Piran Kaliyar-Puhana (PGCIL) line.

And

In the Matter of:

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

...Petitioner

Coram

Shri Subhash Kumar	Chairman
Shri C.S. Sharma	Member
Shri K.P. Singh	Member

Date of Order: 9th October 2015

ORDER

This Order relates to the Petitions filed by Power Transmission Corporation of Uttarakhand Ltd. (hereinafter referred to as "PTCUL" or "the Petitioner") seeking approval of the Commission for the investment of following works:

- (i) Strengthening of 132 kV network comprising of the works (a) Extension of 220 kV S/s Piran Kaliyar (b) Construction of 132 kV LILO of Bhagwanpur-Chudiyala at Piran Kaliyar.
- (ii) Construction of 220 kV Piran Kaliyar-Puhana (PGCIL) line

1. Background

- (1) The Petitioner submitted proposals for capital investment of the works mentioned in the above para for approval of the Commission under Para 11 of Transmission and Bulk Supply Licence [Licence No. 1 of 2003] vide letter no. 621/MD/ PTCUL/ UERC dated 07.05.2015 and letter no. 622/MD/ PTCUL/UERC dated 07.05.2015.
- (2) The investment proposals of the Petitioner comprises of augmentation of existing Sub-station, construction of associated lines and bays.
- (3) The estimated cost of the works proposed by the Petitioner in the DPRs submitted alongwith the Petitions is as follows:

Table 1: Capital Cost proposed by the Petitioner in the DPR

Sl. No.	Particulars	Transformer Capacity (MVA)/ Length of Line (Km.)/type of conductor	Project Cost including IDC as per DPR (Rs. Crore)	Project Cost considered by REC for granting the loan
1.	(a) Augmentation of 220/33 kV S/s to 220/132 kV S/s with additional 2x100 MVA transformers at Pirankaliyar	2x100 MVA	13.20	13.20
	(b) LILO of Bhagwanpur Chudiyala Line at 220/132 kV Pirankaliyar	9.27 Km Double Circuit, Panther Conductor	12.80	12.80
2.	Construction of 220 kV Piran Kaliyar-Puhana (PGCIL) Line	Lattice structure for DC 220 kV line and stringing of 7 KM SC with Zebra Conductor	15.75	15.75

- (4) The Petitioner has submitted copy of extracts of the Minutes of Board Meetings of PTCUL wherein the Petitioner's Board has approved the Corporation's aforesaid proposals with a funding plan of 70% through loan assistance by REC and balance 30% as equity proposed to be funded by GoU. However, the Petitioner did not submit any letter/assurance or any such documentary evidence for the funding of 30% equity from Government.

(5) To justify the need of the works proposed in the above Petitions, the Petitioner has submitted that:

(A) Strengthening of 132 kV network comprising (a) Extension of 220 kV S/s Piran Kaliyar (b) Construction of 132 kV LILO of Bhagwanpur-Chudiyala at Piran Kaliyar.

At present 132 kV S/s Bhagwanpur is highly overloaded and the consumers of Bhagwanpur, Chudiyala and nearby area are facing problems due to overloaded 132 kV and 33 kV network. To strengthen 33 kV network, 132/33 kV Chudiyala S/s is being constructed, however, to strengthen the 132 kV network, additional source would be required to feed 132 kV S/s Bhagwanpur and Chudiyala and the same is proposed to be provided from 220 kV Piran Kaliyar which is under construction and only 8 Km from Bhagwanpur. Therefore, the LILO of 132 kV Bhagwanpur-Chudiyala line with feeding from 220 kV Piran Kaliyar would be required.

The Scope of Work as submitted by the Petitioner is as follows:

- (a) Extension of 220/33 kV Piran Kaliyar S/s to 220/132 kV Piran Kaliyar S/s
 - (i) Two No. 220 kV Bays for 220/132 kV Transformer.
 - (ii) Five No. 132 kV Bays
 - (iii) 132 kV Main bus & Transfer bus
 - (iv) Control and Relay Panels
 - (v) Civil Works for construction of equipment foundation.
 - (vi) Scheme consists of procurement, erection & commissioning of the S/s.
 - (vii) 02 Nos. 220/132 kV transformers
- (b) 132 kV LILO of 132 kV Chudiyala-Bhagwanpur line at Piran Kaliyar S/s
 - (i) Approximately 9.27 Km. DC 132 kV line on lattice structure.

(ii) 132 kV cables and pole structures, wherever RoW problem is encountered.

(iii) Supply & Erection of complete line material including foundation & stringing work.

(B) Construction of 220 kV Piran Kaliyar- Puhana (PGCIL) line.

The Petitioner submitted that 220 kV S/s Roorkee is highly overloaded and there is no margin in 220 kV line emanating from 400 kV S/s Puhana to Roorkee S/s. Construction of S/s at Piran Kaliyar and Chudiyala near Bhagwanpur are under Process to relieve the overloading of the area. Piran Kaliyar would receive power from LILO of Puhana-SIDCUL line. This line alone would not have sufficient capacity to feed Piran Kaliyar. Therefore, there would be need for construction of a circuit from Puhana to Piran Kaliyar to strengthen the 220 kV network. It would also result in enhanced utilization of 400 kV S/s Puhana (PGCIL).

The Petitioner has further stated that, the construction of 220 kV Puhana-Piran Kaliyar line would also strengthen 220 kV network between Roorkee and SIDCUL. The network would be fed from 400 kV S/s Puhana, which is having sufficient capacity. This work would not only facilitate the uninterrupted and quality power supply to the consumers of the area but also would generate additional revenue for the energy saving with load growth in the industrial area.

The Scope of Work as submitted by the Petitioner is as follows:

- (i) Approximately 7 Km. DC 220 kV line on lattice structure and stringing of Single Circuit with Zebra conductor.
- (ii) Wherever RoW problem would be there, 220 kV cables and pole structures would be used.
- (iii) Supply & erection of complete line material including foundation & Stringing work.

(6) With regard to loan assistance, the Petitioner has submitted that REC has sanctioned the project-wise loan as follows:

Table 2: Capital Cost proposed by the Petitioner in the DPR

Sl. No.	Particulars	Project Cost including IDC as per DPR (Rs. Crore)	Project Cost considered by REC for granting the loan	Loan Approved by REC @12% (Rs. Crore)
1.	(a) Augmentation of 220/33 kV s/s to 220/132 kV S/s with additional 2x100 MVA transformers at Piran Kaliyar	13.20	13.20	18.20
	(b) LILO of Bhagwanpur Chudiyala Line at 220/132 kV Piran Kaliyar	12.80	12.80	
2.	Construction of 220 kV Piran Kaliyar-Puhana (PGCIL) Line	15.75	15.75	11.03

(7) On preliminary examination of the proposals, following deficiencies were observed and the same had been communicated to PTCUL vide letter no. 826 dated 24.08.2015:

“

1. In the approval of the BoD, consent has been accorded for financing of the DPRs of the said projects, however, the estimated costs of the projects have not been mentioned in the approval. PTCUL is required to submit copy of the proposals put up before the BoD.
2. PTCUL in its proposals has taken quantity variation as 20% of the base cost and cost escalation@20% of the total cost. PTCUL is required to submit justification for the same.
3. PTCUL in its proposals has taken HEPs pooling power as 50 MW and 100 MW. PTCUL is required to submit the basis for the same alongwith the justification for additional energy to be handled as shown in the DPRs.
4. In the General Abstract of 220 kV Pirankaliyar-Puhana (PGCIL) line, PTCUL has not mentioned whether line is single circuit or double circuit. PTCUL is required to confirm the same.
5. The load flow studies enclosed in the DPRs are not legible and no descriptive reports have been submitted with it. PTCUL is required to submit the legible copies of the load flow studies alongwith descriptive reports on the same.
6. The single line diagram (SLD) of the 220 kV Roorkee-Puhana (PGCIL) line is not clear as there are some corrections shown in the submitted documents. PTCUL is required to submit final SLD of the line.
7. In the proposal for construction of 132 kV LILO line of Bhagwanpur-Chudiyala to Pirankaliyar, draw down of funds have been shown in three years i.e. 1st year 30% 2nd year 40% and 3rd year 30%, whereas, in the Report, project period in the proposal has been shown as two years. PTCUL is required to clarify the same.”

- (8) In response to the deficiencies pointed out by the Commission, PTCUL vide its reply dated 03.09.2015 had submitted the legible copies of the desired documents and made its submission as follows:

“ ...

- 2- *The quantity variation & cost escalation in the estimate has been taken as per general practice prevalent in PTCUL.*
- 3- *Average expected loading on line and extended substation of Pirankaliyar will be approximately 100 MW (depending upon Grid Condition).*
- 4- *It is to clarify that 220 kV Pirankaliyar-Puhana (PGCIL) line is proposed as Single Circuit line on Double Circuit towers.*

...

- 7- *Total period of project is 2 years but payment will be due against 3 Financial years.”*

2. Commission's Analysis and views

- (1) On examination of the proposals and subsequent replies of the Petitioner, it has been observed that:

(A) Strengthening of 132 kV network (a) Extension of 220 kV S/s Piran Kaliyar (b) Construction of 132 kV LILO of Bhagwanpur-Chudiyala.

(a) Extension of 220 kV S/s Piran Kaliyar

With regard to the status of 220 kV S/s Piran Kaliyar, it has been brought to the notice of the Commission that the 220/33 kV S/s Piran Kaliyar is under construction with a transformation capacity of 2x50 MVA.

At present, Roorkee and major part of the adjoining areas are being fed from 220/33 kV S/s Roorkee, 132/33 kV S/s Bhagwanpur. Besides these two Sub-stations 132/33 kV S/s Chudiyala in the vicinity is nearing completion. In the present scenario these Sub-stations are fully loaded. Such heavily loaded network is unreliable and also does not meet N-1 contingency. Therefore, in order to relieve these heavily loaded transmission Sub-stations, the Commission had earlier given approval for construction of 220/33 kV S/s Piran Kaliyar and 132/33 kV S/s Chudiyala with a transformation capacity of 2x50 MVA and 2x40 MVA respectively. However, to further strengthen 132 kV network in the area to ensure quality and reliability of power supply in Roorkee and adjoining areas,

need for an additional source of 132 kV has arisen, which would cater the heavily loaded 132 kV Bhagwanpur & Chudiyala S/s.

- (i) It has also been observed that the closest Sub-station in the vicinity of 220 kV Roorkee S/s is 220 kV S/s Piran Kaliyar, where adequate margin for expansion is available.
- (ii) Further with regard to the limitation of transformer capacity at different voltage level and exploring the possibility of new Sub-station, para 15.4 of the CEA Manual on Transmission Planning Criteria, 2013, stipulates that:

15.4 Effort should be to explore possibility of planning a new substation instead of adding transformer capacity at an existing substation when the capacity of the existing sub-station has reached as given in column (B) in the following table. The capacity of any single sub-station at different voltage levels shall not normally exceed as given in column (C) in the following table:

Voltage Level(A)	Transformer Capacity	
	Existing Capacity (B)	Maximum Capacity(C)
765 kV	6000 MVA	9000 MVA
400 kV	1260 MVA	2000 MVA
220 kV	320 MVA	500 MVA
132 kV	150 MVA	250 MVA

From the above criteria, it has been observed that 2x160 MVA have already been installed at 220/132 kV S/s Roorkee, which just equals to the 'Existing Capacity' mentioned above at column B. Besides this there are 2x50 MVA 220/33 kV transformers also installed at 220 kV S/s Roorkee. Hence, adding any more transformation capacity at 220 kV S/s Roorkee would not be in accordance with the above transmission planning criteria of CEA. Therefore, with extension of 220 kV S/s Piran Kaliyar by constructing two Nos. 220 kV bays for 220/132 kV transformers (2x100 MVA) would provide additional 132 kV level networks which would not only cater the power demand of Roorkee and adjoining areas but also strengthen the existing 132 kV network.

(b) Construction of 132 kV LILO of Bhagwanpur-Chudiyala

The existing 132 kV S/s Bhagwanpur (3x40 MVA) and 132 kV S/s Chudiyala (2x40 MVA) are being fed by LILO connection of 132 kV line between 220/132 kV Roorkee S/s and Saharanpur. The aforesaid 132 kV line with the above LILO arrangements reaches maximum rated capacity of 200 MVA at the existing maximum loads of 132 kV S/s Bhagwanpur (3x40 MVA) and 132 kV S/s Chudiyala (2x40 MVA) Sub-station. Therefore, in the event of breakdown of any one circuit of the aforesaid line, there will not be an alternate source for feeding these two Sub-stations. Hence, there is a need of an alternate power supply source to cater the load of these 132 kV S/s namely Bhagwanpur and Chudiyala. The same would suffice the N-1 contingency criteria of lines at 132 kV network with enhanced availability, reliability and strengthening of existing 132 kV network.

Hence the above proposal of PTCUL to construct 132 kV LILO of Bhagwanpur-Chudiyala line at 220/33 kV S/s Piran Kaliyar is accepted.

(B) Construction of 220 kV Piran Kaliyar-Puhana (PGCIL) line

The instant Petition has been filed by PTCUL for the construction of an additional 220 kV line between Puhana (400/220 kV S/s PGCIL) and Piran Kaliyar (upcoming 220/33 kV S/s). Earlier the Commission had approved connectivity of 220 kV S/s Piran Kaliyar through LILO of 220 kV Puhana-SIDCUL Haridwar (220/132 kV S/s) line. On analyzing the load flow study submitted by the Petitioner, it has been observed that:

The total load of 220/33 kV S/s Piran Kaliyar and 220 kV S/s SIDCUL Haridwar would be catered by 220 kV Rishikesh-SIDCUL Haridwar line and 220 kV Puhana (PGCIL) SIDCUL Haridwar line. The existing capacity of 220/33 kV S/s Piran Kaliyar is 2x50 MVA. To improve the availability/reliability of power at 132 kV level, PTCUL in its proposal mentioned above at para 2 (1)(A) has submitted the extension of 220/33 kV S/s Piran Kaliyar with 2 Nos. 220 kV bay, 5 Nos. 132 kV bays and besides

this construction of 132 kV LILO arrangement of Bhagwanpur-Chudiyala line at Piran Kaliyar.

In case entire load of 132 kV Bhagwanpur (3x40 MVA) and 132 kV Chudiyala (2x40 MVA) is required to be catered through 220 kV Piran Kaliyar (2x100 MVA+2x50 MVA) (proposed + under construction) then the existing 220 kV Puhana-SIDCUL Haridwar SC (Zebra) line would not sustain the load due to heavy loading. Therefore, rationale for construction of additional 220 kV line between 220 kV Puhana S/s and 220 kV Piran Kaliyar S/s proposed by the Petitioner is accepted.

- (2) Further, it has been observed that PTCUL is coming up with number of proposals of LILO connectivity between different S/s at 132 kV/220 kV levels and in addition it is planning new Sub-station also in the region, therefore, it would be essential that at planning stage PTCUL should carry out simulated short circuit studies in accordance with para 15.2 of Manual on Transmission Planning Criteria, 2013 of CEA. The said para is reproduced below:

“15.2 The maximum short-circuit level on any new substation bus should not exceed 80% of the rated short circuit capacity of the substation. The 20% margin is intended to take care of the increase in short-circuit levels as the system grows. The rated breaking current capability of switchgear at different voltage levels may be taken as given below:

Voltage Level	Rated Breaking Capacity
132 kV	25 kA / 31.5 kA
220 kV	31.5 kA / 40 kA
400 kV	50 kA / 63 kA
765 kV	40 kA / 50 kA

- (3) Hence, considering the load conditions of the existing Sub-substations & lines including future load growth in the region, construction of additional 220 kV Piran Kaliyar-Puhana (PGCIL) line & strengthening of 132 kV network by extension of 220 kV S/s Piran Kaliyar and construction of 132 kV LILO of Bhagwanpur-Chudiyala is accepted.
- (4) Further examining the financial aspects of the proposal, it has been observed that while preparing the estimate for the DPRs, the Petitioner in addition to contingency, cost of establishment and audit & accounting has included

quantity variation and cost escalation @ 20% and IDC in the estimate. In absence of any justified reasons for including the said quantity variation and cost escalation, the Commission is not considering the same as of now in the Order.

- (5) Thus, the Commission hereby grants in-principle approval for the investment of Rs 29.82 Crore only against Rs. 41.75 Crore proposed by the Petitioner as per the table given below:

Table 3:Capital Cost approved by the Commission

S. No.	Particulars	Transformer Capacity (MVA)/ Length of Line (Km.)/type of conductor	Proposed cost including IDC as per DPR (Rs. Crore)	Cost Considered by Commission (Rs. Crore)
1.	(a) Augmentation of 220/33 kV s/s to 220/132 kV S/s with additional 2x100 MVA transformers at Piran Kaliyar	2x100 MVA	13.20	9.46
	(b) LILO of Bhagwanpur Chudiyala Line at 220/132 kV Piran Kaliyar	9.27 Km D/C (Panther Conductor)	12.80	9.18
2.	Construction of 220 kV Piran Kaliyar-Puhana (PGCIL) line	Lattice structure for DC 220 kV line and stringing of 7 KM SC with Zebra Conductor	15.75	11.18
Total			41.75	29.82

- (6) The Petitioner is directed to go ahead with the aforesaid works subject to the fulfillment of the conditions mentioned below:
- (a) All the loan conditions as may be laid down by the funding agency in their detailed sanction letter are strictly complied with. However, the Petitioner is directed to explore the possibility of swapping this loan with cheaper debt option available in the market.
- (b) 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 agreed by the State Government or any other source in respect of the proposed schemes.

- (c) After completion of the aforesaid schemes, the Petitioner shall submit the completed cost and financing of the schemes.
- (d) 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.
- (e) The Petitioner is also directed to furnish within one month of this Order details of all S/s having loading of 80% or more of the capacity and action plan for augmentation/new S/s. Similarly details of overloaded lines and action plan to reduce loading of these lines be furnished.

(K.P. Singh)
Member

(C.S. Sharma)
Member

(Subhash Kumar)
Chairman