

# Central Transmission Utility India Limited

Ref: CTU/W/04/LTA-REL/1

Date: 09-08-2021

## **Determination of Stranded Capacity and Relinquishment Charges in accordance with the directions under petition no 92/MP/2015 vide order dated 08-03-2019**

- 1.0 In accordance with CERC's order in petition no 92/MP/2015 dated 08-03-2019, the stranded capacity and the compensation (relinquishment charges) payable by each relinquishing long term customer has been calculated as per methodology specified in the order and reproduced below in point 3 and 4.
- 2.0 Long term access granted have been broadly categorized into the following:
  - i. **LTA's granted with system augmentation:** The stranded capacity has been determined on the specific identified system augmentation.
  - ii. **LTA's granted with Dedicated transmission lines under ISTS:** Dedicated transmission line entire yearly transmission charges is considered as the liability of the relinquished LTA grantee.
  - iii. **LTA's granted with no system augmentation:** Where LTA was granted with existing/Under construction system and no specific system augmentation was identified, the relinquishment charges has been calculated at All India Minimum PoC rate.
- 3.0 The methodology for determination of stranded capacity is as under:
  - (i) **Step 1 (Base case)** - An All India base case is to be prepared based on the actual peak load for the month in which completion of all transmission lines/substations in each of the High Capacity Power Transmission Corridor or identified system augmentation has been completed in the month in which commissioning of the last transmission line or substation element in the identified augmentation occurred.

CTU shall identify the month as above and POSOCO shall provide the base case input data file for this month based on peak load scenario used for TTC computation. Such base case file should include all the identified transmission system as above. On the base case file provided by POSOCO, CTU shall include all generators who have either relinquished or abandoned in the concerned HCPTC corridor/ system augmentation. The injection of the generators who have relinquished the LTA or abandoned the project shall be considered as equal to the LTAs granted to the generators. For Long Term Customers who have relinquished after the above identified month, the base case scenario shall be considered based on actual peak

load for the month in which relinquishment is effective. For load generation balance, generation from other existing generators in the same region, shall be reduced on pro-rata basis.

*Consideration for the study: In the base case files provided by POSOCO, transmission elements of the concerned HCPTC/ identified system augmentation have been matched with the respective LTA agreements and taken accordingly to make the base case file for the study.*

- (ii) **Step 2 (Relinquished scenario)** - The generators in each of the High Capacity Power Transmission Corridor/identified system augmentation of transmission systems who have relinquished LTA /abandoned generation project shall be removed from the above base case or their injection shall be reduced by their relinquished quantum resulting into revised power flow under relinquished scenario. The generation from other existing generators in the same region shall be increased correspondingly.

*Consideration for the study: For relinquishment of hydro generations of Sikkim, the dispatch of other hydro generations of Sikkim/Bhutan capacity is to be enhanced first and balance to be met through other generations of Eastern Region so as to make the LGB same as in the base case, as transmission system of Sikkim corridor (HCPTC-III) would be fully utilized in evening peak hours / monsoon period with these hydro generations.*

- (iii) **Step 3** - The transmission lines/substations covered under the system augmentation in terms of the respective BPTA/LTA agreements of generators which have relinquished the capacity or abandoned the project shall be segregated and separately listed for use in Step 4 below.

*Consideration for the study: Wherever the LTAs have been granted with identified system augmentation and generation projects have sought full or part relinquishment, the stranded capacity has been determined only on the specific identified system augmentation.*

- (iv) **Step 4** - Flow in Step 1 (Base case), Step 2 (Relinquished scenario) and Step 3, i.e., in the transmission lines covered under BPTA/LTA agreements of generators who have relinquished the capacity or abandoned their projects shall be captured.
- (v) **Step 5** - In case there is reduction in the flow, the difference in the transmission line flows between the Base case and the Relinquished scenario shall be treated as the stranded capacity of the line. In cases where there is increase in flow, the stranded capacity shall be considered as zero. Except for the cases where the stranded capacity is to be considered as zero, the percentage capacity of a particular line stranded is to be

determined by dividing the difference of power flow obtained above by the loadability of the line as explained herewith. If the difference in two cases (Base case vis-à-vis Relinquished scenario) for individual lines is more than maximum quantum relinquished for the entire corridor/identified augmentation, the difference between the line flows shall be capped upto relinquished quantum for the corridor/ identified augmentation. The loadability of the line shall be considered as per loadability indicated by CTU on its website for ATC/TTC for the relevant period.

- (vi) **Step 6** - Steps 1 to 5 shall be repeated for all the corridors based on the date of commissioning of the last transmission line/substation in that corridor. In case the transmission system planned under a particular corridor is under execution (i.e. the corridor is yet to be commissioned), the base case shall be prepared on the present peak load condition considering such elements as commissioned in the base case.
- (vii) **Step 7**-The base case should be N-1 and N-1-1 compliant as per CEA Transmission Planning Criterion, 2013. Where the base case is not compliant with CEA Transmission Planning Criterion, 2013, the generation capacity of the generating projects who have relinquished or abandoned the project shall be reduced on pro-rata basis to make the system N-1 and N-1-1 compliant. The quantum of such reduced generation is to be recorded separately as this quantum will not attract any charges towards stranded capacity.

4.0 The methodology for calculating relinquishment charges is as under:

- (i) **Step 8** - As regards cost-plus projects, the Yearly Transmission Charges (YTC) for the identified transmission lines and substations shall be considered as per Commission's orders on determination of tariff of such lines. This would be based on quoted tariff in case of transmission system executed through Tariff Based Competitive Bidding (TBCB). The transmission charge for the substation shall be apportioned among the transmission lines on pro-rata basis emanating from that substation. The transmission charges shall be considered as on the date of the completion of all transmission lines/substations in each of the High Capacity Power Transmission Corridor i.e. the date of commissioning of the last transmission line/substation in the concerned corridor.
- (ii) **Step 9** - For relinquishment charges, 66% of NPV for the transmission charges of stranded capacity for 12 years shall be calculated. The discount rate applicable for computing the net present value shall be the discount rate to be used for bid evaluation in the Commission's Notification issued from time to time in accordance with the Guidelines for Determination of Tariff by Bidding Process for Procurement of Power by Distribution Licensees issued by the Ministry of Power in accordance with Regulation

18 (2) of the Connectivity Regulations. The relinquishment charges shall be apportioned amongst the LTA customers in the ratio of quantum of relinquishment sought by them after taking into account Step 7 at para 121 of the CERC order dated 08-03-2019 in petition no 92/MP/2015.

5.0 The discount rate for NPV calculation for various timeframe as per CERC directions is as under:

Sl.No.	Timeframe	Discount rate
1	Apr'13 - Mar'14	13.10%
2	Apr'14 - Mar'15	10.69%
3	Apr'15 - Mar'16	12.07%
4	Apr'16 - Mar'17	9.78%
5	Apr'17 - Sep'17	8.41%
6	Oct'17 - Mar'18	10.06%
7	Apr'18 - Mar'19	9.33%

6.0 The charges have been determined for following two components:

- (i) **Stranded Capacity Charges:** Amount equal to 66% of the estimated transmission charges (net present value) for the stranded transmission capacity for the period falling short of 12 (twelve) years of access rights
- (ii) **Notice Period Charges:** Amount equal to 66% of the estimated transmission charges (net present value) of the stranded transmission capacity for the period falling short of a notice period of one (1) year.

## Sample Case for Calculation of Stranded Capacity and Relinquishment Charges

The calculation format for element-wise stranded capacity attributable to relinquished long term customers in terms of surrender of LTAs along with the bifurcation of relinquishment charges separately for dedicated line and identified transmission system for LTA is given below:

- i. **LTAs granted with system augmentation:** The stranded capacity has been determined on the specific identified system augmentation.

Transmission System	Base Case Power Flow(MW)	Relinquished Case Power Flow(MW)	Stranded Capacity (MW) $= Abs(X) - Abs(Y),$ <i>if <math>Abs(X) - Abs(Y) &gt; 0</math></i> $0,$ <i>if <math>Abs(X) - Abs(Y) &lt; 0</math></i>	% Stranded Capacity $(= \frac{\text{Stranded Cap.}}{\text{Loadability (L)}} \times 100$	Yearly Transmission Charge <b>YTC</b> <b>(Rs. Lacs)</b>	Yearly Stranded Capacity Charges (Rs. Lacs) $= \frac{\text{YTC} \times \% \text{Stranded Cap.}}{100}$
Line 1	X1	Y1	Z1= Abs(X1)-Abs(Y1)	$(P1 = \frac{Z1}{L1} \times 100)$	R1	$S1 = \frac{R1 \times P1}{100}$
Line 2	X2	Y2	Z2= Abs(X2)-Abs(Y2)	$(P2 = \frac{Z2}{L2} \times 100)$	R2	$S2 = \frac{R2 \times P2}{100}$
.....	.....	.....	.....	.....	.....	.....
					<b>Total</b>	<b>S = S1+S2+...</b>

\* The loadability of the line shall be considered as per loadability indicated by CTU on its website for ATC/TTC for the relevant period.

Further, the Stranded Capacity Charges and Notice Period Charges have been calculated as follows in line with the methodology prescribed in CERC order:

Date of Notice to CTU: Tn

Date of Relinquishment: Tr

Date of Effectiveness of LTA: Te

- **Stranded Capacity Charges** = 66% of NPV of Yearly Stranded Capacity Charges (Rs. S) for the period falling short of 12 (twelve) years of access rights at discount rate (d)\*

- **Time for stranded capacity charges:** 144 – (Tr - Te) months = Tsr#

- **NPV=** 
$$\sum_{n=1}^{Tsr} \frac{1/12}{(1+d)^{\frac{n}{12}}}$$

- **Notice Period Charges** = 66% of NPV of Yearly Stranded Capacity Charges (Rs. S) for the period falling short of a notice period of one (1) year at discount rate\*
  - **Time for stranded capacity charges:** 12 – (Tr - Tn) months =Tnr#
  - **NPV=** 
$$\sum_{n=1}^{Tnr} \frac{1/12}{(1+d)^{\frac{n}{12}}}$$

# In cases where LTA relinquishment date is prior to date of effectiveness of LTA, Date of relinquishment is considered same as LTA effectiveness date.

\*Note: Discount rate applicable is available in the CERC website at [http://cercind.gov.in/escalation\\_rates.html](http://cercind.gov.in/escalation_rates.html) and also mentioned at Point-5 of the methodology.

- ii. **LTA's granted with Dedicated transmission lines under ISTS:** Dedicated transmission line YTC charges is considered as the liability of the concerned generator.

It may be mentioned that, as per para 123 of CERC order dated 08/03/2019 in petition no 92/MP/2015., "...The methodology shall not be applicable for dedicated transmission lines since it is the liability of the concerned generator to pay the transmission charges for such dedicated transmission line."

Transmission System	Base Case Power Flow(MW)	Relinquished Case Power Flow(MW)	Stranded Capacity (MW)	% Stranded Capacity (= $\frac{\text{Stranded Cap.}}{\text{Loadability (L)}} \times 100$ )	Yearly Transmission Charge YTC (Rs. Lacs)	Yearly Stranded Capacity Charges (Rs. Lacs)  = $\frac{\text{YTC} \times \% \text{Stranded Capacity}}{100}$
Line 1	X1	Y1	Z1= Abs(X1)- Abs(Y1)	$(P1 = \frac{Z1}{L1} \times 100)$	R1	$S1 = \frac{R1 \times P1}{100}$
Line 2	X2	Y2	Z2= Abs(X2)- Abs(Y2)	$(P2 = \frac{Z2}{L2} \times 100)$	R2	$S2 = \frac{R2 \times P2}{100}$
.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....
Dedicated line					R3	Sd = Stranded Cap. Charges for DTL $= \frac{\text{YTCx . LTA (relinq. quantum)}}{\text{LTA granted quantum}}$
					<b>Total</b>	<b>S = S1+S2+...+Sd</b>

\* The loadability of the line shall be considered as per loadability indicated by CTU on its website for ATC/TTC for the relevant period.

Stranded Capacity Charges and Notice Period Charges calculation methodology is same as explained above.

- iii. **LTA's granted with no system augmentation:** Where LTA was granted with existing/Under construction system and no specific system augmentation was identified, the relinquishment charges has been calculated at All India Minimum PoC rate.

The calculation format for long term customers in terms of surrender of LTAs for the mentioned case is given below:

**Yearly Stranded Capacity Charges (Rs. Lacs) = All India Minimum POC for that quarter\* (uploaded on POSOCO website) X 12 X LTA quantum relinquished**

\* Only POC slab rate and reliability support charges have been considered.

Stranded Capacity Charges and Notice Period Charges calculation methodology is same as explained above in case (i) & case (ii).

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