

**KERALA STATE ELECTRICITY REGULATORY COMMISSION
THIRUVANANTHAPURAM**

**Present : Shri T K Jose, Chairman
Adv. A.J Wilson, Member
Shri B Pradeep, Member**

OP No 53/2023

In the matter of : Petition in the matter of granting connectivity to the proposed 110KV substation at Laloor, Thrissur.
Petitioner : Thrissur Corporation Electricity Department
Petitioner represented by : Shri M. K. Varghese, Hon'ble Mayor Thrissur Corporation
Shri K.Krishnakumar, Asst: Secretary, TCED
Shri Jose T.S, Electrical Engineer, TCED
Respondent : Kerala State Electricity Board Limited
KSEBL represented by : Shri M.P Rajan, Dy. Chief Engineer
Shri Dinesh.K, Dy Chief Engineer, Transmission
Smt. Latha S.V, Executive Engineer
Shri. Rajesh R, Asst: Executive Engineer
Shri. Shan, Asst: Executive Engineer
Date of the 1st hearing : 12.12.2023
Date of the 2nd hearing : 25.06.2024

Order dated 08.07.2024

1. M/s Thrissur Corporation Electricity Department (hereinafter referred as M/s TCED or petitioner), filed a petition dated 23.06.2023 before the Commission with the following prayers;

“

- *to admit this petition and give direction to the KSEBL to grant connectivity to the proposed 110KV substation of TCED under RDSS project*
- *Pass an order as the Hon'ble Commission may deem fit and appropriate under the circumstances of the case and in the interest of justice.*
- *The petitioner declares that the subject matter of the petition has not been raised by the petitioner before any other competent forum. And that no other competent forum is currently seized of the matter or has passed any order in relation thereto.”*

2. Summary of the petition filed by M/s TCED is given below.

- (1) Thrissur Corporation Electricity Department (TCED) is distributing electricity within 12.65 sq.km area out of 101 sq.km area of Thrissur Municipal corporation, and the balance area is served by KSEBL. TCED is supplying electricity to 41000 consumers within their license area.
- (2) The annual energy requirement of TCED is about 150MU and the average billing demand is about 35 MVA.
- (3) TCED had established one 110kV s/s, one 66kV s/s and one 33kV s/s within their licensed area. M/s TCED avails supply at 110 kV and 66 kV voltage levels from Viyyur Substation of KSEB Ltd. These substations are located at Patturaikal, within the licensed area of TCED. The details of the substations owned by M/s TCED are given below;
 - 110/11 kV system has 2x12.5 MVA capacity with 6 outgoing feeders
 - 66/11kV substation contiguously existing has 3x10 MVA capacity with 8 feeders
 - 110/33kV 16MVA with 2, 33 kV feeders feeding to 33 kV substation situated in east part of the licensee area and has 2x5MVA capacity with 4 feeders.

Thus, the total capacity of the substations installed within the area of TCED is 65 MVA.

- (4) Existing 110kV and 66 kV substation has no space for future expansion. The 110kV and 66kV feeds from the Viyyur substation of KSEBL. Hence these substations have single point of failure vulnerability, which do not meet (N-1) requirement mandated as per CEA standards. The 33kV transformer is also at Full capacity.
- (5) The proposed 110kV substation has primary objective of overcoming the (N-1) constraint since it is from an alternate substation of KSEBL with associated transmission system. The new 110kV substation and 8 feeders planned from there will add enough ring networking to existing TCED 11kV system and thus improving overall reliability, availability of feeders and hours of supply to consumers.

The elimination/ upgradation of the existing 66kV system is possible only with this alternate 110kV S/s to manage change over.

- (6) M/s TCED submitted that, due to the failure of Viyyur Substation, the supply was interrupted for almost 167.4 hours under TCED area in the year during the period from 2021 to 2023.

Hence, TCED is not in a position to provide 24x7 uninterrupted supply to its consumers. By considering all these aspects in detail, M/s TCED has planned to set up a new 110 kV substation by availing supply from a different source from KSEBL.

- (7) M/s TCED further submitted that they had prepared the DPR and submitted the same to the Ministry of Power (MoP) Govt, and approved the scheme under RDSS. The Central Government has approved the estimate of the substation with the capital cost of Rs 38 crore under RDSS scheme. As per the conditions of approval under RDSS, the substation need to be commissioned by the year 2025.
- (8) TCED has identified Laloor as the ideal place for substation. The site survey has already been carried out. To get the connectivity to the proposed substation from Madakathara- Valappad line, TCED and KSEBL had done multiple meetings at various venues but could not come to a consensus. Hence, the TCED file the instant petition before the Commission.

3. M/s KSEB Ltd vide the letter dated 17.08.2023 had submitted the comments on the petition filed by TCED and its summary is given below;

- (1) The 110kV and 66kV substations of TCED at Patturaickal avail power from tap lines, from Viyyur substation of KSEBL. The details of the feeding arrangement are given below;

Sl No	Substation	Transformer details	Feeding
1	110kV Substation Patturaikal	2 x 12.5MVA 110/11KV	Tapping arrangement from Viyyur Pullazhy (VIPL) feeder
		1x16MVA 110/33kV	
2	66kV Substation Patturaikal	3 x10MVA 66/11 kV	Tapping from 66kV CHVI 2 feeder fed from 63MVA 110/66 kV transformer at Viyyur substation and 40 MVA 110/66 KV transformer at Chalakkudy substation
3	33KV substation Ikkanda Warriar road	2x5MVA	110/33 kV transformer installed at 110kV Corporation substation

- (2) M/s TCED has proposed the construction of 110 kV substation at Laloor in the Capital Investment Plan (under RDSS Scheme) for the MYT Control Period 2022-23 to 2026-27. TCED proposes to connect the Laloor substation by tapping the 110 kV Madakkathara Valappad line.

The proposed substation location is beyond the license area of TCED and comes under the license area of KSEBL. This is equivalent to one distribution licensee is constructing 'intrastate transmission' system in the license area of another distribution licensee. This activity is not legitimate in terms of Section 12 of Electricity Act, 2003.

The KSERC (Connectivity and Intra State Open Access) Regulations, 2013, also not provide any provisions for connectivity of transmission substation constructed by one distribution licensee in the license area of another distribution licensee.

(3) KSEB Ltd further submitted that, the redundancy in the existing 110KV Patturaikal substation can be achieved by providing LILO arrangement as follows;

- Providing LILO arrangement on 1VIKK feeder at location 7 to the Corporation Substation by inserting a tower of required height.
- During the period of 110kV LILO arrangement works, the 11kV load of 110kV Corporation substation can be met by providing one 20MVA 110/11KV transformer in the existing yard, for which demand notice already served by STU.
- The 20MVA 110/11kV transformer can be installed in the TCED substation without affecting the existing system. By installing 20MVA 110/11KV transformer, the entire load of 66/11kV system can be met by this transformer and also the existing 66kV system of M/s TCED substation can be easily dismantled.

The 66/11kV system at 110kV substation Viyyur is maintained exclusively for catering the load of M/s TCED and M/s. Appolo tyres. However, M/s Appolo tyres has provided an undertaking to upgrade their 66 kV system to 110 kV, in line with KSEBL.

By providing the LILO arrangement on 1VIKK feeder, 110kV supply redundancy can be ensured at 110KV s/s of TCED at Patturaikkal, which results in better reliability, flexibility and ensuring N-1 security.

(4) KSEBL further submitted the spare capacity available at their nearby substations, the details are given below.

SL No	Substation name	Installed Capacity	Existing Load	Network Augmentation in Progress
1	Viyyur	25 MVA (2 ×12.5 MVA)	15 MVA	AS received for enhancement of 12.5 MVA to 20 MVA
2	Ollur	37.5 MVA (3 ×12.5 MVA)	26 MVA	
3	Pullazhy	40 MVA (2×20 MVA)	21 MVA	
4	Mannuthy	25 MVA (2×12.5MVA)	7.5 MVA	The second 12.5 MVA Transformer is scheduled to commission within one month
		Total Installed capacity- 127.5MVA	Total Demand- 69.5MVA	

(5) KSEBL is directly feeding more than 50% of the consumers in the Thrissur Corporation area. The existing demand of TCED is less than 40 MVA. The gross demand of the TCED can be easily met by KSEBL.

The 110 kV Pullazhy substation which is located at 3 kms from Laloor is under loaded and unutilized. Hence the immediate power requirement can be catered by Pullazhy substation itself by drawing extra 11 kV feeders. After the network augmentation of Viyyur and Mannuthy Substations, abundant spare capacity will be available and KSEBL can cater any future demand of TCED.

- (6) As per the Clause 44.6 of CEA (Measures Relating to Safety & Electric Supply) Regulations, 2010, stipulates that, there shall not be tapping of another transmission line from the main line for 66kV and above class of lines.

Since the feeding arrangement of M/s TCED is from tap lines at both 66kV and 110kV levels, KSEBL has proposed LILO arrangement of existing tap line feeder, i.e., 110kV Viyyur-Pullazhy (1VIPL) feeder to 110kV substation at Patturaickal. As the CEA regulations need to be strictly adhered, the tapping arrangement needs to be converted to LILO immediately.

M/s. TCED is a user of intra state transmission system, they are bound to adhere the safety standards and convert the tapping of lines to LILO arrangement immediately. Due to the non-availability of LILO arrangement, the petitioner is not getting supply redundancy with the existing arrangement.

Considering all the factors, KSEBL requested that, the proposed substation at Laloor which is only 3kms away from existing 110kV substation Pullazhy, is not necessary.

4. The Commission admitted the petition as OP No. 53/2023. The hearing on the matter was conducted on 12.12.2023. Shri. Jose. T.S Electrical Engineer, TCED presented the petition on behalf the petitioner. Sri. Rajan.M.P, Deputy Chief Engineer, Tariff & Regulatory Affairs Cell, and Shri. Dinesh.K, Deputy Chief Engineer, Transmission, Thrissur presented the counter arguments on behalf of the KSEBL. The summary of the deliberations during the hearing is extracted below.

- (1) M/s TCED submitted the following during the hearing;
- The distribution network of the TCED spans approximately 12.65 sq. km and has an annual energy sale of around 158 MU. TCED possesses its own 110kV and 33kV substation at Patturaickal, Thrissur, with 610 distribution transformers. TCED receives incoming supply from Viyyur Substation of KSEB Ltd at 110 kV and 66 kV voltage levels.
 - 110/11kV Substation having 2x12.5 MVA Transformer capacity with 6 nos outgoing feeders(25MVA). The 66/11kV substation having 3x10 MVA transformer capacity with 8 nos outgoing feeders (30 MVA). The 33kV substation located at Ikkandawarrier Road, having 2 x 5 MVA transformer capacity

with 4 nos. outgoing feeders (10 MVA). Thus, the total existing capacity comes to 65 MVA.

- TCED avails 110KV supply through a tap line from the Viyyur Pullazhy (VIPL) feeder. During 2021-23 the frequency of supply interruptions to the TCED substation from KSEB Ltd was very high, due to which the licensee could not provide 24*7 supply uninterrupted. During last month, there are 10 outages which resulted in a total supply interruption of 19 hours.
- TCED further submitted that the maximum demand (MD) of the Patturakkal substation has increased from 26.479 MVA in 2013 to 44.91 MVA in 2023. The implementation of the proposed substation at Laloor will enable them to meet the n-1 requirement. Thrissur town is a fast-growing town and the requirement of power is also increasing. By the year 2030, TCED expects a MD of 71.16MVA.
- TCED further submitted that, the proposed location will shift the feeding source, and the new 110kV s/s with 8 feeders will add enough ring network to the existing 11kV system. It will improve overall reliability, availability of feeders and hours of supply to the consumers.
- Laloor is located at a distance of 600m from the distribution area of TCED. The Madakkathara- Valappad 110kV line is also available nearby. Out of the 8.2km EHT line proposed, 7.50km is going through paddy field.
- The Central Government has approved Rs 38.00 crore for the construction of the proposed 110kV substation and allied works under RDSS and sanctioned 60% of the approved estimate as grant.
- TCED and KSEBL has number of discussions to finalise the connectivity of the proposed substation from Madakkathara-Velappad line, however they could not arrive at a consensus for the project. For connectivity, TCED already submitted an application to the Chief Engineer (Transmission- North), KSEBL, but it is pending for approval.
- The proposal of KSEBL to have 110kV LILO arrangement by dismantling the existing 66kV s/s is possible only after the commissioning of the new substation at Laloor.

(2) The respondent KSEBL submitted the following during the hearing;

- The 110kV s/s and 66kV s/s of TCED at Patturaickal is availing supply from KSEBL at two voltage levels, through tap lines from 110kV Viyyur – Pullazhy (1VIPL) feeder and 66kV Chalakudy-Viyyur (6CHVI 2) feeder. The total load requirement of TCED is about 40 MVA only.

The tapping of 66 kV supply from 6CHVI 2 is causing interruption on line fault and is prolonging for the last few years due to lack of second source. It could be overcome by providing LILO connection. Though KSEBL has proposed for LILO arrangement to TCED number of times, however they are reluctant to accept the proposal.

- There are 5 Nos of 110kV Substations around TCED distribution area viz-Viyyur, Ollur, Pullazhy, Mannuthy and Palakkal. The total capacity of these substations together is about 152 MVA, out of it the demand of KSEBL is 80 MVA only and the spare capacity available is about 72 MVA.

The 110kV Substation Pullazhy is located 3km away from the proposed Laloor substation and is under loaded.

- KSEB Ltd further submitted that the Existing Madakkathara-Valappad 110 kV line is constructed with ACSR Wolf conductor of current carrying capacity of 343 A. The 110 kV Valappad and Palakkal substations connected to this feeder is already having a station capacity of 61 MVA. By adding one more station at Laloor with 40 MVA station load, the existing Wolf conductor had to bear an additional load of 220 A.

More over in case of system contingency, this line is used for feeding other stations with restriction according to the grid conditions. Therefore upgradation of entire 28 kM of 110 kV Madakkathara -Valappad (1MDVA) line from existing Wolf to HTLS conductor incur an additional cost of Rs 14.00 crore.

For the drawal of 110 kV line and tower erection from tower location '60' to the proposed substation site requires new right of way through public land / Kole padam. In addition, the provision towards compensation/ litigation also to be considered into account which will delay the execution beyond the time frame of RDSS. The total additional cost for changing the conductor and allied works may be about Rs 45.00 crore, and KSEBL may submit the details of the additional cost within one week.

- The existing capacity of the 110kV s/s and 66kV s/s of TCED is 65 MVA where as the total demand of the licensee is less than 40 MVA only. Considering the total electricity demand of TCED, the proposed substation at Laloor may be under utilized and the additional cost has to be borne by the consumers without any benefit.
- KSEBL further submitted that, even now, during emergency situation and Thrissur Pooram, 11kV supply from KSEBL is fed to Corporation area at 4nos. of interlinking metered points. Similar interlinking HT points of KSEBL are available at the periphery of TCED to meet the load during emergencies.

- KSEB Ltd submitted that TCED can avail two independent 110kV sources from Madakkathara 400kV Substation or Kunnamkulam 220kV Substation by upgrading present 66kV System to 110kV and there by minimizing interruptions of Thrissur Corporation.
- (3) Based on the deliberations, the Commission has directed the parties to clarify the following;
- (i) To what extent can the interruptions be reduced by the implementation of the proposed 110 kV substation at Laloor?.
 - (ii) Whether TCED has any technical or commercial objection to switching the existing substation arrangement of the tapped line to the LILO arrangement?
 - (iii) The age of the transformers in the existing 66KV substation of TCED and how much duration is needed to dismantle the existing 66KV substation when the proposed substation comes.
 - (iv) Whether TCED had explored the possibility of availing supply from Pullazhy substation as submitted by KSEB Ltd, instead of the proposed Laloor substation.
- (4) In reply to clarifications sought by the Commission, TCED submitted that the two transformers of 66kV s/s were installed in the year 1981 and one transformer is installed in the year 2006.

The upgradation of 66KV substation can be ensured only after ensuring the supply redundancy. The LILO arrangement proposed by the KSEB Ltd can be done after reaching the redundancy of supply.

5. In compliance of the directions of the Commission, KSEBL vide the affidavit dated 09.01.2024 submitted the following, additional points;

- (i) The existing Madakkathara- Valappad 110 kV line is constructed with ACSR Wolf conductor of current carrying capacity of 343 Ampere and is the major source of supply to Valappad 110kV bus feeding other substations.

By adding one more station at Laloor with 40 MVA load, the existing wolf conductor has to bear an additional load of 220A. Moreover, in the case of system contingency, this line is used for feeding other stations with restriction according to the grid condition. Therefore, the upgradation of the entire 28kM of 110kV Madakkathara- Valappad line from the existing Wolf to HTLS conductor is necessitated and the cost of the same will be in addition to the construction cost of 110kV s/s and LILO arrangement.

- (ii) For the drawal of 110kV line and tower erection from tower location 60 to the proposed Laloor s/s, new right of way through public land/ Kole Padam is required.

- (iii) The additional cost for drawing 110kV line works for connecting the Laloor s/s is estimated as below.

Sl No	Particulars	Amount (Rs. Cr)
1	Cost of conductor changing of 28kM (Ckt) 1 MDMA Wolf conductor with HTLS conductor	14
2	Cost of new 110kV line construction with OPGW (7km DC line using HTLS conductor and 1km UG cable)	23
3	Compensation cost towards tower footing and RoW	8
	Total anticipated cost	45

- (iv) KSEBL further submitted that, the LILO work for the conversion of the existing 66kV s/s to 110kV s/s can be managed with minimum interruptions. KSEBL has already prepared DPR and estimate for installing new 110/11kV 20 MVA transformer for transferring the existing 66KV load to the 110kV system at Patturaickal. The LILO arrangement with minimum interruptions can be done subsequently from 110kV Viyyur Kandassankadavu line. Thereby TCED can avail two independent 110 KV sources from Madakkathara 400kV substation or Kunnamkulam 220kV s/s by upgrading present 66kV system to 110kV system. However, TCED has not responded to the proposal of KSEB.

6. In response to additional submission of KSEBL dated 09.01.2024, M/s TCED submitted the following;

- (i) The argument of KSEBL that, the proposed 110kV s/s at Laloor will be underloaded is baseless argument.
- (ii) The completed application rectifying all the anomalies pointed out by the respondent vide Letter No. TCED-RDSS-2405/22 dated 23.01.2024 was submitted to KSEBL.
- (iii) Regarding the upgradation of 66kV s/s to 110kV s/s, it is possible only after the commissioning of the proposed 110 kV s/s.
- (iv) The petitioner will be drawing underground cable from the proposed substation to its distribution area.

7. Based on the deliberations during the hearing, the Commission vide Interim Order dated 27.02.2024 has Ordered the following;

“

- (1) *Grant consent to M/s TCED to proceed with the implementation of the proposed 110 kV substation at Laloor under RDSS, with the observations and clarifications given under paragraphs 10, 11, 12, and 13 of the interim Order.*
- (2) *KSEBL shall conduct detailed load flow studies by modelling the proposed 110kV substation and all the EHT lines, with special*

reference to connect the proposed substation with any one of the nearby 110kV DC lines of KSEBL as discussed under paragraph 13 of this Order. TCED is directed to provide necessary details required for the study.

KSEBL shall submit a detailed report within one month from the date of this Order, with the specific recommendations on the most optimal connectivity, with cost benefit analysis including addition/ reduction in system losses in each case separately.

- (3) *The petition shall be disposed after considering the reports to be submitted by KSEB Ltd and TCED.”*

The Commission further directed TCED to coordinate with the STU and facilitate the modification of the existing connectivity of TCED and also to submit a plan along with time schedule for modifying the connectivity, in consultation with KSEBL, within one month.

8. In compliance of the direction of the Commission, the petitioner M/s TCED vide the letter dated 16.03.2024 has submitted the following regarding the LILO arrangements at existing substations at Patturaikkal.
- (i) TCED is having 3 No of 10MVA transformers at 66kV side. Corporation council, as per resolution No. 38 dated 14.07.2023, decided that the upgradation of 66kV s/s to 110kV s/s as per the direction of KSEBL can be done after the execution of new 110kV s/s at Laloor, in order to avoid the power outage during upgradation works.
 - (ii) TCED is expected to complete the construction of the new substation at Laloor by the year 2025-26. 8 Nos of 11 kV feeders can be fed from the new substation, and it can shift the entire load of 66kV ss from the new s/s. The 66kV existing s/s can be dismantled and the Yard area can be utilised for the proposed 110kV LILO arrangements and for metering.
9. Subsequently, KSEBL vide submission dated 17.05.2024 had submitted the load flow study report before the Commission. The summary of the load flow study report submitted is given below;
- (1) KSEB Ltd submitted that the annual energy requirement of M/s TCED is about 150 MU and the average billing demand is about 40 MW. Hence M/s KSEB Ltd has considered the maximum demand of 40MVA for the load flow studies.
Further, M/s TCED further submitted that the proposed 2*20MVA transformer at 110kV substation Laloor does not meet the n-1 reliability. Hence, the KSEB Ltd had conducted the LFS with 3*20MVA transformers at 110KV Laloor substation for satisfying n-1 condition.

- (2) KSEB Ltd had conducted the LFS by modelling the grid with the following case wise modifications;

SL No	Case	Description	Remarks
1	Case 1	Constructing 110kV substation at Laloor by Thrissur Corporation Electricity Department by LILoing the existing 110kV Valappad- Madakkathara line with 3X20MVA 110/11kV transformers in addition to the existing 110kV Substation at Patturaikkal of TCED. and 66kV Upgraded to 110kV level with 2X 12.5MVA 110/11kV by LILoing VIKK feeder	Peak load system loss increased by 83kW
2	Case 2	Without the Existing 110kV Substation at Patturaikkal of TCED. The 66kV Substation TCED is upgraded to 110kV level with (2x12.5MVA 110kV/11kV 1X20MVA 110/11kV, and 1X16MVA 110/33kV transformers)by LILoing the existing 110kV Viyyur - Kandassankadavu feeder. And the proposed 110kV Laloor with 3x20MVA 110/11kV transformers by LILoing the 110kV Palakkal - Madakkathara feeder	Peak load system loss increased by 44kW
3	Case 2A	With full load at 110kV Substation Laloor of TCED.	Loading of Laloor Madakkathara feeder to around 85% with system loss of 129kW
4	Case 2B	With full load at 110kV Patturaikkal Substation of TCED which is fed by the LILo of 110kV VIKK feeder	Loss reduced by around 30kW. Viyyur Thrissur corporation feeder is loaded to around 78%

- (3) KSEB Ltd submitted that the Power System Engineering (PSE) had concluded the load flow study with the observation that the construction of 110kV substation at Laloor is not found technically feasible under normal loading conditions and considering the increase in peak load system loss.
- (4) As per LFS studies, the case with maximum loss reduction is with the LILo arrangement of Patturaikkal substation with 110kV VIKK feeder and 66kV to 110kV up gradation. Since there will be two numbers of 110kV feeders from two different reliable sources viz 110kV substation Viyyur (fed from 400kV substation Madakkathara) and 110kV substation kandassankadavu (fed from 220kV Substation Kunnamkulam), this will address all the network reliability and availability issues of Ms TCED.

At the same time, LFS report indicates higher loading (78%) on Viyyur-Thrissur Corporation 110 kV feeder in this configuration, warranting upgradation with higher capacity conductor.

Since in all other cases there is considerable increase in system loss, it is recommended that the licensee M/s TCED may proceed with the LILo implementation as mentioned above.

- (5) However, if the licensee desires to construct a new substation at Laloor, as per the feasibility study it can be considered only if the following conditions are adhered
- Installing 3*20MVA 110/11kV transformers at 110kV substation Laloor for meeting N-1 reliability
 - Reconductoring of 110kV Madakkathara-Laloor-Valappad LILO arrangement(44ckt kms) and 110kV Viyyur-Thrissur Corporation kandassankadavu LILO arrangement (19kms) with conductor having higher current carrying capacity as the feeders are loaded above optimum loading limit
- (6) KSEB Ltd submitted the following additional prayers for the consideration of the Commission;
1. TCED may be directed to convert the existing tapping arrangements to LILO arrangements at 110 KV level. This can be done by upgrading of 66kV Viyyur Chalakudy line to 110kV and replacing the existing 66/11 KV transformer to 20MVA 110/11kV.
 2. KSEB Ltd submitted that as above it will also ensure the availability of two reliable sources to the 110kV Patturaikkal substation viz 400kV Substation Madakkathara and 220kV Substation Kunnamkulam. This will in turn increase the reliability of network, reduce the high T &D losses, additional equipment losses of 66kV bays, reduce the interruptions of M/s TCED and N-1 condition can be ensured for the supply.
10. The second hearing on the petition was conducted on 25.06.2024. Shri. Jose T.S, Electrical Engineer TCED presented the matter on behalf of the petitioner. Smt. Latha S.V, Executive Engineer, and Shri. Shan.B.S Assistant Executive Engineer presented the matter on behalf of KSEBL. The summary of the deliberations during the hearing is given below.
- (1) The petitioner M/s TCED submitted that, as per the Load Flow Study (LFS) conducted by the STU, the substation capacity at the proposed 110kV substation at Laloor is considered as 3x20 MVA instead of 2x20 MVA transformer capacity of the s/s as per the approved RDSS scheme.
- The present total load requirement of TCED is less than 40 MVA, out of which, 20 MVA load only proposed to be transferred to the Laloor substation under normal operating conditions. Since the load flow studies are conducted with the transfer capacity of 3 x 20MVA, the losses estimated by KSEBL is on the higher side.
- TCED has also in addition, transferring 20 MVA load from existing substation at Patturaikal to Laloor will reduce the loading at Patturaikal Substation proportionally which also will reduce the respective line losses.

TCED has initiated the tendering procedures for the construction of 110kV substation at Laloor in line with the interim order of Commission OP No: 53/2023 Dated: 27.02.2024. Any further delay in resolving the connectivity issue will result in un-utilization of the substation.

TCED further submitted that, the construction of the 110kV substation is included under the RDSS schemes sanctioned vide the letter of PFC dated 25.04.2022. 60% of the approved cost is provided as grant under the RDSS. If the project could not complete by the Year 2025-26, the grant may be forfeited by the Central Government. Hence the TCED request before the Commission to direct KSEBL to grant connectivity to the proposed 110kV substation of TCED under RDSS project.

- (2) KSEBL Ltd submitted that, since the 2 x 20MVA transformer proposed at 110kV substation does not meet the n-1 criteria, it had conducted the LFS with 3x20MVA transformers at 110KV Laloor substation for satisfying n-1 condition. LFS has concluded with the observation that the construction of 110KV substation is not found technically feasible under normal conditions due to the increase in the peak system loss. However, the proposed 110KV substation may be recommended with the following conditions considering the redundancy/reliability point of view;
- Installing 3x20MVA 110/11kV transformers at 110kV substation Laloor for meeting N-1 reliability.
 - Reconductoring of 110kV Madakkathara-Laloor-Valappad LILO arrangement(44ckt kms) and 110kV Viyyur-Thrissur Corporation kandassankadavu LILO arrangement (19kms) with conductor having higher current carrying capacity as the feeders are loaded above optimum loading limit

KSEBL further clarified that, in redundancy point of view Laloor substation is required. On a query from the Commission, the licensee further clarified that the existing Madakkathara – Valappad 110 kV DC line does not require any upgradation for loading up to 20 MVA on the proposed Laloor Substation

- (3) The Commission has observed that, the following assumptions used by KSEBL for the load flow study is erroneous.
- (i) More than 35 MVA load is considered to be served from the proposed 110kV substation at Laloor alone. Hence KSEBL has considered 3 x 20MVA transformers at Laloor s/s instead of 2 x 20 MVA transformer proposed by TCED. This assumption has lead to the erroneous conclusion of higher system losses and line loading.

TCED has already clarified that, the maximum load that is expected to be shifted to the Laloor substation is 20 MVA only.

TCED further submitted that, in the scheme approved under RDSS, 2 x 20MVA transformers only considered and hence at this stage they cannot enhance the transformer capacity to 3 x 20MVA.

- (ii) The scenario under case 2A and 2B are contingency scenarios and not normal loading scenarios. Even in these contingency situations, line loadings are within limits and grid voltage is stable. However, this contingency situation is considered as the normal loading condition, leading to recommendation for upgradation of capacity of the lines.
- (4) KSEBL in its concluding remarks clarified that, considering excessive rise in electricity demand in the State including the Thrissur Municipal Corporation, there is need to have a 110kV substation at Lalloor, and the same can be connected to Madakkathara- Valappad line as TCED has clarified that loading at Lalloor substation is up to 20 MVA only.
- (5) The Commission clarified that grant of connectivity and ascertaining ATC (import capability for the TCED license area) are two different matters. A perusal of LFS report along with the clarification furnished by KSEB Ltd. during the hearing indicate that the present load in the license area of TCED can be met with optimal loading of both Patturaikal (with LILoing on Viyyur Kandassankadavu feeder) and Lalloor substations without any requirement for line strengthening.

Analysis and Decision of the Commission

- 11. The Commission having examined in detail the proposal of the TCED to construct a new 110kV substation at Lalloor under RDSS and the comments of KSEBL, the provisions of the Electricity Act, 2003, KSERC (Terms and Conditions for Determination of Tariff) Regulations, 2021, other Rules and Regulations in force, decide the matter as follows;
- 12. Thrissur Corporation Electricity Department (TCED) is one of the small distribution licensees in the State of Kerala. The licensed area of TCED is around 12.63 sq.km only and serving electricity to about 40,000 consumers in the area. TCED avail power from KSEBL at BST tariff approved by the Commission from time to time.

At present, TCED has one 110kV substation and one 66kV substation, at same location at Patturaickal. The total capacity of the sub-station together is about 65MVA, as against the present load requirement of 40MVA of TCED.

Both the substations of TCED avail power from Viyyur 110kV substation of KSEBL, through tap arrangements. Since both the substations receives power from the single source, i.e. from the Viyyur substation of KSEBL, TCED reports 8 interruptions with 26 hours duration in 2021, 8 interruptions with 17.80 hours duration in 2022, and 6 interruptions with 24.30 hours in the year 2023 at the 110kV s/s of TCED. Similarly, TCED report 10 interruption with 26.92 hours duration in 2021, 36 interruption with 59.11 hours duration in 2022, and 31 interruptions 54 hour duration in 2023 at 66kV.

Hence, TCED proposed to have a new 110 kV substation at Laloor with a transformer capacity of 40 MVA. The location of the substation is outside the license area of TCED. It is proposed to connect the substation with the Madakkathara- Valappad 110kV line of KSEBL, by drawing 8km 110 kV line through paddy field.

13. The Commission has also noted that, the Power Finance Corporation, on behalf of the Ministry of Power, GoI vide the approval dated 25.04.2022 has approved to include the 110 kV s/s at Laloor and allied works with a total estimate cost of Rs 37.74 crore under Revamped Distribution Sector Scheme (RDSS) of TCED as part of the infrastructure projects approved under RDSS for loss reduction works. Under RDSS, the TCED is eligible to get 60% of the approved estimate of Rs 37.74 crore i.e., Rs 22.64 crore as grant from Central Government for the project.
14. The 110kV substation and associated system approved as part of the 110kV s/s at Laloor is given below.

SL No	Component	Details of Works	Unit Cost	Quantity	Estimated Cost	RDSS Grant (60% of the Cost)	Own fund
			(Rs. Cr)		(Rs. Cr)	(Rs. Cr)	(Rs. Cr)
New 110/11 kV Substation							
1	Construction of 110KV DC line to new Thrissur Corporation substation	Supply and laying of 110 kV, 1core x 630 sq.mm Aluminium Corrugated Sheathed, XLPE Insulated, Aluminium Power cable as per Indian Standard/Technical Specification from the DC tower to the upcoming bays in the new 110 kV substation Thrissur corporation including construction of cable trench, termination of the cable on the Cable Support Structure both end and testing and commissioning of the cable under Thrissur corporation (6 Km)	6.50	1.00	6.50	3.90	2.60
2		Construction of new 110KV substation at Thrissur corporation, Thrissur with 2*20 MVA 110/11KV Transformers, constructing LILO Arrangement	1699.00	1.00	16.99	10.19	6.80
3		Construction of (7.5X2 km) 110 kV DC to 110kV Substation	1425.00	1.00	14.25	8.55	5.70
Total estimated Cost					37.74	22.644	15.10

15. As above, since the proposal to construct the 110kV substation at Laloor is included under RDSS, the licensee TCED is eligible to get Rs 22.66 crore as grant for the construction of the substation and allied works. The project has to be completed by the Year 2025-26 to qualify for the grant. Considering these aspects in detail, the Commission vide the interim Order dated 27.02.2024 had granted consent to M/s TCED to proceed with the implementation of the proposed 110kV substation and allied works.

16. The instant petition was filed for issuing direction to KSEBL to grant connectivity to the proposed 110kV substation at Laloor by tapping the 110kV Madakkathara Valappad line. Though, KSEBL has raised some objections initially, the STU in the second hearing held on 25.06.2024 has clarified that, there is no objection for the proposed 110kV substation at Laloor and also for granting connectivity of the substation with Madakkathara- Valappad line. Hence, KSEBL shall provide the connectivity to the proposed 2x20 MVA substation at Laloor as envisaged in the RDSS scheme.
17. The Commission has also noted that, the cost of construction of the (7.5 x 2km) of 110kV DC to 110kV substation for an amount of Rs 14.25 crore is included in the RDSS Scheme approved by the MoP, Gol. However, the additional cost, if any, incurred by the STU, specifically for the connectivity of the Laloor substation and allied works shall be borne by the TCED, strictly as per the provisions of the provisions of the KSERC (Connectivity and Intra-State Open Access) Regulations, 2013.
18. The petitioner M/s TCED during the deliberations of the subject matter clarified that the maximum load i.e proposed to be shifted from the existing Patturaikal 110KV s/s to the proposed Laloor 110KV s/s is 20MVA only. Further, KSEB Ltd agreed to the connectivity to the Madakkathara- Valappad 110 kV without any upgradation for catering the load of 20MVA at Laloor. TCED shall strive to provide sufficient land area for the future expansion of the substation. While enhancing the contract demand from the present requirement of about 45 MVA, to meet future growth in demand, the ATC to the area of license shall be ascertained by STU and modification requirement, if any, shall be carried out in accordance with the connectivity regulations
19. The Commission has noted that, though 60% of the estimated cost of the 110kV substation and associated system amounts to Rs 22.644 crore only sanctioned as grant under RDSS out of the total estimate of Rs 37.74 crore. The petitioner M/s TCED had not sought investment approval for the balance amount of Rs 15.10 crore and not submitted the source of capital for the same excluding the grant under RDSS.

However, as per the Order dated 22.11.2023 in petition OP No. 33/2023 in the matter of Truing Up of accounts of TCED for the year 2021-22, the total regulatory surplus available with TCED as on 31.03.2022 is Rs 163.51 crore. TCED can utilise 40% of the approved cost of the Laloor substation and allied works amounting to Rs 15.10 crore from the approved surplus available with the licensee with prior approval of the Commission.

20. TCED, vide letter dated 16.03.2024 has agreed to upgrade the 66 kV s/s at Patturaikal to 110 kV and to carry out necessary works to establish LILO connectivity in place of existing tap arrangement. This work shall be carried out either as deposit work through KSEB Ltd or by the licensee in coordination with KSEB Ltd, in a time bound manner. TCED shall include the same in the Capital Investment Plan for the control period within one month of this Order.

21. Since KSEBL in the second hearing held on 25.06.2024 has communicated its concurrence for connectivity for the proposed 110kV substation at Laloor under RDSS by TCED, the Commission does not find it necessary to go into details of the objections raised by KSEBL vide its letter dated 17.08.2023, during the 1st hearing held on 12.12.2023 and discrepancies noted in the LFS report . However, KSEBL should keep in mind that, as per Section 39(2) of the Electricity Act, 2003, KSEBL as the STU is responsible for the co-ordinated development of the intra-State Transmission system within the State of Kerala, and it is the responsibility of the KSEBL as the STU to co-ordinate with other licensees and provide adequate redundancy of supply to TCED and other distribution licensees in the State.

Orders of the Commission

22. The Commission, has examined the petition filed by M/s TCED with the request to give direction to KSEBL to grant connectivity to the proposed 110kV s/s of TCED at Laloor under RDSS, the arguments of the KSEBL, the provisions of the Electricity Act, 2003, other Rules and Regulations in force, hereby Orders the following;
- (1) Grant approval for the implementation of the proposed 2x20MVA 110 kV substation at Laloor and allied EHT line along with its associated works under RDSS by M/s TCED.
 - (2) KSEBL shall grant connectivity to the proposed 2x20 MVA 110kV substation at Laloor on the existing Madakkathara- Valappad 110 kV line without any further delay, based on the application dated 27.05.2023 of M/s TCED
 - (3) M/s TCED shall seek formal investment approval of the Commission for investing the balance amount of Rs 15.10 crore excluding the RDSS grant, and for upgradation of the existing 66 kV s/s including for the LILLOing of 110 kV connectivity, from the internal accrued surplus available with them, within one month from the date of this Order.

The petition disposed of. Ordered accordingly.

Sd/-
T K Jose
Chairman

Sd/-
Adv. A J Wilson
Member

Sd/-
B Pradeep
Member

Approved for issue

Sd/-
C R Satheesh Chandran
Secretary