

KERALA STATE ELECTRICITY REGULATORY COMMISSION
THIRUVANANTHAPURAM

Present: **Shri. Preman Dinaraj, Chairman**
Shri. S. Venugopal, Member
Shri. K. Vikraman Nair, Member

Petition No. OP 31/19

In the matter of : Petition filed by Southern Railway to direct Kerala State Electricity Board Limited to issue No Objection Certificate for availing open access

Petitioner : Southern Railway, represented by the Chief Electrical Distribution Engineer.

Petitioner represented by : Shri. Anoop, Sr. DEE/TRD/TVC
Shri. N.K Subramanian, Standing Counsel
Shri. J Jyothiraman, SSE/TRD/HQ/MAS
Shri. R.Gopakumar, SSE/D/TRD/TVC

Respondent : Kerala State Electricity Board Limited

Respondent represented by : Shri. Sasankan Nair, DCE, TRAC, KSEBL
Sri. K. G. P. Nampoothiri, Executive Engineer
Smt. Latha S.V, AEE, TRAC, KSEBL
Sri. Biju S.S, Asst: Executive Engineer, KSEB Ltd

Daily Order dated 05.08.2019

1. M/s Southern Railway, (hereinafter referred to as the petitioner or Southern Railway) filed a petition on 27.12.2018, before the Commission with the following prayers:

(a) Issue a directive to the respondents herein to issue "No Objection Certificate" and Concurrence to the petitioner for non-discriminatory open access to avail power supply from M/s. Bharatiya Rail Bijlee Company Limited (BRBCL)

Power plant at Nabinagar, Bihar or any other source to the Railway Traction Substations as deemed licensee.

- (b) Direct the Respondents to consider all the drawal points from Inter State Transmission System (ISTS) Located within the Kerala State shall be a single entity for the purpose of scheduling and Energy Accounting as laid down by CERC in its order dated 05.11.2015 (Annexure B) that the drawal points from ISTS located within a State shall be treated as single entity for the purpose of scheduling and group of Traction Sub Stations (TSSs) situated in a State and connected directly with ISTS may be treated as one fragmented control area.*
- (c) Direct the Respondents to provide back-up power supply for Railway Traction in the event of Open Access supply interruption and to claim back-up power supply charges as per Traction tariff approved by Hon'ble Commission for the backup power supplied by KSEB Limited only and not for the power which is wheeled through Open Access.*
- (d) To declare that the 2-phase power supply system existing in the Southern Railway has no unbalance effect in upstream 3-phase power grid and alternate power supply scheme is not warranted as already Hon'ble Commission has recognized the 2-phase scheme of Traction power supply and approved separate tariff for Railway Traction.*
- (e) It is prayed that a formal Deviation settlement mechanism may be please be enabled to take care of the operational requirement of Open Access.*
2. The Commission admitted the petition as OP No. 31 of 2019. Hearing on the petition is conducted on 19.07.2019 at the court hall of the Commission at Thiruvananthapuram. During the hearing Adv. Sri. N. K. Subramanian and Sri. Jyothiraman presented the petition on behalf of Southern Railway. Sri. K.G.P. Nampothiri presented the counter remarks on behalf of the respondent KSEB Ltd.
3. The summary of the issues raised by the petitioner Southern Railway during the hearing is given below.
- (i) Indian Railways is a deemed distribution licensee as per Section 11(a) and 11(g) of Indian Railways Act, 1989 read with third proviso to Section 14 and Section 117 of Electricity Act, 2003. Ministry of Power and CERC has already clarified the position as deemed licensee. Later APTEL has also affirmed the right of railways to get open access.

- (i) Southern Railway is availing power from Kerala State Electricity Board Limited (KSEBL) under a separate tariff category, Railway Traction. There are 12 supply points within the State of Kerala having contract demand of 91 MVA.
- (ii) Indian Railways is currently drawing a power about 1100MW through open access in various states including Maharashtra, Madhya Pradesh, Gujarat, Rajasthan, Jharkhand, Haryana, Karnataka, Delhi, Utter Pradesh, Bihar and DVC area.
- (iii) Southern Railway has requested KSEBL to accord NOC for availing power from M/s BRBCL plant, Nabinagar, Bihar, a plant set up by Indian Railways as JV company with NTPC. This was in line with the direction of Ministry of Railways vide letter dated 17.2.2017.
- (iv) It has also paid Rs.1.15Cr to KSEBL for provision for ABT meters and associated equipments. Railways has indicated the 8 numbers of traction substations under Palakkad and Trivandrum for which payment towards ABT meters were done by Railways .
- (v) Director (Transmission) of KSEB Ltd vide the letter dated 14.11.2017 informed that, prevailing Regulations of CERC and KSERC insists 3 phase loading for consumers availing open access. KSEB Ltd will issue NOC for open access only after railways take necessary action for availing 3 phase supply or provide alternate mechanism to avoid harmonic distortion due to load unbalancing.
- (vi) The Scheme of power supply for Railway Traction in the State of Kerala is both mutually and universally accepted scheme and adopted all over the world.
- (vii) There are 426 Traction Substations of Indian Railways connected to various SEB's are in service throughout India with the same configuration and nowhere any problem of unbalance is encountered.
- (viii) Power supply scheme for Railway Traction is well thought-out scheme and it may be noted that the power supply for Railway Traction is availed at 110kV level even for a demand as low as 3MVA for keeping the voltage unbalance due to traction current as low as possible.
- (ix) Two phase traction system is in existence in Southern Railway since 1965 and first Traction Substation in Kerala was commissioned on 11.06.1997 and no disturbance to the 110kV grid due to traction load is experienced till date.
- (x) The voltage unbalance due to two phase current in the 110kV, 3 phase Grid is well within the limit of 3% specified in CEA Grid connectivity

Regulation. Considering full load current of 196A for 110/27kV 21.6MVA transformer and assuming an average fault level of 2000MVA and zero current on the 3rd Phase, the voltage unbalance could be 1.078%.

- (xi) Power supply for Railway Traction is availed from 110kV Grid and traction power transformers of contiguous Traction Substations are connected cyclically across two phases of grid in the manner R-Y, Y-B & B-R as such traction load on the grid is essentially a three phase load. Hence technically an alternative power supply scheme for Kerala Region alone is not warranted.
 - (xii) Regarding meters, even today 3 phase 4 wire are only used for metering two phase traction supply at all Traction Substations. Hence switching over to open access has no impact on metering.
 - (xiii) Regarding reference to KSERC Supply Code is to state that Regulation 6(2) quoted by KSEB permits the licensee to effect supply at a voltage and phase other than specified in Sub-regulation 6(1) i.e. single/Three Phase, with the approval of the Commission. In this regard it is to point out that KSERC has already recognised Railway Traction and approved Separate Tariff for Railway Traction in the State of Kerala, hence question of any violation of Regulation does not arise.
 - (xiv) Also peculiarity of Kerala Grid, as stated by KSEBL if any exist, does not have relevance to availing open access, since no physical change in the system of supply will come into being, there will only be change in the agency doing the energy accounting from KSEBL to SLDC/Kerala.
 - (xv) Railways submitted that delay in issue of NOC by KSEBL will adversely affect the financial functioning of Railways and further added that KSEBL failed to fulfil the statutory obligation and such failure is against the public interest also.
4. The respondent KSEB Ltd, during the hearing submitted the following on the subject issue.
- (1) The entire transmission and distribution network in the Country is envisaged and developed as 3 phase AC systems with frequency of operation designed at 50Hz. Railways is availing two phase supply and the two phase traction load causes following in the KSEBL grid.
 - (i) Severe load unbalance in KSEBL system consequently affects other consumers.

- (ii) Severely affects capacity of the equipments and reduces its lifetime.
 - (iii) Severe unbalance producing negative sequence currents in the system which adversely affects the feeding transformers and generators due to overheating and development of hot spots. The capacity of the system gets de-rated due to this.
- (2) In addition to the above load unbalance, following damages also occur to KSEBL grid by availing 2 phase supply by the petitioner:
 - (i) the negative phase sequence current due to unbalancing of traction load is more than 30% with a recorded maximum of 43.6%
 - (ii) Zero sequence current component is observed to be of the order of 1.2%.
 - (iii) The single phase loading also cause heavy circulating currents in the delta connected tertiary of the feeding 220kV transformers adversely affecting the life of the transformers.
 - (iv) The harmonic distortion due to the load unbalance is found to be more than 10%.
- (3) The total harmonic distortion due to the load unbalancing is found to be more than 10%.
- (4) As per the provisions in the CERC (Grant of connectivity, Long Term and Medium Term Open Access) Regulations, 2009, CEA (Technical Standards for Connectivity) Regulations, 2007, CEA (Grid Standards) Regulations, 2010, CEA (Installation and Operation of Meters) Regulations, 2006, KSERC (Connectivity and Intrastate Open Access) Regulations, 2013, the open access consumers shall mandatorily avail supply on 3 phase.
- (5) KSEB Ltd further submitted that, unlike other states, the two phase railway traction supply causes serious disturbances in the grid of Kerala in view of the following:
 - (i) The load profile of Kerala unlike other States is such that there is wide variation between peak and off peak demands. The traction system demand peaks in most cases during midnight hours, when the freight trains are also scheduled to run, during which there is minimum demand in Kerala system and correspondingly low generation. This result in higher unbalance and voltage fluctuation in the State grid.

(ii) Even though the adjacent TSS are connected cyclically as stated by the petitioner in the petition, it will not help in mitigating the load unbalance occurring at the incoming side of the source substation in the peculiar grid connection pattern of this State, as each TSS are fed from different grid substations. If the same grid substation is feeding many TSS, then this methodology might have worked as is the case with other State networks where often the same grid substation is feeding multiple TS owing to the reduced inter-distance between the TSSs in those States.

(6) KSEB Ltd further submitted that, at present, these damages to the Kerala grid are being borne by KSEBL and consequently other consumers of this State, which is partly compensated by Railways, being the single most largest consumer in the State. However, if Railways opt for open access, action needs to be taken by Railways for availing three phase load so that adverse impact on the State Transmission system can be minimized. KSEB Ltd and its consumers are not bound to bear the damages to be caused by the open access consumers.

5. The Commission noted the arguments of both the petitioner and the respondent. The Commission observed that, KSEB Ltd cannot deny open access to the Southern Railways, however, the damages, if any, caused by the Southern Railways by availing open access has to be compensated. KSEB Ltd has to study and appraise the extent of damages caused by the petitioner by availing open access and assess the compensation, if any, to be recovered from the petitioner while permitting open access, and submit the same before the Commission through an affidavit.

6. The Commission also noted that, one of the prayer of the petitioner is to direct the respondent KSEB Ltd to provide backup supply in the event of Open Access supply interruption and to claim the back-up power supply charges as per Traction tariff approved by the Commission for the backup power supplied by KSEB Ltd. In this matter, the Commission clarified during the hearing that,

'If the Southern Railways maintain contract demand with KSEB Ltd, the respondent KSEB Ltd has the obligation and responsibility to provide the supply as and when there is interruption in the power contracted under open access to the extent of the contract demand maintained with KSEB Ltd.

However, if Railways not proposed to maintain contract demand with KSEB Ltd, the respondent do not have the obligation to provide any back up supply to the

petitioner and in such cases the petitioner has to pay charges for backup power at the rate to be approved by the Commission.'

Hence, in order to take an appropriate decision on the matter, the Commission hereby directs the petitioner to clarify the following.

- (i) Whether the Railways intend to make long term power purchase contracts/ arrangements from non KSEB Ltd generators for the entire demand of the Traction Substations in the State?
- (ii) Whether the Railways intend to maintain the existing contract demand or a part of the existing contract demand of 91 MVA with KSEB Ltd?.
- (iii) Whether the petitioner intends to proceed on all the prayers in the original petition dated 27.12.2018.

KSEB Ltd shall submit the proposals including charges and other conditions for providing back up supply to the non - embedded open access consumers of the State.

7. The petitioner Southern Railway and the respondent KSEB Ltd shall submit the details on the clarifications sought by the Commission in paragraphs 5 and 6 above, within 15 days from the date of this order, with a copy to either side. The additional comments, if any, on the details submitted by both the parties, may reach the Commission within '7' days from the date of receipt of the comments of the other party.

Sd/-

**K. Vikraman Nair
Member**

Sd/-

**S. Venugopal
Member**

Sd/-

**Preman Dinaraj
Chairman**

Approved for Issue

Secretary