



## KERALA STATE ELECTRICITY BOARD LIMITED

(Incorporated under the Companies Act, 1956)

Reg.Office: Vidyuthi Bhavanam, Pattom, Thiruvananthapuram - 695 004

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### ABSTRACT

Renovation and modernization of existing 110 kV AIS substation at Malappuram by constructing GIS and implementing SAS technology- Administrative Sanction accorded - Orders issued.

### Corporate Office(SBU-T)

B.O.(FTD)No:168/2021/D(T&SO)/T4/110kV GIS S/S Malappuram/2017-18 dated Thiruvananthapuram 25.02.2021

- Read :
1. Letter No. CE/TRN/E3/110 kV GIS MLPM/2016-17/2506 dated 30.03.2017 of the Chief Engineer, Transmission North.
  2. Note No. FA/Tender -II/87/2017 dated 15.12 2017 of the Financial Adviser.
  3. Letter No. CE/TRN/E3/DPR-110kV GIS/2019-20/1425 dated 13.01.2019 of the Chief Engineer, Transmission North.
  4. Note No. FA/Tender -II/76/2019 dated 01.01.2020 of the Financial Adviser.
  5. Letter No. CE/TRN/E3/DPR-110kV GIS/2019-20/1425 dated 13.01.2020 of the Chief Engineer, Transmission North.
  6. Minutes of the DPR Committee meeting held on 15.01.2020.
  7. Letter No. CE/TRN/E3/110 kV GIS Malappuram/2020-21/352 dated 18.06.2020 of the Chief Engineer, Transmission North.
  8. Minutes of the DPR Committee meeting held on 22.09.2020.
  9. Letter No. CE/TRN/E3/110 kV GIS MLPM/2020-21/991 dated 22.10.2020 of the Chief Engineer, Transmission North.
  10. Letter No. CE/TRN/E3/110kV GIS Malappuram/2020-21/1421 dated 22.01.2021 of the Chief Engineer, Transmission North.
  11. Note No. D (T&SO) / T4 / 110 kV GIS S/S Malappuram/2017-18/254 dated 17.02.2021 of the Director(T&SO) to the Full Time Directors (Agenda : 65/2/21).

### ORDER

The existing 110 kV Substation at Malappuram was commissioned in the early 1970s and several modifications were done at the station to meet the requirements from time to time . The Malappuram substation has 110 kV connectivity from three 220 kV Substations, viz. Areekode, Malaparamba and Elankur. The Chief Engineer, Transmission North reported the drawbacks of the present Substation as below:-

- The substation is very old and the yard structures, girders and equipment structures in one portion of the yard are of MS which have become weak due to ageing.
- The station has only one bus which reduces the operational flexibility and reliability of the system. Only one bus tie facility through isolator is available and that too on one end of the bus bar. The sources of supply at Areekode and Malaparamba will be different

- (KSEBL, PGCIL) on most occasions. Transferring/coupling of supply/load can be done in off load condition only (through tie isolator) which leads to interruption at the station as well as the seven downstream stations fed from this station. The operating personnel also find it difficult to transfer the load due to lack of double bus with bus coupler facility.
- Major portion of the load of this station is connected to one end of the bus (single Kundha conductor) and the sources are connected to the other end. Since the load and sources are concentrated on different ends of the bus, supply to the downstream stations also get affected during bus bar maintenance, due to which it is difficult to get sanction for permit for maintenance works.
  - The Technical auditing conducted by the Technical Audit team of KSEBL has instructed to renovate the grounding of the station (plate earthing) with earth mat.
  - The cable trenches , yard fencing etc are also very shabby and the station as a whole requires urgent renovation.
  - The station has no N-1 security at present.
  - It is proposed to upgrade the 66 kV network in the region to 110 kV by the end of March 2021. This necessitates construction of 3 nos of 110 kV feeder bays (Malapparamba- Malappuram, Malappuram- Mankada and Elankur- Malappuram) and only 2 nos of 110 kV feeders can be accommodated in the space available at AIS after dismantling the existing 66kV feeder and transformers.

Due to the factors referred above, constructing double bus bar with bus coupler and additional bays is inevitable. The Chief Engineer, Transmission North reported that there is no adequate space to renovate the existing Air Insulated Substation (AIS) at Malappuram with the additional requirements and as a solution proposed Gas Insulated Substation (GIS) for replacing the present AIS since the area required for GIS is less compared to AIS. It was also proposed to provide Substation Automation System (SAS) to make ready the station in line with modern technology for future.

The Financial Adviser as per letter read as 4<sup>th</sup> above raised queries on the method adopted for calculation of additional revenue due to GIS and opined that Technical sanction may be issued after obtaining investment approval from KSERC. The DPR for GIS was placed before the DPR committee on 15.01.2020 for approval. The DPR Committee, as per minutes read as 6<sup>th</sup> above, directed the Chief Engineer, Transmission North to explore the feasibility of renovating the substation with 110kV AIS (double bus).

The Chief Engineer, as per letter read as 7<sup>th</sup> above has reported that the Power System Engineering (PSE) wing has proposed 18 nos of bays at the Station. It is further reported that the yard layout with 18 nos of 110kV bays was superimposed in the total sketch of the substation compound , in different ways, and in all cases the switch yard boundary is encroaching the nearby private party's compound.

The DPR was again considered in the DPR committee held on 22.09.2020, in which the Chief

Engineer has informed that there is no space to construct conventional AIS and GIS is the only solution to renovate and modernize the station. The Committee has approved the DPR subject to the condition that the estimate is to be revised including the realistic civil estimate.

The Chief Engineer as per letter read as 9<sup>th</sup> above has forwarded the revised estimate of Rs. 38.5 cr along with DPR for sanction. The electrical part of the estimate is prepared based on the rates quoted by the L1 bidder for the construction of 110 kV GIS at Vennakara and Vizhinjam. The estimated cost of construction of GIS building, cost of construction of cable trenches for GIS at Vennakara is taken as the base for GIS Malappuram.

The abstract of the estimate forwarded is as below;-

Sl No.	Description	Amount in lakhs
1	Total cost of materials	2203.797
2	Erection and commissioning @ 7.5%	165.285
3	Insurance ,contingencies & Transportation 6%	132.228
4	Civil works	416.17
5	Sub Total	2917.48
6	Overhead/Supervision charges	291.748
7	PTCC. Electrical inspectorate fees	5
8	Total	3214.228
9	GST@18%	578.561
10	Cost of spares@1% of (Cost of materials+GST)	26.005
11	Unforeseen	31.206
12	<b>Grand Total</b>	<b>3850.00</b>

Based on the observations of the FA on the method adopted for calculating the additional revenue the Chief Engineer (TN) was directed to reassess the additional revenue and the NPV/IRR. The Chief Engineer, as per letter read as 10<sup>th</sup> above submitted the revised calculation details for IRR and NPV after assessing the additional energy transfer on account of the shorter outage time in the case of GIS compared to AIS. The NPV calculated is Rs.20.44 cr and IRR is 5%. As this work is the renovation and modernization of an existing Sub station, a separate Load Flow study is not required. The proposal is included in RE 20-21 and BE 21-22. The proposal for GIS, Malappuram is also included in the Capital Investment Plan submitted to KSERC.

The matter was placed before the Full Time Directors as per note read as 11<sup>th</sup> above.

Having considered the above, the Full Time Directors, in the meeting held on 17.02.2021 resolved to accord Administrative sanction for the construction of GIS with SAS technology for replacing the



existing 110kV AIS, Malappuram at an estimated cost of Rs. 38.5 crore (Rupees Thirty Eight Crores and Fifty Lakhs only) considering that the additional bays and modifications, necessitated for ensuring quality and reliability of supply, cannot be accommodated in the existing AIS due to space constraints.

Orders are issued accordingly.

By Order of the Full Time Directors  
Sd/-  
**Lekha G.**  
Company Secretary (In- Charge)

To :

The Chief Engineer, Transmission North

Copy to:

The Deputy Chief Engineer, Transmission circle, Malappuram

The Deputy Chief Engineer(IT)

The Financial Adviser/ The Chief Internal Auditor.


The RCAO/ RAO.

The TA to Chairman & MD/ D(T&SO)/ D(D, IT&HRM)/ D(G-C)/ D(G-E& SCM), D(P,S&REES)

The PA to Director (Finance)/CA to Company Secretary

Fair Copy Superintendent/Library/Stock File.

Forwarded / By Order

  
Assistant Executive Engineer