

TAMIL NADU TRANSMISSION CORPORATION LIMITED

ABSTRACT

TANTRANSCO – Enhancement of auto transformer capacity from 4x80 MVA to 3x80 +1x160 MVA at Arani 230/110 kV SS in Villupuram Operation Circle of System Operation/Chennai – Administrative approval – Accorded

TECHNICAL BRANCH

(Per) CH TANTRANSCO Proceedings No.164

Dated:24.09.2025
Visuvaavasu Varudam
Purataasi - 08
Thiruvalluvar Aandu 2056

READ: Chairman's approval dated 21.09.2025

PROCEEDINGS:

1. The Tamil Nadu Transmission Corporation Limited hereby approves the proposal for enhancement of auto transformer capacity from 4x80 MVA to 3x80 +1x160 MVA at Arani 230/110 kV SS in Villupuram Operation Circle of System Operation/Chennai at an estimated cost of Rs.1742.39 Lakhs Gross and Rs.1127.41 Lakhs Nett. The detailed estimate and report are annexed to these proceedings.
2. The expenditure is chargeable to TANTRANSCO - Funds - Capital Expenditure – Villupuram Operation Circle - A/C code No: 1020400.
3. By virtue of the provisions contained in sub-section (2) (a) of section 185 of the Electricity Act, 2003, TANTRANSCO being the Transmission utility, Licensee and successor entity of Tamil Nadu Electricity Board will exercise the powers of the Telegraph Authority under the provisions of section 164 of the Electricity Act, 2003, which have already been conferred upon the Board under section 51 of the Indian Electricity Act, 1910.
4. The works will be taken up after ensuring necessary budget provision.

// BY ORDER OF THE CHAIRMAN//

K.SRIDHARAN

CHIEF ENGINEER/TRANSMISSION (FAC)

Encl: Report and detailed estimate

To

The Chief Engineer/System Operation/Chennai

(Per) CH TANTRANSCO Proceedings No.164, dated :24.09.2025

Copy to:

The Managing Director/TANTRANSCO/Chennai-2

The Director/Distribution/TNPDCL/Chennai-2

The Director/Transmission Projects/TANTRANSCO/Chennai-2

The Director Operation/TANTRANSCO/Chennai-2

The Director/Finance/TANTRANSCO/Chennai-2

The Chief Engineer/Transmission Projects/ Trichy

The Chief Engineer/System Operation/Chennai

The Superintending Engineer/Operation/Villupuram

The Superintending Engineer/GCC/Trichy

The Superintending Engineer/Transmission -I/Chennai -2

The Superintending Engineer/Transmission -II/Chennai -2

The Superintending Engineer/System Studies/Chennai -2

The Resident Audit Officer (AGO'S Unit)/Chennai -2

B.P.Section (Administrative Branch)

Stock file

//FORWARDED BY ORDER//

24/09/2025

EXECUTIVE ENGINEER/MASTER PLAN II

REPORT TO ACCOMPANY THE ESTIMATE

This proposal envisages enhancement of auto transformer capacity from 4x80 MVA to 3x80 +1x160 MVA at Arani 230/110 kV SS in Villupuram Operation Circle of System Operation/Chennai at an estimated cost of Rs.1742.39 Lakhs Gross and Rs.1127.41 Lakhs Nett.

Need:

At present 4x80 MVA, 230/110 kV auto transformers are in service at Arani 230/110 kV SS. The peak reached at Arani 230 kV SS is 284.26 MVA which are loaded to 88.83% of its capacity.

The following are the 110 kV feeders being fed by Arani 230 kV SS:

Sl.No	Name of 110 kV Feeder	Peak reached in MVA
1	Kaveripakkam	68.91
2	Kannamangalam	45.90
3	Thayanur	35.32
4	Sirungattur	64.37
5	Santhavasal	62.82
6	Kanchipuram	71.00
7	Singarapet I	36.20
8	Singarapet II	33.86
9	Arani Link	55.04

As per the guidelines given by CEA, the size and the number of interconnecting transformers has to be planned in such a way that the outage of any single unit should not overload the remaining transformers or the underlying system. In such case, the existing 4 Nos. 80 MVA auto transformers at Arani 230 kV SS are overloaded.

Under the above circumstances, the existing auto transformers at Arani 230 kV SS will not be adequate to feed the existing loads and future loads. Hence, it becomes essential to enhance the auto transformer capacity at Arani 230/110 kV SS.

Load flow study:

Load flow study has been conducted for enhancement of the existing auto transformer capacity at Arani 230 kV SS from 4x80 MVA to 1x80 +3x160 MVA for the year 2024 - 25 network condition. The result reveals the following:

Base case : With 4x80 MVA auto transformer at Arani 230/110 kV SS

Case 1 : With 3x160 MVA auto transformer at Arani 230/110 kV SS

1. In the base case, the 4x80 MVA, 230/110 kV auto transformers at Arani 230/110 kV SS are loaded to 65 MW (84%). Under outage of one 80 MVA, 230/110 kV auto transformer, the other auto transformers are observed to be fully loaded.
2. In case 1, the 3x160 MVA, 230/110 kV auto transformers at Arani 230/110 kV SS are loaded to 101 MW (65%).
3. The loading of auto transformers are observed to be within limits under (N-1) condition of auto transformers at Arani 230/110 kV SS and (N-1) outage of source 230 kV feeder.
4. The 230 kV and 110 kV line loadings are observed to be normal.

However, it is proposed to enhance the capacity of 230/110 kV auto transformer capacity at Arani 230 kV SS from 4x80 MVA to 3x80 +1x160 MVA based on present field condition and availability of 160 MVA power transformer.

Details of work involved:-

- Erection of 1 No. 160 MVA, 230/110 kV auto transformer with associated equipments at Arani 230 kV SS.
- Dismantling of 1 No. 80 MVA, 230/110 kV auto transformer and allied equipments.

Handwritten signature
24/07/2025
EXECUTIVE ENGINEER/MASTER PLAN II

DETAILED ESTIMATE FOR ENHANCEMENT OF 230/110 KV AUTO TRANSFORMER CAPACITY FROM 4x80 MVA TO 3x80+1x160 MVA AT ARANI 230/110 kV SS IN VILLUPURAM OPERATION CIRCLE

Cost of new asset

Rs. In Lakhs

SL NO	DESCRIPTION	QUANTITY	RATE	PER	AMOUNT
I	Civil Works				
	Civil works such as modification of plinth for Power transformer, Breakers, earth work excavation, cable duct, filling the yard with gravel, painting, 230 & 110 kV Structure modification and re-engineering works (busbar arrangements, jumpering arrangements, clamps and connectors etc.) inclusive of all etc.			LS	26.570
II	Electrical Works				
1	Control cable and power cable, etc			LS	10.000
2	Cost of materials				10.000
3	Contingencies @ 1%				0.100
4	Sub Total				10.100
5	Labour & Transport charges @ 15%				1.515
6	Sub Total				11.615
7	160 MVA, 230/110 kV Auto Tr with OLTC and NIFPS	1 Nos	1454.507	E	1454.507
8	Labour and Transport charges inclusive of GST	1 Nos	20.000	E	20.000
9	Earthing	1 No	0.55	E	0.550
10	Sub total				1486.672
11	Establishment and Supervision charges 15%				223.001
12	Total for Electrical works				1709.673
13	Total (Civil & Electrical)				1736.243
14	Add Dismantling charges				6.150
15	Total Gross				1742.39
16	Less Credit				614.980
17	Total Nett				1127.41

Part I (a): Dismantling charges

=

6.15 lakhs

Part II: Accumulated Depreciation

Sl.No	Description	Qty	Original cost of asset in lakhs	Full life period	useful life period	Acc.Dep = 0.9*(col.4*col.6/col.5)
1	80 MVA, 230/110 kV Auto Tr with OLTC	1	604.394	25	25	543.955
2	Part IV (Sl.No.2 to 6)		10.586	15	15	9.527
3	Total					553.482

Part III Devolution of old equipment to store

Part III = Part IV - Part II

61.50 lakhs

Part IV Removal of old assets

Sl.No	Description	Qty	Original cost in lakhs *	Original erection charges	Original centages	Original cost of asset in lakhs
1	80 MVA, 230/110 kV Auto transformer with OLTC (Y.O.M-1987) *	1	477.782	47.778	78.834	604.394
2	4Cx2.5 Ar.Cu.sq.mm and various sizes	2 km	2.44	0.244	0.402	3.083
3	Alu bus bar	0.15 MT	0.66	0.066	0.109	0.835
4	11 kV, 120 KN Antifog disc Insulators	300 Nos	1.80	0.180	0.297	2.277
5	ACSR Kundah conductor	0.62 km	0.25	0.025	0.041	0.315
6	230 kV Isolator w/o earth 1200 A	1 No	3.22	0.322	0.532	4.076
7	SubTotal			48.615		10.586
8	Total					614.980

* - 50% value of present cost data rate of 100 MVA has been adopted due to non-availability of 80 MVA auto transformer rates

Rs. In Lakhs

Abstract		Gross	Nett
Part I: New Asset		1742.39	1127.41
Part I (a):Dismantling charges			6.15
Part II: Accumulated Depreciation			553.48
Part III :Devolution of old equipment to store			61.50
Part IV :Removal of old assets			10.59

Hemant
24/09/2025
Executive Engineer/Master Plan II