ENERGY DEPARTMENT

POLICY NOTE
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DEMAND No. 14

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Minister for Electricity, Prohibition and Excise

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Vision

Tamil Nadu is one of the fastest growing states in India in power generation and industrial development. Electricity is not only very essential for the development of a state but also important for the daily life of a man. Electricity is crucial to a State's development. In our modern lifestyle, almost everything including education, healthcare, agriculture, industry, cooking, lighting, mobile charging, even entertainment depends on electricity. The future of mobility is also towards use of electricity. This will lead to heavy increase in power demand.

Tamil Nadu, being an industrialized and urbanized State, has 4th highest peak energy demand in the country. It has highest energy consumption among the Southern States.

The total installed capacity of Power in Tamil Nadu stands at 34,706.16 MW as on 01.04.2023, of which, 8,739.01 MW i.e. 25.18% from Wind, 6,539.23 MW i.e., 18.84% from Solar, 164.84 MW i.e., 0.47% from Bio-mass and 523.80 MW i.e., 1.51 % from Co-generation which are renewable sources of energy.

Tamil Nadu is endowed with significant renewable energy potential. The State is blessed with almost 300 sunny days in a year. Tamil Nadu has the highest Off-shore wind energy potential with maximum Wind Speeds range from 9 m/s to 11 m/s.

The power demand of the State has already hit 18,252 MW on 06.04.2023 @ 10:30 hrs surpassing last year's peak of 16,481 MW on 26.03.2021 with an increase of 1,771 MW. The daily average energy consumption of the State is about 360 Million Units (MU), and the maximum

daily consumption was 388.078 MU on 29.04.2022.

The summer peak power demand is expected to rise in the range of 18,300 to 18,500 MW, and daily energy consumption is likely to increase in the range of 390-395 MU during April and May months.

Tamil Nadu stands first in installed wind capacity in India. The State has the total installed wind capacity of 10,067.20 MW (State capacity - 8,739.01 MW and CTU capacity – 1,328.19) as on 01.04.2023, which is 24% of the Nation's wind power capacity. The maximum wind power of 5,689 MW was harnessed on 03.07.2022 and the maximum wind energy generated and absorbed was 120.25 MU on 09.07.2022.

The State stands fourth highest in installed Solar capacity in India. It has an installed

capacity of 6,689.23 MW (State Capacity - 6,539.23 MW and CTU capacity – 150 MW) as on 01.04.2023. The maximum solar power of 4,866 MW was harnessed on 26.02.2023, and the maximum solar energy generated and absorbed was 36.0 MU on 25.02.2023.

On 11.09.2022, 74% of Tamil Nadu's total electricity consumption was met out from Renewable Energy creating a record.

The power demand of the State is rising year by year. In order to meet the rising power demand of the State and to modernize the distribution system, the Government has rolled out **'TNEB 2.0'** with an aim to double the installed electricity capacity of the State. The major focus is on development of renewable energy sources. The share of renewable energy, which at present stands at 20.88% of the total energy generation is proposed to be increased to 50% by 2030.

Globally, battery storage solutions are still evolving, in order to integrate greater amount of Wind and Solar power in the grid, Pumped Storage Projects are natural enabler. The pumped hydro electric storage project being constructed at Kundah with a capacity of 500 MW will be commissioned by 2024-25. Further, it helps in meeting peak demand of energy. The State has identified 15 sites with potential of 14,500 MW for development of Pumped Storage Projects. Further, the above Hydropower projects will be implemented with public-private partnership at a cost of Rs. 77,000 crore.

The works of on-going thermal power projects of 4,100 MW capacity viz., NCTPP Stage III – 800 MW, Udangudi Super Critical Thermal Power Project Stage 1 – 1,320 MW, Ennore SEZ STPS – 1,320 MW and ETPS Expansion Thermal Power Project – 660 MW are being followed

closely to commission the Projects at the earliest.

TANTRANSCO is consistently building new transmission infrastructure across the State apart from augmentation and upgradation of the existing transmission infrastructure, to ensure that adequate transmission network is available to cater to the growing power demand of the State in various sectors.

Further, TANTRANSCO is also giving special attention to the development of latest technology and most effective means of transportation systems like Metro Rail Projects, Railway Electrification works, development of infrastructure for Electric Vehicle segment and Data Centres.

The Government is constantly making all efforts to ensure continuous, reliable and quality power supply at affordable rate to the consumers of all sectors.

Tamil Nadu is a State, where 2/3rd of rural households depend primarily on agriculture for their livelihood. With the aim of constantly increasing the agricultural production in the State by increasing the area of cultivating land and improving the welfare of farmers, this Government has achieved the task of effecting 1,50,000 free agriculture service connections within a short period of 17 months.

Next to agriculture, the rural and semi-rural households in Tamil Nadu majorly depend on handloom industry for their livelihood. With a view to support the Weaving community, this Government has enhanced the free electricity to the Handloom weavers from 200 units to 300 units bimonthly. Similarly, for Power loom weavers, free electricity has been enhanced from 750 units to 1,000 units bimonthly. Due to this, 73,642 Nos. of Handloom weavers and

1,68,000 Nos. of Power loom weavers are benefitted in Tamil Nadu.

With an objective to reduce fatal accidents and to avoid failure of Distribution Transformers (DTs) caused due to LT conductor snapping, TANGEDCO has proposed to execute Transformer Monitoring and Management System (TMMS) in the existing 3,88,982 Nos. of Distribution Transformers, new DTs to be erected for regular works and the new DTs to be erected under Revamped Distribution Sector Scheme (RDSS).

Further, to reduce losses, actions have been initiated to implement agriculture feeder segregation works in 1,685 nos. feeders and HVDS works in 273 nos. feeders; separation of double DTs in 13,892 locations with HVDS; and reconductoring of 33 kV line for 542.08 kms under RDSS.

In order to further give a fillip to modernization, the State will take up replacement of all the 3 crore meters with Smart Meters. It will help to eliminate human intervention for fetching of meter data accurately and to facilitate auto billing, remote disconnection/re-connection etc., which will reduce the loss of revenue, accurate billing and avoid pilferage of energy. Further the consumer complaints regarding billing issues will be avoided.

Tamil Nadu will set an example for all the states in India by implementing such timely schemes.

ENERGY DEPARTMENT

Energy is one of the key drivers of economic development. It plays a pivotal role in sustainable development. A stable, secure, reliable and affordable supply of electricity is a prerequisite for economic development, social security and public welfare.

The efforts to address climate change and depletion of fossil fuels need to be made to generate as much of electricity as possible from renewable sources. The State aims to increase the energy generation from renewable resources to 50% by 2030.

In this regard, the Government is constantly taking various steps to unlock the renewable energy potential of the State to achieve clean energy target and also to reduce the cost of supply.

The Government of Tamil Nadu unveiled the Tamil Nadu Electric Vehicles Policy 2023 which features electrification of public and commercial transport and formation of e-Vehicle cities.

In order to facilitate the energy transition, modernisation and electrification of new sectors, rapid expansion of Distributed Energy Resources and new policy initiatives, the power system is undergoing a significant transformation.

The Government has taken various initiatives to develop the transmission and distribution infrastructure, in order to meet the needs of this transformation encompassing the entire system.

The following organizations are under the administrative control of Energy Department:

I. TNEB Limited (Holding company) with the following subsidiary companies:

a) Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) and

b) Tamil Nadu Transmission Corporation Limited (TANTRANSCO)

II. Tamil Nadu Energy Development Agency (TEDA)

III. Tamil Nadu Electrical Inspectorate (TNEI)

IV. Tamil Nadu Power Finance and Infrastructure Development Corporation Limited (TNPFIDCL)

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1.1 Generation

Installed capacity

S. N	Category	Capacity in MW
I	**Conventional energy sources**	
1.	Thermal	4,320.00
2.	Gas	516.08
3.	Central Generating Stations (CGS)	7,170.00
4.	Power purchases	
	Independent Power Projects (IPP)	1,105.50
	Long Term Open Access (LTOA)	2,830.00
	Medium Term Open Access (MTOA)	252.00
	Total power purchases	4,187.50
5.	Captive Power Projects/ Third party generators* (Approved open access quantum)	223.80
	Total Conventional	**16,417.38**

II	**Renewable Energy Sources**	
1.	Hydro	
	Non-Irrigation	1,030.65
	Pumped Storage	400.00
	Irrigation	891.25
	Hydro total	2,321.90
2.	Wind**	8,739.01
3.	Solar***	6,539.23
4.	Bio-mass – combustion#	164.84
5.	Co-Generation (Bagasse)##	523.80
	Total Renewables	**18,288.78**
	Grand Total	**34,706.16**

* : Open access quantum approved to the Fossil fuel based Captive/Third party generators for wheeling power through TANTRANSCO network to the EHT/HT consumers of TANGEDCO

** :Excluding 1,328.19 MW wind generators connected to CTU

*** :Excluding 150 MW connected solar generators to CTU

:Excluding 97.75 MW bio mass permanently dismantled

:Excluding 198.1 MW co generators permanently dismantled

I. Thermal Generation

TANGEDCO owns five thermal Stations having total installed capacity of 4,320 MW.

Performance of Thermal Stations during the year 2022-23

Generation in MU, Plant Availability Factor and Plant Load Factor

Sl. No	Name of the Station	Generation for the year (in MU)		Plant Available Factor (PAF)		Plant Load Factor (PLF)	
		2021-22	2022-23	2021 -22	2022 -23	2021 - 22	2022 - 23
1.	TTPS (5x210 MW)	4,962.57	5,717.92	62.89	85.88	53.95	62.16
2.	MTPS –I (4x210 MW)	4,795.93	5,395.74	71.42	88.57	65.18	73.33
3.	MTPS –II (1x600 MW)	2,763.78	3,000.69	78.01	72.92	52.58	57.09
4.	NCTPS –I (3x210 MW)	3,356.50	3,134.38	81.23	58.64	60.82	56.79
5.	NCTPS –II (2x600 MW)	4,512.33	5,440.44	68.96	62.41	42.93	51.75
	TOTAL	20,391.11	22,689.18	72.50	73.68	53.88	59.96

Mettur Thermal Power Station– I (4 x 210 MW)

Mettur Thermal Power Station – I (MTPS – I), located at Mettur Dam of Salem District, has 4 units of 210 MW each with a total installed capacity of 840 MW.

Significant Achievements

- Station Cost of Generation for the year 2022-23 is Rs.5.25/kWhr which is less than TNERC norms of Rs.6.79/kWhr.

- During the financial year 2022-23, Unit-I of MTPS-I was in continuous service from 22.12.2021 to 24.06.2022 (184 days) and with more than 90% PLF in months of April'22, May'22 & Oct'22.

- In MTPS I, there are two numbers of ash water Recovery lines in service, for recycling the ash water from the primary pond to Ash Handling Pump House Stage I & II for ash slurry preparation. The main objective of the system is to reduce the water consumption and also to avoid discharge of ash slurry water into the river Cauvery. The recovery water lines available in MTPS-I are working under syphon principle. No electrical power is being consumed to discharge the recovery water flow of approximately 22,300 m^3/day from the pond to Ash Handling Pump House / Stage I & II. So,

the amount of electrical energy conserved for the year 2022-23 is 3,21,856 kWhr and amount saved is Rs. 16,89,744/-.

Mettur Thermal Power Station – II
(1 x 600 MW)

Mettur Thermal Power Station – II (MTPS – II), located at Mettur Dam of Salem District, has a single unit of 600 MW installed capacity.

Significant Achievements

- ❖ The unit was in continuous operation during the months of April 2022, June 2022 & November 2022 and achieved a Maximum Generation of 320.59 MUs during November 2022.
- ❖ 23 Nos. of ESP fields in A, B, C & D passes have been revamped from July 2022 to Dec 2022 which enables the unit to generate at its full capacity satisfying the Environmental Norms fixed by Pollution Control Board.

Action taken to improve the performance

In order to maintain a **clean environment** and to ensure **maximum Generation**, it has been proposed to Commission a new system viz. PDFACS at a Cost of Rs.51.33 crore during the year 2023-24 for effective handling of excess quantity of Ash Generation to cope up with

100% Indian Coal firing, for which tender is under process.

Tuticorin Thermal Power Station
(5 x 210 MW)

Tuticorin Thermal Power Station, located in Tuticorin District, has 5 units of 210 MW capacity each with total installed capacity of 1,050 MW.

Significant Achievements:

- ❖ During this financial year, TTPS achieved the lowest variable cost of generation (Rs.3.91/kWhr) in July 2022 among all the Thermal Power Stations of TANGEDCO.

- During the financial year 2022-23, Unit-I of TTPS was in continuous service for 75 days from 23.05.2022 to 07.08.2022.

North Chennai Thermal Power Station – I (3 x 210 MW)

North Chennai Thermal Power Station – I (NCTPS – I), located in Thiruvallur District, has 3 units of 210 MW capacity each, with a total installed capacity of 630 MW.

Significant Achievements

- Due to continuous efforts during the year, viz. increased availability of Mills by procuring and reconditioning of Mill spares, changing of Flue gas ducts in Modular reaches and up-gradation of Air Pre-Heater (APH) seal arrangements, the Station Capacity got improved and reached a maximum generation of 620 MW on 22.12.2022.

- The Plant Load Factor of the station improved to 81.94% during the month of February 2023 and sustained generation is being maintained to meet out the forthcoming summer demand by this 25-year-old plant.

- Distributed Control System (DCS), an improved version of Control System was commissioned in Unit-III on 10.08.2022

and Unit-II on 05.11.2022 at a total cost of Rs.16.29 crore, which enabled the operation team personnel ease of operation and quick trouble shooting of equipment and systems on a continuous basis.

- ❖ Conversion of existing single seal Air Pre-heater into a double seal Air preheater was completed in Unit-2 Boiler at a cost of Rs. 12.21 crore, enabling maintenance of the Boiler Furnace draft on Negative side to run the unit at the rated capacity.

- ❖ The Green Belt formation has been initiated by planting 11,590 trees inside NCTPS-I Plant and Ash dyke pond area. Further, a proposal for planting additional 2,000 trees is under consideration to preserve natural environment.

North Chennai Thermal Power Station – II (2 x 600 MW)

North Chennai Thermal Power Station – II (NCTPS – II), also located at Thiruvallur District, has 2 units of 600 MW capacity each, with a total installed capacity of 1,200 MW.

Significant Achievements

- ❖ During the financial year 2022-23, Unit-II of NCTPS II was in continuous service from 11.01.2023 to 13.03.2023 (61 days).

- ❖ Steam Water Analysis System (SWAS), which was not commissioned from the date of commissioning of this power plant till

2022, has been commissioned in February 2023 and critical parameters like pH value, Dissolved oxygen, Cation conductivity, etc. are monitored round the clock to ensure that steam and water parameters are within the limit.

- Condensate polishing unit (CPU) which was not in service since 2019 has been brought into service in both the units. This removes metal particles, chloride, etc. from the condensate and improves the quality of water circulated in the system. Due to the above, boiler tube failures which could cause loss of generation have been reduced.

- Both the streams of HP heaters have been put into service in unit 2 which improves the heat transfer and reduces the coal consumption resulting in reduction of heat rate.

In Unit I, one stream of HP heater is put in to service and action is being taken to replace the other stream which is not in service since 2018.

- Raw water cost is drastically reduced by 45% with the usage of TTRO water (Tertiary treated reverse osmosis) thereby reducing O&M cost and resultant savings up to Rs.18.72 crore per annum.

- The chemical cleaning of unit –I Boiler water wall tubes was completed. After completion of chemical cleaning work, generation was gradually raised and now maintained at around 450 MW. Further the incidents of boiler tube puncture have got reduced. The heat transfer in the water wall area has also increased due to clean water wall tube surface.

- PDFACS (Pressurized dense fly ash conveying system) has been installed in both the units and successfully commissioned in unit I. An additional quantity of 700 MT fly ash is conveyed daily leading to additional revenue from additional sale of fly Ash. Manual ash removal work is completely stopped and environmental pollution is avoided. As fly ash is being conveyed through PDFACS, emission of ash in Chimney is reduced and also the flue gas temperature is maintained within limits.

Action taken to improve the performance

Erection of Dust extraction & Dust suppression system for an amount of Rs.30.77 lakhs is under progress to improve environment and to meet out the MoEF norms.

In all thermal power stations, Automatic Isoperibol Bomb Calorimeters for monitoring the

quality of coal have been installed at a cost of Rs.1.68 crore.

Revenue Augmentation through Sale of Fly Ash

TANGEDCO had resorted to various progressive measures to improve the sustained utilization of fly ash by awarding long term contracts to End user agencies such as cement companies,Brick/Block manufacturers, Asbestos Sheet Companies, Ready Mix Concrete units, etc. By doing so during the FY 2022-23, TANGEDCO has realized revenue of Rs.190.80 crore which is 105% more than the Revenue achieved in the last FY 2020-21.

Sl.No.	Financial Year	Revenue in crore By the end of March
1	2011-12	93.3
2	2012-13	87.64
3	2013-14	112.37

4	2014-15	117.07
5	2015-16	101.29
6	2016-17	91.05
7	2017-18	84.92
8	2018-19	93.66
9	2019-20	92.81
10	2020-21	92.90
11	2021-22	122.13
12	2022-23	190.80

II. Gas Turbine Power Stations

In Gas Turbine Power Stations, Electricity is produced in the Generator driven by Gas Turbines using Natural Gas. Gas Turbine Stations of TANGEDCO having 516.08 MW capacity are generating power according to the availability of natural gas supplied by M/s. Gas Authority of India Ltd. (M/s. GAIL).

Valuthur Gas Turbine Power Station (187.2 MW) Phase I (95 MW) & Phase II (92.2 MW)

M/s GAIL is supplying only 7,50,000 SCMD (Standard Cubic Meters of Gas per day) of Gas against the agreed quantity of 8,88,000 SCMD. According to the above supply of Gas, the station is generating around 155-160 MW.

Kuttalam Gas Turbine Power Station (101 MW)

M/s. GAIL is supplying only 3,75,000 SCMD (Standard Cubic Meters of Gas per day) of gas

as against the agreed quantity of 4,50,000 SCMD. Accordingly, the station is generating around 70 MW.

Thirumakottai (Kovilkalappal) Gas Turbine Power Station (107.88 MW)

M/s. GAIL is supplying only 1,75,000 SCMD (Standard Cubic Meters of Gas per day) of gas as against the agreed quantity of 4,50,000 SCMD. Accordingly, the station is generating around 20 MW.

Basin Bridge Gas Turbine Power Station (120 MW (4X30))

Normally, 2 or 3 Units are being operated on condenser mode for improvement in voltage (110 kV) of Chennai network. During emergency situations/Black Start Operation, the plant can be operated in generation mode using High Speed Diesel (HSD).

The possibility of converting two Units suitable to use Re-gasified Liquefied Natural Gas (RLNG) as fuel instead of Naphtha is being studied so that the Units can be operated at a less cost compared to operating with Naphtha/HSD as fuel.

III. Hydro generation

TANGEDCO’s Hydro wing operates and maintains 47 Hydro Power Stations (107 machines with the total installed capacity of 2,321.90 MW) spread over four generation

circles viz., Erode, Kadamparai, Kundah, and Tirunelveli. Majority of Power Houses are located in Remote isolated areas.

Irrigation based Power Houses (29 Nos.)	891.25 MW
Non-Irrigation based Power Houses (17 Nos.)	1,030.65 MW
Pumped storage power house (1 No.)	400.00 MW

76 Nos. of TANGEDCO owned Dams, Saddles, Reservoirs and Barrages are being maintained by Hydro wing.

Notable Achievements during the year 2022-23

Hydro Generation achieved during the year 2022-23 is the Highest Generation during the last 10 years.

The overall Hydro Generation during the last 10 years is tabulated below. It is seen that the Hydro Generation achieved during the year 2022-23 is the Highest Generation during the last 10 years.

Year	**Hydro Generation in MU**
2012-13	2,896.32
2013-14	5,098.68
2014-15	5,187.59
2015-16	4,641.15
2016-17	2,505.23
2017-18	3,062.65
2018-19	5,472.15
2019-20	4,964.32
2020-21	5,386.58
2021-22	5,514.10
2022-23	**6,174.08**

Surpassing the targets set by CEA

During the year 2022-23, TANGEDCO has exceeded the targets set by the Central Electricity Authority (CEA). TANGEDCO has generated around 6,174.08 MU which is 2,261.08 MU higher than the target fixed by the CEA for the year 2022-23. The performance of hydro units for the year 2022-23 is tabulated below:

Year	CEA Target in MU	Generation in MU	Plant Load Factor %	Plant Availability Factor %	Cost of Generation in Paise
2022-23	3,913.00	6,174.08	30.35	82.71	**65.57**

The hydro generation in the year 2022-23 is surpassing the previous year Generation.

During the year 2022-23, the generation from Irrigation and Non-Irrigation Power Houses has exceeded 2021-22 generation by 281.10 MU and 378.88 MU respectively. Hence, the overall

Hydro generation during this year has exceeded the generation during the previous year by 659.98 MU.

Highest generation achieved during 2022-23 surpassing the previous year generation in following Power Houses:

During the year 2022-23, as a result of periodical and preventive maintenance carried out in hydro stations, the maximum availability of machines has been ensured. The following power houses of TANGEDCO have reached the highest ever generation surpassing the previous best:

Sl. No.	Name of the Power House	Previous Highest Generation in MU	Achieved Highest Generation in MU during 2022-23	% increase
1	Mettur Tunnel PH (4 X 50MW)	759.86 (1994-95)	797.05	4.89
2	Mettur Dam PH (4 x 12.5 MW)	209.71 (1964-65)	226.84	8.17
3	Bhavani Kattalai	84.75 (2021-22)	94.53	11.54

	Barrage PH-2 (2 X 15 MW)			
4	Bhavani Kattalai Barrage PH-3 (2 X 15 MW)	68.59 (2021-22)	76.34	11.30
5	Vaigai Mini PH (2 x 3 MW)	29.83 (2021-22)	31.15	4.43
6	Amaravathy PH (2 x 2 MW)	10.30 (2009-10)	10.45	1.46
7	Sathanur Dam PH (1 X 7.5 MW)	23.36 (2005-2006)	27.45	17.51
8	Perunchani MPH (2 x 0.65 MW)	6.00 (2021-22)	6.08	1.33

Replacement of Stub shaft at Right Bank Canal Power House, Bhavanisagar

At Bhavanisagar, Unit 1- Right Bank Canal Power House, stub shaft had broken twice. Due to frequent failures since 2015, the work of replacement of Stub Shaft was awarded for an amount of Rs.7.67 crore. The work was completed and commissioned successfully on 11.11.2022. The Unit-1 is generating at its rated capacity of 4 MW continuously.

Replacement/rectification of damaged gates at Lower Mettur barrage power house IV, Uratchikottai

At Lower Mettur barrage power house IV, Uratchikottai, there are 18 Nos. of Barrage gates and all have served for 30 years. The failed Barrage gate No. 17 was left unattended since 04.09.2019. Finally, the work was taken up and completed in Feb.2023 at a cost of Rs. 1.78 crore.

All Barrage gates are checked and found that 17 Nos. of Barrage gates were damaged. In first phase, replacement of 7 Nos. of Barrage gates have been taken up at a cost of Rs.10.89 Crore. Fabrication of Four (4) Nos. of Barrage gate are completed and erection of One No. Barrage Gate is under progress. Remaining Ten Nos. of Barrage gates will be replaced during 2023-24.

Suruliyar Penstock replacement works

Suruliyar Power House of Periyar Division was commissioned on 27.08.1978 and has been in operation at full capacity of 35 MW. This Power House has served 43 years which is more than its designed life period of 35 years.

The penstock pipe buckled and burst for a length of 220 metres out of total length of 2,885.17 metres. The Power House could not generate power. The Replacement work has been taken up at a cost of Rs.14.45 crore. The work has commenced on 04.01.2023 after getting Forest approval and is under progress.

Stator coil rectification work at Kodayar Power House-II

Due to lightning & heavy rains and thunder storm on 02.12.2022, flashes and heavy smoke was noticed in Generator Stator assembly of Kodayar Power House-II (1 x 40 MW) due to short circuit. It was found that the stator coils

were damaged and Unit could not generate power. The work of rectification of damaged stator coils has been taken up at a cost of Rs.93.13 lakh on 25.01.2023.

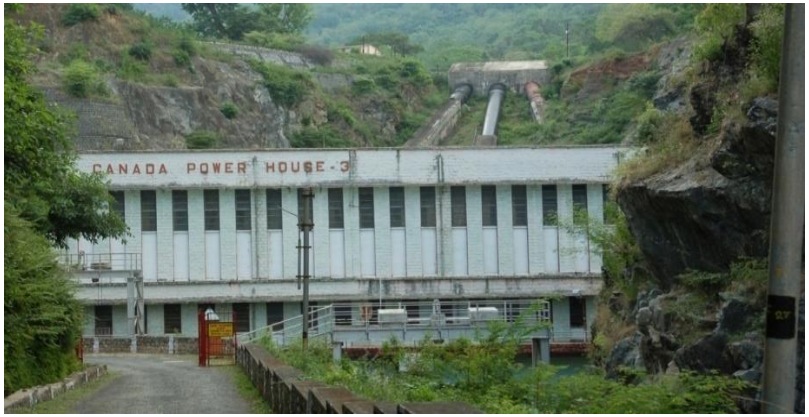
Stator coils rectification work at Kodayar PH-II

Providing protective treatment to 11 Nos. of steel penstocks of Kundah Power Houses- II, III, V & VI

Kundah Power Houses-II, III, V & VI were commissioned during 1960s and the steel penstocks need protective coating. In order to provide protective treatment to 11 Nos. of steel penstocks in these Power Houses, administrative

approval has been accorded vide B.P.No.131 dated 18.6.2022, for a value of Rs.24.89 crore. Tender is under process.

Kundah PH-II



Kundah PH-III

Major rectification works in the Pressure shafts I and II of the Kadamparai Power House

In order to arrest the damages and leakages noticed in Pressure shafts I & II of Kadamparai Power House and to stabilise the water conductor system, major rectification works are required to be carried out. Administrative approval has been accorded vide B.P. No.17, dt. 29.09.2022 for a value of Rs. 6.93 crore. Work is under progress.

Rectification and replacement of defective Stator coils in Kadamparai Power House Unit IV (100 MW)

Rectification and replacement including Re-insulation of defective Stator coils (Top & Bottom) using VPI (Vacuum Pressure Impregnated) system in 100 MW Unit IV Generator at Kadamparai Power House has been

approved for a value of Rs.2.75 crore. Tender has been floated.

Supply of New Turbine shaft at 100 MW Unit–I of Kadamparai Power House

Fabrication and supply of New Turbine shaft (Approx. 8 MT) in the 100 MW Unit–I of Kadamparai Power House has been approved vide B.P. No.209 dt. 13.10.2022 for a value of Rs.1.76 crore. Tender has been floated.

Fire Accident restoration works at Bhavani Barrage Power House-2, Umaipalayam

On 14.7.2020, a fire accident occurred in Unit II and control room of Bhavani Barrage Power House-2, Umaipalayam. Restoration works are under progress.

Replacement of damaged gate No.11 at Lower Mettur barrage power house II, Nerinjipettai

Replacement of One lift type barrage gate along with Dismantling of old barrage Gate

No.11 has been approved vide B.P.No.01 dt. 3.1.2023 for a value of Rs.1.87 crore. Work has been awarded and is under progress.

Rectification of oil leak in runner assembly of Unit-3 at Tunnel Power House/ Mettur Dam.

Administrative approval has been accorded for Rectification of oil leak in runner assembly of Unit-3 at Tunnel Power House/ Mettur Dam, for a value of Rs. 1.57 crore. The Works Contract Order was issued on 18.03.2023 and work is under progress.

Replacement of penstocks expansion joint bits at Unit I & Unit -II of Sholayar Power House –I

Approval has been accorded for replacement of existing eroded and misaligned penstocks expansion joint bits near anchor no: 3, 4, 5 of Unit-I and anchor no: 2 of Unit -II of Sholayar Power House –I for a value of Rs. 1.40

Crore. The tender for award of work is under process.

Renovation, Modernization and Up-rating works (RMU) at various Hydro Power Houses

Some of the Hydro Power Houses in Tamil Nadu are old and have been serving beyond their normative life period (normative life period of a hydro power house is 30 – 35 years).

So, the full load generation of some of the existing hydro power plants could not be achieved due to this ageing. In order to improve the generation capacity of Hydro stations, action has been initiated to undertake renovation, modernization and up-rating works (RMU) in all Hydro Power Stations. Currently, Renovation, Modernization and Up-rating (RMU) works are under progress at Moyar and Kodayar Hydro Power Plants. Details are tabulated below:

Scheme	Life period served in year	Existing Capacity (MW)	Capacity after RMU (MW)	Cost of work Rs. in crore	Average Annual Generation in MU
Moyar PH	70	3 x 12	3 x 14	121.13	133.91
Kodayar PH-I	52	1 x 60	1 x 70	88.48	157.81

Moyar Power House

Dam Rehabilitation and Improvement Project (DRIP-II)

Sanction has been accorded for carrying out rehabilitation and improvement works in 27 dams of TANGEDCO at an estimated cost of

Rs. 461 crore under World Bank funded "Dam Rehabilitation and Improvement Project (DRIP Phase II & III)" being implemented throughout India with Central Water Commission as a nodal agency and various State Governments / State Agencies / Central Agencies as Implementing Agencies.

List of 27 dams

(i) Nilgiris district (16 dams)

Pykara dam, Maravakandy dam, Moyar forebay dam, Niralapallam diversion weir, Parsons valley dam, East Varahapallam weir, Pykara New Forebay dam, Sandynallah dam, Upper Bhavani pumping weir, Western Catchment weir-I, Western Catchment weir-II, Western Catchment weir-III, West Varahapallam weir, Avalanche dam, Mukurthy dam and Kundah Palam dam.

(ii) Coimbatore District (2 dams)

Kadamaparai dam and Pillur dam

(iii) Tirunelveli District (3 dams)

Papanasam Diversion Weir, Servalar dam & Thamiraparani dam

(iv) Kanyakumari District (3 dams)

Kodayar I dam, Kodayar II dam & Chinna kuttiyar dam

(v) Theni District (3 dams)

Manalar dam, Vennirar dam & Periyar Forebay dam

The rehabilitation works in the above dams involve seepage control measures, strengthening of the upstream and downstream flanks, desilting works, instrumentation works, overhauling of gates and hoisting mechanism including electrical works to enhance the life period of the dam so as to generate reliable and sustainable hydro power.

The tender for 13 dams have been awarded for the rehabilitation works based on the recommendation of the expert panel namely "Dam Safety Review Panel (DSRP)" consisting of empanelled experts from various fields such as Hydrology, Design, Geology, Hydromechanics etc. and these works are under progress.

The rehabilitation proposals for the remaining 10 dams viz., Upper Bhavani pumping weir, East Varahapallam weir, Western Catchment weir – 1, Western Catchment weir – 2, Western Catchment weir – 3, West Varahapallam weir, Kundah Palam dam, Kadamparai dam, Chinna Kuttiyar dam and Kodayar I dam will be taken up after obtaining approval from World Bank and the works will be completed within the DRIP II period of 6 years (2021-2027).

IV. Allocation of Power from Central Generating Stations (CGS) from 01.04.2023

Long term power purchase agreements have been executed based on the allocation of share of power by Central Generating Stations by Ministry of Power in order to meet the demand. Agreements have been executed 7,170 MW power. However, at a time the peak availability is only 5,900 MW.

V. Power Purchase

TANGEDCO is managing Tamil Nadu State demand 24x7 basis with an installed capacity of 16,417.38 MW of conventional sources and 18,288.78 MW of renewable sources.

i. Long Term Power Purchase

TANGEDCO avails 2,830 MW RTC power through long term power purchase agreements executed for a period of 15 years from 2013.

ii. Medium Term Power Purchase

Similarly, through medium term power purchase agreements executed for a period of three/ five years, TANGEDCO avails 252 MW RTC power.

iii. Short Term Power Purchase

TANGEDCO has tied up 1,562 MW RTC power under short-term contracts for the months of February, March, April and May 2023 @ Rs 8.50 per unit from Inter and Intra State generators

TANGEDCO during the month of December 2022 itself has tied up RTC power of 1,562 MW @ Rs.8.50 per unit for the months of February to May 2023, thereby TANGEDCO has saved Rs.1,312 crore in purchasing power.

iv. SWAP Power Arrangements

TANGEDCO has entered in to swap arrangements, wherein two utilities /States exchange power to match the seasonal variations in surplus and deficit situations purely on energy to energy transaction basis without any monetary transactions.

This is the innovative method of procuring power wherein the surplus power in other States is supplied to TANGEDCO in the required period and will be returned by TANGEDCO when surplus power is available during June to September of every year.

With the above arrangement, TANGEDCO has tied up the power during summer months of 2023 on RTC /Morning and Evening peak hours basis as detailed below, thereby avoided expenditure on peak hour purchase at a cost of Rs.10/- per unit.

The above SWAP Power arrangements have been availed from the State utilities of Madhya Pradesh and Rajasthan to meet the Morning and Evening Peak Demand during Jan to Mar 23 and March 2023 in RTC by Intra-day arrangements and will be returned from morning 8 hrs to evening 5 hrs.

For the balance peak hour requirement, TANGEDCO has also tied up power through the newly introduced long-term contract system in the power Exchange as given below:

S. No	Month	MW	Duration
1	March 2023	1,355	From 18.00 to 23.00 hrs
2	April 2023	1,293	
3	May 2023	565	

With the above arrangements, the summer demand of 2023 in Tamil Nadu will be managed without any interruption of power.

VI. Renewable Energy

At present, Tamil Nadu ranks third in India with Renewable Energy Installed capacity of 17,445.07 MW (excluding hydro and including CTU). The Installed capacity of Solar power plants including CTU Connectivity and roof top power plants is 6,689.23 MW and for Wind, the total capacity is 10,067.20 MW including CTU. Cogeneration (Bagasse) plants contribute 523.8 MW and biomass power plants contribute 164.84 MW.

i. Wind Power

Tamil Nadu ranks first in India with the highest installed wind capacity of 10,067.20 MW (including CTU) which is 24% of the total wind installed capacity in India. 131.85 MW Wind Energy Capacity was added to Tamil Nadu State Grid during 2022-23.

The all-time high power generation peak of Wind Energy has been recorded on 03.07.2022 as 5,689 MW and all time high energy generation of 120.25 MU recorded on 09.07.2022.

The State of Tamil Nadu is having abundant RE potential particularly Wind and Solar. The terrain of Tamil Nadu is blessed with more Solar radiation, higher Wind potential than other States, industrial friendly policies and availability of infrastructure for easy evacuation of wind and solar power which provide unique combination for tremendous growth potential of RE in the State.

During the year 2022-23 Up to February, the wind energy generated is 12,368 MU from wind energy generators, in which 8,746 MU was generated from the private Wind Energy Generators and were wheeled for their captive/third-party use.

Tamil Nadu is exploring new avenues in the field of Wind power i.e., offshore wind. The potential of Offshore in Tamil Nadu is estimated to be around 31 GW. TANGEDCO has given consent to procure 2 GW of offshore wind power at a rate of Rs. 4.00 per unit through State Transmission Utility (STU) Connectivity.

ii. Solar Power

Tamil Nadu ranks fourth in India with an installed Solar capacity of 6,689.23 MW (including rooftop and CTU connectivity). The all time high solar power generation peak has been recorded on 26.02.2023 as 4,866 MW and all time high solar energy generation of 36 million units recorded on 25.02.2023. Further, the State has harnessed 8,334 million units of solar energy from the installed Solar Power Plants, in which 3,090 MU of Solar Energy was generated from the Private Solar Power Generating

Stations and wheeled for captive and third-party use during the year 2022-23 up to February.

iii. Renewable Purchase Obligation (RPO) by 2030

As per the MNRE guidelines and new notification dated 22.07.2022, the revised Renewable Purchase Obligation (RPO) through various RE sources by 2029-30 is:

Wind RPO – 6.94%
Hydro Purchase Obligation (HPO)– 2.82%
Other RPO (including solar) – 33.57%
Total RPO – 43.33%

In order to achieve the above RPO, TANGEDCO needs the following additional capacities by 2029-30:

Wind	3,368 MW (@ 26.15% CUF)
Others Including Solar	20,568 MW (@ 19% CUF-Solar)
Hydro	2,273 MW (@ 25% CUF)

Action plan

Wind Power :

- ✓ MNRE has been intimated of the willingness of TANGEDCO to buy 2,000 MW from offshore wind projects at Rs.4.00 per unit for 25 years.
- ✓ In the coming year, 1,100 MW will be added by private wind power developers within the State.

Solar Power:

- ✓ TANGEDCO has signed Power Sale Agreement (PSA) with M/s. SECI for 500 MW at Rs. 2.78/-per unit. Out of 500 MW, supply of 330 MW power already commenced from April 2022 and the remaining 170 MW will be commenced from December 2023.

- ✓ Subsequently, another PSA has been signed with M/s. SECI for 1,000 MW at Rs.2.61/- per unit which is expected during 2023-24.
- ✓ Installation of 20,000 MW solar power plant and 10,000 MWhr Battery Storage System (BESS) is planned over the period of 10 years in Tamil Nadu.
- ✓ In Phase-I, 6,000 MW of solar power plant and 2,000 MWhr of BESS has been programmed. 4,014.69 acres of land for establishment of Solar Power plants has been identified in various Districts and acquisition is under process.

Solarisation of Agricultural Feeders :

TANGEDCO has programmed to solarise 1,685 Nos. of segregated agricultural feeders in the next three years. The solarisation of

agricultural feeders has the benefit of energizing the feeders through solar, which is a cheaper source of Renewable energy resulting in cost optimization of subsidized agriculture sector and as solar plants are to be developed at Distribution level, the voltage profile will be improved and line loss will be reduced.

Action plan

Sl. No.	Financial Year	No of feeders to be solarised
1	2023-24	579
2	2024-25	560
3	2025-26	546
	Total	**1,685**

Re-powering of TANGEDCO Wind Mills

Hon'ble Minister for Electricity, Prohibition and excise has announced repowering of the

existing old TANGEDCO's WEGs in Assembly during the year 2022-23.

Based on the announcement, it is proposed to repower the existing TANGEDCO owned, outdated 110 Nos. of WEGs with new WEGs having a total capacity of 41.575 MW along with the erection of 40.500 MW of solar PV plants. Draft DPR has been received from NIWE.

iv. Co-generation Plants in Co-operative and Public Sector Sugar mills

TANGEDCO has taken up the work for establishment of 12 nos. of Co-generation power plants in 10 Co-operative and 2 Public Sector sugar mills along with sugar mill modernization in Tamil Nadu.

Out of which, 6 no. Co-generation power plants have been commissioned with installed capacity of 93 MW and the work of the balance 6 nos. Co-generation power plants with the installed capacity of 90 MW, are under progress.

VII. COAL

Procurement of Coal to TANGEDCO

The requirement of coal for the existing TANGEDCO’s Thermal Power Stations is being procured from Talcher, IB valley mines of Mahanadi Coalfields Ltd., Odisha and Singareni (SCCL) mines in Telangana.

The Annual requirement of coal for existing TANGEDCO’s Thermal Power Stations (Total capacity 4,320 MW) @85 % Plant Load factor (PLF) is 223.4 LTPA (Lakh Tonnes Per Annum). Indian Coal is procured from Mahanadi Coalfields Ltd. (MCL) through Fuel Supply Agreement (FSA) with a linkage of 195.63 LTPA and Singareni Collieries Company Limited (SCCL) through Memorandum of Understanding (MOU) for a quantity of 40 LTPA with a total quantity of 235.63 LTPA.

The receipt of coal during the year 2022-23 from MCL mines is 178.64 LT i.e. about 91% against the linkage (FSA) and from SCCL is 14.03 LT. The total receipt is 192.67 LT.

The above receipt of 192.67 LT coal is recorded to be the highest receipt of coal from mines in the last 10 years.

Sl NO	YEAR	Receipt from CIL	Receipt from SCCL	Total Receipt in LT
1	2013-14	125.69	-	125.69
2	2014-15	136.81	-	136.81
3	2015-16	155.01	-	155.01
4	2016-17	120.59	4.89	125.48
5	2017-18	132.08	2.06	134.14
6	2018-19	150.55	-	150.55
7	2019-20	117.96	-	117.96
8	2020-21	101.49	6.13	107.62

9	2021-22	146.92	25.47	172.39
10	**2022-23**	**178.64**	**14.03**	**192.67**

Imported Coal

No purchase order was placed for the procurement of imported coal during the year 2021-22. Ministry of Power/Govt. of India (GoI), issued guidelines for TANGEDCO to procure 21.94 LT (7.3 LT for each quarter) of imported coal for nine months during the year 2022-23. Based on the directions of GoI, TANGEDCO procured 6.0 LT. Further, based on the directions of GoI, TANGEDCO executed agreement with M/s. Coal India Ltd, for the procurement of 1.3 LT of imported coal and procured only 0.7 LT from them. Hence, even though, GoI directed to procure 21.94 LT of imported coal, TANGEDCO had procured only 6.7 LT of imported coal during the year 2022-23.

Considering the cost of imported coal, TANGEDCO is taking all possible steps to minimise the use of imported coal.

Coal Quality Assurance Wing

TANGEDCO has formed a separate Coal Quality Assurance Wing.

New coal analyzing Lab has been established at Angul, Odisha for testing coal samples received from Talcher/IB Valley mines. On functioning of new Coal Lab at Angul, Odisha, the transit of the coal samples received from MCL to the TPS was stopped as the coal is tested at mine end itself and test results are declared in time before receiving the CIMFR (Central Institute of Mining and Fuel Research) results. This facilitates TANGEDCO to challenge the CIMFR results in time, if grade variations are found. By this process TANGEDCO may achieve

savings in coal bills and assure the receipt of good quality coal.

Further, after the receipt of coal at Power Stations, the samples are prepared and analyzed at Power Plant end.

Online Quality Monitoring of Domestic Coal

An online integrated portal along with dashboard for analyzing coal quality from mine end to TANGEDCO TPS is being explored. This will help TANGEDCO to monitor and to ensure the quality of coal being received at discharge port end resulting in savings of coal cost due to the quality wise payment to coal companies then and there. Telangana State Power Generation Corporation Limited (TSGENCO) has been requested to extend the support in this regard. On implementation, TANGEDCO will be able to identify the reasons for the quality variation at

various locations and make arrangement to get the coal of correct quality.

Coal Handling at Load & Discharge Ports

Paradip Port

- The Quantity of Coal handled at the Paradip Port by utilizing the Mechanised Coal Handling Plant (MCHP) and JSW (PEQCTPL) Berths during the year 2021-22 is 109.03 LT which increased to 152.45 LT during the year 2022-23. The cargo handled at Paradip Port is 39.82 **%** more than the previous financial year.

- Earlier at Paradip Port 80% Bogie Open Bottom Rapid Discharge Hopper wagons (BOBRN) and 20% Box Type Wagons (BOXN) were received. In order to reduce the handling time at Paradip Port, Indian Railway was requested to provide more

BOBRN rakes instead of BOXN rakes. Based on the request, 85% and 95**%** of BOBRN rakes have been received during the year 2021-22 and 2022-23 respectively, thereby reducing the handling time at Paradip Port.

- In order to avoid Pre-berthing delay of vessels at Paradip Port, TANGEDCO had availed the priority berthing scheme for the year 2022-23 and the same is being renewed for the year 2023-24.

Paradip East Quay Coal Terminal Private Limited (PEQCTPL)

A new berth for loading of Coal at Paradip Port (PEQCTPL) was initiated from the year 2022 to reduce the average berthing time at Paradip Port, as only two coal berths were available at MCHP for loading coal into vessels. Moreover, the quantity of coal handled during the year 2022-23 is 51.38 LT enabling dispatch of more quantity of coal to our Thermal Power Stations.

Gangavaram Port

An order was placed for Movement and Handling of Coal from MCL/IB Valley to Thermal Power Stations through Gangavaram Port during the year 2022. The Handling Charges paid have been reduced by Rs. 21.06 per MT when compared to the previous contract handled by M/s. Visakhapatnam Port Trust thereby accrual of savings of Rs. 3.29 crore through handling of 15.65 LT of coal.

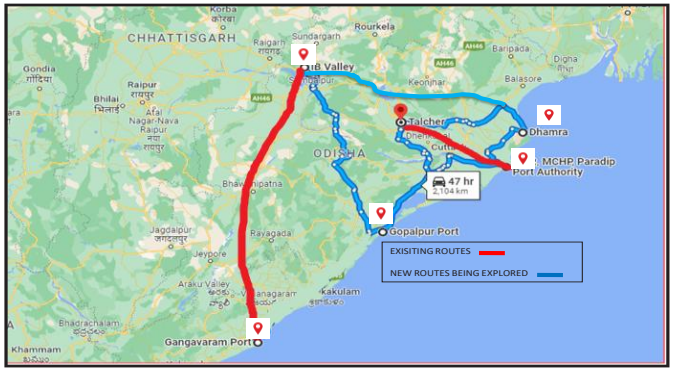
Effective Steps To Be Explored To Load Coal From Other Loading Ports

As there has been congestion in the railway route between the MCL Mines (Talcher) and Paradip Port, TANGEDCO is exploring the possibility of having multiple loading ports.

Possibility of handing coal from MCL Mines (Talcher) and IB Valley to Gopalpur Port and MCL Mines (Talcher) and IB Valley to Dhamra Port is being explored.

Gopalpur Port is having facility of 3 berths and handling capacity of Coal is approximately 18,000 to 20,000 MT/day. Dhamra Port is having facility of 3 berths and handling capacity of Coal is approximately 35,000 MT/day. Based on the economic feasibility, the movement of coal from those ports will be considered.

COAL TRANSPORTATION ROUTES



Order was issued to M/s. Karaikal Port Pvt. Ltd (KPPL), for discharging of Coal at Karaikal Port and further transporting to Mettur Thermal Power Stations – I & II. The quantity of coal handled during the year 2022-23 is about 50.92

LT. With the availability of the Karaikal Port about 4-5 rakes of coal are transported daily by rail and thereby ensuring sustainable generation at MTPS – I & II.

At VOC Port-CJ1 berth, the mechanized discharge through 2 nos. of Shore Unloaders has been brought into operation for TTPS thereby the discharge of coal from large capacity vessels has been made possible leading to faster and adequate build-up of the stock at TTPS.

Coal Shipping

The domestic coal is transported from the load ports of Paradip and Gangavaram to the discharge ports at Ennore, Tuticorin and Karaikal ports. In order to transport the required quantity of coal from load ports effectively, TANGEDCO has operated coal movement from Paradip through MCHP berths (CB-1 & CB-2)

with Minimum Guaranteed Tonnage (MGT) priority and PEQCPTL berth.

At present, TANGEDCO is chartering 12 nos. of vessels directly for coastal movement of domestic coal required for TANGEDCO's Thermal Power Stations. Due to this arrangement, TANGEDCO has saved about Rs. 56 lakh per day i.e., Rs.16.8 crore per month by hiring ships utilizing the cheaper competitive charter hire rates for long term chartering.

TANGEDCO is also exploring the possibility of considering the End To End contract for movement of coal from Mines to various Discharge Ports including the transportation of coal from mines to Load Ports by Road/ Rail and by Seaways from Load Port to various Discharge Ports. Thus, the payments for the coal by end to end means can be made on Quality basis, thus ensuring savings in coal cost.

In VOC port, Tuticorin (discharge port) by commissioning of Shore unloaders in Coal Jetty - 1 berth, the discharge quantity of 20,000 MT per day has been added. By operating Panamax size vessels at CJ-1 berth, savings of about Rs.160 per MT has been accrued to TANGEDCO since January 2023. This would result in total savings of about Rs. 80 crore per annum.

The Ocean freight towards transportation of Coal from Load port to Discharge Port for Thermal Generation is approximately Rs.100 crore per month. Utmost care is to be taken to monitor the ship movement and billing process. Hence, it is proposed to develop software to monitor the shipping process.

Development of web based application software, for end to end shipping process of TANGEDCO has been awarded to M/s.BONTON Software Pvt Ltd., by IT Wing on 09.01.2023. TANGEDCO Shipping and Software teams

discussed about the development of above software and the preparation of Software Requirements Specification (SRS) is in process.

The software will capture various parameters such as vessel movement, quantity of coal being transported, payments made to Ports, Agencies, Insurance, IOCL for bunkering of vessel, etc. Automation of reconciliation with periodic reports for Cost per Ton of coal transported through each voyage of shipping will help in savings to TANGEDCO by optimizing the cost. On implementation of above software, reconciliation of reports will aid in reduction of coal handling time resulting in saving in freight charges.

VIII. MINES

Securing of Coal Mines through Auction

In order to meet the domestic coal requirement of TANGEDCO’s upcoming Thermal

Power Projects and operating Thermal Power Plants from own source, TANGEDCO has been participating in Auction of Coal Mines by Ministry of Coal (MoC).

Chandrabila Coal Mine

The Ministry of Coal (MoC) allocated Chandrabila Coal Block in Odisha with reserve capacity of 896 Million Tonnes to TANGEDCO on 24.02.2016 for meeting the domestic coal requirement of upcoming 3,300 MW Thermal Power Plants at Ennore SEZ (2 x 660 MW), ETPS Expansion (1 x 660 MW) and Udangudi Stage-I (2 x 660 MW).

In order to expedite the development of Chandrabila coal block (non-forest area only), tender has been invited for the selection of Mine Developer and Operator (MDO).

Arrangement of Domestic Coal Linkages

In order to meet the domestic coal requirement of NCTPS stage III (1 x 800 MW) and Uppur TPP (2x800 MW), Fuel Supply Agreement (FSA) with Singareni Collieries Company Ltd (SCCL) for a quantity of 5.913 MTPA (50% of total coal requirement) has been executed for a period of 25 years from 01.07.2022.

The Standing Linkage Committee of Ministry of Coal has recommended for grant of Bridge Linkage (temporary/ short term coal linkage) for upcoming 3,300 MW Thermal Plants at Ennore SEZ TPP (2 x 660 MW), ETPS Expansion TPP (1 x 660 MW) and Udangudi TPP Stage-I (2 x 660 MW) from SCCL, till commencement of coal production from Chandrabila Coal Block allocated to TANGEDCO.

Merging of Mines Wing with Coal Wing

As the existing Mines wing is looking after the linkages of the coal companies for the upcoming Thermal Power Projects, to reduce the expenditure and to have better control of coal for both existing and upcoming Thermal Power Stations, it is proposed to merge Mines wing with Coal wing. The works relating to the development of mines shall also be looked after by the Coal wing.

1.2 GENERATION PROJECTS

The Peak Demand of Tamil Nadu at present is 18,252 MW. In order to cater to this rising demand of Power in the State, as announced by Hon'ble Minister for Electricity, Prohibition and Excise on the floor of Assembly, all necessary steps are being taken to speed up the commissioning of ongoing projects and also necessary actions have been taken to accelerate the upcoming projects. Apart from this, in order to be self-sufficient, the own generation capacity has to be increased and new projects are being explored.

The following ongoing Thermal projects of 4,620 MW capacity will be added to the Tamil Nadu's grid in the next two years:

Sl. No	Ongoing Project	DPR Value Rs. in crore	Value of award (in Rs. crore)	Expenditure so far incurred (Rs. in crore)	Proposed Date of Completion
1	NCTPP Stage III 1 x 800 MW	8,723	5,702	4,793	2023-24
2	Ennore SEZ – 2 x 660 MW	9,800	7,984.82	5,121.30	2024-25
3	Udangudi Stage I –2x660MW	13,077	9,752	6,111.28	2024-25
4	ETPS Expansion Thermal Power Project 1x660MW	6,381	4,443	-	2024-25
	Total: 4,100 MW				
5	Kundah PSP-(4x125MW)	2,863.73	2,444.48	1,105.26	2024-25
6.	Kollimalai HEP (1X20MW)	339	307	163.60	2024-25
	Total: 520 MW				
	Grand Total : 4,620MW				

I. Ongoing Thermal Power Projects

i. North Chennai Thermal Power Projects Stage-III (1x800 MW)

The Project is situated in the Thiruvallur district of Ponneri Constituency. The cost of Super Critical 800 MW project including Interest During Construction (IDC) is Rs. 8,723 crore.

The Project works are under progress.

Physical Progress of 93.80 %

Financial Progress of 84.0 %.

The following milestone activities namely (i) Boiler Hydro Test, (ii) Condenser Hydro Test (iii) Auxiliary Boiler Hydro test (iv) Auxiliary Boiler Light up and (v) Boiler Non-Drainable Hydro test have been completed.

All necessary steps are being taken to speed up the project and it is expected to be synchronized by August 2023.

North Chennai Thermal Power Projects Stage-III(1x800 MW)

ii.Ennore SEZ Thermal Power Project (2 x 660 MW)

The 2x660 MW Ennore SEZ Supercritical Thermal Power Station, spread in an area of 394.5 acres, is situated at Thiruvallur district of Vayalur Village, Ennore. Nearest railway station from this Power Station is Athipattu Pudhunagar which is at a distance of about 5 km.

The total project cost including IDC is Rs. 9,800 crore. The project is under progress.

Physical progress is 64.13% and Financial progress is 64.37%.

NGT ISSUE DETAILS:

National Green Tribunal, South Zone has suo motu taken the case based on articles in the Newspapers related to encroachment of water bodies in Kosathaliyar river due to changes in coal corridor route and sand filling. Civil works of external coal handling system were stopped in area location from TH-1 to PR 30 from 26.07.21. Necessary revised proposal of coal corridor route has been submitted to District Coastal Zone Management Authority (CZMA) committee for approval.

All necessary speedy actions have been taken and the project is expected to be commissioned during the year 2024-25.

Turbo Generator Unit I

Natural Draught Cooling Tower 1

iii. Udangudi Thermal Power Project–StageI (2x 660 MW)

The Project is situated in the Tuticorin district of Thiruchendur Constituency. The cost of Super Critical 2 X 660 MW project including

Interest During Construction (IDC) is Rs. 13,077 crore.

The Project is under execution and the current progress is as follows:

Physical progress is 74 %;

Financial progress is 65.6%.

Udangudi Thermal Power Project (2X660 MW) works were started during December 2017 and only 45.75% works were completed by June 2021, the original Scheduled date of completion. Due to continuous monitoring, the progress of the project has been improved from 45.75 % to 74% during last two years.

The Project is expected to be commissioned during 2023-24 (Unit-I - July 2024 and Unit-II-September 2024).

MAIN PLANT VIEW

Natural Draught Cooling Tower -01
CONSTRUCTION

Coal Jetty

iv. ETPS Expansion Thermal Power Project (1 x 660 MW)

The ETPS Expansion Thermal Power Project (1X660 MW) is situated in the Chennai District of Thiruvottiyur Constituency. LOI for EPC contract was issued to M/s. LANCO Infra Tech Ltd (LITL) for a value of Rs. 3,921.55 crore which was

terminated on 09.04.2018 due to poor performance.

Physical Progress:18% at the time of termination
Financial Progress:18% at the time of termination

Letter of award (LOA) for executing the balance works on 'as is where is basis' condition was issued on 09.03.2022 for a value of Rs. 4,442.75 crore.

v. Kundah Pumped Storage Hydro Electric Project (4x125MW)

The Project is situated in the Nilgiris district of Nilgiris Constituency. This project is being

executed to meet out the peak power demand of the State.

Physical progress: 48%
Financial progress: 46.36%

The project is delayed due to late award of E&M EPC contractors by one and half year. Certain civil components such as pressure shaft steel liner design could not be finalized for want of E&M input details. Incessant and Heavy rains during 2019, 2021 & 2022 have caused severe damage to the coffer dams in upper & lower intake structures. The work could not be undertaken in Emerald reservoir as the water could not be depleted. The works could be undertaken only in upper reservoir as it could alone be depleted. Hence, works in upper reservoir are in progress.

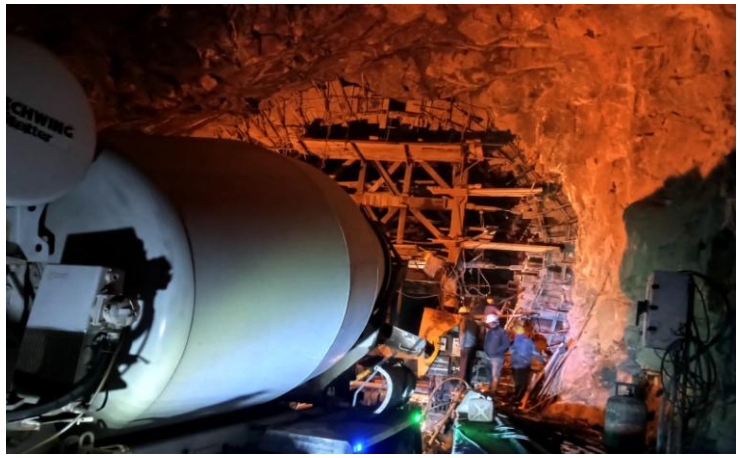
Works contract was awarded to Kundah Pumped Storage Hydro Electric Project (4x125 MW) and 12% works were completed until May

2021. Due to continuous monitoring, the progress of the project has been improved from 12 % to 48% during last two years.

The scheduled date of commissioning is March 2024. The project is expected to be commissioned by October 2024.

Service Bay – Column Concreting work completed upto Elevation 1939.20–12Nos

Transformer Cavern – Mud Mat laying work in progress



TRT – Tail Race Tunnel Overt lining work in progress

vi. Kollimalai Hydro-Electric Project (1x20 MW)

The Project is situated in the Namakkal district of Senthamangalam Constituency. The project cost of Kollimalai Hydro Electric Project 1x20 MW is Rs.338.79 crore. The project comprises of construction of five (5) diversion Weirs / Forebay, Power Tunnel, Penstock in Kollimalai Hills and establishment of Power House of 1x20 MW capacity in Puliancholai Village, Trichy District and works have been awarded for an amount of Rs.307.19 crore and work commenced.

The Physical & Financial progress of the project is 55.50% and 55.37% respectively. The construction of Power House, Power tunnel, Weirs (1, 3 & 5), flume from weir - 2 to 3, flume from weir – 3 to 4 and erection of penstock is in progress.

Kollimalai Hydro-Electric Project (1x20 MW) works were started and 23% works were completed by May 2021. Due to continuous monitoring, the progress of the project has been improved from 23 % to 55.50% during last two years.

The project is expected to be commissioned by October 2024.

II. Upcoming Projects

i. Udangudi Thermal Power Project Stage–II (2x660 MW) and Udangudi Thermal Power Project Stage–III (2x660 MW)

GoTN has accorded approval for the establishment of Udangudi Thermal Power Project Stage II & III- 2x660 MW each. Subsequently, in GO (Ms) 11 dt 23.02.22, GoTN has accorded administrative sanction for acquisition of 1,500 acres of land.

The preliminary activities are under process to get Terms of reference from Ministry of Environment, Forest and Climate Change (MoEF&CC).

ii. UPPUR Super Critical Thermal Power Project (2x800 MW)

The total project cost including Interest During Construction is Rs. 12,778 crore.

The National Green Tribunal Southern Zone, Chennai (NGT) in the judgement on public case,

directed TANGEDCO to suspend the work for six months period on 17.03.2021. Based on the above, the project works have been suspended from 18.03.2021.TANGEDCO Board accorded approval on 29.04.2021 to shift the existing 2x800 MW Uppur STPP to Udangudi site. In the meantime, the order of the National Green Tribunal has been stayed by the Supreme Court on 01.07.2021.

State Government of Tamil Nadu has ordered to restudy the Shifting of Uppur Project so as to meet the rising power demand. Based on the above, High level committee has been constituted to restudy the Shifting of Uppur Project to Udangudi. The Committee has recommended that the 2X800 MW Uppur Project shall be executed at Uppur itself.

TANGEDCO has taken action to obtain opinion from the Strategic Consultant regarding the viability and feasibility of Uppur Project.

It has been reiterated that the report should be submitted in a perspective view based on the need of coal-based plant.

III. New Pumped Storage Projects

- **Kodayar Pumped Storage Hydro Electric Project (6x250 MW), Kanyakumari district & Manalar Pumped Storage Hydro Electric Project (6x200 MW), Theni district & Aliyar Pumped Storage Hydro Electric Project (4x175 MW) Coimbatore District**

Consultancy / Transaction advisory services for preparation of Financial model, documents for Request for Qualification (RFQ), Request for Proposal (RFP), assistance in finalisation of Tender and execution of Concession agreement under PPP mode for three Pumped storage projects has been awarded to M/s. Ernst & Young on 13.03.2023.

- **Proposal to Establish New Pumped Storage Hydro Electric Projects for a total capacity of 11,100 MW in 12 locations of various districts as per Feasibility Study.**

11,100 MW of New Pumped Storage Hydro Electric Projects (PSHEP) as per Pre-feasibility Report (PFR) have been identified in various districts of Tamil Nadu in 12 locations.

The New Pumped Storage hydro projects are furnished as below:

Sl. No.	Name of the project	Capacity in MW as per announcement	Capacity in MW as per Pre-feasibility Report
i)	Upper Bhavani PSHEP/Nilgiris dt.	1,000	1,000
ii)	Vellimalai PSHEP/ Kanyakumari dt.	500	1,100
iii)	Silahalla Stage I PSHEP	1,000	1,000
iv)	Silahalla Stage II PSHEP	1,000	1,000
v)	Sandy Nalla PSHEP/ Nilgiris dt.	1,000	1,200
vi)	Mettur PSHEP/ Salem dt.	500	1,000
vii)	Palar-Poranthalar PSHEP/ Dindigul dt.	1,000	1,100
viii)	Karaiyar PSHEP/ Tirunelveli dt.	500	1,000

ix)	Manjalar PSHEP/Theni dt.	500	500
x)	Chattar PSHEP/ Kanyakumari dt.	500	1,100
xi)	Sigur PSHEP/ Nilgiris dt.	500	800
xii)	Athur PSHEP/ Dindigul dt	500	300
	Total	**8,500**	**11,100**

- Pre-Feasibility Report completed.

- Action to be taken for Engaging Transaction Advisor for preparation of Bid documents for development activities under Public Private Partnership (PPP).

❖ **Installation of Flue Gas Desulphurisation (FGD) in Ennore SEZ Supercritical Thermal Power Project.**

- Amendment order in P.O.No.03 dt. 24.02.2012 for offering pre-award consultancy services for FGD has been issued to M/s. Desein Pvt Ltd, New Delhi, on 18.06.2022.

- Draft specifications are prepared and submitted by the consultant. Remarks

for the draft specification have been communicated to the Consultant, M/s. Desein Pvt Ltd, New Delhi on 02.09.2022. Based on the TANGEDCO remarks, preparation of final specification by the consultant is under process.

❖ **Installing Gas Engine Power Projects to a tune of 2,000 MW capacity comprising of smaller capacity gas engine power projects of 18 to 20 MW based on the feasibility.**

Based on the feasibility report of the Consultant it has been planned to install Gas Power Project to the tune of 2,000 MW comprising 18 MW to 20 MW Units at Ennore, Chennai. The Consultant has submitted the draft Detailed Project Report (DPR) on 27.03.2023.

IV. Achievements

❖ **Mechanization of Coal Jetty-1 with erection of 2 numbers of Gantry Grab**

Type Shore Unloaders at VOCPT/ Tuticorin.

In order to meet the monthly coal requirement of Tuticorin Thermal Power Station, 10 to 12 nos. of small vessels with self geared cranes having capacity of 50,000 MT to 55,000 MT were utilized at Coal jetty 1 and 2 at VOC Port / Tuticorin.

In order to meet out the power demand of Tamil Nadu and to ensure uninterrupted power Generation in all the 5 Units (5x210 MW) of TTPS and to handle more quantum of coal in a shorter period, project for mechanization of Coal Jetty-1 with two numbers of gantry grab type shore unloaders at a cost of Rs.325 crore was evolved by TANGEDCO and these 2 nos. of GSUs were erected at Coal jetty-1 for coal unloading through larger vessels having capacity of 70,000 to 75,000 MT. The operations of the above 2

nos. of GSUs were inaugurated by Honourable Chief Minister of Tamil Nadu on 31.01.2023.

Inauguration of Shore unloaders at VOC Port, Tuticorin by Hon'ble Chief Minister on 31.01.2023

With the operation of newly erected Machines coal can be unloaded quickly from 6 to 8 large vessels at the rate of 70,000 ton to 75,000 ton/vessel and thereby ocean freight charges would be reduced from Rs.700 to Rs.540 per MT of coal, leading to savings of Rs. 80 crore per annum to TANGEDCO.

- **Installation of dust screen system in TANGEDCO's 1x800 MW North Chennai Thermal Power Project Stage – III to comply with the norms of Ministry of Environment and Forest & Climate Change.**

During the Assembly announcement 2021-22, the Honourable Minister for Electricity has announced the proposal of Installation of dust screen system in 1x800 MW North Chennai Thermal Power Project Stage – III to prevent the settlement of coal dust on the sophisticated Electrical equipment for a length of 1 km with 14m height in between North Chennai Thermal Power Station Stage-I and North Chennai Thermal Power Project Stage-III at an estimated cost of Rs.38 crore.

The works on this scheme were started during April 22 and completed during January 23 at a cost of Rs.38.42 crore, which will serve as wind barrier and reduce the accumulation of coal dust from NCTPS-I on to NCTPS – III.

1.3 TRANSMISSION

TANTRANSCO is steadily and continuously establishing new transmission infrastructure across the state apart from augmentation and upgradation of the existing transmission infrastructure to cater to the ever increasing power demand in the State in various sectors.

TANTRANSCO is also adopting the contemporary technology in Power Transmission sector, like 765 kV system and Gas Insulated Substations at Extra High Voltage levels so as to transmit and distribute huge power with very much reduced area requirement in the current scenario of space constraints.

It is also supporting development of latest technology and most effective means of transportation systems like Metro Rail Projects, Railway Electrification works, development of infrastructure for Electric Vehicle segment and Data Centres.

In order to meet the power demands from above new developments, TANTRANSCO is executing various Transmission Schemes at different Voltage Levels.

I. Transmission Infrastructure Development during FY 2022-23

i. Schemes inaugurated by Hon'ble Chief Minister

Hon'ble Chief Minister of Tamil Nadu inaugurated 15 nos. of Substations in 13 Districts and 105 nos. of additional Transformers or enhancement of Transformer Capacity in the 31 Districts and laid foundation stones for 8 New substations in 4 Districts with various Voltage ratings at a total cost of Rs. 588.78 crore on 16.08.2022 and 07.11.2022.

Inauguration of Sub Stations by Hon'ble Chief Minister on 16.08.2022

Inauguration and laying of foundation stone for Sub Stations by Hon'ble Chief Minister on 07.11.2022

ii. Achievement during 2022-23

During the financial Year 2022-23, TANTRANSCO has commissioned the following Transmission Schemes:

- 2 Nos. of 400 kV substations (Pulianthope and Ottapidaram), 1 No. of 230/110 kV GIS Substation at Erode & 13 Nos. of 110 kV Substations with total capacity addition of 2,739 MVA.
- EHT Lines for a length of 596.51 Circuit kms

Significant Transformer capacity addition through Additional Transformer / Enhancement of Power Transformers in existing Substations by adding 150 Nos. of Transformers with a total capacity of 2,174 MVA has been achieved across the state so as to meet the future load growth and to accelerate the growth of different sectors by providing quality and reliable 24 X 7 power.

Also, Reactors & Capacitor Banks at Substations for a total capacity of 583 MVAR have been commissioned to improve voltage profile in the transmission & distribution systems.

II. Transmission Infrastructure in the State

As on 01.04.2023, TANTRANSCO has developed the following Transmission System Infrastructure in the state of Tamil Nadu:

Sl. No	Voltage Level	Total No. of Substations	Total Length of Lines in Circuit kms
1	400 kV	18	4,752.02
2	230 kV	114	11,495.61
3	110 kV	941	20,725.80
4	66 kV	03	83
	Total	1,076	37,056.43

i. Development of 765 kV Transmission Network

Among all State Transmission utilities in India, TANTRANSCO is the first utility to erect a 765 kV transmission network.

TANTRANSCO is expediting works to commission 2 Nos. of 765 kV Substations in Tamil Nadu at **North Chennai Pooling Station 765 kV GIS and Ariyalur 765 kV Substation** during this year. Major works have been completed at North Chennai and works are nearing completion at Ariyalur. The associated 765 kV lines of both these substations have also been completed and kept ready for commissioning.

Another 765 kV substation is under construction at **Virudhunagar** to evacuate power from the nearby power projects and also to facilitate evacuation of existing, upcoming and proposed RE power generation in southern

districts of Tamil Nadu for transferring to load centres. Work is under progress for Virudhunagar 765 kV SS and the associated 765 kV Line from Virudhunagar to Coimbatore 765 kV SS. 400 kV line from Virudhunagar to the Common Point of Kayathar-Thennampatti 400 kV Line is nearing completion. Further, 400 kV line from the above common point to Udangudi Switchyard is to be taken up. All the ongoing works are expected to be completed during 2023-24.

Another 765 kV substation has been proposed in **Coimbatore** and is to be connected to Ariyalur 765/400 kV & Virudhunagar 765/400 KV substations and Palavady, Edayarpalayam & Rasipalayam 400 kV substations, thereby strengthening the transmission infrastructure in Coimbatore, Salem and Mettur areas. In respect of Coimbatore 765 kV SS, 67.78 acres has been purchased out of the total requirement of 99.15

acres, and Administrative sanction has been accorded for acquisition of 31.37 acres and steps are being taken to complete the land acquisition.

Completion of the above 765 kV system comprising North Chennai Pooling Station 765 kV GIS and Ariyalur, Virudhunagar and Coimbatore 765 kV Substations will enhance the Available Transfer Capability, reliability and performance of Intrastate and Interstate power system in the State.

ii. Development of 400 kV Transmission Network

a. Chennai area

The multi-sectoral growth potential in Greater Chennai Corporation and adjoining Avadi & Tambaram Municipal Corporations, viz., Industrial / Commercial / Construction / Urbanisation / Chennai Metro Rail Phase-II / Data Centres / Electric Vehicle segment, necessitates Extra High Voltage Transmission

System and Substations with very less space requirements to make it robust and reliable.

Accordingly, 5 Nos. of 400 kV GIS Substations and 1 No. of AIS Substation (Total 6 Nos.) have been proposed for improving Chennai network.

2 Nos. of 400 kV Substations, one at Thervoikandigai proposed to evacuate power generated in Gummidipoondi and North Chennai area and another at Guindy proposed to strengthen the Chennai network, have been completed and charged at 230 kV level. Works are under progress for the associated 400 kV lines of these Substations. All efforts are being taken to commission these Substations at 400 kV level at the earliest.

All the works of Pulianthope 400 kV GIS have been completed and test charged on 24.03.2023.

230 kV GIS Bus of Tharamani 400 kV GIS has been test charged on 17.03.2023. Associated 400 KV UG Cable work of Tharamani SS has been awarded recently.

The works of Korattur 400 kV GIS are being executed at fast pace and expected to be commissioned during 2023-24.

Koyambedu 400/230 kV GIS

Considering the rapid growth of Data Centre in and around Chennai, it is proposed to establish 1 no. 400/230 kV GIS Sub-Station at Koyambedu with 2X500 MVA ICT capacity. Land for establishment of the said Sub-Station has been identified and acquired. All steps will be taken to initiate the construction activities of the Sub-Station during this financial year.

b. Other than Chennai Area

TANTRANSCO has proposed 5 Nos. of 400 kV substations in areas other than Chennai, viz. Vellalaviduthi, Edayarpalayam, Ottapidaram,

Samugarengapuram and Parali for system strengthening and for power evacuation throughout the State.

Works are nearing completion for Vellalaviduthi and the Substation is expected to be commissioned shortly.

Works have been completed in Ottapidaram 400 kV SS and the Substation has been test-charged on 22.03.2023.

Works are under progress for Edayarpalayam 400 kV SS.

Permission has been granted by the Supreme Court to execute Parali SS with compensatory afforestation. Proposal is under process in concerned Department to issue orders so as to take up the work.

Tender to be floated for Samugarengapuram 400 kV SS, covered under Green Energy Corridor-II scheme.

The aforesaid schemes have been planned for System Strengthening and for Green Energy Evacuation.

iii. 230 kV Transmission System

a. Chennai Area

8 Nos. of 230 kV Substations have been proposed in Chennai Area at Thiruvanmiyur (GIS), Ennore (GIS), Ganesh Nagar (GIS), K.K.Nagar (GIS), Panjetty, Avadi, Maraimalainagar and Mambakkam.

Works are under progress in Thiruvanmiyur (GIS), Maraimalainagar, Mambakkam, Panjetty and Avadi Substations.

Contract for Ganesh Nagar GIS has been awarded on 03.03.2023. Tendering is under

process for Ennore and K.K. Nagar GIS Substations.

b. Other than Chennai Area

TANTRANSCO has proposed 16 Nos. of 230 kV substations for system strengthening and flexibility of operation throughout the State other than Chennai.

Works are under progress in 7 Nos. of Substations namely, Karuppur, Selvapuram, Kalivelampatty, Vembakkam, Nallur, Sathumadurai and Nanguneri Substations.

5 Nos. of Substations namely Narimanam, Muppandal, Poolavadi, Keezhakuppam and Thumbalapatti are in initial Stages of Tendering.

Land identification for AIS in lieu of GIS due to cost cutting measures is under process for 4 nos. of 230 kV Substations namely, K.Pudur, Rajagopalapuram, Thuckalay and

Saravanampatty. On acquisition of Land, tendering will be taken up.

III. Projects funded with External Assistance

i. Japan International Cooperation Agency (JICA)

Under the Official Development Assistance (ODA) Loan of JICA, funding assistance amounting to Rs.3,572.93 crore has been sanctioned for creation of Transmission Network.

Initially 5 Nos. of 400 kV substations and 12 Nos. of 230 kV substations along with the associated transmission lines have been approved at a cost of Rs 2,494.67 crore. Out of the five 400 kV substations, Karamadai, Manali (GIS) and Sholinganallur substations have been commissioned. Guindy (GIS) has been back charged at 230 kV Level. 400 kV source line works of Guindy (GIS) are under progress. On completion of line works, Guindy (GIS) will be

charged at 400 kV level during 2023-24. Work is in progress for Korattur (GIS) substation.

All the 12 Nos of 230 kV substations under this funding assistance have been commissioned.

Additional schemes in 15 packages at a cost of Rs. 634.85 crore, which are approved by JICA for establishing additional transmission network have been awarded and works are in progress.

The schemes under JICA funding are expected to be completed during 2023-24.

ii. Schemes under Green Energy Corridor – Phase –I (GEC-I)- Funded by KfW (German Development Bank), Germany

In order to evacuate the huge quantum of the Renewable Energy (RE), TANTRANSCO has taken up establishment of a vast network of high capacity transmission lines in the State with the

Project cost of Rs. 2,049.392 crore including GST.

The projects under the scheme have been implemented with the grant of Rs.529.31 crore under National Clean Energy Fund (NCEF) and soft Loan of 76 Million Euro (Rs. 573.26 crore) from KfW German funding under Indo German Bilateral Co-operation with the balance as Equity by TANTRANSCO.

All the projects covered under the GEC-I, viz., Establishment of Thennampatty 400 kV SS, 400 kV DC line from Thennampatty to Kayathar, 400 kV DC line from Rasipalayam to Palavadi, Erection of 6 Nos. of 230 kV lines, Augmentation of 230/110 kV auto transformer capacity from 100 MVA to 160 MVA in existing 5 Nos. of 230 kV substations have been completed.

iii. Schemes Proposed for Green Energy Corridor – Phase –II

Establishment of new extra high capacity Substations and Transmission Lines have been identified under GEC-II to facilitate absorption of Renewable Energy in the State and effective Intra-state transmission of Renewable Energy. GEC-II is proposed for evacuating RE power by establishing 400 kV Substation at Tirunelveli District and 230 kV Substations in Tiruppur and Kanyakumari Districts.

Under Green Energy Corridor Phase –II, establishment of 1 no. of 400 kV Substation at Samugarengapuram in Tirunelveli district, 3 nos. of 230 kV substations at Muppandal in Kanyakumari district, Poolavady and Kongalnagaram in Tiruppur district have been approved.

The revised project cost of Rs. 1006.64 crores is funded as under:

Grant from MNRE – Rs.237.52 crore

Loan from KfW – Rs.473.12 crore
(47% of project cost)

Equity – Rs.296.00 crore

The proposal is approved by DEA, MNRE/MoF. Loan agreement has been signed with KfW on 24.11.2022. Tender for the GEC-II will be called during April 2023.

iv. Schemes under Chennai – Kanyakumari Industrial Corridor (CKIC) Funded by ADB

a. Substations and associated Line works

Virudhunagar 765 kV SS and Ottapidaram 400 kV SS along with the associated lines, at a total estimated cost of Rs.4,332.57 crore are being implemented for evacuation of electricity from new generation capacity additions including renewable energy in southern districts and to strengthen the transmission connectivity between southern and northern ends of the

proposed Chennai Kanyakumari Industrial Corridor (CKIC). Asian Development Bank (ADB) is funding an amount of 451 Million USD for the project. This project is being supported by GoTN with a funding of Rs.1,000 crore.

Works have been completed in Ottapidaram 400 kV SS and it has been test-charged on 22.03.2023.

Works are in progress for Virudhunagar 765 kV SS along with the associated lines. Proposal for availing funding for additional work of 400 kV DC Line from Common Point of 400 kV Kayathar -Thennampatty line to Udangudi is under process.

b. Organizational Transformation Study funded by ADB

In order to improve the overall financial and fiscal performance of TANGEDCO and TANTRANSCO, a detailed strategic management study has been undertaken with ADB funding.

M/s. Ernst & Young LLP, New Delhi was appointed as consultant.

The assignment is focused on generation Planning, Transmission Modelling, Distribution efficiency improvement and Financial due diligence along with Study of various organization structuring options. The agency has submitted their report after study for certain tasks and the same is under scrutiny by the respective Task Core committee.

v. Projects under Tamil Nadu Investment Promotion Programme (TNIPP)

i. Phase – I

6 Nos. of Transmission Schemes have been planned for execution under TNIPP Phase –I. An amount of Rs. 195.23 crore has been funded by GoTN for the schemes against the project cost of Rs. 216.39 crore and balance amount of Rs.21.26 crore as equity from TANTRANSCO. Out of 6 nos. schemes, 5 nos.

have been completed and 110 kV GIS Substation at Munusamy Salai is in Progress.

ii. Phase – II

15 Nos. of Transmission Schemes have been planned for execution under TNIPP Phase –II. The project cost of Rs.481.65 crore has been funded by GoTN. All the 15 Nos. of projects have been awarded, out of which 9 nos. have been completed. For the balance 6 nos. viz., Kunjalam 110 kV SS, Thiruvanmiyur 230 kV GIS, Avadi 230 kV SS, Panjetty 230 kV SS, Maduravoyal 110 kV GIS and associated Lines of Thuvakudy 230 kV SS, works are in progress.

IV. Power Evacuation Lines envisaged for the Generation Projects under pipeline:

TANTRANSCO has taken up / proposed to take up the following Power Evacuation Lines that have been envisaged for various ongoing / proposed Generation Projects:

Sl.No	Name of the Project	Connectivity
1	NCTPP Stage III (Thermal)	765 kV DC line from NCTPS Stage-III Project to the ongoing 765/400 kV North Chennai Pooling station.
2	Ennore SEZ TPP (Thermal)	400 kV DC line from Ennore SEZ Project to the ongoing 765/400 kV North Chennai Pooling station.
3	ETPS Expansion Thermal Power Project	400 kV DC line from ETPS Expansion Project to the ongoing 765/400 kV North Chennai Pooling station
4	Udangudi TPP-Stage-I (Thermal)	400 kV DC line from Udangudi project to 1) Ottapidaram 400/230 kV SS. 2) Virudhunagar 765/400 kV SS.
5	Kundah Pumped Storage HEP-VII (Hydro)	Three nos.230 kV feeders from Kundah Pumped storage Generating Station switchyard to Parali 400/230kV SS.
6	Silahalla pumped storage (Hydro) HEP	400 kV DC line to Parali 400 kV SS

765 kV Power Evacuation Line in respect of NCTPP Stage III is nearing completion. 400kV Lines in respect of Ennore SEZ & ETPS Expansion Projects and 230 kV Lines of Kundah Pumped Storage HEP are under progress. Also, 400 kV Power Evacuation Lines from Udangudi TPP to Ottapidaram and Virudhunagar are under

progress. 400 kV Line in respect of Silahalla Hydro Project will be taken up on obtaining Administrative Approval.

V. Strengthening of Transmission Network

In order to develop the Transmission Network further and to serve the larger public interest, it has been announced in the Assembly 2021-22, that 102 Nos. of New EHT Substations at an estimated cost of Rs. 10,994 crore, Upgradation of 12 Nos. 33 kV Substations as 110 kV Substations at an estimated cost of Rs. 125 crore and enhancement of Power Transformer capacity in 245 Nos. in existing Substations at an estimated cost of Rs. 601 crore and in the year 2022-23, that 52 Nos. of New EHT Substations at an estimated cost of Rs. 1,198 crore and enhancement of Power Transformer capacity in 33 Nos. in existing EHT Substations at an estimated cost of Rs. 154

crore will be commissioned. Administrative approval has been accorded for 89 Nos. EHT substations (including upgradation), in which for 18 Nos of sub stations works contract has been awarded. Similarly, for 246 EHT Sub stations (out of 245+33), enhancement of power transformers in the existing transformer categories, necessary administrative approval has been accorded and works have been completed in 145 Nos. of schemes.

VI. RENEWABLE ENERGY MANAGEMENT CENTRE (REMC)

i. Renewable Energy in Tamil Nadu

Tamil Nadu is a RE rich State and the Renewable energy sources of Wind and Solar provide clean, inexhaustible and increasingly competitive energy. They contribute to green environment, reduce carbon emissions, ease our

dependence on fossil fuel and lead to energy security.

In order to integrate more RE into the grid and also for enabling better grid management, the Ministry of Power, Govt. of India, through Grid India (old PGCIL) has provided funds to a tune of Rs.49 crore as Grant for implementation of Renewable Energy Management Centres (REMCs) in Southern region.

The REMC in Tamil Nadu provides forecasting and scheduling of RE generation from 9,860 Nos of WEG Services (12,525 WEGs) and 960 Nos. of Solar Services on Week ahead, Day-ahead & Intraday which enables planning of the power availability and Real Time operation of the Grid.

VII. Intra-State Deviation Settlement Mechanism for Grid discipline

In order to bring grid discipline to ensure grid stability and security towards the goal of uninterrupted power supply, all generators have been brought under the ambit of a set of Regulations for Deviation Settlement Mechanism and Related Matters formulated by the Hon'ble Tamil Nadu Electricity Regulatory Commission in March 2019.

As per these Regulations, all Generators (both State owned and Private generators including Renewable Energy Generators) will have to forecast and schedule the power to be generated on day ahead basis in order to ensure effective grid operation through effective power planning. In case of any deviation from the schedule, the Deviation Settlement Mechanism (DSM) will be enforced. The DSM Charges will be payable/receivable by the generators to/from

the State Deviation Pool Account maintained by the State Load Despatch Centre (SLDC), as the case may be.

The Mock trial for implementation in respect of conventional generators is under process. With respect to Renewable energy generators, the mock trial will commence on issue of Amendment to the Regulations by the Hon'ble TNERC.

The entire implementation process of the DSM will be carried out through a software mechanism named SAMAST (Scheduling Accounting Metering and Settlement of Transaction in Electricity) that has been initiated and funded by the Ministry of Power, Government of India.

VIII. Cyber Security

In order to ensure that the TN State Load Despatch Centre and the infrastructure of

TANTRANSCO stays secure from Cyber attacks, the Tamil Nadu Government is taking all actions to implement the guidelines issued by MoP/CEA in this regard.

The Computer Emergency Response Team-Grid Operation (CERT-GO) in consultation with SLDC has identified the critical information infrastructure to be notified by the GoTN that will be protected from cyber-attacks. The Crisis Management Plan document towards mitigation of any possible cyber attacks has been prepared and got approved by the Computer Emergency Response Team – India (CERT-In) which is the Nodal Agency to co-ordinate all matters related to Cyber Security in the country.

In order to watch the cyber threats to SLDC on a 24x7 basis and for monitoring, detecting, investigating, preventing and responding to cyber threats round the clock, an Information Security Division (ISD) and a

Security Operation Centre (SOC) have been approved.

Advisories on Cyber Attacks as and when received from the CERT-In are being attended by SLDC and TANTRANSCO.

The GoTN is closely following up the implementation of the cyber security measures to ensure secure operation of the Grid and uninterrupted power supply to the consumers in the State.

IX. Hot Lines

The essential EHT line maintenance works are being carried out by the special Hotline trained staff on extra high voltage transmission lines without interrupting the power supply. At present, Hot lines Sub-divisions are functioning at Chennai, Thiruvalam, Coimbatore, Trichy and Madurai.

The Hon'ble Minister for Electricity, Prohibition and Excise has announced on the floor of Assembly on 26.04.2022 that a new hotline division will be formed. Based on the announcement, a new hot lines division has been formed at Korattur, Chennai on 11.01.2023.

Hotline water washing at 230 kV Kilpauk SS

During the last financial year, the Hot Lines wing has replaced weak insulators in 92 transmission towers, 124 defective clamps in the substation elements and weak jumpers.

Around 149.44 million units of additional electricity was supplied by carrying out the EHT line maintenance works on live lines during the year (2022-23).

X. EHT Substations

Tamil Nadu Transmission Corporation Ltd. is functioning with a total of 1,076 EHT Sub-stations.

During the year 2022-23, 126 Nos of substations have NIL outage of Equipment out of total existing 1,076 Substations as a result of effective periodical maintenance carried out by the existing SF6 subdivisions at Korattur, Vinnamangalam and Trichy.

Also, considering the importance of preventive maintenance works to be carried out in SF6 breakers throughout the state by SF6 sub-divisions, approval has been issued to form 3 more SF6 sub divisions at Coimbatore, Neyveli and Virudhunagar.

In order to ensure uninterrupted power supply, 941 EHT Feeders are in service at various voltage ratings of 765, 400, 230 and 110 Kilo Volt.

Emergency Restoration Systems are kept ready at various locations in the state to meet out any eventuality due to collapse of transmission towers.

498 EHT Feeders have NIL tripping for more than consecutive six months due to effective line maintenance activities.

XI. Reliable Communication

At present TANTRANSCO is having about 5,000 kms optical fibre network with 12/24 core fibre in various routes in the State. Further, using various advantages of the fibre technology such as quick and bulk data transfer capability, reliability with redundancy of data transfer, a reliable communication scheme is being executed for establishment of new 10,770 kms of 48 core optic fibre network along with EHT towers covering 620 Nos. of 110 kV Substations.

The scope of this project is to provide reliable Optical Ground Wire (OPGW) based Optical Fibre Communication with Data Acquisition system at 110 kV & above level substations in the state of Tamil Nadu at a total estimated project cost of Rs.479.84 crore.

The Ministry of Power have sanctioned a grant of Rs.155.48 crore from Power System

Development Fund (PSDF) for implementation of the above scheme in Tamil Nadu.

Out of total quantity of 10,770 kms 48-core fibre OPGW, about 7,296 kms has been supplied; 6,187 kms has been erected; and about 1,360 kms of OPGW has been commissioned as on 23.03.2023. About Rs. 94.49 crore has been spent so far on this project.

Further, to establish optical fibre network connectivity for the left out 400 Nos. of 110 kV Substations, it is proposed to lay about 7,000 kms of OPGW with Optic Fibre Terminal Equipment.

XII. Achievements

By means of state-of-the-art testing technology, preventive maintenance testing at EHV (Extra High Voltage) levels were carried-out scrupulously in all the EHV substations. Due to this, vital equipment at the verge of failure were

identified in 400 kV Alamathy Sub Station, 400 kV Sunguvachatram Sub Station, 230 kV Mylapore Sub Station, 230 kV Mosur Sub Station, etc. which in turn averted unexpected failures of Power Transformers and power supply interruptions saving revenue to the tune of Rs. 80 crore.

In future, more no. of transformers will be tested and failure of transformers will be reduced which in turn will reduce the supply interruptions.

1.4 Distribution

Introduction

Distribution network of Tamil Nadu plays a major role in providing and maintaining uninterrupted, reliable and quality power supply to the consumers. Power to consumers is carried in distribution network either through overhead lines on poles or underground cables. Distribution network comprises of 33/11 kV Substations, Distribution Transformers, overhead lines and underground cables at High Tension 33 kV, 22 kV, 11 kV and LT voltage levels.

In order to provide 24x7 uninterrupted quality power supply to all the consumers, TANGEDCO has established the entire essential distribution infrastructure and has taken all the efforts to improve voltage profile of the power supply.

Based on the directions of Hon'ble Chief Minister of Tamil Nadu, TANGEDCO is focusing on strengthening the existing Sub-Transmission System and its allied network. Several schemes like establishment of new 33/11 kV Substations, enhancement of existing power transformer capacity, implementation of High Voltage Distribution System (HVDS), conversion of OH to UG in Chennai and cyclone prone areas etc., are being implemented.

All consumers now have access to TANGEDCO's online services. This enables them to easily register all types of applications, complaints and transact payments online.

During the last year, overloaded distribution transformers and under voltage pockets throughout the State were identified and the issues were resolved by energizing 8,905 new distribution transformers. Special Maintenance works were also carried out all

over the State to ensure uninterrupted and reliable power supply to all consumers.

I. Salient Features

In order to develop the Sub Transmission Distribution Network further and to serve the larger public interest, it has been announced in the Assembly 2021-22, that 102 Nos. of New 33/11 kV Substations at a total estimated cost of Rs. 700 crore and enhancement of Power Transformer capacity in 44 Nos. in existing 33/11 kV Substations at total estimated cost of Rs. 78 crore and in the year 2022-23, that 48 Nos. of 33/11 kV New Substations at an estimated cost of Rs. 451 crore and enhancement of Power Transformer capacity in 6 Nos. in existing 33/11 kV Substations at an estimated cost of Rs. 12 crore will be commissioned.

New sub-stations have been included in RDSS and tendering works are under progress.

During the year 2022-23, TANGEDCO commissioned 10 nos. of new 33/11 kV substations, 4 nos. of augmentation of substations, erected 5,094 kms of HT lines, 15,984 new distribution transformers and 9,555 kms of LT lines for strengthening of the Distribution network. Further, 8.88 lakh new service connections have been effected.

The details of Distribution network as on 01.04.2023 are given below:

Distribution network	
33/11 kV Substations	779 Nos.
High Tension Lines 33 KV, 22 KV and 11 KV (HT-OH)	1,89,582 km
Low Tension Lines (LT-OH)	6,19,319 km
Distribution Transformers	3,88,982 Nos.
HT Cables (HT-UG)	7,285 km
LT Cables (LT-UG)	11,824 km
Total Consumers	3,31,15,958

Category wise total number of consumers is as below:

S. No.	Category	Numbers in Lakhs	
		2021-22	**2022-23**
A	**HT Services**	0.1 (10,417 nos.)	0.11 (10,983 nos.)
B	**LT Services**		
1	Domestic	233.51	235.55
2	Commercial	36.27	37.04
3	Industries	7.55	7.70
4	Agriculture	22.87	23.36
5	Huts	9.75	9.45
6	Others	14.49	17.95
	LT Total	**324.44**	**331.05**
	Grand Total	**324.54**	**331.16**

II. Effecting 50,000 Agricultural service connections in 2022-2023:

A famous quote by Thiruvalluvar says:

"உழுவார் உலகத்தார்க்கு ஆணி அஃதாற்றாது

எழுவாரை எல்லாம் பொறுத்து"

– திருவள்ளுவர்

Agriculturists are (as it were) the linchpin of the world, for they support all other workers who cannot till the soil.

- **Kalaignar's Text**

With the aim of improving the welfare of farmers and per the instructions of Hon'ble Tamil Nadu Chief Minister who knows the pride of farming industry, 1,00,000 new agriculture service connections were effected during the year 2021-22. In continuation to this and as per the directives of Hon'ble Tamil Nadu Chief Minister announcement was made by the Hon'ble Minister for Electricity, Prohibition and

Excise during the presentation of 2022-23 Demand for Energy Department in the Assembly, to provide 50,000 agriculture free service connections.

Accordingly, effecting of new Agriculture free Service Connection was inaugurated by the Honorable Chief Minister of Tamil Nadu on November 11, 2022 at Aravakurichi, Karur and issued the service connection orders to beneficiaries in the inauguration function. This scheme was completed in a very short time and the closing function was held on 11.01.2023 at the Secretariat, Chennai headed by the Hon'ble Chief Minister of Tamil Nadu. During the function, the service connection orders to last five beneficiaries of the 50,000 beneficiaries were issued by the Hon'ble Chief Minister of Tamil Nadu.

Inauguration of 50,000 Agriculture Service Connection at Aravakuruchi, Karur

50,000 agricultural electricity connections were provided on the basis of pending ready parties as on 31.03.2022. Following the formation of this Government for the people, for the first time ever in Tamil Nadu Electricity Board History, 1,00,000 agricultural service connections were effected in 2021–22 and 50,000 agricultural service connections were effected in 2022–23 in just 17 months, and has set a new record.

As a result of effecting 50,000 agricultural service connections, an additional 86,384 acres of agricultural land has been brought under irrigation, costing to TANGEDCO a total amount of Rs. 816 crore. Due to this, agricultural pump sets with a capacity of 229 MW have been connected to the distribution network.

District wise agricultural services effected from 01.04.2021 to 31.03.2023 is as below.

Sl. No.	District Name	2021-22	2022-23	Total
1	Ariyalur	1894	851	2745
2	Chengalpattu	667	562	1229
3	Coimbatore	5627	2457	8084
4	Cuddalore	1553	865	2418
5	Dharmapuri	6785	5325	12110
6	Dindigul	5916	1819	7735
7	Erode	3669	2659	6328
8	Kallakuruchi	5380	2207	7587
9	Kancheepuram	662	222	884
10	Kanyakumari	301	26	327
11	Karur	2807	631	3438
12	Krishnagiri	6906	4704	11610
13	Madurai	2484	839	3323

14	Mayiladuthurai	753	597	1350
15	Nagapattinam	121	65	186
16	Namakkal	2829	2584	5413
17	Perambalur	1685	332	2017
18	Pudukkottai	2575	1788	4363
19	Ramanathapuram	366	213	579
20	Ranipet	2147	747	2894
21	Salem	3613	2623	6236
22	Sivagangai	2363	869	3232
23	Tenkasi	2172	272	2444
24	Thanjavur	3398	2408	5806
25	The Nilgiris	259	90	349
26	Theni	1728	1068	2796
27	Tirupathur	1185	1287	2472
28	Trichirappalli	3115	1809	4924
29	Thirunelveli	1249	188	1437
30	Tiruppur	7572	4345	11917
31	Thiruvallur	2811	928	3739
32	Tiruvannamalai	6527	1082	7609
33	Thiruvarur	1324	610	1934
34	Thoothukudi	750	255	1005
35	Vellore	1567	605	2172
36	Viluppuram	4366	1621	5987
37	Virudhunagar	874	447	1321
38	Chennai	0	0	0
	Grand Total	**1,00,000**	**50,000**	**1,50,000**

The Government of Tamil Nadu provides subsidy to all agricultural free service connections at a rate of Rs. 3,550 per horse power per annum as fixed by the Hon'ble Tamil Nadu Electricity Regulatory Commission.

The Government of Tamil Nadu will provide subsidy of Rs.6,036.10 crore every year to TANGEDCO, for the existing agriculture service connections including the newly effected 1,50,000 agriculture service connections.

Hon’ble Chief Minister issued orders to the last 5 beneficiaries of 50,000 Agriculture Service Connection at Secretariat, Chennai on 11.01.2023

Further in the year 2022-23, supply was effected to 589 applicants who have registered from 01.04.2014 under special priority category viz., Physically challenged, Widows, Tribes, Inter caste marriage persons, serving and Ex Military Personnel, serving and Ex Para military Personnel who have registered from 01.04.2014.

Additionally, Hon’ble Minister for Agriculture and Farmers Welfare announced the launch of a new scheme called “Kalaignarin All Village Integrated Agriculture Development Programme (KAVIADP)” in 2021–22, which aims to convert fallow land into arable land in the State in order to increase agricultural productivity and farmers' economic standing.

Under KAVIADP scheme, so far 324 Nos. of service connections have been effected.

III. Minnagam

Minnagam, a Centralized Customer Care Centre has been inaugurated by Hon'ble Chief Minister of Tamil Nadu on 20.06.2021 for redressing consumer grievances. Minnagam is operated at the number 94987 94987. Minnagam provides for 37 types of online complaints by the consumers. It is running successfully till now and receiving a very encouraging response from the Public throughout Tamil Nadu. From 20.06.2021 to 31.03.2023, 15,04,970 complaints have been received and 14,97,782 complaints have been redressed. The redressal percentage is 99.5%.

Hon'ble Chief Minister inspected Minnagam on 16.08.2022 and received the 10,00,000th consumer grievance

IV. Appointment of Nodal Officers to all the Constituencies

In accordance with the directives of the Honourable Chief Minister of Tamil Nadu, Nodal Officers for each of the 234 constituencies have been appointed to appraise the concerned Honorable Ministers, MPs & MLAs about the TANGEDCO's works proposed, under execution and completed in the constituency. A procedure has been introduced whereby each nodal officer regularly meets the respective Honorable Ministers, MPs & MLAs to inform them about the works done and the works to be completed.

V. Restructuring of the Organization

With an objective to bring about the balancing the work and administrative process, to implement the Government schemes faster, to ensure uninterrupted quality power supply and also to take immediate action on public complaints, etc., the Hon'ble Minister for

Electricity, Prohibition and Excise has announced on the floor of Assembly during the year 2022-23, that three new distribution regions with headquarters at Karur, Thanjavur and Tiruvannamalai will be formed. Based on the announcements, new regions formed at Karur, Thanjavur and Tiruvannamalai and Hon'ble Chief Minister of Tamil Nadu was inaugurated on 16.04.2022.

Inauguration of 11 new Distribution Divisions on 15.12.2022

In continuation to the above, the Hon'ble Chief Minister of Tamil Nadu inaugurated the 11

new Distribution Divisions with head quarters at viz., Chepauk, Sholinganallur, Pallavaram, Denkanikottai, Pennagaram, Thiruvenneinallur, Uthukuli, Vedasanthur, Jayamkondam, Sattur and Gangavalli on 15.12.2022.

VI. North East Monsoon 2022 and Cyclone Mandous

Due to heavy rainfall in North East Monsoon, Mayiladuthurai, Nagapattinam, Thiruvallur, Vellore, Villupuram, Cuddalore, Chengalpattu, Dindigul and Tiruvarur Districts were severely affected.

The Mandous Cyclone crossed nearer to Mamallapuram at the night of 9th December 2022. Chennai, Kanchipuram, Ranipet, Vellore, Villupuram, Tiruvannamalai, Nilgiris, Chengalpattu and Tiruvallur Districts were severely affected by Mandous Cyclone.

Due to heavy rainfall, the existing sub-Transmission and Distribution infrastructure was severely damaged. The damaged distribution network details are detailed as below.

Sl. No.	Damaged Infrastructures	North East Monsoon 2022	Mandous Cyclone
1.	Poles	768 Nos.	1,134 Nos.
2.	Distribution Transformers	204 Nos.	73 Nos.
3.	Conductors	59.30 km.	28.44 km.
4.	Sub Stations	1 No.	10 Nos.

Due to preventative measures already taken, supply restoration works were carried out immediately, without delay in Sirkazhi, the most severely affected area by the heavy rain on November 11, 2022. With the presence and the guidance of Honorable Minister for Electricity, Prohibition and Excise, the power supply was quickly restored to all the affected areas in Sirkazhi during the North East Monsoon of 2022, within two days. Due to the tireless work of the TANGEDCO Engineers and Staff 324 damaged

poles, 47 distribution transformers, 43.91 km of conductors and defective insulators at 671 locations were replaced.

VII. Pillar Box heightening works in Chennai

Due to water logging in some low lying areas of Greater Chennai corporation area, power outages were a regular occurrence during rainy seasons. Normally, the Pillar Boxes are installed at ground level. Due to water logging, the base of the Pillar Box comes into contact with the stagnant rain water with possible electricity leakage and accidents.

In order to address this problem, it has been planned to raise the existing pillar boxes to about one metre above the ground level in the areas that were severely affected during the rainy seasons. 1,420 Pillar Boxes were identified in such locations under Phase-I and all the Pillar Boxes have been heightened.

4,375 Pillar Boxes were identified under Phase-II, out of which 2,950 Pillar Boxes have been heightened. Balance Pillar Boxes will be heightened before the forthcoming monsoon. Similarly, the plinths of 41 Power Transformers in 19 substations have also been raised to a height of one metre from the ground.

This arrangement will reduce consumer supply interruptions and make supply restoration tasks easier.

VIII. Mass Maintenance Programme in 2022-2023

A special scheme was announced on June 15, 2022 for carrying out maintenance work under the mass maintenance program across Tamil Nadu. In pursuance to the above announcement, mass maintenance works were carried out from 15.06.2022 to 31.07.2022 under 19 categories of works in all the Distribution Sections across the State. During

the above period, 10,77,910 works have been completed.

Regular maintenance works were subsequently carried out totalling 11,23,280 tasks as on 31.03.2023 and were completed.

Thus, as a result of the mass maintenance works, supply interruptions were reduced and the number of trippings also decreased.

IX. Integrated Power Development Scheme (Additional)

Fully automated 33/11 kV Gas Insulated Substations (GIS)

Seven SCADA-integrated fully automated gas-insulated substations, first of their kind in Greater Chennai Corporation area, have been installed and commissioned. These substations have been established at Kannammapet, Damodharan Street, Millers Road, Corporation Colony, Kodambakkam, Vadapalani & Anakaputhur.

X. Over Head to Under Ground Conversion

i. Chennai

In order to avoid accidents due to snapping of conductors and to have safe distribution network, TANGEDCO has decided to convert the existing Over Head Lines (OH) into Under Ground Cables (UG) in and around Greater Chennai Corporation areas with the financial assistance from funding Agency with PFC. The conversion works of over head lines to under ground cables in 12 divisions namely Perambur, Tambaram, Avadi, Adyar & ITC, K.K.Nagar, Porur, Guindy, Anna Nagar, Ambattur, Tondiarpet & Vysarpadi have been commenced.

OH to UG conversion works have been completed in Perambur division with 48.69 km HT cable and 626.63 km LT cable and Avadi division with 90.47 km HT cable and 449.35 km LT cable on 26.06.2022 and 22.08.2022

respectively. The works are nearing completion in remaining 3 Divisions namely Tambaram, Adyar and ITC Divisions.

ii. Nilgris

During natural calamities, in order to provide uninterrupted power supply to public drinking water scheme for Ooty Joint Water Project, work of converting the overhead lines into underground cables are under progress from Parson Veli to Ooty to a length of 13.125 km at an estimated cost Rs. 6.61 crore.

iii. Conversion of Overhead line into Underground Cable during Temple Car Processions

In pursuance to the announcement made by the Honorable Minister for Electricity, Prohibition and Excise on the floor of assembly, conversion of overhead lines to underground cables in the Temple Car Streets has been initiated at Arulmigu Thiyagaraja Temple at Thiruvarur, Arulmigu Andal Thirukoil at Srivilliputhur and

Arulmigu Thanumalayan Temple at Suchindram. Tenders for the underground cable conversion works have been floated and steps are being taken to complete the work at the earliest.

Also, a works contract for Rs 10.82 crore has been awarded for conversion of overhead lines in to underground cables in the Temple Car Streets of Arulmigu Madurai Meenakshi Amman Thirukoil and works are under progress.

XI. Provision of Ring Main Units (RMUs) in Chennai area

In order to minimize the supply interruptions through changeover of supply automatically from one source to another source within seconds, it was planned to convert the existing conventional Distribution Transformer structures into Ring Main Units. Out of 5,692 Nos. identified, 4,654 RMUs have been test charged and 2,704 RMUs have been commissioned. The Hon’ble Chief Minister of

Tamil Nadu during the programme held on 28.09.2022 at Thousand Lights constituency, inaugurated 2,488 RMUs erected in Chennai and its surrounding areas have been connected to the distribution network.

On 28.09.2022, Hon'ble Chief Minister dedicated 2,488 RMUs in 28 constituencies for public use

Inauguration of RMU at Anna Salai near Khadi Bhavan

XII. Action plan to save wild animals in forest area due to electrocution

Out of 38 districts in Tamil Nadu, except 6 districts viz., Tirupur, Madurai, Ramanathapuram, Tiruvarur, Chennai and Tenkasi all other districts have high and low voltage over head lines passing through the forest.

Totally, 1,509 km of HT and 1,255 km of LT bare overhead lines and 19.9 km insulated conductors exist in forest area.

The above over head electric lines were laid in the permitted routes of Forest department and have been in existence for so many years. In the past few years, when elephants move from the forest area to nearby rural/remote villages for various reasons, the death of elephants by hitting electric lines, poles, getting struck in the electric fences erected without

permission has been occurring. In recent times, such accidents have increased.

TANGEDCO is committed to extend power supply to entire State of Tamil Nadu. TANGEDCO is providing power supply to the rural/remote villages in forest and adjoining area by incurring huge expenditure. As electricity is the fundamental need for development of economy of State of Tamil Nadu, the infrastructure of HT/LT lines have been created to uplift the rural areas.

TANGEDCO is already conducting periodical joint inspections with Forest Department officials in the respective jurisdictions and rectification works are being carried out then and there.

Further, announcements are made among the public through newspaper/media, Thandora in villages, issuing of bit notices etc. appealing the public to give information to nearest

TANGEDCO section office, if they come across illegal electrical fencing as it is a criminal offence.

The following works were carried out by TANGEDCO officials since the year 2021, after joint inspections with Forest Department:

1) Re-sagging the lines - 838 locations
2) Insertion of poles in the long span to increase vertical clearance- 295 locations
3) Heightening of the poles – 244 locations
4) Replacement of damaged poles – 128 locations
5) Set right of leaned poles – 6 locations
6) Re-routing of 3.5 km line in Sirumugai village, Uliuyur hamlet, Mettupalayam area.

However, in the recent times, elephants migrated from Forest area to inhabited areas/villages even beyond 60 kms from forest

and have died due to electrocution by illegal electrical fencing.

During last 10 years, out of 79 numbers of electrocutions of elephants have occurred, 48 deaths (61%) have occurred due to electrocution through **Illegal electrical fencing** by the farmers and balance accidents have occurred when the elephants pull tree branches or hit the electric poles.

In this connection, a High-Level meeting was conducted at the Government level, to save the wild animals especially elephants from electrocution.

Accordingly, 10-point Action Plan has been formed by TANGEDCO to save elephants from electrocution and it has been planned to complete the works in one year.

1) Identification of elephant path areas,

2) Regular Intensive joint inspections along with Forest officials to identify vulnerable locations,
3) Raising/Heightening of the existing poles at identified locations,
4) Removal of low sag by re-sagging the lines and insertion of new poles in the long span lines to minimize sagging.
5) Providing spikes or barbed wires around poles to avoid them being pushed by elephants.
6) Replacement of damaged poles/ setting right leaned poles
7) Converting bare Overhead conductors into insulated Overhead conductors
8) Establishment of Distribution Transformer Management System to automatically trip the LT lines at the time of snapping.
9) Formation of Special Teams comprising of 3 line departments at field level viz., Revenue Department, Forest Department

and TANGEDCO to identify illegal electrical fences in forest area through surprise checks.

10) Standard Operating Procedure for erection of solar/electrical power fences and necessary Standards for these fences will be finalised in co-ordination with CEIG, Forest and Agriculture departments, to protect the wild animals as well as the livelihood of the farmers.

XIII. REVAMPED DISTRIBUTION SECTOR SCHEME- (RDSS)

TANGEDCO has proposed to implement RDS Scheme, with the objective of reducing the AT&C losses, reducing the ACS–ARR gap and improving the quality, reliability and affordability of power supply to consumers through a financially sustainable and operationally efficient Distribution Sector. The above scheme consists of two components:

a) Smart Metering

For better Energy Accounting and Auditing, it has been proposed to install smart meters, metering of all the feeders and Distribution transformers with remote communication facility. All the metering works have to be done in TOTEX mode.

b) Distribution infrastructure works

Under Distribution Infrastructure works, there are two parts namely loss Reduction works and Modernisation of distribution infrastructure which are to be carried out. Loss reduction works such as Agriculture Feeder Segregation, establishment of High Voltage Distribution System, Separation of Double DTs using HVDS etc., and Metering works such as Smart Metering, Distribution Transformer metering, Feeder metering and Circle level Boundary Metering works will be implemented.

TANGEDCO has satisfied all the Pre-qualification criteria for sanctioning of Modernisation works under Phase –II of RDS Scheme. Under this scheme, Establishment of New Sub Station, Augmentation of Sub Station, laying of new lines etc. will be implemented.

XIV. Special Initiatives

i. Linking of Aadhaar with Electricity service connection

Linking of individual Aadhaar number with TANGEDCO's service connection numbers has been commenced through online from 15.11.2022 and through Section Office Counters and special counters from 18.11.2022. The great task of linking of Aadhar has been completed successfully. Out of 2.67 crore of eligible consumers, 2.66 crore consumers have linked their Aadhar Number with electricity service connection number.

ii. Tariff change through online

In order to facilitate consumers for easy filing for Tariff change, Online Application portal has been developed for tariff change applications and put into public use from 10.06.2022 onwards, thereby avoiding the visit of public to the section office.

iii. Online refund

Automatic Refund of amount for the cancelled applications has been made easier through online Bank transfer and implemented from 01.12.2022 onwards. Previously, applicants had to apply manually and get the amount through cheque. Henceforth, the applicant will get their refund amount automatically in their account without visiting office.

iv. MRT testing process and raising of Automatic shortfall through Software

This will facilitate in raising shortfall amount due to errors / non-capture of actual final

reading of the released/defective meters. This has resulted in augmentation of revenue to the tune of 2 crore in the last 2 months.

v. Enterprise Resource Planning (ERP)

Use of SAP Enterprise Resource Planning (ERP) has started in TANGEDCO and TANTRANSCO from 05.05.2021. This is significant milestone in the history of TNEB. Materials Management, Finance and control, Human Capital Management, Projects System, Plant Maintenance and Sales & distribution are the Modules included in ERP.

- The Fixed Asset Register of TANTRANSCO up to 31.03.2021 has been fully uploaded in ERP.
- The Fixed Asset Register of TANGEDCO up to 31.03.2021 has been fully uploaded in ERP.

- Received SKOCH Gold award under Power and Energy category in 2022 for ERP implementation.
- Maintenance of Power Transformers and Sub Station equipments of TANTRANSCO are supervised under ERP system. This will facilitate to maintain proper maintenance schedule and to avoid overdue of maintenance, which will improve the efficiency the equipment.

vi. Smart Metering in TANGEDCO

In order to eliminate human intervention in fetching of meter data and to facilitate auto billing, automatic disconnection / re-connection process, a pilot project of smart metering system in T.Nagar area of Chennai is being implemented in TANGEDCO. As the electricity consumed is accurately assessed without any human error, the loss of revenue to TANGEDCO and billing complaints are avoided.

Also, consumers can view their electricity consumption anytime through their mobile app and pay their electricity bills through the online payment system before the due date to avoid disconnection.

Presently, the communication technologies such as radio frequency, cellular are being adopted for smart metering system.

vii. E-receipt downloads from Online portal

Consumers can download e-receipt online for payments made through Online Portal / UPI Apps either paid recently or any old payments, from February 2023.

viii. TANGEDCO Website

The TANGEDCO website was updated in accordance with the GIGW (Guidelines for Indian Government Websites) standards and launched on 23.02.2023.

ix. Solar to Non-Solar Applications

Provision has been given to the consumers to convert their Solar service into non-Solar service through web portal, for reverting to normal billing with effect from February 2023.

x. Redesigned Mobile App for Consumers

With effect from 14.12.2022, an updated mobile payment app with substantial improvements such as OTP-based log in, bill details view, receipt download, and inter design changes has been made available to all consumers.

xi. Facility to lodge Theft of Energy online Complaints

Facility to lodge Theft and Misuse of tariff complaint through Online (anonymous also) was implemented from April 2022. The complaints will be listed for enforcement for further processing.

XV. Energy conservation & DSM measures

i. Activities of TANGEDCO as State Designated Agency (TNSDA) with financial assistance from BEE

- To conserve electrical energy in Govt. Schools and Govt. Hospitals, it is proposed to replace the existing inefficient electrical appliances by energy efficient LED tube lights and BEE's star rated ceiling fans in 103 nos. of Government Schools in Dharmapuri, Sivagangai and Kanyakumari Educational Districts and in 159 nos. of Govt. Primary Health Centres in Kovilpatti, Nagercoil, Dharmapuri and Ariyalur Districts which will result in saving of about 5.3 lakh units / year and 5.75 lakh units / year respectively.

- In the same manner, replacements are being done in 2 villages (Karenthal & Othayal) in Ramnad and Virudhunagar

districts where energy saving of about 43,000 Units/year is expected.

- Awareness programmes on Energy Conservation (EC) was conducted for 1,913 farmers in 25 Districts (29 EDCs) during 2022-23. Further programmes are planned for 2023-24 for farmers in the remaining districts.

- In order to reduce energy consumption in commercial buildings and to make the buildings energy efficient, Tamil Nadu Energy Conservation Building Code Rules, 2022 were prepared by TNSDA (TANGEDCO) and submitted to GoTN and the same were notified vide G.O No.71 on 27.12.2022.

- **Electric Vehicle:** TANGEDCO has been appointed as State Nodal Agency (SNA) for promotion of installation of Public Charging

Stations (PCS) across the state for Electric Vehicles (EV).

- **Perform Achieve and Trade (PAT) scheme:** 81 nos. of industries have been identified as Designated Consumers (DCs) and target for reduction in Specific Energy Consumption (SEC) fixed by BEE in various PAT (PAT cycle - I to VII(A) cycles. The reduction in SEC as per target fixed is monitored and verified at the end of the respective PAT cycle. In continuation, BEE with the assistance of TNSDA is in the process of identifying more industries for carrying out baseline audit verification for inclusion in the upcoming PAT cycles.

- 937 nos. Energy clubs were established as on 31.01.2023 in Government High and Higher Secondary Schools in 28 districts (30 EDCs) with an enrolment of 29,538 students, to create awareness on energy

conservation among the students and about 100 nos. of Energy clubs are proposed to be established in 8 more districts (14 EDCs).

- 28 nos. of one day Retailer Training Programmes (RTP) on Star labelling of Home appliances were conducted benefitting about 565 sales persons / technicians along with general public in Chennai and Trichy districts. Further 28 programmes have been proposed at Madurai, Salem, Erode and Chennai districts.

- In respect of creating awareness on energy conservation and energy efficiency in electrical appliances among the officials of government departments, 38 one day awareness programmes were conducted for TWAD, Municipal Administration,

Greater Chennai Corporation and CMWSSB officials (901 participants).

ii. Energy Conservation Measures

Prevention of Energy Theft

TANGEDCO has formed 21 Enforcement Squads, 1 number Intelligence Wing and 1 number flying squad comprising of TANGEDCO employees 43 teams of Ex-servicemen for surprise inspection and detection of theft of energy in Electricity Distribution Circles.

During the year 2022-23, provisional assessment and compounding charges amounting to Rs. 63.81 crore has been levied upon the consumers involved in theft of energy.

XVI. Human Resources Development

Human Resource Development (HRD) Wing is imparting various types of training to all the officers / staff of TANGEDCO / TANTRANSCO regularly throughout the year to enhance /

upgrade their technical / functional / management skills for the excellence of the organisation. Training is imparted continuously to the Engineers / Officers / Staff of TANGEDCO / TANTRANSCO through 4 Training Institutes and 11 Training Centers.

Annual Training Programme for the year 2022-23 were conducted in 1,185 batches for 44,852 employees. Apart from the regular Annual Training Programmes, training classes funded by the REC Institute of Power Management & Training (RECIPMT) and National Power Training Institute (NPTI) are organized for the benefit of the board employees for 474 employees in 15 batches.

Training programmes on “Energy efficiency and its conservation measures” were conducted for officers / Technicians of Municipal Administration Department, Greater Chennai

Corporation and Chennai Metropolitan Water Supply & Sewage Board.

XVII. Research & Development

TANGEDCO has established one stationary lab and two numbers of mobile labs each at Tirunelveli and Udumalpet for testing of energy meters and CTPT at a cost of around 12 crore. NABL accreditation has been obtained for the labs at Chennai and Tirunelveli during 2022-23, for Testing and Calibration of Energy meters for the first time in TANGEDCO. In these labs, Testing and Calibration for all types of Energy meters has been facilitated with high accuracy and precision.

A new laboratory to carry out test on transformer oil was proposed at Chief Engineer Distribution Office, Madurai at an estimated cost of Rs. 3.13 crore (approx.). Civil Works have been completed and the process of procurement of lab equipment is going on.

XVIII. Wage Revision

The Tamil Nadu Electricity Board has been formed in the year 1957 (01.07.1957) under the Electricity Supply Act 1948.

After formation of Tamil Nadu Electricity Board, the scale of pay have been fixed every 5/4 years based on the provisions under the Industrial Disputes Act, 1947, after making elaborate discussions with the Trade Unions / Association. Accordingly, for the past years, the Workload and Wage Revision Settlement have been made in Tamil Nadu Electricity Board (at present TANGEDCO) up-to 2015.

So far 11 settlements have been made and signed between the Trade Unions and Management since 1969 to 2015 for revision of pay for the Officers / Employees.

Now, the Wage Revision is due from 01.12.2019. The Wage Revision Committee has

been constituted vide (Per) FB TANGEDCO Proceedings No. 224, (SB) dated 07.12.2019. The Wage Revision committee members have conducted meetings along with Trade Unions on 15.09.2022, 16.09.2022, 21.09.2022 and 09.01.2023. As insisted upon by the Union, the Board had given a proposal with regard to Wage Revision on 10.01.2023. Thereafter discussions were held with the Unions / Associations on 24.01.2023, 25.01.2023 and 24.03.2023. During the discussion on 24.03.2023, the Unions have raised the various demands with regard to the Wage revision & others related demands and requested to submit the Board's proposals regarding Wage Revision.

Based on the Trade Unions request, the Wage Revision Committee Members have given the TANGEDCO proposal to the Trade Unions on 27.03.2023 and requested to furnish the views regarding the proposal within 7 days. Certain

Unions/Associations have submitted their views. On considering the views of the Trade Unions/Associations, decision will be taken at the earliest in consultation with the trade unions.

XIX. Sustainable Development Goals (SDG)

SDG consists of 17 goals and 169 related targets to be achieved by 2030. Out of 17 goals, Goal 7 pertains to Energy Department. The goal 7 is "Ensure access to affordable, reliable, sustainable and modern energy for all". Goal 7 comes under Working Group 5 "Innovation, Industrialisation and Sustainable Development". The Principal Secretary to Government, Industries department is Chairperson of this working group.

Important targets and the indicators

- Access to affordable, reliable and modern energy services.

  Percentage of Households electrified.

For the above indicator, TANGEDCO has achieved the target 100%.

With the policy of Leaving No One Behind (LNOB), TANGEDCO has electrified the households in remote/forest area habitations through solar Roof Top System since conventional mode of electrification is not possible in these areas.

- Increase substantially the share of renewable energy mix

  Renewable Purchase Obligation (RPO) achieved (%)

The value of this indicator for the year 2021-22 is 20.88%. In order to achieve the target, various projects such as establishment of 20,000 MW solar parks, establishment of 14,500 MW pumped storage hydro-electric projects etc., have been proposed and works are under progress for implementation.

- Double the global rate of improvement in energy efficiency.

In order to monitor the progress of the ongoing schemes related to these indicators, GoI has introduced a framework namely, Output Outcome Monitoring Framework (OOMF) to monitor the performance of the schemes mapped with these indicators.

1.5 Finance

I. TANGEDCO

- TANGEDCO has been continuously incurring revenue losses mainly due to gap between average revenue realisation and average cost of supply. The increase in power purchase cost, fuel cost, interest expenses, employees benefits, etc. are not recovered through tariff charged on the sale of power to the consumers.
- During the previous four years the total revenue, total expenditure and revenue loss incurred by TANGEDCO are tabulated below:

(Rs. in crore)

Elements	2018–19	2019–20	2020–21	2021–22	2022–23 (B.E)
Total Revenue	61,666.73	65,177.10	63,388.52	70,447.44	70,097.08
Total Expenditure	74,290.14	77,142.03	76,795.84	82,402.08	77,683.37
Revenue Loss	–12,623.41	–11,964.93	–13,407.32	–11,954.64	7,586.29

- The revenue loss of TANGEDCO is expected to be Rs.7,825 crore for the FY 2022-23.
- Due to cumulative losses, TANGEDCO has availed loans from various Financial Institutions and Banks which resulted in loans outstanding of about Rs.1,44,000 crore as on 31.03.2023.
- In order to improve the financial position of TANGEDCO, the Government of Tamil Nadu is continuously providing financial assistance in the form of Equity Share Capital, Tariff Subsidy, Grants towards funding of loss, etc.

- During the financial year 2022-23, the Government of Tamil Nadu has provided a financial assistance in the form of Tariff subsidy of Rs.13,783.68 crore, Loss funding grant of Rs.12,315.36 crore and for other financial assistance Rs.437.00 crore.
- In order to further improve the billing and collection efficiency, efforts are being made to install Smart meters, replace the defective meters, ensure 100% assessment, disconnect the defaulted services, control improper use of energy, enhanced online payment usage, etc.
- TANGEDCO has facilitated its consumers to make payment of current consumption charges through various modes viz., net banking, Bharat Bill Payment System, e-Seva Centres, Post offices, Payment Gateways, Debit Card/Credit Cards, bank counters, ATMS, etc. TANGEDCO has

collected 74% of the total revenue through digital modes. In view of the above facilities extended to the consumers, TANGEDCO's collection efficiency stands at more than 99%, which is highest in the country.

- TANGEDCO has developed a Dashboard for local bodies and Government Departments to enable them to monitor the dues to TANGEDCO and facilitate them to make payment flexibly. Further, in order to optimize the cost of supply of power, several cost cutting measures are being taken up such as Merit Order Dispatch on power purchase to avail cheaper power, Interest rate reduction by swapping of high cost loans, improving the ratings for cheaper rate of interest, continuous monitoring for timely completion of projects, etc.

- Further, mobilisation of funds through the issue of Bonds on Private Placement basis to the tune of Rs.7,605 crore at lower coupon rate is under process for repayment of high cost loans to save interest burden.
- The Government of Tamil Nadu has also provided Government Guarantee of Rs.6,000 crore for availing loan facility from Financial Institutions.

II. Salient features of New Tariff

- The subsidy commitment of Government of Tamil Nadu, due to revision of tariff with effect from 10.09.2022 has increased by Rs.4000 crore per annum. 100 units of free supply is being continued for all domestic consumers and free supply for Agriculture and Hut consumers is also being continued. Subsidy in the form of reduction in tariff to Domestic, Handloom,

Power loom and Places of Worship consumer categories are being continued.
- Fixed charges for Domestic consumers have been withdrawn and they are charged single part tariff only.
- Free electricity of 200 units for two months to the Handloom weavers, has been enhanced to 300 units, which will result in an additional subsidy commitment of Rs.8.41 crores per annum to the Government. Due to this enhancement, 73,642 Nos. of Handloom weavers will be benefitted in Tamil Nadu.
- Free electricity for two months for Power loom weavers has been enhanced from 750 units to 1000 units and the reduction in tariff of 35 paise for units 1001 to 1500 bimonthly and 70 paise for units above 1500 bimonthly has been effected resulting in the additional subsidy commitment of Rs.53.62 crores per annum

to the Government of Tamil Nadu. Due to this enhancement of 750 units to 1000 free units and reduction in tariff, 1,68,000 Nos. of Power loom weavers will be benefitted in Tamil Nadu.

- Further, Time of the Day (ToD) peak hour charges have been reduced from 25% to 15% for Low Tension MSME Industrial consumers. Due to this reduction there would be additional subsidy commitment of Rs.145 crore per annum to Government of Tamil Nadu and around 3.37 Lakhs industries will be benefitted.

III. TANTRANSCO

The main activity of TANTRANSCO is the transmission of electricity from the generating station to distribution network. TANGEDCO is the major customer which contributes to about 80% of the total revenue of TANTRANSCO.

TANTRANSCO has incurred losses during the past 7 out of 10 years due to which the accumulated losses have increased to Rs.6,796.34 crore as on 31.3.2021. The provisional losses for the financial year 2021-22 has been estimated as Rs.1,871.16 crore.

The year-wise Revenue account details for the past 4 years are as below:

Financial Years	Revenue Receipts (Rs in crores)	Revenue Expenditure (Rs in crores)	Revenue Gap (Rs in crores)
2018 – 19	3,224.63	3,859.54	-634.91
2019 – 20	3,366.22	4,440.70	-1,074.48
2020 – 21	3,391.06	5,141.62	-1,750.56
2021 -22 (Provisional)	3336.69	5207.84	-1871.16
2022-23 (Provisional)	4,489.33	5,352.74	863.41

In order to improve the financial position of TANTRANSCO, it has been planned to take up measures on cost control aspects such as

savings in interest on loans, reduction of expenditure in certain areas, etc.

IV. Savings Achieved

TANTRANSCO is availing financial assistance from various financial institutions. viz. REC, PFC, IREDA and other institutions for executing certain transmission Projects. The outstanding loan as on 31.03.2023 is Rs. 24,211.64 crore.

Due to the continuous effort taken by TANTRANSCO, the above institutions have offered reduction in interest rate. Due to this, TANTRANSCO will save interest on loan to the tune of Rs. 148 crore over a period of one year.

V. Indian Accounting Standards (IND AS)

The financial statements of TANGEDCO & TANTRANSCO ought to be prepared in compliance with Indian Accounting Standards (IND AS) as per the Companies Act provisions

from the financial year 2017-18 onwards. In order to implement IND AS, consultant has been appointed. For TANGEDCO the progress so far reached is 97 % and was completed for TANTRANSCO. By implementing IND AS, the rate of interest charged by REC and PFC will be reduced.

1.6 SAVINGS ACHIEVED

Through consistent efforts to reduce costs, TANGEDCO and TANTRANSCO were able to save **Rs. 1,090 crore in 2022–2023** by reducing the O&M cost in Thermal Stations, coal handling charges, CTU charges, loan interest rates, effective transport of coal from load port, enhancement of discharge quantity of coal, sale of fly ash and power swapping arrangements.

2. Tamil Nadu Energy Development Agency (TEDA)

Introduction

Energy demand has been increasing steadily along with the development of the State. In view of the limited conventional energy sources and their limited exploitation and increasing environmental pollution, production of energy based on New and Renewable energy sources is being promoted and given high priority.

Tamil Nadu Energy Development Agency (TEDA), an independent agency established by the Government of Tamil Nadu with a specific purpose to create awareness and migrate the State from use of conventional fossil fuel to renewable energy for their electricity needs. TEDA is also shouldering the responsibility as a State Nodal Agency (SNA) of the Ministry of New and Renewable Energy Sources (MNRE) and

playing a major role in the implementation of State and Union Government schemes pertaining to Renewable energy.

In ccontributing promotion of Renewable Energy in Tamil Nadu, TEDA has successfully implemented around a cumulative capacity of 76.28 MW of medium and small solar projects, which include 59.28 MW in domestic rooftop solar PV systems and 17 MW demonstration wind projects.

TEDA also creates awareness on use of renewable energy and functions as an integrator platform for all stakeholders of the renewable energy in the state of Tamil Nadu.

Energy Scenario in Tamil Nadu

Tamil Nadu has been one of the early proponents of clean energy and is at the forefront of India's clean energy transition. With the State government's endeavour to become

energy self-sufficient, there is great opportunity for solar energy generation across segments- rooftop, large-scale solar parks, wind-solar hybrid projects

Tamil Nadu has achieved significant success in providing 24×7 power to all. The State is also recognised for its transformative climate action.

Major Programmes and Projects

TEDA has been in the forefront of implementation of Renewable Energy Programmes in the State. On the direction of the Government, several initiative programmes, flagship schemes and Socio-Economic Benefit programmes have been conceived and implemented by TEDA. The major programmes being undertaken by TEDA are detailed below:

Grid Connected Rooftop Solar PV System – Phase II (*for residential consumers*)

TANGEDCO has been nominated as the State Implementing Agency for Phase – II of Grid Connected Rooftop Solar Programme of MNRE, to install Rooftop Solar PV systems for residential consumers. TANGEDCO entrusted the work of empanelment of vendors for a cumulative capacity of 12 MW. Tenders have been finalized and empanelment of vendors have been completed. 1714 applications have been received for a capacity of 6066 kW and 505 services have been effected for a capacity of 1978 kW. The programme is implemented with subsidy up to 40% from MNRE. The programme is valid up to 19.01.2024 and the target of 12 MW is expected to be completed by July 2023. Around 4000 consumers will be benefited from the programme.

On completion of the programme, additional Rooftop Solar PV systems for a capacity of 50MW will be implemented with MNRE subsidy during 2023-24. Around 20,000 residential consumers are expected to avail the benefit of the scheme.

(3+1) kW Rooftop Solar PV System installed at Madurai under GCRTS – Phase II

Grid Connected Rooftop Solar PV System (*Government office buildings*)

Solar PV systems will be installed on the top of building roofs of Government offices, educational institutions, State run industrial units to generate electricity. As these beneficiaries are high tariff paying consumers, adoption of solar power would be economically beneficial. The power generated through Rooftop Solar plant would result in significant reduction of the electricity bill.

Rooftop Solar Power Plants on the building roofs of Government offices like District Collectorates, TNSTC, Court complexes etc, Educational institutions (universities, schools), State run industrial units, places of worship for a cumulative capacity of 20 MW has been programmed for year 2023-24. TEDA has identified various Government office buildings

for a cumulative capacity of 10.8 MW. Tenders have been called for and opened on 28.03.2023.

The scheme will be implemented under CAPEX business model. In the capex model, the beneficiary contributes the entire capital investment and own the Rooftop Solar PV system. TEDA will be responsible for installing the system and initial Comprehensive Maintenance for a period of five (5) years. The systems will be connected to the TANGEDCO's grid under Net billing feed-in tariff methodology.

So far, TEDA has facilitated installation of Rooftop Solar Power Plants in the office buildings like Periyar University, Zonal Transport Office, Chennai, V.O.C Port Trust etc.,

300 kW Rooftop Solar PV system at Periyar University

Solar Powered Street Lights

Solar Powered Street Lights will be arranged to be installed in Government office complexes, educational institutions and State-run industrial units. TEDA has facilitated installing of solar powered street lights in the following locations based on the requests from beneficiary departments:

- Tamil Nadu Herbal Farms and Herbal Medicine Corporation (TAMPCOL) – 50 Nos.

- Check posts of Prohibition Enforcement Wing (PEW) – 40 Nos.

Solar Powered Street Lights, TAMPCOL, Chennai

Solar Powered Electric Vehicle Charging Station

Tamil Nadu Energy Development Agency (TEDA) being the State Nodal Agency for promoting renewable energy projects in the state has one solar powered EV charging station of a capacity of 25 kW at the DPI complex on pilot basis and is available for the general public to charge their electric vehicles.

25 kW Solar Powered EV Charging Station, DPI Complex, Chennai

Wind-Solar-Battery Energy Storage System

To harness both Solar and Wind energy and to provide support in meeting the peak energy demand, it has been proposed to install 1 (one) wind-solar-BESS hybrid plant at TEDA's land at Kayathar village, Thoothukudi district. In the first phase a ground mounted solar power plant with a capacity of 2 MW will be intercropped between the existing wind mills which will be repowered in the second phase. 1 MW Battery Storage system will be added in the third phase.

3. ELECTRICAL INSPECTORATE

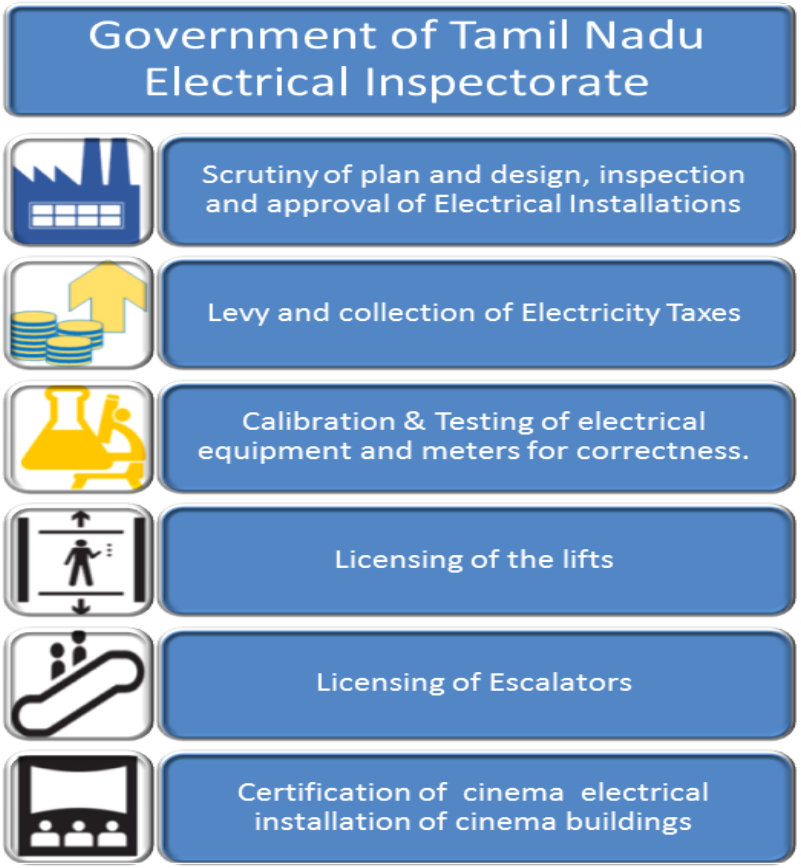
3.1 Introduction

The Electrical Inspectorate is a statutory body created under the Indian Electricity Act, 1903, which is the foremost Act concerning Electricity. Following the establishment of the Tamil Nadu Electricity Board, the Electrical Inspectorate was reorganized and the Chief Electrical Inspector to Government was appointed as the Electrical Inspector throughout the State of Tamil Nadu, including the areas of the Tamil Nadu Electricity Board, with effect from 7th September 1961. The Electrical Inspectorate, with the Chief Electrical Inspector to Government as the Head of the Department, was under the administrative control of the Public Works Department until 31st July 1993. After the formation of the Energy Department on 1st August 1993, the Electrical Inspectorate came under its administrative control. The Chief Electrical Inspector heads the Electrical Inspectorate and he is assisted by Senior Electrical Inspectors at the circle level and Electrical

Inspectors at the district level. The primary responsibility of the Electrical Inspectorate is to ensure the safety of electrical installations as per the provisions of Section 53 of the Electricity Act, 2003, and the regulations made under it, thereby minimizing danger to human lives, animals, and damage to property.

In addition to its primary responsibility of ensuring the safety of electrical installations, the Electrical Inspectorate also has the responsibility to implement safety provisions relating to lifts and escalators, and cinemas under State Laws. Furthermore, the Electrical Inspectorate is responsible for the levy and collection of electricity tax under the State law on electricity tax.

3.2 SERVICES RENDERED BY ELECTRICAL INSPECTORATE



3.3 STATUTORY FUNCTIONS, ROLES & RESPONSIBILITIES

3.3.1 Electrical Installations

The Electrical Inspectorate has been assigned several crucial duties and functions to ensure compliance with the Central Electricity Authority (Measures relating to Safety & Electric Supply) Regulations, 2010. These duties and functions include:

i. Conducting inspections and providing approvals for the electrical installations of High-Tension service connections, Wind Energy generating stations, Independent Power Projects, and Captive Power Projects.
ii. Carrying out inspections and providing approvals for Generating Stations, Sub-Stations, Distribution transformers, transmission lines, and distribution lines of TANGEDCO/TANTRANSCO.

iii. Conducting inspections and providing approvals for Multi-Storeyed buildings.
iv. Conducting periodical inspections to verify satisfactory maintenance of electrical installations.
v. Conducting investigation of electrical accidents and suggesting remedial measures or recommendations to avoid such accidents in future.

Through these responsibilities, the Electrical Inspectorate aims to make electrical installations safe and reliable besides preventing electrical accidents.

3.3.2 VVIP Visits and Public Functions

In addition to its regular duties, the Electrical Inspectorate is also responsible for inspecting and certifying temporary electrical installations that are set up for events involving VVIPs such as the Hon'ble President, Hon'ble Vice President, Hon'ble Prime Minister, Hon'ble

Governor, Hon'ble Chief Minister, as well as other public functions where large crowds are expected to gather. The purpose of these inspections is to ensure the safety of the electrical installations and prevent any potential accidents.

3.3.3 Cinema Installations

To ensure the safety of cinemagoers, the Tamil Nadu Cinemas (Regulation) Act, 1955 and Rules, 1957 have stipulated specific safety requirements for cinemas. The Electrical Inspectorate is responsible for carrying out the following duties under these rules:

a) Issuing Drawing Approvals for the electrical installations of cinema premises.
b) Inspecting and issuing Electrical Certificates for all cinema theaters.
c) Conducting annual inspections of cinemas.

Through these duties, the Electrical Inspectorate aims to ensure that all cinema theaters in Tamil Nadu comply with the safety regulations, and that the cinema theaters are safe and reliable for the cinemagoers.

3.3.4 Lifts and Escalators

The Tamil Nadu Lifts Act, 1997 was enacted by the Government of Tamil Nadu to ensure the safe erection, maintenance, and operation of lifts. In 2017, the Act was amended to include escalators. Under the Tamil Nadu Lifts and Escalators Act, 1997 and its associated rules, the Electrical Inspectorate performs the following activities to protect individuals who use lifts and escalators:

a) Issues Erection Permissions for lifts and escalators.

b) Inspects and issues licenses for the commencement of lift and escalator operations.
c) Conducts periodic inspections and renews licenses to ensure the continued safe operation of lifts and escalators.
d) Issues authorizations to companies responsible for erecting, maintaining, inspecting, and testing lifts and escalators.

Through these activities, the Electrical Inspectorate aims to promote the safety of lift and escalator users, and ensure that all operations adhere to the rules stipulated under the Tamil Nadu Lifts and Escalators Act.

3.3.5 Electricity Tax

The Tamil Nadu Tax on Consumption or Sale of Electricity Act, 2003 (Tamil Nadu Act No.12 of 2003) was introduced to consolidate and rationalize laws concerning the taxation of electricity consumption or sale in the state of

Tamil Nadu. This act repealed the Tamil Nadu Electricity Duty Act, 1939 and the Tamil Nadu Electricity (Taxation on Consumption) Act, 1962. The Act came in to force from 16th June 2003.

Under this Act, the Government has assigned TANGEDCO with the responsibility of collecting taxes on the consumption of electricity from captive generators and IEX purchases. Through this provision, the Government aims to streamline and simplify the taxation process, while ensuring that all stakeholders comply with the regulations set forth in the Act.

3.3.5.a The Government has notified the following rates of electricity taxes for sale or consumption of electricity:

S. No.	Category	Rate of Tax	Tax collected by
1	Electricity sold by Licensee (TANGEDCO) to consumers	5% on the Consumption Charge	TANGEDCO
2	Electricity Sold by Captive Generating Plants to Consumers	5% on the Consumption Charge	Electrical Inspectorate
3	Consumption of Electricity by Captive Generating Plants including standby Generators (DG sets) for Own Use & IEX purchase	10 paise per unit of electricity consumed	TANGEDCO

3.3.5.b Exemption Categories

The following categories are exempted from electricity tax:

1. Electricity sold to the Government, local authorities, and railways.
2. Electricity sold for agricultural purposes and for hut service connections.
3. Electricity sold to domestic consumers
4. Electricity sold to TANGEDCO.

5. Electricity sold to and consumed by companies set up under various policies, such as Special Economic Zone Policy, Industrial Policy, Solar Policy, Data Centre Policy, and Electric Vehicle Policy.

3.3.6 Government Electrical Standards Laboratory

The Government Electrical Standards Laboratory (GESL) is a highly respected laboratory that provides calibration and testing of meters, and instruments. It is attached to the Office of the Chief Electrical Inspector to the Government and serves a wide range of clients, including consumers, electricity suppliers, generating companies, and electrical contractors.

To ensure that GESL continues to provide world-class calibration services and to facilitate the mutual acceptance of results and measurement data, the Government has allocated Rs.1.5 crore for obtaining accreditation

from the National Accreditation Board for Testing and Calibration Laboratories (NABL) and to purchase precision calibration equipment. Most of the equipment have already been procured, installed, and commissioned in 2020-2021.

In addition, the Government have re-allocated the unspent Rs.10 lakhs in 2021-2022 and Rs.5.46 lakhs in 2022-2023 to obtain accreditation from NABL. An audit for compliance with ISO 17025 was conducted on 17-12-2022 and 18-12-2022 by NABL and certificate of accreditation has been received (certificate No. CC-3520, valid from 31.01.2023 to 30.01.2025)

3.3.7 Electrical Licensing Board

Regulation 29 of the Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations, 2010 mandates that all electrical installation works must be carried out by licensed contractors and

workmen. In Tamil Nadu, the Electrical Licensing Board (TNELB) is the competent authority designated to issue licenses to electrical contractors and grant certificates of competency to wiremen and supervisors. This ensures that all electrical works are carried out by licensed contractors and certified personnel.

The TNELB issues electrical contractor licenses classified into four grades, namely ESA, EA, ESB, and EB, based on the contractor's competency in handling voltage levels.

3.3.8 Number of Electrical Contractor Licenses and Competency Certificates issued up to March-2023.

S.No.	License / Competency Certificate	Numbers
1.	Electrical Contractor Super "A" Grade License	472
2.	Electrical Contractor "A" Grade License	2562
3.	Electrical Contractor Super "B" Grade License	2709

4.	Electrical Contractor "B" Grade License	22198
5.	Supervisory Competency Certificate	60573
6.	Wireman Competency Certificate	150975
7.	Wireman Helper Competency Certificate	28252
8.	Power Generating Operator License	377

3.4 PERFORMANCE

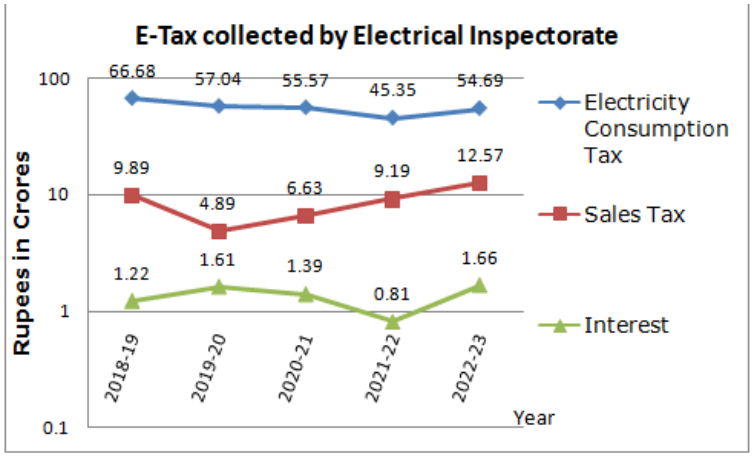
3.4.1 The following is a summary of the Department's performance for the financial years 2021-22 and 2022-23.

Sl. No	Services Rendered by TNEI	2021-22	2022-23
a)	Lifts & Escalators		
	(i) Issue of licences for new lifts	2,153	2,877
	(ii) Issue of licences for new escalators	247	164
	(i) Renewal of licences for the existing lifts	5,589	11,626
	(ii) Renewal of licences for the existing escalators	-	4

(b)	Issue of permissions for electrical installations under Regulation 43	2,025	2,760
(c)	Statutory Periodical inspections of High-Tension installations under Regulation 30	4,496	4,603
(d)	Scrutiny of drawing proposals for the new Electrical Installations and additions/alterations of equipment in the existing installations	1,522	2,142
(e)	Issue of permissions for generating units under Regulation 32	1,298	1,454
(f)	Issue of permissions for Multi Storeyed Buildings under Regulation 36	173	216
(e)	Cinema Theatres		
	(i) Existing cinema theatres	856	902
	(ii) Certification of Electrical Fitness to new cinema buildings	32	66
	(iii) Renewal of certification of Electrical Fitness to existing cinema buildings	313	302
(f)	Testing and calibrations of electrical meters	3,787	5,862

3.4.2 REVENUE

I. Tax Collected by Electrical Inspectorate:



II. Tax Collected by TANGEDCO Limited:

Tax collected by TANGEDCO Ltd	Total amount collected (Rupees in Crore)	Amount deposited into Government account (Rupees in Crore)
2018-2019	1279.29	522.82
2019-2020	1266.04	479.96
2020-2021	1102.09	400.00
2021-2022	1387.73	400.00
2022-2023 (upto Jan-23)	1704.28	Nil

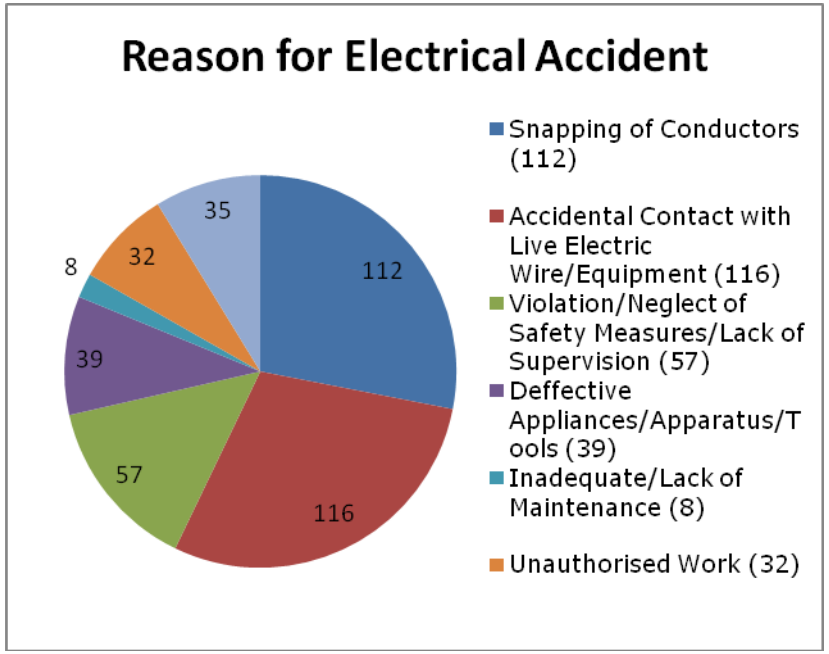
By means of G.O. Ms. No. 121, Energy (B1) Department, dated December 23, 2010, the Government entrusted TANGEDCO Limited with the responsibility of collecting E-Tax from captive generating plants on their own electricity consumption, as required under section 3(1)(b) of the Tamil Nadu Tax on Consumption or Sale of Electricity Act 2003.

In a subsequent G.O. Ms. No. 55, Energy (D2) Department, dated October 20, 2021, the Government expanded TANGEDCO's duties to include the collection of tax on electricity purchased through open access from energy exchanges IEX and PXIL, as mandated under section 3(1)(c) of the same Act.

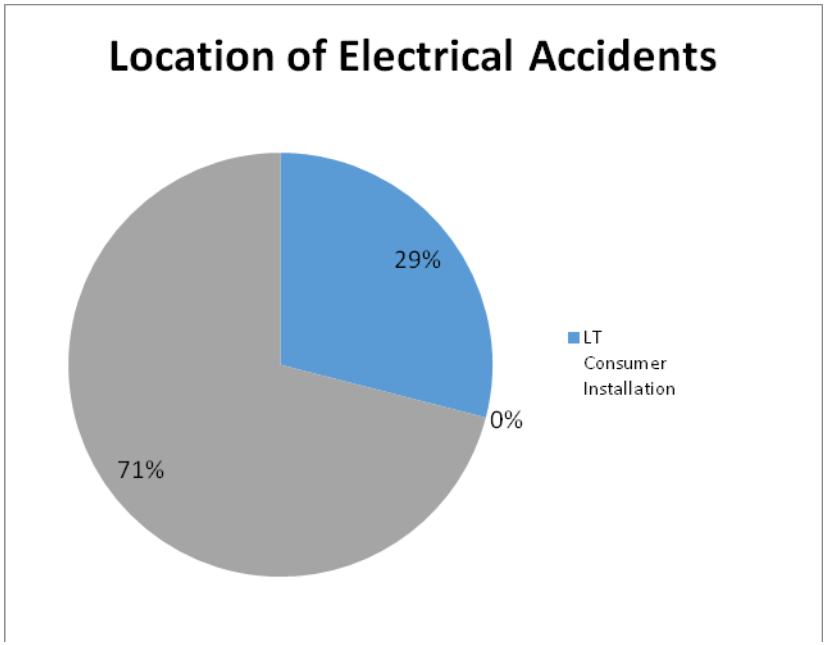
As a result, TANGEDCO's Superintending Engineer circles are collecting E-Tax in both categories, while the Chief Electrical Inspector to

the Government oversees revenue realization on behalf of the government.

3.4.3 ANALYSIS OF ELECTRICAL ACCIDENTS OCCURRED DURING 2022-2023



Total number of Accidents – 399



Total number of Accidents - 399

3.5 E-GOVERNANCE:

The Electrical Inspectorate's website, https://www.tnei.tn.gov.in is a user-friendly and informative portal that provides citizens with access to all the information they need. The department's website features an easy-to-use content management system, allowing for the swift dissemination of up-to-date information to users. Moreover, the website voluntarily provides information in compliance with the Right to Information Act.

The offices of Electrical Inspectorate are equipped with internet access and the necessary information and communication technology infrastructure to offer all departmental services online. To promote transparency in governance, the department has implemented the "Online Lift and Escalator License Management" system. This system enables applicants seeking new or

renewal of licenses for lifts and escalators to apply online, monitor their application status, and receive their license online in a seamless process, thereby eliminating the need for manual procedures and achieving doorstep delivery of services.

3.6 Ease of Doing Business, Ease of Living & Business Reforms Action Plan

As a part of reforms aimed at fostering an investor-friendly and hassle-free environment, this department has launched six of its services related to electricity safety measures as end-to-end e-service delivery through the single-window portal of Guidance. These include the (i) approval of electrical drawings, (ii) issuance of safety certificates, (iii) permission to erect lifts, (iv) licensing of new lifts, (v) permission for modifications to existing lifts, and (vi) renewal of lift operation licenses.

3.7 FUTURE SCENARIO

The Electrical Inspectorate is committed to embracing technological advancements and delivering services in a timely manner, while aligning its functions and responsibilities with the forward-thinking and transformative reforms introduced by the Government for the betterment of the public.

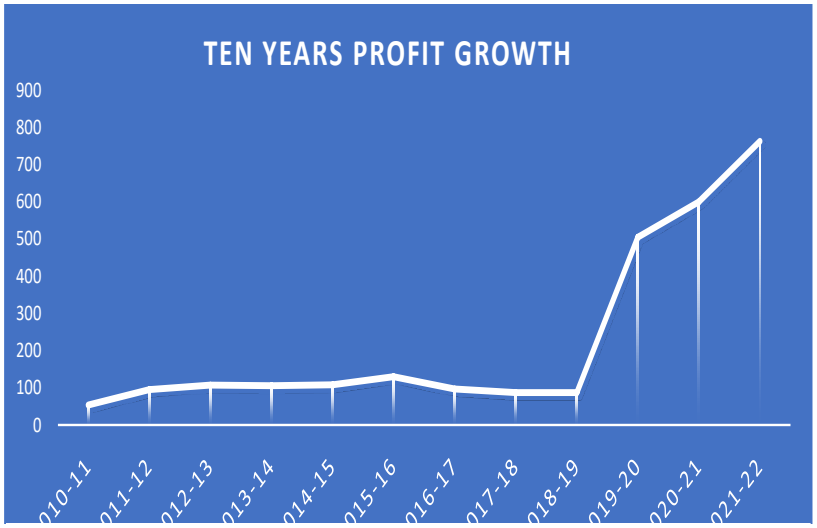
4. TAMIL NADU POWER FINANCE AND INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.,

The Tamil Nadu Power Finance and Infrastructure Development Corporation Ltd. (TNPFIDCL), wholly owned State Public Sector undertaking incorporated in 1991 as a Non-Banking Finance Company (Deposit). The company's Paid-up Capital is Rs.3,767 crore. The company mobilizes funds primarily through public deposits and has been funding Infrastructure projects undertaken by TANGEDCO. At present, the Company's total loan exposure is Rs.45,859.62 crore.

Financial Performance:

The sound financial and professional management of the Company has lead to a profit-making Company since its inception. The total provisional revenue of this Company during the financial year 2022-23 is Rs.4,800.18 crore.

The provisional Net Profit after tax of the Company for the 2022-23 is Rs.761.71 crore. In order to reinvest Profit for maintaining CRAR necessitated by the withdrawal of exemption by RBI to Government Company, the dividends have not been declared for the year 2020-21 and 2021-22.



Exposure to TANGEDCO:

Since inception, the total financial assistance provided to TANGEDCO for its generation of power and its related projects by way of long-term loan and short-term loans is Rs.2,15,362.99 Crore. The net loan outstanding from TANGEDCO is Rs.45,859.62 crore.

Fixed Deposits:

The Fixed deposits are mobilized from public, Institution, Government departments and the State Government under various Schemes such as cash incentive scheme, Bread-winning scheme, Chief Minister's Girl Child Protection Scheme, Oru Kala Pooja Scheme and Covid-19 Scheme. The company offers interest on average 200 basis points more than the interest rates offered by the public sector banks. Even at the time of pandemic situation, the steady growth of deposits was possible due to focused policies and attractive interest rates on term

deposits during the financial year 2022-23. TNPFIDCL offers an attractive interest rate of 6.75% on term deposits for one year, 7.00% for deposits for 2 years, 7.50% for deposits for 3 and 4 years and 7.75% for tenure up to 5 years. The Company offers an additional interest of 0.25% p.a. for one year and two years and 0.50% p.a. from 3 to 5 years term for senior citizens with age of 58 years and above. This Corporation has mobilized deposits of Rs.38,368.35 crore during the year 2022-23.

Corporate Social Responsibility (CSR)

As per section 135 of the Companies Act,2013 read with rule 9 of the Companies (Accounts) Rules,2014, CSR activities shall be undertaken by the Company as per CSR policy and the Company shall spend, in every financial year, at- east 2% of the average Net Profits of the Company made during the last three financial years. During 2022-23, the Company

has spent Rs.14.43 crore focusing mainly on sanitation projects in schools and health centers.

Software Upgradation:

During the financial year 2020-21, TNPFC has upgraded the Core banking Financial Service Software in line with the RBI's IT Policy Framework and Directives. Upon implementation of this Software, TNPFC is offering 24 hours a day and 7 days a week transaction for its Customers through digital web portal and mobile app. TNPFC is working to build a robust IT system.

Further, TNPFC has established a Customer Support Desk with the new age digital tools for Customers' service request namely E-mail with fresh desk ticketing system, WhatsApp, video call – KYC update, Interactive Voice Response (IVR) which has paved the way for a better Customer service.

Way forward

TNPFC is looking forward to participate in loan syndication or co-lending to other Government departments of Tamil Nadu and to explore the possibility of Retail lending like financing for trade receivables, etc. These alternative avenues of investment may help TNPFC to improve the credit rating of TNPFC from BBB (-) stable, minimize the risk of single source lending and explore more profitable avenues.

V SENTHILBALAJI

Minister for Electricity,
Prohibition and Excise