ENERGY DEPARTMENT

POLICY NOTE
2020-2021

DEMAND NO.14

P. THANGAMANI

Minister for Electricity,
Prohibition and Excise

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ENERGY DEPARTMENT

எண்ணிய எண்ணியாங்கு எய்து எண்ணியார்
திண்ணியர் ஆகப் பெறின் (குறள் – 666)

(If those who have planned possess firmness in executing it they will obtain what they have desired and how they have desired it.)

Introduction

Every day, we are surrounded by the most important innovation of all time, electricity. Electricity, use and access are strongly correlated with the economic development of the State. The growth of this sector has an immense implication not only on business and public policy but also promotes socio-economic development. Affordable, reliable and clean energy is fundamental to modern life. The adoption of energy specific sustainable development policies of the State Government is a milestone in moving the State towards a more sustainable and equitable system.

Due to the determined efforts and the road map laid by **the late Hon'ble Chief Minister Amma** and the tremendous efforts taken by this Government, a massive addition of power to the tune of **15,410 MW** has been added to the grid since 2011 by commissioning of new power stations in State and Central sectors, through medium and long term power purchase agreements and through addition of renewable energy.

Energy is at the heart of many of the Sustainable Development Goals and one of these goals aims to ensure access to affordable, reliable and sustainable energy for all by the end of the next decade. Tamil Nadu has already attained the status of 'Power for All' with 24x7 power to all categories of consumers by lifting all Restrictions and Control (R&C) measures since June 2015.

The present average power demand of Tamil Nadu is about **14,500 MW to 15,500 MW**. However, the maximum demand met was **16,151 MW on 03.04.19.** To meet this demand, Tamil Nadu operates the most diversified electricity generation portfolio in India, with an installed capacity of **31,894 MW** which includes 50% of renewable energy, 28% from coal based power plants including shares from central generating stations, 5% from nuclear power plants, 3% from gas power plants and 14% through Long term and Medium term Open Access and Captive Power Plants (CPP).

However, burning of fossil fuels for energy, results in significant amount of green house gas emission that contributes to global warming. Hence, with renewable energy being the source of clean and inexhaustible energy, most of the countries have started taking steps to make

increasing use of these alternative energy sources. Tamil Nadu is a pioneer in renewable energy, having an installed capacity of **15,779 MW** of renewable energy, which constitutes around 50% of the State's total installed capacity. Also, the emerging trend towards electric vehicles, with charging infrastructure, as well as electrical storage infrastructure would further contribute to the growth of non-fossil fuel energy.

The State has harnessed **11,717 million units of wind energy and 3,842 million units of solar energy** during 2019-20 as on 31.01.2020. As of today, around 21% of the State's energy needs are being met from renewable energy sources.

Energy is central to nearly every major challenge and opportunity the world faces today. To be sustainable, electricity systems

must recover operating costs, invest for the future, provide reliable electricity and meet environmental and social objectives. Understanding this aspect, the State Government is taking immense efforts in the path laid by the **late Hon'ble Chief Minister Amma** for the development of this sector**.**

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

I. Erstwhile Tamil Nadu Electricity Board which has been re-organized as, 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. Chief Electrical Inspectorate to Government (CEIG)

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

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1. TNEB Limited

Tamil Nadu Generation and Distribution Corporation Limited and Tamil Nadu Transmission Corporation Limited

Tamil Nadu Electricity Board (TNEB) was restructured into TNEB Limited (holding company) and two subsidiary companies namely Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) and Tamil Nadu Transmission Corporation Limited (TANTRANSCO) on 01.11.2010 as mandated by the Electricity Act 2003 after a long journey of 53 years since it came into existence in the year 1957.

Tamil Nadu being the front runner in the electrification of all its habitations has extended the electricity network throughout the State thus making the State 100% electrified. Consequent to the restructuring of the erstwhile

TNEB, Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) handles the function of power generation and distribution and Tamil Nadu Transmission Corporation Limited (TANTRANSCO) serves as the State Transmission Utility that handles the intra state power transmission with the State Load Dispatch Centre (SLDC) under its fold, which were earlier handled by the vertically integrated erstwhile TNEB.

1.1 Vision

Tamil Nadu's power sector is one of the most diversified in India. Electricity demand in the State has increased rapidly and is expected to rise further in the years to come. In order to meet the increasing demand for electricity in the State, a massive addition to the installed generating capacity is required. There are many challenges to overcome during the

implementation, leading to a gap between what is actually planned and what is implemented.

However, immense efforts are being taken for the development of conventional forms of energy for meeting the growing energy needs of the society. A massive capacity addition to the tune of 13,000 MW of thermal power projects and 2,500 MW of hydro power projects have been proposed and are under various stages of implementation in a phased manner.

Though conventional sources of energy are necessary to meet out the rising demand and to have a stable grid, the conventional sources have an intimidating shadow on our future energy security, environment, health and society in general. Understanding this, the State Government has taken various steps to promote renewable energy on a larger scale. The State has significant amount of renewable energy sources and hence efforts are

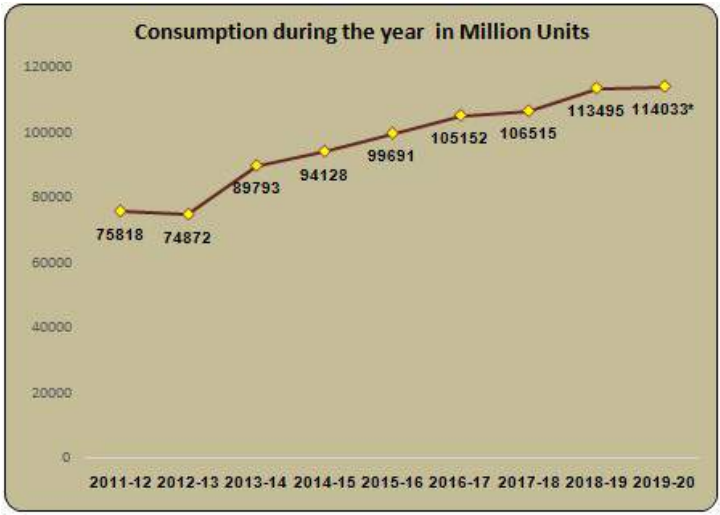
persistently being put into harness various forms of renewable energy sources with the use of newer technologies.

Apart from establishment of 500 MW Kadaladi Ultra Mega Solar Power Project and 250 MW of Floating Solar Power Project, special initiatives are being taken by the State Government for promoting Electric Vehicles with charging infrastructure and implementing the ambitious KUSUM scheme of Government of India. Also, in addition to the on shore wind projects, establishment of off shore wind projects are also being explored.

1.2 Sector Transformation

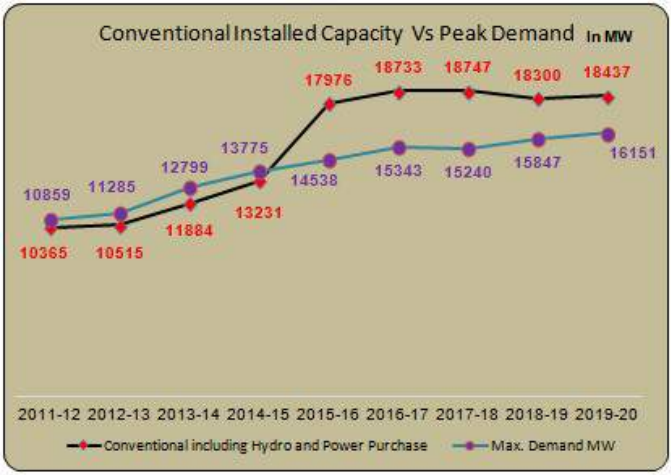
Power is one of the most critical components of infrastructure and a core industry as it facilitates development across various sectors of the State. The existence and development of adequate electrical infrastructure is essential for the economic growth of the State.

The sustained economic growth of the State drives the electricity demand in the State. Electricity demand in the State has increased manifold in the last 10 years, as the energy consumption, which was 75,032 million units during 2010-11, is expected to be around 1,14,033 million units during 2019-20. In order to meet the increasing demand for electricity, massive addition to the installed generating capacity is required.



*expected during 2019-20

Consequently, due to the strenuous and determined efforts taken by **the late Hon'ble Chief Minister Amma** and the immense efforts taken by this Government under the able leadership of **the Hon'ble Chief MinisterThiru. Edappadi K. Palaniswami** a capacity to the tune of **15,410 MW** has been added to the State grid since 2011 of which capacity to the tune of 2,788 MW has been added to the grid in the last three years alone, making Tamil Nadu a power surplus State. Special emphasis is also being made by this Government towards augmenting the power system by way of progressively enhancing the Transmission and Distribution networks.



1.3 Performance Highlights and Landmarks

➢ Wind Energy

- ✓ Total wind installed capacity is 8507 MW. With 23% of India's total wind installed capacity, Tamil Nadu holds first place in the country.
- ✓ The State has harnessed around 11,717 million units of wind energy during 2019-20 upto January 2020.
- ✓ Maximum wind generation harnessed to the grid was 5095.6 MW on 27.07.2017 and 107.317 MU on 19.07.2018.

➢ Solar energy

- ✓ Total solar installed capacity is 3974 MW.
- ✓ The State has harnessed around 3,842 million units of solar energy during 2019-20 upto January 2020 **which is around 35% increase compared to last year.**
- ✓ **Maximum solar generation harnessed to the grid was 3018 MW on 19.02.2020 and 20.12 MU on 17.02.2020.**

- **Power consumption**

✓ Tamil Nadu has met an all time high peak demand of 16,151 MW on 03.04.2019 and an all time high energy consumption of 369.94 MU on 12.04.2019.

✓ Chennai has met an all time high peak demand of 3,738 MW on 18.06.2019.

- **One day service connection scheme**:

Since launching the scheme on 12.06.2017, around 7,21,706 service connections have been effected under this scheme.

- **New LT industrial service connections within 7 days:**

Since launching the scheme on 15.07.2017, around 88,703 service connections have been effected under this scheme.

- **Mobile App:**

Since launching this App on 12.07.2017, around **31,52,058** transactions have been

made using this application and the amount collected using it is about **Rs. 561 crores.**

- **Online payment:**

  Around 55% of overall collection is being made through digital transactions.

- **Implementation of Electric Vehicle (EV) Policy:**

  The "Tamil Nadu Electric Vehicle Policy 2019" has been released by the Hon'ble Chief Minister of Tamil Nadu on 16.09.2019. Government of Tamil Nadu has also notified Industries, Energy and Transport Departments as nodal Agencies for the implementation of this policy in the State.

Generation Infrastructure

- As on 01.02.2020 the installed capacity is 31,894 MW of which 7,175 MW is own generation (from all its power plants) by TANGEDCO.

- Since 2011, capacity of 15,410 MW has been added to Tamil Nadu's grid, of which 2,788 MW has been added during the last three years.

Transmission Infrastructure

- As on 01.02.2020 - 1770 substations and 34,969 circuit kms of Extra High Tension (EHT) lines.
- 119 substations and 861 circuit kms of EHT lines have been energized during 2019-20 till January 2020
- **First State Utility to erect 765 kV network on its own.**

Distribution Infrastructure

- As on 01.02.2020 - With 303.27 lakh consumers, the distribution infrastructure comprises of 3.23 lakh distribution transformers, 1.81 lakh kms of High Tension (HT) lines and 6.34 lakh kms of Low Tension (LT) lines.

- During 2019-20, 13,797 distribution transformers, 3,566 kms of HT lines and 5,718 kms of LT lines have been energized.
- 7.48 lakh new service connections have been effected under all categories.

1.4 Sustainable Development Goals (SDGs)

The Sustainable Development Goals (SDGs) are an ambitious commitment by world nations which set out a universal and an unprecedented agenda that embraces economic, environmental and social aspects for the well being of societies.

The year 2020 is the fifth anniversary of the adoption of Sustainable Development Goals (SDGs) by 193 countries at the UN General Assembly. The SDGs, constituted through an unprecedented consultative process, have 17 goals and 169 related targets to be achieved by 2030. The aim of the ensuing Agenda 2030 is to help streamline development policies and action

for the higher and time bound achievement of human well being.

There is a growing consensus for the State to play a pivotal role in designing, executing, and monitoring development policies and interventions. As per the SDG India Indexing for 2019, Tamil Nadu shares the third place along with Andhra Pradesh and Telangana.

SDG Goal-7 and its Targets

Sustainable Development Goal 7 pertains to TANGEDCO, and the goal is to ensure access to affordable, reliable, sustainable and modern energy for all.

The important targets are

7.1 Access to affordable, reliable and modern energy services,

7.2 Increase substantially the share of renewable energy mix and

7.3 Double the global rate of improvement in energy efficiency.

Indicators have been fixed for the above targets and action is being taken towards achieving these goals.

Tamil Nadu is a front runner with regards to Goal-7. Two national-level indicators, viz., percentage of households electrified and percentage of households using clean cooking fuel (LPG) have been selected based on the availability of data at the sub-national level and to ensure comparability across States and UTs.

The State of Tamil Nadu is well within its reach in accomplishing the SDG targets of Energy within the targeted period. In line with this the key result areas having much implications for achieving the SDG Goals have been identified and mapped with SDG Goals. Roadmap has been drafted to achieve the targets and significant efforts are being taken to implement those identified key results areas.

Target	Key Result Area
7.1 By 2030, ensure universal access to affordable, reliable and modern energy services	100 % Household electrification
7.2 By 2030, increase substantially the share of renewable energy in the global energy mix.	Promoting clean energy Solarization of Government buildings and agricultural pump sets.
7.3 By 2030, double the global rate of improvement in energy efficiency	Reduction of AT&C losses, voltage profile improvement and strengthening of distribution network.

Road Map for SDG Goal-7

Target 7.1 - Access to affordable, reliable and modern energy services

- Tamil Nadu has already achieved 100% electrification. Access to electricity by households is available in all corners of the State. The State provides uninterrupted quality supply at affordable price to all categories of consumers.
- The State, with the policy of Leaving No One Behind (LNOB) in line with SDG goal, is taking the utmost efforts in effecting the supply even to the remote/forest area

habitations where the conventional mode of electrification is not possible. TANGEDCO has electrified the households in these areas through Solar Roof Top Systems.

- To meet the ever rising demand of the State and to continue the supply of uninterrupted reliable power, the State Utilities (TANGEDCO and TANTRANSCO) continuously augment the infrastructure network.

Target 7.2 - Increase substantially the share of renewable energy mix

- Tamil Nadu with rich renewable energy resources, is a pioneer in renewable energy generation in India. The State is one of the front runners in renewable energy generation with an installed capacity of 15,779 MW.
- The maximum renewable energy contribution in a single day consumption is around 38% on 19.07.2019 and maximum renewable energy contribution in instantaneous demand is around 49% on 21.07.2019.

- In line with the country's ambitious aim of adding 1,75,000 MW of renewable energy (RE) by 2022, the State has added about 1,278 MW of RE during 2019-20 alone, which is around 10.5% more compared to the previous year.
- In order to promote renewable energy in the State with less dependency on fossil fuels to reduce greenhouse gas emissions and towards climate change mitigation, effective steps are being implemented by the State Government.

✓ Solar Policy 2019 was launched during Feb 2019 which aims to achieve the target of 9,000 MW of installed solar capacity by 2023. The Solar Policy encourages both distributed and utility scale Photo Voltaic (PV) generation.

✓ Establishment of 500 MW of Ultra Mega Solar Photo Voltaic Power Park Project and 250 MW of Floating Solar PV Power Projects.

✓ Roof top solar - It is proposed to establish 5 MW capacity of Roof Top System (RTS) under domestic category in the year 2019-20.

- ✓ PM-KUSUM - The Government of India has launched the new scheme Pradhan Mantri Kisan Urja Suraksha Evem Utthan Mahabhiyan (PM KUSUM) Scheme for farmers. The State is taking effective steps in implementing KUSUM scheme.

  The component wise allocation for Tamil Nadu is as follows:

  Component-A: Setting up of decentralized solar / renewable energy based power plants for 75 MW

  Component-B: 17,500 nos. standalone solar pumps

  Component-C: 20,000 nos. solarisation of grid connected agricultural pumps.

  The implementation of Component-A is being done by TANGEDCO, Component-B by Agricultural Engineering Department and for Component-C TANGEDCO is the nodal agency and the component will be implemented by TEDA.

- ✓ Being a renewable energy rich State, apart from promoting onshore wind power projects, off-shore wind generation is also being explored.

Target 7.3 - Double the global rate of improvement in energy efficiency

- The State indicator for this parameter is reduction in Aggregate Technical and Commercial (AT & C) losses. The advantage of the parameter is that it provides a realistic picture of energy and revenue loss situation.
- The AT & C losses of TANGEDCO is 13.64 % (provisional) in the 1st half of 2019 which is much less than the country's AT & C losses, which is around 20.59% indicated in the UDAY portal – AT&C Dash Board. TANGEDCO has proposed to reduce AT&C losses down to 10% by 2030.
- TANGEDCO is taking concerted efforts to reduce the AT&C losses as below.

✓ Distribution strengthening works proposed under Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY) and Integrated Power Development Scheme (IPDS) schemes are nearing completion.

- ✓ Intensive study has been undertaken on the Distribution Network. Based on the study, schemes have been proposed under UDAY scheme and are in various stages of implementation.
- ✓ Erecting High Voltage Distribution System (HVDS) by replacing the existing higher capacity Distribution Transformers with lower capacity so as to improve the High Tension to Low Tension line length ratio (HT/LT ratio) is being implemented.
- ✓ Feeder segregation, feeder metering, distribution transformer metering and implementation of smart meters are being undertaken for effective energy accounting.
- ✓ TANGEDCO is also taking effective steps in promoting energy conservation. Also, to have uniform mechanism to promote energy conservation in buildings, Energy Conservation Building Code (ECBC) is being evolved.

Generation

1.5 Generation

1.5.1 Demand and supply

The maximum demand of the State met was 16,151 MW on 03.04.19 and in Chennai the all time high demand of 3,738 MW on 18.06.2019. The present average power demand varies between 14,500 MW to 15,500 MW.

The maximum consumption of the State has reached 369.94 MU on 12.04.2019 with the daily average consumption of 300 million units in 2019, which was 200 MU during the year 2011.

Installed capacity as on 01.02.2020

Sl No.	Category	Capacity in MW
I	**Conventional energy sources**	
1	Thermal	4,320.00
2	Gas	516.08
3	Central Generating Stations (CGS)	6166.00

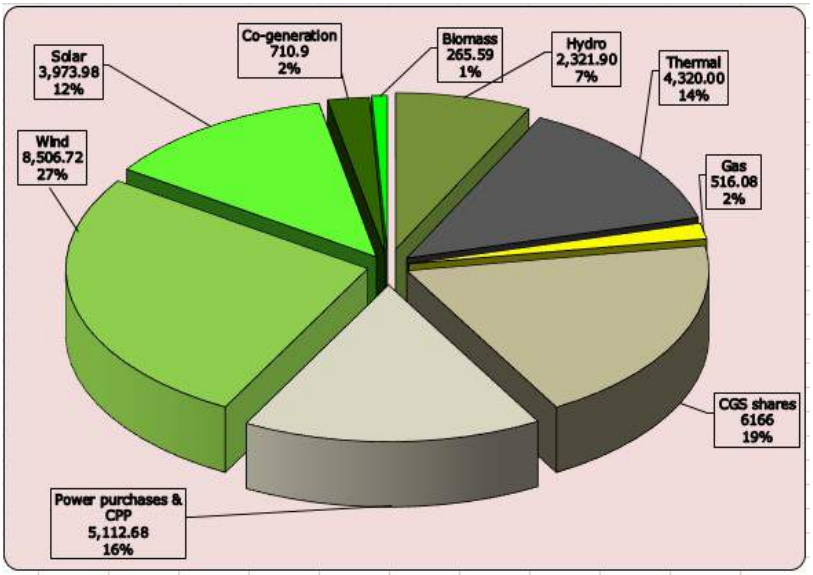
Sl No.	Category	Capacity in MW
4	Power purchases	
	Independent Power Projects (IPP)	746.50
	Long Term Open Access (LTOA)	2,830.00
	Medium Term Open Access (MTOA)	550.00
	Total power purchases	4126.50
5	Captive Power Projects * (CPPs)	986.18
	Total conventional	**16,114.76**
II	**Renewable energy sources**	
1	Hydro **	2,321.90
2	Wind	8,506.72
3	Solar	3,973.98
5	Biomass – Combustion	265.59
5	Co-generation ***	710.90
	Total non- conventional	**15,779.09**
	Grand total	**31,893.85**

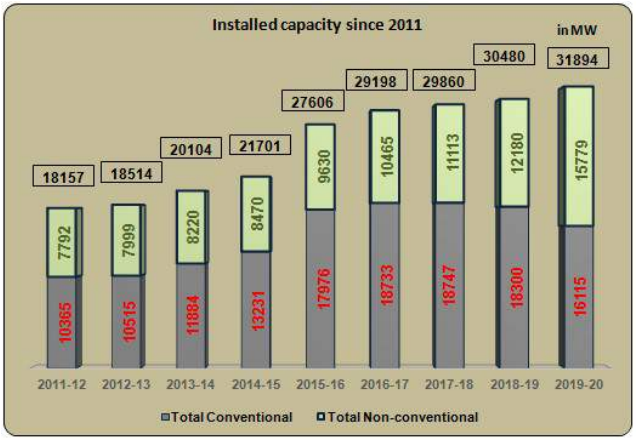
***** These CPPs though not supplying to TANGEDCO, supply through open access to private consumers.

** As per the CEA memorandum dated 08.03.2019, hydro generation has been considered as renewable energy resource and has been deleted from conventional sources.

*** Reduction in capacity of 10.5 MW

Installed capacity as on 01.02.2020 in MW





Hydro generation has been considered as renewable energy since from this year based on CEA guidelines

1.5.2 Capacity added from the year 2011-12

Year wise Capacity Addition from 2011-12 as on 01.02.20			
Year	**Projects**	**Capacity in MW**	**Commissioning date**
2011-12	Bhavani Kattalai Barrage II	30	29.11.11
	Periyar –Vaigai Small HEP II	2.5	30.01.12
	Simhadri stage II Unit 1 (CGS Share)	99.5	16.09.11
	Periyar PH RMU Unit 1(35MWto42MW)	7	14.07.11
	TOTAL	**139**	
2012-13	Simhadri stage II Unit 2(CGS Share)	99.5	30.09.12
	TANGEDCO -NTPC JV Unit 1 (Vallur)	359	29.11.12
	Periyar PH RMU Unit 2 (35MW to 42MW)	7	11.09.12
	Bhavani Barrage II	10	26.10.12
	TOTAL	**475.5**	
2013-14	TANGEDCO -NTPC JV Unit 2 (Vallur)	359	25.08.13
	Mettur Thermal Power Station - Stage III	600	12.10.13
	North Chennai Thermal Power Station Stage II	600	20.03.14

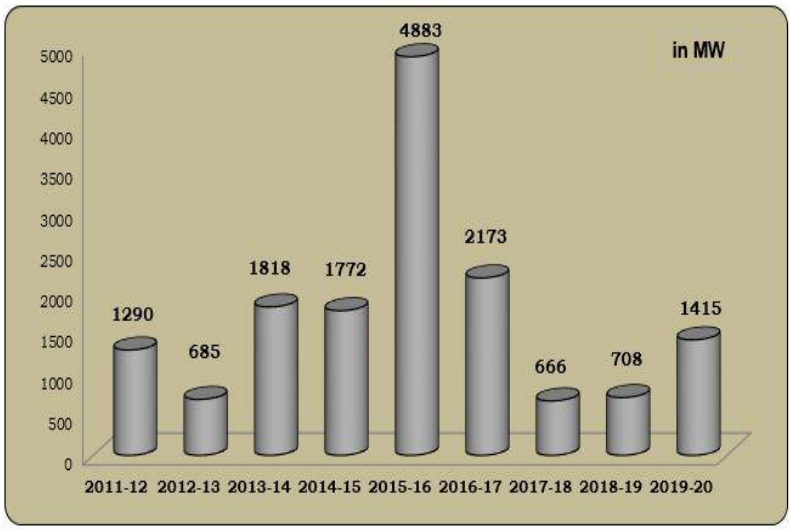
Year wise Capacity Addition from 2011-12 as on 01.02.20			
Year	**Projects**	**Capacity in MW**	**Commissioning date**
	Unit 1		
	Periyar PH RMU Unit 3 (35MW to 42MW)	7	08.01.14
	Bhavani Kattalai Barrage III (2x15MW)	30	16.10.13
	Periyar –Vaigai Small HEP III (2x2MW)	4	Unit 1-11.09.13 Uni 2- 09.10.13
	TOTAL	**1600**	
2014-15	NCTPS Stage II Unit 2	600	08.05.14
	Kudankulam Unit 1	563	31.12.14
	TANGEDCO -NTPC JV Unit 3 (Vallur)	358	26.02.15
	TOTAL	**1521**	
2015-16	Neyveli TS 2 Expansion (2x250 MW)	271	Unit-2 22.04.15 Unit-1 05.07.15
	TANGEDCO -NLC JV Tuticorin(2x500MW)	439	Unit-1 18.06.15 Unit-2 29.08.15
	Bhavani Barrage 1	10	Unit-1 29.05.15 Uni -2 02.07.15
	Periyar Vaigai Small HEP–IV (2x1.25 MW)	2.5	Unit-1 01.03.16 Unit-2 29.02.16
	Periyar PH RMU - Unit 4(35to42 MW)	7	23.03.2016

Year wise Capacity Addition from 2011-12 as on 01.02.20			
Year	**Projects**	**Capacity in MW**	**Commissioning date**
	TOTAL	**729.5**	
2016-17	Changes in the Unallocated shares	36	
	Kudankulam Unit 2	562.5	31.03.2017
	Total	**598.5**	
2017-18	Changes in the Unallocated shares	(-) 97.5	
	Kudgi Stage I (Unit I, Unit 2)	212	
	Total	**114.5**	
2018-19	Kudgi Stage I (Unit 3)	111	15.09.2018
	Sholayar PH RMU Unit 1 (35MW to42MW)	7	29.10.18
	NLC Vintage TPS 1	(-) 475	PPA expired on 31.03.19
	Changes in the Unallocated shares	48	
	TOTAL (2018-19)	**(-) 309**	
2019-20	Sholayar PH RMU Unit 2 (35MW to42MW)	7	03.09.19
	New Neyveli TPS	327	16.12.2019
	Changes in Unallocated Shares	3	
	TOTAL (2019-20)	**337**	

Year wise Capacity Addition from 2011-12 as on 01.02.20			
Year	**Projects**	**Capacity in MW**	**Commissioning date**
	Long Term Open Access (LTOA)	2,830	
	Medium Term Open Access (MTOA)	550	
	Total conventional with Power Purchase since 2011	8586	
	Renewable Energy added since 2011 (except Hydro)	**6823.84**	
	Grand Total (with power purchases and Renewable Energy)	**15,409.84**	
Note : Reduction in the capacity additions are due to changes in unallocated shares to Tamil Nadu from CGS every year, variation in power purchase through Open Access and expiry of PPA executed with NLC vintage TPS I during 2018-19			

Capacity addition since 2011 including Renewable Energy as on 01.02.2020

Year	Capacity Added in MW		
	Conventional and Power Purchase	Renewable	TOTAL
2011-12	139	1150.96	1289.96
2012-13	475.5	210	685.5
2013-14	1600	217.64	1817.64
2014-15	1521	251	1772
2015-16	3759.5	1123.85	4883.35
2016-17	1298.5	874.57	2173.07
2017-18	14.5	651.4	665.9
2018-19	-359*	1066.92	707.92
2019-20	137	1277.5	1414.5
TOTAL	**8586**	**6823.84**	**15409.84**
Note : * Expiry of PPA executed with NLC vintage TPS I during 2018-19			



1.5.3 GREEN ENERGY

A renewable energy based future is necessary not only addressing climate change challenges, but also for local communities to move away from the current fossil fuel economy, reduce pollution, enhance energy security, lower risk of fuel spills and reduce the need for imported fuels. Also, it helps in conserving the nation's natural resources.

Being a State rich in Solar and Wind Energy potential and with the policies of this Government, Tamil Nadu still continues to stand first across the country with highest total installed capacity in respect of wind energy. As more and more renewable energy, which is infirm in nature is integrated with the dynamic grid of Tamil Nadu, supply-side variability and uncertainty causes new challenges for the utility. In spite of these tremendous challenges, TANGEDCO makes all efforts to maintain uninterrupted quality power supply in the State of Tamil Nadu.

1. Solar power

With the people-friendly policies of Tamil Nadu, the total solar installed capacity in the State of Tamil Nadu as on 31.01.2020 is **3973.98 MW** which includes 214.08 MW of combined capacity of rooftop solar systems. Tamil Nadu continues to occupy one among the first 5 positions in India with respect to installed capacity.

In the year 2019-20 (till January 2020), 1,249 MW has been added to the grid which amounts to a 46% increase, compared to the previous year's installed capacity.

The State has harnessed around 3,842 MU of solar energy during 2019-20 upto 31.01.2020. Further, an all-time high generation of 3,018 MW on 19.02.2020 and all time maximum energy of 20.12 Million Units on 17.02.2020 has been harnessed from solar generators. At present, considerable quantum of solar generation is being realized during day time at an average of around 1,500 MW to 2,600 MW.

The State of Tamil Nadu was one of the pioneer States to execute Power Purchase Agreements (PPAs) with solar developers under preferential tariff scheme wherein 78 nos. developers for a total capacity of 1,409 MW have commissioned solar power plants.

Based on the directions of National Tariff Policy, TANGEDCO was the forerunner to float tenders for procurement of solar power from private developers under reverse bidding process. TANGEDCO has successfully executed Power Purchase Agreements for a combined capacity of 1,520 MW of solar energy, through two phases of tender and 1264 MW of solar plants have been commissioned as on date. Project works for balance capacity of around 200 MW are under progress.

Apart from this, Solar Energy Corporation of India (SECI) is to float a tender, on behalf of TANGEDCO, for procurement of 1,000 MW in two stages of 500 MW each, from the developers for establishing solar power plants in the State of Tamil Nadu. The phase-I tender for 500 MW solar power has been floated by M/s. SECI under reverse bidding.

In order to meet the Renewable Purchase Obligation (RPO) requirement fixed to the State, TANGEDCO is in the process of procurement of 500 MW solar power from SECI.

In addition to this, initial works are under process to establish a 500 MW Ultra Mega Solar Photo Voltaic Power Park Project at Kadaladi and 250 MW floating solar projects at Vaigai, Mettur and Bhavani Sagar Reservoirs.

The Government of Tamil Nadu has announced "Tamil Nadu Solar Policy 2019" with a vision to facilitate the Renewable Purchase Obligation of this State. With these twin policy objectives of protecting the environment and the welfare of its people, Tamil Nadu is committed to a sustainable and equitable energy future. Tamil Nadu Solar Energy Policy, 2019 provides an inclusive policy framework that promotes both utility category and consumer category solar

energy generation through various enabling mechanisms.

2. Wind Power

Tamil Nadu is pioneer in promoting wind energy in the country. The State has the highest wind power capacity in the India, contributing about 23% of the country's total wind installed capacity, with an installed capacity of **8,506.72 MW** contributing about 27% to the State's total installed power capacity.

An all-time high generation of **5095.6 MW on 27.07.2017 and all time maximum energy of 107.317 MUs** on 19.07.2018 has been harnessed from wind generators.

Apart from this, 689.01 MW of wind projects with Central Transmission Utility (CTU) connectivity through the Power Grid Corporation of India Limited (PGCIL), has been commissioned

in Tamil Nadu and around 1,000 MW is under process.

As Tamil Nadu is already having a huge installed capacity of wind power, the State of Tamil Nadu satisfies its Renewable Purchase Obligation (RPO).

3. Co-generation projects

TANGEDCO has taken up establishment of **12 co-generation plants** with a total capacity of **183 MW** in co-operative and public sector sugar mills along with sugar mill modernization in Tamil Nadu at a total cost of **Rs. 1,241.15 crores.**

Out of the 12 cogeneration projects, 5 projects viz., 18 MW each at Chengalrayan Co-op. Sugar Mills Ltd., Villupuram District and Perambalur Sugar Mills Ltd., have been commissioned along with 15 MW each at Vellore Co-op. Sugar Mills Ltd., Cheyyar Co-op. Sugar Mills Ltd., and Arignar Anna Sugar Mills Ltd., Tanjore District.

Dharmapuri (12 MW) and Kallakurichi-II (15 MW) Co-gen projects are expected to be commissioned by this financial year i.e.2019-20.

Balance 5 Nos. Co-gen projects are likely to be commissioned during next Financial Year 2020-2021.

1.5.4 TANGEDCO owned Power Stations

1. Thermal Power Stations

Sl. No	Name of the Thermal Power Station	Generation in MU for the year 2019-20 (upto January 2020)	Actual Plant Load Factor (%) For the year 2019-20 (upto January 2020)	Deemed Plant Load Factor (%) For the year 2019-20 (upto January 2020)
1	Tuticorin Thermal Power Station (5 x 210 MW)	4380.53	56.81	78.45
2	Mettur Thermal Power Station I (4 x 210 MW)	3863.747	62.63	82.84
3	Mettur Thermal Power	2116.76	48.04	88.49

Sl. No	Name of the Thermal Power Station	Generation in MU for the year 2019-20 (upto January 2020)	Actual Plant Load Factor (%) For the year 2019-20 (upto January 2020)	Deemed Plant Load Factor (%) For the year 2019-20 (upto January 2020)
	Station II (1 x 600 MW)			
4	North Chennai Thermal Power Station I (3x210 MW)	2805.097	60.63	79.06
5	North Chennai Thermal Power Station II (2x600 MW)	4626.40	52.50	81.30

Most of the existing thermal power stations of TANGEDCO have served more than 25 years. However, due to proper maintenance, the thermal stations are performing well with a deemed plant load factor ranging between 78% to 88%. The Generation and Plant Load Factor of the stations are subject to the backing down of the Thermal

units to accommodate the generation by must run plants viz. renewable energy.

Achievements/Improvements

1. Tuticorin Thermal Power Station

    i. Unit –I which commissioned during 1979 with 210 MW capacity, was running at 180 MW for the past two years due to condenser ageing. After renovation during 2019, this unit was successfully brought back to its full load of 210 MW on 28.12.2019.

    ii. Unit – III has crossed its continuous service of 100 days for the sixth time, since its inception in April 1982.

2. Mettur Thermal Power Station I

    i. All four Units of MTPS –I which were commissioned during 1987-1990 were in continuous operation for more than 100 days during 2019-20.

    ii. Received "Motivational Award" from National safety council/ TAMIL NADU during 19-20.

3. Mettur Thermal Power Station II

    Was in continuous service for 205 days during 19-20

2. Hydro Stations

1. There are 47 Nos. of hydro power stations in Tamil Nadu with installed capacity of 2,321.90 MW. Of the total installed capacity, Non-irrigation based hydro power station's capacity is 1030.65 MW, Irrigation based hydro power station's capacity is 891.25 MW and Pumped storage capacity is 400 MW.

2. After 2007-2008 (6,455.16 MU), the overall highest Hydro Generation 5,472.16 MU which was achieved during 2018-19, thereby exceeding the CEA Target by 53%. For the year 2019-20, the Generation upto Jan 2020 is 4,349.11 MU and the cost of Generation is 63 paise per unit.

3. In Unit I & II of Sholayar Power House I, Renovation, Modernisation & Up-rating (RMU) works enhancing machine

capacity from 35 MW to 42 MW were completed on 11.08.18. & 23.07.19 respectively, thereby a capacity addition of 14 MW is made to the Grid.

4. Works related to Renovation Modernization and Up-rating of Moyar Power House has been awarded for enhancing the machine capacity from 3 x 12 MW to 3 x 14 MW on 28.11.2019 at a cost of Rs.121.12 crore. Reverse Engineering works for Unit II commenced. The expected date of completion is during 2023-24.

5. The present energy equivalent to total water storage in the reservoirs is about 1,500 MU.

3. Gas Turbine Stations

The Gas Turbine Power Stations of TANGEDCO are generating power as per the availability of natural gas being supplied by M/s.

Gas Authority of India Limited (GAIL). The installed capacity and generation during FY 2019- 2020 are as below.

- Thirumakottai (Kovilkalappal) Gas Turbine Power Station has installed capacity of 107.88 MW and has generated 223 MU. The Gas Turbine Generator has achieved a continuous running of 118 days for one time. Against the 4,50,000 SCM/day agreed quantity of gas only 2,25,000 SCM/day (approximately) is being supplied and the plant is operated at 31% of PLF.

- Valuthur Gas Turbine Power Station-Phase-I has installed capacity of 95 MW and has generated 604 MU. The Gas Turbine Generator has achieved a continuous running for more than 100 days twice during FY 2019-2020. Against the 4,50,000 SCM/day agreed

quantity of gas only 4,05,000 SCM/day (approximately) is being supplied and the plant is operated at 96% of PLF.

- Valuthur Gas Turbine Power Station-Phase-II has installed capacity of 92.2 MW and has generated 489 MU. The Gas Turbine Generator has achieved a continuous running for more than 100 days once during FY2019-2020. Against the 4,38,000 SCM/day agreed quantity of gas only 3,94,200 SCM/day (approximately) is being supplied and the plant is operated at 80% of PLF.

- Valuthur Gas Turbine Power Station has generated power with the minimum variable cost of generation of Rs.2.28 per Unit.

- Kuttalam Gas Turbine Power Station has installed capacity of 101 MW and has

generated 86 MU. Against the 4,50,000 SCM/day agreed quantity of gas only 2,70,000 SCM/day (approximately) is being supplied and the plant is operated at 39% of PLF.

- Basin Bridge Gas Turbine Power Station has installed capacity of 120 MW (4x30MW). The fuel used for this station being Naphtha, the station is being operated only during emergencies based on the grid demand.

1.5.5 Installation of Pollution Control Equipments in existing Thermal Power Stations

The New Environmental Norms stipulated by the MoEF&CC insists to reduce the Oxides of Sulphur (SOx), Oxides of Nitrogen (NOx) and Particulate Matter (PM) in the flue gas in all Thermal Stations. There is continuous follow up

by the Central Electricity Authority (CEA) and the Hon'ble Supreme Court for implementation of new norms and it has been insisted that the Thermal Stations which have not implemented the new Environmental norms will not be permitted to operate beyond the year 2022.

In this connection, TANGEDCO has entrusted Consultancy works to M/s. Mecon Ltd., Ranchi, a Central Government Enterprise to evaluate the methodology to be implemented for reducing SOx emission, preparation of Detailed Project Report (DPR), Tender Specifications and other works for erection and commissioning of the requisite De-Sulphurisation units in all the existing Thermal Power Stations of TANGEDCO. The Final Feasibility Report/ Detailed Project Report (DPR) submitted by Consultant is under scrutiny.

In order to reduce Particulate Matter (PM) emission in Old Units (210 MW), retrofitting of

Electro Static Precipitator (ESP) in one Unit of MTPS I is under progress. Administrative approval has been accorded for other Units of Old Thermal Stations.

It is scheduled to complete the installation and commissioning of the requisite pollution control equipments in a phased manner within the scheduled period.

MTPS-I R&M of ESP Unit-IV: Erection of Inlet Duct and Gate for "F" Pass

MTPS-I R&M OF ESP UNIT-IV - Footings Work for 21 Column Completed in F Pass Area

1.5.6 Coal and Logistics

1. TANGEDCO requires about **72,000 Tonnes/ day** which works out to **262.80 Lakh Tonnes Per Annum (LTPA**) of coal for full capacity generation of power at the existing thermal power stations with installed capacity of **4320 MW** at 100% Plant Load Factor (PLF). TANGEDCO has executed Fuel Supply Agreements (FSA) with coal companies of Coal India Limited (CIL) for a total quantity of **229.45 LTPA** (including a side agreement quantity of 25 LTPA under import substitution) for the supply of coal to the existing thermal power stations (capacity 4,320 MW). This has been revised to **212.91 LTPA** by reducing 16.54 LTPA linkage quantity allotted to decommissioned Ennore thermal Power station as communicated by Coal India Limited in the meeting held at Kolkata on 23.09.2019.

2. The total generation of all the TPS for the year 2019-20 (upto 31.01.2020) is **17,793**

million units. The total coal consumed to meet the above generation is 128.03 Lakh Tonnes. Against this, M/s.Coal India Limited had supplied only **93.91** Lakh Tonnes which works out to only 51.9 % of the prorata FSA quantity of **180.95** Lakh Tonnes.

Hence, due to inadequate supply of indian coal, TANGEDCO imported coal to meet the shortfall during the year 2019-20 and to follow the MoEF&CC stipulation for coal based thermal power plants which shall use coal with weighted average ash not exceeding 34% on quarterly basis since the average ash content of Indian coal is 39-49% .

2019- 20 up to 31.01.2020	**Indian Coal (Lakh Tonnes)**	**Import Coal (Lakh Tonnes)**	**Total (Lakh Tonnes)**
Receipt	**93.91**	**40.02**	**133.93**
Consumption	**88.15**	**39.88**	**128.03**

TANGEDCO had placed Purchase orders for supply of Import of coal for **25 Lakh Tonnes** through **Open Tender (E–Tender) with E–reverse auction** during the year **2019-20** to cater the needs of coal for Thermal Power Stations. So far 6.48 Lakh Tonnes of import coal has been supplied against the above orders and balance will be supplied upto JUNE 2020.

3. The primary supply (about 80%) of domestic coal is from Mahanadhi Coalfields Limited (MCL)/ Talcher. The realization of domestic coal from MCL/Talcher during the period between April 2019 and January 2020 was 62.04 Lakh Tonnes against the prorata linkage quantity of 120.53 Lakh Tonnes which is 51.47%.

4. Since there was a continued less supply of coal by the coal companies of Coal India Limited, various representations were made to the Govt. of India requesting them to instruct M/s. Coal India Limited for arranging to supply as

per agreed supply matrix to meet the power demand of the State of Tamil Nadu and sustain the generation at TANGEDCO's thermal power stations.

5. Coal Logistics

- TANGEDCO has started chartering vessels directly from August 2019 onwards, by way of a Trial Order on M/s. Shipping Corporation of India Ltd., (a Govt. of India Enterprise) for coastal movement of 5 Lakh Tonnes of coal. Savings obtained is about Rs.83 lakhs for 2.35 Lakh Tonnes moved so far and anticipated savings for the total quantity of 5 Lakh Tonnes is about Rs.1.78 crores.

- Subsequent to the trial order, TANGEDCO is in the process of taking over chartering operations for about 5 vessels in the coming financial year 2020-21. This would result in reduction of about Rs. 50 crores per annum

in which Rs. 10 crores in administrative expenses and about Rs. 40 crores by way of reduction in GST and charter hire rates.

- Savings in handling of coal at Haldia and Vizag Ports, by direct payment of port dues by TANGEDCO is Rs.20.52 crores.

6. COST REDUCTION IN IMPORTING COAL FOR THE YEAR 2019-20:

25 Lakh Tonnes of imported coal have been ordered through e-tender cum e-reverse auction during the financial year 2019-20. The purchase order rate was very much competitive when compared to International Market price and TANGEDCO achieved a total savings/ reduction in expenditure of Rs.189 crore, till date.

1.5.7 Mines and Coal Linkages for new projects

1. Chandrabila coal block

The Ministry of Coal has allocated Chandrabila coal block in Odisha with reserve

capacity of 896 Million Tonnes to Tamil Nadu Generation and Distribution Corporation Ltd on 24.02.16. TANGEDCO has signed Coal Block Development and Production Agreement with Ministry of Coal on 30.03.16.

Lack of area for dumping overburden to be generated from Chandrabila coal block, within the boundary of the coal block and the non-issuance of clearance by MoEF&CC for exploration in the forest area of Chandrabila coal block are the two critical issues that had hindered the developmental activities of coal block.

On pursuance of TANGEDCO, the Ministry of Coal (MoC) has constituted a Sub-Committee and the Sub-Committee had recommended to MoC to consider for allotment of 0.98 sq.km of additional area to TANGEDCO for dumping of overburden and also to redefine the block boundary area.

The necessary clearance for exploration works in the forest area of the block by drilling of

16 boreholes has not been accorded by MoEF&CC. The Regional Empowered Committee (REC) of MoEF&CC, Bhubaneswar has decided not to approve the proposal of exploratory drilling of 16 boreholes in the forest area of the Chandrabila coal block, inspite of the recommendation of the Govt. of Odisha. TANGEDCO is taking best efforts to sort out the issue by pursuing with the Ministry of Environment and Forest & Climate Change and the Ministry of Coal of Govt. of India and the Govt. of Odisha.

Meanwhile, TANGEDCO had floated a tender for selection of Mine Developer and Operator for Chandrabila coal block on 29.11.2019 for the development and mining works of the block. The Mine Development and Operation work will be entrusted to an appropriate external agency shortly.

2. Long Term and Bridge linkages for Coal Supply

The Standing Linkage Committee of Ministry of Coal has recommended for grant of coal linkage for 50% of the installed capacity of 3 units of 2400 MW [i.e. NCTPS stage III (1 x 800 MW) and Uppur Super Critical Thermal Power Project (2 x 800 MW)] from Singareni Collieries Company Ltd.(SCCL) (20 LTPA of G15 grade) and balance 39.13 LTPA from Coal India Ltd.(CIL) as per coal availability for linkage confirmed by SCCL & CIL.

The Standing Linkage Committee of Ministry of Coal has recommended Bridge Linkage (short term coal linkage) for the first unit of Ennore SEZ TPP (1 x 660 MW) of TANGEDCO for the 50% capacity and stated that the Bridge Linkage for the other unit of Ennore SEZ TPP (1 x 660 MW), ETPS Expansion TPP (1 x 660 MW) and Udangudi TPP stage-I (2 x 660 MW) shall be considered in

2021-22 after taking into account the inputs on the development of coal block (Chandrabila).

3. Need for import of coal for upcoming thermal projects

The Steam Generators of the upcoming Super Critical thermal power projects are designed for operation with coal having maximum ash content of 26.5%. As the domestic coal is having more than 35% of ash content, it is essential to import coal with low ash content and blend it suitably with domestic coal for using in the upcoming Super Critical thermal power plants.

1.5.8 Power Purchases

1. Long term power purchase

Tamil Nadu Generation and Distribution Corporation Limited had executed 11 long term Power Purchase Agreements (PPAs) for procurement of 3,330 MW power for fifteen years from 2014.

Out of 3,330 MW, 2158 MW is from inter-state generators and 1,172 MW from intra-state generators. Out of 2,158 MW, from inter-state generators, 1,658 MW is being received. In case of intra-state generators, the entire 1,172 MW is being received.

2. Medium term power purchase

Tamil Nadu Generation and Distribution Corporation Limited had executed 3 medium term Power Purchase Agreements for procurement of 500 MW power for five years from 2012 to 2017 from Inter-State generators viz M/s. National Energy Trading Services Ltd, M/s. Jindal Power Ltd and M/s. Adani Enterprises Ltd.

Power Purchase Agreements with M/s. NETS and M/s. Jindal was extended for a further period of 2 years from 2017. Out of which, the Power Purchase Agreements with M/s. NETS expired on 31.01.2019 and agreement with M/s. Jindal (200 MW) expired on 31.08.2019.

Further, TANGEDCO executed medium term Power Purchase Agreement during 2018 with M/s.Power Trading Corporation (PTC) India Ltd under through Pilot Scheme (I) for procurement of 550 MW Round the Clock (RTC) power for a period of three years from 2019.

Generation Projects

1.6 Generation Projects

1.6.1 Ongoing projects

Seven nos. of generation projects for an aggregate capacity of 6,220 MW are presently under various stages of construction at a total cost of Rs.50,582 crores as detailed below:

Sl. No	Projects	Capacity in MW	Value in Rs. (Crores)
1	North Chennai Thermal Power Station Stage-III (1x800 MW)	800	6,376
2	Ennore SEZ Thermal Power Project (2 x 660 MW)	1320	9,800

3	ETPS Expansion Thermal Power Project (1 x 660 MW)	660	6,381
4	Uppur Thermal Power Project (2 x 800 MW)	1600	12,778
5	Udangudi Thermal Power Project Stage I (2x660MW)	1320	13,077
6	Kundah pumped storage hydro-electric project (4x125MW)	500	1,831
7	Kollimalai Hydro Electric Project (1X20MW)	20	339
	TOTAL	**6,220**	**50,582**

1. North Chennai Thermal Power Station Stage-III (1 x 800 MW)

The total project cost including IDC is **Rs.6,376 crores**. LOI has been issued for Boiler, Turbine and Generator (BTG) package to M/s BHEL on 29.01.2016 to complete the works by 42 months and Balance of Plant (BoP) package on 28.10.2016 to M/s. BGR Energy Systems Limited (BGRESL) to complete the works by 36 months on EPC basis.

Completed Works

- Boiler drainable hydro test on 31.12.2019.
- Power House and Boiler structural erection.
- Electro Static Precipitator (ESP), Chimney & Natural Draught Cooling Tower (NDCT).

Works under Progress

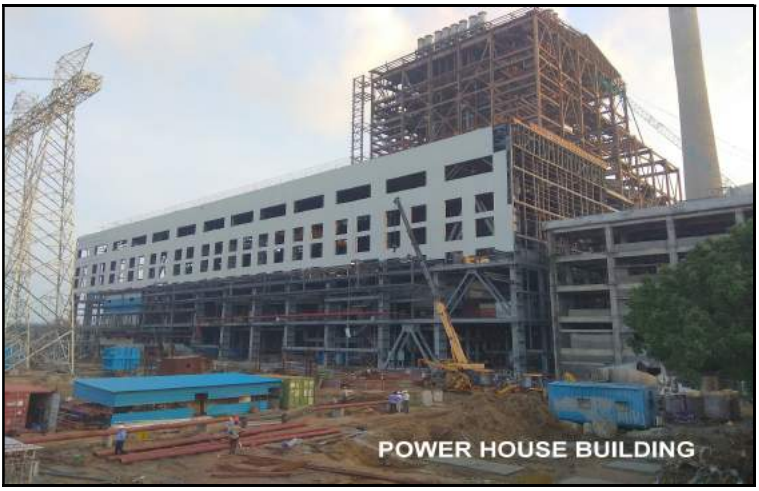
- Balance Boiler and Mill erection.
- Turbo Generator erection.
- Sea water Intake system, Cooling water system, Reverse Osmosis-De-Mineralisation Plant (RO-DM) plant, Coal Handling Plant (CHP), Ash Handling Plant (AHP), Shore Unloader, 230KV and 765 kV Switch yard with Gas Insulated Substation (GIS) work.

Physical Progress :

Boiler Turbine Generator (BTG) : 83 %

Balance of Plant (BoP) : 85 %

The project is expected to be commissioned during 2020-21.



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

The total project cost including IDC is **Rs.9,800 crores**. M/s. BHEL were awarded the project works on total single EPC cum Debt finance basis on 27.09.2014 to complete the works by 42 months.

Work was temporarily suspended from 07.09.15 due to a writ petition filed by one of the bidders in the Hon'ble High Court of Madras. On appeal to Hon'ble Supreme Court by TANGEDCO and after receipt of order dated 18.10.16 in favour of TANGEDCO from Hon'ble Supreme Court, EPC work was resumed from 19.10.16.

Completed works

- Boiler I & II Ceiling Girder erection Works.
- TG Column erection works.
- Chimney shell casting works
- Video Conferencing facility works
- Air leak test in Boiler-I.

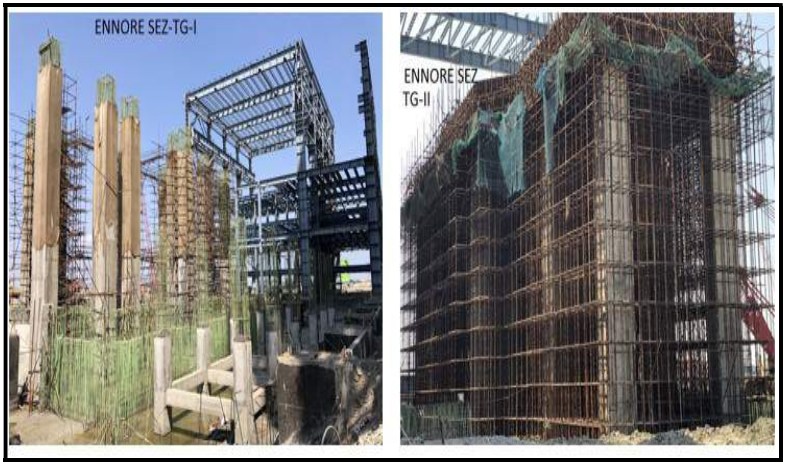
Works under Progress

- Boiler 1,2 & Electro Static Precipitator (ESP) 1,2 structural erection.
- Turbine Generator (TG) Unit I column erection.
- Mill bunker fabrication & erection.
- Civil works related to Primary Air/Induced Draft/Forced Draft (PA/ID/FD) Fans.
- External Compound Wall
- External Coal Handling Plant (ECHP) Coal Conveying package works.

Physical Progress: 45 %

The project is expected to be commissioned during 2021- 22.


ENNORE SEZ-ESP-I


ENNORE SEZ-TG-I
ENNORE SEZ
TG-II

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

Letter of Intent (LOI) for Engineering, Procurement and Construction (EPC) contract was issued to M/s. LANCO Infra Tech Ltd on 27.02.2014. Consequent to the Corporate Insolvency Resolution Process initiated on the contractor in National Company Law Tribunal (NCLT), Hyderabad, Contract to M/s. LITL had been terminated on 09.04.2018.

Partially Completed Works **(Physical progress: 18%)** by M/s. LITL include the foundation works in Turbine Generator, Boiler & Electro Static Precipitator (ESP) and the erection work of Chimney shell, Natural Draught Cooling Tower (NDCT), Sea water Intake & compound wall.

Fresh Letter of Acceptance was issued to M/s. BGRESL Chennai on 02.03.2019. The project cost has been revised to

Rs.6,381 crores including Interest During Construction (IDC).

On receipt of the fresh Environmental Clearance on 11.12.2019, the Letter of Intent (LOI) for the new contract for executing the balance works on "as is where is basis" was issued to M/s. BGRESL Chennai on 12.12.2019, to complete the works by 36 months. M/s. BGRESL Chennai have commenced the Engineering works required for the projects.

The consent to Establish the project (CTE) got lapsed on 31.03.2019 and hence revised Consent to Establish (CTE) for the project has also been applied along with the new Environmental Clearance. As soon as the revised CTE from Tamil Nadu Pollution Control Board (TNPCB) is received, M/s. BGRSESL will commence the site works.

The project is expected to be commissioned during 2022-23.

4. Uppur Thermal Power Project (2 x 800 MW)

The total project cost including IDC is **Rs. 12,778 crores**.

M/s BHEL was awarded Boiler Turbine Generator (BTG) package on 27.02.2016 on EPC basis to complete the works by 42 months. M/s. Reliance Infrastructure Ltd. was awarded Balance of Plant (BoP) package on 21.02.2018 on EPC basis to complete the works by 36 months. M/s. L&T Ltd was awarded Sea water intake and outfall system on 08.05.2018 on EPC basis to complete the works by 36 months.

Completed Works

- Geo-technical investigation works.
- Piling works in Electro Static Precipitator (ESP),
- Mill, Boiler, Power House area have been completed.

Works under Progress

- Structural fabrication works in ESP I & II.
- Boiler column erection works are underway.
- Erection of underground Pipes in the sea water intake & Outfall system.

Out of the total project area of 995 acres, Patta land to an extent of around 355 acres is under litigation which is yet to be handed over to the BTG/ BoP Contractors. Writ petitions challenging the Land Acquisition Act have been filed by land-owners of the project site. Land acquisition for the Railway siding works for a stretch of 28 km has also to be taken up.

Another petition has been filed by Anaithu Vivasayikal Paathukapu Nalasangam in the High Court of Madras in December 2017, stating that a few areas of the project site are obstructing the surplus water flow from the nearby tanks.

In this regard, Ministry of Environment, Forest and Climate Change has issued an amendment on 29.10.2018 for the Environmental clearance accorded for the projects, stating that artificial canal shall be constructed to divert the surplus water from the nearby tanks to maintain the water flow to preserve mangroves in the creek. Counter has been filed by Ministry of Environment, Forest and Climate Change based on this Amendment. This case is pending in the Hon'ble High Court of Madras.

In addition to the above cases, the farmers of the area have filed an Appeal in the National Green Tribunal (NGT) in 2016, challenging the Environmental Clearance issued by Ministry of Environment, Forest and Climate Change for the project. This case is to be heard by the Tribunal.

Physical Progress :
Boiler Turbine Generator(BTG) - 39%
Balance of Plant (BoP) - 1 %

Sea Water Intake &
Out Fall System (SWIO) – 27 %

The project is expected to be commissioned during 2022-23.

5. Udangudi Thermal Power Project– Stage-I (2 x 660 MW)

The total project cost including IDC is **Rs. 13,077 crores.** LOI was issued to M/s. BHEL for Design, Engineering, Manufacture, Supply, erection, testing and commissioning of complete thermal power project, on EPC basis on 07.12.2017 to complete the works by 42 months.

Work for establishment of Captive Coal Jetty has been awarded to M/s. ITD Cementation India Limited on 13.02.2018 to complete the works by 30 months.

Completed Works

- Foundation work for Boiler & Electro Static Precipitator (ESP) Unit I & II Turbine Generator (TG) area and Chimney.
- Topographical Survey, Land investigation, Bathymetry Survey and Marine investigation in the Captive Coal Jetty.

- Approach Pile and Pile cap construction activities in the off shore for about 1 km from shore in the Captive Coal Jetty.

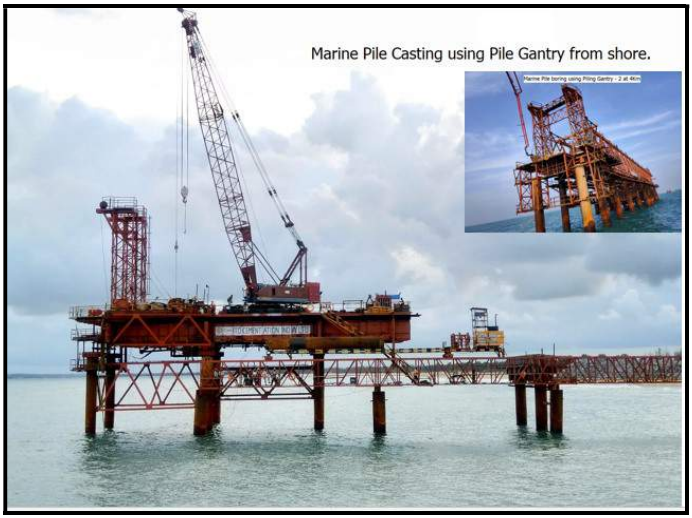
Work under Progress

- Chimney construction works, Boiler & ESP Structural erection for unit I & II.
- Approach Pile and Pile cap construction activities in the off shore from 3 Km to 4 km from shore as a next reach, Casting of PSC Girders and Accropode Pre casting & Pre casting of deck slab, Brake water construction at 8 km from shore & Construction of compound wall in the Captive Coal Jetty.

Physical Progress:
Power Plant : 31 %
Captive Coal Jetty : 28 %

The project is expected to be commissioned during 2021-22.


Placing of Boulders in the breakwater location (8.0 Km inside sea)



6. Kundah pumped storage hydro electric project (4x125MW)

The total project cost (as per 2013-14 price level) including IDC is **Rs.1,831 crore**. Now, after award of Electrical & Mechanical (E & M)

works EPC contract, revised project cost is expected to be around Rs. 2,900 crore (2019-20 price level).

All the statutory clearances required for the project have been obtained. The Environmental Clearance to this project expires on 07.05.2020. As directed by Ministry of Environment, Forest and Climate Change, application has been filed for fresh Terms of Reference (TOR) and it is expected to be issued in April' 2020.

EPC contracts in 2 packages for the Civil and Hydro Mechanical works have been issued to M/s. Patel Engineering on 15.02.2018. EPC contracts in 3 packages for Electrical & Mechanical works have been issued on 28.11.2019 to M/s. Megha Engineering & Infrastucture Ltd, Hyderabad to complete the works by 39 months.

Works under Progress

In respect of Civil and hydro mechanical works, the following are under way:

Mining and tunneling works pertaining to

- Main Access Tunnel.
- Cable Cum Ventilation Tunnel and Additionally Driven Inspection Tunnel (ADITs).
- Power House Cavern and Transformer Cavern.
- Tail race tunnels and
- Pressure Shafts I and II.

Site is yet to be handed over to Electrical & Mechanical works contractor.

Physical Progress in civil works:

Package I : 30 %

Package II : 8 %

This Project is expected to be commissioned during 2022-23.

7. KOLLIMALAI HYDRO ELECTRIC PROJECT (1 X 20 MW)

The total cost of the project is **Rs. 339 crore**

The project envisages for construction of Five Number of diversion Weirs / Fore bay in Kollimalai Hill ranges and Power House of 1x20MW capacity in Puliancholai Village, Namakkal District. Necessary orders for land acquisition have been issued by the Government.

The Project work commenced during October 2016 and works are under progress.

Completed Works

The survey works for various components of this project are completed.

Works under Progress

The various components of the project such as Power House, Power Tunnel, Surge Shaft, Penstock, Weir 3, Flume and Pipe Tunnel has been commenced.

Physical Progress : 20%

Financial progress : 15%

The project is expected to be completed by 2022-23.

SURGE SHAFT

WEIR FOUNDATION CONCRETE

1.6.2 New Projects

Nine nos. proposed new generation projects for an aggregate capacity of 13,110 MW are under various preliminary stages at a total cost of Rs.62,365 crores (excluding cost of Cheyyur UMPP) as detailed below:

Sl. No	Projects	Capacity in MW	Value in Rs. Crores
1	Ennore Replacement Thermal Power Project (1x660 MW)	660	5,400
2	Udangudi Expansion Project Stage II (2x660MW)	1,320	8,745
3	Udangudi Expansion Project Stage III (2x660MW)	1,320	8,745
4	Sillahalla Pumped Storage HEP(8x250 MW in 2 Stages)	2,000	7,000
5	Kadaladi Thermal Power Project (5x800 MW)	4,000	24,000
6.	Cheyyur Ultra Mega Power Project (4000 MW (5 x 800 MW); Total estimate: Rs. 25,970 crores	1,600 (share)	-
7.	Kadaladi Ultra Mega Solar Photo Voltaic Power Park Project (500 MW)	500	2350

8	Floating Solar PV Power Projects Theni, Salem and Erode districts	250	1,125
9	2 x 730 MW Gas Turbine Combined Cycle Power Project.	1,460	5,000
	TOTAL	**13,110**	

1. Ennore Replacement Thermal Power Project (1 x 660 MW)

The total project cost including IDC is **Rs.5,400 crore.** This project has been proposed in place of the Ennore Thermal Power Station which has been decommissioned on 31.03.2017.

Terms of Reference (TOR) for the project has been issued by Ministry of Environment, Forests and Climate Change (MoEF&CC) New Delhi on 25.07.2014. DPR for the new Replacement project was received from consultant on 21.07.17. The Expert Appraisal Committee meeting of MoEF & CC was held on 30.08.2017 and the committee considered the project proposal but stated that a Sub-

Committee may be sent to visit the project site to ascertain the Environmental conditions.

The committee on visit, directed to furnish certain documents related to Environmental conditions, study of assessing Ambient Air Quality (AAQ) in and around ETPS, Replacement Thermal Power Project area and the Study of Bio-accumulation of plant and water quality in Buckingham canal was directed to be carried out. Ambient Air Quality study and the study of Bio-accumulation of plant and water quality in Buckingham canal have been completed.

Based on the above reports Post-Project Impact to be studied by the Environment Impact Assessment Consultant and the study reports received. MoEF&CC has to be approached with the study reports for issue of Environmental Clearance.

The project is expected to be commissioned in the year 2024-25.

2. Udangudi Thermal Power Project Stage–II (2 x 660 MW)

The total project cost including IDC is **Rs.8,745 crores**.

Land acquisition and various other related activities are under progress. Ministry of Environment, Forest and Climate Change (MoEF&CC), Government of India has directed TANGEDCO to approach the Ministry after awarding the work of Udangudi Stage I, for considering the issue of Terms of Reference (ToR) for Stages II & III. As the contract for establishment of Udangudi Stage –I has been awarded, the MoEF&CC will be approached shortly by TANGEDCO .

The project of Stage II is expected to be commissioned in the year 2026-27

3. Udangudi Thermal Power Project Stage–III (2 x 660 MW)

The total project cost including IDC is **Rs.8,745 crores**.

Land acquisition and various other related activities are under progress. MoEF & CC, Government of India has directed TANGEDCO to approach the Ministry after awarding the work of Udangudi Stage I, for considering the issue of Terms of Reference (ToR) for Stages II & III. As the contract for establishment of Udangudi Stage –I has been awarded, the MoEF&CC will be approached shortly by TANGEDCO. The project of Stage III is expected to be commissioned in the year 2026-27.

4. Sillahalla Pumped Storage Hydro Electric Project (2,000 MW-8x250 MW in 2 Stages of 4x250 MW each)

The total cost of the project is **Rs. 7,000 crores.**

In the first instance, Stage I (1000 MW) of the project with proposed new Sillahalla reservoir as Upper Reservoir and a new reservoir below the existing Kundah palam as lower reservoir is taken up. Consultancy services towards preparation of DPR conducting all geo-technical investigation works, EIA study, getting all necessary clearances for the Stage I of this project has been awarded to M/s. WAPCOS on 23.1.2019. Feasibility Report has been approved by TANGEDCO on 09.07.2019. Tamil Nadu Infrastructure Development Board (TNIDB) have sanctioned an amount of Rs. 21.83 crore as grant for the above consultancy work.

The proposal for Terms of Reference (TOR) was considered in the MoEF&CC's Expert Appraisal Committee (EAC) meeting held on 31.10.19. The sub-committee of EAC visited the project site on 6.12.2019. ToR is awaited. Further, the survey works for preparation of DPR are in progress.

Copies of Feasibility Study Report have been submitted to the Appraising Directorates of Central Electricity Authority/Central water Commission (CEA/CWC) for pre-DPR stage clearances.

The Stage I of the project is expected to be commissioned in 2025-26.

5. Kadaladi Thermal Power Project, Ramanathapuram District (5x800 MW)

The total project cost is **Rs.24,000 crores**. The MoEF & CC, in its Expert Appraisal Committee meeting has directed TANGEDCO to explore 3 new sites, as the sites already proposed fall within the buffer zone of Gulf of Mannar Biosphere Reserve Area. It is proposed to shift the site suitably away from the buffer zone. Alternate sites are being identified.

6. Cheyyur Ultra Mega Power Project (5 x 800 MW)

The total project cost is **Rs. 25,970 crores**. This is a project being developed by Government of India with private sector participation through Power Finance Corporation. Tamil Nadu will get 1,600 MW power from the project as its share. Environmental clearance has been received for the project on 30.09.2013. Land acquisition for port and plant completed for entire patta land to an extent of 623 acres and possession has been taken by M/s. Coastal Tamil Nadu Power Limited (CTNPL) (Special Purpose Vehicle).

As most of the utilities have opted out of the project, it has been proposed for closure by M/s. PFC Consulting Limited (PFCCL) with Ministry of Power (MoP) and recommendation of TANGEDCO on closure of project to MoP through Government of Tamil Nadu (GoTN) is under process.

7. Kadaladi Ultra Mega Solar Photo Voltaic Power Park Project (500 MW)

The total cost of the project including IDC is **Rs. 2,350 crores**. Approval from MNRE obtained on 08.12.2017 and approval from Government of Tamil Nadu was issued, for establishment of the project in Narippaiyur and nearby villages in 900 Hectares of land on EPC contract basis under State Sector. Land acquisition is under progress. Administrative sanction for Land acquisition was issued on 19.11.18, for 21.62.50 hectares of Poromboke Land and 1611.10.50 hectares of Patta Land.

Meanwhile, Writ petitions (PIL) have been filed by the land owners at Madurai Bench of the Madras High Court challenging that livelihood of the land owners are affected by acquisition of Patta lands for establishment of this Project. Counter prepared by TANGEDCO and handed over to standing counsel.

The Coastal Regulation Zone (CRZ) Demarcation of the site has been carried out

through Institute of Remote Sensing (IRS), Anna University.

In the meantime, M/s. Solar Energy Corporation of India (SECI) have offered to invest and develop the Solar Project in the land to be provided by TANGEDCO on Build Own Operate (BOO) basis. However, TANGEDCO will off take 100% power generated in the solar park.

Ministry of New and Renewable Energy (MNRE), Government of India, has issued the necessary amendment on 15.10.18 that TANGEDCO will be the Solar Power Park Developer (SPPD) instead of TNEB Ltd and SECI will be the Solar Project Developer (SPD).

Geotechnical investigation study conducted and report received. Geohydrology and rain water harvesting study by Anna University is received. Revised Detailed Project Report was received from the consultant and sent to MNRE. SECI has informed to identify the alternate site near Kamuthi instead of Kadaladi in order to reduce the

project cost towards the establishment of transmission infrastructure.

The District Collector/Ramanathapuram has also opined to find some other suitable location. In this regard, an alternative site have been identified near Kamuthi for the establishment of above Solar Power Project. Negotiations are being carried out by Special Officer for the lands proposed for the project near Kamuthi.

The project is expected to be commissioned in 2020-21 subject to acquisition of land.

8. Floating Solar PV Power Projects in Theni, Salem and Erode districts (250MW)

The total cost of the project is **Rs. 1,125 crores**. For establishing this project, Vaigai, Mettur and Bhavani Sagar Reservoirs have been identified and initial works are under progress. M/s. SECI has been authorized to execute this project with 100% funding from World Bank Loan. The power from this project shall be procured by TANGEDCO at the tender

discovered tariff rate subject to the approval by the Hon'ble Tamil Nadu Electricity Regulatory commission (TNERC).

9. Combined Cycle Gas Turbine Power Project (2 x 730 MW).

To cater the rising demand of Chennai city, it is proposed to install **2 numbers of combined cycle gas turbine power projects of capacity 730 MW** each, in and around Chennai at a tentative total cost of **Rs.5,000 crore**, utilizing Regasified-Liquified Natural Gas (R-LNG) stored in M/s. Indian Oil Corporation Limited (IOCL) terminal at Ennore**.**

Tender for providing consultancy services for the preparation of feasibility report is under process.

Transmission

Transmission

The continuous development of transmission infrastructure is vital to meet the increasing power demand of the State and to improve the quality of power delivery. To facilitate evacuation of power from generation capacity addition planned every year and its delivery to the load centre, development of robust transmission network in the State is highly essential. To meet the above objectives, TANTRANSCO is consistently planning and executing additional transmission infrastructure at voltage levels of 110 kV and above.

In the past, TANTRANSCO has built more infrastructures at 110 kV and 230 kV levels predominantly. In recent years due to the technology developments, TANTRANSCO is focusing more on development of 230 kV, 400 kV and 765 kV levels network for transfer of bulk power across the State from ongoing and

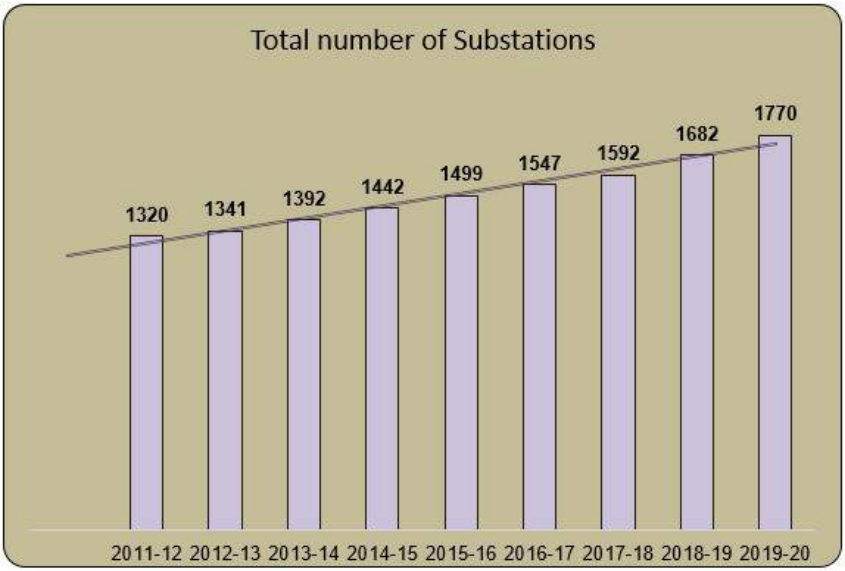
upcoming power plants in the State**. TANTRANSCO is the first State power Utility in India to plan and execute four 765 /400 kV Substations in different parts of the State.**

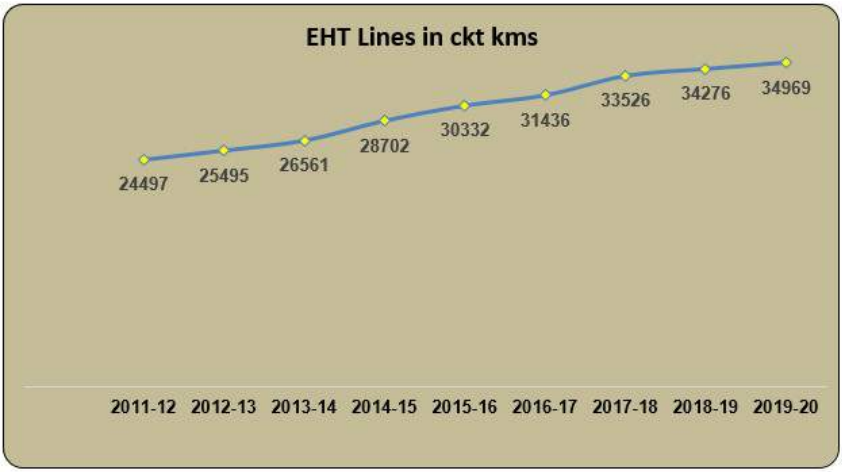
An extensive network of substations and transmission lines has been developed over the years for evacuating power from the generating stations and its delivery to the load centre. The details of transmission network as on 31st January 2020 and the year-wise network developed from the year 2011 are given below.

Existing network details as on 31.01.2020

S.No	Substation	Number of substations
1	765 kV	4 * (PGCIL SS)
2	400 kV	27 **
3	230 kV	105
4	110 kV	889
5	66 kV	03
6	33 kV	742
	Total Substations	1770
	EHT lines	**34969.068 Circuit kms**

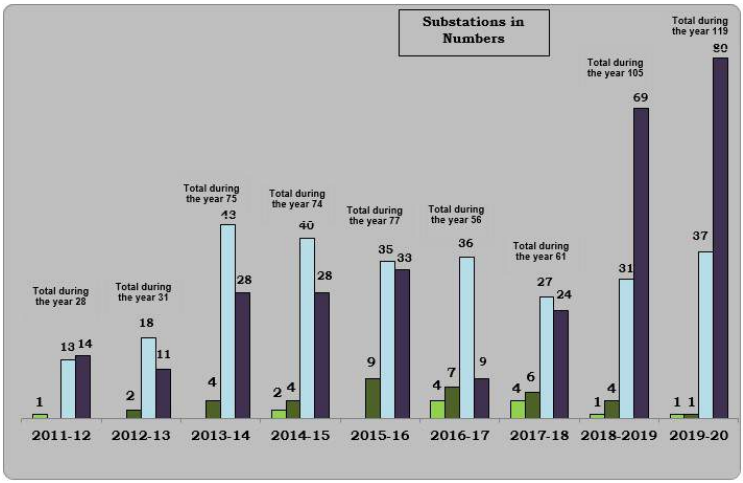
(Note *3 substations initially charged at 400 Kv level,
**11 nos. are PGCIL SS)


Total number of Substations
1320
1341
1392
1442
1499
1547
1592
1682
1770
2011-12 2012-13 2013-14 2014-15 2015-16 2016-17 2017-18 2018-19 2019-20


EHT Lines in ckt kms
24497
25495
26561
28702
30332
31436
33526
34276
34969
2011-12 2012-13 2013-14 2014-15 2015-16 2016-17 2017-18 2018-19 2019-20

Year wise Substations commissioned and EHT lines energized from the year 2011

S.No.	Year	Number of Substation commissioned (including 33kV SS)	EHT lines Energised in circuit kms
1	2011-12	28	691.072
2	2012-13	31	1268.05
3	2013-14	75	1436.391
4	2014-15	74	2634.147
5	2015-16	77	1987.679
6	2016-17	56	1487.437
7	2017-18	61	2208.951
8	2018-19	105	1190.815
9	2019-20 (Upto Jan2020)	119	861.435
	Total	**626**	**13765.977**



Capacity	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-2019	2019-20
400kV	1	0	0	2	0	4	4	1	1
230kV	0	2	4	4	9	7	6	4	1
110kV	13	18	43	40	35	36	27	31	37
33kV	14	11	28	28	33	9	24	69	80
Total	28	31	75	74	77	56	61	105	119

1.7.1 Major schemes commissioned during 2019-20:

During 2019-20, 1 no. 400 kV substation at Thennampatty in Tuticorin District and 1 no. 230 kV substation at Uddanapally in Krishnagiri have been commissioned.

Thennampatty 400 KV SS – Tuticorin District

Uddanapally 230 KV Substation (1000th EHV Substation) in Krishnagiri

Inauguration of Perambalur 110/11kV SS in Dharmapuri District along with 91 substations in 27 districts through video conferencing at Secretariat on 29.01.2020 by the Hon'ble Chief Minister of Tamil Nadu

1.7.2 Infusion of new Technology in Transmission Network

1. Establishment of Digital Substations in Tamil Nadu

Traditionally substations have used circuit breakers, current transformers (CT), voltage transformers (VT) and protection relays all wired together using copper cables. With advances in digital technology, communications and

standards, this is now changing to what is known as the digital substation. The first digital substation adopting digital technology in the communication network between Control and Relay (C&R) Panels and yard equipments, for reducing the time for rectification of fault and early restoration of supply has been proposed at Selvapuram in Coimbatore district with a scheme cost of Rs.65 crore. The works for this digital substation are under progress and is expected to be commissioned during 2020-21.

Apart from the above, two more digital substations, one at Karuppur in Salem district and another at Thiruvanmiyur in Chennai district are under construction and these digital substations are expected to be commissioned during 2020-21.

2. Emergency Restoration System (ERS)

The natural disasters such as flood and cyclone cause extensive damages to transmission networks. As immediate and Temporary

restoration of Transmission network is possible by ERS System, it is proposed to purchase 2 sets of Emergency Restoration System (ERS) suitable up to 765 kV at a cost of Rs.30 crore. Procurement activities are under process for the ERS System.

3. High Temperature and Low Sag Conductor (HTLS)

To enhance the power transfer capability of the existing Transmission lines without changing

the towers or expanding the Right of Way (RoW) or upgrading the transmission voltage level, TANTRANSCO has planned to strengthen the Transmission network by replacing the existing conductor using High Temperature Low Sag conductor (HTLS). Initially, 2 nos. 110 kV schemes are evolved with replacement of existing conductor with HTLS conductors at a cost of Rs.63.66 crores, in which works are completed in 110 kV line from Kundah PH - II to Thudiyalur 230 KV SS and commissioned during December 2019 and works are in progress for Kodayar–Kayathar 110 kV line.

1.7.3 Major Transmission Schemes for development of State Grid

765 kV substations:

765 kV network will be formed with establishment of 4 Nos 765 kV Substations at North Chennai Gas Insulated Substation (GIS), Ariyalur, Virudhunagar and Coimbatore with associated 765 kV lines for transfer of bulk power

from generating stations and for transfer of interstate power with downstream connectivity for effective distribution of generated power from Thermal, Solar and Wind Power Plants.

- **North Chennai 765 kV GIS Pooling Station** has been planned to evacuate power from the upcoming thermal power projects located in North Chennai and Ennore area. Works are under progress for Substation & its associated lines and expected to be completed during 2020-21.

- **Ariyalur 765 kV SS** has been planned to transfer the power pooled at North Chennai 765 kV pooling Station and power sourced from other states.

  Works are under progress for Substation. Work completed for its associated lines. The work of Ariyalur 765 kV SS is expected to be completed during 2020-21.

- **Virudhunagar 765 kV SS** has been planned to evacuate power from upcoming Power project in Uppur (2x 800 MW). In addition, this Substation is to facilitate evacuation of existing, upcoming and proposed Renewable Energy (RE) power generation in southern areas of Tamil Nadu for transferring to load centre.

  Work has been awarded for Virudhunagar 765 kV Substation and its associated 765 kV Line from Virudhunagar to Coimbatore. This Substation is expected to be completed during 2022-23.

- **Coimbatore 765 kV SS** has been planned to transfer power pooled at North Chennai pooling Station through Ariyalur 765 kV SS and to transfer interstate power to the load centres. Administrative approval has been accorded for establishment of 765 kV

substation at Coimbatore and land registration is in final stage.

ARIYALUR 765 KV SS – VILLUPURAM DISTRICT

North Chennai 765 kV GIS Pooling Station

1.7.4 Building Robust Greater Chennai Electric Grid

Apart from the 765 kV network indicated above, the following schemes are proposed for the improvement of Chennai Electric Grid.

1. 400 kV Network

To evacuate power from generators located in Gummidipoondi and North Chennai, 400 kV Substations at Thervoikandigai and Pulianthope (GIS) have been planned. Thervoikandigai SS has been charged at 230 kV level and 400 kV line works are under progress. Pulianthope (GIS) SS is under way and will be commissioned in 2020-21.

A 400 kV GIS SS at Taramani in IT Corridor has also been planned and works started recently. Further, land acquisition is under process for establishment of 400 kV GIS at Koyambedu.

2. 230 kV Network

To strengthen the Greater Chennai Electric Grid, 10 Nos 230 kV Substations have been planned at Mambalam (GIS), Thiruvanmiyur (GIS), Ennore (GIS), Ganesh Nagar (GIS), Panjetty (GIS), Avadi, Maraimalainagar, K.K.Nagar (GIS), Pallavaram(GIS) and Mambakkam.

Works are under progress for Thiruvanmiyur (GIS), Mambalam (GIS) and Mambakkam substations. Tendering is under various stages for the balance substations.

1.7.5 Network development proposed in various parts of the State other than Chennai

1. 400 kV Substations

TANTRANSCO has proposed to establish 5 nos. 400 kV substations at Vellalaviduthi, Edayarpalayam, Ottapidaram, Samugarengapuram and Parali for system strengthening and for power evacuation. Works are under progress for Vellalaviduthi 400 kV SS. Work awarded and

commenced for Ottapidaram and Edayarpalayam 400 kV SS.

Floating of tender is under process for Parali 400 kV Substation.

2. 230 kV substations

TANTRANSCO has proposed to establish 20 nos. 230 kV substations throughout the State other than Greater Chennai, for system strengthening and flexibility of operation. Works are under progress for substations at Karuppur, Singarapet, Samayanallur, Thirupathur, Sankarapuram, Selvapuram, Thuvakudy, Kalivelampatty and Erode GIS.

Work awarded and commenced for Nanguneri and Vembakkam 230 kV substations. Tender under process for Narimanam, Sathumadurai and Nallur. Tendering is under various stages for substations at K.Pudur (GIS), Rajagopalapuram (GIS), Thackalay (GIS), Muppandal, Poolavady and Saravanampatty (GIS).

1.7.6 Externally aided Projects

1. Projects funded by Japan International Cooperation Agency (JICA)

Under the Official Development Assistance (ODA) Loan of JICA, funding assistance amounting to Rs.3,572.93 crores have been sanctioned for establishing 5 nos. 400 kV substations and 12 Nos. 230 kV substations along with associated transmission lines towards the total scheme cost of Rs.5,000 crores.

Out of 5 nos. 400 kV substations, 3 nos. 400 kV Substations at Karamadai, Manali and Sholinganallur 400 kV substations have been commissioned. Works are in progress for Guindy 400 kV GIS and tender is under finalisation for Korattur 400 kV GIS .

Guindy 400 KV GIS –Chennai District

Out of 12 nos. 230 kV substations, 9 nos. 230 kV substations at Alandur (CMRL), Karuvalur, Echur (Purisai), Kinnimangalam, Poiyur, Ambattur III Main Road, R.A.Puram, Kumbakonam and CMRL Central have been commissioned. Works are under progress for 3 nos. substations at Tiruppur and Shenbagapudur and TNEB Head Quarters.

The schemes under JICA Funding is expected to be completed during 2021-22.

2. Projects funded by KfW (German Development Bank), Germany

Ministry of New and Renewable Energy (MNRE) recommended assistance for a portion of creation of the transmission network infrastructure for Rs. 1,462.69 crore to Ministry of Finance/Government of India. Project cost has been revised after inclusion of GST to Rs. 2,049.392 crore.

The schemes are being implemented with the financial assistance of Rs. 538.91 Crores as Grant under National Clean Energy Fund (NCEF), as soft Loan of 76 Million Euro from KfW German funding under Indo German Bilateral Co-operation and the balance as Equity by TANTRANSCO.

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. 230 kV lines and augmentation of 17 nos. auto transformer capacity in 6 nos.

existing 230 KV substations are covered under this funding.

As on date, Thennampatty 400 kV SS, 400 kV DC line from Thennampatty to Kayathar, 4 nos. 230 kV lines with a length of 215.779 kms and 12 nos. 160 MVA Transformers have been commissioned. Balance works under this funding are in progress and are expected to be completed during December 2020.

3. Schemes under Chennai – Kanyakumari Industrial Corridor Project funded by Asian Development Bank (ADB)

For availing loan assistance from Asian Development Bank, under Chennai – Kanyakumari Industrial Corridor (CKIC) Project, schemes comprising 765 kV substation at Virudhunagar and 400 kV substation at Ottapidaram with their associated lines at a cost of Rs. 4,987 crores have been proposed.

Loan agreement has been signed between Government of India and ADB on 28.11.2019 for

an amount of 451 Million USD, for Chennai-Kanyakumari Industrial Corridor projects in TANTRANSCO. Government of Tamil Nadu has issued order for fund assistance of Rs.1000 crore for this project.

Work has been awarded and commenced for Ottapidaram 400 kV SS and its associated 400 KV Lines. Work has also been awarded for Virudhunagar 765 kV Substation and its associated 765 kV Line from Virudhunagar to Coimbatore.

1.7.7 Schemes proposed for Intra-State Green Energy Corridor (Phase II)

For availing Ministry of New & Renewable Energy (MNRE) Grant under Green Energy Corridor Phase – II, schemes comprising 1 no. 400 kV SS at Samugarengapuram, 3 nos. 230 kV substations at Poolavady, Muppandal and Kongalnagaram and 400 kV DC line from Kamudhi to Thappagundu at a total cost of Rs. 1,609 crore has been sent to Central Electricity Authority

(CEA) and MNRE for approval. CEA approval has been received for an amount of Rs. 1,355.14 crore. Approval is awaited from MNRE.

ABSTRACT OF SCHEMES AVAILABLE FOR EXECUTION

(AS ON 31.01.2020)

Sl. No.	Voltage Rating	Number of substations	Total Scheme cost in Rs crore
1	765 kV	4	12,454.43
2	400 kV	10	6,527.89
3	230 kV	34	4,386.59
4	110 kV	119	1,998.97
	Total	**167**	**25,367.88**

1.7.8 New Initiatives

1. HOT LINES

Hot Line / Korattur wing was established in the year 1957. It is the first Hotline wing in TNEB. Initially Hotline crew members were trained in Hot

Stick method. Hot line works by Hot stick method are being taken up by utilizing special Tools & Plants (T&Ps) viz Fibre Reinforced Plastic (FRP) sticks, Ropes, Hardwares etc. The total cost of the T&P procured for Hot stick method is around Rs 1.62 crore. By this method, the replacement of insulator, jumper, conductor clamps tightness, provision of Bye pass jumpers etc **in EHT Live Lines were carried out upto 230 kV**.

In later advancement of Hotline Procedures, the crew members were further trained in **Bare Hand method** upto 400 kV. By this method, the Insulator **replacement works can be carried out in an effective manner in Live EHT lines upto 400 kV**. And also Bare Hand training in Switch Yard Maintenance technique upto 400 kV voltage level were given for attending replacement of damaged conductor clamps, Hot Spot in the clamps.

Having trained in Bare Hand Works, the following materials at a cost of about **Rs 8.50 lakhs** were procured to take up the bare

hand works since the existing equipments are not suitable for bare hand works.

- POLY DECRON ROPEHAND LINE HOOKS
- RATCHET WRENCHES
- BARE HAND SUIT WITH CONDUCTIVE SOCKS, GLOVES AND SHOES
- This suit is made up of 25% stainless steel fiber and 75% of Nomex (synthetic fiber).
- VARIOUS TOOLS AND PLANTS FOR BARE HAND WORK
- BARE HAND WORKING CHAIR AND HOOKS

By utilizing the above bare hand tools, 400 kV operations were carried out for the first time at Alamathy 400 kV SS on 14.11.2019 in live line.

Further, purchase order for supply of Hotline Water Washing System Vehicle has been issued during January 2018 at a cost of Rs 52.33 lakhs. The same is about to be delivered shortly around last week of February 2020. It comprises of 5000 litres water tank to carry Demineralised (DM) water and hose reel of 2 sets each of 150 meter length with 11 seats. This vehicle can be

effectively utilized in the washing of tower line insulators upto 765 kV and Substation Equipments in the coastal regions and highly polluted areas. By this washing method, the unnecessary tripping of feeders due to failures of insulation resistance can be avoided in the highly polluted industrial and coastal areas.

2. Reliable communication

To provide reliable Optical Ground Wire (OPGW) based Fibre Optic Communication with Data Acquisition system to all stations of 110 kV & above level in the state of Tamil Nadu for catering data & voice as well protection requirements for Grid Management, Natural Disaster Management and new technological requirements such as Special Protection Scheme, Automatic Defense Mechanism, Substation Automation, Phasor Measurement System etc., for the existing, new/ upcoming sub stations/

Generating stations and Control Centres in Tamil Nadu.

In this project, 10,770 kms of OPGW has to be laid for connecting around 800 nos. of 110 kV substations. Multi Protocol Label Switching – Transport Profile/Synchronous Digital Hierarchy (MPLS–TP/SDH) based Optical Line Transmission Equipments (OLTEs), Remote Terminal Units (RTUs) and Battery & battery chargers have to be provided in these substations for data acquisition under this scheme.

The estimated total project cost for the Reliable communication scheme is Rs. 480 crores. The works have been awarded and commenced. The estimated cost of fibre optic end equipments is Rs. 100 crore. Specification is under preparation for end equipments such as OLTE, Multiplexer, RTU, Battery & chargers.

Ministry of Power, vide their order dated 15.11.2017, have sanctioned grant of Rs.155.48 crore (Rs. 105.93 crore for OPGW & Rs. 49.55 for end equipments) under Power System Development Fund (PSDF) for the implementation of the above scheme in Tamil Nadu.

Tamil Nadu Fibre Net Corporation Limited (TANFINET, a subsidy of Govt. of Tamil Nadu) has requested 50% of fibres to be laid under Reliable Communication scheme for implementing their Bharat Net project. The proposal for sharing of cost is under consideration of GoTN.

3. Renewable energy management centre(REMC)

Renewable energy management include Real time renewable energy (RE) generation data visibility to the grid operator/State Load Dispatch Centre (SLDC), RE forecasting and scheduling on short term basis enabling large scale integration of RE generation for better and economical grid operation.

The Ministry of Power, Govt. of India, through PGCIL has provided funds to a tune of Rs.49 Cr as Grant for implementation of REMC project in Southern region including Tamil Nadu. All the works relating to setting up of Renewable energy management centre (REMC) at SLDC have been completed and was **inaugurated by the Hon'ble Minister for Electricity and Prohibition & Excise on 28.02.2020.**

Inauguration of Renewable energy management centre (REMC) by the Hon'ble Minister for Electricity and Prohibition & Excise on 28.02.2020

Distribution

1.6 Distribution

Distribution is the crucial link in the electricity supply chain. It assumes great significance as this segment has a direct impact on the sector's commercial viability and ultimately on the consumers. With a vast network, the continuous growth of population followed by advancements and improvements in complex electric power systems has raised big challenges, to provide, assure and enhance power system sustainability and efficiency.

Apart from the space constraints, higher land cost, right of way (RoW) issues, currently the major issue to be faced by the Distribution network is integration of distributed renewable energy. High penetration of renewable energy connected to the distribution network could lead to various technical issues in the network and may be a challenge to maintain grid stability. Introduction of charging infrastructure for E-

vehicles will have a major challenge in augmentation of distribution network.

Power distribution is a complex system which requires effective planning and augmentation, thereby ensuring technical up-gradation and stable power supply to the consumers. The State utility having understood the importance of the distribution sector, is striving hard to meet the increasing demand.

1.8.1 Salient Features

During the year 2019-20 (as on 31.01.2020), **80 nos. 33 kV substations, 5,718 kms of LT lines, 3,566 kms of HT lines and 13,797 distribution transformers** have been energized. Further, new service connections have been effected to **7.48 lakhs** new consumers during the year 2019-20.

Category wise total number of consumers being served in the State by TANGEDCO as on **31.01.2020** is as follows:

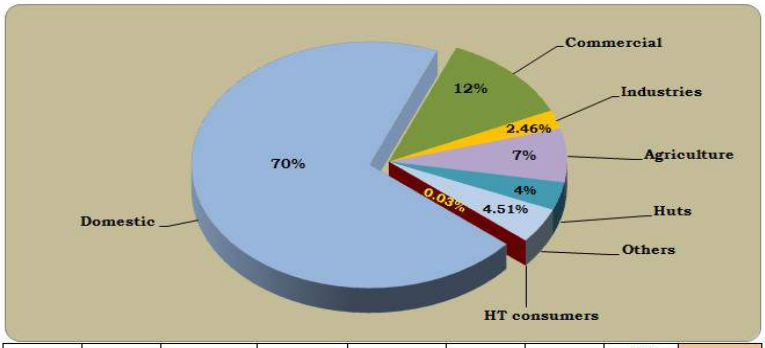
Sl. No.	Category	Numbers in Lakhs	Number of new service connections effected	
			During 2019-20(as on Jan 2020)	Since 2011 (upto Jan 2020)
	HT Services	0.1 (10229 nos)	0.006 (574nos)	0.04 (3999 nos)
	LT Services			
1	Domestic	212.49	4.83	53.50
2	Commercial	36.44	1.06	13.51
3	Industries	7.47	0.23	2.11
4	Agriculture	21.40	0.20	1.68
5	Huts	11.20	-	0.16
6	Others	14.17	1.16	7.59
	Total	**303.27**	**7.48**	**78.59**

New service connections effected since 2011

Distribution Transformers, LT lines and HT lines added since 2011

	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Transformers in nos.	9125	8369	9936	15524	17281	18020	11273	16167	13797
LT lines in kms	11010	10773	10007	10473	11121	9244	8936	6407	5718
HT lines in kms	2979	2486	4088	3686	3548	3426	2894	3628	3566

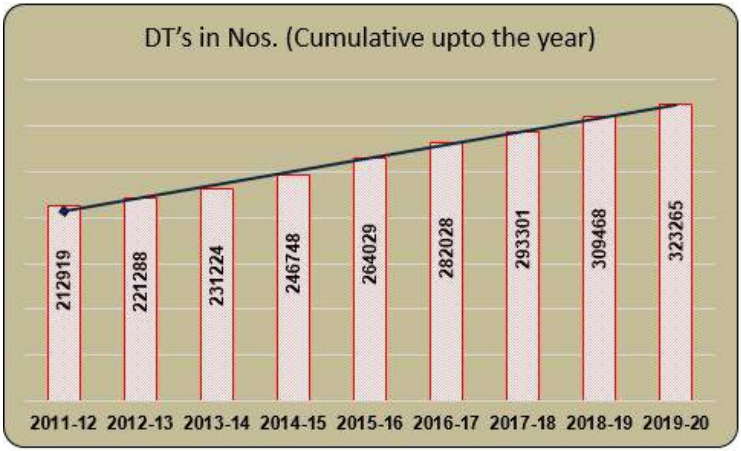
Category wise total number of consumers as on 31.01.2020

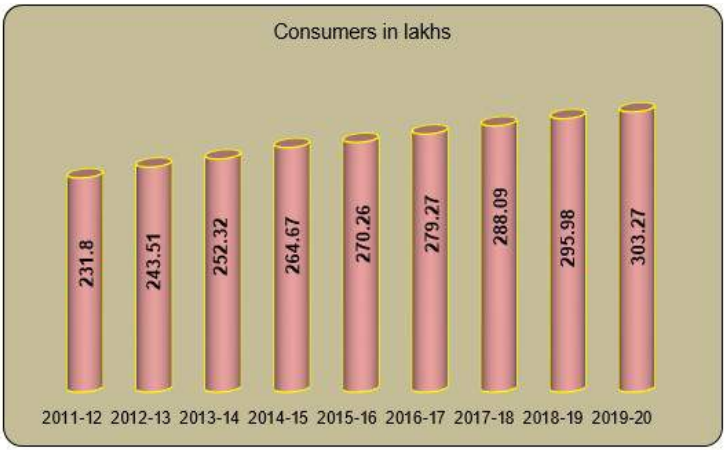


Category	Domestic	Commercial	Industries	Agriculture	Huts	Others	HT services	Total
Total Number (in lakhs)	212.49	36.44	7.47	21.4	11.2	14.17	0.1 (10229 Nos)	303.27

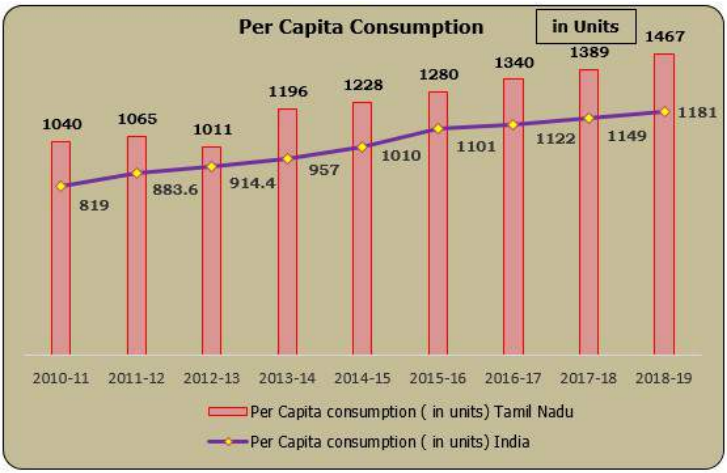
Cumulative total length of High Tension lines and Low Tension lines since 2011

Cumulative number of Distribution transformers since 2011





As an indication of growing demand for electricity in the State, the state's **per capita electricity consumption** has reached 1,467 units in 2018-19, compared to 1,389 units during the previous year. The percentage increase of per capita consumption is 5.6%. Also, this is 24% more than the national per capita consumption of 1,181 units during the year 2019.



Also, the **consumption of energy of the state** has increased to 1,13,495 Million Units in the year 2018-19 compared with 75,032 Million Units in 2010-11.

1.8.2 Strengthening of Distribution network

Distribution network being the last mile connectivity in the electrical infrastructure needs to be regularly monitored and requires continuous augmentation. Day to day challenges need to be addressed in the context of dynamic consumer requirements, to ensure uninterrupted reliable supply to all categories of consumers.

During the year 2019-20 upto 31.01.2020, around 36,885 damaged poles have been replaced to ensure safety, around 2825.565 kms of aged conductors have been identified and replaced, 5,308 Nos. guarding have been provided in road crossings and low sagging lines of about 68,312 locations have been rectified under improvement works throughout the State. Additionally, the height of 2,795 pillar boxes have been increased in Chennai alone.

1.8.3 Enhancement of Distribution network in Greater Chennai

Chennai has met an all time high peak demand of 3,738 MW on 18.06.2019 and this is 5.68% more than that of the previous year. Further, the all time high per day energy consumption of 64.73 million units met on 02.06.2017.

During the year 2019-20 upto 31.01.2020, around 4,275 damaged poles have been replaced to ensure safety, 151.44 kms of aged conductors

have been identified and replaced, and low sagging lines of 4,476 locations have been rectified in Greater Chennai under improvement works.

Apart from this, in order to cater the ever rising demand of Chennai and in order to strengthen the network, 3 substations, 6 nos. 33 kV feeders and 68 nos. 11 kV feeders have been commissioned. Further, 1,387 nos Distribution Transformers have been energized and 193 MVA of Power Transformer capacity have been added to the network.

Schemes executed with own funds exclusively in Greater Chennai

In order to further strengthen the Greater Chennai network to ensure reliable quality supply, works are under progress to establish 33 nos. substations and 36 numbers 33 kV feeders. Apart from this to build a robust networks following

schemes are also under progress to ensure not only uninterrupted power supply but also safety.

1. Conversion of existing Overhead(OH) lines into Underground (UG) Cables

As Chennai has a long coastal line, it is often prone to natural calamities. Also, Chennai and its suburban areas are thickly populated, which are vulnerable to accidents. Hence, to handle natural calamities and to prevent occurrence of accidents with secured network, it has been proposed to convert the existing 2,004.89 kms of High Tension overhead lines and 33,307.81 kms (10,755.22 kms of LT lines and 22,552.59 kms of service cables) of Low Tension overhead lines, into underground cables at an estimated amount of Rs.2,567 crore, funded by M/s. PFC Ltd., New Delhi.

The conversion works were proposed to be taken up in 8 packages, grouping them based on the geographical location for 1,281.50 kms of

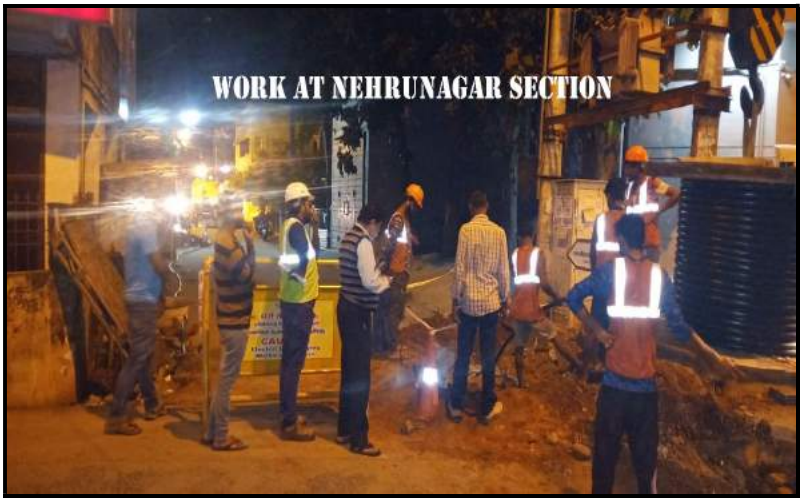
High Tension overhead lines and 5,251.80 kms of Low Tension overhead lines and balance works of conversion will be taken up by TANGEDCO.

In the first phase, work orders have been issued for Tambaram (1,230 km of HT & LT) and Perambur (653 km of HT & LT) divisions and cable laying work has been completed to a length of around 107 kms in Perambur division and around 223 kms in Tambaram division. Orders have been issued for Avadi (561 kms of HT & LT) and Adayar & IT corridor (822 kms of HT & LT) divisions and survey works are under progress. The above works are expected to be completed during 2020-21. The works under balance packages will be taken up in a phased manner.


Cable Termination - Agaram - CKM Colony
TANGEDCO
எச்சரிக்கை
CAUTION
Electric Cable Laying
Works in Progress
Cable Laying works - Agaram - Jambulingam Main Road


Entry/Exit Pit Excavation - Poombuhar Nagar Section - CKM Colony
CAUTION
Pit Works - Poombuhar Nagar Section - Rajeswari Nagar 5th Cross Street


HDD works – Thiru. Vi. Ka. Nagar Section – Ayyavu Street
GPR Survey - Retteri Section – KVR Nagar


WORK AT NEHRUNAGAR SECTION


WORK AT CHITLAPAKKAM SECTION

2. Conversion of existing Distribution Transformer (DT) structures to Ring Main Units (RMUs) in Chennai suburban areas

In order to reduce the downtime due to supply interruption to the consumers in Chennai city and its suburban areas, it has been proposed to replace 13,810 Nos. of existing DT structures into 11 kV RMUs at an estimated cost of Rs.1,819 crore. In the first phase, it has been programmed to replace 5,692 Nos. of DT structures with RMUs at a cost of about Rs.785 crore, for which tender is under finalization. Works are expected to be completed by 2020-21.

3. Replacement of Pillar Box with High Rupturing Capacity (HRC) fuse MS 6 way Pillar Box in Chennai Region

Chennai being in coastal area, the pillar boxes are prone to rust which damages the doors and the internal parts of the pillar box, resulting in frequent power supply interruption and lacking

safety. In order to minimize power interruptions, ensure safety and for modernization, it was proposed to replace the existing pillar boxes by High Rupturing Capacity (HRC) fuse MS 6 way pillar boxes in Chennai region in a phased manner. These modern HRC fuse pillar boxes are small in size with inbuilt parts and do not cause much hindrance to the general public. Further, damages of inbuilt parts due to excessive heating is avoided thus ensuring safety and reduction of losses.

Accordingly, it has been proposed for replacement of 33,225 Nos. of existing pillar boxes with new HRC pillar boxes at an estimated amount of Rs.389 crore, funded by M/s. Rural Electrification Corporation (REC). Tender process is under progress for this proposal and works are expected to be completed by 2021-22.

1.8.4 Schemes executed with own funds in Tamil Nadu including Chennai

1. Ujwal Discom Assurance Yojana (UDAY)

The Ujwal DISCOM Assurance Yojana (UDAY) was launched on 20.11.2015 by the Government of India for operational and financial turnaround of State owned Power Distribution Companies (DISCOMs). Tripartite agreement was signed amongst MoP/Govt. of India, Govt. of Tamil Nadu and TANGEDCO on 09.01.2017 for effective implementation of UDAY scheme in Tamil Nadu.

Objective: To Reduce the AT&C losses of TANGEDCO.

After conducting intensive study of the distribution network, the following HT strengthening works are proposed for the reduction of AT&C losses in all the nine regions:

S.No	Description	Quantity
01	Erection of new 33/22/11 kV	2990 km
02	Replacement /	18,920

Procurement of materials is under progress for these works.

2. Sub-Transmission T&D Programme

In order to provide reliable and uninterrupted power supply to all categories of consumers, sub transmission network needs to be progressively strengthened. Sub-transmission network being the bridge connectivity between transmission network and distribution, augmentation of this network plays an important role in providing reliable power supply.

TANGEDCO has planned to execute 116 schemes., comprising of 47 nos. of new 33/11 kV SS and erection of additional / enhancement of 69 nos. power transformer in existing 33/11 kV SS at an estimated cost of Rs. 380 crores.

So far, 2 nos. of 33/11 kV substations schemes and 14 nos augmentation schemes have been completed. Other schemes are under progress and are expected to be completed by 2020-21.

Chekkampatty (Viruveedu)
33/11kV SS – Dindugal District

Muthupet 33/11kV SS – Tiruvarur District

3. Conversion of 33 KV Overhead (OH) source lines of 33 kV substations feeding the distribution network into 33 KV underground cables in delta districts

Based on the experiences of 'Gaja' cyclone, to restore the electrical infrastructure swiftly, it has been proposed to convert the 33 kV **Overhead (OH) source lines of 33 kV substations** feeding the distribution network into 33 kV underground cables in Delta districts including Nagapattinam, and Tiruvarur at an total estimated cost of Rs. 300 crore, so that power supply upto substations are not affected due to the calamities which will aid in restoration of power supply in the affected areas within a shortest possible time. Purchase order has already been issued for procurement of 60 kms of 33 kV, 3x400 sq.mm cable and Detailed Project Report (DPR) is under preparation. Tendering for procuring balance quantity of materials is under process.

4. High Voltage Distribution System (HVDS)

In order to increase the efficiency of the system and to have a better voltage profile, adoption of HVDS by converting existing low voltage distribution system (LVDS) to HVDS is envisaged. This will also help to reduce the technical losses appreciably. Small capacity Distribution Transformers (100 KVA and below capacity) are to be introduced for better voltage regulation and reliability. By reducing the HT/LT ratio to 1, better voltage profile can be achieved and it will also result in reduction of AT&C losses. In the first phase, it is proposed to introduce High Voltage Distribution System (HVDS) for 50 rural feeders at a cost of Rs.400 crore. Preliminary works are under progress.

1.8.5 Externally Aided Projects

Conversion of overhead lines into underground cables under Coastal Disaster Risk Reduction Project (CDRRP)

Conversion of the HT and LT overhead power lines into underground cables has been taken up in cyclone prone coastal towns of Cuddalore and Velankanni with revised administrative sanction of **Rs. 406.83 crore** for this project with funding assistance from World Bank. Works were awarded in three packages for conversion of overhead lines to underground cables in Cuddalore and Velankanni.

- **Cuddalore Package 1** – Letter of Acceptance (LoA) for conversion of OH to UG cabling system for 22 kV Alpettai, Suthukulam and Pentesia feeders in Cuddalore Town has been issued for a value of **Rs.143.86 crore**.

- **Works under progress**:

✓ HT and LT Cable trenching works and Cable laying works,

✓ Laying of LT service connection & street light cables, shifting of existing DT with elevated foundation, Ring Main Unit (RMU) panel erection,

✓ Testing and Commissioning of RMUs, Precast erection of Feeder pillars and service pillars and

✓ other erection works are under progress.

Supply progress – 85%;
Erection progress – 60%.

➢ **Cuddalore Package 2** – LOA for Conversion of OH to UG cabling system for 22 kV Sellankuppam, New Town and Manjakuppam (part) feeders in Cuddalore Town issued for a value of **Rs.204.12 crore**

- **Works under progress:**

✓ Laying of HT UG cables,

✓ Shifting of existing DT with elevated foundation, Precast of RCC foundation works for DTs and RMUs,

✓ RMU panel erection and 2 nos. switching station works at Cuddalore are under progress.

Supply progress – 50%;

Erection progress – 34%.

➢ **Velankanni Package** – LOA for conversion of OH to UG cabling system for 11 kV Velankanni Town feeder in Nagapattinam District issued for a value of **Rs.58.85 crore**.

- **Works under progress**

✓ HT and LT Cable trenching and Cable laying works,

✓ Laying of LT service connection & street light cables, DT foundation

✓ Other erection works at Velankanni town are under progress.

Supply progress – 93%;

Erection progress – 21%.

Service connection to the household using UG cables

1.8.6 Schemes executed with the assistance of Government of India

1. Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY)

Government of India has launched Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY) for the rural areas with following components:

a. Separation of agriculture and non-agriculture feeders.

b. Strengthening and augmentation of sub-transmission & distribution (ST&D).

c. Rural electrification

Ministry of Power, Government of India has approved Rs. 924.12 crore.

The progress so far achieved as on 31.01.2020 is given below.

S. No	Description	Unit	BoQ Quantity	Completed Quantity
1	33/11 kV	Nos.	106	98
2	Augmentation	Nos.	118	115
3	Distribution	Nos.	1189	1158
4	Feeder	Ckm	672	662
5	LT line	Ckm	1,171	1,095
6	11 kV Line	Ckm	1,537	1,498
7	33 & 66 kV	Ckm	1522	1,455
8	Energy Meter	Nos.	11,93,990	11,52,128
9	Intensive	Nos.	1,018	1,018
10	Connection to	Nos.	1,145	1,145

- Physical Progress: 95 % ;
- Financial Progress: 80%
- Completion Date: 31.03.2020

Melma 33/11kV SS – Thiruvannamalai District

Thirumani 33/11kV SS – Thiruvannamalai District

2. Integrated Power Development Scheme (IPDS)

Integrated Power Development Scheme (IPDS), funded by Ministry of Power, Government of India, is implemented in urban areas of all the States, with the following objectives.

(i) 24x7 Power supply for all

(ii) AT&C Losses reduction

(iii) Electrification of all urban households

Sub transmission and Distribution system strengthening works in 521 nos. towns, having population above 5,000 as per 2011 census, have been sanctioned at a project cost of Rs. 1,695.86 crore with funding as follows:

- Upfront grant by MoP/ Govt. of India - 60%
- Lending from Financial Institutions (FIs) - 30%

(Of which 50% will be additional grant for successful achievement of milestones stipulated.)

- Utility own funds - 10%

The progress achieved as on 31.01.2020 is detailed below:

Sl. No.	Description	Units	Actual Quantity	Completed Quantity
1.	New 33/11	Nos.	68	59
2.	Augmentation	Nos.	41	36
3.	Installation of	Nos.	13,859	13,859
4.	New 33 kV	kms	585.43	568
5.	22/11 kV	kms	3,600	3,600
6.	Replacement	Nos.	23,95,490	23,81,379

Physical Progress: 96.45%;

Financial Progress: 75.34%

Works are expected to be completed by 31.03.2020

DT Meter Kanjikovil

Nathamedu 22 KV Structure

Kuruchi SS – Erode District

IRTS 11kV Yard with Control Room – Erode District

Thondamuthur 33/ 11 kV SS in Coimbatore District

3. Fully automated 33/11 kV substations

In the light of adoption of new technology as well as to reduce manual operation and to cater the rising demand, it is proposed to establish **7 numbers fully automated 33/11 kV GIS SS with full remote operation** in Distribution regions at a total sanctioned cost of **Rs. 92.87 crore under IPDS.**

i) Approved DPR Costs - Rs. 92.87 crore

ii) Govt. of India (GoI) Grant - Rs. 55.72 crore (60% of S. No. (i))

iii) GoI Grant for Project Management Agency Rs. 0.464 crore

Total GoI Grant (ii)+(iii) = Rs. 56.18 crore

Projects are to be implemented by TANGEDCO on Turnkey basis. Tender for the 7 nos GIS SS has been floated and the orders are to be issued. Works are expected to be completed during 2021.

4. KUSUM scheme

In order to increase the installed capacity share of electric power from non-fossil fuel sources, the Government of India has launched the new scheme **Pradhan Mantri Kisan Urja Suraksha Evem Utthan Mahabhiyan (PM KUSUM) Scheme** for farmers with following components:

i. Component-A: Setting up of 10,000 MW of Decentralized Ground/ Stilt Mounted Grid Connected Solar or other Renewable Energy based Power Plants;

ii. Component-B: Installation of 17.50 Lakh Stand-alone Solar Agriculture Pumps; and

iii. Component-C: Solarisation of 10 Lakh Grid Connected Agriculture Pumps.

All three components of the scheme aim to add Solar capacity of 25,750 MW by 2022 with

the total Central Financial Support of Rs.34,422 crore.

- Initially, the Component-A will be implemented on pilot mode for 1000 MW capacity and Component-C will be implemented for one lakh grid connected agriculture pumps. Further, Component-B will be implemented in full-fledged manner with total Central Government support of Rs. 19,036.5 crore.

- In the State wise allocation, for Tamil Nadu the component wise allocation is as follows:

Component-A : 75 MW

Component-B : 17,500 Nos. Standalone Solar pumps

Component-C : 20,000 Nos. Solarisation of Grid connected pumps.

✓ Component-A is being implemented by TANGEDCO. Spare capacities of the substations

have been identified and confirmation letter for allotment of capacity from Ministry of New & Renewable Energy is awaited. On receipt of the confirmation, Expression of Interest will be called for and further process will be carried out.

✓ Component-B is being implemented by Agricultural Engineering Department.

✓ And for Component-C, TANGEDCO is the nodal agency and TEDA is the implementing agency. TANGEDCO has proposed to implement Component-C, Feeder-wise on net metering basis. As per the Ministry of New & Renewable Energy guidelines, to ensure "must-run" status to the solarised feeders, TANGEDCO has proposed to select feeders with 24 Hours of power supply for the pilot study with a load of 7.5 HP. Identification of 20,000 beneficiaries from the existing agriculture service connections with a load of 7.5 HP is under process.

1.8.7 IT enabled Energy Accounting and Audit

1. 100% Distribution Transformer (DT) Metering

In order to have an effective Energy Accounting and Audit, it is proposed to implement 100% DT Metering in all the Distribution Transformers in a phased manner and proposed to be completed by 31.03.2022. Ministry of Power/ Government of India has been addressed seeking a grant of Rs. 1200 crore towards this project.

2. Automatic Meter Reading (AMR) facility

By providing automatic meter reading facilities, the meter reading can be taken at remote place using latest communication technology at specified intervals or as and when required. To achieve accurate meter reading and to minimise the manual intervention in HT services, Automatic Meter Reading (AMR) facility has been introduced.

At present, there are around 10,000 HT services in TANGEDCO, distributed in 44 circles. Modems have been installed in 9,136 services. The HT service readings are now fetched through AMR and billing is being carried out using these readings from the month of November 2019.

Automatic Meter Reading facilities have also been installed for the Wind Energy Generators (WEG), Solar Energy Generators (SEG) and pooling stations of wind energy, **which is first of its kind in India.** The billing details are downloaded through AMR.

3. Smart Meter Implementation under Chennai smart city project in T.Nagar ABD area

In order to eliminate human intervention for fetching of meter data and to facilitate disconnections / reconnection remotely, smart meters with radio frequency based communication technology has been proposed to be implemented for 1.41 lakh consumers under Chennai Smart

City scheme's Area Based Development (ABD) in Thyagaraya Nagar.

IT infrastructure, hardware and software have been procured for Rs.7.45 crore and installation completed. Letter of Award has been issued for procurement and implementation of smart meters at a cost of Rs. 137 crore.

4. Prepaid meters

Pilot study of prepaid meter has been completed by providing the smart prepaid meters in the selected services of local bodies and the field report has concluded that smart prepaid meter with built-in communication module may be adopted. Also, an exposure visit to Telangana State was performed to know the best practices of implementing the prepaid meters in that State. Based on this further action is being taken.

1.8.8 Special Initiatives

1. Implementation of Enterprise Resource Planning (ERP) in TANGEDCO and TANTRANSCO

The ERP system is the management of all the information and resources involved in a company's operations which enables integration of all the core business processes of an organization into single system on a real time basis to manage day to day business transactions.

The implementation of ERP in TANGEDCO and TANTRANSCO covers the following major functionalities:

- Procurement and Inventory
- Human Capital Management
- Financial Accounting and Control

The total cost of the project is Rs 140 crore approximately. The 60% cost of the project for Distribution sector is provided as grant, amounting to Rs. 33.57 crore, out of Rs. 55.95

crore, under the IPDS scheme by M/s Power Finance Corporation Limited. The funding for Generation and Transmission project is from TNEB's own funds.

Present Status of implementation

1. Contract order for implementation of SAP ERP in TANGEDCO and TANTRANSCO has been awarded.

2. Purchase order has been placed for procurement of SAP S/4 HANA ERP servers.

3. About 8554 SAP ERP Professional Use Licenses and its allied components have been procured.

The time line for completion of the project is by 03.01.2021

2. Implementation of Video Conferencing (VC) for TANGEDCO and TANTRANSCO

To improve communication between Head Office and the field office, video conferencing facility connecting the Head Office, all 9 Distribution Regional offices and 44 Distribution Circle offices is being established at an estimated

cost of Rs. 3.00 crores. This will also help to cut cost and to save time, as officials will not be required to travel to attend frequent review meetings as well as other discussions.

Orders has been issued.

3. Establishment of NABL Labs for testing of ABT Meters, Current Transformers (CTs) and Potential Transformers (PTs)

The Metering Regulation 17 of the Central Electricity Authority (CEA) stipulates that the licensee shall set up appropriate number of meter testing laboratory and shall take immediate action to get the accreditation from National Accreditation Board for Testing and Calibration Laboratories (NABL) and the same has been emphasized by the Hon'ble Tamil Nadu Electricity Regulatory Commission (TNERC).

Availability Based Tariff (ABT) complied Energy Meters requires calibration and testing once in 5 years. In addition, the associated Current and

Potential Transformers (CTs and PTs) which are the only input source to these ABT Meters, also require calibration for stipulated ratio and phase angle compliance.

Accordingly, establishment of one number stationary lab at Chennai and two numbers mobile labs one each at Thirunelveli and Udumalpet are being carried out at a total cost of Rs.12.14 crore. The first Mobile Lab has reached Thirunelveli and process of getting NABL accreditation is under process. The installation of equipment in the second Mobile Lab is being carried out. A separate Building for housing the Stationary Lab is being constructed at a cost of about Rs.3.3 crore, at Walajah Road, Chennai.

By establishing these Labs, TANGEDCO will be

(i) Fulfilling the CEA Norms and orders of TNERC

(ii) Saving the expenditure for the periodical testing of Board side ABT Meters, CTs and PTs.

(iii) Also earning revenue by periodical testing of third party ABT meters, CTs and PTs.

4. Implementation of Electric Vehicle Policy

Electric Vehicles (EV) are being introduced to cut emission levels which promises to be zero emission transport model and are also cost effective. The FAME India (Faster Adoption and Manufacture of (Hybrid and) Electric Vehicles) Scheme was launched by the Ministry of Heavy Industries and Public Enterprises in 2015 upto March 2019. Subsequently, FAME-II was launched

for further 3 years from April 2019. Main thrust of FAME is to encourage electric vehicles by providing subsidies.

Tamil Nadu is taking all efforts to promote E-Vehicle (2W, 3W, 4W) in the State. Government of Tamil Nadu has notified "The Tamil Nadu EV policy 2019" on 16.09.2019.

Government of Tamil Nadu has also notified Industries, Energy and Transport Departments as nodal Agencies for the implementation of E-vehicle policy in Tamil Nadu. TANGEDCO has been nominated as the State Nodal Agency for charging infrastructure for Electric vehicle.

As per the policy, Government of Tamil Nadu gives fiscal and non-fiscal benefits to the manufacturers / end users of EVs to encourage more penetration and usage of EVs.

As per provision of FAME-II, Department of Heavy Industries has sanctioned 2,636 charging

stations in 62 cities across 24 States/UTs out of which 256 charging stations have been allotted to various cities in Tamil Nadu during January 2020. Also, Government of Tamil Nadu encourages various public /private entities to establish charging stations in Tamil Nadu.

1.8.9 Deviation Settlement Mechanism (DSM)

Deviation Settlement Mechanism is the frame work for Energy Accounting, Deviation Accounting, Rules for pricing of deviation(s) payable and receivable by State entities and other design parameters as specified in the regulations notified by Hon'ble TNERC in this regard.

- The objective of the Regulations is to maintain grid discipline and grid security as envisaged under the grid code through commercial mechanism for deviation settlement through drawal and injection of electricity users of grid. The Draft procedure for implementation of above Regulations have been submitted to

Hon'ble TNERC and approval is awaited from TNERC.

- These Regulations shall be applicable to all seller(s) including Open Access Generating Station(s), generating stations of distribution licensees, wind and solar generating stations, and to transactions of conveyance of electricity through open access transactions using intra state transmission system or Distribution system of electricity.

- In order to implement DSM, ABT meters have to be provided in all generating stations including wind and solar and in all 400 kV, 230 kV, 110 kV substation and data to be transferred to server at SLDC.

- Provision of ABT meters have been completed in all Thermal & Gas stations of TANGEDCO, 400 kV and 230 kV substations, 102 wind pooling substations and Solar generating station's end. In Hydro stations, ABT

meter fixing works are progress, procurement of ABT meters for all 110 kV SS is under process. Procurement of ABT meters for all 110 kV SS and Data Concentrator Unit (DCU) for communication of datas to server at SLDC is under process.

1.8.10 State Designated Agency to enforce the provisions of the Energy Conservation Act 2001

To give impetus to Energy Conservation in the country, Government of India enacted the Energy Conservation Act (EC Act) which came into force on 1st March 2002. Under the Act, Ministry of Power, Government of India established the Bureau of Energy Efficiency (BEE) to spearhead improvement in energy efficiency through various regulatory and promotional measures and implements the provisions of the act.

The Government of India enacted the law to provide for efficient use of energy and its conservation.

The Government of Tamil Nadu in consultation with Bureau of Energy Efficiency (BEE) has nominated Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) as the State Designated Agency (SDA) to enforce the provisions of the Energy Conservation (EC) Act 2001 as per the powers conferred by clause (d) of section 15 of the Energy Conservation Act, 2001 and has reallocated the energy conservation activities from Tamil Nadu Electrical Inspectorate (TNEI) to TANGEDCO. TANGEDCO has taken over the State Designated Agency responsibility on 30.01.2020

TANGEDCO as the State Designated Agency will coordinate, regulate and enforce the provisions of the EC Act 2001 within the State. The responsibilities the State Designated Agency are:

a) Spread awareness on Energy Conservation Act, Energy Efficiency Labeling programs, Energy

Conservation Building Codes (ECBC), etc., framed under the Act.

b) Undertake voluntary initiatives to promote energy conservation

c) Liaison and coordinate with Bureau of Energy Efficiency, State Government Departments dealing with energy, industry, planning, regulators, consumer affairs, municipal bodies etc.

d) Capacity building of staff employed

e) Launch and maintain state specific website addressing the voluntary and mandatory provisions of Act

f) Undertake energy conservation awareness program for consumers, industrial & commercial sector, school children, farmers etc.

g) Arrange interactive meets between energy managers, energy auditors and experts in the field.

h) Request State Government to constitute a state energy conservation fund for the purposes of promotion of efficient use of energy and its conservation within the state.

TANGEDCO will actively implement the above energy efficiency and energy conservation activities in the state in the coming days.

1.8.11 Energy conservation measures

1. Awareness creation

Every year during 14th to 20th December, "Energy Conservation Day and Week" is being celebrated to create awareness among the public and various crucial sectors of economy on the importance of energy conservation.

SMS slogan on energy conservation "SAVE ELECTRICITY" is being sent to 2.79 crore consumers along with SMS on payment of current consumption (CC) charges.

To disseminate the knowledge and the latest technical knowhow about energy conservation, talks /seminars are being taken up for Government sectors, micro/ small/ medium enterprises, private/ public sector, multinational companies and higher educational institutions.

During October 2014, the program "Taking energy conservation awareness to school students" has been started throughout the State. About 12.08 lakh students have been enlightened on energy conservation upto January 2020.

2. Prevention of Energy Theft

TANGEDCO has formed 21 enforcement squads and one flying squad for inspection and detection of theft of energy in Electricity

Distribution Circles. One Intelligence wing has been formed to detect theft of energy in HT consumers by studying and analyzing electronic data collected from meters to curb the theft in HT industries.

Further, ex-servicemen teams have also been formed in 2011 to reduce thefts and as of now 43 teams are available.

During the year 2018-19, enforcement squads have detected 6,242 cases of theft of energy and have levied penalties of Rs.46.31 crore. The Intelligence wing has detected 429 cases and levied penalties for Rs.4.30 crore and the Ex-servicemen teams have detected 10,402 cases of theft of energy and have levied penalties of Rs.19.09 crore towards provisional assessment and compounding charges.

Similarly, for the year 2019-20 (Upto December 2019), enforcement squads have detected 4,348 cases of theft of energy and have

levied penalties of Rs.33.81 crore. The Intelligence wing has detected 298 cases and levied penalties of Rs.3.29 crore and the Ex-servicemen teams have detected 7,684 cases of theft of energy and have levied penalties of Rs.14.04 crore towards provisional assessment and compounding charges.

3. Unnat Jyothi by Affordable LEDs to All (UJALA) scheme

In order to march towards Energy Efficiency (EE), TANGEDCO had permitted M/s. Energy Efficiency Services Limited (EESL) for implementing UJALA scheme in Tamil Nadu. This scheme comprises of selling 9W LED bulbs, 20 W LED tube lights and 50 W Energy Efficient five star rated ceiling fans at affordable price to the willing domestic consumers through independent kiosks set up by M/s. EESL in the collection centres of TANGEDCO.

The sale commenced in Chennai (Phase I) on 22.03.2017 through Distribution Agents (DAs)

and is in progress in 26 EDCs in the state. As on 31.01.2020, 26.24 lakh LED bulbs, 4.72 lakh LED tube lights and 1.23 lakh BEE 5 star fans have been sold.

Cumulative Energy savings due to sale of LED Bulbs, LED tube lights and Energy efficient fans as on 31.01.2020

Description	2017-18	Cumulative upto 2018-19	Cumulative upto 2019-20 (upto 31.01.2020)
LED Bulbs (nos.)	1,629,738	3,118,100	3,462,764
Energy saving (MU)	55.07	244.0	440
LED Tube lights (nos.)	3,74,425	4,43,332	4,72,339
Energy saving (MU)	9.31	36.39	82.63
EE fans (nos.)	72,528	1,04,760	1,23,892
Energy saving (MU)	2.50	10.90	19.61
Total Energy savings (MU) upto the year 2019-20 (upto 31.01.2020)			**542.24**
Reduction of CO2 emission (MTs) upto the year 2019-20 (upto 31.01.2020)			**3,83,388 MTs**

1.8.12 Consumer Friendly Measures

TANGEDCO has implemented various schemes in order to improve the customer oriented services.

- To ease the hassle of applying for a new service connection, **on-line filing of applications** has been launched on 05.08.2016 by **the late Hon'ble Chief Minister Amma.** Now, consumers can file the application for new service connection through on-line. So far **31,466** numbers of service connections were effected under this scheme.

- **One day service connection scheme** This scheme was launched on 12.06.2017. Under this scheme, for new LT Domestic and Commercial service connections (other than special and multi-storeyed buildings) falling under mere service connection category, the electricity service connection will be effected

on the same day on receipt of application. So far **7,21,706** numbers of service connections were effected under this scheme.

- **Minsara Nanban (Urja Mitra):**

Minsara Nanban is a new initiative by TANGEDCO in association with Ministry of Power, Govt. of India under the Urja Mitra scheme. This consumer-friendly initiative has been launched by the Hon'ble Minister of Electricity, Prohibition and Excise on 12.06.2017.

The main objective of the scheme is to share information about scheduled / unscheduled electrical power outages in rural and urban areas directly to consumer through SMS to their mobile phones.

So far, details for 2,70,96,239 nos. of TANGEDCO consumers have been uploaded.

By utilizing the Rural Electrification Corporation (REC) server, a message will be sent to all the registered mobile numbers in an area about the planned shutdown and feeder level unplanned outage in that area.

- On the Agriculture side, **a fast track (tatkal) scheme** for effecting free agriculture service connections against a one-time payment for infrastructure development only for willing farmers had been introduced with effect from **24.06.2017.** There was a remarkable response for this scheme and 10,000 agriculture service connections per year have been effected during 2017-18 and 2018-19. This year also the scheme has been announced for effecting 10,000 agriculture service connections out of which 6,205 agriculture service connections have been effected upto 31.01.2020.

- A scheme for effecting LT industrial service connections within 7 days up to a demand of **112 kilo watt** for both new and additional load has been launched with effect from 15.07.2017 and **88,703 Nos** service connections have been effected under this scheme.

- Towards enhancement of **ease of doing business**, the Policy of 24x7 power to Industries / Developers, with a demand of 10 MVA and above or with an investment of Rs.100 crore or more, has been launched with effect from 05.09.2017. Under this scheme, in respect of the industries or developers who have signed Memorandum of Understanding (MoU), TANGEDCO / TANTRANSCO will establish the Sub-Station at its own cost on the land provided by the developers. This will help the industries/developers in getting

uninterrupted power supply through dedicated dual network, in which the cost of the first feeder will be borne by TANGEDCO/ TANTRANSCO and the cost of the second feeder will be borne by the industries / developers.

- A mobile application for both Android and IOS operating systems have been launched for hassle free payment of current consumption charges.

- Multiple channels of collection of current consumption charges viz., Net Banking, Debit/Credit Cards through Payment Gateway, HT-RTGS, Mobile Banking, Mobile App, Post office collection, Bank counter collection, ATM collection, Government e-seva centres, collection through Point of Sale (PoS) machines, collection through Bharat bill payment system etc., are already in place. Presently **34% of the consumers** are

paying around **Rs.1,626 crores per month** by making use of the above facilities.

1.8.13 Call centres

Automatic computer based power failure redressal call centres are functioning at Chennai(5 EDC), Coimbatore(Metro), Madurai(Metro), Trichy, Erode, Tirunelveli, Nagercoil, Salem, Vellore, Kanchipuram, Karur, Tiruppur, Nammakkal, Krishnagiri, Dharmapuri, Mettur, Thirupathur, Tuticorin, Chengalpattu, Theni, Gobi and Virudhunagar. Further, new call centres were commissioned at Coimbatore (2EDCs), Cuddalore, Dindigul, Thiruvarur, Perambalur, Sivagangai, Villupuram, Nagapattinam, Thanjavur, Pudukkottai, Madurai EDC, Nilgiris, Udumalpet, Thiruvannamalai, Ramnad and Kallakurichi district. Consumers can register their complaints by dialing 1912.Hence call centres are functioning in 43 Electricity Distribution Circles.

Also, a 24 hrs consumer redressal centre functions **in the camp office of the Hon'ble Minister for Electricity, Prohibition and Excise** to attend the grievances of the consumers. The general public can contact this centre through **044-24959525.**

Besides, the electricity consumers of the entire Tamil Nadu can register their power supply failure complaints through **WhatsApp number 9445850811.** Since introduced during October 2019, 413 complaints have been received through WhatsApp of which action have been completed for 347 complaints.

Apart from this, telephone numbers **044-28521109 & 28524422 are functioning in the Chairman's Special Cell** at Call Centre at TANGEDCO's Headquarters for the convenience of the general public to register their complaints.

Human Resource Management

1.9 Human Resource Management

1.9.1 Direct Recruitment

It is proposed fill up 500 posts of Junior Assistant/ Accounts by Direct Recruitment. Applications are being received from eligible candidates via online from 10.02.2020 (last date for receipt of applications is 09.03.2020).

Also, it is proposed to fill up 2,900 posts of Field Assistant (Trainee) by Direct Recruitment and selection of candidates is to be made based

on the marks obtained in the competitive examination and as per the communal roster.

Further, it is also proposed to recruit for 400 Assistant Engineer/ Electrical, 75 Assistant Engineer/ Civil and 125 Assistant Engineer/ Mechanical posts, totaling 600 posts, by Direct Recruitment and selection of candidates is to be made based on the marks obtained in the competitive examination and as per the communal roster. Applications are being received from eligible candidates via online from 15.02.2020 (last date for receipt of applications is 16.03.2020).

The post of Assessor Grade II has been merged with Assessor and it is proposed to recruit 1,300 Assessors. Applications from eligible candidates were received via online from 10.01.2020 to 10.02.2020 and steps to conduct Computer Based Test are under process.

Considering the interest of the public at large, in view of the huge number of vacant field posts prevailing at the feeder category and also in order to provide uninterrupted power supply, TANGEDCO has created a new post called Gangman (Trainee). The job profile includes initial ground level works such as erection of poles, stringing of lines etc., for establishing distribution network without any delay. It has been proposed to recruit for 5,000 posts of Gangman (Trainee) for which notification has been issued on 07.03.2019. Applications from eligible candidates with a minimum qualification of 5th standard have been received via online. The physical test for the applied candidates for the posts of Gangman (Trainee) was conducted in a transparent manner from 25.11.2019 to 18.12.2019 and the written test for the post of Gangman (Trainee) is proposed to be conducted during March 2020. Final selection will be made based on the outcome

of the court case filed before the Hon'ble High Court of Madras and Madurai.

1.9.2.1 Training

The training policy in TANGEDCO emphasizes on Training and Development of employees with a view to equip them capable of contributing to the growth and performance of the organization. The version of TNEB Training policy reads "Training for all" (vision) by providing at least One week training in a year to every employee. Human Resource Development (HRD) Wing is imparting training to all the officers, staff of TANGEDCO & TANTRANSCO regularly throughout the year to enhance/upgrade their technical, functional and management skills for the excellence of our organisation.

Training is imparted to the Engineers/ Officers/Staff of TANGEDCO/ TANTRANSCO through 4 Training Institutes and 11 Training Centres.

1.9.2.1 Training Institutes and Training Centres:

The four training Institutes headed by the Deputy General Managers are Staff Training College/Chennai, Transmission & Distribution, Training & Development Institute and Research Institute, Madurai, Thermal Training Institute & Research Institute / NCTPS and Hydro Training Institute / Kuthiraikalmedu.

There 11 Training Centres headed by the Senior Managers located at Korattur, Vellore, Tiruvannamalai, Madurai, Trichy, Thanjavur, Virudhunagar, Tirunelveli , Coimbatore, Mettur and Cable Jointing Training Development Centre, Chennai

1.9.2.2. Activities of Training Institutes/ Centres:

The Trainings provided by the Institutes and Centres are detailed below.

Staff Training College, Chennai	Imparting training on Management and Administration related subjects to all the technical / administration and accounts officers/ Engineers/ Staff.
Transmission & Distribution, Training & Development Institute and Research Institute, Madurai	Imparting training on Transmission & Distribution related subjects to all the Engineers/ Officers/Staff.
Thermal Training Institute & Research Institute / NCTPS	Imparting training on Thermal & Gas Power Generating Stations related subjects to all the Engineers/ Officers/ Staff
Hydro Training Institute and Research Centre, Kuthiraikalmedu	Imparting training on Hydro Power Generating Stations related subjects to all the Engineers/officers/staff of Hydro.
Technical Training & Development	Imparting training on technical and other subjects

Centres located at Korattur, Vellore, Tiruvannamalai, Madurai, Trichy, Thanjavur, Virudhunagar, Tirunelveli, Coimbatore and Mettur	to all the RWE & Provincial staff of TANGEDCO/TANTRANSCO
Cable Jointing Training and Development Centre, Chennai	Imparting training on Power Cable Jointing & End Termination subjects to the Engineers/ RWE staff

1.9.2.3 Training on Safety for Officers/ Staff

In all the training Institutes/centers, prime importance is given to conduct Safety oriented training programmes. Division wise /sub division wise / section wise safety awareness programmes are also being conducted in all the training centres to Class III & IV employees.

Various training programmes viz., operation & maintenance, safety rules, earthing practices,

disaster management, accident prevention, fire protection etc., are being imparted to all the technical Staff/ Officers in all the Training Institutes / Centers.

Case studies on recent accidents are being discussed and ways and means to prevent accidents are also being discussed in the training programmes.

1.9.2.4. Annual training programme for the year 2019-20:

During the financial year 2019-20, it has been proposed to conduct Annual training Programmes (ATP) to all the categories of Officers / Engineers / Staff of TANGEDCO/ TANTRANSCO for 38,806 mandays at a total expenditure of Rs.3.30 crore through the 4 Training institutes and 11 training Centers. The training programmes are being conducted in all the centres/ institutes as per the schedule.

Finance

1.10 Finance

The Government of Tamil Nadu is continuously providing financial assistance to TANGEDCO, in the form of Equity Share Capital, Tariff Subsidy, Grants under Financial Restructuring Plan and UDAY scheme, loan assistance, funds for disaster recovery purpose, etc.

Financial Assistance from Government of Tamil Nadu

Sl. No.	Financial Years	Financial Assistance (Rs. in crore)	
		Tariff Subsidy	Other category
1	2011 - 2012	2071.41	5841.94
2	2012 - 2013	4457.23	4784.77
3	2013 - 2014	4985.09	3394.22
4	2014 - 2015	6953.00	6886.50

5	2015 - 2016	6695.10	5695.62
6	2016 - 2017	8484.91	30823.02
7	2017 - 2018	7643.39	6303.63
8	2018 - 2019	7731.67	5531.45
9	2019 - 2020 (upto 10.02.2020)	8034.77	6808.84

TANGEDCO's loan of Rs.22,815 crore has been taken over by the Government of Tamil Nadu, under UDAY scheme through issue of special securities. The interest free loan of Rs. 22,815 crore provided by Government of Tamil Nadu on taken over of loans is being converted into revenue grants in five installments from the financial year 2017-18 onwards.

In addition to above grants, the Government of Tamil Nadu is also sanctioning grants under UDAY for funding the losses incurred by TANGEDCO. Accordingly the Government of Tamil Nadu has sanctioned grants of Rs.217.44 crore for the losses of financial year 2016-17 and

Rs.776.08 crore for the losses of financial year 2017-18 during 2017-18 and 2019-20 respectively.

Loan Assistance from External Financial Institutions viz., JICA, KfW, ADB, World Bank are being availed to execute several Transmission and Distribution related capital expenditure of Rs. 12,700 crore.

The entire loan sanctioned by Tamil Nadu Power Finance and Infrastructure Development Corporation (TNPFC) is being availed by Tamil Nadu Generation and Distribution Corporation Limited to meet its operational and capital commitments.

The financial assistance to TNEB allocated in Budget Estimate 2019-2020 and released so far is given below:

(Rs.in crore)

S. No	Assistances	BE 2019-20	Received till 10.02.2020
1	Tariff subsidy	8,118.25	8034.77
2	Taking over future loss of TANGEDCO by State Government under UDAY Scheme	1,254.70	776.08
3	Transmission System Improvement Loans & Grants	660.95	135.14
4	Cyclone Resilient Electrical Network under Coastal Disaster Risk Reduction Project (CDRRP) Grants	165.00	0.00
5	Hydel Swing Subsidy	125.00	0.00
6	Conversion of Government of Tamil Nadu Loans to TANGEDCO as Grants.	4,563.00	4,563.00
7	Allocation under TNIPP Phase-II expenditure	398.70	334.62
	Total	15285.62	13843.61

During the current financial year 2019-20, the Government of Tamil Nadu has released Rs.1000 crore of ways & Means advance, in order to meet the financial shortfall of TANGEDCO.

Further, the Government of Tamil Nadu has given a Government guarantee of Rs.2294.00 crore, as required by TANGEDCO, to avail the loans from Financial Institutions and Banks during the current financial year 2019-20.

In the Government of Tamil Nadu's Budget estimate for the financial year 2020-21, a sum of Rs.20,115.58 crore of allocation has been proposed to TNEB.

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TAMIL NADU ENERGY DEVELOPMENT AGENCY

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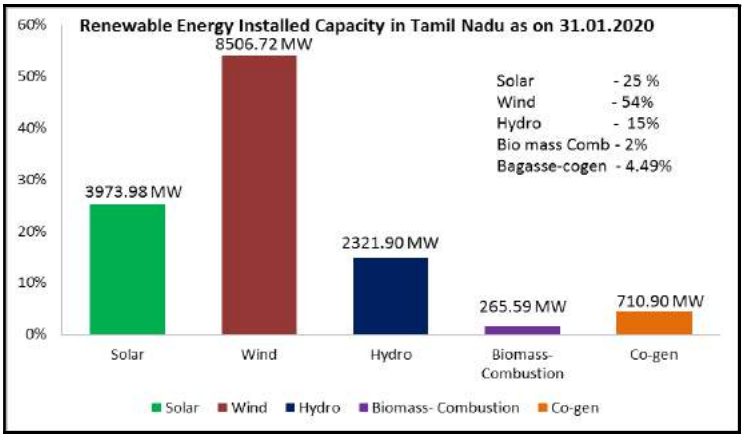
2. TAMIL NADU ENERGY DEVELOPMENT AGENCY

2.1 Introduction

TEDA was established as a society under the Societies Registration Act in 1985 with the objective of promoting Renewable Energy in all aspects like Identification, Trapping, Research and Development and conservation. The Government of Tamil Nadu is giving emphasis on the development of renewable energy through TEDA by implementation of various schemes. Tamil Nadu Energy Development Agency provides technical support to the renewable energy promotional activities and it is a non-profit organisation. TEDA also acts as the State Nodal Agency for the purpose of implementation of various projects of Ministry of New and Renewable Energy (MNRE) , Government of India.

Tamil Nadu, with an installed capacity of 15,779 MW, is the leading state in the Country in Renewable Energy Sector.



Total Installed RE Capacity is 15,779MW

Source: TANGEDCO

2.2 Major Programmes and Projects

During the year 2019-20, a cumulative capacity of 1249.42 MW of solar power has been added in order to achieve the target envisaged in the Solar Energy Policy 2019. TEDA has been at the fore front of the national renewable energy initiative since it's formation. Several innovative programmes have been conceived and are being implemented by TEDA, at the advice of the State Government/Central Government.

2.3 Tamil Nadu Solar Energy Policy 2019

Tamil Nadu is the pioneer state in promotion of wind energy. In order to make the State in the similar manner in the solar sector also, Late Hon'ble Chief Minister Amma announced the Solar Energy Policy 2012, the first in the country. In continuation to this, a revised Solar Energy Policy 2019 was launched by the Hon'ble Chief Minister on 04.02.2019 which envisages a fresh target of 9000 MW by 2023.

The salient features of Tamil Nadu Solar Energy Policy 2019 are as below:

- To make Tamil Nadu a forerunner / leader in Solar Power generation, besides wind power generation.
- To provide "Net feed-in facility" for all Low Tension (LT) electricity consumer categories against "Net Metering facility" in the earlier Policy.

- To provide green jobs to a significant number of the State's workforce in solar energy sector.
- To design and to promote solar energy generation in the agricultural sector with suitable incentives to farmers.
- To promote both utility and consumer category solar energy systems.

Further, to consider

i) Net feed in for HT consumers.

ii) Exemption of Electricity tax for consumer category.

2.4 Demonstration of a Sustainable Village

The implementation work is under progress for providing Uninterrupted Electricity Supply (24X7) in a sustainable manner to the village Irumbai, Vanur Taluk, Villupuram District by establishing a 170kW grid connected Ground Mounted Solar Photovoltaic Power Plant

(without battery) under the Uninterrupted Electricity Scheme.

2.5 Solarization of Government Buildings:

Tamil Nadu Energy Development Agency, as a Renewable Energy Service Company (RESCO) will install solar rooftops in Government /Local body/Public Sector undertaking buildings and operate and maintain them for 25 years under the RESCO mode.

Based on the above, an agreement has been executed with EESL - a Central PSU in the presence of Hon'ble Minister for Electricity,

Prohibition and Excise on 19.09.2019 for initiating the project and the scheme is under implementation.

2.6 Solar Energy Producing Farmers (PM-KUSUM Scheme):

The PM KUSUM Scheme will be implemented, under which 20,000 individual farmers having grid connected agriculture pumps will be supported by the installation of a solar power plant at each location so as to have both grid supply and solar power and will be fed by grid supply when there is less (or) no generation of solar power. Solar PV plant capacity upto two times of the pump capacity in kW is allowed under the scheme.

The State will provide a subsidy of 30% of the cost besides the Central Financial Assistance of 30% of the benchmark cost or the tendered cost, whichever is lower and 40% of the cost being the contribution of the farmer will be raised

as a loan by TEDA through financial institutions such as TNIFMC, so that the free supply of power to the farmers continued to be extended to them. The loan raised will be repaid by selling the Gross Energy generated from the Solar Plants to TANGEDCO, by fixing a meter (Gross Generation Meter).

In order to encourage the farmers to effectively utilize the power and water, it has been proposed to pay incentive annually to the farmers for the net units exported to the grid after own use.

A remote monitoring system to monitor performance of the system, post-installation in coordination with TANGEDCO will be in place.

TNERC has been addressed for the implementation of the scheme as well as to fix tariff for the purchase of Gross Solar Energy generated, from the Solar Power plant by TANGEDCO.

The beneficiary list of Farmers preferably feeder wise will be identified by TANGEDCO.

2.7 Rural Mini Solar Park (RMSP):

TEDA is the nodal Agency in establishing the Rural Mini Solar Park of 20MW capacity under the Solar Park Scheme of MNRE, GOI for which in principle approval has been sought from MNRE.

2.8 Self-Employment Generation Programme:

TEDA is implementing Self-Employment Generation Programme in Tamil Nadu. In this regard, a Co-ordination committee has been constituted with one representative each from the following Departments/ Institutions for the purpose of preparation of scheme guidelines and to finalize the other modalities:

1. Commissionerate of Industries and Commerce, Chennai.
2. Entrepreneurship Development and Innovative Institute-TamilNadu (EDII).

3. Tamil Nadu Industrial Investment Corporation Limited (TIIC).
4. Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO).

2.9 Rooftop Solar Photovoltaic Power Plants

This organization has facilitated the installation of off grid roof top solar power plants of cumulative capacity of 30 MW which includes 25.78 MW from that of solar home lighting systems under the Late Hon'ble Chief Minister's Solar Powered Green House Scheme.

TEDA has also facilitated the installation of solar power plants in the following locations on behalf of Government Departments during 2019-20:

- In the premises of 11 District Courts across Tamil Nadu with a cumulative capacity of 227 kWp
- In the premises of Madras High Court Buildings cumulative capacity of 160 kWp

- In the premises of Bharathiyar University, Coimbatore with a cumulative capacity of 448 kWp.

2.10 Grid Connected Roof Top Solar Power Plants (GCRTS) under phase-II:

TANGEDCO (DISCOM) has authorized TEDA, the State Nodal Agency (SNA) to implement the Grid Connected Rooftop Solar Programme (GCRTS), Phase II of MNRE , GOI for a cumulative capacity of 5MW.

TANGEDCO will provide a service charge of 3% of eligible CFA for implementing this

programme. The Scheme will be implemented in coordination with TANGEDCO.

Residential households are eligible to avail the Central Financial Assistance as below:

S.No.	Total capacity of rooftop solar installations	Applicable subsidy in terms of Benchmark cost or cost arrived through tender, whichever is lower
1	Upto 3 kW	40%
2	Above 3 kW and upto 10 kW	40% for first 3 kW and 20% for balance capacity.
3	Above 10 kW	40% for first 3 kW and 20% for next 7 kW. No. subsidy beyond 10kW capacity.
4	Group Housing Societies / Residential Welfare Associations	20%

	(GHS/RWA) etc. for common facilities upto 500 kWp @ 10kWp per house, with the upper limit inclusive of individual rooftop plants already installed by individual residents in that GHS/RWA at the time of installation of RTS for common activity.	

2.11 Effective Energy Efficiency Measures

TEDA will act as a procurement agency (to procure specified classification of goods or services on behalf of any procuring entity upon payment of fees) and also as a Renewable Energy Service Company (RESCO) for providing solar rooftops in Government/Local Body/Public sector undertaking buildings.

Reputed agencies / vendors will be engaged to provide the following goods and services

pertaining to Energy Efficiency as per Government order in this regard.

Goods:-

- Renewable energy generation systems including balance of systems
- Appliances, equipments, devices and accessories including pumps, motors, lighting and mobility systems powered by renewable energy
- Energy efficient systems, gadgets, devices, utilities, appliances and accessories

Services:-

- Energy services including design, implementation of energy saving projects, retrofitting, energy conservation, energy infrastructure outsourcing, renewable power generation and supply and risk management.
- Project Development management, operation and maintenance of renewable energy projects and energy efficiency projects.
- Technical Consultancy.

2.12 Chief Minister's Solar Powered Green House Scheme (CMSPGHS)

This is a flagship programme announced by our Amma, Late Hon'ble Chief Minister of Tamil Nadu, mainly for the benefit of the families coming under below poverty line. Under this programme, CFL /LED based SPV home lighting systems have been provided in 2,92,816 houses, with a cumulative capacity of 25.78 MW as on 31.01.2020. Besides the above, 10,000 Weavers houses have been provided with SPV home lighting systems.

The above installed quantity includes 6,482 Nos. of CFL / LED based SPV home lighting systems with a cumulative capacity of 1.17 MW in 2019-20.

2.13 Public Awareness on Green Energy:

To make Tamil Nadu a Green State, TEDA will undertake a mass publicity and Awareness Campaign on Green Energy involving both school and college students across Tamil Nadu for an estimated amount of Rs.1 Crore.

As a part of this initiative, a Pavilion has been erected in the 46th India Tourist and Industrial Fair 2019-20 organized by Tamil Nadu Tourism Development Corporation Limited at Island Grounds, Chennai with the concept on "**Green Energy – A Better Future for all"**. This pavilion has attracted more than 1lakh school, college students and general public so far.

2.14 MNRE Benchmark costs for Off-grid Solar PV Systems and Grid Connected Rooftop Solar Power Plants:

2.14.1 Standalone Solar Pumps

Pump Capacity (HP)	Pump Type	Benchmark Cost (Rs./ HP)
0.5 HP	AC/DC Surface	53000
	AC/DC Submersible	68000
1 HP	AC Surface	102000
	AC Submersible	113000
	DC Surface	108000
	DC Submersible	119000
2 HP	AC Surface	65000
	AC Submersible	76000
	DC Surface	73000
	DC Submersible	86000

3 HP	AC Surface/ Submersible	67000
	DC Surface/ Submersible	74000
5 HP	AC Surface/ Submersible	56000
	DC Surface/ Submersible	66000
7.5 HP	AC/DC Surface/ Submersible	56000
10 HP	AC/DC Surface/ Submersible	51000

- Bench Mark per system instead of per HP shown for 0.5 HP Solar Pumps.

2.14.2 Solar Lighting Systems

System	Benchmark Cost (Rs./Wp)
Solar Study Lamps	160
Solar Street Lights (With Li-Ion battery)	299

2.14.3 Standalone Solar Power Plants / Packs

Capacity (kW)	Battery back -up (hrs)	Benchmark Cost (Rs./Wp)
Upto 10	6	94
	3	74
	1	62
Above 10 and upto 25	6	84
	3	66
	1	55

2.14.4 Solarization of Grid connected Agriculture Pumps

Capacity	Benchmark Costs (Rs./Wp)
Upto 10 kW	54
Above 10 kW	48

2.14.5 Grid Connected Rooftop Solar Power Plants

Capacity	Benchmark Costs (Rs./Wp)
Above 1 kW and upto 10 kW	54
Above 10 kW and upto 100 kW	48
Above 100 kW and upto 500 kW	45

2.14.6 Solar Thermal Applications:

Sl. No.	Name of the Scheme	Available Financial Assistance/Subsidy
1	Solar collector system for direct heating applications (NIC/CPC)	Rs.3600/-sq. m.
2	Concentrator with manual tracking	Rs.2100/- sq. m.
3	Concentrator with single axis tracking (including shufflers dishes)	Rs.4500/- sq. m.
4	Concentrator with single axis tracking (SCMR/ETC),	Rs.5400/- sq. m.
5	Concentrator with double axis tracking	Rs.6000/- sq. m.

Programme on "Energy from Urban, Industrial and Agricultural Waste/ Residues" for 2017-2020.

Sl.No.	Program Description	Central Financial Assistance
1	Biogas generation from Urban Waste/ Agricultural Waste/ Industrial Waste/ Effluents or mix of these wastes. (Distillery effluent is excluded)	Rs.1.0 Crore Per 12000m3 Biogas/day (Max. Rs.10 crore/project)

2	Power generation based on Biogas generated from Urban Waste/ Agricultural Waste / industrial Waste/ Effluents or mix of these wastes. In case, developer wants to set up power generating unit at already existing Biogas generation unit, in that case, the applicable CFA will be only Rs.2.0 crore per MW	Rs.3.0 Crore per MW (Max. Rs.10 crore/project)
3	BioCNG generation based on Biogas generated from Urban waste/ Agricultural Waste / Industrial Waste/ Effluents or mix of these wastes. In case developer wants to set up BioCNG generating unit at already existing Biogas generation unit, applicable CFA will be Rs.3.0 crore	Rs.4.0 Crore Per 4800 kgs of BioCNG/day generated from 12000 m3 Biogas/day (Max. Rs.10 crore/project)
4	Biomass gasifier based captive power and thermal applications in industries Distributed/off-grid power for villages	<u>Electrical</u> • Rs.2,500 per KW with dual fuel engines • Rs.15,000 per

	using biomass gasifier systems.	KW with 100% gas engines Thermal • Rs.2 lakh per 300 KW for thermal applications.

Besides implementing the State Government Schemes, TEDA has also been implementing the schemes announced/being announced by the Ministry of New and Renewable Energy, GOI, facilitating the disbursement of eligible subsidy / incentive to the beneficiaries.

ELECTRICAL INSPECTORATE

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3. ELECTRICAL INSPECTORATE

3.1 INTRODUCTION

The Electrical Inspectorate Department's primary mandate is to ensure that all electrical installations are safe and complies with the Central Electricity Authority Regulations framed under the Electricity Act, 2003 and the Bureau of Indian Standards.

The Department also administers and enforces the statutory provisions relating to lifts and escalators safety, electrical and fire safety in cinema halls and electricity tax collection under various provisions of State Laws.

3.2 ROLES OF ELECTRICAL INSPECTORATE DEPARTMENT

3.3 STATUTORY FUNCTIONS

3.3.1 (a). Inspection and Issue of approval for Electrical Installations – under Electricity Act and Regulations made there under:

The Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations, 2010 framed under Section 53 of

the Electricity Act, 2003 specifies the measures for

i) protecting the public (including the persons engaged in the generation, transmission or distribution or trading) from dangers arising from the generation, transmission or distribution or trading of electricity, or use of electricity supplied or installation, maintenance or use of any electric line or electrical plant.

ii) eliminating or reducing the risks of personal injury to any person, or damage to property of any person or interference with use of such property;

iii) prohibiting the supply or transmission of electricity except by means of a system which conforms to the specifications as may be specified;

The above Regulations specifically define the conditions of safety in electricity supply and the following activities are carried out by the Department under them.

i. Scrutinizing and issue of report on the compliance of the design drawings of electrical installations receiving HT supply (More than 650V) and Power Plants in accordance with Regulations / Bureau of Indian Standards.

ii. Inspection and Testing of Electrical Installations receiving HT supply and Power Plants for ensuring compliance of Regulations and hence for Certifying under Regulation 43.

iii. Inspection and Testing of Electrical Installations in Multi-Storeyed Buildings of more than 15m in height for ensuring compliance of Regulations and hence for Certifying under Regulation 36.

iv. Inspection and Certification of generating units under Regulation 32.

v. Periodical Inspection and Testing of Electrical Installations receiving HT supply, Power Plants and all those installations of Supplier of Electricity,

under Regulation 30 for ensuring continued compliance of Regulations.

(b) Investigation of Electrical Accidents - under section 161 of the Electricity Act, 2003.

The Electrical accidents are investigated and remedial measures are suggested to avoid such accidents in future.

(c)Inspection and Testing of temporary installations where public gather and VVIP visits - under section 54 of the Electricity Act, 2003.

The temporary electrical installations put up in connection with the visit of VVIP's namely the Hon'ble President, Hon'ble Vice President, Hon'ble Prime Minister, Hon'ble Governor, Hon'ble Chief Minister and other Public functions where large number of people are likely to be assembled are inspected, tested and verified to ensure electrical safety.

3.3.2 Inspection and Issue of Electrical Certificate for Cinemas– under the Tamil Nadu Cinemas (Regulation) Act, 1955 and Rules, 1957

The Tamil Nadu Cinemas (Regulation) Act, 1955 and Rules, 1957 provide enough provisions to ensure electrical and fire safety in Cinema Theatres, besides other regulatory mechanism. Under these Rules, the Department carries out the following duties to ensure safety to the Cinemagoer.

a) Issue of Drawing Approval
b) Inspection and Issue of Electrical Certificate for all Cinema Theatres
c) Annual Inspection of Cinemas

3.3.3 Inspection and Issue / Renewal of License for Lifts and Escalators – under the Tamil Nadu Lifts and Escalators Act, and Rules,1997.

The Government of Tamil Nadu enacted the Lift laws in 1997 to regulate the erection, maintenance and safe working of Lifts. Subsequently by an Amendment Act in 2017, the Escalators are also included.

Under this Act and Rules, the Department carries out the following activities.

a) Issue of Erection Permission for Lifts and Escalators
b) Inspection and Issue of Licenses for working the Lifts and Escalators
c) Periodical Inspection and Renewal of Licenses for working the Lifts and Escalators
d) Issue of Authorization for Companies carrying out erection, maintenance, inspection and testing of Lifts and Escalators.

3.3.4 Implementation of Energy Conservation Measures – under Energy Conservation Act, 2001 (Central Act No.52 of 2001)

The Government of India enacted the law to provide for efficient use of energy and its conservation. The Government of Tamil Nadu notified the Department of Electrical Inspectorate as the State Designated Agency for implementing the

provisions of the Act. The responsibilities and duties of the Department as the State Designated Agency are:

i) Spread awareness on Energy Conservation Act, Energy Efficiency Labeling programme, Energy Conservation Building Codes (ECBC), etc., framed under the Act.
j) Undertake voluntary initiatives to promote energy conservation
k) Liaison and coordinate with Bureau of Energy Efficiency, State Government Departments dealing with energy, industry, planning, regulators, consumer affairs, municipal bodies etc.
l) Capacity building of staff employed
m) Launch and maintain state specific website addressing the voluntary and mandatory provisions of Act
n) Undertake energy conservation awareness programme for consumers, industrial and commercial sector, school children, farmers etc.
o) Arrange interactive meets between energy managers, energy auditors and experts in the field.

p) Request State Government to constitute a state energy conservation fund for the purposes of promotion of efficient use of energy and its conservation within the state.

In G.O.(Ms.)No. 76, Energy (D3)Department, dated 04.10.2019 the above subjects were transferred from this department to TANGEDCO Ltd.

3.3.5 Collection of Electricity Tax – under the Tamil Nadu Tax on Consumption or Sale of Electricity Act, and Rules, 2003

The Tamil Nadu Tax on Consumption or Sale of Electricity Act, 2003 (Tamil Nadu Act No.12 of 2003) was enacted in 2003 to consolidate and rationalise the laws relating to the levy of tax on consumption or sale of electricity in the State of Tamil Nadu, repealing the Tamil Nadu Electricity Duty Act, 1939 and the Tamil Nadu Electricity (Taxation on Consumption) Act, 1962. The Act came into force with effect from 16th June, 2003.

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

S. No.	Category	Rate of Tax
1	Electricity sold by Licencee (TANGEDCO/Independent Power Plants/ Trader) to consumers	5% on the Consumption Charge
2	Electricity Sold by Captive Generating Plants to Consumers	5% on the Consumption Charge
3	Consumption of Electricity from Captive Generating Plants including standby Generators (DG sets) for Own Use	10 paise per unit of electricity consumed

The following are exempted from levy of electricity tax.

1) Electricity sold to Government, Local Authority and Railways.
2) Electricity sold for agricultural purposes and hut service connections.
3) Electricity sold to Domestic consumers by Licencee (TANGEDCO).

4) Electricity sold to the TANGEDCO.
5) Exemptions granted under Special Economic Zone Policy, Industrial Policy, Solar Policy and Electric Vehicle Policy.

The Government have entrusted levy and collection of electricity tax to TANGEDCO for the following categories:-

1) Electricity sold by TANGEDCO to Consumers at the rate of 5% on the consumption charge.

2) Consumption of Electricity from Captive generating plants (including DG sets, windmills, etc.,) for own use by Consumers at the rate of 10 paise per unit of electricity.

The other categories of levy of electricity tax are carried out by this Department.

3.4 OTHER FUNCTIONS AND SERVICES

a. Government Electrical Standards Laboratory:

The lab attached to the Office of the Chief Electrical Inspector to Government is a premier lab catering the calibration and testing needs of consumers, suppliers power plants. The laboratory receives energy meters and other electrical instruments from various State Electricity Boards in our country for calibrating their accuracy.

To enhance the testing facility of the lab to International Standards, it is proposed to purchase precision calibration equipment at an estimated cost of Rs. 1.5 crores. The procurement of high precision equipment is under progress.

b. Electrical Licensing Board

As per regulation 29 of Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations, 2010 all the electrical installation works can only be carried out by the licensed contractors and workmen. The Electrical

Licensing board under the Electrical Inspectorate has been designated as competent authority to issue license to the electrical contractors and to grant certificate of competency to wiremen and supervisors in order to ensure that all the electrical works are handled by licensed contractors and certified personnel. The electrical contractor's licenses are classified as ESA, EA, ESB and EB grade depending upon the competency in handling voltage level.

3.5 ACHIEVEMENTS AND REVENUES

3.5.1 The performance of the Department is as follows:

No.	Services Rendered by this department	2017-2018	2018-2019	2019-2020 (Upto December 2019)
a.	Lifts			
	(i) Issue of licenses for new lifts	2,565	2,265	1,505
	(ii) Renewal of licenses for the existing lifts	11,553	12,308	9,094

b.	Issue of permission for electrical installations under Regulation 43	1,774	2,030	1,618
c.	Statutory Periodical inspections of High Tension installations under Regulation 30	4,198	3,938	2,197
d.	Scrutiny of drawing proposals for the new Electrical Installations and additions/Alterations of equipment in the existing installations	1,960	2,246	1,848
e.	Issue of permission for generating units under Regulation 32	1,237	1,108	848
f.	Issue of permission for Multi Storeyed Buildings under Regulation 36	60	65	69
e.	Cinema Theatres			
	(i) Existing cinema theatres	1,080	1,107	1,109

	(ii) Certification of Electrical Fitness to new cinema buildings	21	30	23
	(iii) Renewal of certification of Electrical Fitness to existing cinema buildings	373	349	167
f.	Testing and calibrations of electrical meters	4,540	4,347	3,204

The department mobilized Rs.18.58 crores of revenue from its inspection and other services from April 2019 to December 2019.

3.5.2 ELECTRICITY TAX:

Tax Collected by Electrical Inspectorate	**2017-2018 (in crores)**	**2018-2019 (in Crores)**	**2019-2020 (Upto December 2019) (in Crores)**

Registration	0.14	0.1695	0.12
Electricity Consumption Tax	65.87	66.68	43.71
Sales Tax	1.81	9.89	6.87
Interest	2.07	1.22	0.96
Total	69.89	77.97	51.66

Tax collected by TANGEDCO Ltd	2017-2018 (in crores)	2018-2019 (in Crores)	2019-2020 (in Crores)
through Consumption Bill	1135.82	522.82	479.96

Number of Electrical Contractor Licenses and Competency Certificates issued upto January 2020.

1.	Electrical Contractor License	26,860
2.	Certificate of Competency to Wireman and Supervisor	2,29,145

3.6 IMPROVEMENT IN SERVICE DELIVERY OF THE ELECTRICAL INSPECTORATE

"Online Lift and Escalator License Management" system has been implemented which enables an applicant seeking grant of new licence and renewal of licence for lift and escalators to apply online and also monitor the status of his/her application.

"Online Filing of Returns of Electricity Tax" has also been implemented throughout the State of Tamil Nadu.

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4.TAMIL NADU POWER FINANCE AND INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED

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4. TAMIL NADU POWER FINANCE AND INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED

4.1 Introduction:

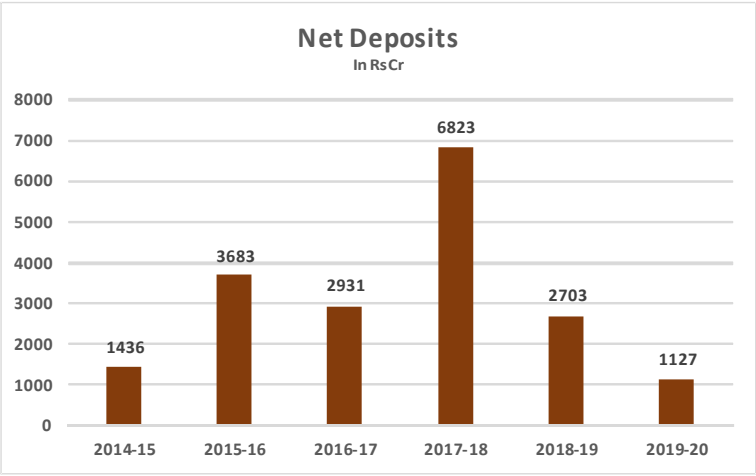
The Tamil Nadu Power Finance and Infrastructure Development Corporation Ltd., (TNPFIDCL), wholly owned state public sector undertaking incorporated in 1991 as a Non-Banking Finance Company- (Deposit). The TNPFIC is classified as Public Financial Institution U/S 4A of the Companies Act. The company has been funding Infrastructure projects undertaken by TANGEDCO. The company's authorized capital and Paid up Capital is Rs.5000 Crore and Rs.2930 Crore respectively. The company mobilizes funds primarily through public deposits and debt markets. The Company has loan assets of Rs.36,161 Crore as on 31.12.2019. Due to its sound financial and professional management, the company has earned a Net profit after tax of

Rs.224.76 crore during the financial year 2019-2020 (upto 31.12.2019).

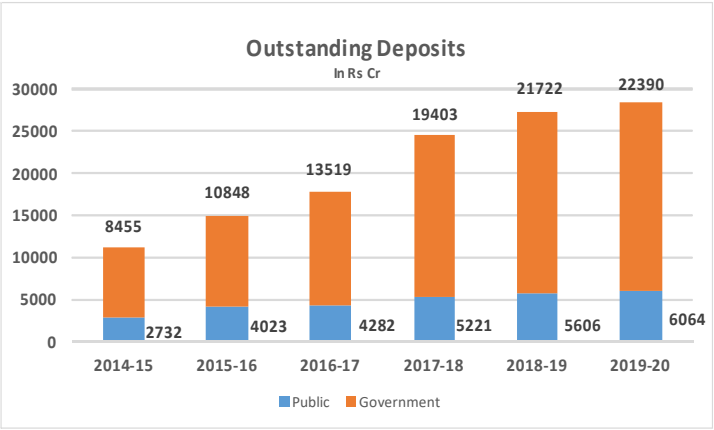
4.2 Fixed Deposits:

TNPFC continues to attract public deposits on account of its depositor focused policies and attractive interest rate on term deposits. The company offers on an average of 100 basis points more than the interest rates offered by the Public sector banks. This has resulted in steady growth of deposits during the financial year 2019-2020. This Corporation has mobilized a sum of Rs.1,126.82 crores as net deposits from 1.4.2019 to 31.12.2019. The net deposits during the year from 1.4.2019 to 31.12.2019 has grown at a rate of 4.12% from 9,93,108 to 10,03,042 depositors. The net deposits from individual and institutional depositors have grown from Rs.27,327.36 Crore in 2018-19 to Rs.28,454.18 crores in 2019-2020 (upto 31.12.2019). This includes deposits mobilized from public, Institutional deposits and

the State Government Schemes. Out of the total deposits of Rs.28,454.18 crores, the contribution from the individual investors is Rs.6063.70 crores and the balance amount of Rs.22,390.48 crores is from Institutional investors and State Government Schemes.



•2019-20 figures considered till 31st Dec 2019



* 2019-20 figures considered till 31st Dec 2019

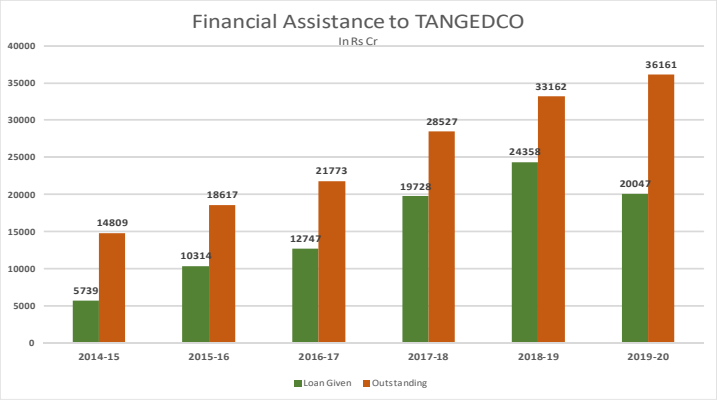
4.3 Rate of Interest

TNPFIDCL offers a competitive interest rate, as given below:

Senior citizens(58years and above)		Others	
Period	Rate of Interest (% per annum)	Period	Rate of Interest (% per annum)
12 Months	7.75	12 Months	7.50
24 Months	8.00	24 Months	7.75
36,48 & 60 Months	8.75	36,48 & 60 Months	8.25

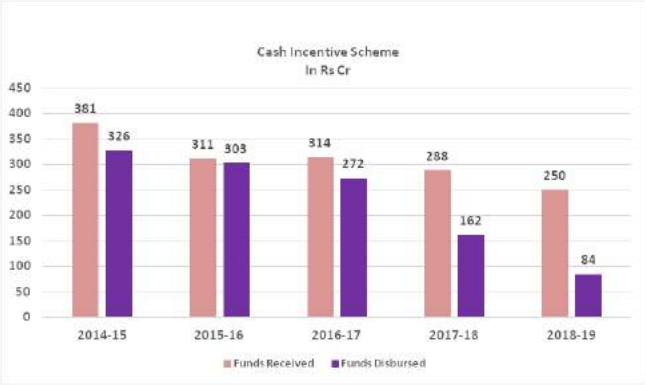
4.4 Financial Assistance to TANGEDCO:

TANGEDCO is the sole beneficiary of the funds mobilized by TNPFIDCL. The funds mobilized by TNPFIDCL are used by TANGEDCO for its generation and its related projects. The total financial assistance provided to TANGEDCO by way of hire purchase, lease and term loan since inception is Rs.1,23,565.39 Crore upto 31.12.2019. A record high amount of Rs.20,047 crore has been provided as financial assistance to TANGEDCO in the financial year 2019-2020(upto 31.12.2019). The net loan outstanding from TANGEDCO is Rs.36,161.08 Crore as on 31.12.2019

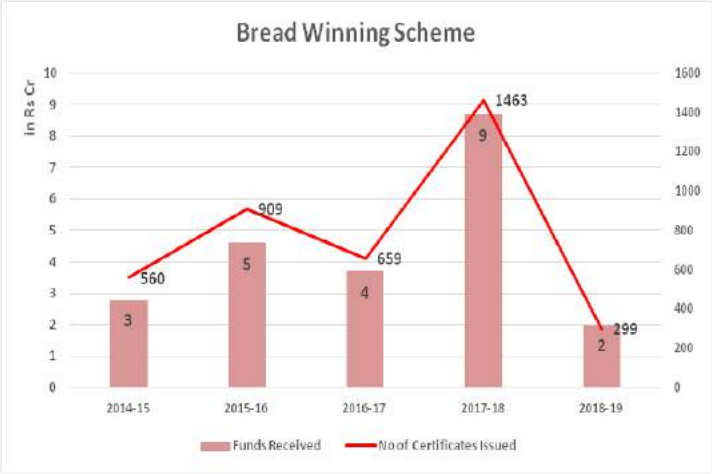


4.5 Deposits received under the State Government Schemes:

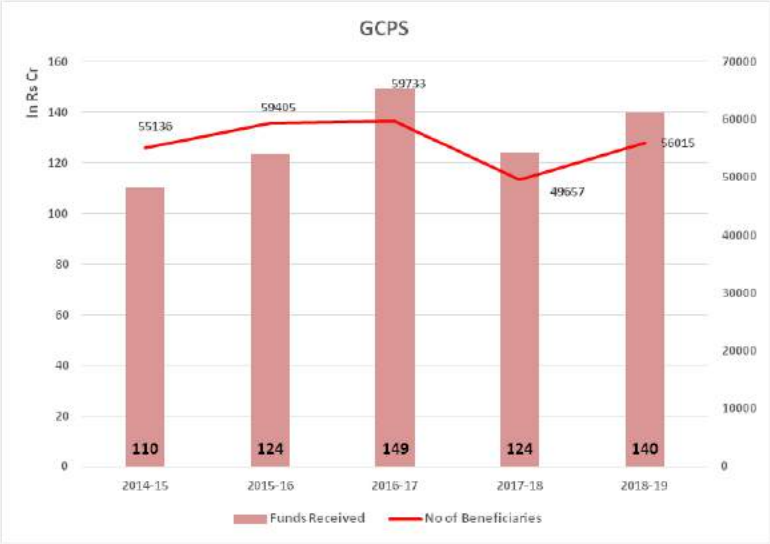
4.5.1 Cash Incentive Scheme: Government in the year 2011-12 vide G.O.(Ms.)No.141, School Education Department, dated 13.9.2011 ordered to implement a new "Special Incentive Scheme (3 Years Deposit)" for students in Government and Government – Aided Schools to prevent the school dropouts in 10^{th}, 11^{th} and 12^{th} standards. An incentive of Rs.1500/- per student for 10^{th} and 11^{th} standards and Rs.2000/- per student for 12^{th} standard is deposited by the Government in Tamil Nadu Power Finance Corporation every year. The School Education Department has deposited a sum of Rs.250 crore in the year 2018-19 as cash incentive to reduce dropout of students in the Schools. After passing class 12^{th} examination, the incentive along with interest of Rs.5851/- per student is directly transferred to the bank account of the students. So far (upto 31.12.2019) 40,07,413 students have been benefited under this scheme with cash incentive of Rs.2069.02 crore since 2011-12.



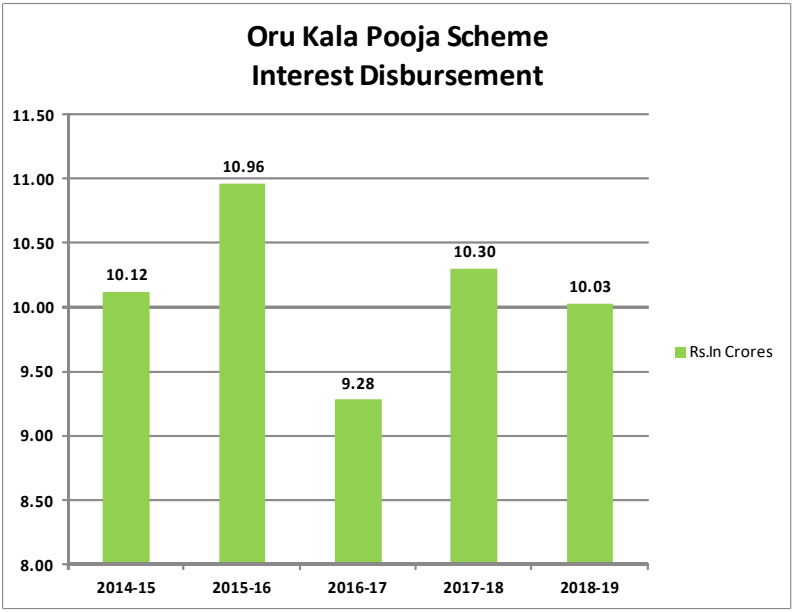
4.5.2 Bread-winning Scheme: Government vide G.O.(Ms.)No.195, School Education Department dt.27.11.2014, have enhanced the existing deposit amount from Rs.50,000/- to Rs.75,000/- per student under this Scheme to provide financial assistance to students studying from 1st standard to 12th standard in Government and Government – Aided Schools, whose bread-winning parent died or got permanently incapacitated in an accident. The amount will be deposited in Tamil Nadu Power Finance and Infrastructure Development Corporation Limited till the child attains 21 years of age. A sum of Rs.51.90 crore has been deposited by the School Education Department from the year 2005 till 31.12.2019.



4.5.3 Chief Minister's Girl Child Protection Scheme: Government vide G.O.(Ms.)No.61, Social Welfare and Nutritious Meal Programme Department, dt.5.7.2013 have enhanced the deposit amount from Rs.22,200/- to Rs.50,000/- per child under "One Girl Child Scheme" (Scheme I) and a sum of Rs.15,200/- to Rs.25,000/- per child under "Two girl children Scheme" (Scheme II) in the name of the child. An incentive of Rs.1,800/- is given per child on completion of 5th year up to 18th year of deposit for her educational purpose. Under the scheme, a sum of Rs.1467.33 crore has been deposited by the Social Welfare Department since the year 2001 till 31.12.2019.



4.5.4 Oru Kala Pooja Scheme: Government vide G.O.(Ms.)No.197, Tamil Development, Hindu Religious and Information Department, dated 20.9.2011 have enhanced the existing deposit amount from Rs.25,000/- to Rs.1,00,000/- towards "Oru Kala Pooja" scheme for performing daily Pooja in the fund starved temples from the quarterly interest earned on such deposits in TNPFIDCL. A sum of Rs.116.54 crore has been deposited with the Corporation to benefit 11,654 temples.



4.6 Financial Performance

TNPFIDCL is a profit making Company since its inception. The total revenue of this Company during the financial year 2019-2020 (upto 31.12.2019) is Rs.2,518.91 Crore*(Provisional)*. The Company has earned a Net profit after tax of Rs.224.76 crore during the financial year 2019-2020 (upto 31.12.2019). The company has declared dividend regularly from the year 1995-96 onwards.

4.7 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 shall spend, in every financial year, at-least 2% of the average Net Profits of the Company made during the last three financial years. During 2019-20, the Company has proposed to spend Rs.18.65 lakhs for purchase of Electric Car to Anna University for encouraging environmental friendly atmosphere inside their campus.

4.8 Software Upgradation

Starting from Financial Year, April 2020 TNPFIDCL will be offering 24 hours a day and 7 days a week transactions for its retail depositors through upgraded digital web portal and mobile app. The new start of the art platform will be complied with RBI's IT Policy Framework and

Directives. TNPFIDCL will also be adopting new age digital tools for depositor's communications through SMS, e-mail, Chatbot, WhatsApp and Customer Support Desk for online application submission, uploading KYC, updating nomination and contact details, renewals etc.

P. THANGAMANI

Minister for Electricity,

Prohibition and Excise