Report of the
Comptroller and Auditor General of India
on

Public Sector Undertakings
for the year ended 31 March 2017

Government of Tamil Nadu

Report No. 5 of 2017

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PREFACE

This report deals with the results of audit of Government Companies and Statutory Corporation for the year ended March 2017.

The accounts of the Government Companies (including Companies deemed to be Government Companies as per the provisions of the Companies Act) are audited by the Comptroller and Auditor General of India (CAG) under the provisions of Section 619 of the Companies Act, 1956 and Section 139 and 143 of the Companies Act, 2013. The accounts certified by the Statutory Auditors (Chartered Accountants) appointed by the CAG under the Companies Act are subject to supplementary audit by officers of the CAG and the CAG gives his comments or supplements the reports of the Statutory Auditors. In addition, these Companies are also subject to test audit by the CAG.

Reports in relation to the accounts of a Government Company or Corporation are submitted to the Government by CAG for laying before State Legislature of Tamil Nadu under the provisions of Section 19-A of the Comptroller and Auditor General's (Duties, Powers and Conditions of Service) Act, 1971.

In respect of Tamil Nadu Electricity Regulatory Commission, the CAG is the sole auditor. The Audit Report on the annual accounts of Tamil Nadu Electricity Regulatory Commission is forwarded separately to the State Government.

The instances mentioned in this Report are those, which came to notice in the course of test audit for the period 2016-17 as well as those which came to notice in earlier years, but could not be reported in the previous reports; matters relating to the period subsequent to 2016-17 have also been included, wherever necessary.

The audit has been conducted in conformity with the Auditing Standards issued by the CAG.

OVERVIEW

1 Overview of Government Companies and Statutory Corporations

Audit of Government Companies is governed by Section 139 and 143 of the Companies Act, 2013. The accounts of Government Companies are audited by Statutory Auditors appointed by the CAG. These accounts are also subject to supplementary audit conducted by the CAG. Audit of Statutory Corporations is governed by their respective legislations.

As on 31 March 2017, the State of Tamil Nadu had 68 working PSUs (67 Companies and one Statutory Corporation) and six non-working PSUs (all Companies), which employed 2.84 lakh employees. The State PSUs registered a turnover of ₹ 1,10,850.43 crore as per their latest finalised accounts. This turnover was equal to 8.54 per cent of State's Gross Domestic Product, indicating the important role played by State PSUs in the economy. The PSUs had accumulated losses of ₹ 78,854.25 crore as per their latest finalised accounts.

Investment in PSUs

As on 31 March 2017, the investment (capital and long-term loans) in 74 PSUs was ₹ 1,53,870.74 crore. Power sector accounted for 92.95 per cent of total investment and Service sector 3.20 per cent in 2016-17. The State Government contributed ₹ 46,127.14 crore towards equity, loans and grants/subsidies during 2016-17.

Performance of PSUs

As per latest finalised accounts, out of 68 working PSUs, 39 PSUs earned profit of ₹ 931.08 crore and 25 PSUs incurred loss of ₹ 9,366.31 crore. The major contributors to profit were Tamil Nadu Newsprint and Papers Limited (₹ 257.53 crore), Tamil Nadu Power Finance and Infrastructure Development Corporation Limited (₹ 129.74 crore), TIDEL Park Limited (₹ 49.28 crore), IT Expressway Limited (₹ 33.39 crore), Tamil Nadu Industrial Investment Corporation Limited (₹ 30.97 crore) and Tamil Nadu Magnesite Limited (₹ 21.74 crore).

In respect of Tamil Nadu Civil Supplies Corporation, the loss is compensated by the State Government. Three Companies neither earned profit nor incurred loss. Heavy losses were incurred by Tamil Nadu Generation and Distribution Corporation Limited (₹ 5,786.82 crore) and all the eight State Transport Corporations (₹ 3,049.39 crore).

Arrears in accounts

Twenty nine working PSUs had arrears of 32 accounts as on 30 September 2017, of which three accounts pertained to earlier years and the remaining were 2016-17 accounts.

Winding up of non-working PSUs

There were six non-working PSUs including one under liquidation. The Government may take a decision regarding winding up of six PSUs.

Quality of accounts

The quality of accounts of PSUs needs improvement. During the year, out of 68 accounts finalised, the Statutory Auditors of Government Companies had given unqualified certificates for 40 accounts and qualified certificates for 28 accounts. There were 32 instances of non-compliance with Accounting Standards. Reports of Statutory Auditors on internal control of the Companies indicated several weak areas.

Response of the Government to Audit

The Government of Tamil Nadu had instructed their administrative departments to submit replies to the paragraphs/reviews included in the Audit Report of CAG of India within two months of their presentation to the Legislature. However, out of 14 Performance Audit Reports and 107 paragraphs included in the Audit Reports from the year 2008-09 to 2015-16, the explanatory notes in respect of nine Performance Audit Reports and 37 paragraphs were not received from eight departments as of October 2017. Further, the Action Taken Notes to 227 paragraphs, pertaining to 40 Reports of Committee on Public Undertakings (COPU) presented to the Legislature between April 2002 and March 2016 were not received as of October 2017.

Performance Audit Relating to Government Company

2.1 Performance Audit on Operational performance of gas turbine power stations of Tamil Nadu Generation and Distribution Corporation Limited

Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) had installed its own power generation plants of 7,144 MW capacity, which included the capacity of 516.08 MW (7.22 per cent) of Gas Turbine Power Stations (GTPS) as on 31 March 2017.

The operational performance of GTPS was earlier reviewed by Audit in 2007-08 and 2009-10 (as a part of the performance audit of the entire generation activities of TANGEDCO). To assess the efforts taken by TANGEDCO since then for improving the performance of GTPS, a Performance Audit on the operational performance of GTPS was taken up covering the period 2012-17.

Operational performance

Three out of four GTPS, viz., Kuttalam Gas Turbine Power Station (KGTPS), Thirumakottai Gas Turbine Power Station (TGTPS) and Valuthur Gas Turbine Power Station-II (VGTPS-II) achieved the average Plant Load Factor (PLF) ranging from 40.88 to 50.46 per cent against the norm of 80 per cent resulting in loss of generation of 4,396.66 MU valued at ₹ 1,203.46 crore. Due to non-achievement of the normative PLF, Tamil Nadu Electricity Regulatory Commission (TNERC) disallowed fixed cost claims amounting to ₹1,830.02 crore for the purpose of tariff fixation.

Only in VGTPS-I, the capacity utilisation was more than 85 per cent in all the years upto 2016-17. But, in TGTPS, KGTPS and VGTPS-II, the capacity utilisation declined from 78.79 per cent (2012-13) to 40.38 per cent (2016-17), 74.19 per cent (2013-14) to 46.29 per cent (2016-17) and 83.86 per cent (2013-14) to 73.08 per cent (2016-17) respectively. The low capacity utilisation was due to not carrying out periodical maintenance, forced outages, reduced generation due to operational problems and Station Heat Rate (SHR) being high, running the station with partial load due to inadequate supply of fuel, etc.

TANGEDCO did not adhere to the committed annual maintenance schedules, which led to forced outages in GTPS and loss of generation of 2,491.59 MU valued at ₹749.56 crore in three GTPS.

Forced outages

VGTPS-II tripped in January 2015, within the warranty period. Though TANGEDCO found that the Original Equipment Manufacturer (OEM) was also responsible for the tripping of the unit, it bore the entire cost of rectification of ₹58.74 crore citing urgency and also suffered loss of generation of 1,354.73 MU valued at ₹407.02 crore.

TANGEDCO did not have a spare rotor as a backup in any of the GTPS. Consequently, KGTPS was kept under forced shut down for a period of one year from 22 February 2012 to 21 February 2013 resulting in generation loss of 708 MU valued at ₹191.16 crore.

Under-performance

The Steam Turbine Generators (STG) of GTPS worked for 1,30,263 hours against the available 1,75,296 hours. Further, the STG did not generate the possible output during the actual hours worked resulting in loss of generation of 1,494.09 MU valued at ₹465.26 crore.

Excess Station Heat Rate

Due to excess station heat rate, the GTPS consumed excess gas valued at ₹249.08 crore in the five years ending 2016-17 and became liable to purchase 19,763 numbers of Energy Saving certificates valued at ₹20.07 crore as penalty.

Excess auxiliary consumption

Except VGTPS-I, all the other GTPS failed to achieve auxiliary consumption norm of six per cent during 2012-17, resulting in non-availability of 118.13 MU of power valued at ₹36.60 crore for sale.

Fuel management

Due to shortfall in supply of committed quantity of gas by Gas Authority of India Limited (GAIL), there was loss of generation of 1,993.84 MU with contribution loss of ₹599.60 crore.

KGTPS and VGTPS-II paid ₹38.83 crore of minimum guaranteed off-take charges to GAIL for short drawal of gas on account of forced outages.

Issues concerning environment

The emission levels of Nitrogen Oxides in GTPS were within the norms in all the five years covered by audit, but the levels of effluent were more than the permissible limit in TGTPS, VGTPS-I and VGTPS-II. In TGTPS, the accumulation of the chemical sludge was neither measured nor disposed-off since October 2013.

Due to non-registration of the GTPS for Clean Development Mechanism (CDM) benefits, TANGEDCO lost 15.28 lakh Carbon Emission Reduction Credits for the period 2012-17 resulting in loss of potential revenue of ₹39.12 crore.

Conclusion

During the performance audit period of 2012-17, the PLF was achieved only in VGTPS-I and the remaining GTPS had achieved average PLF ranging from 40.88 to

50.46 per cent. The lower PLF led to loss of generation to the extent of 4,396.66 MU valued at ₹1,203.46 crore. Besides this, forced outages, operation of GTPS at partial loads, not carrying out mandatory maintenances, not maintaining the station heat rate and auxiliary consumption within the norms were noticed. The issues concerning the environment were in the areas of water pollution and non-registration of GTPS for CDM benefits.

Recommendations

In view of the findings, audit, inter alia, recommended to achieve normative PLF, carry out mandatory inspections, avoid forced outages and lower capacity utilisation, ensure availability of gas for running the plants at optimum level.

2.2 Information Technology Audit of Drug Distribution Management System in Tamil Nadu Medical Services Corporation

Tamil Nadu Medical Services Corporation (TNMSC) Limited is engaged in procurement and supply of drugs, medicines, surgical sutures. TNMSC makes procurements through tenders, stores the stocks in warehouses and supplies to Government medical institutions.

TNMSC had computerised all its major activities through two application software viz., Drug Distribution Management System (DDMS) and Warehouse Information System (WIS).

Audit of DDMS brought out the following significant findings:

- ***The tender processing module of DDMS was not comprehensive rendering the data held in the system incomplete and unreliable.***
- ***Incorrect mapping of business rules in the system resulted in excess projection of requirement in the pre-order statements due to non-consideration of excess stock available in some warehouses.***
- ***The software failed to prevent placing of orders on blacklisted suppliers due to non-integration of the blacklist module with the purchase order module.***
- ***The system failed to detect/prevent data entry errors in the dates of manufacturing and expiry, making it ineffective in handling outward transfer of drugs and reports on short expiry drugs, pre-order level and stock-out level.***
- ***Despite availability of stock, delay in capturing laboratory test reports resulted in non-supply of drugs in 43,039 instances during 2012-17.***
- ***590 drugs valuing ₹16.13 crore expired during 2012-17 included 306 drugs valuing ₹ 5.93 crore, which were supplied beyond the stipulated 30 days after manufacturing.***
- ***Due to delay in communication of "stop issue" order and batch number mismatch, in 982 instances, drugs, which failed in quality test were issued to medical institutions after "stop issue" order date.***
- ***The system did not calculate penalty for non-supply or short supply of drugs, leading to non-collection of penalty to the tune of ₹40.90 crore during 2012-17.***

TNMSC did not implement Disaster Recovery Plan and Business Continuity plan, as envisaged in the e-Security policy of Government of Tamil Nadu.

Compliance Audit Observations

Audit observations included in the Report highlight deficiencies in the management of PSUs with sizeable financial implications. Irregularities pointed out include the following:

Twelve PSUs incurred avoidable expenditure of ₹ 1,766.49 crore due to poor contract management of chartering of vessels, taking up road projects for execution without ensuring availability of land, delay in taking up flood management works, delay in utilising new buses by STUs, not inviting and non-evaluation of bids for import of coal on variable price method, *etc*.

(Paragraphs 3.1, 3.2, 3.4, 3.5, 3.10, 3.12 and 3.14)

Two PSUs extended undue benefit of ₹ 22.92 crore, due to delay in revision of lease rent and non-recovery of cost of transmission lines from the consumer.

(Paragraphs 3.7 and 3.11)

Three PSUs suffered revenue loss of ₹ 25.03 crore due to not enforcing liquidated damages as per the contractual terms, not insisting supply as per the purchase order and not classifying the service connection under industrial category.

(Paragraphs 3.1, 3.8, 3.9 and 3.13)

Some of the important Audit observations are given below:

Poor contract management of chartering of vessels by **Poompuhar Shipping Corporation Limited** led to avoidable extra expenditure to the extent of ₹ 55.83 crore, besides foregoing revenue of ₹ 12.48 crore due to non-levy of liquidated damages and non-collection of service charges.

(Paragraph 3.1)

Tamil Nadu Road Infrastructure Development Corporation, which commenced widening of road for the length of 57.40 KMs into four lane did not complete the same till date (October 2017). Besides planning deficiencies, there was poor contract management of these works, which resulted in avoidable cost escalation of ₹ 82.89 crore.

(Paragraph 3.2)

The implementation of Tamil Nadu State Rural Livelihood Mission by **Tamil Nadu Corporation for Development of Women Limited** revealed the non-completion of base line study even after spending ₹ 434.34 crore on the mission related activities and non-ascertaining the status of 3.19 lakh Self Help Groups (57.37 *per cent* of the total), which were covered under the scheme. Further, there was no coverage of insurance of health, life and assets under the scheme.

(Paragraph 3.3)

Delay of ten years in execution of flood management works by Electronics Corporation of Tamil Nadu Limited led to hardship to the public and avoidable cost escalation of ₹ 28.15 crore.

(Paragraph 3.4)

Inordinate delay of 13 years in revision of lease rent as per lease agreement by **Tamil Nadu Tourism Development Corporation Limited** resulted in undue benefit to a private tenant to the extent of ₹ 10.17 crore.

(Paragraph 3.7)

Not inviting and evaluating bids on variable price method for import of coal by **Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO)** led to avoidable expenditure of ₹ 746.13 crore. Further, its failure to independently verify the correctness of gross calorific value furnished by the supplier resulted in undue benefit to the extent of ₹ 813.68 crore.

(Paragraph 3.10)

Failure of **TANGEDCO** to recover the cost of transmission lines from the client as per the provisions of Distribution Code led to extension of undue benefit of ₹ 12.75 crore.

(Paragraph 3.11)

CHAPTER-I

CHAPTER - I

1 Functioning of State Public Sector Undertakings

Introduction

1.1 The State Public Sector Undertakings (PSUs) consist of State Government companies and Statutory Corporations. The State PSUs are established to carry out activities of commercial nature while keeping in view the welfare of people and also occupy an important place in the State economy. As on 31 March 2017, there were 74 PSUs in Tamil Nadu. Of these, two companies[1] were listed on the stock exchange. The details of the State PSUs in Tamil Nadu as on 31 March 2017 are given below:

Table:1.1 Total number of PSUs as on 31 March 2017

Type of PSUs	Working PSUs	Non-working PSUs[2]	Total
Government companies[3]	67	6	73
Statutory Corporation	1	---	1
Total	**68**	**6**	**74**

(Source: Details collected from the Government)

The working PSUs registered a turnover of ₹ 1,10,850.43 crore, as per their latest finalised accounts as of September 2017. This turnover was equal to 8.54 *per cent* of State Gross Domestic Product (GDP) for 2016-17. The working PSUs incurred loss of ₹ 8,435.23 crore, as per their latest finalised accounts, as of September 2017. They had employed 2.84 lakh employees as at the end of March 2017.

As on 31 March 2017, there were six non-working PSUs existing from 14 to 27 years and having investment of ₹ 69.61 crore.

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1 Tamil Nadu Newsprint and Papers Limited and Tamil Nadu Industrial Explosives Limited.

2 Non-working PSUs are those which have ceased to carry on their operations.

3 Government PSUs include other companies referred to in Section 139 (5) and 139 (7) of the Companies Act, 2013.

Accountability frame work

1.2 The process of audit of Government companies is governed by respective provisions of Section 139 and 143 of the Companies Act, 2013 (Act). According to Section 2(45) of the Act, "Government Company" means a Company in which not less than 51 *per cent* of the paid-up share capital is held by the Central Government or any State Government/Governments or partly by the Central Government and partly by one or more State Governments. The subsidiary of a Government Company is also Government Company. Further, as per sub-Section 7 of Section 143 of the Act, the Comptroller and Auditor General of India (CAG) may, in case of any Company covered under sub-Section (5) or sub-Section (7) of Section 139, if considered necessary, by an order, cause test audit to be conducted on the accounts of such Company and the provisions of Section 19 A of the CAG's (Duties, Powers and Conditions of Service) Act, 1971 shall apply to the report of such test Audit. Thus, a Government Company or any other Company owned or controlled, directly or indirectly, by the Central Government or by any State Government or Governments or partly by Central Government and one or more State Governments is subject to audit by the CAG. The audit of the financial statements of a Company in respect of the financial years that commenced on or before 31 March 2014 shall continue to be governed by the provisions of the Companies Act, 1956.

Statutory Audit

1.3 The financial statements of the Government Companies (as defined in Section 2 (45) of the Act) are audited by Statutory Auditors, who are appointed by CAG as *per* the provisions of Section 139 (5) or (7) of the Act. The Statutory Auditors are required to submit a copy of the Audit Report to the CAG, which among other things, include financial statements of the Company under Section 143 (5) of the Act. These financial statements are subject to supplementary audit by CAG within 60 days from the date of receipt of the audit report under the provisions of Section 143 (6) of the Act.

Audit of Statutory Corporations is governed by its respective legislation. At present, in Tamil Nadu, there is only one Statutory Corporation *viz*., Tamil Nadu Warehousing Corporation. Its audit is conducted by Chartered Accountants and supplementary audit by CAG, in pursuance of the State Warehousing Corporations Act, 1962.

Role of Government and Legislature

1.4 The State Government exercises control over the affairs of these PSUs through its administrative departments. The Chief Executive and Directors to the Board are appointed by the Government.

The State Legislature also monitors the accounting and utilisation of Government investment in the PSUs. For this, the Annual Reports together with the Statutory Auditors' Reports and comments of the CAG, in respect of State Government companies and Separate Audit Report, in case of Statutory Corporation, are to be placed before the Legislature under Section 394 of the Act or as stipulated in the respective Acts. The Audit Reports of CAG are submitted to the Government under Section 19 A of the CAG's (Duties, Powers and Conditions of Service) Act, 1971.

Stake of Government of Tamil Nadu

1.5 The State Government's stake in PSUs is mainly of three types:

- **Share Capital and Loans:** In addition to the share capital contribution, State Government also provides financial assistance by way of loans to the PSUs from time to time.
- **Special Financial Support:** State Government provides budgetary support by way of grants and subsidies to the PSUs, as and when required.
- **Guarantees:** State Government also guarantees the repayment of loans with interest availed by the PSUs from Financial Institutions.

Investment in State PSUs

1.6 As on 31 March 2017, the investment (capital and long-term loans) in 74 PSUs was ₹ 1,53,870.74 crore as per details given below:

Table 1.2: Total investment in PSUs

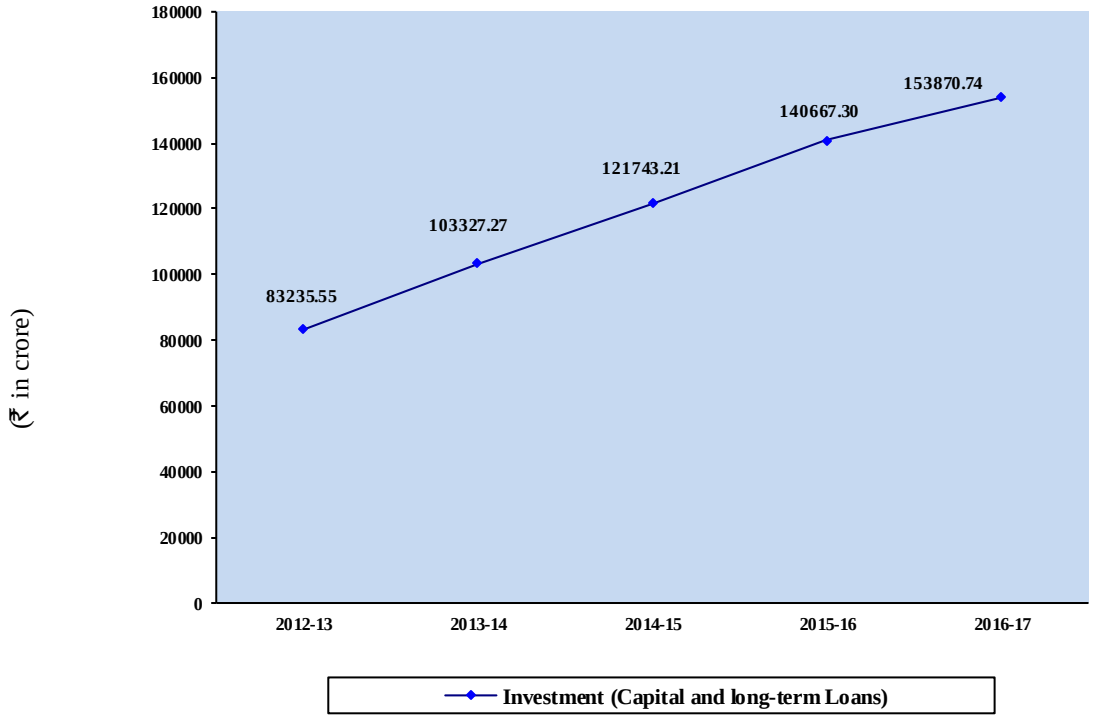
(₹ in crore)

Type of PSUs	Government companies			Statutory Corporation			Grand total
	Capital	Long-term loans	Total	Capital	Long-term loans	Total	
Working PSUs	49,664.34	1,04,129.18	1,53,793.52	7.61	---	7.61	1,53,801.13
Non-working PSUs	47.65	21.96	69.61	---	---	---	69.61
Total	**49,711.99**	**1,04,151.14**	**1,53,863.13**	**7.61**	**---**	**7.61**	**1,53,870.74**

(Source: details as per the financial statements of PSUs)

As on 31 March 2017, of the total investment in State PSUs, 99.95 *per cent* was in working PSUs and the remaining 0.05 *per cent* in non-working PSUs. This total investment consisted of 32.31 *per cent* towards capital and 67.69 *per cent* in long-term loans. The investment has grown by 84.86 *per cent* from ₹ 83,235.55 crore in 2012-13 to ₹ 1,53,870.74 crore in 2016-17, due to loans availed by State Transport Undertakings and power companies from sources like banks and other financial institutions, as shown in the following graph:

Chart 1.1 Total investment in PSUs



1.7 The sector-wise summary of investments in the State PSUs as on 31 March 2017 is given below:

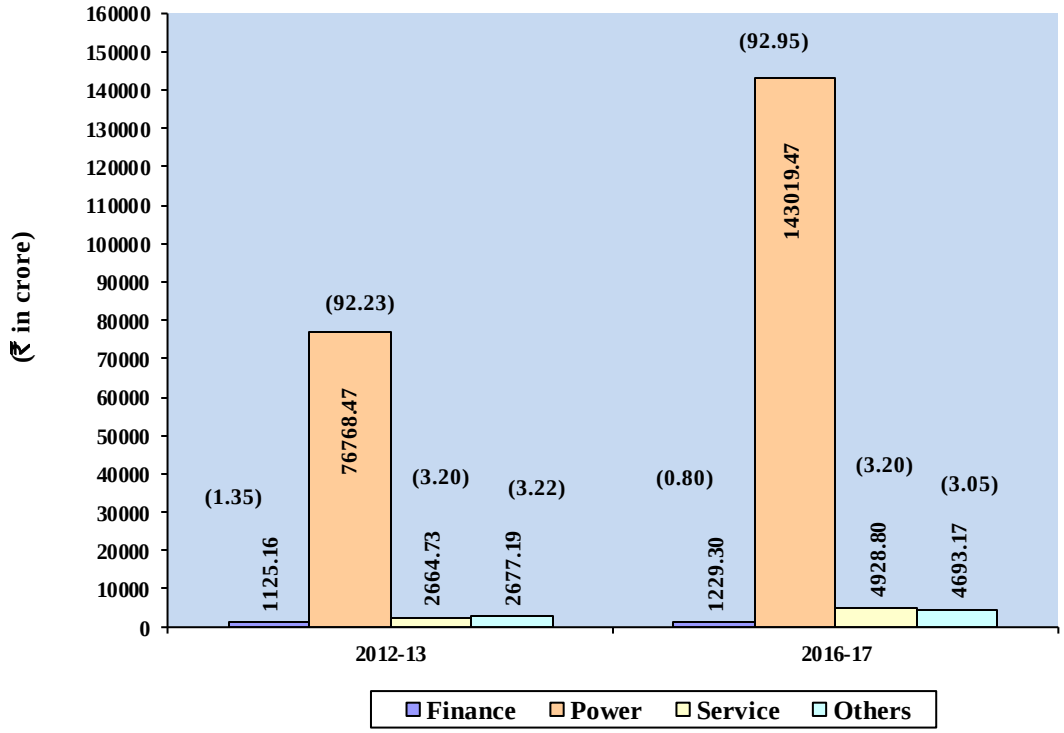
Table 1.3: Sector-wise investment in PSUs

(₹ in crore)

Name of Sector	Government/Other companies		Statutory Corporation	Total	Investment *(In per cent)*
	Working	Non-working	Working		
Power	1,43,019.47	---	---	1,43,019.47	92.95
Finance	1,229.30	---	---	1,229.30	0.80
Service	4,920.86	0.33	7.61	4,928.80	3.20
OTHERS					
Manufacturing	2,822.34	35.04	---	2,857.38	1.86
Infrastructure	1,716.83	6.00	---	1,722.83	1.12
Agriculture & Allied	84.72	28.24	---	112.96	0.07
TOTAL	**1,53,793.52**	**69.61**	**7.61**	**1,53,870.74**	

The investment in four significant sectors and percentage thereof at the end of 31 March 2013 and 31 March 2017 are indicated in the bar chart. The thrust of investment in PSUs was mainly in power sector which accounted for 92.95 *per cent* of the total investment.

Chart 1.2: Sector-wise investment in PSUs



(Figures in brackets show the sector percentage to total investment)

Special support and returns during the year

1.8 The State Government provides financial support to PSUs in various forms through annual budget. The summarised details of budgetary outgo towards equity, loans, grants/subsidies, loans written off and interest waived in respect of State PSUs are given below for three years ended 2016-17.

Table 1.4: Details regarding budgetary support to PSUs

(₹ in crore)

Sl. No.	Particulars	2014-15		2015-16		2016-17	
		No. of PSUs	Amount	No. of PSUs	Amount	No. of PSUs	Amount
1	Equity capital outgo from budget	14	4,663.25	12	3,515.07	12	4,027.01
2	Loans given from budget	9	6,479.95	8	858.19	7	23,836.59
3	Grants/subsidy from budget	21	12,224.93	18	14,042.79	18	18,263.54
4	**Total outgo (1+2+3)**	**27[4]**	**23,368.13**	**25[4]**	**18,416.05**	**21[4]**	**46,127.14**

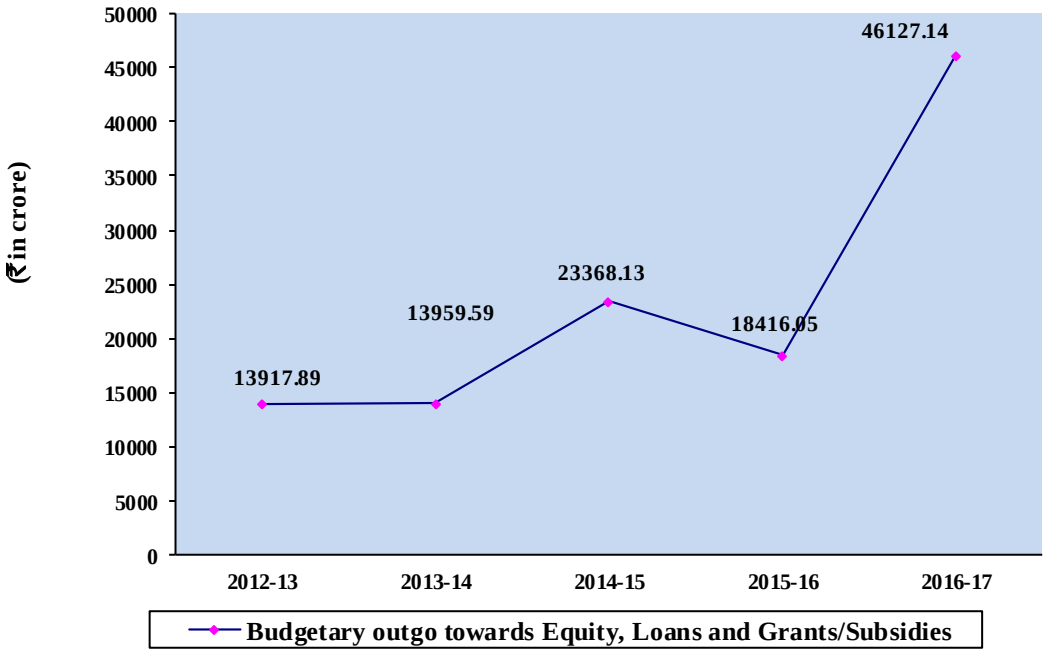
[4] These are the actual number of Companies/Corporation, which have received budgetary support in the form of equity, loan, subsidies and grants from the State Government during the respective years.

Sl. No.	Particulars	2014-15		2015-16		2016-17	
		No. of PSUs	Amount	No. of PSUs	Amount	No. of PSUs	Amount
5	Loans converted into equity	1	40.00	---	---	---	---
6	Loans written off	---	---	---	---	---	---
7	Interest/penal interest written off	---	---	---	---	---	---
8	**Total waiver (6+7)**	---	---	---	---	---	---
9	Guarantees issued	7	6,548.33	8	2,108.59	5	228.30
10	Guarantee commitment	13	46,853.57	13	49,083.40	11	23,118.44

(Source: Details furnished by the companies)

The details regarding budgetary outgo towards equity, loans and grants/subsidies for past five years upto 2016-17 are given in the graph below:

Chart 1.3: Budgetary outgo towards Equity, Loans and Grants/Subsidies



Budgetary support in respect of equity, loans and grants/subsidies showed an increasing trend from 2013-14 to 2016-17 mainly due to increase in equity, loans and subsidy by the State Government over the years to electricity companies, Tamil Nadu Civil Supplies Corporation and State Transport Corporations.

PSUs are liable to pay guarantee fee to the State Government upto 0.5 *per cent* of guarantee amount utilised by them on raising cash credit from banks and loans from other sources including operating Letters of Credit. The guarantee commitment decreased from ₹ 46,853.57 crore in 2014-15 to ₹ 23,118.44 crore in 2016-17. During 2016-17, eight PSUs paid guarantee fee of ₹ 1.57 crore, but four PSUs[5] did not pay guarantee fee. The accumulated/outstanding guarantee fee payable by these four PSUs was ₹ 918.69 crore as on 31 March 2017.

Reconciliation with Finance Accounts

1.9 The figures in respect of equity, loans and guarantees, outstanding as per records of State PSUs, should agree with that of the figures appearing in the Finance Accounts of the State. In case the figures do not agree, the concerned PSUs and the Finance Department should carry out reconciliation of differences. The position in this regard as on 31 March 2017 is stated below:

Table:1.5 Equity, loans, guarantees outstanding as per finance accounts *vis-a-vis* records of PSUs

(₹ in crore)

Outstanding in respect of	Amount as per Finance Accounts	Amount as per records of PSUs	Difference
Equity	26,736.29	26,659.17	77.12
Guarantees	28,172.24	23,118.44	5,053.80

(Source: Finance Accounts for 2016-17 and details furnished by the companies)

Audit observed that the differences in respect of equity and guarantees occurred in 13 and eight PSUs, respectively. In case of one PSU[6], the reconciliation was pending from June 2009. The matter was referred (November 2017) to the Principal Secretary to Government of Tamil Nadu, Finance Department drawing his attention to reconcile the figures of Finance Accounts with the figures furnished by the companies. The Government and PSUs should take concrete steps to reconcile the differences in a time bound manner.

Arrears in finalisation of accounts

1.10 The financial statements of the companies, for every financial year, are required to be finalised within six months from the end of the relevant financial year, *i.e.*, by September end, in accordance with the provisions of Section 96 (1) of the Act. Failure to do so, may attract penal provisions under

[5] Serial Number 8, 10, 47 and 48 of Annexure-2.
[6] Tamil Nadu Transmission Corporation Limited.

Section 99 of the Act. Similarly, in case of the Statutory Corporation, its accounts are finalised, audited and presented to the Legislature as per the provisions of State Warehousing Corporations Act, 1962.

The table below provides the details of progress made by working PSUs in finalisation of accounts as on 30 September 2017.

Table:1.6 Position relating to finalisation of accounts of working PSUs

Sl. No.	Particulars	2012-13	2013-14	2014-15	2015-16	2016-17
1.	Number of working PSUs	64	64	65	68	68
2.	Number of accounts finalised during the year	64	68	57	64	69
3.	Number of accounts in arrears	25	21	29	33	32
4.	Number of working PSUs with arrears in accounts	21	17	25	30	29
5.	Extent of arrears (years)	1 to 3	1 to 2	1 to 2	1 to 2	1 to 2

(Source: Details compiled by audit based on certified accounts of companies)

It can be observed that the number of accounts in arrears had increased from 21 in 2013-14 to 32 in 2016-17. While 26 PSUs had arrears of accounts for the year 2016-17, remaining three PSUs had arrears of accounts for the years 2015-16 and 2016-17.

The Administrative departments have the responsibility to oversee the activities of these entities and to ensure that the accounts are finalised and adopted by these PSUs within stipulated period. The Accountant General (AG), Economic & Revenue Sector Audit, Tamil Nadu has brought the position of the arrears of accounts to the notice of the Additional Chief Secretary, Finance Department during every quarter. As arrears in accounts were noticed in 29 working PSUs upto 2016-17, their net worth could not be assessed in Audit.

1.11 The State Government had invested ₹ 33,263.74 crore in 11 PSUs {equity: ₹ 7,141.84 crore (five PSUs), loans: ₹ 23,779.07 crore (three PSUs) and grants: ₹ 2,342.83 crore (six PSUs)}, during the years for which accounts have not been finalised, as detailed in **Annexure-1**. In the absence of finalisation of accounts and their subsequent audit, it could not be ensured whether the investments and expenditure incurred have been properly accounted for and the purpose for which the amount was invested was achieved or not. Thus, Government's investment in such PSUs remained outside the control of State Legislature.

1.12 In addition to the above, as on 30 September 2017, there were arrears in finalisation of accounts by non-working PSUs. Out of six non-working PSUs, one PSU *viz.*, Tamil Nadu Goods Transport Corporation Limited had submitted winding up proposals and hence, its accounts were not considered due. Of the remaining five non-working PSUs, two[7] PSUs had submitted its

[7] Southern Structurals Limited and State Engineering and Servicing Company of Tamil Nadu Limited.

accounts for the year 2016-17. The accounts of three[8] PSUs are in arrears from one to four years.

Impact of non-finalisation of accounts

1.13 As pointed out above (Para 1.10 to 1.12), the delay in finalisation of accounts may also result in risk of fraud and leakage of public money apart from violation of the provisions of the relevant Statutes. In view of the above state of arrears of accounts, the actual contribution of PSUs to the State GDP for the year 2016-17 could not be ascertained and their contribution to State exchequer was also not reported to the State Legislature.

It is, therefore, recommended that:

- The Government may set up a Cell to oversee the clearance of arrears and set the targets for individual companies, which would be monitored by the cell.
- The Government may consider outsourcing of the work relating to preparation of accounts, wherever the staff is inadequate or lack expertise.

Performance of PSUs as per their latest finalised accounts

1.14 The financial position and working results of working Government companies and Statutory Corporation are detailed in **Annexure-2**. A ratio of PSUs turnover to State GDP shows the extent of PSUs activities in the State economy. Table below provides the details of turnover of working PSUs and State GDP for a period of five years ending 2016-17.

Table:1.7 Details of turnover of working PSUs *vis-a-vis* State GDP

(₹ in crore)

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17
Turnover[9]	70,673.64	83,455.28	87,083.36	99,850.38	1,10,850.43
State GDP	7,44,474	8,54,238	9,76,703	12,12,668	12,98,511
Percentage of turnover to State GDP	9.49	9.77	8.92	8.23	8.54

(Figures of State GDP for 2016-17 are advance estimates reset with base year as 2012-13)

(Source: Details furnished by the companies and the data on GDP furnished by the Government)

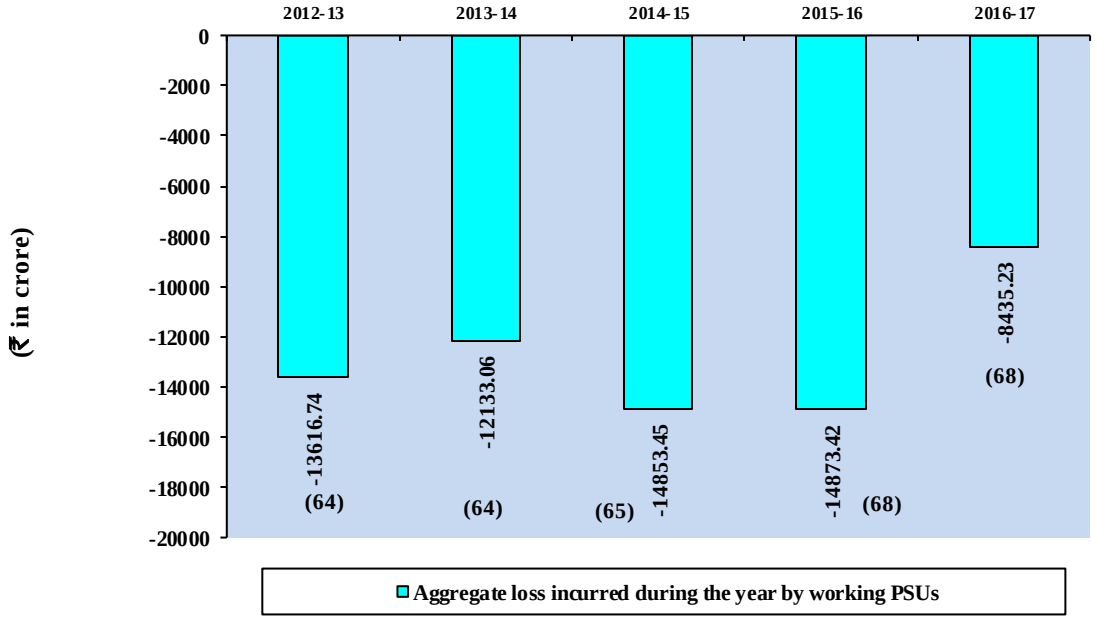
Turnover of PSUs has increased continuously from 2012-13 to 2016-17 and increased by 56.85 *per cent* in 2016-17 as compared to 2012-13. The increase was contributed to the extent of 93.74 *per cent* by the PSUs of power and service sectors. Percentage of turnover of PSUs to State GDP decreased from 2012-13 to 2016-17.

[8] Tamil Nadu Agro Industries Development Corporation Limited, Tamil Nadu Poultry Development Corporation Limited and Tamil Nadu State Construction Corporation Limited.

[9] Turnover as per the latest finalised accounts as of 30 September 2017.

1.15 Overall losses incurred by State working PSUs during 2012-13 to 2016-17, as per the latest finalised accounts are given below in bar chart.

Chart: 1.4 Profit/Loss of working PSUs



(Figures in brackets show the number of working PSUs in respective years)

Working PSUs of the State collectively incurred continuous losses from 2012-13 to 2016-17. But, the loss decreased from ₹ 13,616.74 crore in 2012-13 to ₹ 8,435.23 crore in 2016-17.

As per the latest finalised accounts, out of 68 working PSUs, 39 PSUs earned a profit of ₹ 931.08 crore and 25 PSUs incurred a loss of ₹ 9,366.31 crore. In respect of Tamil Nadu Civil Supplies Corporation, the entire deficit of income is compensated by the State Government in the form of subsidy. Three[10] companies neither earned profit nor incurred any loss.

The accounts finalised as of 30 September 2017 indicated that major contributors to profit were Tamil Nadu Newsprint and Papers Limited (₹ 257.53 crore), Tamil Nadu Power Finance and Infrastructure Development Corporation Limited (₹ 129.74 crore), TIDEL Park Limited (₹ 49.28 crore), IT Expressway Limited (₹ 33.39 crore), Tamil Nadu Industrial Investment Corporation Limited (₹ 30.97 crore) and Tamil Nadu Magnesite Limited (₹ 21.74 crore). Heavy losses were incurred by Tamil Nadu Generation and Distribution Corporation Limited (₹ 5,786.82 crore) and all the eight[11] State Transport Corporations (₹ 3,049.39 crore).

10 Serial Number 26, 29 and 45 of Annexure-2.

11 Serial number 59 to 66 of Annexure-2.

1.16 Some other key parameters of PSUs are given below:

Table:1.8 Key parameters of State PSUs

(₹ in crore)

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17
Return on capital employed[12] (*per cent*)	NIL	NIL	NIL	NIL	NIL
Debt	62,044.08	77,285.51	86,727.04	98,863.64	1,04,151.14
Turnover[13]	70,673.60	83,455.24	87,083.36	99,850.38	1,10,850.43
Debt/turnover ratio	0.88:1	0.93:1	0.99:1	0.99:1	0.94:1
Interest payments	6,649.97	7,840.67	9,830.89	11,920.21	13,846.29
Accumulated losses	38,233.61	50,826.43	65,725.89	80,925.82	78,854.25

(Above figures pertain to all PSUs except turnover which is for working PSUs)

(Source: Details furnished by the companies including latest finalised accounts)

1.17 The State Government had formulated (May 2014) a dividend policy, under which all PSUs were required to pay a minimum return of 30 *per cent* of net profit after tax or 30 *per cent* of the paid-up share capital, whichever was higher, subject to availability of disposable profits. As per their latest finalised accounts as of 30 September 2017, 39 State PSUs had earned an aggregate profit of ₹ 931.08 crore and 20 PSUs declared a total dividend of ₹ 239.74 crore. Of this, major contributors of the dividend were Tamil Nadu Power Finance and Infrastructure Development Corporation Limited (₹ 38.92 crore), Tamil Nadu Industrial Development Corporation Limited (₹ 35.38 crore), State Industries Promotion Corporation of Tamil Nadu Limited (₹ 34.75 crore), Electronics Corporation of Tamil Nadu Limited (₹ 23.87 crore) and Tamil Nadu Newsprint and Papers Limited (₹ 18.29 crore) aggregating to ₹ 151.21 crore, which worked out to 63.07 *per cent* of total dividend declared (₹ 239.74 crore) during the year 2016-17.

Audit analysis of payment of dividend by profit making PSUs revealed that, though some PSUs had disposable profits, they had either not declared dividend or declared dividend at rates lower than those stipulated by the State Government as detailed below:

Table:1.9 Declaration of dividend by PSUs at rates lower than those stipulated by the Government

(₹ in crore)

Sl.No.	Name of the Company	Dividend to be declared as per GO	Dividend actually declared	Reference to Serial Number in Annexure-2
1.	TIIC	9.29	6.08	5
2.	TN Women Limited	1.72	NIL	11

12 NIL indicates that Return on Capital Employed was negative during those years.

13 Turnover of working PSUs as per the latest finalised accounts as of 30 September 2017.

Sl.No.	Name of the Company	Dividend to be declared as per GO	Dividend actually declared	Reference to Serial Number in Annexure-2
3.	TUFIDCO[14]	19.20	3.84	12
4.	IT Expressway	13.22	NIL	24
5.	TEXCO[14]	9.34	NIL	58

(Source: Latest finalised accounts of companies)

Winding up of non-working PSUs

1.18 There were six non-working PSUs as on 31 March 2017. Of these, one[15] PSU had commenced liquidation process and in respect of another PSU,[16] merger orders were issued and its implementation was pending. The closure orders for remaining four[17] PSUs were issued but the liquidation process had not yet started.

Since the non-working PSUs were not contributing to the State economy and meeting the intended objectives, these PSUs may be considered either to be closed down or revived. During 2016-17, two non-working PSUs incurred an expenditure of ₹ 14.08 lakh. This expenditure was met from their internal resources.

The process of voluntary winding up under the Companies Act is much faster and needs to be pursued vigorously. The Government may take a decision regarding winding up of six non-working PSUs.

Comments on accounts

1.19 Sixty working companies forwarded their 68 audited accounts to AG during the year 2016-17. Of these, 43 accounts of 39 companies were selected for supplementary audit. The audit reports of statutory auditors appointed by CAG and the supplementary audit of CAG indicated that the quality of maintenance of accounts was required to be improved substantially. The details of aggregate money value of comments of Statutory Auditors and CAG are given below:

Table:1.10 Impact of audit comments on working companies

(₹ in crore)

Sl. No.	Particulars	2014-15		2015-16		2016-17	
		No. of accounts	Amount	No. of accounts	Amount	No. of accounts	Amount
1.	Decrease in profit	9	170.29	13	192.80	9	204.47
2.	Increase in profit	---	---	3	1.94	1	0.02
3.	Increase in loss	14	11,207.08	12	7,544.38	12	30,660.19

14 The amount represents dividend payable in respect of two accounts finalised by these companies.

15 Tamil Nadu Goods Transport Corporation Limited.

16 State Engineering and Servicing Company of Tamil Nadu Limited.

17 Tamil Nadu Agro Industries Development Corporation Limited, Tamil Nadu Poultry Development Corporation Limited, Tamil Nadu State Construction Corporation Limited and Southern Structurals Limited.

Sl. No.	Particulars	2014-15		2015-16		2016-17	
		No. of accounts	Amount	No. of accounts	Amount	No. of accounts	Amount
4.	Decrease in loss	3	87.79	2	541.37	1	15.73
5.	Non-disclosure of material facts	1	44.94	---	---	---	---
6.	Errors of classification	8	101.50	3	35.49	4	103.27

(Source: Latest finalised annual accounts of companies)

During the year, the Statutory Auditors had given unqualified certificates for 40 accounts and qualified certificates for 28 accounts. The compliance of companies with the Accounting Standards remained poor, as there were 32 instances of non-compliance in 14 accounts during the year.

1.20 Similarly, Tamil Nadu Warehousing Corporation forwarded its accounts for 2015-16 to AG during the year 2016-17, for which supplementary audit was conducted. The Audit Report of Statutory Auditors indicated that the quality of maintenance of accounts needed to be improved substantially. The details of aggregate money value of comments of Statutory Auditors and CAG are given below:

Table:1.11 Impact of audit comments on Tamil Nadu Warehousing Corporation

(₹ in crore)

Sl. No.	Particulars	2014-15		2015-16		2016-17	
		No. of accounts	Amount	No. of accounts	Amount	No. of accounts	Amount
1.	Decrease in profit	1	3.44	1	2.50	1	6.64

(Source: Latest finalised annual accounts of Tamil Nadu Warehousing Corporation)

Response of the Government to Audit

Performance Audit and Paragraphs

1.21 For the Report of the CAG of India for the year ended 31 March 2017, one Performance Audit, one Information Technology audit and 14 audit paragraphs were issued to the Additional Chief Secretaries/Principal Secretaries of the respective Departments with request to furnish replies within six weeks. However, replies in respect of two compliance audit paragraphs were not received from the State Government (October 2017).

Follow-up action on Audit Reports

Replies outstanding

1.22 The Report of the CAG of India represents the culmination of the process of audit scrutiny. It is, therefore, necessary that they elicit appropriate and timely response from the Executive. The Government of Tamil Nadu had issued (1997) instructions to all Administrative Departments to submit replies/explanatory notes to paragraphs/reviews included in the Reports of the CAG of India within a period of two months of their presentation to the

Legislature in the prescribed format without waiting for any questionaires from the Committee on Public Undertakings (COPU).

Table: 1.12 Explanatory notes not received (as on 31 October 2017)

Year of the Audit Report	Date of placement of Audit Report in the State Legislature	Total Performance Audits (PAs) and Paragraphs in the Audit Report		Number of PAs/Paragraphs for which explanatory notes were not received	
		Performance Audit	Paragraphs	Performance Audit	Paragraphs
2008-09	14.05.2010	03	21	02	---
2010-11	16.05.2012	02	18	01	01
2011-12	15.05.2013	02	14	---	02
2012-13	12.08.2014	01	15	---	02
2013-14	29.09.2015	01	15	01	13
2014-15	02.09.2016	03	11	03	06
2015-16	19.07.2017	02	13	02	13
TOTAL		**14**	**107**	**9**	**37**

From the above, it could be seen that out of 14 Performance Audits and 107 paragraphs, explanatory notes to nine performance audits and 37 paragraphs in respect of eight departments, which were commented upon, were not received (October 2017).

Discussion of Audit Reports by COPU

1.23 The status as on 31 October 2017 of Performance Audits/paragraphs that appeared in Audit Reports (PSUs) and discussed by COPU was as under:

Table 1.13 Reviews/Paras appeared in Audit Reports *vis-a-vis* discussed as on 31 October 2017

Period of Audit Report	Number of PAs/paragraphs			
	Appeared in Audit Report		Paragraph Discussed	
	PAs	Paragraphs	PAs	Paragraphs
2003-04	04	20[18]	03	10
2006-07	04	23	03	23
2007-08	04	20	02	20
2008-09	03	21	01	20
2009-10	02	17	---	17
2010-11	02	18	---	07
2011-12	02	14	01	01
2012-13	01	15	---	01
2013-14	01	15	---	01

[18] Out of 20 paras printed, only 10 paras were selected for discussion.

Period of Audit Report	Number of PAs/paragraphs			
	Appeared in Audit Report		Paragraph Discussed	
	PAs	Paragraphs	PAs	Paragraphs
2014-15	03	11	---	---
2015-16	02	13	---	---
TOTAL	**28**	**187**	**10**	**100**

Compliance to Reports of COPU

1.24 As per the directions (1997) given by the Government, the Action Taken Notes (ATNs) on the COPU's recommendations were to be forwarded within six months from the date of placement of COPU's recommendations in the State Legislature. It was, however, noticed that ATNs in respect of 227 paragraphs pertaining to 40 Reports of the COPU presented to the State Legislature between April 2002 and March 2016 had not been received (October 2017) as indicated below:

Table 1.14: Compliance to COPU Reports

Year of the COPU Report	Total number of COPU Reports	Total number of recommendations in COPU Report	Number of recommendations where ATNs not received
2002-03	02	02	02
2009-10	01	04	04
2010-11	01	17	17
2011-12	02	05	05
2013-14	10	35	35
2014-15	11	82	82
2015-16	13	82	82
TOTAL	**40**	**227**	**227**

These Reports of COPU contained recommendations in respect of paragraphs pertaining to 10 Departments, which appeared in the Reports of CAG of India for the years 1992-93 to 2009-10.

It is recommended that the Government may ensure (a) sending replies to the Performance Audit Reports and Paragraphs, Explanatory Notes and ATNs on the recommendations of COPU as per the prescribed time schedule; (b) recovery of loss/outstanding advances/overpayments within the prescribed period; and (c) revamping of the system of responding to audit observations.

Coverage of this Report

1.25 This Report contains 14 paragraphs, one Performance Audit *i.e.*, on Operational performance of gas turbine power stations of Tamil Nadu Generation and Distribution Corporation Limited and one IT audit of Drug Distribution System in Tamil Nadu Medical Services Corporation involving financial effect of ₹ 2,277.27 crore.

Disinvestment, Restructuring and Privatisation of PSUs and reforms in power sector

1.26 There was no disinvestment, privatisation or restructuring of PSUs in the State during the year.

Status of implementation of MOU between the State Government and the Central Government

1.27 The State Government formed Tamil Nadu Electricity Regulatory Commission (TNERC) in March 1999 under the Electricity Regulatory Commissions Act, 1998, with the objective of rationalisation of electricity tariff, for advising on matters relating to electricity generation, transmission and distribution in the State and issue of licences. CAG, who is the Auditor for TNERC, has issued Separate Audit Reports (SARs) upto 2015-16. The SARs upto 2015-16 have been placed in the State Legislature. During 2016-17, TNERC issued five tariff orders including Comprehensive Tariff Orders for Municipal Solid Waste Power plants and on solar power.

In pursuance of the decisions taken at the Chief Ministers' conference on Power Sector Reforms held in March 2001, a Memorandum of Understanding (MOU) was signed in January 2002 between the Ministry of Power, Government of India and the Department of Energy, Government of Tamil Nadu as a joint commitment for implementation of the reform programme in the power sector with identified milestones.

Commitments made in the MOU, except the following, have been achieved as reported by TANGEDCO:

Table:1.15 Non-achievement of commitments made in the MOU

	Commitment as per MOU	Target completion schedule	Status (as on 31 March 2017)
1.	Reduction of Transmission and Distribution losses to 15 *per cent*	December 2003	As per the provisional accounts of TANGEDCO for the year 2016-17, Transmission and Distribution losses worked out to 22.10 *per cent*. Similarly, as per provisional accounts of TANTRANSCO for 2016-17, the transmission loss was 4.08 *per cent*.
2.	100 *per cent* metering of all consumers	September 2012	All services except the agricultural and hut services have been metered. TNERC, in its order dated 11 July 2013, extended the time for fixing of individual meters in agricultural and hut services upto 31 March 2014. Meanwhile, TANGEDCO had approached the Government for issue of policy direction to the Commission, since fixing of meters in agriculture and hut services is the policy decision to be taken by the Government of Tamil Nadu. However, response from the Government to TANGEDCO's proposal was still awaited (October 2017).

	Commitment as per MOU	Target completion schedule	Status (as on 31 March 2017)
3.	Current operations in distribution to reach break-even	March 2003	As per the provisional accounts for 2016-17, TANGEDCO had incurred a loss of ₹ 4,348.76 crore and TANTRANSCO had incurred a loss of ₹ 274.93 crore.
4.	Energy audit at 11 KV sub-stations level	January 2002	Out of 1,603 feeders identified with loss of more than 10 *per cent*, the losses had been brought down to below 10 *per cent* in 1,211 feeders. The reduction of losses in the balance 392 feeders involved large capital works such as erection of new sub-stations (SS), *etc*. Hence, the same was included under 'Part-II works' under Ujwal Discom Assurance Yojana (UDAY) Scheme, involving establishment of new 33/11 KV SS, erection of additional/enhancement of power transformers in the existing 33/11 KV SS and erection of 33 KV lines with associated bay extension works at a total cost of ₹ 409.21 crore covering all the nine regions of TANGEDCO. Based on the methodology formulated by Rural Electrification Corporation, 128 feeders, where the distribution loss was very high have been identified for reduction of distribution loss. The voltage regulation was brought down within the permissible limits in 107 feeders. Such improvement works on feeders was also covered under 'Part I works' under UDAY Scheme involving erection of new 22/11KV lines with associated bay extension works, strengthening of existing 33/22/11 KV line with standard size conductors, erection of 33 KV and 11 KV under ground cables and erection of 33 KV and 11 KV cables at a total cost ₹ 1,408.04 crore in all the nine regions of TANGEDCO.

(Source: Details furnished by TANGEDCO)

CHAPTER-II

CHAPTER-II

2.1 Performance Audit on Operational performance of Gas Turbine Power Stations of Tamil Nadu Generation and Distribution Corporation Limited

Executive Summary

Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) had installed its own power generation plants of 7,144 MW capacity, which included the capacity of 516.08 MW (7.22 per cent) of Gas Turbine Power Stations (GTPS) as on 31 March 2017.

The operational performance of GTPS was earlier reviewed by Audit in 2007-08 and 2009-10 (as a part of the performance audit of the entire generation activities of TANGEDCO). To assess the efforts taken by TANGEDCO since then for improving the performance of GTPS, a Performance Audit on the operational performance of GTPS was taken up covering the period 2012-17.

Operational performance

Three out of four GTPS, viz., Kuttalam Gas Turbine Power Station (KGTPS), Thirumakottai Gas Turbine Power Station (TGTPS) and Valuthur Gas Turbine Power Station-II (VGTPS-II) achieved the average Plant Load Factor (PLF) ranging from 40.88 to 50.46 per cent against the norm of 80 per cent resulting in loss of generation of 4,396.66 MU valued at ₹ 1,203.46 crore. Due to non-achievement of the normative PLF, Tamil Nadu Electricity Regulatory Commission (TNERC) disallowed fixed cost claims amounting to ₹1,830.02 crore for the purpose of tariff fixation.

Only in VGTPS-I, the capacity utilisation was more than 85 per cent in all the years upto 2016-17. But, in TGTPS, KGTPS and VGTPS-II, the capacity utilisation declined from 78.79 per cent (2012-13) to 40.38 per cent (2016-17), 74.19 per cent (2013-14) to 46.29 per cent (2016-17) and 83.86 per cent (2013-14) to 73.08 per cent (2016-17) respectively. The low capacity utilisation was due to not carrying out periodical maintenance, forced outages, reduced generation due to operational problems and Station Heat Rate (SHR) being high, running the station with partial load due to inadequate supply of fuel, etc.

TANGEDCO did not adhere to the committed annual maintenance schedules, which led to forced outages in GTPS and loss of generation of 2,491.59 MU valued at ₹749.56 crore in three GTPS.

Forced outages

VGTPS-II tripped in January 2015, within the warranty period. Though TANGEDCO found that the Original Equipment Manufacturer (OEM) was also responsible for the tripping of the unit, it bore the entire cost of rectification of ₹ 58.74 crore citing urgency and also suffered loss of generation of 1,354.73 MU valued at ₹407.02 crore.

TANGEDCO did not have a spare rotor as a backup in any of the GTPS. Consequently, KGTPS was kept under forced shut down for a period of one year from 22 February 2012 to 21 February 2013 resulting in generation loss of 708 MU valued at ₹191.16 crore.

Under-performance

The Steam Turbine Generators (STG) of GTPS worked for 1,30,263 hours against the available 1,75,296 hours. Further, the STG did not generate the possible output during the actual hours worked resulting in loss of generation of 1,494.09 MU valued at ₹465.26 crore.

Excess Station Heat Rate

Due to excess station heat rate, the GTPS consumed excess gas valued at ₹ 249.08 crore in the five years ending 2016-17 and became liable to purchase 19,763 numbers of Energy Saving certificates valued at ₹ 20.07 crore as penalty.

Excess auxiliary consumption

Except VGTPS-I, all the other GTPS failed to achieve auxiliary consumption norm of six per cent during 2012-17, resulting in non-availability of 118.13 MU of power valued at ₹36.60 crore for sale.

Fuel management

Due to shortfall in supply of committed quantity of gas by Gas Authority of India Limited (GAIL), there was loss of generation of 1,993.84 MU with contribution loss of ₹599.60 crore.

KGTPS and VGTPS-II paid ₹ 38.83 crore of minimum guaranteed off-take charges to GAIL for short drawal of gas on account of forced outages.

Issues concerning environment

The emission levels of Nitrogen Oxides in GTPS were within the norms in all the five years covered by audit, but the levels of effluent were more than the permissible limit in TGTPS, VGTPS-I and VGTPS-II. In TGTPS, the accumulation of the chemical sludge was neither measured nor disposed off since October 2013.

Due to non-registration of the GTPS for Clean Development Mechanism (CDM) benefits, TANGEDCO lost 15.28 lakh Carbon Emission Reduction Credits for the period 2012-17 resulting in loss of potential revenue of ₹39.12 crore.

Conclusion

During the performance audit period of 2012-17, the PLF was achieved only in VGTPS-I and the remaining GTPS had achieved average PLF ranging from 40.88 to 50.46 per cent. The lower PLF led to loss of generation to the extent of 4,396.66 MU valued at ₹ 1,203.46 crore. Besides this, forced outages, operation of GTPS at partial loads, not carrying out mandatory maintenances, not maintaining the station heat rate and auxiliary consumption within the norms were noticed. The issues concerning the environment were in the areas of water pollution and non-registration of GTPS for CDM benefits.

Recommendations

In view of the findings, audit, inter alia, recommended to achieve normative PLF, carry out mandatory inspections, avoid forced outages and lower capacity utilisation, ensure availability of gas for running the plants at optimum level.

Introduction

2.1.1 Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) is engaged in generation and distribution of electricity in the State and had installed its own power generation plants of 7,144 MW capacity as on 31 March 2017 including coal based thermal capacity of 4,320 MW. It also receives power from the Central Generating Stations, Independent/Captive Power Projects, renewable power projects *etc*. As the thermal power plants are dependent on availability of coal and are subject to stringent environmental controls, large scale expansion of coal based thermal plants by TANGEDCO was not feasible. On the other hand, natural gas is a clean fuel compared to coal and can be efficiently used for power generation.

Taking this into account, TANGEDCO established (1996) a major Natural Gas based power project for a capacity of 120 MW, *viz.*, the Basin Bridge Gas Turbine Power station (BBGTPS) near Chennai. Due to non-availability of natural gas within Chennai, the BBGTPS is operated only as a peak hour station[19] using the high cost fuel Naphtha.

Consequent to the discovery of natural gas in the Cauvery basin and in Ramnad district of Tamil Nadu, TANGEDCO established (between February 2001 and March 2004) three Gas Turbine Power Stations (GTPS) of a total capacity of 303.88 MW on combined cycle mode at Thirumakottai (Tiruvarur district), Kuttalam (Nagapattinam district) and Valuthur (Ramnad district). Later on, Valuthur Phase-II (VGTPS-II) gas station was commissioned during August 2008 with installed capacity of 92.2 MW. The natural gas required for these GTPS is supplied by Gas Authority of India Limited (GAIL) based on the agreements between GAIL and TANGEDCO. The total installed capacity of all GTPS as on 31 March 2017 was 516.08 MW **(Annexure-3)** and are in

[19] The station is operated only during peak hours to meet the high demand and for generation of reactive power for stabilisation of the grid.

operation for eight to 21 years. The GTPS constituted 7.22 *per cent* of the total installed power generation capacity of TANGEDCO.

Generation process in a gas turbine power station

2.1.2 In a GTPS, ambient air is compressed and as a consequence, its temperature rises. The hot air is used to burn the fuel (natural gas or a liquid fuel like Naptha), which rotates the turbine and drives the generator that produces electricity. The flue gas that exits has temperature of 500-640 ºC and it is transferred to a Heat Recovery Steam Generator for producing steam to drive a steam turbine generator for further power generation. This combination of gas and steam cycle to generate electricity is called a "combined cycle gas turbine" plant.

Organisational set up

2.1.3 The activities relating to GTPS are managed at TANGEDCO's Headquarters by the Director (Generation), who is assisted by the Chief Engineer (Gas Turbine Schemes). At the field level, GTPS are headed by the Superintending Engineers, who are assisted by the functional Executive Engineers.

Scope and methodology of audit

2.1.4 The operational performance of TANGEDCO's GTPS was reviewed earlier by us in 2007-08 and also in 2009-10 (as part of the Performance Audit on generation activities of TANGEDCO). The issues brought out in these reports were (i) shortfall in generation due to partial load operation resulting in loss of generation, (ii) not carrying out scheduled and regular maintenance resulting in forced outages,[20] besides damage to critical equipments, (iii) payments for unutilised gas to GAIL, (iv) non-monitoring and control of auxiliary consumption of power, (v) inadequate facility for evacuation of generated power and (vi) non-monitoring of the quality of ambient air and effluents. These reviews are yet to be discussed by the Committee on Public Undertakings.

To assess the efforts taken by TANGEDCO since then for improving the performance of the GTPS, a Performance Audit on the Operational performance of GTPS was taken up covering the period 2012-2017. The audit commenced with an Entry Conference on 4 April 2017 with the Principal Secretary to the Government, Energy Department to explain the audit scope and objectives. The audit methodology involved scrutiny of records at TANGEDCO's Headquarters as well as in four GTPS with regard to their activities relating to power generation. The methodology also involved interaction with auditee personnel, analysis of the data with reference to audit criteria, raising audit enquiries and issue of draft audit findings to the management for their comments. Besides, data available on the websites of Central Electricity Authority (CEA), Power and other Ministries of the Governments of India and the State and other recognised websites were

[20] A forced outage results from emergency conditions requiring that the component of the plant is taken out of service immediately.

utilised for analysing the performance of GTPS. The Draft Performance Audit Report was also discussed with the Principal Secretary to the Government, Energy Department in the Exit Conference held on 31 October 2017. The views expressed by the Government in the Exit Conference along with the replies received from the Government (October 2017) were considered and incorporated, wherever found appropriate, while finalising the report.

Audit objectives

2.1.5 The Objectives of the Performance Audit were to assess whether:

- the operational performance of GTPS was in accordance with the standards prescribed and GTPS were operated efficiently;
- fuel management was efficient; and
- GTPS complied with the pollution control norms.

Audit Criteria

2.1.6 The criteria considered for assessing the achievement of audit objectives included the following:

- Norms/guidelines prescribed by CEA, Central Electricity Regulatory Commission (CERC) and Tamil Nadu Electricity Regulatory Commission (TNERC) relating to the operational performance of GTPS;
- Norms prescribed by Original Equipment Manufacturers (OEM) for efficient and optimum utilisation of the plant capacity;
- Board Minutes, circulars *etc*., of TANGEDCO;
- Parameters fixed for plant availability, Plant Load Factor (PLF)[21] and planned outages, *etc*.;
- Comparison with best performers in the region/all India averages;
- Gas supply agreements with Gas Authority of India Limited (GAIL) and
- Acts/Rules relating to Environmental issues.

[21] PLF is the ratio between actual generation and maximum possible generation at installed capacity.

Audit Findings

The audit findings are given below:

Operational Performance

2.1.7 The details of profit/loss in operations of the three combined cycle Gas Turbine Power Stations (GTPS)[22] at Thirumakottai (TGTPS), Kuttalam (KGTPS) and Valuthur (VGTPS-I and II) during the five year period 2012-2017 are indicated in **Annexure-4**.

It could be seen that:

- There was contribution[23] from all the three GTPS in all the years upto 2016-17. But, the contribution was eroded by high fixed cost resulting in loss in respect of TGTPS (except 2012-13) and KGTPS (except 2014-15).
- In VGTPS, the better performance of Phase-I was off-set by the poor performance of Phase-II. Consequently, the station's profit, which was at ₹ 87.52 crore in 2012-13 declined to ₹ 33.42 crore in 2016-17.
- In exercise of its powers conferred under the Electricity Act, 2003, the TNERC determines the tariff taking into account the total annual fixed and variable cost incurred by TANGEDCO for generation and distribution of power. Regulation 42 of TNERC's Tariff Regulations, 2005 provided that the recovery of fixed cost of GTPS below the normative level of 80 *per cent* would be on *pro-rata* basis. Since the GTPS did not achieve the normative PLF during the five year period 2012-17, TNERC disallowed fixed cost claims amounting to ₹ 1,830.02 crore[24] for the purpose of tariff fixation. As this amount was not included in the tariff, it was absorbed by TANGEDCO, thereby increasing its loss to that extent.

Non-achievement of normative Plant Load Factor

2.1.8 Regulation 37 of the TNERC (Terms and Conditions for Determination of Tariff) Regulations, 2005,[25] specifying Norms of Operations of Thermal Power Generating stations, prescribed a PLF of 80 *per cent* for all the three combined cycle GTPS. The following chart indicates the actual PLF of the three GTPS in comparison with the TNERC norm, national average and the best performing similar gas power station in the country (Agartala Gas Turbine Station in the Central Sector) and a private generation plant in the Kuttalam region (Lanco Tanjore Power).

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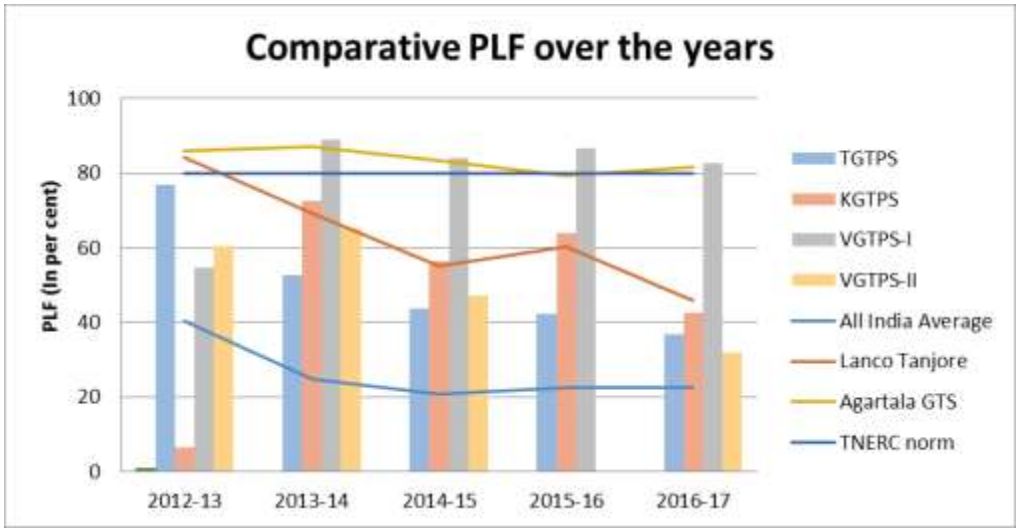
22 BBGTPS is not considered for this analysis as it is a peak hour station and is not operated continuously. Audit findings on BBGTPS are discussed separately in the report.

23 Contribution is the difference between average rate of realisation per unit of power sold and the variable cost incurred on its generation.

24 TGTPS: ₹ 585.33 crore, KGTPS: ₹ 721.81 crore and VGTPS-I & II: ₹ 522.88 crore worked out by audit on the basis of TNERC's Tariff Orders dated 11 August 2017.

25 As amended upto 31 December 2009.

Chart:2.1.1



The details of actual generation *vis-a-vis* possible generation as per norms, shortfall in possible generation as well as normative PLF during 2012-17 worked out by audit is also given in **Annexure-5**, which revealed that:

- except VGTPS-I (2013-14 to 2016-17), none of the other three GTPS, *viz.*, KGTPS, TGTPS and VGTPS-II achieved the PLF norm of 80 *per cent* in any of the years 2012-17. The average PLF achieved by these three GTPS ranged from 40.88 to 50.46 *per cent*.
- VGTPS-II was out of operation from 23 January 2015 to 26 September 2016 due to major break down in the gas turbine as discussed *vide* Paragraph 2.1.11.
- the shortfall in generation of power in TGTPS, KGTPS and VGTPS-II was due to shortage in availability of gas, delays in repairs and maintenance and major shutdowns, as discussed in the succeeding paragraphs.

These problems resulted in loss of generation of 4,396.66 MU of power valued at ₹ 1,203.46 crore[26] during the period 2012-17.

Low capacity utilisation of the plants

2.1.9 Another key indicator of the performance of the plant is the plant's capacity utilisation. The capacity utilisation is the ratio of actual generation to possible generation during actual hours of operation of the plant after excluding hours on planned and forced outages. The summarised position of the capacity utilisation of the plants is as under:

[26] Calculated on the quantum of shortfall in generation during the year multiplied by the contribution per unit station-wise during the respective years.

Table:2.1.2 Capacity utilisation

(in MU)

Year	TGTPS			KGTPS			VGTPS-I			VGTPS-II		
	Total possible generation for actual hours worked	Gross generation	Total capacity utilisation (*per cent*)	Total possible generation for actual hours worked	Gross generation	Total capacity utilisation (*per cent*)	Total possible generation for actual hours worked	Gross generation	Total capacity utilisation (*per cent*)	Total possible generation for actual hours worked	Gross generation	Total capacity utilisation (*per cent*)
2012-13	922.43	726.74	78.79	89.73	55.84	62.23	486.34	449.41	92.41	627.05	488.02	77.83
2013-14	875.74	497.92	56.86	864.46	641.37	74.19	786.81	729.33	92.69	627.61	526.33	83.86
2014-15	873.80	413.70	47.34	839.07	497.36	59.28	774.31	700.58	90.48	481.13	380.30	79.04
2015-16	784.29	399.10	50.89	870.09	563.68	64.78	776.65	721.18	92.86	0.00*	0.00*	0.00*
2016-17	861.70	347.98	40.38	813.42	376.50	46.29	804.05	688.17	85.59	381.07	278.48	73.08

(Source: Data furnished by the Company)

* **VGTPS-II was shut down during 2015-16**

From the table, it could be seen that only in VGTPS-I, the capacity utilisation was more than 85 *per cent* in all the years upto 2016-17. However, in TGTPS, KGTPS and VGTPS-II, the capacity utilisation declined from 78.79 *per cent* (2012-13) to 40.38 *per cent* (2016-17), 74.19 *per cent* (2013-14) to 46.29 *per cent* (2016-17) and 83.86 *per cent* (2013-14) to 73.08 *per cent* (2016-17) respectively. The main reasons for the low capacity utilisation were not carrying out periodical maintenance, forced outages, reduced generation due to operational problems and Station Heat Rate (SHR) being high, running the station with partial load due to inadequate supply of fuel. These factors are discussed in the following paragraphs.

Delays in carrying out periodical maintenance

2.1.10 A proper plan for carrying out timely repair and periodical maintenance would ensure optimum utilisation of existing facilities. As per the recommendations of the OEM, (i) combustion and borescopic inspection[27] of GTPS is to be carried out after every 8,000 firing hours, (ii) hot gas path inspection[28] after 24,000 firing hours and (iii) major inspection after 48,000 firing hours.[29] The details of mandatory inspections to be carried out *vis-a-vis* the actual inspections in the three GTPS since their commissioning, are indicated in **Annexure-6**. In this connection, we observed that:

- Though CEA had stressed upon the necessity to have a written maintenance policy for the power plants, TANGEDCO had not laid down a maintenance policy for GTPS. Further, it had not adhered to the inspection schedule prescribed for GTPS by OEM as detailed in the following table:

27 Combustion Inspection is a short dis-assembly shutdown inspection of fuel nozzles, liners, cross fire tubes, spark plugs, flame detectors *etc*. Borescope is an optical device used where the area to be inspected is inaccessible by other means.

28 The purpose of hot gas path inspection is to examine all of the internal rotating and stationery components in the total path of the hot gas (as produced in the combustion chamber).

29 Gas turbine components are subjected to a series of maintenance inspections at specified intervals based on equivalent operating hours of the unit.

Table:2.1.3 Statutory Inspections carried out

Type of Inspection	Due as per OEM recommendation (in fired hours)	Actual fired hours from date of commissioning upto March 2017[30]			Number of inspections to be carried out during the period			Actual inspections carried out		
		TGTPS	KGTPS	VGTPS-I	TGTPS	KGTPS	VGTPS-I	TGTPS	KGTPS	VGTPS-I
Combustion Inspection	8,000	1,31,535	82,121	1,10,715	16	10	14	7	4	5
Hot Gas Path Inspection	24,000				5	3	4	2	1	2
Major Inspection	48,000				2	1	2	2	1	2

(Source: Data furnished by the Company)

We noticed that the combustion inspection and hot gas path inspection were not carried even to the extent of 50 *per cent* of the requirement in all the three GTPS. Further, there was no combustion inspection carried out in TGTPS after December 2015 and in KGTPS after June 2014 even though the fired hours after the previous inspection had already crossed 10,368 hours and 22,722 hours, respectively in these two GTPS. Similarly, in TGTPS, there was no major inspection carried out after October 2009 even though the station had run for more than 61,728 fired hours after the previous inspection.

Non-adherence to inspection schedule led to the risk of GTPS being operated without adequate maintenance with increased probability of malfunctioning and under-performance, which ultimately led to forced outages of GTPS to the extent of 23,454 hours in Gas Turbine Generator (GT) (13.38 *per cent*[31] of the total available hours) and 30,274 hours in Steam Turbine Generator (STG) (17.27 *per cent*[32] of the total available hours) in the three GTPS during 2012-17 (**Annexure-7**). The forced outages led to loss of generation of 2,491.59 MU valued at ₹ 749.56 crore[33] in the three GTPS**.**

- We had already pointed out in the earlier review about the lapses in adherence to the scheduled maintenances in respect of GTPS by TANGEDCO. The continued non-adherence to the regular maintenances without adequate justification indicated that TANGEDCO had not given the due importance for maintenance, which is essential for upkeep and proper functioning of the critical equipments.

The Government replied (October 2017) that postponement of the mandatory inspections was due to practical field conditions like permission from Load Despatch centre for shutdown, delay in procurement of imported spares, *etc.*

30 VGTPS-II had been excluded from this analysis as the unit had been under frequent forced outages necessitating major overhauls and rehabilitation works.

31 23,454 hours out of the total available 1,75,296 hours during 2012-17.

32 30,274 hours out of the total available 1,75,296 hours during 2012-17.

33 Loss of generation calculated on the quantum of possible generation during the hours of forced outage multiplied by the contribution per unit from that station during the respective years.

Since annual maintenance schedules were committed well in advance to the Regional Power Committee by TANTRANSCO, which also controls the Load Despatch Centre, the reply regarding seeking permission from it is not acceptable. The fact, therefore, remained that not carrying out the inspection within the stipulated time resulted in instances of forced outages, which are discussed in the succeeding paragraphs:

Forced outages

Continued breakdown of the GT in VGTPS-II

2.1.11 All GTPS of TANGEDCO were erected by BHEL except Phase-II of VGTPS, which was awarded (May 2006) to BGR Energy Systems Limited (BGR) for a contract price of ₹ 355.53 crore. The OEM of the station was M/s ANSALDO, Italy and the unit started its commercial operation in February 2009. The GT and Gas Booster Compressor (GBC) were of new type[34] in which the temperature of the gas at the inlet of the GT was to be restricted to a maximum of 50º C, whereas no such restriction was attached in respect of all other GTPS. A mention was already made in the Report of the CAG for the year ended 31 March 2015 – Government of Tamil Nadu, Public Sector Undertakings (Paragraph 4.9) about acceptance of new type of GBC recommended by the supplier without having operational experience either by TANGEDCO or by the Indian supplier, *viz*., BGR and verifying its operational risk leading to frequent defects in the GT and the resultant avoidable expenditure.

During the present audit, we noticed that between April 2012 and March 2014, VGTPS-II suffered breakdowns for 102 days (GT) and 169 days (ST) due to problems associated with defective air filter, activation of surge protection relay, failure of bearing in Inlet Guide Vane, *etc*. Considering the above, TANGEDCO carried out (November/December 2014) major overhauling of GT and generator of the unit through ANSALDO at a cost of ₹ 15.71 crore. The unit again tripped on 23 January 2015, within the warranty period of one year, due to high vibration in the GT bearing. ANSALDO, which inspected the GT, observed that the damages could be repaired only by replacement of the major parts of GT. The warranty claim of TANGEDCO was rejected by ANSALDO on the grounds that the cause of failure was entry of foreign particles into the compressor inlet, which was not covered under warranty conditions.

Citing urgency in rectification of the fault in GT, TANGEDCO issued (February 2016) purchase orders/works contracts for a total value of ₹ 58.74 crore. After rectification, the unit was brought back into operation on 26 September 2016.

We observed in this regard that:

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[34] In a normal centrifugal GBC, lubrication was required only for the bearings, whereas in reciprocating GBC used in this unit, continuous lubrication for movement of piston was essential and there is a possibility that the lube oil may escape and contact with the natural gas during operation of GT.

- Even though TANGEDCO noted (April 2015) that the failure of GT was due to negligence on the part of ANSALDO while carrying out the scheduled maintenance during November-December 2014, it failed to prepare a check list of items to be 'covered and not covered' during the scheduled maintenance to enable pinpointing ANSALDO's deficiencies, causing failure of GT.
- TANGEDCO decided (September 2015) to form a technical committee consisting of external members to study the causes for the failure and suggest ways for revival of the project. The committee concluded that ANSALDO was equally responsible for completing the overhaul activity without analysing certain repeated failures and for not having advised TANGEDCO for corrective operations. But it did not work out the financial liability of ANSALDO for such lapses and recommended (January 2016) for the revival of the unit by ANSALDO in view of urgency in bringing back the unit into service. TANGEDCO accepted the recommendation as it was felt that any replacement of the ANSALDO make GT with another GT would result in reduced efficiency/increased heat rate and may not be cost effective. Thus, the decision not to fix responsibility for ANSALDO's lapses in maintenance and to bear the entire cost of rectification of ₹ 58.74 crore was a forced decision considering the urgency in repairing the plant and was not on merits.
- Due to continued shutdown of the plant from 23 January 2015 to 26 September 2016, TANGEDCO suffered generation loss of 1,354.73 MU valued at ₹ 407.02 crore.

The Government replied (October 2017) that the GT tripped because of frequency variation/grid condition which could not be predicted and controlled. The fact, however, remained that the unit tripped immediately after carrying out the major overhaul. TANGEDCO observed that the ineffectiveness of the works carried out by ANSALDO, led to subsequent breakdown of the unit.

- As the unit was having frequent operational problems taking longer time for ANSALDO to rectify the defects, it was envisaged (January 2013) to provide an Advanced Diagnostic Analysis (ADA) monitoring system for the unit to enable round the clock monitoring of the operations by ANSALDO from Italy. Accordingly, contract was awarded (October/December 2013) and the system was installed (December 2014) at a cost of ₹ 2.09 crore with annual maintenance and internet connectivity cost of ₹ 32 lakh. As the unit was shut down from January 2015 to September 2016, the ADA was not put to the intended use till September 2016. The dedicated internet connection also remained disconnected from July 2015 onwards till date (October 2017). Thus, the capital investment and the annual maintenance cost of ₹ 2.41 crore incurred on this system became infructuous.

Forced outage due to delay in refurbishment

2.1.12 TANGEDCO had four GT rotors[35] in service, one each in TGTPS, KGTPS and VGTPS-I and II. During major inspections conducted in VGTPS-I and TGTPS during August/September 2009, damages were noticed in the rotor parts in both GTPS. While a new one was installed in TGTPS, the existing rotor was reconditioned and installed in VGTPS-I.

As the old retrieved rotor in TGTPS had severe damages in its rotor blades, TANGEDCO proposed (December 2009) refurbishment of the damaged rotor. Administrative approval was accorded (January 2010) for the refurbishment. As the item was proprietary in nature, protracted negotiations were held with the OEM, BHEL for finalisation of the rotor price. The negotiations were finally concluded in July 2011 at a cost of ₹ 10.63 crore.

Before purchase order could be issued for the refurbishment, the rotor in KGTPS failed (October 2011). As the repairing of the damaged GT would take four to five months, TANGEDCO decided to utilise the GT rotor already removed (October 2009) from TGTPS in its existing damaged condition at KGTPS, to bring the unit back into service at the earliest.

Accordingly, the GT rotor of TGTPS was diverted and erected at KGTPS and the station was re-commissioned (23 November 2011) after incurring an expenditure of ₹ 2.50 crore. TANGEDCO decided to get the failed rotor in KGTPS repaired first and purchase order was issued (9 January 2012) at the rates already finalised for TGTPS (₹ 10.63 crore). While repair works were still pending, the replaced GT also failed (22 February 2012) leaving the station under complete shutdown. One more purchase order was issued (18 April 2012) for reconditioning of this rotor at a cost of ₹ 10.14 crore, which was subsequently enhanced to ₹ 27.18 crore in November 2013 due to additional works.

In the meanwhile, the GT in VGTPS-I also failed (26 June 2012) forcing TANGEDCO to divert the refurbished rotor (order for which was placed in January 2012) to VGTPS-I and it resumed operations from 18 October 2012. A new rotor was procured at a cost of ₹ 56 crore and KGTPS was brought back to service on 21 February 2013. The rotor for which refurbishment order was placed in April 2012 was received in VGTPS-I and is being kept as spare.

We observed in this regard that:

- TANGEDCO did not have a spare rotor initially to serve as a back-up for any emergencies.
- Protracted deliberations on the issue of refurbishing the failed rotor in TGTPS for over 22 months from October 2009 till July 2011, led to non-availability of the damaged GT for emergency use, which had a cascading effect since no replacement was available for both VGTPS-I and KGTPS.

[35] A rotor is a device having blades radiating from a central hub that is rotated to produce magnetic field.

- Consequently, KGTPS was kept under forced shut down for a period of one year from 22 February 2012 to 21 February 2013 resulting in generation loss of 708 MU[36] valued at ₹ 191.16 crore.

While replying, the Government stated (October 2017) that since this was the first instance of refurbishment of GT rotor, some additional time was consumed to ascertain the feasibility, cost reasonableness and economy of refurbishment of the rotor, *etc*. The fact, however, remained that TANGEDCO failed to get the GT repaired in time from September 2009 onwards, which mainly resulted in forced shutdown of the station and the resultant loss of generation.

Forced shut down due to delay in taking up major inspection

2.1.13 Major Inspection of Gas Turbine as per norms (after 48,000 hours) is a statutory requirement for reliable and sustained power generation. Major inspection of the 95 MW VGTPS-I was planned to be taken up only during May 2012 after the station had clocked more than 72,000 fired hours.

In the meantime, it was noticed (January 2012) that the vibration level in the load gear box increased whenever grid frequency exceeded 50 Hz. Due to this problem, raising the load on GT beyond 50 MW (against the full capacity of 60 MW) resulted in tripping of GT on three occasions during February 2012. Consequently, VGTPS-I was under forced shutdown from 11 March 2012 and the same was re-commissioned on 02 May 2012 after major overhaul and replacement of major spares worth ₹ 30.44 crore, leading to a generation loss of 69.29 MU valued at ₹ 33.44 crore during the period March-May 2012.

But, the unit once again failed on 26 June 2012 due to damages in GT requiring complete dismantling, repairing and re-commissioning of it. After repair work including replacement of the GT rotor (meant for KGTPS and diverted to VGTPS-I in July 2012), the unit recommenced operations from 18 October 2012. The cost of rectification work (including ₹ 10.63 crore being the cost of the diverted rotor) worked out to ₹ 12.65 crore.

We observed in this regard that the failure of the GT reflected inadequacies of major inspection carried out in May 2012, which resulted in non-availability of the unit from 26 June 2012 to 18 October 2012 resulting in loss of generation of 262.20 MU valued at ₹ 79.18 crore, which was avoidable.

Under-performance

Under-performance of steam turbine generator

2.1.14 As per the designed parameters of GTPS, the steam turbine generators in each of the combined cycle plants were capable of generating 334.89 MU (TGTPS), 324.12 MU (KGTPS), 307.48 MU (VGTPS-I) and 295.21 MU (VGTPS-II) *per annum* at 100 *per cent* capacity utilisation. Our examination of the outputs of the STG in the three GTPS during 2012-17 revealed that the STGs worked only for 1,30,263 hours against the total available 1,75,296

[36] For an Installed capacity of 101 MW at the PLF of 80% for 365 days (101X80%X8.76 MU/ *per annum*).

hours indicating STG availability factor[37] of only 74.31 *per cent*. Further, the STGs also did not generate the maximum possible output during the hours worked resulting in loss of generation of 1,494.09 MU valued at ₹ 465.26 crore (**Annexure-8**). The poor performance of STGs were due to reasons like steam loss, poor vacuum in condenser, *etc.*, causing the STG to run at restricted loads in all the three GTPS.

A detailed analysis of the STG of TGTPS revealed that:

- there was complete outage from 31 August 2015 to 6 November 2015 resulting in loss of 1,633 hours due to high vibrations in the turbine blades causing loss of generation of 62.45 MU valued at ₹ 16.61 crore.
- TGTPS uses a water cooled condenser,[38] which was in service from 2001. The water requirement for the condenser was met from six bore wells. The water based condenser was envisaged in this plant during the commissioning stage when there was abundant availability of raw water. Due to passage of time, supply of water from its bore wells (250 tonnes/hour) was reduced causing frequent shut down of the STG due to puncture and choking of the condenser tubes. This had resulted in shutting down of the STG to the extent of 620 hours and loss of generation of 23.70 MU valued at ₹ 6.79 crore during the period from October 2011 to August 2014. It was, therefore, decided (September 2014) to replace the water cooled condenser with an air cooled one at an estimated cost of ₹ 32.85 crore with estimated payback period of two years. However, the replacement was not executed as BHEL, the OEM had recommended (July 2015) for modification in the STG before switching over to air cooled condenser. Consequently, the problems associated with the water cooled condenser persisted till date (October 2017) resulting in frequent shutdown of the STG and leading to the complete failure of the STG from 11 March 2017 to 20 May 2017 causing loss of generation of 54.52 MU valued at ₹ 18.54 crore.

The Government replied (October 2017) that tendering was in progress for erection of the air cooled condenser. The fact, however, remained that though the proposal for replacement of condenser was initiated in September 2014, the same was not completed till date resulting in persistence of the problem in the plant.

Delay in rectifying the problem of high wheel space temperature

2.1.15 The GT of 64 MW capacity at KGTPS was not operated beyond 55 MW due to its 'High wheel space[39] temperature' reaching alarming level. In the absence of adequate cool air to reduce the high wheel space temperature, KGTPS had to reduce the quantum of gas injection to keep the wheel space

37 Availability factor is the amount of time that a plant is able to produce electricity over a certain period, divided by the amount of the time in the period.

38 A condenser is a device used to condense a substance from its gaseous to its liquid state.

39 Wheel space is the area between nozzles of the turbine stator and turbine buckets of the turbine rotor. The temperature measured in this area is known as wheel space temperature.

temperature within the permissible limits. When the station was taken up for combustion inspection in June 2014, it was found out by BHEL (the OEM) that the old refurbished Load Gear Box (LGB) fitted in the GT rotor in January 2013 was the main reason for the rise in temperature as vibration level started increasing whenever the load was raised beyond 55 MW. Though a new LGB was installed (June 2014), the problem persisted. The problem was rectified only in June 2016 after replacement of the old bearings with a new one. Audit worked out the loss of generation due to the high wheel space temperature problem during the test checked period from April 2013 to December 2015 as 13.33 MU valued at ₹ 3.60 crore.

Excess Station Heat Rate

2.1.16 The agreements with GAIL provided for payment for supply of gas based on a net calorific value of 10,000 Kcal/SCM,[40] which was also adopted by TNERC for tariff determination. However, we noticed that the gas supplied during the five year period ending March 2017 was with lesser calorific value compared to the normative calorific value leading to higher consumption of gas. Audit worked out the normative Specific Gas Consumption (SGC)[41] per unit for each of the three GTPS (with reference to the normative calorific value of 10,000 Kcal/SCM) and observed that the actual SHR [42] and actual Specific Gas Consumption (SGC) per unit in all the three GTPS were in excess of the standards as detailed in the following table:

Table:2.1.4 Actual SHR and Actual Specific consumption of gas

Station	Designed SHR (Kcal/ Kwh)	Normative Specific Gas consum-ption per unit[43] (SCM/ KWh)	Actual Heat Rate and Specific Gas consumption per unit									
			2012-13		2013-14		2014-15		2015-16		2016-17	
			SHR	SGC	SHR	SGC	SHR	SGC	SHR	SGC	SHR	SGC
TGTPS	1,670	0.167	1,833	0.194	2,051	0.206	2,132	0.223	2,282	0.237	2,682	0.254
KGTPS	1,868	0.187	2,361	0.208	2,203	0.198	2,428	0.214	2,380	0.208	2,200	0.234
VGTPS-I	1,671	0.167	1,793	0.205	1,777	0.202	1,812	0.200	1,796	0.204	1,809	0.206
VGTPS-II	1,676	0.168	1,945	0.220	1,960	0.222	2,003	0.218	0	0.000	2,163	0.217

(Source: Data furnished by the Company)

We observed that the main reason for the high SHR was due to operation of GTPS at partial loads, frequent stoppages and forced outages, *etc*., which resulted in the plants consuming 217.23 Million Standard Cubic Metre (MSCM) of excess gas valued at ₹ 249.08 crore in the five years ending 2016-17 (**Annexure-9)**.

We also noticed that the three GTPS were marked as designated consumers by the Bureau of Energy Efficiency (BEE), a statutory body under the Ministry of

40 Kcal/SCM – Kilo Calories per Standard Cubic Metre.
41 The quantum of gas consumed per unit of generation of power.
42 Station Heat Rate means the heat energy input in Kcal required to generate one unit of energy at the generating station.
43 As worked out by audit.

Power, GoI and were set targets for achievement in reduction of SHR during Phase-I of the scheme period (2012-15) as detailed below:

Table:2.1.5 Non-achievement of BEE notified SHR with resultant penalty

Station	BEE notified average net heat rate for 2012-15 (Kcal/Kwh)	Normalised Heat rate achieved during 2012-15 as per BEE calculation (Kcal/Kwh)	Deviation (Kcal/Kwh)	Number of certificates to be purchased
TGTPS	2,113	2,311	198	11,839
KGTPS	2,067	2,148	81	3,656
VGTPS-I	2,058	2,126	68	4,268
Total				**19,763**

(Source: Data furnished by the Company)

As the three units were not able to meet the SHR fixed by BEE, TANGEDCO become liable to purchase 19,763 numbers of Energy Saving certificates[44] valued at ₹ 20.07 crore as penalty. Though TANGEDCO stated (November 2016) that it had requested BEE to exempt all its GTPS from the Perform, Achieve and Trade (PAT) cycle till such time natural gas supply is improved adequately or alternate fuel is made available, BEE neither relaxed the conditions nor withdrew the penalty. Hence, the liability to pay the penalty was outstanding till date (October 2017).

Excess auxiliary consumption

2.1.17 Auxiliary consumption is the energy used by the power stations for running its machinery and common services. The Gas Booster Compressors (GBC) of 2.5 MW capacity installed in the three GTPS to boost the gas pressure from 2 kg/cm^2 to 26 kg/cm^2, account for the maximum auxiliary consumption in these GTPS. TNERC, in its various tariff orders, allowed a limit of six *per cent* towards auxiliary consumption. The details of gross generation, allowable and actual auxiliary consumption and excess auxiliary consumption over the TNERC norms are detailed in the **Annexure-10**.

It was seen that except VGTPS-I, all the other plants failed to achieve the auxiliary consumption norm during 2012-17. The auxiliary consumption at TGTPS even went upto 11.21 *per cent* in 2016-17. The excess auxiliary consumption resulted in non-availability of 118.13 MU of the power valued at ₹ 36.60 crore for sale. We observed that the excess auxiliary consumption was due to:

- the requirement to run auxiliaries even when plants were operated at partial loads;
- frequent trippings of the generating units due to mechanical defects, which led to frequent start ups;

[44] The Energy Saving Certificate is sold by industries achieving greater reduction than their target, which has a value calculated on the basis of price and consumption mix of coal, oil, gas and electricity of all Designated Consumers. The value considered by audit for valuation purposes is ₹ 10,154 per certificate.

- taking minimum period of five to six hours to attain maximum generation, during which period the auxiliaries were required to be maintained in normal working condition.
- the designed norm for auxiliary consumption of these plants ranged[45] from 4.72 *per cent* of the gross generation (TGTPS) to 5.26 *per cent* (VGTPS-I). However, TNERC had allowed an auxiliary consumption of six *per cent* considering the limitations of the plants due to inadequate supply of fuel. Though the plants did not achieve the relaxed norm fixed by TNERC for auxiliary consumption, TANGEDCO had not taken any remedial measures to control the auxiliary consumption within the norms.

Performance of Basin Bridge Power Station

2.1.18 The Basin Bridge Power Station (BBGTPS) could be operated by multi fuels such as Naptha and Natural gas. However, due to non-availability of natural gas at Chennai, the station uses Naptha as fuel and is being operated as a peak hour station only for a few hours a day as per instructions of the State Load Despatch Centre. The proposal made (August 2007) for conversion of the plant into a regular combined cycle generating station for a capacity of 220 MW by using natural gas as fuel has not fructified so far due to the delay in completion of the Liquefied Natural Gas Import Terminal Project[46] at the Ennore Port.

Owing to the high cost of operation of this station, TNERC permitted this station to generate power only during contingencies that too with its prior approval. With effect from January 2010, the station is run for generation of reactive power[47] to improve the voltage profile of the grid.

2.1.19 Audit observed that the variable cost relating to the station was very high ranging from ₹ 15.72 to ₹ 21.64 per unit compared to ₹ 1.91 to ₹ 3.31 in TGTPS, ₹ 2.22 to ₹ 4.28 in KGTPS and ₹ 2.03 to ₹ 3.48 in VGTPS-I and II. Consequently, the station was earning negative contribution throughout the five year period resulting in non-recovery of fixed costs as shown below:

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45 TGTPS - 4.72 *per cent*, KGTPS – 5.25 *per cent*, VGTPS-I - 5.26 *per cent* and VGTPS-II - 5.10 *per cent*.

46 A joint venture project of Tamil Nadu Industrial Development Corporation and Indian Oil Corporation Limited.

47 Synchronous condenser mode is used to adjust conditions in the power transmission grid to either generate or absorb reactive power as needed to stabilise the grid's voltage.

Table:2.1.6 Cost of operation in BBGTPS

Year	Net generation (in MU)	PLF (*Per cent*)	Variable Cost (₹in crore)	Variable cost per unit (₹)	Average rate of realisation per unit (₹)	Contribution per unit (₹) (5-4)	Total contribution (₹ in crore) (6 x 1)	Fixed cost[48] (₹ in crore)	Loss for the year (₹ in crore) (7 + 8)
	1	2	3	4	5	6	7	8	9
2012-13	0.412	0.04	0.85	20.72	5.05	(-)15.67	(-)0.65	163.92	164.57
2013-14	0.822	0.08	1.76	21.37	4.92	(-)16.45	(-)1.35	238.83	240.18
2014-15	2.854	0.29	6.18	21.64	5.53	(-)16.11	(-)4.60	282.84	287.44
2015-16	9.872	1.00	16.66	16.87	5.97	(-)10.90	(-)10.76	273.30	284.06
2016-17	10.469	1.06	16.46	15.72	6.23	(-)9.49	(-)9.93	379.65	389.58

(Source: Aggregate Revenue Requirement petition filed by TANGEDCO with TNERC and data furnished by the company)

We observed that the incidence of higher negative contribution was due to operation of the plant during non-peak hours in eight out of sixty months during 2012-17, as per the instructions from the load despatch centre to meet emergency grid requirements**,** for which TANGEDCO obtained *post facto* approval from TNERC for the years 2013-15. Approval of TNERC for such non-peak hour operation during 2016-17 was still awaited (October 2017).

Fuel Management

Procurement of fuel

2.1.20 For supply of natural gas for operation of GTPS, TANGEDCO had entered into agreements with GAIL based on Administered Price Mechanism[49] (APM) determined by the Ministry of Petroleum and Natural Gas, GoI. The details of requirement of gas as per design,[50] contracted quantity and actual supply of gas for the three GTPS during the five years ending 2016-17 are as indicated in **Annexure-11**. Based on the review of the supply arrangement, we observed the following:

Inadequate supply of gas

2.1.21 Against the contracted quantity, the actual supply of gas was less upto 46 *per cent* in normal years[51]. We worked out the shortfall in generation due

48 Fixed cost include interest on loan capital, depreciation, return on equity, operation and maintenance expenditure and interest on working capital.

49 Presently, there are two pricing regimes for natural gas – one applicable for production by ONGC from its nominated fields called Administered Price Mechanism (APM) and second is market determined prices for gas produced by joint ventures/private companies under Production Sharing Contracts.

50 As worked out by audit on the basis of design parameters specified by the OEM.

51 Considering the periods in which there was no major outages and shut downs and there was a plant availability of over 90 *per cent*.

to short supply of the committed quantity of gas in three GTPS when there were no major outages as 1,993.84 MU with a contribution loss of ₹ 599.60 crore (**Annexure-12)**. In addition, there were instances of short supply of gas due to unplanned repair and maintenance works carried out by GAIL, which were not synchronised with the maintenance work carried out by GTPS resulting in loss of generation equivalent to 52.81 MU valued at ₹ 15.25 crore.

To compensate the short supply of gas, TANGEDCO was forced to purchase additional gas for KGTPS and VGTPS-I and II at the Market Driven Price, which was higher than the price under APM. The additional expenditure incurred in this regard during the five years 2012-17 in these two GTPS amounted to ₹18.90 crore[52].

Shortfall in drawal of gas

2.1.22 While on the one hand TANGEDCO suffered due to short supply of gas, there were instances, where KGTPS and VGTPS-II had paid ₹ 38.83 crore to GAIL being the MGO[53] charges during 2012-15 for short drawal of gas on account of forced outages. Audit observed that the payment of MGO could have been avoided if adequate periodical and scheduled maintenances were carried out on time as discussed in Paragraph 2.1.10.

Additional expenditure due to short supply of gas

2.1.23 As per the Gas Supply Agreement entered with GAIL, TANGEDCO was to pay transmission charges of ₹ 20.79 lakh per month in addition to the cost of gas. We noticed that against the total availability of 8.00 lakh SCM per day from the Kuttalam zone of the Cauvery basin, GAIL had already allotted 11.6 lakh SCM of gas per day to TANGEDCO (4.5 lakh SCM) and to other captive/private power projects (7.10 lakh SCM). Thus, there was an inherent over allotment to the extent of 3.6 lakh SCM per day. To overcome the resultant short supply, GAIL proposed (August 2004) inter-connection of the Kuttalam zone with the Narimanam zone by laying a pipeline to carry additional 3.00 lakh SCM of gas per day to its consumers. The proposal involved payment of additional transmission charges by TANGEDCO on monthly basis. The inter-connection was completed in July 2005 and TANGEDCO started paying additional monthly transmission charges of ₹ 33.98 lakh per month from July 2005 to April 2006 and ₹ 32.91 lakh per month[54] thereafter.

We observed that against the envisaged quantity of 164 million SCM per year after completion of the inter-connection work, the actual supply to TANGEDCO did not cross a maximum of 138 million SCM per year. Therefore, the inter-connection and the payment of additional transmission

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52 Calculated at the differential price per thousand SCM/per MMBTU and not considering other charges like transmission charges, marketing margin *etc*.

53 As per agreement, TANGEDCO has to pay for actual drawal of gas subject to a minimum of 90 *per cent* of the annual quantity, which is Minimum Guaranteed Off-take quantity.

54 Re-worked by GAIL later.

charges of ₹ 7.90 crore during the period from April 2012 to March 2014[55] did not yield the desired results.

Inequitable agreements with GAIL

2.1.24 A review of the Gas Supply and Transmission agreements between TANGEDCO and GAIL revealed that the following clauses of the agreements were not on equitable basis as detailed below:

- Article 4.3 dealing with delivery pressure provided that GAIL would maintain gauge pressure in the range of 2 to 5 KG/cm^2 subject to availability of matching pressure from ONGC and other sources. However, in cases where the pressure of gas received was not sufficient, TANGEDCO was to bear the additional cost of compression of gas. It is pertinent to note that due to drop in pressure in supply of gas at the required level, there were trippings and forced outages totaling to 447 hours resulting in loss of generation to the extent of 19.71 MU valued at ₹ 5.70 crore in the three GTPS during 2012-17.
- Article 5.2 of the agreement required TANGEDCO to pay for 90 *per cent* of the allotted quantity as Minimum Quantity, whereas there was no reciprocal clause for payment of penalty by GAIL in the event of its failure to supply MGO quantity of gas. TANGEDCO was forced to pay ₹ 38.83 crore as MGO during the review period, whereas there was no similar penalty on GAIL for the short supply.
- The price of gas paid by TANGEDCO to GAIL (both APM and non-APM) is governed by Article 10 of the Gas Sale agreements. The gas price is linked to a net calorific value of 10,000 Kcal/SCM. In addition, GAIL is also paid, marketing margin at applicable rates on the same 10,000 Net Calorific Value. Our review revealed that while marketing margin was claimed correctly in respect of APM gas, by linking it to the actual net calorific value, there was no such linking in respect of the gas supplied under non-APM category. This lacuna resulted in additional payment to GAIL to the extent of ₹ 1.89 crore during 2012-17.

The Government replied (October 2017) that GAIL had been requested for appropriate modifications of the above clauses. It is, however, noted that since TANGEDCO is also a public sector undertaking like GAIL and as the MGO clause was included in GAIL's interest, a corresponding clause in TANGEDCO's interest could be included.

Issues concerning Environment

2.1.25 In order to regulate pollution levels and minimise the adverse impact on the environment, the GoI has enacted various Acts such as the Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, *etc*. The Tamil Nadu Pollution Control Board (TNPCB) is the regulating authority to ensure compliance to the provisions of these statutes in the State.

[55] From April 2014, the transmission charges levied by GAIL for all GTPS was revised based on Petroleum and Natural Gas Regulatory Board's order dated 11 July 2014 based on actual quantum supplied.

Our analysis of the adherence to the provisions of these Acts by GTPS revealed the following:

Air Pollution

2.1.26 Emissions of GTPS include Nitrogen Oxides (NOx), which are formed in the localised high temperature regions of the combustor. Ministry of Environment, Forest and Climate Change (MoEFCC), GoI had prescribed NO_x emission standards for natural gas/naphtha based thermal power plants as 75/100 ppm[56] respectively. We noticed that the emission levels of NO_x from the four GTPS were within the norms in all the five years covered by audit.

Water Pollution

2.1.27 The waste water from the gas turbine power plants (containing toxic substances)[57] is a source of water pollution. The extent of effluents in the solar pond, neutralisation pit and effluent treatment plants in terms of Total Dissolved Solids (TDS),[58] and Chlorides (CL) in the three combined cycle GTPS were as below:

Table:2.1.7 TDS and Chloride Effluents in discharged water

(in PPM)

Station	Period of sample	TDS				Chloride			
		Permissible limit	Actual level			Permissible limit	Actual level		
			Solar Pond	Neut. Pit	ETP		Solar Pond	Neut. Pit	ETP
TGTPS	16.08.16 to 18.08.16	2,100	4,550	4,470	2,980	600	3,200	3,500	8,200
KGTPS	19.08.16 to 21.08.16		---	398	292		---	160	120
VGTPS (I & II)	21.08.16 to 24.08.16		26,780	10,140	5,050		17,000	6,800	3,300

(Source: Reports of TANGEDCO's Environmental Monitoring Cell)

From the above table, it could be seen that the effluents were within limits in KGTPS. But, the same were more than the permissible limits in TGTPS and VGTPS-I and II. We further noticed that in TGTPS, the chemical sludge obtained from the waste water, which is a hazardous waste was accumulated in the solar evaporation pond since its inception to the extent of 126 MT and was disposed off only during October 2013. But, the subsequent accumulation of sludge, the quantum of which was yet to be measured was not disposed off till date (October 2017).

The Government replied (October 2017) that with the proposed commissioning of the air cooled condenser in TGTPS, water requirement and pollution would be considerably reduced and action was also being taken for early disposal of the accumulated sludge. As regards VGTPS-I and II, the Government stated that with the completion of the water supply project to the

56 ppm – parts per million.
57 Toxic substances include chloride, oil and grease, *etc*.
58 TDS are the combined content of all the effluents.

station, the problem of high TDS and chlorides would be solved in the near future.

Noise Pollution

2.1.28 The Noise Pollution (Regulations and Controls) Rules, 2000 prescribed that ambient air quality levels in respect of noise in industrial area should not exceed 75 decibels (dbs) during day time and 70 dbs during night time respectively. The table below indicates noise levels attained by the three plants in three areas *viz.*, Gas Compressor area, near GT Generator Turbine and near ST Generator.

Table:2.1.8 Level of Noise in Plant area

(in decibels)

Station	Period of reading	Area	Day time Noise in the range
TGTPS	16.08.16 to 18.08.16	Gas Compressor Area	80.0 to 86.0
		Near GT Generator	86.0
		Near ST Generator	68.0
KGTPS	19.08.16 to 21.08.16	Gas Compressor Area	84.0 to 86.4
		Near GT Generator	84.2 to 89.6
		Near ST Generator	90.0 to 92.0
VGTPS (I & II)	21.08.16 to 24.08.16	Gas Compressor Area	88.2 to 94.2
		Near GT Generator	59.8 to 60.2
		Near ST Generator (Phase-I)	89.0 to 73.6

(**Source: Data obtained from Annual Environmental Monitoring Reports of TANGEDCO**)

The noise level in GTPS, being more than the prescribed limit, would have adverse impact on the health and well being of the employees of the plants. Therefore, it becomes necessary for TANGEDCO to contain the excessive noise levels.

The Government replied (October 2017) that since noise levels are determined by design factors and there is no possibility to reduce noise from heavy equipment, action had already been taken for providing ear plugs to the staff and more trees are also being grown to reduce noise pollution.

Non-claiming of Clean Development Mechanism benefits

2.1.29 Pursuant to the Kyoto protocol[59] (December 1997), the basic rules for the functioning of the Clean Development Mechanism (CDM) were agreed at the United Nations Framework Convention on Climate Change (UNFCCC) held in October-November 2001. The CDM allowed emission reduction projects in developing countries to earn Carbon Emission Reduction Credits (CERs). The projects commissioned after 2000 and emitting less carbon (as per standard) have to register with the UNFCCC for obtaining CERs. As the

[59] The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change, which commits its parties by setting internationally binding emission reduction targets.

GTPS are using cleaner fuel and emits less carbon dioxide for generation of power they are eligible for registration under UNFCCC.

We noticed that though TANGEDCO accorded approval (January 2008) for pursuing benefits under CDM for its GTPS, the proposal was subsequently dropped (May 2009) citing the presumed risk of the projects becoming ineligible due to stringent rules for claiming the CDM benefits. Instead, VGTPS-II alone was registered under the alternate Voluntary Carbon Standards[60] (VCS) scheme and 1,70,473 Verified Carbon Units (VCUs) were received (November 2011) relating to the period May 2008 to January 2010. The VCUs were traded in June 2014 for an amount of ₹ 36.32 lakh after incurring a total expenditure of ₹ 42.94 lakh in the process. No further claim towards VCUs for VGTPS-II was subsequently made.

We observed that:

- Though TANGEDCO dropped the proposal of registering the GTPS for CDM benefits, LANCO, an Independent Power Producer which was commissioned in August 2005 got registered with UNFCCC and received 9.98 lakh CERs equivalent to ₹ 25.55 crore[61] as of March 2017.
- Due to non-registration of the GTPS for CDM benefits, TANGEDCO lost 15.28 lakh CERs for the period 2012-17 and had foregone a potential revenue of ₹ 39.12 crore.

The Government replied (October 2017) that TANGEDCO did not take a decision for further verification and issuance of VCUs as the process involved expenditure and it was imperative for TANGEDCO to recover the expenses incurred.

The fact, however, remained that TANGEDCO, after initially proposing to pursue CDM benefits for its GTPS, reversed its decision considering the stringent rules for registration. This led to the non-registration of the projects under CDM and resulted in non-availing of potential revenue amounting to ₹ 39.12 crore till 2016-17.

Non-compliance with the provisions of Public Liability Insurance Act

2.1.30 The Public Liability Insurance (PLI) Act, 1992 was enacted to provide immediate relief to the victims of accidents that might occur while handling hazardous substances. Accordingly, it was mandatory to have an insurance cover for every owner handling hazardous substances above the threshold quantity listed in the schedule to the Act. We observed that the GTPS, which handle flammable substances like natural gas, naptha and high speed diesel are covered under the PLI Act, as the quantity handled was in excess of the threshold limits[62]. The MoEFCC, also in its environmental clearance for the

60 The VCS is a voluntary market for trading of carbon credits outside of compliance schemes and is more flexible than the CDM. This scheme is sponsored by the Climate Group, International Emission Trading Association and World Economic Forum.

61 Calculated as per UNFCCC formula for emission reduction and valued at the average market price of US $ 4 per CER as per the World Bank Report on State and Trends of the carbon market, 2016 converted at an exchange rate of 1 US$ = ₹ 64.

62 15 MT for natural gas, 1,000 MT for naphtha and 25 MT for high speed diesel.

various gas turbine power projects, insisted to comply with PLI Act. However, TANGEDCO had so far (March 2017) not taken the mandatory insurance policies to comply with the PLI Act.

The Government replied (October 2017) that action would be taken for the public liability insurance.

Acknowledgement

We acknowledge the co-operation and assistance extended by the management and the staff of TANGEDCO in conducting this Performance Audit.

Conclusion

During the Performance Audit (PA) period of 2012-17, normative PLF of 80 *per cent* was achieved only by VGTPS-I and the remaining three units had achieved an average PLF ranging from 40.88 to 50.46 *per cent*. Similarly, the plants' capacity utilisation declined from 78.79 to 40.38 *per cent* in TGTPS and 74.19 to 46.29 *per cent* in KGTPS.

- The lower PLF and capacity utilisation led to loss of generation to the extent of 4,396.66 MU valued at ₹ 1,203.46 crore, which was due to (i) not carrying out even 50 *per cent* of the periodical maintenance as prescribed, (ii) forced outages due to controllable factors such as delay in carrying out refurbishment and non-replacement of water cooled condenser, *etc*., (iii) lower capacity of plants due to operational problems and (iv) running GTPS with partial loads due to short supply of fuel.

Due to poor performance/maintenance of the GTPS, TANGEDCO had to incur the following additional expenditure, loss of generation or liability:

- Avoidable extra expenditure of ₹ 58.74 crore in VGTPS-II because of installation of new type GT and GBC, the operation of which were not familiar either to TANGEDCO or to the Indian supplier *viz*., BGR.
- The excess SHR of all GTPS resulted in additional consumption of 217.23 million SCM of gas valued at ₹ 249.08 crore, besides liability to purchase energy saving certificate for ₹ 20.07 crore as penalty.
- All the three GTPS not achieving even the relaxed auxiliary consumption norm of 6 *per cent* leading to non-availability of 118.13 MU of power valued at ₹ 36.60 crore for sale.
- Loss of potential generation to the extent of 1,993.84 MU with contribution loss of ₹ 599.60 crore due to short supply of committed quantity of gas by GAIL.

TANGEDCO had the following deficiencies with reference to the pollution control norms:

- Though the levels of air pollution of GTPS were within the norm, the water pollution was more than the norm in TGTPS and VGTPS-I and II.
- Due to non-registration of GTPS for getting CDM benefits, TANGEDCO had foregone a potential revenue of ₹ 39.12 crore.

- Mandatory insurance policies in compliance with the Public Liability Insurance Act, 1992 were not taken.

Recommendations

In the light of the above conclusion, TANGEDCO needs to:

- achieve normative PLF of 80 *per cent* in KGTPS, TGTPS and VGTPS-II as was achieved in VGTPS-I.
- carry out mandatory inspections of the plants to identify the operational problems.
- avoid forced outages and lower capacity utilisation.
- find out a permanent solution for the operational problems of VGTPS-II.
- ensure availability of gas for running the plants at the optimum level, through appropriate provisions in the agreement.
- explore modifications in the clauses of the agreement with GAIL, which are not on equitable basis.
- ensure conformation to pollution control norms and procedures.

2.2 Information Technology Audit of Drug Distribution Management System in Tamil Nadu Medical Services Corporation

Executive Summary

Tamil Nadu Medical Services Corporation (TNMSC) Limited is engaged in procurement and supply of drugs, medicines, surgical sutures. TNMSC makes procurements through tenders, stores the stocks in warehouses and supplies to Government medical institutions.

TNMSC had computerised all its major activities through two application software viz., Drug Distribution Management System (DDMS) and Warehouse Information System (WIS).

Audit of DDMS brought out the following significant findings:

- ***The tender processing module of DDMS was not comprehensive rendering the data held in the system incomplete and unreliable.***
- ***Incorrect mapping of business rules in the system resulted in excess projection of requirement in the pre-order statements due to non-consideration of excess stock available in some warehouses.***
- ***The software failed to prevent placing of orders on blacklisted suppliers due to non-integration of the blacklist module with the purchase order module.***
- ***The system failed to detect/prevent data entry errors in the dates of manufacturing and expiry, making it ineffective in handling outward transfer of drugs and reports on short expiry drugs, pre-order level and stock-out level.***
- ***Despite availability of stock, delay in capturing laboratory test reports resulted in non-supply of drugs in 43,039 instances during 2012-17.***
- ***590 drugs valuing ₹ 16.13 crore expired during 2012-17 included 306 drugs valuing ₹ 5.93 crore which were supplied beyond the stipulated 30 days after manufacturing.***
- ***Due to delay in communication of "stop issue" order and batch number mismatch, in 982 instances, drugs, which failed in quality test were issued to medical institutions after "stop issue" order date.***
- ***The system did not calculate penalty for non-supply or short supply of drugs, leading to non-collection of penalty to the tune of ₹ 40.90 crore during 2012-17.***
- ***TNMSC did not implement Disaster Recovery Plan and Business Continuity plan, as envisaged in the e-Security policy of Government of Tamil Nadu.***

Introduction

2.2.1 Tamil Nadu Medical Services Corporation Limited (TNMSC) was established (July 1994) with the objective of procurement, storage and timely distribution of quality drugs, medicines, surgical sutures at the most economical cost to cater to the need of all medical institutions[63] coming under Directorate of Medical Education, Directorate of Medical & Rural Health Services and Directorate of Public Health and Preventive Medicine.

TNMSC had 29 warehouses throughout the State for storage and distribution of drugs to medical institutions. The total requirements of drugs, medicines and surgical items are finalised by TNMSC by getting the requirements from the Medical Directorates every year. The major activities[64] of TNMSC were computerised in 1995 as it plays a crucial role in catering to the day-to-day medical needs of the Government medical institutions.

Organisational structure

2.2.2 TNMSC is managed by its Board of Directors with Principal Secretary, Health & Family Welfare as its Chairman. The Managing Director, who is usually an IAS officer, heads the operations. At the district level, the warehouse operations are managed by the Warehouse-in-charge and Assistant Warehouse-in-charge.

Objectives of computerisation

2.2.3 In order to assist the management in planning, procurement and distribution of drugs to the stakeholders, TNMSC had computerised all its major activities through two application softwares *viz.*, Drug Distribution Management System (DDMS) and Warehouse Information System (WIS). DDMS is a centralised database maintained in TNMSC head office. The district warehouses use DDMS and WIS for carrying out their day-to-day functions. In addition, there is Management Information System (MIS) application software to generate reports[65] for DDMS and WIS.

The above applications are deployed in a mid-range server at the Head Office and desktops at the 29 district warehouses. Initially, these software were developed and maintained by an external agency. From the year 2010 onwards, further development, customisation and maintenance were carried out in-house.

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63 District Head Quarters Hospitals, Taluk Head Quarters Hospitals, Medical College Hospitals, Primary Health Centres.

64 Identification of Drugs, Forecasting, Tendering, Order Processing & Scheduling, Inventory (stock) management, Passbook utilisation, Quality Control and Bill Processing.

65 Tender details, EMD/SD Details, Up-to-date stock (warehouses and QC Section), Inwards, Outwards, Consumptions, Unexecuted, Passbook Utilisation, Non-moving, Short-expiries, Nil-stocks, Pending quality results, NOC details, Frozen details, Bill clearance, Sanction order and Cheque details.

Audit objectives

2.2.4 The audit objectives were to examine:

- Whether the Information Technology (IT) system was used effectively by TNMSC as per the policy documents on drug procurement and quality control;
- Whether computerisation was in accordance with the IT policy of the Government and as per the norms of an IT enabled system; and
- Whether existing IT-enabled Management Information System was adequate and effectively used for monitoring.

Audit criteria

2.2.5 The audit findings were benchmarked against the following criteria:

- Government Orders issued by Health Department on procurement of drugs by TNMSC;
- Circulars/instructions issued by TNMSC and Directorates;
- Tender documents and agreements for procurement of IT assets/drugs;
- Policy documents of TNMSC on drug procurement and quality control; and
- System Requirement specifications, user manuals and data dictionary.

Scope and methodology

2.2.6 The IT audit covered the application software *viz.*, DDMS, WIS and MIS. The period covered by Audit was from April 2012 to March 2017. Audit scrutinised the manual records/files at the Head Office of TNMSC and eight[66] district warehouses and analysed data available in DDMS and WIS (Oracle data dumps) using SQL queries. The audit team visited the eight sampled warehouses for assessing the working of the above two modules. In addition, the team visited one Government medical institution[67] in each of the selected eight districts. The audit was conducted from April to September 2017. An Entry Conference was held with Principal Secretary to Government, Health and Family Welfare Department and Managing Director of TNMSC on 24 April 2017. The Draft IT Audit Report was also discussed with the Principal Secretary to Government, Health and Family Welfare Department in the Exit Conference on 16 November 2017. The views expressed by the Government/TNMSC during the Exit Conference as well as the reply received from the Government in November 2017 were considered, wherever found necessary.

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66 Selected through random sampling method - Chennai (KK Nagar Warehouse), Dharmapuri, Dindigul, Erode, Thanjavur, Tiruchirappalli, Tirunelveli and Villupuram.

67 Government Headquarters Hospitals (Tambaram-Chennai, Villupuram, Srirangam-Tiruchirappalli, Erode, Dindigul and Dharmapuri) and Government Medical College Hospitals (Thanjavur and Tirunelveli)

Tender and Procurement

2.2.7 The tenders are received in two covers, Cover-A (technical bid) and Cover-B (price bid). During scrutiny of Cover-A, it would be ensured that all tender requirements had been met. Subsequently, Cover-B would be opened and the details of the price quoted by the tenderer are fed into the software.

Based on the data entry carried out in the system, the provisional list of tenderers with their rate for each drug is generated and placed before the Tender Committee[68] of the Board and the lowest (L-1) rates are approved. Thereafter, willingness of other bidders for matching L-1 rate is obtained and 60 *per cent* of the order is placed on L-1 and the balance 40 *per cent* is shared among other bidders, who agreed to match the price of L-1. Performance security is obtained from all bidders and agreement is executed before purchase orders are placed for supply of drugs.

Deficiencies in Tender processing system in DDMS

2.2.8 As per TNMSC manual, the officers nominated to scrutinise tender documents are required to record the conformity or otherwise of the documents in the checklist for updating computer system. Thereafter, the EDP section would be responsible for entering the rates quoted in Cover-B and taking printout of comparative statement.

The information involved in this process is captured in DDMS database. During the scrutiny of the database for the period 2012-13 to 2016-17, following points relating to tender processing were noticed:

(i) The table COVERA_DETAILS of DDMS, which captured details of documents received, did capture the documents/certificates, which were actually received. When the CHECKLIST table, which had the list of documents to be received, was compared with COVERA_DETAILS1 table, it was noticed that in 165 instances (relating to 11 tenders out of 48 tenders), the remarks column indicating the document submitted was not complete.

It was noticed that only the details of non-submission of documents by the tenderers were captured in the system and forwarded to the purchase department for following it up with the tenderers to obtain them before short-listing the tenderers for opening of Cover-B (financial bid). After the production of the documents by the tenderers, the purchase department considered their technical bid as complete. The receipt of pending documents, however, were not updated in the system. As a result, the database was showing bidders short listed were eligible for opening of Cover-B although they had not submitted requisite documents.

(ii) In the table COVERA_DETAILS3**,** details of Earnest Money Deposit (EMD) and Security Deposit were captured. These details would have a bearing while refunding these deposits to the tenderers. The deficiencies noticed in this table during analysis are as follows:

[68] Comprising of Chairman, Health Secretary; Managing Director, TNMSC; Director, Finance; Joint Secretary, Finance Department; Director of Medical Education.

- Though EMD was collected in all cases, the system showed non-collection of EMD in 107 instances (relating to 27 tenders and 84 tenderers). This was evidently due to non-capturing of data.
- Similarly, in 521 instances (relating to 38 tenders and 266 tenderers), Security Deposit was shown as not collected from L-1 or bidders matching their rates with L-1 price on whom orders were placed.

Though the application software had been developed with necessary tables to capture the relevant information so as to automate the functionality, the tender processing which is one of the components of DDMS application software for finalising L-1 supplier was partial and the data held in the system was incomplete and unreliable. Since the application software has provisions for processing of the tenders through system, online submission of tenders may be considered to ensure that the bids submitted by the tenderers were received without any omission.

The Government accepted (November 2017) that information were not being properly updated/verified. It was further stated that customisation of payment module in DDMS application to link with EMD/SD details was in progress during 2016-17.

Inconsistencies in Pre-order statements

2.2.9 The drug wise consumption/requirement details of all the warehouses including the manufacturing capacity of the supplier furnished by the suppliers at the tender finalisation stage were used for preparing the pre-order statements. The actual requirement of quantity of drug to be ordered (tender quantity) from the supplier were arrived at by taking into account the past six months' consumption in all the warehouses and reducing the ground stock available in the warehouses and pipeline stock. The pre-order statement generated by the computer system was the input for placing purchase orders (PO) and hence, it was a critical stage in procurement process.

The data relating to pre-order statement pertaining to the year 2016-17, which was generated and stored as a database, was produced to audit. For the years 2014-15 and 2015-16 hard copy of the pre-order statement was produced to audit. On scrutiny, the following observations were made:

(a) Incorrect mapping of business rule in IT system leading to excess procurement

Audit scrutiny indicated that pre-order statements were prepared without taking into account ground stock at warehouses in 232 cases, which resulted in excess procurement of drugs/medicines. This happened due to incorrect mapping of business rules in the computer system.

Excess holding of stock resulted in avoidable investment in drugs not required for consumption in the immediate future and would run the risk of expiry.

The Government stated (November 2017) that a decision was taken to consider the stock position of individual warehouses rather than the stock of State. However, from the year 2017-18, the decision was revised to consider the stock of State for re-order level instead of the individual requirement of the warehouses and also to issue suitable inter-warehouse transfers automatically

for the movement of the drugs from the available warehouses to the required warehouses.

TNMSC should have taken steps for inter-warehouse transfers instead of raising purchase orders to meet the requirement of individual warehouses when the excess stock position was exhibited in the other warehouses as per the pre-order statements generated by the system.

(b) Manual modifications in system-generated pre-order statements

As per clause 13.4 (i) and (ii) of the Tender document, the supplier should supply at least 50 *per cent* of the ordered quantity within 45 days from date of purchase order and balance quantity within next 15 days. There was no condition that preference would be given to the supplier who promised to supply within 10 days.

It was observed from the pre-order statements that quantities to be ordered on finalised suppliers were frequently modified manually by purchase section. We noticed that out of 4,259 drugs, manual modifications were carried out in the pre-order statements of 1,591 (37.36 *per cent*) drugs.

Instances of manual interventions violating the policy are detailed in **Table 2.2.1**:

Table 2.2.1: Instances of manual intervention in the purchase order

Sl.No.	Pre-order Statement number	Drug code	Instances of manual intervention
1.	14.10.2014/01:28:04	2	The purchase department manually modified the pre-order statement and placed entire order on L-1.
		104	The purchase department manually modified the pre-order statement to place the entire order on L-1 supplier on the ground that the firm had agreed to supply in short period of 10 days.
		114	The purchase department manually modified the pre-order statement to place the entire order on one supplier, who matched his rates with L-1 on the ground that the previous purchase order was not placed on him and he had agreed to supply the ordered quantity in short period of 10 days. Thus, the L-1 and another supplier who matched his rate with L-1 were not considered.
		232	The purchase department manually modified the pre-order statement to place the order for the entire quantity on L-1 bidder on the ground that the L-1 bidder was ready to supply in 10 days.
2.	16001201703271205	16	The supplier who matched L-1 rate was given order for more than the system-generated quantity without asking L-1 supplier to increase the production capacity resulting in supplier who matched L-1 rate getting 63 *per cent* of the

Sl.No.	Pre-order Statement number	Drug code	Instances of manual intervention
			quantity as against the norm of 40 *per cent* of the total quantity.
		17	Both L-1 and suppliers who matched L-1 rates were given order for more than the system-generated quantity stating that the suppliers had increased their production capacity.

(Source: Database of DDMS)

The above cases indicated that the permission granted to the purchase department to manually over-ride the purchase order was against TNMSC's policy and defeated the objective of IT enabled tender finalisation system.

(c) Excess stock and drug out status in warehouses

The table DRUGINW of DDMS, captured supplies received from suppliers and by inter-warehouse inward transfers. The DRUGOUT table captured supplies made to medical institutions and inter-warehouse outward transfers and the table WHSTOCK captures the closing balance. Ideally, ground stock was to be 35 *per cent* of annual consumption and if the stock position was less than 10 *per cent*, then it might lead to unavailability of drug stock for issue to medical institutions.

- An analysis of closing balance during 2012-13 to 2016-17, disclosed that the closing balance was more than the prescribed 35 *per cent* of annual consumption in respect of 9,174 cases. In 73 cases, the stock was in excess of 35 *per cent* continuously[69] for the last five years (2012-13 to 2016-17), in 114 cases for last four years (2013-14 to 2016-17) and in 228 cases for last three years (2014-15 to 2016-17).
- Out of 9,174 cases, the closing balance of drugs at each warehouse was less than 10 *per cent* in eight cases continuously for last five years (2012-13 to 2016-17), in 19 cases for last four years (2013-14 to 2016-17) and in 95 cases for last three years (2014-15 to 2016-17).
- There were no ground/pipeline stock as it showed 'NIL' stock in the warehouses in the pre-order statements generated during 2016-17 in respect of 406 drugs in 2,014 cases. Audit noticed that against 6,106 indents received from the medical institutions during this period, no supply was made in 1,122 indents due to non-availability of stock.
- In 87,072 records (relating to 16,525 indents and 1,482 drugs) for the period 2012-13 to 2016-17, the required drugs could not be supplied to the indenting institutions due to non-availability of ground stock.

The excess/short stock position discussed above indicated that there were inadequacies in planning, procurement and monitoring by TNMSC in spite of DDMS and MIS being in operation for more than 22 years. Further, deficiency in the system also contributed to this situation as it considered the previous

[69] 2014-15 to 2016-17 – ranging between 35.23 *per cent* and 99.43 *per cent*; 2013-14 to 2016-17 – ranging between 35.23 *per cent* and 99.07 *per cent*; 2012-13 to 2016-17 – ranging between 35.39 *per cent* to 98.33 *per cent*.

year's consumption (static) for preparation of pre-order statement to decide the requirement of drugs instead of immediate 12 months' consumption (dynamic) as contemplated in the purchase policy of TNMSC. This resulted in preparation of pre-order statement not in line with the real requirement.

The Government replied (November 2017) that eventhough the stock was 'Nil' at the warehouse level, the hospitals would be left with a month's stock to meet their requirement. It further stated that instructions were given to the medical institutions to place their indents 15 days in advance to mobilise the drugs from suppliers/warehouses. The reply was not acceptable since as per clause 18.2 of Purchase Policy of TNMSC, four months' stock was to be maintained in its warehouses and two months stocks in pipeline for all the drugs.

Placement of purchase orders on blacklisted suppliers

2.2.10 As per tender conditions, the supplier would be blacklisted for two years if he failed to execute at least 70 *per cent* of the ordered quantity for any three purchase orders of the same drug.

Further, if the stock supplied was declared to be 'Not of Standard Quality' or spurious or adulterated or misbranded, such batch/batches would be deemed to be rejected goods and the supplier would be blacklisted.

Analysis of tables 'ORDERPROCESS', 'BLACKLISTED', 'DRUGINW', 'DRUGOUT' and 'BILLPASS' revealed that:

- During the period from July 2013 to March 2017, 1,115 purchase orders were placed on firms blacklisted by purchase department. Out of 1,115 purchase orders, 10 purchase orders were subsequently cancelled, whereas in 925 cases supplies were received. However, no supply was received in respect of balance 180 cases.
- In four instances as detailed in **Table 2.2.2**, though the supplier had been blacklisted for supplying 'Not of Standard Quality' drugs, the system had generated purchase orders and the entire supply had been delivered.

Table 2.2.2: Orders placed on blacklisted suppliers

Sl. No.	Supplier name	Purchase order number	Date of purchase order	Drug Code	Quantity (In numbers)	Amount (In ₹)	Blacklisted period
1	Safe Surgical Industries	QA0029	26-May-12	R142	1,14,000	1,16,96,400	20-Jun-08 to 19-Jun-13
2	Safe Surgical Industries	QA0059	26-Jul-12	R142	1,66,000	1,70,31,600	20-Jun-08 to 19-Jun-13
3	Safe Surgical Industries	QA0119	26-Oct-12	R142	69,800	71,61,480	20-Jun-08 to 19-Jun-13
4	Safe Surgical Industries	QA0152	06-Dec-12	R142	96,700	99,21,420	20-Jun-08 to 19-Jun-13
	Total					**4,58,10,900**	

(Source: Database of DDMS)

The software failed to prevent placement of purchase orders on blacklisted suppliers due to non-integration of the blacklist module with the purchase order module. Further, due to lack of monitoring at different level users despite

having a Management Information System, these purchase orders had been processed and items were delivered.

In respect of blacklisting of the surgical item (Drug code: R142- Absorbent cotton wool IP), the Government stated (November 2017) that details of blacklisting was not available in the Drugs Purchase Section, Quality Control Section and in the Electronic Data Processing section of TNMSC at the time of finalising the tender during 2012-13. Therefore, tender had been finalised and product received from the firm.

The reply is not acceptable since the procurement of surgical item was from the supplier who had been blacklisted since 2008. This error happened as the detail had been updated on 2 June 2010 with flag Active 'Y' in database. Due to non-availability of inbuilt alerts and input controls at purchase order issue stage and receipt at supply stage, the system failed to integrate inter-related tables and filter the ineligible suppliers and items failed in quality test.

Supply of drugs

Supply of drugs with lesser shelf-life

2.2.11 As per tender conditions, the supplier should supply the products within 30 days from the date of manufacturing. In case, the product is received after 30 days of manufacture and the product is not consumed before its expiry, the supplier should replace the expired quantity with fresh stock of longer shelf-life. In case of non-replacement, the cost of expired quantity would be recovered.

It was observed from the table 'DRUGINW' that 1,245 drugs were supplied after 30 days from the date of manufacturing. The analysis of 'DRUGOUT' tables revealed that:

- 590 drugs valuing ₹16.13 crore expired during 2012-17.
- Out of these, 306 drugs valuing ₹ 5.93 crore were supplied after 30 days of manufacturing for which the recovery was pending as of September 2017.

This indicated that neither internal controls were integrated into the system nor TNMSC ensured replacement of drugs, which had shorter shelf-life.

As the system installed at Head Office of TNMSC capture due or extended date of delivery for a particular supply of drugs, it was possible to monitor the supply of drug with short expiry.

Non-blacklisting of suppliers

2.2.12 The tender conditions envisaged blacklisting of suppliers if they failed to adhere to the prescribed time for supply. The tables 'ORDERPROCESS', 'BLACKLISTED' and 'DRUGINW' were analysed and the following observations are made:

(i) In 43 out of 655 instances, the firms supplied less than the prescribed 70 *per cent* of purchase order quantity of same drug under same tender for more than two times. However, 41 out of 43 instances, the firms were not blacklisted.

(ii) Though 115 purchase orders were cancelled due to failure of the suppliers to adhere to tender conditions warranting blacklisting, the system did not blacklist the suppliers automatically.

The Government stated (November 2017) that the majority of suppliers failed to acknowledge the receipt of purchase orders issued to them. Though the system had been designed to prevent acceptance of supply beyond the stipulated date of delivery at the warehouse, the system failed to cancel such purchase orders.

(iii) Whenever the supplier defaults in supply of drugs, TNMSC resorted to placement of Emergency Purchase Orders (EPOs) on another supplier at the risk and cost of the defaulted supplier. It had been observed that during 2012-17, 145 EPOs were placed, which included 138 EPOs with higher cost amounting to ₹ 3.37 crore. As the system was not designed to capture recovery of the amount from the defaulted suppliers, audit could not ascertain the recovery of differential cost by TNMSC from the defaulted suppliers.

Thus, the system failed to detect the habitual defaulters and lack of monitoring at different levels, which resulted in issue of purchase orders to defaulted suppliers and resultant EPOs at higher cost.

The Government stated (November 2017) that they had implemented a module in DDMS in October 2017 to generate blacklist report on performance, as per the tender conditions. Further, necessary modifications had been made in DDMS to indicate the details of blacklisted suppliers in the pre-order statement and also to restrict purchase order entry on such supplier and such errors would not occur in future.

Discrepancies in data capture

2.2.13 On receipt of goods, the warehouse-in-charge entered the details of receipt in Inwards Goods Register and handed over the same to Data Entry Operator for capturing the inward drug details in the system. As the data was stored in the database without any verification and authorisation by the warehouse-in-charge, there were errors in capture of manufacturing/expiry date of drugs for same Purchase Order Numbers, Drug Codes and Batch Numbers as detailed in **Table 2.2.3.**

Table 2.2.3: Discrepancy in data capture

Sl. No.	Type of error	Number of instances	Error impact on shelf-life of the drug
1	Errors in capture of expiry date across all warehouses	3,082	(-) 3,653 days to (+) 6,200 days
2	Errors in capture of expiry date within a warehouse	10	(-) 365 days to (+) 365 days
3	Errors in capture of manufacturing date across all warehouses	1,889	(-) 1,248 days to (+) 9,131 days
4	Errors in capture of manufacturing date within a warehouse	16	(-) 214 days to (+) 731 days

(Source: Database of DDMS)

As errors in expiry date would affect the chain report for transfer of drugs, short expiry drugs *etc*., the failure of the system to detect/prevent these errors at input

stage revealed lack of input controls including at the level of warehouse-in-charge.

The Government accepted (November 2017) the audit observation and stated that necessary validation modules had been incorporated at the input stage to prevent discrepancies in future. Remedial action taken in respect of cases observed by audit had not been furnished.

Quality control

2.2.14 Under the Quality Control (QC) process, samples were selected and assigned secret code numbers by the system and sent to empanelled private Analytical Laboratories. The testing reports were received as soft copies by e-mail and as hard copies. The drugs could be supplied from the warehouse only when the drugs cleared the quality test. In case of failure of the samples in two successive tests, stop issue order is issued to warehouses and drugs are returned to suppliers. Timelines have been fixed for different stages of quality control process.

Non-drawal of samples as per the prescribed procedure

2.2.15 According to the "Quality control policy and procedure" of TNMSC, soon after receipt of drugs in the warehouse, the warehouse-in-charge had to number the boxes. The total number of boxes received had to be fed into computer system batch-wise and item-wise. The computer system had been programmed to randomly select box numbers from which the samples had to be drawn by the warehouse-in-charge for laboratory test.

During field visit to eight warehouses, it was ascertained that the above activity was being carried out only manually. This led to drawal of samples by the warehouse-in-charges at their own discretion, which did not serve the intended purpose.

Delays in quality testing process

2.2.16 Audit noticed delays at all stages of QC process as discussed below:

(a) Delay in receipt of samples in TNMSC headquarters from warehouses

An analysis of 1,11,023 records of inward and outward transactions relating to quality control testing samples during 2012-17 revealed that in 54,646 records, the drug samples were received in the HO from the warehouses, after a delay of more than three days as against the stipulated norms of sending samples within two days. An analysis is given in **Table 2.2.4**.

Table 2.2.4: Delay in receipt of sample

(In numbers)

Year	Delay in excess of three days with number of instances			
	01 to 04 days	05 to 11 days	12 to 27 days	More than 27 days
2012-13	4	1	---	---
2013-14	55	5	---	---
2014-15	168	13	4	6
2015-16	19,306	7,653	841	106

Year	Delay in excess of three days with number of instances			
	01 to 04 days	05 to 11 days	12 to 27 days	More than 27 days
2016-17	24,184	1,803	365	132
Total	**43,717**	**9,475**	**1,210**	**244**

(Source: Database of DDMS)

The warehouse-in-charges stated (July 2017) that delays were due to transportation problems, batch number mis-match, *etc*. The delays stated by the warehouse-in-charges could have been avoided had the MIS relating to receipt of samples in TNMSC HO been effectively used. The mis-match in batch numbers was avoidable by using barcode readers.

The Government accepted (November 2017) the audit observation and stated that necessary monitoring mechanism had been incorporated in the DDMS Head office module to list out details of warehouses which did not send QC samples to Head Office. Though it was stated that provision has been incorporated to list out details of warehouses which did not send QC samples to Head Office, there is no provision of 'Edit Module' to update the mis-match of batch entries and no trail of the resample sent in case of damage or short supply of drug sent for quality testing.

(b) Delay in receipt of empanelled laboratory reports

As per tender conditions for testing of drugs, the Analytical Laboratory had to furnish the test reports within eight days of receipt of the samples for Category-A[70] drugs and within 21 days for Category-B[71] drugs. For any delay, one *per cent* of the testing charges per week and the part thereof would be deducted as penalty. If the delay occurred consecutively for four times or more than eight times in a year, then the penalty would be two *per cent* of testing charges per week or part thereof.

An analysis of data containing information on laboratory reports (1,25,876 records) disclosed that in 17,778 records, the QC testing results of Category-A drugs were reported by the laboratories after 12 days (eight days + transit days) and in 4,564 instances, the QC testing results of Category-B drugs were reported by the laboratories, after 25 days (21 days + transit days) as given in **Table 2.2.5**.

Table 2.2.5: Delay in receipt of laboratory reports

(In numbers)

Drug category	Delay in days with number of instances				Total
	01 to 07 days	08 to 14 days	15 to 60 days	More than 60 days	
Category-A	13,915	2,557	1,251	55	17,778
Category-B	3,351	758	433	22	4,564
Total					**22,342**

(Source: Database of DDMS)

[70] Category-A - tablets, capsules, pessaries, ointments, powder, liquid oral preparations and other items.

[71] Category-B - intravenous fluid injections, disinfectants, surgical and sutures.

It was observed that out of 22,342 records, though there were delays in reporting the test results in 11,880 records, Liquidated Damages (LD) were not levied to the extent of ₹ 0.81 lakh.

The Government stated (November 2017) that QC section was taking utmost care to minimise the delay and sending reminders to the empanelled laboratories for the pending analytical reports. Though the Government stated that QC was regularly deducting the penalty for the sample reports received after the due period and the deduction of penalty was programmed in the system, the details of recovery of LD as per tender conditions in the cases pointed out by audit had not been furnished.

(c) Delay in receipt of Government laboratory reports

Drug samples, which failed in the first analysis are sent to Government Analyst (GA). Audit analysis of 1,869 records in respect of samples sent to GA revealed that QC test results were not received within the time limit stipulated for empanelled laboratories for first/second time analysis in 1,728 records (92 *per cent*) of Category-A/Category-B drugs as detailed in **Table 2.2.6**.

Table 2.2.6: Delay in receipt of Government laboratory reports

(In numbers)

Sl.No.	Drug category	Analysis	Delayed results	'Pass' samples	'Fail' samples
1	A	First	504	313	191
2	B	First	500	365	135
3	A	Second	454	281	173
4	B	Second	270	164	106
Total			**1,728**	**1,123**	**605**

(Source: Database of DDMS)

Since results from GA are considered as final, any delay would affect the timely supply of quality drugs to end users.

The Government stated (November 2017) that laboratories owned by it were not bound by TNMSC's tender conditions and TNMSC's QC section was regularly requesting them to provide the analytical report at the earliest.

However, in the Exit Conference (November 2017), TNMSC informed that the Drug Controller General of India had directed the State Government laboratories to submit their reports within 60 days.

As the Government Analytical Laboratory was functioning under the Health and Family Welfare Department, TNMSC may take up the matter with Government to fix time for furnishing QC report so that timely supply of quality drugs, prevention of expiry of frozen drugs, prevention of delay in return of frozen drugs to suppliers would be ensured.

(d) Delay in entry of laboratory test results in the system

As per the system in vogue, the Manager (QC) in TNMSC headquarters would receive test reports from laboratories and arrange to enter the data in the system. Based on test results, 'Issue Letter' or 'Stop issue Letter' would be issued by

Manager (QC) to the warehouse-in-charge. Thus, timely receipt and entry of test reports are important activities to start/stop dispensing drugs by warehouses.

An analysis of information on laboratory reports (1,25,876 records) disclosed that 74,787 'pass' reports and 871 'fail' reports were captured in the system after two days as detailed in **Table 2.2.7** below:

Table 2.2.7: Delay in entry of laboratory test reports results in the system

(In numbers)

Result	Delay range in days with number of instances				Total
	01 to 05 days	05 to 11 days	12 to 27 days	More than 27 days	
Pass	39,995	23,643	9,396	1,753	74,787
Fail	398	235	143	41	817

(Source: Database of DDMS)

The delay at various stages brought out in the preceding paragraphs affected the distribution of drugs as only the drugs passed in quality control testing were distributed to medical institutions. Further, data analysis of 38,02,088 records revealed that in respect of 43,039 records (relating to 13,900 indents and 480 drugs) for the period 2012-13 to 2016-17, no drug supply was made and in 72,005 records (relating to 16,233 indents and 968 drugs) the indenting institutions were supplied drugs partially due to non-availability or insufficient quantity of drugs, which had passed quality control tests, respectively.

The Government stated (November 2017) that the date mentioned in the analytical reports could be the date of completion of tests. Later the analytical reports were verified, authorised by the technical person from the concerned laboratories and then sent to TNMSC by e-mail. Hence, the date mentioned in the report was not the date of TNMSC report receiving date.

The reply is not acceptable, since there was no provision in the database table to capture separately the report date and report receipt date. Further, the report date is the data, which was to be used for calculating the date of receipt of laboratory reports and levy of LD for delayed reports. Moreover, as per the procedure laid down under clause 6.2 of Quality Control Policy, the reports were to be uploaded by the laboratories on the website of TNMSC and simultaneously e-mailed to TNMSC Head office apart from sending it by fax/e-mail.

Testing by non-empanelled laboratories

2.2.17 The analytical laboratories are empanelled through a tender process after considering various factors such as their quality process, adherence to 'Good Laboratory Practice', past three years turnover, *etc*.

An analysis of data files, containing information on drug-wise list of samples sent to laboratories, disclosed that in 2,656 out of 1,25,876 instances, samples were sent to non-empanelled analytical laboratories.

As empanelled laboratories were meant for ensuring quality drug testing, sending drugs to laboratories which were not empanelled for the particular

financial year/particular drug was on account of deficiencies in the computer system.

The Government replied (November 2017) that due to urgency, such samples were sent to other laboratories after obtaining willingness from them. The reply was not acceptable as it was a deviation from the prescribed procedure for empanelment of analytical testing laboratories. Further, the reply was silent about the approval of the Board for entrusting the samples for quality tests to non-empanelled laboratories.

Non-inclusion of drug batches for sample selection

2.2.18 As per the system being followed, drug-wise and batch-wise samples are selected by the system from the samples received from the warehouses and sent to analytical laboratories for QC test.

An analysis of data disclosed that during 2014-17, a total of 384 batches of drugs were missed out in the sample selection process for quality test, rendering the selection process deficient.

In response to specific instances pointed out by audit, TNMSC stated that the sample drugs were omitted in the random sampling as they were not listed in MIS report. Audit observed that the MIS report, which was being relied upon, was deficient as it was restricted to the current financial year and hence the year-end transactions of the previous year were not displayed.

The Government accepted (November 2017) the audit observation and stated that application software had been modified in such a way that sample selection module automatically search entries both from current year and previous year tables to avoid delay and manual intervention.

Non-analysis of stocks held for more than six months

2.2.19 With a view to ensure the quality of the drugs during the storage period, samples were to be drawn from the lots which were lying in the warehouse for more than six months. An analysis of data on inward and outward transaction of drugs revealed that during 2012-17, supplies made in 6,949 instances, which were lying in the warehouses for more than six months were not sent for second time QC testing.

There was no provision in the software application to generate the list of drugs, which were lying without being quality tested for the second time after six months.

During field visit to eight district warehouses, it was noticed that 81 drugs were reported (2014-17) to be 'Not of Standard Quality' by Government Drug Inspectors. Since, the prescribed procedures for re-testing of quality after six months were not followed, these quality issues were not detected in-house before distribution to hospitals.

The Government accepted (November 2017) the audit observation and stated that necessary modules had been implemented in DDMS to list out pending samples to QC section to ensure quality of drugs throughout the shelf life of the drug as prescribed. However, no reply had been furnished on deputing officers for inspection at warehouses to draw random samples for quality check.

Not blacklisting the suppliers of failed drugs

2.2.20 An analysis of data on laboratory reports (1,25,876 records) and blacklisting of the suppliers (113 records) disclosed that in 61 instances, a drug supplied by 46 suppliers, failed in Government laboratories more than once within tender period. But the suppliers of the drugs were not blacklisted as per QC policy and terms and conditions of tender.

The above deficiencies revealed that in spite of requisite data available in the system, no provision had been made to identify the suppliers, whose drugs had failed repeatedly to enable the management to take necessary action against defaulters.

Not blacklisting the laboratories despite discrepancies in their results

2.2.21 As per tender conditions, if there were repeated variations[72] in the analytical reports furnished by the empanelled laboratories, they would be blacklisted for a period of two years.

An analysis of data of laboratory reports (1,25,876 records) disclosed that only 1,176 entries were made for the fields,[73] which related to the analytical test details. This omission had resulted in non-review of laboratory reports through the system. It was also observed that QC test results of same drug of same batch within a short period differed between two empanelled laboratories and between an empanelled laboratory and Government analyst in respect of 2,184 samples during 2012-17.

Periodical reviews were not conducted by TNMSC in respect of above mentioned 2,184 samples involving 41 laboratories, where the results differed. The system did not generate any report on laboratories producing conflicting reports. This resulted in failure to blacklist the laboratories concerned so as to ensure supply of quality drugs.

The Government, while accepting the audit observation, replied (November 2017) that due to increase in the number of samples year after year, compared to the available laboratories, blacklisting clause of the tender condition could not be enforced. The Government stated that several other parameters were also to be considered. However, these information were not captured due to lack of provision in the system, which had resulted in non-review of laboratory reports through system.

Sending more than one sample drugs to Analytical Laboratories

2.2.22 As per the QC policy, the samples received from the warehouses were to be segregated drug-wise and batch number-wise and then the common batches of the drugs were eliminated and samples randomly selected by the system.

An analysis of data relating to laboratory reports (1,25,876 records) disclosed that in 2,017 records, samples from same batch number for the same drug were

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72 If there is any variation in the analytical reports furnished by the empanelled laboratories (either pass or fail) with the Government Laboratory for 3 times in assay and 4 times for parameters other than assay for any drug in a year, the empanelled laboratory would be blacklisted for a period of 2 years besides forfeiture of the security deposit after following the due process.

73 'MILLIGRAM1', 'MILLIGRAM2', 'PERCENT1' and 'PERCENT2.'

selected and sent for analysis, resulting in duplicate testing of these samples and incurring excess expenditure of ₹ 9.92 lakh.

The Government replied (November 2017) that as per instructions, random sample was being selected in DDMS application software based on purchase order number, drug code and batch number. The reply was not acceptable as it was a deviation from clause 4.2 of the Quality control policy for sample analysis which contemplated that the sample receipts from warehouses were segregated drug-wise and batch number-wise.

Distribution of drugs

2.2.23 The medical institutions draw their requirement of drugs from their jurisdictional warehouse using indents. The value of drugs and other supplies issued were debited in the Medicine Pass Book issued to the institution indicating the annual budget.

Distribution of drugs after "stop issue" order

2.2.24 If a drug failed in the quality test of the analytical laboratory or in the Government analytical laboratory, TNMSC headquarters issued the "stop issue" order to all warehouses and also issued instructions to retrieve any quantity already issued to the medical institutions.

An analysis of the data held in 'lab result' and 'drug out' tables revealed that in 982 out of 25,680 instances, during 2014-17, drugs were issued to various medical institutions by the warehouses, after the date of "stop issue" order by TNMSC headquarters. This was due to the non-updating of the latest test results, in an automated manner.

The district warehouse-in-charges in the eight test-checked warehouses replied (July 2017) that due to delay in receipt of "stop issue" orders at the warehouses and batch number mismatch, drugs were continued to be issued to medical institutions after the "stop issue" order date.

As the warehouse database is accessible to TNMSC Electronic Data Processing, controls should have been included in the application software to ensure that distribution of drugs was not done after issue of "stop issue" order. This deficiency in the software had resulted in continued distribution of sub-standard drugs even after "stop issue" order.

The Government, while accepting the audit observation, replied (November 2017) that necessary changes had been incorporated in the application software from July 2017 to prevent issue of drugs which failed the quality test.

Deficiencies in transfer of stock between warehouses

2.2.25 TNMSC has a policy to conduct a fortnightly review of short expiry drugs lying in the warehouses so as to transfer the same to the needy warehouses for issue before expiry. These transfers were effected by TNMSC Head office based on the request from the needy warehouse or on its own initiative.

An analysis of WHTRASFER table, which contain the information on transfer between warehouses, indicated non-adherence to transfer proposals as indicated in **Table 2.2.8**.

Table 2.2.8: Inter-warehouse transfer of drugs

Year	Transfer Proposals			Drug-wise transfers not done (In numbers)	Percentage of drug-wise transfer not done
	Total number of transfer orders	Total number of drugs	Total quantity (In numbers)		
2012-13	11,123	594	44,85,05,015	1,873	16.84
2013-14	11,729	691	33,62,12,443	10,492	89.45
2014-15	13,115	608	41,34,04,203	2,950	22.49
2015-16	7,186	552	28,20,50,451	643	8.95
2016-17	11,658	804	29,64,25,231	1,009	8.66
Total	**54,811**	**3,249**	**177,65,97,343**	**16,967**	**30.96**

(Source: Database of DDMS)

It could be seen that out of total drug-wise 54,811 transfers, 16,967 transfers were not effected.

We observed that poor planning with regard to scheduling of deliveries, inadequate assessment of requirement and monitoring of supplies led to number of inter-warehouse transfers. We also observed that necessary controls in the application software could have minimised these inter-warehouse transfers.

Difference in value of drugs between 'indent master' and 'indent details'

2.2.26 The major details of indents received *viz*., indent number, passbook number of the medical institution, date of indent and total value of the drugs indented are stored in the 'Indent Master' table of the database at the warehouse. The details of drugs issued and value of each drug (indent number is the linking or key field between the master and detail table) are stored in the 'Indent Detail' table. In other words, the total value of the drugs issued under an indent is sum of the value of each drug in the indent detail table and under no circumstances the total value of drugs and sum of break-up value of each drug can differ. However, in 173 cases involving 24 warehouses, it was noticed that there was a difference in value between the two tables discussed above indicating lack of referential integrity.

The Government replied (November 2017) that the validation mechanism is being incorporated at the back end in the new module to avoid the variations pointed out by audit.

Payments to suppliers

Non-levy of penalty for short supply

2.2.27 As per the tender conditions, if the supplier failed to execute the supply within the stipulated time, TNMSC was at liberty to make alternative purchase and impose a penalty of upto 30 *per cent* on the value of unexecuted order.

(a) Non-supply

Audit noticed that supply was not received in respect of 2,603 purchase orders. Out of these, TNMSC levied penalty of ₹ 7.30 crore for non-supply in respect

of 915 purchase orders. But, the system did not generate the penalty amount for the unexecuted quantity, which worked out to ₹ 34.77 crore.[74]

The Government stated (November 2017) that supply had been made in respect of 788 cases and in remaining cases, penalty had been calculated and recovered fully/partially. As of October 2017, ₹ 13.13 crore had been recovered and ₹ 7.63 crore was pending recovery.

The fact, however, remained that no recovery has been initiated in respect of the balance amount of ₹ 14.01 crore pointed out by audit.

(b) Partial supply

An analysis of data containing information on placement of purchase orders, supply at warehouses and payments disclosed that in 8,033 purchase orders, supplies were partially made. In 4,595 purchase orders, penalty of 30 *per cent* was not generated by the system for the unexecuted value of the purchase orders, which worked out to ₹ 6.13 crore.

The audit trail revealed that lack of documentation (Data Flow Diagrams, Data Dictionary, *etc*.,) had rendered the data available in the system incomplete, inconsistent and unreliable for calculation of penalty for unexecuted value of supply order.

The Government replied (November 2017) that the data required for audit trail was available in the system.

The reply was not acceptable as the details of unexecuted quantity, date of supply, penalty for unexecuted quantity, *etc*., were not available in the database provided by TNMSC.

Refund of penalty despite non-supply

2.2.28 An analysis of data containing information on placement of purchase orders, supply at warehouses and payments, revealed that out of 1,385 cases of refund of penalty on unexecuted orders, in 791 cases the penalty amounts were refunded in full though the unexecuted portion of the order were not supplied. In the remaining 594 cases, the penalty was refunded either fully or partially though there were unexecuted portions of supply.

Audit observed that there was no rule provision in TNMSC to refund the penalty. It was also observed that system had failed to correlate the supplies and the refund of penalty, resulting in return of the penalty even in the cases of non/partial supply.

The Government stated (November 2017) that in respect of 594 cases, it had levied penalty of ₹ 4.08 crore. It further stated that the penalty was refunded in respect of the balance 791 cases based on the tender condition for refund in case of damaged supplies. The reply is not acceptable since the tender condition provided for refund of a maximum of five *per cent* on each order quantity for Ampoules, Vials and Glass Bottles and two *per cent* for remaining drugs in

[74] 2012-13 – ₹5.26 crore (264 cases); 2013-14 – ₹4.06 crore (108 cases); 2014-15 – ₹1.23 crore (57 cases); 2015-16 – ₹0.09 crore (nine cases) and 2016-17 – ₹24.13 crore (1,250 cases).

damaged supplies. Thus, the amount refunded in violation of the above condition, resulted in loss of ₹ 62.39 lakh.

Levy of penalty on empanelled laboratories

2.2.29 As per tender conditions, Analytical Laboratories had to furnish the test reports within eight days for Category-A and 21 days for Category-B drugs. For any delay, one *per cent* of the testing charges per week and the part thereof would be deducted as penalty. For repeated delays[75] the penalty would be two *per cent* of testing charges per week and part thereof.

An analysis of data of laboratory reports (1,25,876 records) revealed that in 81 instances involving 14,332 records, the test results from empanelled laboratories were received with delay occurrences of more than eight times in a year or delay of more than ten days. Contrary to the tender conditions to levy penalty at two *per cent*, the system levied penalty at one *per cent*.

In 5,179 out of 23,595 records, penalty was levied though the testing results were received within the stipulated time.

Thus, the systems failed to correlate the data relating to date of sending samples to laboratories for quality testing and the date of receipt of laboratory results based on which the penalty is calculated. This resulted in incorrect calculation of penalty by the system and unwarranted correspondence with the laboratories.

The Government stated (November 2017) that audit had calculated the delay from the difference in days between 'date sent' and 'report date' whereas TNMSC calculated the difference in days between 'date sent' and 'result entry date' and accordingly penalty was deducted from their payment.

The reply of the Government is not acceptable due to the fact that as per clause 23 (h) of the tender condition, the report was to be sent by e-mail/fax to TNMSC head office as soon as the test is completed. Audit observed that the test report should be sent to TNMSC as soon as the test was completed and that date (report date) should be reckoned for arriving difference in days to levy penalty, in case the stipulated days exceeded 8 and 21 days for Category-A and Category-B, respectively. Even if the analysis to work out the delay in submitting the report was calculated as per the reply of TNMSC, there were 414 out of 23,595 records, where penalty had been levied though the testing results had been received within the stipulated time.

Demurrage charges not computed

2.2.30 As per tender conditions, drugs found to be 'Not of Standard Quality' was to be taken back by the supplier within 30 days of communication of test results. In case of failure by the supplier, TNMSC would collect demurrage charges, at the rate of two *per cent* per week, on the value of the drugs rejected. Such unlifted/rejected stocks would be liable to be destroyed after 90 days.

We computed that ₹ 6.38 lakh and ₹ 2.36 lakh was leviable as demurrage during 2015-16 and 2016-17, respectively. TNMSC, however, did not collect any demurrage charges.

[75] If the delay occurred consecutively for four times or more than eight times in a year or a delay of more than 10 days occurs over the time period stipulated.

Audit observed that though the required data for such calculation was available in the database, no provision was available in the application software to automatically work out the demurrage charges, which resulted in financial loss to TNMSC.

Government accepted (November 2017) the audit observation and stated that the application software was being customised to collect demurrage from respective suppliers.

General

Change management control and documentation

2.2.31 The e-Security Policy of 2010 of Government of Tamil Nadu, contemplated that maintenance of software developed by the department has to be logged to ensure changes are authorised, tested and accepted to maintain software accuracy and integrity.

The present system was evolved by incorporating the changes required from time-to-time. The change management[76] from FoxPro application was carried out after re-engineering and documented. However, while upgrading to web-based architecture, the re-engineering process was neither done nor supported by change management control process and documentation.

To cite an instance, in the warehouses, both DDMS and WIS application software were used. It was seen that DDMS was modified 18 times in warehouses during the year 2016-17.

We observed that whenever there was a change of architecture (from client-server to web-based) or changes are made in the existing application software to cater to the needs of the user departments, there should be change management process and documentation for efficient and effective management of the IT System with transparency.

Deficiencies brought out by audit in this report were also due to absence of the change management controls and documentation.

The Government replied (November 2017) that the basic system flow was not changed from the earlier version of documentation and only the business logic and data dictionary changed from time-to-time, needed to be documented. It also stated that on completion of migration process, the existing document would be updated.

Lack of third-party IT Security Assessments

2.2.32 According to the e-security policy, 2010 of GoTN, Government or third party IT security assessments of all IT devices, applications and assets was to be carried out annually. The 'e-Security Policy' envisaged comprehensive vulnerability assessment covering all devices and applications that formed the network.

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[76] **Change management** arising from various factors including hardware or software change, change in a process, change in technology, change in configuration *etc*., is one of the key disciplines of IT service management, which ensures a systematic and efficient approach to managing change in order to minimise the number and impact of any related incidents upon service.

We noticed that such assessments for ensuring the security of the IT Systems were never carried out till date (September 2017). As a result, TNMSC had no inkling of the security issues and other vulnerabilities of the system relied upon for its functions.

While accepting the audit observation, the Government stated that (November 2017) necessary steps had been taken to conduct IT Security audit of their web portals and IT infrastructure. However, no timeline has been indicated in the reply.

Non-adherence to business continuity planning and disaster recovery Site

2.2.33 The e-Security Policy, 2010 of GoTN envisaged contingency planning which included (a) definition of critical information, threats, controls, system environment and roles and responsibilities, (b) establishment of critical information back-up services and (c) determination of recovery strategies (preventive/maintenance/corrective). However, except taking periodical back-up of the data held in TNMSC headquarters and warehouses and storing them in server systems/external storage devices, no plan and setup was in place in TNMSC. Considering the criticality of the IT Systems through which the day-to-day functions of TNMSC were carried out, Audit observed that a business continuity and disaster recovery plan, as envisaged in the e-Security policy is required.

The Government accepted (November 2017) the audit observation and stated that on completion of the planned migration of application software into web-based, the application would be hosted at Tamil Nadu State Data Centre with support from existing disaster and recovery infrastructure. However, no time-line has been indicated in the reply, for the planned conversion.

Conclusion

The computerised activities of TNMSC while catering to the day-to-day medical needs of the Government medical institutions had deficiencies which were attributable to ineffective implementation and dilution of the system controls by manual interventions.

- Inadequate mapping of business rules, lack of change management control processes and documentation were noticed.
- Tender processing data held in the system was incomplete and unreliable and purchase order quantities worked out by the system were manually modified.
- Inadequate planning and non-adherence to procurement policy resulted in excess/short stock position noticed in warehouses.
- TNMSC accepted supply of drugs with lesser-shelf life and also did not obtain replacement of drugs received after expiry valued at ₹ 5.93 crore.
- The prescribed procedure for drawal of samples was not followed. TNMSC could have avoided delay at various stages in quality control through alerts in the system.

- Non implementation of validation controls in the application software resulted in issue of drugs even after generation of "stop issue" order in the system.
- The system was deficient in blacklisting the defaulting supplier/laboratories.
- The system had deficiencies in calculating the penalty on unexecuted orders, refunds, liquidated damages and demurrage charges.
- There was no business continuity and disaster recovery plan. No third party e-security assessment was carried out so far.

Recommendations

TNMSC may ensure

- Overall effective utilisation of the system in tender processing by limiting human intervention to the minimum.
- Complete automation and eliminating human intervention in bid submission and processing, deciding bidder-wise order quantity with audit trail and blacklisting of suppliers/laboratories to enhance transparency.
- Incorporation of controls into the system to ensure replacement of drugs which had shorter shelf life at the time of supply and to prevent distribution of sub-standard drugs after 'stop issue' order.
- Streamlining of inter-warehouse transfers with added features in the system.
- Proper mapping of business rules on charging of penalty on unexecuted purchase orders, refunds, liquidated damages and demurrage charges.
- Efficient use of MIS reports to avoid delays in quality control process at various stages and to monitor stock position at warehouses.
- Documentation of system upgrades and business continuity & disaster recovery plans.

CHAPTER-III

CHAPTER-III

Compliance Audit Observations

Important Audit findings, noticed as a result of test check of transactions of the State Government companies are included in this Chapter.

3.1 Chartering of vessels by Poompuhar Shipping Corporation Limited

Introduction

3.1.1 Poompuhar Shipping Corporation Limited (PSC) acts as an agent of Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) for organising ocean movement of indigenous coal required by the thermal stations of TANGEDCO from the loading ports at Paradip, Haldia and Vishakhapatnam to the discharge ports at Chennai and Tuticorin. The ocean movement is carried out by PSC's three own vessels and by hiring 6 to 14 vessels on charter basis. Apart from TANGEDCO, PSC started to extend coal movement services for NTPC – Tamil Nadu Energy Company Limited (NTECL)[77] from March 2012.

The details of coal discharged during 2012-13 to 2016-17 by own and chartered vessels for TANGEDCO and NTECL and the revenue earned thereon are given below:

Table 3.1.1: Movement of coal by PSC

(In lakh MT)

Sl. No.	Year	Coal movement for TANGEDCO	Coal movement for NTECL	Total revenue earned on coal movement (₹ crore)
1.	2012-13	122.89	5.16	537.37
2.	2013-14	130.25	19.86	658.61
3.	2014-15	138.33	23.21	619.18
4.	2015-16	159.02	32.99	547.72
5.	2016-17	125.44	43.92	N.A

(Source : MIS data of PSC)

[77] NTECL is a joint venture company of NTPC and TANGEDCO.

3.1.2 The performance of PSC relating to chartering of vessels was included as a Draft Paragraph in the Report of the Comptroller and Auditor General of India (Commercial) – Government of Tamil Nadu for the year ended 31 March 2010. Based on the findings of the Draft Paragraph, Committee on Public Undertakings (COPU) had recommended (July 2014) to PSC to adhere to the Transparency in Tender Rules for allowing adequate time for submission of bids and impose penalty as per the terms and conditions of charter agreement.

To assess the efficiency and economy of chartering of vessels and to evaluate the remedial actions taken by PSC based on the COPU's recommendations, a compliance audit on Chartering of vessels by PSC was taken up (between April and July 2017) covering the period from 2012-13 to 2016-17. The audit findings are discussed below:

Tender for chartering of vessels

3.1.3 PSC selects chartered vessels through tender on spot/time[78] basis and hires only geared vessels (vessels having crane facilities for unloading of coal) for operation at Tuticorin port as this port does not have shore crane facility. Whereas in Ennore port, shore crane facility is available in all the three coal berths and hence, vessels with crane facility is not required in this sector. The short comings noticed in tendering of vessels are discussed below:

Avoidable extra expenditure due to non-floating of tender

3.1.4 Based on the tender floated (December 2014), PSC entered (February 2015) into an agreement for hiring of MV Chennai Jayam, a vessel having crane facility and cargo carrying capacity of 41,349 MT at a hire rate of ₹ 5.30 lakh per day. The charter period of three years for this vessel commenced from February 2015. But, the vessel was withdrawn by its owner for condemnation on 14 May 2016 after providing an alternate vessel (MV Chennai Selvam), with effect from 7 June 2016, which had cargo carrying capacity of 52,158 MT for remaining charter period of the previous vessel. The charter hire rate of ₹ 4.83 lakh per day for MV Chennai Selvam was fixed based on the negotiations with the vessel owner. In this connection, we observed that:

- As per serial number 3(a) of Section II of Bid Qualification Requirement (BQR), the vessels which are more than 30 years old as on the date of completion of the charter period would not qualify for tender evaluation. But, MV Chennai Jayam, which was built in August 1983, was 32 ½ years old at the time of bid and hence, acceptance of MV Chennai Jayam by the tender committee was *ab initio* faulty as per BQR.
- As per Clause 25 of Section 7 of the agreement, the owner of the vessel was permitted to substitute another vessel of similar capacity and specifications only during temporary withdrawal of the existing vessel on account of minor repair, dry docking,[79] *etc*. But, MV Chennai Jayam was

[78] Spot charter denotes hiring of vessels upto three months and time charter denotes chartering for more than three months.

[79] Dry docking is an activity carried out for maintenance and repair of the vessel.

permanently withdrawn by its owner and hence, substitution by another vessel of different capacity was not possible. Therefore, PSC should not have accepted the alternate vessel. But the tender negotiation committee of PSC accepted MV Chennai Selvam as an alternate vessel with the operational cost of ₹ 347.67 per MT, which was more than the prevailing market rate of ₹ 301.75 per MT obtained through tender in May 2016, for a similar vessel. Thus, acceptance of the high operational cost of ₹ 347.67 per MT for MV Chennai Selvam resulted in an avoidable extra expenditure of ₹5.48 crore[80] during the charter period upto September 2017.

The Government replied (October 2017) that MV Chennai Selvam was accepted considering its capacity more than MV Chennai Jayam. The reply was not convincing because the vessel with similar capacity was available in the market at lower rates compared to the rates obtained through negotiations from the vessel owner. Hence, PSC should have selected alternate vessel only through tender and not by negotiation.

Additional extra expenditure due to non-consideration of Lowest offer

3.1.5 PSC invited (February 2016) tenders for chartering of a vessel for a period of three months (+)/(-) 10 days. The evaluated price quoted by MV Vishva Jyoti (a vessel without crane) at ₹ 132.92 per MT was the lowest (L-1) against the second lowest (L-2) rate of ₹ 164.93 per MT quoted by a vessel with crane facility (MV Chennai Selvam). However, PSC did not consider the L-1 offer and awarded the contract to L-2, considering its crane facility.

From the performance record of the geared vessel during its charter period, we noticed that the crane of MV Chennai Selvam was utilised for unloading of 31,110 MT of coal against the total discharge quantity of 1,06,281 MT in first two voyages. The vessel's crane facility was not at all utilised from the third voyage onwards, which commenced from April 2016 and the unloading was handled by the shore crane facility. This indicated that the vessel with crane was not necessary for unloading operation at Ennore and hence, award of contract to L-2 on the pretext of availability of crane facility in the vessel was unjustified, which resulted in incurring of additional cost of ₹ 1.01 crore.[81]

3.1.6 In two more charter agreements (26 February 2016 and 5 March 2016) for a charter period of six months in respect of MV Vishva Prerna and MV Nandini, the cranes of these vessels were utilised only to the extent of a meagre two *per cent* of the total discharge of 13.47 lakh MT of coal. Consequent upon the readiness of the shore crane facility in Ennore port from April 2016 onwards, the balance quantity of 98 *per cent* of the coal was unloaded only by shore crane facility. Thus, engagement of vessel with crane facility in Ennore port was faulty. As PSC had incurred cost per MT of ₹ 166.54 for MV Vishva Prerna and ₹ 161.30 per MT for MV Nandini against the cheaper hire charge of ₹ 132.92 per MT paid for MV Vishva Jyoti, a gearless vessel during the same period, engagement of high cost geared

[80] Being the difference between ₹ 347.67 – ₹ 301.75 = ₹ 45.92 X 11,92,347 MTs of coal handled during the period from June 2016 to September 2017.

[81] ₹ 164.93 – ₹ 132.92 = ₹ 32.01 per MT X 3,16,109 MT being the quantity unloaded.

vessels for Ennore sector had resulted in avoidable extra expenditure of ₹ 4.18 crore.[82]

The Government replied (October 2017) that if it had engaged a vessel without crane, it could have incurred a total expenditure of ₹ 180.53 per MT, *i.e.*, ₹ 47.61 per MT payable for shore crane and hire charges of ₹ 132.92 per MT for vessel without crane. It added that the above cost was more than the total expenditure of ₹ 161 to ₹ 167 per MT actually paid to the vessel with the crane facility. This reply is not acceptable as the Company even after engaging the vessel with the crane facility had only utilised the shore crane, thereby incurred total expenditure of ₹ 209 to ₹ 215 per MT (*i.e.*, ₹ 161 to ₹ 167 per MT payable to the vessel and ₹ 47.61 per MT payable for shore crane).

Unwarranted award of new contract before expiry of the existing contract

3.1.7 PSC chartered MV APJ Mahakali at a hire rate of ₹ 4.21 lakh per day from 2 November 2015 to 17 March 2017 with a provision to extend contract period by one month. But, the vessel was released on 17 March 2017 without exercising the option for extension and was re-engaged with effect from 20 March 2017 for a charter period of six months at the charter hire charge of ₹ 6.38 lakh per day. Prior to calling for the second tender, PSC had finalised four charter agreements for Ennore-Paradip sector for the period from January to March 2017 and in all the tenders, the cost per MT was higher than the rates obtained in November 2015. In view of the increasing trend in the market rate of the charter hire charges, non-availing the option for extension of the existing contract, which had a lower charter hire charges and engaging the same vessel through a new tender at the hire rate of ₹ 6.38 lakh per day was an imprudent decision. This resulted in avoidable extra expenditure of ₹ 65.10 lakh[83].

The Government replied (October 2017) that while the contract that expired on 17 March 2017 was for TANGEDCO, the new contract commenced on 20 March 2017 with the same vessel was on behalf of NTECL and hence, the option for extension was not considered. The reply was not convincing because in both the cases the charter agreement was between the vessel owner and PSC. Being the agent, PSC could have extended the charter period irrespective of the fact that the benefit was accruing to NTECL.

Deficiencies in contract management

Unwarranted diversion of vessels

3.1.8 The cost of operation of unloading coal at Tuticorin port was higher[84] than at Chennai Ennore port, as the charter hire charges of the vessels involves longer distance and the vessels are required to have crane for unloading at Ennore, the vessels do not require crane, as it is available in Ennore port itself

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82 Differential rate per MT ₹ 33.62 X quantity unloaded 6,80,365 MT = ₹ 2.29 crore and differential rate per MT ₹ 28.38 X quantity unloaded 6,66,671 MT = ₹ 1.89 crore.

83 ₹ 6.38 lakh – ₹ 4.21 lakh = ₹ 2.17 lakh X 30 days.

84 Ranging between ₹ 92 and ₹ 261 per MT of coal during the period from February 2015 to March 2017.

for unloading of coal. Therefore, it would be prudent for PSC to operate vessel with crane facility only in Tuticorin sector instead of both in Tuticorin and Chennai sector. During the present audit, we noticed that on 21 occasions the vessels with crane facility were diverted to Chennai Ennore port citing the urgent requirement for coal in Ennore in view of the dwindling coal stock position at thermal stations of Chennai. These diversions had resulted in incurring additional cost of ₹ 19.26 crore. In this connection, audit observed that:

- Though the above diversions were stated to be on account of urgency, the verification of the coal stock at North Chennai Thermal Stations during the periods of diversion revealed that there was no substantial increase in stock position due to arrival of the diverted vessels as detailed in the graph in **Annexure-13.** Therefore, both TANGEDCO and PSC could have planned for operation of the vessels with crane facility only in Tuticorin instead of operating both at Ennore and Tuticorin, thereby avoiding the additional expenditure of ₹19.26 crore.

The Government replied (October 2017) that since diversions in the route was decided by TANGEDCO, the issue would be discussed with them to avoid unwarranted diversion in future.

Additional expenditure due to engagement of high cost vessel

3.1.9 Audit noticed that PSC had engaged (September 2012) one craned hopper self unloader vessel (MV Gem of Ennore) exclusively for operation in Chennai Ennore port at a hire charge of ₹ 15.15 lakh per day for a period of three years and nine months. The vessel was utilised in Chennai sector between November 2012 and July 2016. The Company justified engagement of the above vessel for Chennai Ennore port in view of the following:

- The self unloading crane facility was essential till the shore crane was installed in Coal Berth (CB)-2 as the shore cranes in CB-1 were fully occupied.
- The discharge rate of the self unloader was 2,600 MT per hour compared to the shore crane capacity of 2,000 MT per hour.
- In an emergency situation, the vessel could be diverted to Tuticorin port.

A review of the operational performance of the vessel revealed that the vessel had performed 112 voyages during the charter period and the vessel had unloaded coal in CB-2 only on 35 occasions and the balance discharges were made in CB-1 in which there was no requirement for operation of the self unloader of the vessel. Further, the self unloader of the vessel had achieved guaranteed discharge of 2,600 MT per hour only on two occasions. In balance 110 voyages, the average discharge rate of the self unloader was as follows:

Table 3.1.2: Discharge performance of MV Gem of Ennore

Sl.No.	Discharge rate per hour (In MT)	Number of voyages
1	525 – 1,000	4
2.	1,001 – 1,500	18
3.	1,501 -2,000	49
4.	2,001 -2,500	36
5.	2,501 – 2,600	3
6.	More than 2,600	2
	TOTAL	**112**

(Source : MIS data of PSC)

From the above, it could be seen that in 71 out of 110 voyages (64.55 *per cent*), the average discharge rate was below 2,000 MT per hour. This was due to (i) mismatch between carrying capacity of TANGEDCO's owned conveyor belt of 1,500 MT per hour and the discharge capacity of 2,600 MT per hour for the self unloaders and (ii) overstay of the vessel for 53 days in Ennore port due to problems/repairs in internal and external coal handling systems of TANGEDCO. These factors led to incurring of an avoidable extra expenditure of ₹ 10.29 crore.

MV Gem of Ennore was also paid extra cost amounting to ₹ 7.08 crore for consumption of bunker[85] in excess of the declared quantity by the vessel during tender. The above additional cost was also avoidable as the same was attributable to poor infrastructure of TANGEDCO as mentioned above.

The Government replied (October 2017) that after installation of gantry crane in CB-II, the vessel MV Gem of Ennore was operated in both CB-I and II in an optimum manner. Notwithstanding the stated optimum utilisation of MV Gem of Ennore in Ennore port, its operation had actually resulted in extra expenditure of ₹ 17.37 crore as detailed in the above paragraph, which was on account of mismatch between unloading discharge capacity of the vessel and the carrying capacity of conveyor belt and hence was avoidable.

Irregular admission of escalation in the charter hire charges during dry dock period

3.1.10 The vessel MV Gem of Ennore was on charter with PSC from November 2012 to July 2016. The charter hire charges payable for the first year was ₹ 15.15 lakh per day with eight *per cent* cumulative escalation[86] for the next four years. During 2013-14, the vessel was kept out of service for 85 days on account of dry docking. Since the vessel was not in operation during the dry dock period and was not entitled for any payment towards charter hire charges, this period was also to be not reckoned for allowing escalation for the subsequent years. But, the Company had not excluded the dry dock period for

85 Bunker refers to Furnace Oil and High Flash High Speed Diesel used for sailing of the vessel.

86 The escalated charter hire charges for the second year was ₹ 16.36 lakh, third year was ₹ 17.67 lakh, fourth year was ₹ 19.08 lakh and for fifth year ₹ 20.61 lakh per day.

reckoning the annual escalation of eight *per cent* on the charter hire charges applicable for the third year. This had a cumulative impact on the escalation in the subsequent years resulting in avoidable extra expenditure of ₹ 2.31 crore,[87] which ultimately resulted in undue benefit to the contractor.

The Government replied (October 2017) that as TANGEDCO had advised not to give any extension in charter period on account of dry docking, the dry dock period was not excluded for reckoning the annual escalation. The reply was not convincing because when the dry dock period was not considered for payment of hire charges, the same should also not be considered for allowing annual escalations in the charter hire charges.

Improper planning for berthing

3.1.11 PSC charters 12 to 13 vessels for TANGEDCO and three vessels for NTECL for carrying out continuous unloading operation at Chennai Ennore port. This causes congestion forcing the vessels to wait outside the port till such time the vessels already berthed have completed unloading of coal at CB-1 and CB-2. PSC has to pay charter hire charges and bunker charges during the vessel's waiting period before berthing, termed as pre-berthing charges. These pre-berthing charges could be minimised by prioritising the high cost vessel for berthing than that of the low cost vessel. Our scrutiny of the daily vessel position in Ennore port revealed that on eight occasions, PSC had given priority in berthing to low charter vessels compared to the high charter vessels, which resulted in avoidable pre-berthing charges to the extent of ₹ 60.33 lakh (**Annexure-14**).

The Government replied (October 2017) that since the berthing of vessels were decided by TANGEDCO/NTECL, the audit observations would be discussed with them to avoid such recurrences in future.

Avoidable payments/non-recovery

Excess payment for bunker

3.1.12 As per charter party agreement, PSC has to pay for the cost of fuel utilised for operating the vessel during the entire period of charter. When the vessels commences its first journey from the loading port, the reimbursement for the cost of fuel at the rates prevailing at the loading port for its journey from the loading port to unloading port and back is made based on the quantity specified in the tender. Audit scrutiny of reimbursement of the fuel charges by PSC between October 2014 and March 2017 in respect of 18 vessels revealed that the agreed quantity[88] of fuel was in excess of the actual quantity required (170 MT of FO and 14 MT of HFHSD oil for one round voyage) for the first journey to the extent of 1,618 MT of FO and 444.20 MT of HFHSD oil. Though the excess quantity was adjusted for subsequent voyages, still the excess payment as a result of higher rates of bunker at the loading ports

87 Premature admission during third year: ₹ 1,30,900 X 85 days = ₹ 1,11,26,500. For fourth year: ₹ 1,41,300 X 85 days = ₹ 1,20,10,500. Total: ₹ 2,31,37,000.

88 250 to 300 MT of Furnace oil (FO) and 60 MT of High Flash High Speed Diesel (HFHSD) oil for Paradip to Ennore sector and 350 to 400 MT of FO and 100 MT of HFHSD oil for Paradip to Ennore/Tuticorin sector.

compared to the rates prevailing in Chennai Ennore port remained unadjusted permanently (excess cost ranged between ₹ 3,477 to ₹ 8,021 per MT of FO and ₹ 994 to ₹ 3,994 for HFHSD oil). The excess reimbursement of cost of fuel was worked out to ₹ 1.12 crore (being the differential rate between Paradip/Haldia port and Ennore/Tuticorin port for the excess quantity). This was continued in respect of three more chartered vessels, which performed their last journey and were redelivered at the loading ports. Consequently, PSC had made over payment to the extent of ₹ 0.28 crore in respect of these vessels.

The Government replied (October 2017) that the cost of bunker was to be reimbursed at the cost prevailing at the loading ports. Hence, the payments were in order. Since audit observation was about the excess quantity admitted over and above the quantity at the loading ports and not about the rates of reimbursement, the reply was not acceptable.

Loss due to non-payment of hire charges

3.1.13 PSC hired (4 September 2016) MV Sanvi for a charter period of nine months at a rate of ₹ 4.00 lakh per day (the cost worked out to ₹ 136.13 per MT). However, after completing 5 months and 25 days, the vessel was withdrawn (2 March 2017) by the owner citing non-payment of ₹ 2.02 crore of charter hire charges on the due dates. Consequently, PSC arranged for a substitute vessel MV APJ Mahakali at a charter hire charges of ₹ 6.37 lakh per day (which worked out to ₹ 181per MT) for six months commencing from 20 March 2017. In this connection, we observed that as per the charter agreement, the charter hire charges was required to be paid 30 days in advance. Moreover, the vessel owner of MV Sanvi had issued (9 February 2017) notice intimating the intention to withdraw the vessel in the event of non-payment of the overdue amount of hire charges. Thus, non-payment of charter hire charges even after receiving the withdrawal notice forced PSC to arrange for the substitute vessel at the cost of ₹ 181 per MT, which was higher by ₹ 44.87 per MT and resulted in avoidable additional expenditure of ₹ 2.51 crore. The verification by audit revealed that PSC was having a cash balance (during February 2017) of ₹ 3.00 crore received from NTECL for payment of hire charges to the vessel owner. Thus, non-payment of dues to MV Sanvi was not on account of cash constraint and was avoidable.

The Government replied (October 2017) that the vessel was withdrawn by its owner due to hire charges being high in the international market and not due to any payment issues. The reply was an afterthought because this was not mentioned as a reason for withdrawal of the vessel in the files examined by audit.

Short recovery of service charges from NTECL

3.1.14 As per the Memorandum of Understanding (MOU) executed (March 2012) between PSC and NTECL, the charges for transportation of coal was to be paid by NTECL at 5 *per cent* of the basic charter hire charges including all taxes thereon. A review of the collection of service charges revealed that NTECL paid service charges on net of the hire charges excluding the penalty recovered by PSC for delay in supply of vessels, consumption of excess fuel,

etc., which was not in line with the terms of MOU mentioned above. The difference in service charges on this account worked out to ₹ 86.40 lakh during the period from April 2012 to December 2015. PSC was yet to work out the service charges for the years 2016 and 2017.

The Government replied (October 2017) that steps were being taken to recover the short fall amount from NTECL at the earliest.

Non-compliance with the COPU's recommendations

3.1.15 While discussing the Draft Paragraph on PSC relating to chartering of vessels (included in the Report of the Comptroller and Auditor General of India (Commercial) for the year ended 31 March 2010), COPU had recommended (July 2014) PSC to adhere to the stipulation made in Tamil Nadu Transparency in Tender Rules, 2000 (Tender Rules) for allowing adequate time for submission of bid and impose penalty for belated delivery of vessels. During the present audit, it was noticed that PSC did not comply with these recommendations resulting in continuation of the lapses already pointed out as detailed below:

- During 2012-13 to 2016-17, 33 out of 60 vessels were hired with short tender notice ranging from 4 to 22 days against the stipulated time limit of 30 days fixed as per Rule 20 (1) of Tender Rules, without any recorded reasons. We further noticed that in the above tenders, PSC invited bids also from global bidders by advertising through Lloyd List, London and spent ₹ 1.06 crore towards advertisement charges in the last three years upto March 2017. As these tenders were issued with short tender notices, it deprived the global bidders adequate time for participation, which resulted in wasteful expenditure of ₹ 1.06 crore.
- The constitution of the tender evaluation committee approved by the Board of Directors (BOD) from time to time stipulated that the said committee should include State Port Officer (SPO) as an independent member to offer advices for evaluation of technical and commercial bids. However, it was noticed that in 31 out of 33 tender committee meetings held between 2012 and 2017, the SPO was not present, which revealed that PSC failed to take corrective action as assured to COPU.
- As per Clause 37 (g) of the tender specification, the vessel owners shall deliver the chartered vessel within the mutually agreed lay day[89]. In case of non-delivery of the vessel within the lay day, the charterer has the right to claim damages at the charter hire rate stipulated in the agreement. The scrutiny of the records of delivery of vessels revealed that there were delays in delivery of vessels on 38 occasions during 2012-13 to 2016-17. PSC had recovered Liquidated Damages (LD) for delay in delivery of vessels amounting to ₹ 4.56 crore on nine occasions, but did not levy LD of ₹ 11.62 crore on the balance 29 occasions, which resulted in undue benefit to the vessel owners to that extent. The reasons for non-levy of LD were not found on record.

The Government replied (October 2017) that (i) the time frame for chartering

[89] The day stipulated in the charter agreement for delivery of the vessel.

of vessels was approved by its BOD, (ii) the SPO had been requested to participate in all future tender evaluation committee and (iii) the LD could be recovered only when the charter agreement had been terminated on account of delay in delivery of vessel. The reply was not convincing because notwithstanding the approval by the BOD, there were no recorded reasons for allowing short tender notices as prescribed in the tender rules. In case of delay in delivery of the vessels beyond lay days, PSC has two options either to levy LD or terminate the contract. But in respect of the cases mentioned above, PSC did not resort to either one of the options, thereby it allowed undue benefits to the vessel owners.

Conclusion

During our earlier and current audit, we noticed that there were repeated failures by PSC due to:

- Not allowing prescribed time for bidders to participate in the tender.
- Awarding contract to unqualified bidders.
- Instances of avoidable extra expenditure due to non-availing the option for extension of the contract, not considering L-1 offer, engagement/diversion of crane fitted vessels to Ennore sector without justification.
- Non-levy of LD for belated delivery of vessels.

The poor contract management by PSC led to an avoidable extra expenditure of ₹ 55.83 crore which was borne by TANGEDCO/NTECL, deprived a revenue of ₹ 12.48 crore due to non-levy of LD and non-collection of service charges from NTECL. The above instances revealed that PSC had not acted judiciously to safeguard the financial interest of TANGEDCO and NTECL. This was despite the cautions/recommendations by audit and COPU to streamline its systems. Thus, there is an urgent need to streamline the entire system of chartering of vessels.

3.2 Road projects implemented by Tamil Nadu Road Infrastructure Development Corporation

Introduction

3.2.1 Tamil Nadu Road Infrastructure Development Corporation (Company) was established in March 2005 to implement, upgrade and maintain the road infrastructure in the State of Tamil Nadu as per the directions of Government of Tamil Nadu (GoTN).

Between October 2006 and January 2016, the Company was entrusted with widening and improving the State Highway Roads as detailed below:

Table 3.2.1:Road projects of TNRIDC

Name of the Road	KMs	Type of conversion	Approved cost of Project (₹ in crore)
A. Oragadam Industrial Corridor Project			
(i) The project work includes four laning of 24 KMs in State Highway- (SH) 57 from Singaperumal Koil to Sriperumbudur and 33.40 KMs in SH-48 from Vandalur to Wallajabad	57.40	Four laning	300.00
(ii) The work includes six laning of 40.60 KMs out of 57.40 KMs in SH-57 and SH-48	40.60	Six laning	391.46
B. Madurai Ring Road (BOT)	27.20	Four laning	200.00
		Total	**891.46**

Formation of four lane in Oragadam Industrial Corridor Project (Oragadam project)[90], for a length of 57.40 KMs was approved by the Government in October 2006 at an estimated cost of ₹ 300 crore without mentioning the scheduled date of completion. The four lane work taken up under Phase-I was completed upto 95 *per cent* as on September 2017 at the revised cost of ₹ 612.82 crore. In addition, the Company obtained[91] Government's approval for conversion of 40.60 KMs of road (out of 57.40 KMs of four lane road) into six lane road at the estimated cost of ₹ 391.46 crore. The six lane work being executed under Phases-II to IV were under progress with financial progress of ₹ 293.96 crore. The physical progress of these works being 93 *per cent* for

90 The widening of road between Singaperumalkoil – Sriperumpudur for a length of 24 KMs (State Highway (SH) -57) and between Vandalur – Walajabad Road for a length of 33.40 KMs (SH-48) would establish connection to Oragadam Industrial Park and would create access to National Highway (NH)-4 and 45.

91 The Government approval for formation of six lane road was first obtained in March 2011 for a length of 12 KMs, the second approval for another 12 KMs was obtained in January 2015 and third approval for 16.6 KMs was obtained in January 2016.

Phase-II, 95 *per cent* for Phase-III and 58 *per cent* for Phase-IV, as on September 2017. The status of the contracts awarded for Phase-I to Phase-IV of Oragadam project are detailed in **Annexure-15**. The Madurai Ring Road project (Madurai project),[92] taken up for execution in February 2016 under Build, Operate and Transfer (BOT) is in the initial stages of implementation as only ₹ 1.41 crore has been incurred (September 2017) towards preliminary expenses.

As there were significant delays in execution of Oragadam project, the audit of contract management of the Oragadam project was taken up between May and August 2017 focusing on planning, award and execution of works. The audit was conducted based on the criteria contained in Government Orders, Rules and Regulations issued by the Highways Department, Indian Road Congress (IRC) standards, tender specifications and the contract agreement.

Audit findings

The audit findings are discussed below:

Planning

Project appraisal with incorrect projections

3.2.2 GoTN observed (September 2007) that there were huge cost escalations and inordinate delays in the road projects, which were attributed to non-availability of land. It therefore, directed the executing agencies to seek its administrative approval for the road projects only after ensuring the availability of the required land. The only exception to this direction was the road projects, which are considered urgent.

We noticed that the Detailed Project Reports (DPR) for Oragadam project was prepared (October 2007) by two consultants[93] in which the traffic was surveyed in February 2007 at (initial Average Daily Traffic/Peak Hour) 13,278/5,662 and 19,191/8,823 passenger car units (PCU) respectively in SH-57 and SH-48 which justified formation of six lane roads in the entire project stretch as per Indian Road Congress specification No. 106 of 1990. For execution of six lane roads, the DPR projected the requirement of additional land to the extent of 108.25 hectares over and above 31.78 hectares of land already available within the existing right of way as detailed below:

92 This is a part of mega project for the development of expressway in the State and was proposed as a four lane road between Meenakshi Mission Hospital to Kappalur for a length of 27.20 KMs.

93 For Singaperumal Koil – Sriperumpudur Road, the DPR was prepared by M/s Wilbursmith Associates (Private) Limited (Wilbursmith) and for Vandalur – Wallajabad Road, the DPR was prepared by M/s Sai Consulting Engineers (Private) Limited (Sai).

Table 3.2.2: Land requirement for road works

(In hectares)

Road work	Land available in the right of way	Land to be acquired			Grand Total
		Private land	Forest land	Total	
Four lane work for 57.40 KMs	31.78	34.97	20.81	55.78	87.56
Six lane work for 40.6 KMs	---	52.47	---	52.47	52.47
TOTAL	**31.78**	**87.44**	**20.81**	**108.25**	**140.03**

(Source : Data furnished by the Company)

Though there was additional requirement for land to the extent of 55.78 hectares for four lane formation, the Company proposed (November 2007) to the Government to carry out four lane works on the available (31.78 hectares) as a first phase due to urgency and fast development of industries in the vicinity of the project area.

In this connection, we observed that:

- The Company's proposal to form four lane road within the available land was incorrect as there was an additional requirement to acquire private land/use the forest land to the extent of 55.78 hectares for completion of Phase-I. Since DPR projected that the project could be completed in two years of its commencement (June 2008), the four lane works was expected to be completed in June 2010 as per DPR projection. But the acquisition of the private land and obtaining permission for usage of forest land became a main bottleneck for completion of the four lane roads, which resulted in overall delay of eight years in completion of the project. It is pertinent to mention that the four laning of Oragadam project was taken up citing urgency but the target date for completion was neither fixed by the Government nor indicated by the Company in its proposals, thereby vitiating the urgency.
- No annual targets were fixed for acquisition of private land/take over of the forest land to match with the milestones fixed for completion of road works by the contractors. This had resulted in rescinding of contract by two contractors of Phase-I citing non-availability of land for execution of work as detailed in Paragraph **3.2.6**.

The Government replied (October 2017) that Phase-I was taken up for execution in June 2008 with the expectation to provide land in a phased manner based on the progress of work. The reply confirmed the audit point that the project was commenced in June 2008 without availability of the required land and hence, was in violation of the stipulation of the Government's directions of September 2007.

Delay in acquisition of land

3.2.3 The related activities of land acquisition for formation of the road involved identification of the required land, issue of notification under Section

15 (1) of the Highways Act, 2001 by the Land Acquisition Officer, publication of Gazette notification under Section 15 (2) of the Highways Act and take possession of the land. As per the Standard Data Book of Public Works Department, a total of 325 days has been earmarked for completing the entire process of land acquisition. This standard duration of 325 days was also reiterated by the DPR consultant of Oragadam project.

Four/six lane of road project of Oragadam required acquisition of 87.44 hectares of private land. As the Company had initiated land acquisition work by preparing Land plan schedule in February 2008, the acquisition of land was required to be completed by January 2009 *i.e.*, within 325 days of identification of land for this work. Against this milestone, the progress made in acquisition of land is given in the following table:

Table 3.2.3: Progress of land acquisition

(In hectares)

Year	Total area required for		Total area acquired for		Balance to be acquired	
	Four lane	Six lane	Four lane	Six lane	Four lane	Six lane
2010-11	34.97	52.47	0.20	0.30	34.77	52.17
2011-12			14.97	22.45	19.80	29.72
2012-13			9.41	14.12	10.39	15.60
2013-14			0.14	0.22	10.24	15.38
2014-15			1.99	2.98	8.25	12.40
2015-16			3.06	4.60	5.19	7.80
2016-17			2.92	4.38	2.27	3.42
TOTAL			**32.69**	**49.05**		

(Source: Data furnished by the Company)

Even though contracts for four lane works were awarded simultaneously in June 2008, no progress was made in acquisition of the land upto the year 2010-11 and it was not 100 *per cent* even in the year 2016-17. The reasons for the delay in acquisition of the land and its impact on the cost of the project are discussed below:

- The Company prepared schedule for acquisition of land required for four/six lane work of the project involving 43 villages in February 2008. The land acquisition process was required to be completed by January 2009. Against this target, the Company approached the Government for formation of the land acquisition office only in January 2009. Further, 10 out of 13 post of Land Acquisition Officers sanctioned (June 2009) by the Government remained vacant till the year 2014-15, which resulted in slow progress in land acquisition as mentioned above.

The Government replied (October 2017) that the Revenue Department had taken appropriate action for acquisition of land for which the Company rendered all the necessary assistance. Notwithstanding the appropriate actions and the assistance by the Company, there was overall delay of eight years in acquisition of the land beyond the time limit of 325 days fixed by the

Government.

- The period of 325 days required for completion of the entire land acquisition process included 180 days for determination and payment of compensation to the private land owners after issue of notification for land acquisition. We noticed that in respect of 79.49 hectares of land (out of the total area of 87.44 hectares) for which award had been determined, there were delays ranging from 179 to 2,374 days in payment of compensation to the land owners. Consequently, the Company had to pay additional compensation of ₹ 41.22 crore (**Annexure-16**).
- In addition, the Highways Department of GOTN incurred expenditure of ₹ 91.56 lakh for maintenance of the roads and carrying out the repair works during the period from February 2012 to February 2016 in six stretches to the extent of 6.90 KM in four lane road works, which was not handed over to the contractor on account of delay in acquisition of the land. Had the land in these stretches been handed over to the contractor for execution of strengthening work, the expenditure incurred by the Highways Department could have been avoided.

The Government replied (October 2017) that the expenditure incurred by the Highways Department in the interest of public could not be treated as avoidable. The fact, however, remained that the expenditure was borne by the Highways Department only due to not handing over the land to the contractor, who had already been engaged in executing the road works in the same location.

Delay in takeover of forest land

3.2.4 The execution of four lane road involved takeover of 20.81 hectares of land from Forest Department. For takeover of this land, the Company had to hand over 41.62 hectares of land (two times of the land to be taken over) to the Forest Department to enable them to carry out afforestation in the alternate land. Audit noticed that the Company submitted (May 2008) proposal for takeover of the forest land and identified (November 2010) the alternate land to be handed over to the Forest Department. But the alternate land was actually handed over only in June 2014, *i.e.*, after a delay of four years from the date of identification, which was attributed to (i) submission of inadequate proposals by the Company for takeover of forest land resulting in return of the proposals by the Forest Department four times (August 2008, March 2009, October 2011 and September 2012) and (ii) delay in obtaining the Government's approval for handing over the alternate land to the Forest Department upto February 2014. Thus, the procedural delays mentioned above committed by the Company/Government led to the overall delay of six years in completion of the four lane works.

Tender evaluation

Award of contracts to ineligible contractors

3.2.5 The Phase-I of Oragadam project was split into four packages (excluding grade separator) and the tenders were called for in two parts for evaluation of the technical and financial capabilities of the bidders. The price bid would be opened for evaluation only when the bidders were qualified

based on the technical eligibility criteria.

(i) Audit scrutiny of the evaluation of bids revealed that two tenderers *viz.*, M/s SDCEPL-PKM & Company – JV and M/s NAPC Limited, were not eligible to participate in the tender (March 2008) as detailed in the following table:

Table 3.2.4: Non-fulfillment of eligibility criteria for tender participation

Name of the Contractor	Estimated value (₹ in crore)	No. of bidders	Value of the contract (₹ in crore)	Pre-Qualification	
				Required	Fulfilled
SDCEPL-PKM & Co (JV) (Package-II/ Phase-I)	50.47	8	60.40	Each one of the JV partner should have fulfilled the conditions individually and executed similar work in the last five years for a value of ₹ 18.00 crore.	JV Partner had executed the works for a value of ₹ 12.40 crore
NAPC Limited, (Package-III/ Phase-I)	40.15	9	48.43	The contractor in the same name and style as prime contractor should have successfully completed atleast one contract within the last five years.	The bidder fulfilled the conditions only as sub-contractor and not as prime contractor.

Though these bidders did not fulfill the respective criteria of the tender, they were awarded works violating the tender conditions and the Tamil Nadu Transparency in Tender Act.

The Government replied (October 2017) that during execution of the work, the performance of the contractors was found satisfactory. The fact, however, remained that the contractors were *ab initio* ineligible for award of work as per the tender specifications. The subsequent satisfactory performance claimed by the Government would not absolve the irregular selection of the contractor.

Execution of contract

Failure to offer the prevailing market rate to existing contractor

3.2.6 The Company awarded (June 2008) contracts of Package-II and III of Phase-I work valued ₹ 61.00 crore and ₹ 54.83 crore to M/s SDCEPL-PKM & Co (JV) (SH-57) and M/s NAPC Limited (SH-48) respectively with scheduled completion by September 2009. As per the agreement, the entire stretches were to be handed over to the contractors within 15 days of signing the agreement. However, the Company could not hand over 2.05 KMs to M/s SDCEPL-PKM & Co (JV) and 1.38 KMs to M/s NAPC Limited, due to non-acquisition of the required land and their contracts were foreclosed (October 2013). After completing the land acquisition (May 2014) required for these stretches, these works were awarded to two new contractors at a higher rate as follows:

Table 3.2.5: Details of extra expenditure

(₹ in crore)

Sl. No	Description of the stretch of work	Package	Name of the new contractor	Estimated cost as per schedule of rates of 2013-14	Awarded value	Date of award	Difference
1	12/600-12/920 KMs and 13/865-15/600 KMs of SH-57	II (2.05 KMs)	Sunshine Infra Engineers India Private Limited	13.68	14.36	03.03.14	0.68
2	44/905-46/286 KMs of SH-48	III (1.38 KMs)	SPK & Co.,	12.40	13.02	16.07.14	0.62
Total							**1.30**

Audit observed that:

- Both contractors requested (June 2013) for foreclosure since they were not prepared to execute the pending works at the rates agreed in June 2008, as they were not getting the work front for carrying out the pending works. Therefore, it would have been a judicious decision to execute the work through the existing contractors at the current market price by recasting the value of the balance works based on the schedule of rates of 2013-14 instead of rescinding the contract and awarding the work to a new contractor at a cost higher than the current market price. The failure of the Company to exercise this option resulted in avoidable extra expenditure of ₹ 1.30 crore.

The Government replied (October 2017) that the Company could not execute the works through the same contractor, who had already refused to extend their contract period. The reply was not convincing because the contractors had refused to execute the balance work based on the schedule of rates of 2007-08 and not based on the current market rates.

Undue benefits to the contractor

3.2.7 As per rule 14 (3) (b) of Tamil Nadu Transparency in Tender Rules 2000, the Company has to obtain Performance Guarantee (PG) from the contractors only in the form of demand draft/bankers' cheque/specified small savings instruments. As per tender conditions, the quantum of PG to be obtained from the contractors was determined at 2.5 *per cent* of the contract value, which was to be retained for five years after completion of the road works. We noticed that in respect of eight contracts, the Company recovered PG of ₹ 5.60 crore from the running bills of the contractor and retained the same only for two years after completion of the work. For the remaining period of three years, it had returned back the retention money and obtained only an indemnity bond in lieu of the retention money. Thus, PG obtained from the contractors were retained only for two years, resulting in undue benefit to the contractors to the extent of ₹ 5.60 crore, besides failure to safeguard the financial interest of the Company.

The Government replied (October 2017) that as per the Government Order of November 1985, the indemnity bond was also an approved form of security. The reply was not convincing because this was not an approved form of

security as per the Tender Act, 2000 and the Rules made there under issued in supersession of the earlier orders of the Government.

3.2.8 As per the terms of contract for Phase-I (four contracts) seigniorage fee[94] and cess was to be recovered from the running bills of the contractor and remitted to the Government. Our verification of these contracts revealed that a total of 12.15 lakh cum of earth material were used by these contractors from barrow pits for earth works for which an amount of ₹ 2.43 crore[95] of seigniorage fees was to be recovered from the contractors. However, no such recoveries were made from the bills of these contractors and remitted to the Government, which resulted in undue benefit to the contractor.

The Government replied (October 2017) that the Company was not responsible for recovering the seigniorage fees from the contractor. The reply was not acceptable as the Company was bound to recover the seigniorage fees from the contractor as per the clause of the agreement.

Avoidable extra expenditure due to excess provision for Dense Bituminous Macadam

3.2.9 As per IRC (81-1997/ para 7.4) specifications, the overlay thickness of 100 mm of Bituminous Macadam (BM) was equivalent to the thickness of 70 mm for usage of Dense Bituminous Macadam (DBM) or Asphaltic or Bituminous Concrete (BC), which was used as substitute of BM. Audit scrutiny of the estimates and payment particulars in respect of 23 stretches revealed the following:

- The Company provided excess DBM thickness during execution of the actual work due to incorrect estimation/wrong calculation of thickness of DBM. The total quantity of DBM to be provided including strengthening and widening for both the works as per estimate was worked out to 73,469.89 cum against the actual requirement of DBM in the work to the extent of 72,506.40 cum. This had resulted in excess usage of 963.49 cum of DBM material and avoidable additional expenditure of ₹ 50.32 lakh as detailed in **Annexure-17**.

The Government replied (October 2017) that the Company had adopted uniform thickness of binder course of 70 mm based on the technical consideration, but it did not attribute any reason for the errors in calculation pointed out by audit.

Wasteful expenditure

3.2.10 The four/six lane works in Oragadam project was executed in packages by a total of 15 contractors. Seven out of 15 contract agreements included a provision for supply of AC car[96] and drivers for ₹10.00 lakh for use by the Company. Accordingly, seven contractors had provided 10 AC cars along with drivers. The total value of the cars supplied by the contractors worked

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94 The fees payable to the Government for removal of the earth material from the approved quarries of the Government.

95 Worked out at the rate of ₹ 20 per cum for usage of 12.15 lakh cum of earth material.

96 Each agreement provided for supply of AC car/cars for a value of ₹ 10 lakh during the agreement period.

out to ₹84.19 lakh, which formed part of the total project cost of each work.

In this connection, audit observed that the stipulation in the contract for supply of AC cars for each contract along with driver was contrary to the provisions of the contracts entered into by Highways Department of Government of Tamil Nadu, which did not provide for supply of cars and drivers by the contractors executing the road works. It is pertinent to note that the Company had engaged two supervision consultant for overseeing the road works of Oragadam project. As per the agreements with the supervision consultants, the transport facility for project site was to be arranged by the supervision consultant themselves. Moreover, the details of utilisation of the cars supplied by the contractor for project use was not kept on record. Thus, engagement of ten cars at a cost of ₹ 84.19 lakh was unwarranted and wasteful.

The Government replied (October 2017) that even if no provision for supply of car existed in the contract agreement, the cost of transportation would have been incurred by the Company separately and debited to the project account. The reply was not tenable in view of (i) the estimate prepared by the Company for the road works included provision for overhead charges at 8/10 *per cent* of the cost of the project, which includes provision for vehicle and (ii) the cost payable to the supervision consultant included element of transportation charges. Therefore, payment to the contractors for transport arrangement was unwarranted.

Execution of six lane project

3.2.11 As per projections made in the Detailed Project Report in December 2007, the Oragadam project had qualified for construction of six lane even at the first stage based on the traffic projections subject to acquisition of 87.44 hectares of private land and 20.81 hectares of Forest land. But, the Company obtained (February 2008) Government's approval for formation of four lane in the project area due to non-availability of the required land. In this connection, we observed the following:

The six lane work had been contemplated without completion of four laning work and prior to acquisition of requisite land in the respective stretches as follows:

Table 3.2.6: Status of four lane works

Phase	Length of the road taken up for six lane work (In KMs)	Month of submission of proposal for six lane work	Corresponding status of four lane work in the same stretch	Percentage of land acquisition completed at the time of proposal
II	12 (Package II)	January 2011	Four lane was completed in 7 KMs and the balance work was pending in 5 KMs for want of land.	NIL[97]
III	12 (Package I)	September 2014	Four lane was completed in 5.4 KMs and the balance work was pending in 6.6 KMs due to non-availability of land.	59
IV	16.6 (Package III)	October 2015	The work was completed for a length of 15.10 KMs and the balance work was pending.	71

Non-completion of four lane work in the balance stretches mentioned above was mainly due to problems faced in acquisition of land. However, at the time of proposing (January 2011) for conversion of these four lane roads into six lane for a length of 12 KMs, the Company stated that the land acquisition process would be completed in a month's time. In other two stretches, it did not discuss about the problems faced in acquisition of the land. Thus, the proposal to the Government for six lane work was also made, disregarding the Government directions to take up the project only after ensuring the availability of the land. This failure resulted in time overrun ranging from 9 to 26 months in completion of 27.50 out of 40.60 KMs of six lane works. However, the cost overrun of the six lane work was not quantifiable as on date (October 2017) as the works were still ongoing.

(i) Audit further noticed that the design life of four lane work was 10/15 years as per the projections of DPR. Due to taking up of six lane work before the expiry of designed life of four lane, some portions of the four lane work were overlaid/corrected resulting in avoidable extra expenditure as detailed below:

The estimates prepared for widening of four laning to six laning work provided for 16,693 cum of Dense Bituminous Macadam (DBM), 18,577.68 cum of Bituminous Coarse (BC) and 4,64,442 sq. mts of Tack coat for the stretches, which were already laid by the earlier contractors under Phase-I as part of strengthening/providing overlay of the existing four lane. In this connection, audit observed that the execution of DBM and BC works for full width of existing four lane roads for the second time with the preceding tack coat was unwarranted as these roads were newly constructed with the design life period of 10/15 years. As per the clauses of contract agreement entered into with the contractors, who executed the four lane roads in the same stretches, any defects/corrections on these four lane roads within the defect liability period were to be carried out only by the erstwhile contractors. Thus,

[97] NIL denotes no land was acquired for six lane work in January 2011.

the relaying of DBM/BC/tack coat on these stretches was neither warranted nor to be carried out by the new contractors executing the six lane work in these stretches. This resulted in avoidable expenditure of ₹ 28.30 crore as detailed in **Annexure-18**.

The Government replied (October 2017) that whenever road widening work was taken up, it was mandatory to lay BC in the existing roads to ensure uniform riding comfort. The reply was not tenable because it was not mandatory to relay the BC as per Indian Road Congress specifications.

(ii) The Company constructed (June 2013) depressed median[98] at a cost of ₹ 1.32 crore in Package-III of Phase-I during four laning. When the six lane of the same stretch was taken up, the depressed median was demolished and an elevated median at a cost of ₹ 7.50 crore was being constructed. In this connection, we observed that IRC had not specified about the type of median to be constructed and insisted (para 6.2.7 of IRC 86-1983) only for construction of median in roads of four lane and above category, irrespective of the classification of roads. Further, we noticed that the DPR consultant had suggested (October 2007) construction of "elevated median" for four laning itself. Therefore, the decision to construct depressed median during execution of four lane work and its demolition during six laning of work within three years of its construction was unwarranted resulting in wasteful expenditure of ₹ 1.31 crore.

The Government replied (October 2017) that the replacement of median was based on the safety consideration. If only the Company had constructed an elevated median considering the safety of public at the first instance itself, the necessity for the demolition of the existing median would not have arisen at the second stage.

Non-adoption of uniform rates for same work

3.2.12 The work of six laning for 12 KMs of Phase-III was divided into two packages of six KMs each and awarded (June 2015) to two contractors *viz.*, M/s Sunshine Infra Engineers India Private Limited (Sunshine) and M/s SPK & Co. The work awarded to Sunshine for a total value of ₹ 88.43 crore included six lane work for a value of ₹ 65.79 crore and execution of balance of four laning in the same stretch for a total length of 2.6 KMs. Our scrutiny of the awarded rates for four lane and six lane works revealed that two different rates were awarded for same items of works resulting in extra expenditure of ₹ 46.75 lakh **(Annexure-19)**. Had the Company properly negotiated with the contractor and insisted for adoption of uniform rates for same item of works, the dichotomy in rates could have been avoided.

The Government replied (October 2017) that adoption of different rates was on account of variation in the percentage of overhead charges for these two works. The fact, however, remained that though the estimates for these works were prepared separately, the works were combined together and awarded as a single work to the same contractor. Therefore, adoption of two different rates for the same item of work within the same contract was not justified on any grounds.

[98] Depressed Median means median with low height.

Conclusion

The widening of the Oragadam Project Road into four lane for a length of 57.40 KMs was approved by the Government at a cost of ₹ 300 crore as early as in October 2006 and commenced in June 2008 was not completed till date (October 2017). In the meantime, the cost was revised thrice, the latest one to ₹ 612.82 crore. The undue delay in execution of the project was mainly due to deficiencies in planning:

- Execution of project without ensuring availability of land as directed by the Government.
- Frequent foreclosure/termination of contract by not providing work fronts to the contractors and poor performance of the contractors.

Besides planning deficiencies, poor contract management in the form of award of contract to ineligible contractors, avoidable extra expenditure, undue favour were noticed.

While the Company was unable to complete the Phase-I of the project, it hurriedly took up execution of six lane work under the same project area. This deficiency/lapse resulted in avoidable extra expenditure in the four/six lane works of the project to the extent of ₹82.89 crore.

3.3 Implementation of Tamil Nadu State Rural Livelihood Mission by Tamil Nadu Corporation for Development of Women Limited

Introduction

3.3.1 The Tamil Nadu Corporation for Development of Women Limited (TNCDW), established in 1983 under Rural Development and Panchayat Raj Department of Government of Tamil Nadu (GoTN), was responsible for implementing various schemes meant for women Self Help Groups[99] (SHGs) in the State. Government of India (GoI) restructured (October 2010) Swarnajayanti Gram Swarozgar Yojana (SGSY) as National Rural Livelihood Mission (NRLM) to be implemented by States over a period of five to seven years. In Tamil Nadu, GoTN implemented NRLM in the name of Tamil Nadu State Rural Livelihood Mission (TNSRLM) and for this, nominated (December 2010) TNCDW as the implementing agency. Implementation of the scheme commenced in April 2012. The Mission envisaged reaching out to all rural poor families and linking them to sustainable livelihood opportunities and nurture them till they come out of poverty by enabling the poor households access institutional credit. TNSRLM activities were funded by GoI and GoTN in the ratio of 75:25 upto 2014-15 and 60:40 from 2015-16 onwards. TNSRLM was implemented in 265 Blocks in 31 districts of the State except Chennai (which is an urban district); this includes 16 Blocks in

[99] Self Help Group is a voluntary association of poor women formed into a group of 10 to 12 women.

four[100] districts where TNSRLM was implemented as World Bank assisted National Rural Livelihood Project.

The Principal Secretary to GoTN, Rural Development and Panchayat Raj Department is the overall head at Government level. TNCDW is the State Mission Management Unit (SMMU) at the State level, supported by District Mission Management Unit (DMMU) at the district level and Block Mission Management Units (BMMU) at Block level. Implementation structures were created in the form of Village Poverty Reduction Committee (VPRC), headed by Village Panchayat President with representation from beneficiaries and Panchayat Level Federation, formed in each village comprising of membership from SHGs.

The audit of implementation of TNSRLM was conducted during May - August 2017 covering the period from 2014-15 to 2016-17 with a view to assess whether funds were released in time, expenditure conformed to norms and benefits were given as envisaged.

Audit test checked the records of TNCDW, DMMUs in five districts[101] selected on random sampling basis, covering 25 out of 40 Blocks in the five districts and two Blocks (Thanjavur and Udhagamandalam) out of eight National Rural Livelihood Project Blocks in Thanjavur and The Nilgiris Districts.

Financial performance

3.3.2 The details of allocation, receipt of funds and expenditure for TNSRLM during the period 2014-17 is given in **Table 3.3.1.**

Table 3.3.1: Allocation, release and expenditure under TNSRLM

(₹ in crore)

Year	Opening Balance	Allocation as per Annual Action Plan			Receipt			Expenditure	Closing Balance
		GoI share	GoTN share	Total	GoI share	GoTN share	Total		
2014-15	249.27	112.77	37.59	150.36	33.61	11.20	44.81	216.04	78.04
2015-16	78.04	48.19	32.13	80.32	39.74	89.78*	129.52	99.82	107.74
2016-17#	107.74	69.48	46.32	115.80	43.98	35.77	79.75	118.48	69.01
Total		230.44	116.04	346.48	117.33	136.75	254.08	434.34	

* Includes unspent SGSY fund balance of ₹ 69.74 crore utilised for TNSRLM activities; hence, the actual release by GoTN for the three years was ₹ 67.01 crore.

unaudited figures

(Source: For Opening Balance: Worked out by Audit; for other figures: Government Orders and details furnished by TNCDW)

[100] Erode, Thanjavur, The Nilgiris and Tiruchirappalli.

[101] Ariyalur, Thanjavur, The Nilgiris, Thoothukudi and Villupuram.

Audit findings

Audit findings are given in succeeding paragraphs.

Planning

Non-completion of baseline study

3.3.3 On the basis of advice (November 2014) of GoI and in order to assess the livelihood of the rural poor in both Mission and non-Mission areas at the baseline, TNCDW entrusted (7 September 2015) the baseline study work to a consultant at a cost of ₹ 35.90 lakh and to submit the report within six months' time. However, the consultant submitted the report on 5 December 2016, which was forwarded to National Mission Management Unit (NMMU), Ministry of Rural Development of GoI. NMMU stated (March 2017) that the report did not contain verifiable data, analysis and discussion on methodology and declined to accept it in the present form. TNCDW paid (July 2016 and November 2016) ₹ 14.45 lakh to the consultant. Due to non-follow up by TNCDW since the entrustment of work, there was delay of nine months in receipt of the report and also there were deficiencies in quality aspects pointed out (March 2017) by NMMU. NMMU requested TNCDW to advise the consultant to re-examine the data collected, to a meaningful analysis and present the report using the template therefor. TNCDW forwarded (August 2017) the consultant's revised and final baseline study report to NMMU, the reply of which was awaited (September 2017).

Thus, the TNCDW had not completed the baseline study, which should have been done at the beginning of the Mission period, due to which the livelihood of the rural poor could not be assessed.

Financial management

Non-payment of interest for delayed release of funds

3.3.4 GoI stipulated in its fund release orders that the State Government must transfer the funds along with State share to SMMU within three days of receipt and delay, if any, would attract interest at the rate of 12 *per cent per annum*. However, GoTN released the GoI funds during 2014-17 to TNCDW with delays ranging from five to 82 days for which it did not pay interest to the tune of ₹ 1.15 crore **(Annexure-20)**.

Unspent SGSY Funds

3.3.5 TNSRLM was implemented with effect from April 2012 in place of SGSY. Hence, TNCDW directed (July 2012) the DMMUs to return unspent SGSY funds available with them. GoI instructed (June 2013) that the balance funds available under SGSY should be recouped to TNSRLM for adjustment against releases under NRLM. Taking into account the funds received (₹ 5.94 crore) from DMMUs, TNCDW submitted (March 2014) a closure report for SGSY stating that the amount of ₹ 5.94 crore had been transferred to TNSRLM account and the same was adjusted against NRLM while releasing

funds for 2012-13. However, after sending the closure report to GoI, TNCDW identified (June/September 2015) availability of ₹ 69.74 crore as unspent SGSY funds. GoTN ordered (February 2016) for utilising the amount of ₹ 69.74 crore for TNSRLM. In addition to the above funds, TNCDW had (March 2017) unspent SGSY funds of ₹ 25.42 crore in another bank account. However, TNCDW did not intimate GoTN about availability of this amount. Further, TNCDW did not send to GoI a revised closure report for SGSY stating the actual amount as ₹ 101.10 crore.[102]

Expenditure in excess of ceiling

3.3.6 GoI guidelines (August 2013) for NRLM prescribed ceiling for expenditure on various NRLM activities, which *inter alia*, included ₹ 6 lakh *per annum* for salary to the Heads of DMMUs and ₹ 2 lakh per Block Mission Management Unit for purchase of furniture and equipment. However, during 2014-17, sampled DMMUs exceeded the limit by ₹ 25.38 lakh on salary component and by ₹ 7.40 crore in purchase of furniture and equipment as detailed in **Table 3.3.2.**

Table 3.3.2: Expenditure in excess of ceiling

(₹ in lakh)

District	Permissible amount		Actual expenditure		Excess expenditure	
	Salary for Head of DMMU	Furniture and equipment	(A)	(B)	(A)	(B)
	(A)	(B)				
Ariyalur	18.00	4.00	26.65	43.92	8.65	39.92
Thanjavur	18.00	28.00	22.92	242.90	4.92	214.90
The Nilgiris	18.00	8.00	22.01	49.60	4.01	41.60
Thoothukudi	18.00	14.00	22.70	67.78	4.70	53.78
Villupuram	18.00	34.00	21.10	424.28	3.10	390.28
Total					**25.38**	**740.48 or 7.40 crore**

Due to expenditure on the above heads exceeding the limit prescribed, extending of benefits to the scheme beneficiaries was correspondingly reduced.

Implementation

3.3.7 TNSRLM provides financial assistance to SHGs in the form of Revolving Fund and Community Investment Fund to strengthen their financial management capacity and attract mainstream banks to finance the SHGs.

[102] ₹ 5.94 crore + ₹ 69.74 crore + ₹ 25.42 crore = ₹ 101.10 crore.

Non-release of assistance from Revolving Fund

3.3.8 To strengthen the institutional and financial management capacity of the SHGs and build a good credit history within the group, the concept of Revolving Fund was envisaged. TNSRLM would provide Revolving Fund ranging from ₹ 10,000 to ₹ 15,000 to each SHG which was in existence for a minimum period of three/six months. During 2014-17, DMMUs released Revolving Fund amounting to ₹ 29.58 crore to 19,783 SHGs; DMMUs of the five sample districts released ₹ 12.96 crore (at ₹ 15,000 per SHG) to 8,643 SHGs out of 8,914 SHGs.

Further, in the entire State, despite availability of funds, TNCDW did not release Revolving Fund amounting to ₹ 5.10 crore (at ₹ 15,000 per SHG) for 3,403 SHGs covered under Phase-III of TNSRLM which was started in 2014-15. Reasons for non-release of funds were neither available in records nor furnished to Audit. As a result, the envisaged objective of building the financial management capacity of members of SHGs and their joining the mainstream financial inclusion was lost.

Interest subvention scheme

3.3.9 As a part of strategy for financial inclusion of rural poor, a scheme of interest subvention was evolved to ensure that desired amount of credit was available at affordable price and at convenient repayment terms. At the same time to encourage timely repayments, the benefit of interest subvention was available for the SHGs, which were prompt in repayment of loan. Under the scheme, interest in excess of seven *per cent per annum* was reimbursed to the eligible NRLM-compliant[103] SHGs.

National Resource Organisation would obtain details of loans and repayments of SHGs which were prompt in repayment as dump data directly from the Core Banking Solution platform and calculate the amount of interest subvention. SMMUs were to download the dump data, mark therein the NRLM-compliant SHGs through DMMUs who will return the eligibility report for marked SHGs to SMMUs for release of interest subvention amount. SMMU would disburse the interest subvention directly to the SHGs' bank accounts through an identified nodal bank by National Electronic Funds Transfer.

Omission to ascertain compliance status of SHGs

(i) On a scrutiny of the data uploaded in NRLM portal on implementation of the interest subvention scheme, Audit noticed (April 2017) that out of 5.56 lakh SHGs which availed loans from banks, the NRLM compliant status of 3.19 lakh SHGs (57.37 *per cent*) was not ascertained. In the five sample districts, out of 51,089 SHGs, which availed loans from banks, NRLM compliant status of 34,067 SHGs (66.68 *per cent*) was not ascertained by the respective DMMUs.

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[103] Women SHGs having 70 *per cent* or more members from BPL households or poor households identified through participatory process and ratified by Grama Sabha.

Due to non-ascertaining of the NRLM compliant status of the SHGs, those eligible SHGs amongst them were denied the benefit of interest subvention.

Non-release of interest subvention benefit

(ii) During 2014-17, TNCDW transferred ₹ 15.94 crore to a nodal bank for release of interest subvention benefit to 79,543 SHGs. Out of this, the nodal bank did not release ₹ 73.14 lakh to 5,543 SHGs due to reasons such as closure of loan account, invalid account number/IFSC code and name mismatch. TNCDW did not make efforts to ensure that the amount reached 5,543 SHGs. In four sample districts *viz.*, Ariyalur, Thanjavur, The Nilgiris and Thoothukudi, out of ₹ 62.41 lakh transferred to nodal bank for 3,222 SHGs, the nodal bank could not release ₹ 4.23 lakh to 458 SHGs.

Lack of action for insurance of life, health and assets

3.3.10 As vulnerability reduction is an important element of the Mission, NRLM envisaged insulation of the beneficiaries from loss of life, health and assets. To achieve this, the Framework required TNCDW to (i) work with insurance companies to ensure coverage of micro insurance services, particularly to cover life, health and asset risks of the poor and vulnerable households, (ii) create a special fund out of the capital subsidy fund of VPRCs to provide small grants to the poorest like destitute, old, infirm and disabled for meeting emergency expenditure including health insurance and (iii) arrange convergence with GoI's insurance programmes like Aam Admi Bima Yojana and Rashtriya Swasthya Bima Yojana.

Under TNSRLM, 32,963 SHGs had been formed till March 2017 covering 4.34 lakh persons. However, TNCDW did not initiate any action on the subjects mentioned above. Thus, the intended benefit was not extended to the targeted members of SHGs.

Monitoring

3.3.11 To monitor and guide the implementation of NRLM in Tamil Nadu, GoTN constituted (December 2010) a High Level Empowered Committee at State-level headed by Minister for Rural Development (substituted in January 2013 with Minister for Municipal Administration and Rural Development). With GoTN not having fixed periodicity for the Committee's meetings, only three meetings were held since its constitution, *viz.*, February 2013, August 2013 and January 2015. Therefore, there was no high level guidance on the implementation as well as monitoring of the scheme.

Conclusion

Audit of implementation of Tamil Nadu State Rural Livelihood Mission by Tamil Nadu Corporation for Development of Women Limited during 2014-17 revealed (i) non-completion of baseline study even after spending ₹ 434.34 crore on the Mission-related activities till March 2017, (ii) Government of Tamil Nadu (GoTN) not paying ₹ 1.15 crore as interest for belated release of Government of India (GoI) funds, (iii) TNCDW not informing about availability of Swarnajayanti Gram Swarozgar Yojana funds to the extent of ₹ 69.74 crore to GoI and ₹ 25.42 crore (which should have been taken as

Mission funds) to both GoI and GoTN and (iv) sample districts spending ₹7.65 crore in excess of ceiling for salaries and furniture/equipment.

Audit further revealed (i) non-release of ₹ 5.10 crore to SHGs under Revolving Fund and (ii) non-ascertaining of NRLM compliant status of 3.19 lakh SHGs (57.37 *per cent* of total) in the State under Interest Subvention scheme resulting in denial of scheme benefits to those eligible amongst them. There was no action by TNCDW regarding coverage of insurance of health, life and assets. The High Level Empowered Committee at State-level met only thrice since its constitution in 2010.

The matter was referred to Government in October 2017; reply has not been received (November 2017).

Electronics Corporation of Tamil Nadu Limited

3.4 Avoidable expenditure

Delay of ten years in execution of flood management works led to hardship to the public and avoidable cost escalation of ₹28.15 crore to the Company

The Government of Tamil Nadu (GoTN) alienated (July 2005) 377 acres of land at Shollinganallur, at outskirts of Chennai to the Electronics Corporation of Tamil Nadu Limited (Company) for establishment of a Special Economic Zone (SEZ) under the name "Knowledge Industry Township". The said land was contiguous to the marsh land at Pallikaranai and served as flood plain to drain water into the Buckingham canal during monsoon periods as per the records of the State Revenue Department. Therefore, the Company requested (February 2007) Chennai Metropolitan Development Authority (CMDA) for reclassification of the land into "light industrial area" to enable it to use the land for establishment of SEZ. The State Public Works Department (PWD), which was consulted (May 2007) by CMDA for such reclassification recommended (November 2007) for reclassification subject to the Company taking up the following flood management works under its direct supervision.

(i) Construction of 74 metre long and 40 metre width bridge across the Shollinganallur-Medvakkam Road and storm water drainage for a width of 10 metres on both sides of the above road.

(ii) Construction of drainage channels on the eastern and western sides of the road abutting the SEZ area.

The Water Resource Department of PWD prepared an estimate for an amount of ₹ 13.18 crore for the above works and requested (April 2008) the Company to deposit the amount to enable it to take up these works. Pending deposit of the amount by the Company, CMDA approved (December 2008) the layout for construction of SEZ. However, the Company did not deposit the above amount to enable construction of drainage works. As the comprehensive flood

management works were being delayed due to non-deposit of funds by the Company, the Highways Department submitted (May 2009) an estimate of ₹ 1.00 crore to construct three culverts as an immediate relief for easing out the flow of water. The Company deposited (August 2009) ₹ 1.00 crore to Highways Department for construction of three culverts and also executed (March 2010) a storm water drainage channel for a length of 1,530 metres at a cost of ₹ 1.28 crore through its own contractor without PWD's involvement.

The High Court of Madras, based on a Public Interest Litigation in 2008, passed an interim order (October 2009) as well as a final order (September 2015) directing the Company to carry out the entire flood management works in a comprehensive manner by August 2016. Accordingly, PWD proposed construction of bridge/culverts in Medavakkam – Shollinganallur road at the revised estimated cost of ₹ 19.10 crore. Besides these works, PWD identified (November 2015) flood mitigation plan at a cost of ₹ 22.13 crore to be executed in two phases. For execution of these works, the Company had deposited (November 2016) ₹ 9.90 crore.

In this connection, Audit observed that:

- PWD adequately cautioned about the possibility of flood due to reclassification of the area and therefore suggested the necessity to execute flood management works in a comprehensive manner. However, the Company failed to comply with the conditions of approval and executed the flood management works only in piecemeal. This was despite the interventions of the High Court in 2008 and 2015. Though these works were to be completed before August 2016 as per directions of High Court, the Company continued to be slow in executing these works as it was neither aware of the present status of Phase-I works nor urged PWD to take up the Phase-II works expeditiously. Thus, the mandate to execute the flood control measures was not given the due importance by the Company.
- Due to non-execution of these works in initial stages upto 2009 at a cost of ₹ 13.18 crore (₹ 9.18 crore for construction of channel works and ₹ 4.00 crore for construction of bridge), the Company is facing the liability to spend ₹ 41.23 crore on these works, resulting in avoidable cost escalation of ₹ 28.15 crore.

The Government replied (October 2017) that there were changes in the technical and financial proposals submitted by PWD for flood management works at the first stage and the present ongoing works. Therefore, the differential cost on account of change in scope could not be considered as additional expenditure to it. The reply was not convincing because the increase in scope of the work as well as the expenditure was due to abnormal delay of 10 years in executing the flood mitigation work in a comprehensive manner as prescribed by PWD for conversion of the marsh land into an "Industrial area" and hence, the same was avoidable.

State Transport Corporations

3.5 Delay in putting the vehicles on road

Delay in utilising the new buses on road resulted in avoidable interest loss of ₹ 10.29 crore and excess fuel cost of ₹ 3.94 crore

In Tamil Nadu, there are eight State Transport Undertakings (STUs) providing inter-State and intra-State bus services through the collective fleet strength of 20,839 buses (March 2016). During the period from 2012-16, the STUs procured 4,606 chassis at a total cost of ₹ 891.41 crore[104] from M/s Ashok Leyland and M/s Tata Motors Limited (suppliers). The bus body building on these chassis were carried out either in-house or by outsourcing and the buses were put on road between June 2012 and March 2017. For purchase of chassis, the suppliers allow a credit period of 90 days and the STUs avail an average lead time of 50 days for construction of bus body on the chassis.

As interest on loan for procurement of chassis as well as body building cost could be recovered only by operation of these buses on road, it is imperative for the STUs to put all the new buses on road as early as possible. Moreover, the new buses are fuel efficient and therefore operation of new buses immediately after completion of bus body work, as the replacement of overaged buses would result in savings in cost of diesel consumption. A test check of records pertaining to purchase of chassis and time taken by all STUs for putting the buses on road during the five years period ending March 2017 revealed that out of 4,357 buses, 2,020 buses (46.36 *per cent*) were actually put on road after a delay of more than 90 days from the date of their purchases as detailed below:

Table 3.5 Delay in putting the new buses on road

Sl.No.	Delay more than 90 days	Number of buses involved
1.	91 to 100 days	280
2.	101 to 200 days	1,184
3.	201 to 300 days	334
4.	301 to 400 days	74
5.	401 to 500 days	92
6.	More than 500 days	56
	TOTAL	**2,020**

A further analysis of the delay by all STUs revealed that:

- The construction of bus body on 2,020 chassis were completed and were ready for registration with Regional Transport Office. But, these buses were kept idle without any commercial use.

[104] This cost represents the cost of purchase of 4,357 buses put on road and for the remaining 249 buses, the total cost details are awaited from STUs.

- The financial assistance given by Tamil Nadu Transport Development and Finance Corporation Limited (TDFC)[105] and the Government (which is routed through TDFC) is converted into loan by TDFC on the 91st day after the end of the supplier's credit period and interest is recovered from STUs. Therefore, the delay in putting the 2,020 buses on road beyond 90 days led to avoidable interest loss of ₹ 10.29 crore[106] during the idle period (**Annexure-21**).
- The avoidable delay in putting the above vehicles on road had also resulted in loss of savings in fuel cost amounting to ₹ 3.94 crore[107] in respect of 1,095 buses (**Annexure-21**) in which there was noticeable savings in fuel cost.

The Government replied (September 2017) that it was the prevailing practice of the former Chief Minister to flag off all the new buses on a particular day in a grand manner and obtaining the convenient date for flagging ceremony was beyond its administrative control. The fact, however, remained that these administrative delays had resulted in avoidable interest loss of ₹ 10.29 crore and loss due to excess fuel consumption amounting to ₹ 3.94 crore without justification.

Tamil Nadu Civil Supplies Corporation

3.6 Diversion of PDS wheat

Diversion of wheat, procured under Public Distribution System for sale to the Corporation of Chennai by the Company for Amma Unavagam, a State Level Scheme resulted in violation of the Public Distribution System (Control) Order, 2001 besides earning of unjustified profit of ₹ 5.97 crore

As per Para No. 3(2) of Annexure to the Public Distribution System (Control) Order, 2001 issued by the Government of India on 31 August 2001, the State Governments shall not divert the allocations made by the Central Government for distribution under the Public Distribution System (PDS). The orders issued by Food Corporation of India (FCI) for monthly district wise sub-allocation of food grains under PDS also reiterate that the food grains allocated under Targeted Public Distribution System (TPDS) should be utilised only for the purpose for which it has been allotted and not for any other purpose/scheme.

The Government of Tamil Nadu (GoTN) vide G.O. Ms (D) No.386 dated 12 July 2013 of Municipal Administration and Water Supply (MC-I) Department issued orders for preparation and supply of chapatthi to the poor people

105 Another State PSU, which is engaged in mobilising funds from the public and funding the activities of STUs.

106 Worked out on the basis of minimum interest rate of 10.5 *per cent* per *annum* charged by TDFC during 2011-16 for the number of days of delay for each bus.

107 Being the difference in KM per litre achieved by new bus and the old bus X average number of KM run by the old bus X number of days of delay X average diesel cost incurred by STUs.

through Amma Unavagam (Tiffin centres), a State level scheme run by the Chennai Corporation. It was stated in Para 5 of the Government Order (GO) that Tamil Nadu Civil Supplies Corporation (Company) should issue wheat stock from their savings to Chennai Corporation as per their requirement. In the event of no savings of wheat, the Chennai Corporation should have to bear the full expenses from their funds by buying wheat from the open market.

The Company decided (24 July 2013) to utilise 500 MT of wheat allotted by the Government of India under Open Market Sale Scheme (Domestic) {OMSS (D)} at ₹ 17.25 per Kg through FCI, for issue to Amma Unavagam for preparation of Chapatthi. The GoTN, Co-operation, Food and Consumer Protection Department, vide letter dated 5 September 2013, directed the Company to allot whatever the quantity of wheat requested by the Corporation of Chennai for Amma Unavagam, which was in contradiction to the G.O dated 12 July 2013 wherein it was instructed that the Company should issue wheat stock only from their savings. Audit noticed that the Company had supplied 5,096.883 MT of wheat to Amma Unavagam during the period from September 2013 to June 2017 at a total sale value of ₹ 8.85 crore at ₹ 17.25/ ₹ 18.10 per Kg (Open Market Rate).

Audit observed that out of 5,096.883 MT of wheat supplied for Amma Unavagam, 500 MT of wheat was supplied out of procurement made from FCI at open market rate of ₹ 17.25 per Kg under OMSS (D), the balance supplied quantity of 4,596.883 MT was out of procurement made by the Company from FCI under PDS. This included 3,108 MT meant for Below the Poverty Line (BPL) families procured at Central Issue Price (CIP) of ₹ 4.15 per Kg, 451 MT of Priority wheat[108] at CIP of ₹ 2.00 per kg, 328.483 MT of Above the Poverty Line wheat at CIP of ₹ 6.10 per kg and 709.400 MT of Tide Over wheat[108] at CIP of ₹ 6.10 per kg.

This resulted in diversion of 4,596.883 MT of wheat procured under PDS for a State scheme, which was a violation of condition specified in Para No. 3(2) of Annexure to the Public Distribution System (Control) Order, 2001 issued by the Government of India and the targeted beneficiaries were deprived of PDS wheat in Fair Price Shops to that extent. Further, by procuring 4,596.883 MT of wheat at the rates ranging from ₹ 2.00 per kg to ₹ 6.10 per kg under PDS and selling the same at a higher rate of ₹ 17.25/ ₹ 18.10 per Kg to the Chennai Corporation, the Company made an unjustified profit of ₹ 5.97 crore (*i.e.*, sale value of ₹ 7.98 crore – procurement value of ₹ 2.01 crore), which was to be refunded to the Government of India.

In reply, the Company stated (September 2017) that the cost of wheat had to be worked out by following the due procedures of costing, which included transport, handling, storage charges and interest factor also. While reiterating the reply of the Company, the Government added (September 2017) that after completion of costing, necessary orders would be issued in this regard for compliance of audit observation. The reply was not tenable, since the

[108] Consequent to implementation of National Food Security Act, 2013 by Tamil Nadu Government with effect from 1 November 2016, the allocation of food grains for PDS by Government of India under BPL and APL categories had been restructured as Priority and Tide Over.

diversion of PDS wheat for a State scheme itself was a violation of the Government of India's PDS (Control) order, 2001, the incidental cost incurred in connection with the distribution of such wheat to Amma Unavagam was to be borne by the Company only and could not be set-off against the refund amount of ₹ 5.97 crore due to the Government of India.

Tamil Nadu Tourism Development Corporation Limited

3.7 Undue benefit

Inordinate delay of 13 years in revision of lease rent as per lease agreement resulted in undue benefit to a private tenant to the extent of ₹ 10.17 crore

Tamil Nadu Tourism Development Corporation Limited (Company) leased out (June 1994) its hotel premises situated in 4.70 acres of land in a prime locality of Trichy to M/s SRM[109] Group of companies to develop a hotel in the premises. After handing over the land to the lessee in June 1994, the Company entered (March 1996) into an agreement, which stipulated that the lease period of 30 years would commence from June 1994. The agreement also stipulated that the initial lease rent of ₹ 3.85 lakh per *annum* (being 7 *per cent* of the market value of the land) was to be revised by the District Collector once in three years with effect from June 1997.

Audit noticed that though the annual lease rent for next three years upto June 2000/2003 was duly revised to ₹ 5.76 lakh/₹ 7.01 lakh *per annum*, the same was not revised at all thereafter, resulting in adoption of the lease rent of ₹ 7.01 lakh *per annum* from June 2003 to till date (October 2017). This lease rent was far below the market value of the rent during the block years from June 2003 to June 2018, as reported (April 2016) by the District Revenue Officer (DRO), Trichy to the Commissioner of Land Administration, Chennai as detailed below:

Table 3.7: Differential lease rent to be recovered

(Amount - ₹ in lakh)

Period	Market value as reported by DRO (₹ per sq.ft.)	Market value for 4.70 acres of land (equivalent to 2,04,732 sq.ft.)	Lease rent to be fixed at 7 *per cent*	Lease rent collected	Differential lease rent	Differential amount for three years
13.06.03 to 12.06.06	414	847.59	59.33	7.01	52.32	156.96
13.06.06 to 12.06.09	464	949.95	66.50	7.01	59.49	178.47
13.06.09 to 12.06.12	491	1,005.23	70.37	7.01	63.36	190.08

[109] The group of companies engaged in hotel, education and hospital services in Tamil Nadu.

Period	Market value as reported by DRO (₹ per sq.ft.)	Market value for 4.70 acres of land (equivalent to 2,04,732 sq.ft.)	Lease rent to be fixed at 7 *per cent*	Lease rent collected	Differential lease rent	Differential amount for three years
13.06.12 to 12.06.15	701	1,435.17	100.46	7.01	93.45	280.35
13.06.15 to 12.06.17	785	1,607.15	112.50	7.01	105.49	210.98 (for two years)
TOTAL						**1,016.84**

* Calculated by notionally increasing ₹ 701 per sq.ft. + 12 *per cent per annum* as per the Government G.O.Ms.324 (Revenue Department) dated 10 September 2001, which provided for notionally increasing the market value in respect of the Government lands.

Thus, non-revision of lease rent as per lease agreement led to undue benefit to private occupant to the extent of ₹ 10.17 crore. The audit analysis of the reasons for non-revision of the lease rent revealed the following:

- Between June 2003 and February 2015, the Company had been randomly corresponding with the District Collector and Special Commissioner and Commissioner of Land Administration for revision of lease rent on 23 occasions, which included nine correspondences at the Managing Director level. Though these requests did not yield the required results, the Company did not discuss the issue with the District Collector/Commissioner of Land Administration to safeguard its financial interest.
- On the earlier occasion also, the lease rent for the period from 2000-2003 was fixed by the Company based on the proposals submitted by District Revenue Officer (DRO), Trichy to the Commissioner, Land Administration, Chennai without waiting for the formal orders from the Land Administration Department. However, after it became aware of the similar proposals in April 2016, it neither attempted to revise the lease rent based on these proposals as done in the previous occasions nor approached the Commissioner, Land Administration for expediting the formal orders.
- When Audit pointed out (February 2016) about the lapse, Company replied (April 2016) that efforts were being taken to revise the lease rent. But, the continuous failure to revise the lease rent in last 13 years indicated Company's lack of seriousness to protect its financial interest.

The Government replied (October 2017) that a notice was issued to SRM Hotels Private Limited instructing them to remit the tentative outstanding lease amount of ₹ 12.50 crore to the Company. The fact, however, remained that the notice was served at the instance of audit.

Tamil Nadu Cements Corporation Limited

3.8 Tardy implementation of a scheme

Failure to ensure supply of committed quantity of 33.07 lakh MTs of cement to "Amma Cement Scheme" by private cement manufacturers resulted in deprival of 88,187 low and middle income group beneficiaries from obtaining cement at lower cost and revenue loss of ₹ 5.75 crore to Tamil Nadu Cements Corporation Limited

In Tamil Nadu, the market price of cement increased from ₹ 250 per bag of 50 Kgs. in 2010-11 to ₹ 320 per bag in 2013-14. In order to mitigate the hardship faced by the public due to price rise in the retail market, Tamil Nadu Cements Corporation Limited (TANCEM) proposed (February 2014) to sell Pozzolana Portland Cement (PPC) at a rate of ₹ 190 per bag[110] to the people belonging to low and middle income group by purchasing the same at ₹ 185 per bag from private cement manufacturers. In a meeting arranged (February 2014) by the Government, six cement manufacturers confirmed in writing to supply 40,000 MTs of cement each month at the agreed purchase price. Based on this confirmation, the Government of Tamil Nadu (GOTN) launched (December 2014) "Amma Cement Supply Scheme" (scheme) to sell cement through retail outlets of Tamil Nadu Civil Supplies Corporation (TNCSC).

The scheme, *inter alia*, envisaged that TANCEM would:

- Issue Purchase Order (PO) on fortnightly basis to cement suppliers and pay for the supplies through an exclusive bank account[111] to be opened in this regard.
- Create a scheme monitoring cell at Corporate Office and deploy required manpower at the districts to ensure holding of 400 bags of cement at each retail outlet.

After issuing the first batch of PO in January 2015, TANCEM ordered for a total quantity of 57.45 lakh MTs of cement upto May 2017, against which the cement suppliers supplied 24.38 lakh MTs of cement and the same was sold to 7.40 lakh beneficiaries for a total value of ₹ 926.35 crore. Audit scrutiny of records pertaining to the scheme at TANCEM revealed the following:

(i) The suppliers had supplied 24.38 lakh MTs of cement representing 42.44 *per cent* of the ordered quantity. Although there was short supply of cement by four suppliers ranging from 53 to 58 *per cent*, which persisted from the beginning, TANCEM did not effectively pursue the short supply and issued subsequent POs and routine reminders without a critical review by its

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110 The differential amount of ₹ 5 per bag would be apportioned as Value Added Tax (₹ 0.63), TANCEM's margin (₹ 0.87) and ₹ 3.50 to TNCSC and Panchayat Raj and Rural Development for providing their godown to stock this cement at field level.

111 This account was to be utilised for collection of sale proceeds of cement and making payments to cement suppliers.

Board of Directors (BOD). The Government also failed to enforce its GO, which was issued based on the consent letters given by the cement manufacturers. Thus, there was no mechanism either at TANCEM or Government to enforce the PO.

(ii) An initial investment of ₹ 74 crore was required for purchase of two lakh MTs of cement per month, but neither TANCEM made any arrangement to mobilise the funds required for the scheme nor the Government arranged financial assistance. Consequently, TANCEM had to wait for the sales realisation to make payment to the suppliers. This led to delays in payment and total outstanding was ₹ 12.61 crore in June 2017. Besides this amount, TANCEM was also to pay ₹ 8.10 crore to the agencies involved in godown arrangements. This indicated that TANCEM did not make prompt payment to the suppliers to ensure uninterrupted supply of cement.

(iii) The scheme envisaged creation of monitoring cell at the headquarters of TANCEM and deployment of adequate manpower in the district to co-ordinate purchase and sale of cement. It was noticed that the monitoring cell at TANCEM's headquarters was manned by a single officer on deputation. At the field level, TANCEM did not depute any manpower at all till date (May 2017) resulting in lack of co-ordination for supply and sale of cement by TANCEM.

From the above, it is evident that TANCEM failed to draw an effective action plan to ensure supply and sale of the envisaged quantity of 2 lakh MTs of cement per month to the people belonging to low and middle income group. Based on the information made available to audit, it was noticed that though there was adequate demand from the public, 316/230 out of the total 502 godowns reported[112] (July 2015/January 2016) "Nil stock" defeating the basic objective of the scheme to supply cement to needy public at concessional price. As the ordered quantity constituted only seven *per cent* of the production capacity of six cement manufacturers from whom the consent was obtained by the Government, the short supply to the extent of 33.07 lakh MTs of cement during the period from January 2015 to May 2017 deprived 88,187 low and middle income beneficiaries from obtaining cement at lower cost and a revenue loss of ₹ 5.75 crore to TANCEM.

The Government replied (October 2017) that the short supply was due to restricting the supply to the actual requirement at godowns. It added that for effective monitoring of the scheme, a new software *viz.*, "supply chain management system" was under launch. The reply was not tenable as audit could not find any directions by TANCEM to the cement suppliers to reduce the supplies based on the actual demand. Moreover, around 50 *per cent* of the godowns reporting "NIL" stock proved short supply and the resultant non-availability of stock was not on account of lack of demand.

[112] These reports were not generated during the rest of the period by TANCEM as verified by audit.

3.9 Non-recovery of liquidated damages

TANCEM issued purchase order to a supplier without signing the agreement and collecting the bank guarantee in violation of tender conditions. Subsequently, when the supplier failed to supply the ordered quantity of cement, it could not levy liquidated damages of ₹ 2.77 crore for breach of contract

TANCEM acts as a nodal agency (since June 2007) for procurement of cement from the cement manufacturers on rate contract basis for supply to Rural Development and Panchayat Raj Department. As part of this agency function, the Company invited (July 2012) tender for supply of 9.85 lakh MTs of cement and issued (November 2012) Letter of Intent (LOI) to six[113] successful bidders.

As stipulated in the tender conditions, TANCEM requested (28 November 2012) ACC Limited (ACC), one of the six suppliers, to provide security deposit of ₹ 1.20 crore (being two *per cent* of the order value of ₹ 60.10 crore) in the form of Bank Guarantee (BG) and also execute an agreement for supply of cement. However, TANCEM issued Purchase Order (PO) to ACC for supply of 49,380 MTs of cement on the same day, *i.e.*, on 28 November 2012 without waiting for submission of BG and execution of agreement by it. TANCEM again released (January to June 2013) four more POs for a total quantity of 14,005 MTs of cement, pending execution of agreement and furnishing of BG by ACC. Out of the total ordered quantity of 63,385 MTs of cement, ACC supplied only 15,722 MTs of cement (24.80 *per cent*) upto August 2013. Against the supply value of ₹ 6.92 crore, TANCEM paid ₹ 4.95 crore upto May 2013 and withheld ₹ 1.97 crore for the shortfall in supply of cement. Citing the non-supply of cement as breach of contract, TANCEM proposed (July 2013) to levy Liquidated damages (LD) of ₹ 2.77 crore on ACC as per Clause 22 of the tender conditions, but kept the decision on the issue pending till December 2015. The Board of Directors (BOD) finally decided (January 2016) not to levy the LD and release the withheld amount on the grounds that (i) there was no formal agreement with ACC and (ii) ACC had assured to supply 4,500 MTs of cement per month to another welfare scheme[114] of the Government. Accordingly, it released the withheld amount of ₹ 1.22 crore (between May and November 2016). The balance of ₹ 75 lakh was yet (July 2017) to be released.

In this connection, Audit observed that:

- As per Clause 30(5) of the Tamil Nadu Transparency in Tender Rules, 2000, (applicable to the Public Sector Undertakings), the successful bidder was required to sign the agreement within the time specified in the tender. Moreover, as per the conditions of tender floated by TANCEM, the PO

[113] Dalmia Cements Limited, Madras Cements Limited, India Cements Limited, Chettinad Cements, ACC Limited and Ultratech Cements Limited.

[114] This is a welfare scheme titled "Amma Cement Supply Scheme" in which the poor people would get cement at the concessional rate of ₹ 185 per bag.

was to be issued only after the successful bidder furnishing the BG and signing the agreement. However, TANCEM issued PO in haste without signing the agreement and submission of BG by ACC, which was devoid of merits especially when it got the agreement signed by all other suppliers of this contract. Though this failure contributed to release of withheld amount, no internal responsibility was fixed for this serious lapse.

- Acceptance of LOI is must before initiating any action for enforcement of the contract in the Court of law. Therefore, issue of PO without getting the agreement signed and collecting BG was an undue favour, which resulted in non-levy of LD of ₹ 2.77 crore for breach of contract by ACC.

The Government replied (June 2017) that the Board of Directors (BOD) of TANCEM decided to waive the penalty as there was genuine difficulty faced by ACC in supplying the ordered quantity of cement and the support assured by ACC to Amma Cement Supply Scheme. The reply is not tenable as the waiver of LD by BOD was mainly on account of not having the valid agreement with ACC as discussed in the BOD's meeting, which revealed its improper contract management.

Tamil Nadu Generation and Distribution Corporation Limited

3.10. Import of coal by TANGEDCO

Introduction

3.10.1 The total installed capacity of thermal power stations[115] owned by TANGEDCO as on 31 March 2017 was 4,320 MW for which 21.5 Million Metric Tonnes (MMT) of coal was required annually. As there was short supply of domestic coal[116], TANGEDCO started (2005) to procure imported coal as per the advice (2004) of GOI through STC,[117] MSTC Limited, MMTC[118] and TNPL[119] at negotiated prices. From July 2012 onwards, TANGEDCO switched over to global tender system to obtain competitive prices. Accordingly, TANGEDCO floated seven tenders between July 2012 and February 2016 and procured 24.4 MMT of coal valued at ₹ 12,247 crore as detailed in **Annexure-22.** To assess the economy and effectiveness of the procurement of imported coal through tender, we analysed five tenders floated between October 2013 and February 2016 for a total quantity of 21.6 MMT of coal valued at ₹ 11,233 crore. The results of audit are discussed below:

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115 North Chennai, Tuticorin and Mettur.

116 Mahanadi Coalfields Limited, Eastern Coalfields Limited, Singareni Collieries Company Limited and Central Coalfields Limited.

117 State Trading Corporation.

118 MMTC Limited (A Government of India enterprise).

119 Tamil Nadu Newsprint and Papers Limited (TNPL) (A Government of Tamil Nadu Enterprise).

Tender for import of coal

Absence of Policy framework for import of coal

3.10.2 We noticed that though TANGEDCO had started floating global tenders for import of coal since 2012, it had not evolved any specific policy for importing coal. In the absence of a comprehensive policy, there was no direction for key decisions for import, which led to excessive Bid Qualification Requirement (BQR), non-adoption of e-tendering and variable pricing method for payment of imported coal, *etc.*, as detailed in the subsequent paragraphs.

Inadequate time for submission of bids

3.10.3 As per Rule 20(1) of the Tamil Nadu Transparency in Tenders Rules, 2000 (Tender Rules), the procuring entities are required to allow a minimum period of 30 days for submission of tenders valuing more than ₹ two crore from the date of publication of Notice Inviting Tender (NIT). The Rule 16(1) of the Tender Rules provided that the procuring entities should make available the tender documents for sale from the date of publication of tender. We noticed that after publication of NIT, TANGEDCO closed the sale of tender documents much earlier to 30 days for submission of bids contrary to the Rule 20 of the Tender Rules as detailed below:

Table 3.10.1: Time allowed for submission of bids

Tender No.	Date of publishing in News-papers	Date of publishing in website and commencement of sale of tender document	Closing date of sale of tender document	Due date for submission of bids	Time gap 4 - 3	Number of bids received
(1)	(2)	(3)	(4)	(5)	(6)	(7)
48	05-11-2013	07-11-2013	06-12-2013	16-12-2013	30	3
49	29-05-2014	29-05-2014	26-06-2014	04-07-2014	29	3
50	08-02-2015	09-02-2015	03-03-2015	12-03-2015	23	3
51	06-12-2015	07-12-2015	28-12-2015	06-01-2016	22	1
52	07-02-2016	08-02-2016	17-02-2016	22-02-2016	10[120]	4

Since the time allowed for purchase of tender documents and submission by the prospective bidders from the date of publishing of the tender was gradually reduced from 30 to 10 days without any reasons on record, the number of bids received remained at three/four throughout the audit period thereby limiting competition.

[120] Minimum time specified by the competent authority was 15 days as per Rule 20(2).

The Government stated (October 2017) that it had allowed window time in accordance with Tender Rules. But audit analysis revealed that 30 days of time was not available between commencement and closing date of sale of tender document, hence the provision of tender rules was not followed in its spirit.

Injudicious fixation of Bid Qualification Requirement (BQR)

3.10.4 The criteria fixed (July 2012) in the BQR for import of coal stipulated that the bidder should have supplied one MMT of imported coal during any one of the preceding four financial years and have an annual average turnover of ₹ 1,000 crore during the preceding three financial years. We noticed that the turnover criteria of ₹ 1,000 crore was more than the Purchase Order value ranging from ₹ 68 crore to ₹ 330 crore for Tuticorin Port and ₹ 170 crore to ₹ 1,295 crore for Ennore Port. It is pertinent to note that the criteria fixed (July 2010) by TANGEDCO for all tenders was 25 *per cent* of the estimated value of the tender. Moreover, TNPL and NTECL fixed turnover criteria of NIL and ₹ 281 crore (26 *per cent*) against their value of import of ₹ 167 crore and ₹ 1,092 crore, respectively.

The Government replied that (October 2017) same BQR was fixed for supply to both the ports so as to finalise the tender in time and to ensure coal supplies continuously.

The fact, however, remained that after obtaining separate price bids for Ennore and Tuticorin discharge ports, the purchase orders were issued in the ratio of 60:40 between L-1 and L-2 (matching price with L-1). Therefore, the turnover criteria fixed at ₹ 1,000 crore for each tender against the purchase order value ranging from ₹ 68 crore to ₹ 330 crore for Tuticorin port and ₹ 170 crore to ₹ 1,295 crore for Ennore port was not justified. Due to fixation of higher turnover criteria, only three/four bidders repeatedly participated and three[121] of them shared 96 *per cent* of the total import value of ₹ 8,884.44 crore in all the five tenders covered by audit.

Selection of inappropriate price discovery mechanism

3.10.5 The importers of coal generally finalise the competitive prices based on (i) e-submission[122] method, (ii) reverse auction[123] method and (iii) variable price[124] method. However, TANGEDCO did not adopt any of the above methods but followed the conventional method of obtaining bids in sealed covers. We noticed that the Government of Tamil Nadu (GoTN) ordered (May 2007) that e-submission of tenders should be followed for procurement exceeding a value of ₹ 10 lakh by major infrastructure agencies like PWD,

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121 Adani, KISPL/KISSPL and MSTC.

122 E-submission of tender means submission of bids on-line in the website.

123 Reverse auction is a method by which the sellers compete with each other by decreasing their quote starting from the price declared by the procuring entity on the date/time of opening of on-line bids.

124 For example, the contracted price was USD 66.88 per MT and the Indonesian Coal Index was 47.50 for the tender opened on 12 March 2015. If the Index moved down to 45.80 on the date of import (20 April 2015), then the price payable would be USD 64.49 per MT and not at the contracted price of USD 66.88 per MT.

Highways Department, Tamil Nadu Electricity Board, *etc.*

We further noticed that sister PSUs *viz.*, TNPL, NTECL[125] and NTPL[126] had adopted online reverse auction method and obtained lower quote compared to the initial quotations received by them through off-line. But, TANGEDCO did not practice the reverse auction method thereby lost an opportunity of getting lower price for their imported coal as detailed in the following table.

Table 3.10.2: Comparative rates obtained by TANGEDCO and other PSUs

TANGEDCO							Other PSUs			
Name of the bidder	Tender Number	Tender Date	Date of price negotiation	Rate quoted off-line (USD per MT)	Rate as per price negotiation (USD per MT)	Percentage of price reduction in negotiation	PSUs name	Quoted price in the bid (off-line) (USD per MT)	Quoted price in reverse auction (on-line) (USD per MT)	Percentage of price reduction in reverse auction
Adani	48	31.10.13	18.01.14	99.76	91.05	8.68	TNPL	81.60	72.75	10.85
KISPL	48	31.10.13	18.01.14	102.90	92.72	9.89	TNPL	96.50	70.50	26.94
MSTC	49	28.05.14	06.08.14	104.76	87.00	16.95	TNPL	90.00	73.00	18.89
KISPL	49	28.05.14	06.08.14	106.28	88.60	16.63	TNPL	77.85	72.80	6.49
Adani	50	05.01.15	14.05.15	94.40	77.00	18.43	NTECL	69.54	56.20	19.18
KISSPL	50	05.01.15	14.05.15	97.55	78.50	19.53	NTECL	74.56	57.40	23.02
Adani	52	05.02.16	25.02.16	61.85	61.00	1.37	TNPL	54.05	45.20	16.37

The reduction in the quoted prices obtained by TANGEDCO through negotiation from the bidders was ranging from 1.37 to 19.53 *per cent* against the reduction of 6.49 to 26.94 *per cent* obtained by other PSUs through reverse auction during the same period from the same bidders who participated in the bids of TANGEDCO.

It is pertinent to mention that the bidders have confirmed the fact, as early as in July 2013, that they were forced to quote higher prices for TANGEDCO by loading additional cost for possible increase in the international price during long delivery period of six to eight months. TANGEDCO, however, never switched over to the variable price method especially when the price of imported coal continuously declined from USD 92.06 per MT (October 2012) to USD 61.00 per MT (February 2016). It is pertinent to note that Central Electricity Regulatory Commission had recommended (2005) to adopt variable price method for bid evaluation and payment for import of coal.

Our independent analysis of 131 out of 297 consignments of imported coal received under five tenders during the review period revealed that the pricing under variable price method would have resulted in overall reduction in payments to the extent of ₹ 746.13 crore as detailed in the **Annexure-23.**

125 NTPC Tamil Nadu Energy Company Limited, a joint venture company between NTPC Limited and TANGEDCO.

126 NLC Tamil Nadu Power Limited, a joint venture company between NLC Limited and TANGEDCO.

Thus, TANGEDCO's failure to switch over to the industrial practice of variable price method even after knowing all the major PSUs importing coal are adopting this method led to avoidable expenditure to ₹ 746.13 crore.

The Government replied (October 2017) that the firm price was found to be beneficial to TANGEDCO based on the long term analysis.

The reply is not tenable because:

- Adoption of FIRM price method of inviting tender and evaluation followed by TANGEDCO was contrary to the practice of inviting bids on variable price basis by other PSUs *viz.*, NTECL, NTPL, NTPC, and various SEBs.[127]
- In all the tenders covered in Audit, the variable price method of contract was beneficial both at the time of fixation of price as well as at the time of payment to suppliers.
- Examination by audit revealed that TANGEDCO did not carry out any long term analysis of the benefits under FIRM pricing *vis-a-vis* variable pricing method in the preceding five years.

Contract Management for import of coal

Non-adherence to the directives of Ministry of Shipping

3.10.6 The GOI policy (November 2001) stipulate that import contracts by all Government departments/PSUs are required to be finalised on Free on Board (FOB) basis to retain control on shipments and to extend maximum cargo support to the Indian shipping industry. The policy further stipulated that No Objection Certificate (NOC) should be obtained from the Ministry of Shipping, GOI for deviation from FOB basis on each and every case.

We noticed that TANGEDCO finalised all coal import contracts on CIF basis but it did not obtain NOC from the Ministry of Shipping, GOI as required.

The Government replied (October 2017) that NOC would be obtained for coal import from Ministry of Shipping, Government of India.

Non-furnishing of the Certificate of Origin

3.10.7 As per tender conditions, production of Certificate of Country of Origin (COO) by the suppliers for all consignments was mandatory for getting concessional customs duty and ensuring the genuineness of the import. The tender condition also stipulated that payments shall be made by TANGEDCO only upon furnishing of COO by the suppliers.

The test check by Audit revealed that 176 out of total 297 consignments were originated from Indonesia as per Bill of Lading. But the COO was not produced by the suppliers in respect of all the 176 consignments. Therefore, the genuineness of the source of import was not established in respect of 176

[127] Gujarat State Electricity Corporation Limited, Rajasthan Rajya Vidyut Uthpadan Limited, Haryana Power Generation Corporation Limited, Maha Generation Company Limited.

consignments till date (October 2017). However, the payment of ₹ 5,767.31crore was made to the supplier without obtaining mandatory COO.

The Government replied (October 2017) that the source of supply was established through documents such as Bill of Lading, insurance, certificate of origin furnished by the testing agency. The fact, however, remained that the COO from Government of the exporting country was not obtained in all the 176 consignments which was mandatory as per the TANGEDCO's tender conditions.

Acceptance of lower grade of coal

3.10.8 As per the tender conditions, the Gross Calorific Value (GCV) of the imported coal was required to be at 6,000 Kcal/Kg with an acceptable range between 5,800 and 6,700 Kcal/Kg. While there is no premium for GCV exceeding 6,000 Kcal/Kg, for GCV lower than 6,000 Kcal/Kg, the price was to be adjusted as per the formula[128] specified in the tender.

To ensure GCV of the coal supplied as per tender conditions, supplier was required to engage independent testing agency with the approval of TANGEDCO. The quality of coal is decided based on the reports of these testing agencies. Against this practice, our verification of the system for quality testing in place in other PSUs revealed that:

- TNPL select the testing agency for each consignment of coal from its empanelled testing agencies through a lot system and coal samples were collected from the automatic coal sampler installed in the conveyor at the TNPL plant.
- NTECL also select the testing agency from its empanelled testing agencies.
- The quality of coal will be finally decided by both TNPL and NTECL based on the test conducted at their own laboratories in their plants.

On the contrary, TANGEDCO did not collect coal samples on its own but was solely dependent on the third party testing agency for collection of samples as well as for testing both at the laboratories of TANGEDCO and the testing agencies. This deficiency led to variation of only ± one *per cent* in the GCV reported by the third party testing agencies as well as TANGEDCO's own laboratory.

Our independent verification of the coal quality test reports from the laboratory of the Customs Department[129] in respect of 121 consignments of TANGEDCO revealed that GCV was lesser than that of the discharge port laboratory test reports submitted by the suppliers as detailed below:

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128 Penalty for GCV less than 6,000 Kcal/Kg (i) If reported GCV is from 5,800 to 5,999 Kcal/Kg, adjustment in price = Contracted C&F price – (Contracted C&F price x GCV/6,000), (ii) If reported GCV is less than 5,800 Kcal/Kg, adjustment in price = (200 x Contracted C&F price/6,000) + [(5,800 – GCV) x 2 x contracted C&F price/6,000].

129 Deputy Commissioner, Group-I/ Commissioner-II, Chennai Customs.

Table 3.10.3: Penalty leviable for differential GCV

Difference in GCV between customs report and suppliers test reports (Kcal/Kg)	Number of consignments	Total Quantity (MMT)	Penalty leviable as per GCV reported by Customs (₹ in crore)
0-200	30	2.09	19.62
201-500	29	1.92	82.92
501-1,000	33	2.29	250.29
1,001-1,500	20	1.38	274.27
1,501-2,000	8	0.56	165.81
Above 2,001	1	0.05	20.77
Total	**121**	**8.29**	**813.68**

Thus, TANGEDCO had accepted lower grade of coal as revealed in the customs test reports but it made payment for coal having GCV as per the test results submitted by the suppliers' testing laboratory and made excess payment of ₹ 813.68 crore.[130]

The Government replied (October 2017) that in view of the questionable samples as per the non-standard procedure adopted by the Customs Department and due to non-communication of the test results, it was not in a position to comment on the test results of Customs Department. The fact, however, remained that the test results of the Customs' laboratory, which could be taken as legal evidence, indicated wide variations in respect of 121 consignments and hence, the same should not be ignored altogether and required detailed investigation by TANGEDCO.

Conclusion

Before embarking on import of coal on regular basis, TANGEDCO did not consider the prevailing best practices in the industry to frame an import policy as directed by its BOD. This resulted in fixation of higher levels of turnover criteria, which led to elimination of small bidders from the competition. Further, TANGEDCO did not adopt the best practices such as e-tendering, reverse auction and inviting and evaluation of bids on variable price methods. Non-adherence to variable price method led to avoidable expenditure to the extent of ₹ 746.13 crore.

TANGEDCO had made payments to the supplier without obtaining the mandatory COO in respect of 176 out of 297 consignments test checked in audit.

The price of imported coal mainly depends on its GCV. Despite very significant difference in GCV between the test reports submitted by the suppliers and the one revealed in the test reports of Customs authorities, TANGEDCO did not independently verify the correctness of GCV reported by

[130] Calculated on the differential GCV for the quantity supplied as per the penalty clause for lower grade coal.

the suppliers. This resulted in excess payment to the suppliers to the extent of ₹ 813.68 crore.

3.11 Undue benefit

Failure of TANGEDCO to recover the cost of transmission lines from the client as per the provisions of Distribution Code led to undue benefit of ₹ 12.75 crore

Tuticorin Port Trust (TPT) formed (August 2010) a Special Purpose Vehicle Company *viz*., Tuticorin Coal Terminal Private Limited (TCTL) and also entered (September 2010) a concession agreement with TCTL for development of Cargo Berth-II[131] for handling bulk cargo in Tuticorin Port. As per the agreement, TPT would arrange for obtaining power supply from TANGEDCO to TCTL. TCTL requested (October 2012) TANGEDCO to provide supply of 12,000 KVA of power at 110 KV level and subsequently reduced (October 2013) its demand for 7,000 KVA of power through the overhead lines for a distance of 8.6 KMs from a 230 KV Sub-station (SS) located outside the port trust area.

TANGEDCO initially proposed (February 2014) to recover the entire cost of laying of 110 KV lines from the Sub-station to the port trust area from TCTL. But, subsequently decided (July 2014) to bear the cost of laying of transmission lines by itself, as the proposed line predominantly passed through port trust area belonging to TPT, which was not owned by TCTL. The work was completed in April 2017 at a total cost of ₹ 14.75 crore. Out of this amount, TANGEDCO had borne ₹ 12.75 crore and the balance of ₹ 2.00 crore was recovered from TCTL for execution of infrastructure work within its premises.

In this connection, Audit observed the following:

- TPT and TCTL were revenue sharing partners of the project with onus of providing electricity supply for the project resting with TPT. Moreover, at the end of the concession period of 30 years, TPT would be the owner of all the infrastructure created in the project site including the 110 KV transmission lines. Therefore, the cost of ₹ 12.75 crore borne by TANGEDCO towards construction of 110 KV line was to be recovered from TCTL.
- The recovery of the cost of transmission line from TCTL was also justified by the Regulation 29 (16) of the Tamil Nadu Electricity Distribution Code, which stipulated that the power distribution licencee (TANGEDCO) should take up execution of transmission lines within the premises of the consumer only after the consumer paying 100 *per cent* of the estimated amount. Thus, the expenditure of ₹12.75 crore borne by TANGEDCO for laying of the transmission lines was unwarranted.

[131] A designated location in the port used for stationing the vessels during loading and unloading of cargo.

The Government replied (October 2017) that as per the provisions of the Distribution Code, the cost could be recovered only when the property was owned by TCTL and not from the deemed consumer, *viz.*, TPT. The reply was not convincing because TCTL is the owner of the property till the end of the concession period of 30 years and hence, the cost of transmission line was to be borne only by TCTL.

3.12 Avoidable payment

Failure of TANGEDCO to exclude funds mobilisation expenditure, which was to be borne by Tamil Nadu Power Finance and Infrastructure Development Corporation Limited (Powerfin) led to an avoidable expenditure of ₹14.68 crore

TANGEDCO proposed (September 2011) to borrow funds to the extent of ₹ 18,010 crore to meet its capital expenditure and liquidate its liabilities. Out of this amount, TANGEDCO preferred (September 2011) to raise public bonds of ₹6,000 crore through Tamil Nadu Power Finance Corporation Limited[132] (Powerfin) based on the permission obtained (August 2011) from the Government of Tamil Nadu. Accordingly, Powerfin mobilised (between August 2012 and May 2013) ₹ 1,964.20 crore through public bonds in four trenches, which were issued as separate loan repayable after 10 years at the interest rates varying from 10.5 to 11.0 *per cent per annum*.[133] In addition to the interest, TANGEDCO would also reimburse all the bond related expenses, *viz.*, arranger fee, rating agencies fee, *etc*.

In line with the above conditions, TANGEDCO was paying interest on loans on half-yearly basis and also reimbursed (between November 2012 and November 2015) ₹ 14.68 crore being the expenditure relating to the issue of bonds by Powerfin. In this connection, Audit observed that despite charging the interest, Powerfin also passed on the bonds issue expenditure of ₹ 14.68 crore[134] to TANGEDCO, which was to be borne only by Powerfin as the funds mobilised were treated as loans by it.

Thus, transfer of bonds issue expenditure of ₹14.68 crore to TANGEDCO was unjustified.

The Government replied (October 2017) that TANGEDCO had to accept the loan along with the incidental expenditure from Powerfin, as it could not have mobilised funds on its own from any other alternate source. The fact, however, remained that the inability of TANGEDCO to mobilise funds on its own would not justify Powerfin passing on the incidental expenditure on bonds issue to TANGEDCO, a sister PSU, which was already a loss making Company.

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132 Powerfin is a non-banking financial company, which is accepting public deposits and extending term loans to TANGEDCO.

133 The rate of interest of public bonds varying from 9.17 *per cent* to 9.67 *per cent per annum plus* guarantee fee payable to the Government 0.5 *per cent plus* margin of 0.83 *per cent* payable to Powerfin.

134 This represents the expenses incurred by Powerfin towards arranger fee, rating fee, advertisement expenditure, *etc*., for issue of bonds.

3.13 Loss of revenue

TANGEDCO suffered a potential revenue loss of ₹ 4.03 crore due to its failure to correctly classify service connections under industrial category. This resulted in undue benefit to the consumer to that extent

As per the Tariff Schedule applicable for High Tension (HT) service connections, the HT consumers are classified into the following categories:

Table 3.13: Categorisation of consumers

Sl.No.	Type of tariff	Applicability	
1.	HT Tariff-I A	(a)	All manufacturing and industrial establishments.
		(b)	Common Effluent Treatment plants, water treatment plants in industrial estates and water plants for supply of water.
The consumers under this category shall be billed 20 *per cent* extra on energy charges for the consumption during peak hours from 6 a.m to 9 a.m and 6 p.m to 9 p.m.			
2.	HT Tariff-II A	Services under the control of Central/State Government, local bodies, Tamil Nadu Water Supply and Drainage Board (TWAD Board), *etc*.	
3.	HT Tariff-II B	The consumers like educational institutions, hospitals, *etc*.	
4.	HT Tariff-III	Commercial	
No peak hour energy charges shall be levied for the consumers under HT Tariff-II A, II-B and III.			

The New Tirupur Area Development Corporation Limited (NTADC) was a Special Purpose Vehicle company formed (1995) by private promoters for providing water supply to the industries and domestic consumers apart from treatment of sewage in and around Tirupur.

Audit noticed (January/April 2017) that TANGEDCO had provided (between February 2005 and May 2005) ten HT service connections and 23 Low Tension (LT) service connections to NTADC. The HT service connections were initially billed under commercial tariff but were classified (October 2005) as industrial category (HT Tariff-I A) and reiterated (at the time of fixation of tariff for the year 2012-13) by TNERC. However, the classification of HT service connections were once again changed (June 2013) to HT Tariff-II A by TNERC based on the request of NTADC to treat it on par with local bodies and Tamil Nadu Water Supply and Drainage Board (TWAD). The tariff change was effected with the condition that NTADC would use the service connection for supply of drinking water predominantly to local bodies/public. Thereafter, all the HT service connections of NTADC had been charged under HT Tariff-II A till date (October 2017). In this

connection, Audit observed that:

- TANGEDCO itself had objected (October 2008) to the downward revision from Commercial Tariff to Tariff-I A by TNERC citing that reduction in electricity charges on account of change in tariff extended was not passed on to the consumers. However, its appeal was dismissed (February 2009) by TNERC as time barred.[135] Therefore, TANGEDCO should have preferred appeal for the second time when TNERC further lowered the tariff from I-A to II-A in June 2013. As TANGEDCO did not prefer an appeal, it lost an opportunity to get the tariff revised to the industrial category as originally contemplated.
- Audit's verification from the records of Water Resources Organisation (WRO), Salem division revealed that WRO entered (January 2002) into an agreement with NTADC to release a maximum of 185 Million litre per day (MLD), which included 85 MLD for domestic and non-domestic purposes and balance 100 MLD for supply to industrial units. Against agreed quantity, the supply of water to the domestic beneficiaries was only to the extent of 38 MLD in 2006 and was to increase to 57 MLD in the year 2031. Thus, the condition of supply of drinking water predominantly to local bodies and public was not fulfilled by NTADC since 2006 and hence the application of Tariff-II A was incorrect and resulted in undue benefit to NTADC.
- The ten HT service connections include two[136] service connections exclusively for water treatment plant and sewage treatment plant, which were to be classified under industrial tariff as per the classification of TNERC. Failure of TANGEDCO to classify a minimum of two service connections under industrial category led to potential revenue loss of ₹ 4.03 crore from July 2013 to March 2017, which resulted in undue benefit to NTADC to that extent. It is pertinent to mention that TANGEDCO would continue to suffer a recurring loss of ₹ 3.27 lakh per month on these two service connections alone, till such time the service connections are billed under correct category of tariff in future.

The Government replied (October 2017) that NTADC was predominantly supplying water for domestic purposes, which was evident from the fact that drinking water constituted 81 *per cent* of the total supply of 1,87,768 million litre during the period from 2013-14 to 2016-17. The reply was not convincing because the data on supply of water for domestic purpose furnished by the Government was only in respect of Erode Distribution Circle and it did not include the supply position for Tirupur. Moreover, this data was also based on the self certificate given by NTADC without any independent verification of the same by TANGEDCO/Government.

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135 The appeal was not preferred within the stipulated time of 30 days of revision and hence treated as time barred.

136 HT No.190 – Sewage pumping station (385 KVA) and HT No.194 – Pumping equipments for sewage treatment plant (530 KVA).

3.14 Avoidable extra expenditure

TANGEDCO had purchased 66.06 MU of power from a co-generation power producer at the rates higher than the TNERC notified rates and incurred avoidable extra expenditure of ₹ 10.90 crore

TANGEDCO has been purchasing power from bagasse based co-generation plants within Tamil Nadu. The price fixed by TANGEDCO for purchase of power effective from 2000-2001 was ₹ 2.73 per unit[137] during the crushing season (December to June) and at ₹ 2.48 per unit during non-crushing season (July to November). These rates were subject to cumulative increase of five *per cent* every year. Accordingly, TANGEDCO entered (February 2003) into a Power Purchase Agreement (PPA) for purchase of power from EID Parry India Limited (EID Parry) from its bagasse based co-generation plant of 24.5 MW capacity for a period of 15 years. The price for purchase of power from EID Parry as per the tariff fixed during 2015-16 and 2016-17 was as detailed below:

Table 3.14.1: Price for purchase of power

(Rate per unit – in ₹)

Sl. No.	Year	Rate of Power tariff during crushing season	Rate of Power tariff during non-crushing season
1.	2015-16	3.52	5.15
2.	2016-17	3.99	5.40

In the absence of TNERC's approval for the tariff in respect of bagasse based co-generating plants established prior to May 2006, TANGEDCO filed (November 2011) tariff petition with TNERC for fixing the purchase price in respect of these co-generation plants. As per the tariff, approved by TNERC in March 2016 with retrospective effect from November 2011, the price payable for purchase of power from co-generation plants was as detailed below:

[137] The purchase rate during crushing season for every year was to be limited to 90 *per cent* of the HT industrial tariff rates prevailing during that year.

Table 3.14.2: Price for purchase of power

(In ₹)

Year	Price per unit
2015-16	3.52
2016-17	3.99
2017-18	4.12

Prior to the approval of purchase price in respect of co-generation plants, TANGEDCO terminated (15 March 2015) the PPA with EID Parry based on its request (March 2015) and entered (17 March 2015) into a new agreement for supply of surplus power through Short Term Open Access (STOA) route with effect from 22 November 2015 to 31 May 2016. The price admitted through STOA[138] arrangement was ₹ 5.05 to ₹ 5.50 per unit from March to October 2015 and ₹ 5.05 per unit from November 2015 to May 2016. For purchase of 88.04 MU of power under STOA route (this included 66.06 MU of power purchased during crushing season), TANGEDCO had paid an amount of ₹ 46.84 crore to EID Parry. Subsequently, based on TNERC's order dated 31 March 2016 fixing tariff in respect of bagasse based co-generation plants, EID Parry once again entered into a new PPA for selling surplus power for the period of 20 years from December 2016, at the rates fixed by TNERC.

In this connection, Audit observed that:

- TANGEDCO's termination of PPA in respect of EID Parry was faulty as it was aware that the power generated by EID Parry was made available for sale under STOA routes at the prices ranging from ₹ 5.05 to ₹ 5.50 per unit, which was more than the prevailing rates fixed by TNERC for crushing season ranging from ₹ 3.52 to ₹ 3.99 per unit. This mistake led to purchase of 66.06 MU of power produced by EID Parry during crushing season at the rates higher than the prevailing rates, which worked out to ₹ 10.90 crore (as detailed in **Annexure-24**).

[138] Under this system, power can be sold by power generators to the traders, who are free to sell power either to TANGEDCO or to others.

The Government replied (October 2017) that after termination of the PPA with EID Parry, TANGEDCO purchased power during the period from November 2015 to May 2016 on need basis through STOA route and hence, the payment made on this purchase was in order. The reply was not convincing because (i) the purchase of power through STOA route was made at the price more than the price fixed by TNERC for crushing season and (ii) TANGEDCO intended to purchase surplus power through STOA route only during non-crushing season, but it purchased power at higher rates both during crushing and non-crushing seasons.

Chennai
Dated 11 February 2018

(R. THIRUPPATHI VENKATASAMY)
Accountant General
(Economic and Revenue Sector Audit)
Tamil Nadu

Countersigned

New Delhi
Dated 13 February 2018

(RAJIV MEHRISHI)
Comptroller and Auditor General of India

ANNEXURES

ANNEXURE-1

Statement showing investments made by State Government in PSUs, whose accounts are in arrears

(Referred to in paragraph 1.11)

(Figures in columns (4) & (6) to (8) are ₹ in crore)

Sl. No.	Name of the Public Sector Undertaking	Year upto which accounts finalised	Paid-up capital	Period of accounts pending finalisation	Investment made by State Government during the year of which accounts are in arrears		
					Equity	Loans	Grants
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Working Government companies						
1.	Tamil Nadu Small Industries Development Corporation Limited (TN SIDCO)	2015-16	24.70	2016-17	0.44	---	9.83
2.	Tamil Nadu Adi Dravidar Housing and Development Corporation Limited (TAHDCO)	2014-15	128.27	2015-16	6.63	---	---
3.	Tamil Nadu Corporation of Development of Women Limited (TN Women)	2015-16	0.78	2016-17	---	---	35.77
4.	Tamil Nadu Rural Housing and Infrastructure Development Corporation Limited (TN Rural Housing)	2015-16	3.00	2016-17	---	---	132.03
5.	Tamil Nadu Cements Corporation Limited (TANCEM)	2015-16	62.27	2016-17	49.05	49.05	---
6.	TNEB Limited	2014-15	15,364.39	2015-16	3,253.65	---	---
		2015-16		2016-17	3,828.07	---	---
7.	Tamil Nadu Transmission Corporation Limited (TANTRANSCO)	2015-16	4,135.53	2016-17	---	515.02	---
8.	Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO)	2015-16	13,778.28	2016-17	---	23,215.00	2,000.00
9.	Tamil Nadu Civil Supplies Corporation (TNCSC)	2015-16	67.74	2016-17	4.00	---	---
10.	Tamil Nadu Skill Development Corporation Limited (TNSDC)	2015-16	0.05	2016-17	---	---	84.20
11.	Tamil Nadu Warehousing Corporation Limited	2015-16	7.61	2016-17	---	---	81.00
	TOTAL				**7,141.84**	**23,779.07**	**2,342.83**

ANNEXURE-2

Summarised financial position and working results of Government companies and Statutory corporation as per their latest finalised financial statements/accounts

(Referred to in paragraph 1.14)

(Figures in Column (5) to (12) are ₹ in crore)

Sl. No.	Sector/Name of the Company	Period of accounts	Year in which accounts finalised	Paid-up capital	Loans outstanding at the end of the year	Accumulated profit(+)/ Loss(-)	Turnover	Net profit(+)/ Loss(-)	Net impact of audit comments	Capital employed	Return on capital employed	Percen-tage of return on capital employed	Man-power
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
A. Working Government Companies													
	AGRICULTURE & ALLIED												
1.	Tamil Nadu Fisheries Development Corporation Limited (TN Fisheries)	2016-17	2017-18	4.46	0.03	22.56	462.15	8.03		49.18	8.21	16.69	127
2.	Tamil Nadu Forest Plantation Corporation Limited (TAFCORN)	2016-17	2017-18	5.64	0.00	187.12	84.12	18.31		210.73	18.36	8.71	286
3.	Tamil Nadu Tea Plantation Corporation Limited (TANTEA)	2016-17	2017-18	14.96	51.18	(-)65.00	71.00	(-)9.17		1.14	(-)6.39	---	5,045
4.	Arasu Rubber Corporation Limited (ARC)	2016-17	2017-18	8.45	---	(-)14.29	23.63	(-)10.39		8.74	(-)10.39	---	1,180
	Sector-wise total			**33.51**	**51.21**	**130.39**	**640.90**	**6.78**		**269.79**	**9.79**	**3.63**	**6,638**
	FINANCE												
5.	Tamil Nadu Industrial Investment Corporation Limited (TIIC)	2016-17	2017-18	321.00	597.90	45.06	235.06	30.97		1,119.94	161.12	14.39	407
6.	Tamil Nadu Handloom Development Corporation Limited (TN Handloom)	2016-17	2017-18	4.29	2.17	(-)1.69	7.68	0.11		4.77	0.71	14.88	4
7.	Tamil Nadu Small Industries Development Corporation Limited (TN SIDCO)	2015-16	2016-17	24.70	---	80.24	77.03	5.73		104.94	6.79	6.47	301

(Figures in Column (5) to (12) are ₹ in crore)

Sl. No.	Sector/Name of the Company	Period of accounts	Year in which accounts finalised	Paid-up capital	Loans outstanding at the end of the year	Accumulated profit(+)/ Loss(-)	Turnover	Net profit(+)/ Loss(-)	Net impact of audit comments	Capital employed	Return on capital employed	Percen-tage of return on capital employed	Man-power
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
8.	Tamil Nadu Adi-dravidar Housing and Development Corporation Limited (TAHDCO)	2014-15	2016-17	128.27	0.09	42.80	16.93	2.63		173.27	2.96	1.71	243
9.	Tamil Nadu Transport Development Finance Corporation Limited (TDFC)	2016-17	2017-18	61.74	---	92.83	290.00	5.71		2,124.57	283.87	13.36	28
10.	Tamil Nadu Backward Classes Economic Development Corporation Limited (TABCEDCO)	2014-15	2015-16	12.27	---	21.82	5.10	5.05		134.99	6.63	4.91	18
11.	Tamil Nadu Corporation for Development of Women Limited (TN Women)	2015-16	2017-18	0.78	---	28.39	220.93	5.72		29.52	5.72	19.38	491
12.	Tamil Nadu Urban Finance and Infrastructure Development Corporation Limited (TUFIDCO)	2016-17	2017-18	32.00	2.67	97.32	42.06	16.60		457.04	35.46	7.76	32
13.	Tamil Nadu Minorities Economic Development Corporation Limited (TAMCO)	2015-16	2017-18	2.05	0.00	19.28	7.06	0.83		65.59	4.23	6.45	4
14.	Tamil Nadu Infrastructure Fund Management Corporation Limited (TN Infra Management)	2016-17	2017-18	32.30	0.00	0.34	7.50	0.26		32.64	0.26	0.80	6
	Sector-wise total			**619.40**	**602.83**	**426.39**	**909.35**	**73.61**		**4,247.27**	**507.75**	**11.95**	**1,534**
	INFRASTRUCTURE												
15.	Tamil Nadu Industrial Development Corporation Limited (TIDCO)	2015-16	2016-17	72.03	---	340.33	129.59	117.93		521.02	131.21	25.18	52
16.	State Industries Promotion Corporation of Tamil Nadu Limited (SIPCOT)	2015-16	2016-17	123.91	---	857.05	260.21	99.96		1,003.13	99.96	9.96	182
17.	Tamil Nadu Police Housing Corporation Limited (TN Police Housing)	2016-17	2017-18	1.00	---	49.86	170.54	10.51		50.86	10.51	20.66	332

(Figures in Column (5) to (12) are ₹ in crore)

Sl. No.	Sector/Name of the Company	Period of accounts	Year in which accounts finalised	Paid-up capital	Loans outstanding at the end of the year	Accumulated profit(+)/ Loss(-)	Turnover	Net profit(+)/ Loss(-)	Net impact of audit comments	Capital employed	Return on capital employed	Percen-tage of return on capital employed	Man-power
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
18.	TIDEL Park Limited (TIDEL, Chennai)	2016-17	2017-18	44.00	---	368.13	65.62	49.28		416.72	49.28	11.83	28
19.	Tamil Nadu Rural Housing and Infrastructure Development Corporation Limited (TN Rural Housing)	2015-16	2017-18	3.00	617.46	1.01	---	(-)0.92		621.88	61.58	9.90	---
20.	Nilakottai Food Park Limited (Nilakottai)	2015-16	2017-18	0.68	---	0.06	---	0.11		0.75	0.11	14.67	---
21.	Guindy Industrial Estate Infrastructure Upgradation Company (Guindy Industrial Estate)	2015-16	2016-17	0.01	---	(-)0.03	---	(-)0.03		(-)0.02	(-)0.03	---	1
22	Tamil Nadu Road Infrastructure Development Corporation (TN Road Infrastructure)	2016-17	2017-18	5.00	---	2.19	1.86	0.08		7.19	0.08	1.11	2
23	Tamil Nadu Road Development Company Limited (TNRDC)	2016-17	2017-18	10.00	185.92	27.86	20.18	2.32		370.29	9.24	2.50	65
24.	IT Expressway	2016-17	2017-18	44.05	138.30	47.98	59.48	33.39		241.65	44.27	18.32	46
25.	TIDEL Park Coimbatore Limited (TIDEL,Coimbatore)	2016-17	2017-18	177.11	201.84	(-)32.91	37.77	(-)4.17		311.04	18.93	6.09	20
26.	Adyar Poonga	2016-17	2017-18	0.10	---	---	---	---		0.10	---	---	---
27.	TICEL Bio Park Limited (TICEL Bio Park)	2016-17	2017-18	89.00	0.66	(-)21.60	26.08	(-)10.87		145.90	(-)3.19	---	15
28.	Tamil Nadu Polymer Industries Park Limited (TNPIP LIMITED)	2015-16	2016-17	2.71	---	(-)0.55	---	(-)0.55		2.16	(-)0.55	---	---
29.	Madurai Thoothukudi Industrial Corridor Development Corporation Limited (MTICD Limited)	2015-16	2016-17	0.05	---	---	---	---		0.16	---	----	---
	Sector-wise total			**572.65**	**1,144.18**	**1,639.38**	**771.33**	**297.04**		**3,692.83**	**421.40**	**11.41**	**743**

(Figures in Column (5) to (12) are ₹ in crore)

Sl. No.	Sector/Name of the Company	Period of accounts	Year in which accounts finalised	Paid-up capital	Loans outstanding at the end of the year	Accumulated profit(+)/ Loss(-)	Turnover	Net profit(+)/ Loss(-)	Net impact of audit comments	Capital employed	Return on capital employed	Percen-tage of return on capital employed	Man-power
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	MANUFACTURING												
30.	Tamil Nadu Small Industries Corporation Limited (TANSI)	2015-16	2016-17	20.00	---	87.83	51.80	4.88		303.78	5.45	1.79	79
31.	Tamil Nadu Textiles Corporation Limited (TN Textiles)	2016-17	2017-18	1.54	5.68	(-)0.61	25.91	0.68		6.74	1.42	21.07	121
32.	Tamil Nadu Zari Limited (TN Zari)	2016-17	2017-18	0.34	0.25	2.76	34.52	0.17		3.58	0.20	5.59	88
33.	Tamil Nadu Handicrafts Development Corporation Limited (TN Handicrafts)	2016-17	2017-18	3.22	---	5.83	40.07	1.13		11.72	1.13	9.64	123
34.	Tamil Nadu Salt Corporation Limited (TN Salt)	2016-17	2017-18	6.34	---	9.37	38.49	0.47		16.21	0.60	3.70	67
35.	Tamil Nadu Sugar Corporation Limited (TASCO)	2015-16	2016-17	80.59	62.85	(-)159.34	61.41	(-)41.44		(-)48.96	(-)37.13	---	245
36.	Tamil Nadu Cements Corporation Limited (TANCEM)	2015-16	2017-18	62.27	73.90	(-)15.54	948.81	10.19		71.58	12.75	17.81	437
37.	Perambalur Sugar Mills Limited (PSM) (subsidiary of TASCO)	2015-16	2016-17	37.62	128.44	(-)237.55	58.46	(-)44.48		(-)102.16	(-)34.39	---	237
38.	Tamil Nadu Minerals Limited (TAMIN)	2016-17	2017-18	15.74	---	105.21	112.36	(-)5.03		120.95	(-)5.03	---	1,079
39.	Tamil Nadu Magnesite Limited (TANMAG)	2016-17	2017-18	16.65	31.96	63.92	95.02	21.74		80.57	26.87	33.35	320
40.	Tamil Nadu Industrial Explosives Limited (TIEL)	2015-16	2016-17	27.03	45.63	(-)154.82	21.09	(-)13.51		(-)111.61	(-)8.39	---	294
41.	Tamil Nadu Medicinal Plant Farms and Herbal Medicine Corporation Limited (TAMPCOL)	2016-17	2017-18	3.00	---	17.31	37.22	3.21		22.04	3.21	14.56	98
42.	Tamil Nadu Paints and Allied Products Limited (TAPAP)	2015-16	2016-17	0.02	---	2.06	2.15	0.25		2.08	0.32	15.38	5

(Figures in Column (5) to (12) are ₹ in crore)

Sl. No.	Sector/Name of the Company	Period of accounts	Year in which accounts finalised	Paid-up capital	Loans outstanding at the end of the year	Accumulated profit(+)/ Loss(-)	Turnover	Net profit(+)/ Loss(-)	Net impact of audit comments	Capital employed	Return on capital employed	Percen-tage of return on capital employed	Man-power
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
43.	Tamil Nadu Newsprint and Papers Limited (TNPL)	2016-17	2017-18	69.38	2,080.84	109.32	3,093.97	257.53		3,356.77	509.55	15.18	2,746
	Sector-wise total			**343.74**	**2,429.55**	**(-)164.25**	**4,621.28**	**195.79**		**3,733.29**	**476.56**	**12.77**	**5,939**
	POWER												
44.	Tamil Nadu Power Finance and Infrastructure Development Corporation Limited (TN Powerfin)	2016-17	2017-18	90.00	---	481.10	2,236.96	129.74		12,251.41	2,006.66	16.38	28
45.	Udangudi Power Corporation Limited (Udangudi Power)	2016-17	2017-18	65.00	4.00	0.56	---	---		65.56	---	---	---
46.	TNEB Limited	2014-15	2016-17	15,364.39	---	(-)0.86	---	(-)0.26		15,363.53	(-)0.26	---	---
47.	Tamil Nadu Transmission Corporation Limited (TANTRANSCO)	2015-16	2016-17	4,135.53	12,768.61	1,168.11	2,305.24	(-)263.40		21,436.59	796.41	3.72	---
48.	Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO)	2015-16	2016-17	13,778.28	85,208.75	(-)63,162.38	49,210.85	(-)5,786.82		35,120.62	3,035.03	8.64	86,997
	Sector-wise total			**33,433.20**	**97,981.36**	**(-)61,513.47**	**53,753.05**	**(-)5,920.74**		**84,237.71**	**(-)5,837.84**	**6.93**	**87,025**
	SERVICE												
49.	Tamil Nadu Tourism Development Corporation Limited (TTDC)	2015-16	2016-17	10.43	8.00	37.43	93.76	(-)0.21		64.88	0.25	0.39	339
50.	Tamil Nadu Civil Supplies Corporation (TNCSC)	2015-16	2017-18	67.74	---	---	10,093.74	---		77.06	154.92	201.04	14,357
51.	Poompuhar Shipping Corporation Limited (PSC)	2015-16	2016-17	20.53	---	14.36	554.38	4.20		34.89	6.38	18.29	105
52.	Electronics Corporation of Tamil Nadu Limited (ELCOT)	2016-17	2017-18	25.93	---	99.55	19.11	20.58		286.49	30.11	10.51	140
53.	Overseas Manpower Corporation Limited (OMPC)	2015-16	2016-17	0.15	---	0.49	1.58	0.13		0.64	0.13	20.31	10

(Figures in Column (5) to (12) are ₹ in crore)

Sl. No.	Sector/Name of the Company	Period of accounts	Year in which accounts finalised	Paid-up capital	Loans outstanding at the end of the year	Accumulated profit(+)/ Loss(-)	Turnover	Net profit(+)/ Loss(-)	Net impact of audit comments	Capital employed	Return on capital employed	Percen-tage of return on capital employed	Man-power
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
54.	Tamil Nadu Skill Development Corporation Limited (TNSDC)	2015-16	2016-17	0.05	---	0.18	---	0.06		0.23	0.06	26.09	13
55.	Tamil Nadu State Marketing Corporation Limited (TASMAC)	2015-16	2016-17	15.00	---	(-)180.83	30,287.29	(-)125.64		(-)150.37	158.30	---	26,978
56.	Pallavan Transport Consultancy Services Limited (PTCS)	2016-17	2017-18	0.10	---	(-)3.12	1.00	(-)0.03		(-)1.38	(-)0.03	---	8
57.	Tamil Nadu Medical Services Corporation Limited (TN Medical)	2016-17	2017-18	4.04	---	14.86	40.68	0.18		54.47	0.18	0.33	593
58.	Tamil Nadu Ex-servicemen's Corporation Limited (TEXCO)	2016-17	2017-18	0.23	---	121.32	212.30	16.49		121.55	16.49	13.57	92
59.	Metropolitan Transport Corporation Limited (MTC)	2016-17	2017-18	589.30	347.04	(-)3,022.03	1,370.22	(-)519.48		(-)2,145.29	(-)404.14	---	23,895
60.	State Express Transport Corporation Limited (SETC)	2016-17	2017-18	360.33	552.38	(-)1,793.56	578.69	(-)177.09		(-)1,090.98	(-)93.31	---	6,417
61.	Tamil Nadu State Transport Corporation (Coimbatore) Limited (TNSTC, Coimbatore)	2016-17	2017-18	385.94	277.59	(-)2,918.25	1,148.60	(-)480.80		(-)2,046.91	(-)360.48	---	18,683
62.	Tamil Nadu State Transport Corporation (Kumbakonam) Limited (TNSTC, Kumbakonam)	2016-17	2017-18	359.08	413.81	(-)2,486.94	1,488.83	(-)477.22		(-)1,709.46	(-)358.98	---	24,692
63.	Tamil Nadu State Transport Corporation (Salem) Limited (TNSTC, Salem)	2016-17	2017-18	170.00	100.58	(-)1,737.23	845.42	(-)305.30		(-)1,305.44	(-)239.43	---	13,516
64.	Tamil Nadu State Transport Corporation (Villupuram) Limited (TNSTC, Villupuram)	2016-17	2017-18	295.96	145.26	(-)1,924.64	1,501.83	(-)376.13		(-)1,406.56	(-)302.21	---	22,530
65.	Tamil Nadu State Transport Corporation (Madurai) Limited (TNSTC, Madurai)	2016-17	2017-18	525.69	32.03	(-)2,768.77	966.59	(-)345.35		(-)1,856.67	(-)274.34	---	15,089

(Figures in Column (5) to (12) are ₹ in crore)

Sl. No.	Sector/Name of the Company	Period of accounts	Year in which accounts finalised	Paid-up capital	Loans outstanding at the end of the year	Accumulated profit(+)/ Loss(-)	Turnover	Net profit(+)/ Loss(-)	Net impact of audit comments	Capital employed	Return on capital employed	Percen-tage of return on capital employed	Man-power
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
66.	Tamil Nadu State Transport Corporation (Tirunelveli) Limited (TNSTC, Tirunelveli)	2016-17	2017-18	141.31	31.67	(-)2,543.90	676.51	(-)368.02		(-)1,712.54	(-)243.56	---	12,478
67.	Arasu Cable TV Corporation Limited (Arasu Cable TV)	2015-16	2016-17	25.00	11.69	34.49	218.03	34.95		76.10	36.83	48.40	1,545
	Sector-wise total			**2,996.81**	**1,920.05**	**(-)19,056.59**	**50,098.56**	**(-)3,098.68**		**(-)12,709.29**	**(-)1,872.83**	**---**	**1,81,480**
	Total A (All sector-wise working Government Companies)			**37,999.31**	**1,04,129.18**	**(-)78,538.15**	**1,10,794.47**	**(-)8,446.20**		**83,471.60**	**5,380.51**	**6.45**	**2,83,359**
B.	**Working Statutory Corporations**												
	SERVICE												
1.	Tamil Nadu Warehousing Corporation (TANWARE)	2015-16	2016-17	7.61	---	102.13	55.96	10.97		109.74	10.97	10.00	251
	Total B (All sector-wise working Statutory Corporations)			**7.61**	**---**	**102.13**	**55.96**	**10.97**		**109.74**	**10.97**	**10.00**	**251**
	Grand total (A+B)			**38,006.92**	**1,04,129.18**	**(-)78,436.02**	**1,10,850.43**	**(-)8,435.23**		**83,581.34**	**5,391.48**	**6.45**	**2,83,610**
C.	**Non-working Government Companies**												
	AGRICULTURE & ALLIED												
1.	Tamil Nadu Agro Industries Development Corporation Limited (TN AGRO)	2012-13	2015-16	6.01	20.96	(-)79.62	---	(-)2.73		17.56	0.91	5.18	---
2.	Tamil Nadu Poultry Development Corporation Limited (TAPCO)	2015-16	2017-18	1.27	---	(-)10.37	---	---		(-)0.73	---	---	---
	Sector-wise total			**7.28**	**20.96**	**(-)89.99**	**---**	**(-)2.73**		**16.83**	**0.91**	**5.41**	**---**

(Figures in Column (5) to (12) are ₹ in crore)

Sl. No.	Sector/Name of the Company	Period of accounts	Year in which accounts finalised	Paid-up capital	Loans outstanding at the end of the year	Accumulated profit(+)/ Loss(-)	Turnover	Net profit(+)/ Loss(-)	Net impact of audit comments	Capital employed	Return on capital employed	Percen-tage of return on capital employed	Man-power
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	INFRASTRUCTURE												
3.	Tamil Nadu State Construction Corporation Limited (TN State Construction)	2010-11 to 2013-14	2017-18	5.00	1.00	(-)45.70	---	(-)4.64		(-)17.84	---	---	64
	Sector-wise total			**5.00**	**1.00**	**(-)45.70**	**---**	**(-)4.64**		**(-)17.84**	**---**	**---**	**64**
	MANUFACTURING												
4.	Southern Structurals Limited (SSL)	2016-17	2017-18	34.54	---	(-)268.48	---	(-)11.41		(-)230.34	(-)0.18	---	---
5.	State Engineering and Servicing Company of Tamil Nadu Limited (SESCOT) (subsidiary of TANSI)	2016-17	2017-18	0.50	---	(-)12.73	---	(-)0.03		0.01	(-)0.03	---	---
	Sector-wise total			**35.04**	**---**	**(-)281.21**	**---**	**(-)11.44**		**(-)230.33**	**(-)0.21**	**---**	**---**
	SERVICE												
6.	Tamil Nadu Goods Transport Corporation Limited (TN Goods)	1989-90		0.33	---	(-)1.33	---	---		(-)0.30	0.07	---	---
	Sector-wise total			**0.33**	**---**	**(-)1.33**	**---**	**---**		**(-)0.30**	**0.07**	**---**	**---**
	Total C (All sector-wise non-working Government companies)			**47.65**	**21.96**	**(-)418.23**	**---**	**(-)18.81**		**(-)231.64**	**0.77**	**(-)0.33**	**64**
	Grand total (A+B+C)			**38,054.57**	**1,04,151.14**	**(-)78,854.25**	**1,10,850.43**	**(-)8,454.04**	**---**	**83,349.70**	**5,392.25**	**6.47**	**2,83,674**

NOTE:

1. Loans outstanding at the close of 2016-17 represent long-term loans only.
2. Capital Employed represents Share Holders Funds PLUS Long Term Borrowings.
3. Return on Capital Employed has been worked out by adding Profit and Interest charged to Profit and Loss Account.
4. Accumulated loss of ₹ 34,741.35 crore relating to erstwhile Tamil Nadu Electricity Board upto October 2010 has not been transferred to TANGEDCO and TANTRANSCO, as the restructuring process is pending till date (November 2017).

ANNEXURE-3

(*Referred to in Paragraph 2.1.1*)

Statement showing installed capacity of Gas Turbine Power Stations of TANGEDCO

Sl.No.	Station	Particulars				Actual date of commissioning	
		Number of GTG/STG[139]	Capacity of GTG/STG (in MW)	Total Capacity (in MW) (2 x 3)	Actual cost of the project (₹ in crore)	Open cycle	Combined cycle
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1.	**BBGTPS**	4 GTG	30.00	120.00	490.23	12.02.1996 to 31.03.1996	
2.	**TGTPS**	1 GTG	69.65	107.88	305.00	05.02.2001	30.03.2001
		1 STG	38.23				
3.	**KGTPS**	1 GTG	64.00	101.00	346.00	27.11.2003	24.03.2004
		1 STG	37.00				
4.	**VGTPS-I**	1 GTG	59.90	95.00	345.00	24.12.2002	13.03.2003
		1 STG	35.10				
	VGTPS-II	1 GTG	58.50	92.20	355.53	06.05.2008	31.08.2008
		1 STG	33.70				
Total				**516.08**	**1,841.76**		

[139] GTG – Gas Turbine Generator, STG – Steam Turbine Generator.

ANNEXURE-4

(*Referred to in Paragraph 2.1.7*)

Statement showing profit/loss from operation in TGTPS, KGTPS and VGTPS

	2012-13			2013-14			2014-15			2015-16			2016-17		
	TGTPS	KGTPS	VGTPS	TGTPS	KGTPS	VGTPS	TGTPS	KGTPS	VGTPS	TGTPS	KGTPS	VGTPS	TGTPS	KGTPS	VGTPS
Average rate of realisation (₹ per unit)	5.05	5.05	5.05	4.92	4.92	4.92	5.53	5.53	5.53	5.97	5.97	5.97	6.23	6.23	6.23
Less: Variable cost (₹ per unit)	1.91	4.28	2.03	2.41	2.22	2.24	2.91	2.83	2.43	3.31	2.82	3.48	2.31	2.34	2.21
Contribution (₹ per unit)	**3.14**	**0.77**	**3.02**	**2.51**	**2.70**	**2.68**	**2.62**	**2.70**	**3.10**	**2.66**	**3.15**	**2.49**	**3.92**	**3.89**	**4.02**
Generation available for sale (net of auxiliary consumption) (MU)	682.66	51.09	879.90	457.65	594.39	1,180.79	373.23	452.73	1,014.80	363.40	518.84	680.47	308.97	335.93	906.90
Total Contribution (₹ in crore)	214.36	3.93	265.73	114.87	160.49	316.45	97.79	122.24	314.59	96.66	163.43	169.44	121.12	130.68	364.57
Fixed cost[140] (₹ in crore)	143.14	57.42	178.21	202.74	229.62	249.81	235.22	122.07	288.83	246.13	215.37	332.79	257.88	223.02	331.15
Profit/(Loss) from operation (₹ in crore)	**71.22**	**(53.49)**	**87.52**	**(87.87)**	**(69.13)**	**66.64**	**(137.43)**	**0.17**	**25.76**	**(149.47)**	**(51.94)**	**(163.35)**	**(136.76)**	**(92.34)**	**33.42**

[140] Fixed cost includes interest on loan capital, depreciation, return on equity, operation and maintenance expenditure and interest on working capital.

ANNEXURE-5

(*Referred to in Paragraph 2.1.8*)

Statement showing Generation[141] as per norms and Actual Generation

Station	Normative PLF (in percentage)	Generation to be achieved as per normative PLF (in MU)	Actual and Shortfall													
			2012-13			2013-14			2014-15			2015-16			2016-17		
			Actual PLF (in percentage)	Gross Generation (in MU)	Shortfall in Generation (in MU)	Actual PLF (in percentage)	Gross Generation (in MU)	Shortfall in Generation (in MU)	Actual PLF (in percentage)	Gross Generation (in MU)	Shortfall in Generation (in MU)	Actual PLF (in percentage)	Gross Generation (in MU)	Shortfall in Generation (in MU)	Actual PLF (in percentage)	Gross Generation (in MU)	Shortfall in Generation (in MU)
TGTPS	80.00	756.02	76.90	726.74	29.28	52.69	497.92	258.10	43.78	413.70	342.32	42.12	399.10	356.92	36.82	347.98	408.04
KGTPS	80.00	707.81	6.31	55.84	651.97	72.49	641.37	66.44	56.21	497.36	210.45	63.54	563.68	144.13	42.55	376.50	331.31
VGTPS-I	80.00	665.76	54.74	449.41	216.35	87.64	729.33	(-)63.57	86.76	700.58	(-)34.82	86.66	721.18	(-)55.42	82.69	688.17	(-) 22.41
VGTPS-II	80.00	646.14	60.39	488.02	158.12	65.18	526.33	119.81	47.09	380.30	265.84	0.00	0.00	646.14	31.73	278.48	367.66
Total					**1,055.72**			**380.78**			**783.79**			**1,091.77**			**1,084.60**

Total Loss of Generation – 4,396.66 MU

[141] Gross Generation including auxiliary consumption.

ANNEXURE-6

(*Referred to in Paragraph 2.1.10*)

Statement showing statutory inspections carried out

Type of inspection	Due as per OEM recommendation (fired hours)	TGTPS		KGTPS		VGTPS-I		VGTPS-II	
		Actual fired hours as on date of inspection	Period of inspection	Actual fired hours as on date of inspection	Period of inspection	Actual fired hours as on date of inspection	Period of inspection	Actual fired hours as on date of inspection	Period of inspection
Combustion Inspection	**After every 8,000 hours**	12,300	28.08.02 to 22.09.02	11,745	17.07.05 to 24.08.05	11,226	26.05.04 to 30.07.04	38,442	30.07.13 to 04.08.13
		19,732	28.07.03 to 02.08.03	20,360	22.08.06 to 24.09.06	22,709	21.12.05 to 30.12.05	---	---
		33,700	03.03.05 to 20.04.05	42,796	17.02.11 to 22.02.11	52,908	22.08.09 to 25.08.09	---	---
		44,493	30.07.06 to 04.08.06	59,349	05.06.14 to 19.06.14	83,131	21.11.13 to 25.11.13	---	---
		86,046	05.09.11 to 10.09.11	---	---	105,679	14.08.16 to 16.08.16	---	---
		1,02,386	08.08.13 to 14.08.13	---	---	---	---	---	---
		1,21,167	16.12.15 to 22.12.15	---	---	---	---	---	---
Hot Gas Path Inspection	**After every 24,000 hours**	33,700	03.03.05 to 20.04.05	75,577	27.05.16 to 13.06.16	36,396	01.08.07 to 16.08.07	-	-
		1,11,230	03.09.14 to 17.09.14	---	---	92,428	02.01.15 to 14.01.15	---	---

Type of inspection	Due as per OEM recommendation (fired hours)	TGTPS		KGTPS		VGTPS-I		VGTPS-II	
		Actual fired hours as on date of inspection	Period of inspection	Actual fired hours as on date of inspection	Period of inspection	Actual fired hours as on date of inspection	Period of inspection	Actual fired hours as on date of inspection	Period of inspection
Major Inspection	**After every 48,000 hours**	55,474	10.12.07 to 10.01.08	---	---	72,450	11.03.12 to 02.05.12 (Forced major inspection)	51,565	06.11.14 to 18.12.14
		69,807	06.09.09 to 23.10.09	22,494	24.12.06 to 10.02.08 (Forced major inspection)	73,716	30.07.12 to 18.10.12 (Forced major inspection)	---	---
		---	---	48,273	03.01.13 to 21.02.13 (Forced major inspection)	---	---	---	---
GT refurbishment	---	---	---	---	---	---	---	16,505	25.11.10 to 07.05.11
IGV Inspection	---	---	---	---	---	---	---	31,142	02.10.02 to 06.10.02
Rehabilitation	---	---	---	---	---	---	---	52,986	26.07.16 to 26.09.16

ANNEXURE-7

(*Referred to in Paragraph 2.1.10*)

Statement showing forced outages in TGTPS, KGTPS and VGTPS

Station	Period	Forced outage hours		Reasons for major outages
		GT	ST	
TGTPS	**2012-13**	28	104	Air Filter replacement, low GBC suction pressure, tripping due to condenser tube punctures.
	2013-14	178	277	GTG bushing failure, HRSG bottom and IP Eco vent leak problem in GBC, combustion tube puncture.
	2014-15	27	427	Condenser tube leakage, rotor earth fault.
	2015-16	100	2163	Very high shaft vibration, very high turbine rear bearing vibration, GBC tripping.
	2016-17	16	720	Air Filter replacement, high vibration in GT Generator drive end bearing, Low condenser vacuum.
Total		**349**	**3691**	
KGTPS	**2012-13**	3	0	GT continued to be under outage for most part of the year due to rectification works for rotor.
	2013-14	137	234	Low suction flow in GBC, ST hand tripped due to GT tripping.
	2014-15	42	112	Low suction flow in GBC, defective HR system.
	2015-16	82	185	Tripping due to Gas Premix/Trim not tracking, low gas suction flow.
	2016-17	661	786	Low gas suction flow, primary and quaternary gas control valve not following reference trip, ST hand tripped since GBC got tripped.
Total		**925**	**1317**	
VGTPS-I	**2012-13**	3481	3675	High vibration in load gear box, GT failure due to heavy internal damages.
	2013-14	330	405	Tripping of auxiliaries, low gas pressure.
	2014-15	116	519	Gas premix trim valve not tracking, tripping of vacuum pump, tripping of GBC
	2015-16	355	744	Low gas pressure, tripping of GBC, high thrust bearing temperature, tripping of GBC.
	2016-17	69	165	Stator earth fault, tripping of GBC.

Station	Period	Forced outage hours		Reasons for major outages
		GT	ST	
Total		**4351**	**5508**	
VGTPS-II	**2012-13**	1435	2021	Defective air filters, high vibrations in HP boiler feed pump, failure of electronic control unit of inlet guide vane.
	2013-14	1000	2030	Tripping of GBC, surge protection, failure of HP boiler feed pump motor.
	2014-15	2080	2236	Surge protection, leak in HRSG, low discharge pressure of GBC, high turbine bearing vibration.
	2015-16	8784	8784	High turbine bearing vibration.
	2016-17	4530	4687	High turbine bearing vibration, HP pressure drop, surge protection.
Total		**17829**	**19758**	
Grand Total		**23454**	**30274**	

ANNEXURE-8

(Referred to in Paragraph 2.1.14)

Statement showing performance of steam turbo generator

Year	Station	Total Operated hours	Possible Generation during Operated hours (MU)	Actual generation (MU)	Shortfall in generation in comparison to possible generation during operated hours (MU)	Contribution per unit of generation (In ₹)	Total Contribution Loss (₹ in crore)
2012-13	**TGTPS**	8,376	317.28	230.55	86.73	3.14	27.23
	KGTPS	842	28.63	20.59	8.04	0.77	0.62
	VGTPS-I	4,968	174.38	146.07	28.31	3.02	8.55
	VGTPS-II	6,254	210.76	146.47	64.29	3.02	19.42
2013-14	**TGTPS**	7,744	293.34	167.25	126.09	2.51	31.65
	KGTPS	8,488	288.59	226.87	61.72	2.70	16.66
	VGTPS-I	8,209	288.14	247.08	41.06	2.68	11.00
	VGTPS-II	6,059	204.19	142.31	61.88	2.68	16.58
2014-15	**TGTPS**	7,931	300.43	151.12	149.31	2.62	39.12
	KGTPS	8,246	280.36	186.17	94.19	2.70	25.43
	VGTPS-I	7,986	280.31	233.29	47.02	3.10	14.58
	VGTPS-II	4,896	165.00	114.01	50.99	3.10	15.81

Year	Station	Total Operated hours	Possible Generation during Operated hours (MU)	Actual generation (MU)	Shortfall in generation in comparison to possible generation during operated hours (MU)	Contribution per unit of generation (In ₹)	Total Contribution Loss (₹ in crore)
2015-16	TGTPS	5,873	222.47	108.91	113.56	2.66	30.21
	KGTPS	8,443	287.06	203.94	83.12	3.15	26.18
	VGTPS-I	7,930	278.34	238.70	39.64	2.49	9.87
	VGTPS-II	---	---	---	---	2.49	0.00
2016-17	TGTPS	7,499	286.53	96.78	189.75	3.92	74.38
	KGTPS	7,975	295.08	150.56	144.52	3.89	56.22
	VGTPS-I	8,371	293.82	238.64	55.18	4.02	22.18
	VGTPS-II	4,173	140.63	91.94	48.69	4.02	19.57
		1,30,263	**4,635.34**	**3,141.25**	**1,494.09**		**465.26**

ANNEXURE-9

(*Referred to in Paragraph 2.1.16*)

Statement showing excess consumption of gas due to excessive Station Heat Rate

	Gross Generation (MU)	Design Station Heat Rate (Kcal/Kwh)	Total Qty of gas consumed (MSCM)	Average calorific value of gas (Kcal/SCM)	Heat required from gas for actual generation (million Kcal) (1x 2)	Gas required for actual generation (MSCM) (5/4)	Excess consumption (MSCM) (3-6)	Average Cost of gas (₹. per SCM)	Value of excess consumption (₹. in crore) (7*8)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2012-13									
TGTPS	726.74	1,670	140.07	9,502	12,13,656	127.73	12.34	9.33	11.51
KGTPS	55.84	1,868	10.45	9,446	1,04,309	11.04	-0.59	15.40	-0.91
VGTPS –I	449.41	1,671	92.05	8,732	7,50,964	86.00	6.05	8.50	5.14
VGTPS –II	488.02	1,676	107.46	8,022	8,17,922	101.96	5.5	8.50	4.68
2013-14									
TGTPS	497.92	1,670	105.98	9,579	8,31,526	86.81	19.17	10.38	19.90
KGTPS	641.37	1,868	127.19	9,340	11,98,079	128.27	-1.08	10.90	-1.18
VGTPS –I	729.33	1,671	147.45	8,874	12,18,710	137.34	10.11	9.96	10.07
VGTPS –II	526.33	1,676	116.61	8,787	8,82,129	100.39	16.22	9.96	16.16
2014-15									
TGTPS	413.70	1,670	91.88	9,600	6,90,879	71.97	19.91	12.53	24.95
KGTPS	497.36	1,868	106.60	9,334	9,29,068	99.54	7.06	13.00	9.18

	Gross Generation (MU)	Design Station Heat Rate (Kcal/Kwh)	Total Qty of gas consumed (MSCM)	Average calorific value of gas (Kcal/SCM)	Heat required from gas for actual generation (million Kcal) (1x 2)	Gas required for actual generation (MSCM) (5/4)	Excess consumption (MSCM) (3-6)	Average Cost of gas (₹. per SCM)	Value of excess consumption (₹. in crore) (7*8)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VGTPS –I	700.58	1,671	144.44	8,787	11,70,669	133.23	11.21	11.91	13.35
VGTPS –II	380.30	1,676	82.86	8,787	6,37,382	72.54	10.32	11.91	12.29
2015-16									
TGTPS	399.10	1,670	94.77	9,612	6,66,497	69.34	25.43	12.99	33.03
KGTPS	563.68	1,868	117.16	9,544	10,52,954	110.33	6.83	13.90	9.49
VGTPS –I	721.18	1,671	146.97	8,792	12,05,091	137.07	9.90	13.27	13.14
VGTPS –II	000.000	1,676	000.00	0	0	0	0	13.27	0.00
2016-17									
TGTPS	347.98	1,670	88.51	9,551	5,81,126	60.84	27.67	11.72	32.43
KGTPS	376.50	1,868	88.11	9,401	7,03,302	74.81	13.30	11.89	15.81
VGTPS –I	688.17	1,671	141.77	8,770	11,49,932	131.12	10.65	11.21	11.94
VGTPS –II	278.48	1,676	60.45	8,770	4,66,732	53.22	7.23	11.21	8.10
						TOTAL	**217.23**		**249.08**

ANNEXURE-10

(*Referred to in Paragraph 2.1.17*)

Statement showing excess auxiliary consumption

Year	Name of the Station	Gross Generation (In MU)	Auxiliary consumption as allowed by TNERC at 6% (In MU)	Actual auxiliary consumption (In MU)	Percentage of actual consumption	Excess consumption over TNERC norms (In MU)	Contribution per unit of generation – (In ₹)	Value of excess consumption (₹ in crore)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2012-13	TGTPS	726.74	43.60	44.07	6.06	0.47	3.14	0.15
	KGTPS	55.84	3.35	4.75	8.51	1.40	0.77	0.11
	VGTPS-I	449.41	26.96	26.80	5.96	(-)0.16	3.02	(-)0.05
	VGTPS-II	488.02	29.28	32.50	6.66	3.22	3.02	0.97
2013-14	TGTPS	497.92	29.88	40.27	**8.09**	10.39	2.51	2.61
	KGTPS	641.37	38.48	46.98	7.32	8.50	2.70	2.30
	VGTPS-I	729.33	43.76	42.98	5.89	(-)0.78	2.68	(-)0.21
	VGTPS-II	526.33	31.58	33.24	6.32	1.66	2.68	0.44
2014-15	TGTPS	413.70	24.82	40.49	**9.79**	15.67	2.62	4.11
	KGTPS	497.36	29.84	44.63	8.97	14.79	2.70	3.99
	VGTPS-I	700.58	42.03	41.36	5.90	(-)0.67	3.10	(-)0.21
	VGTPS-II	380.30	22.82	26.55	6.98	3.73	3.10	1.16
2015-16	TGTPS	399.10	23.95	35.70	**8.95**	11.75	2.66	3.13
	KGTPS	563.68	33.82	44.83	7.95	11.01	3.15	3.47
	VGTPS-I	721.18	43.27	41.28	5.72	(-)1.99	2.49	(-)0.50
	VGTPS-II	000.00	0.00	1.28	-	1.28	2.49	0.32

Year	Name of the Station	Gross Generation (In MU)	Auxiliary consumption as allowed by TNERC at 6% (In MU)	Actual auxiliary consumption (In MU)	Percentage of actual consumption	Excess consumption over TNERC norms (In MU)	Contribution per unit of generation – (In ₹)	Value of excess consumption (₹ in crore)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2016-17	**TGTPS**	347.98	20.88	39.01	**11.21**	18.13	3.92	7.11
	KGTPS	376.50	22.59	40.58	10.78	17.99	3.89	7.00
	VGTPS-I	688.17	41.29	40.91	5.94	(-)0.38	4.02	(-)0.15
	VGTPS-II	278.48	16.71	18.83	6.76	2.12	4.02	0.85
					TOTAL	**118.13**		**36.60**

ANNEXURE-11

(*Referred to in Paragraph 2.1.20*)

Statement showing availability of gas

(In million standard cubic metre)

Year	Name of the Station	Contracted quantity	Actual supply	Short supply compared to contracted quantity (3 – 4)	Percentage of short supply to contracted quantity (5/3 x 100)	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)
2012-13	TGTPS	164.25	140.07	24.18	14.72	
	KGTPS	164.25	10.45	153.80	93.64	GT Under shutdown due to rotor problem
	VGTPS-I	164.25	92.05	72.20	43.96	Heavy internal damage to GT
	VGTPS-II	159.87	107.46	52.41	32.78	GT under shutdown due to vibration
2013-14	TGTPS	164.25	105.98	58.27	35.48	
	KGTPS	164.25	127.19	37.06	22.56	
	VGTPS-I	164.25	147.45	16.80	10.23	
	VGTPS-II	159.87	116.61	43.26	27.06	GT Shutdown due to gear box oil leak
2014-15	TGTPS	164.25	91.88	72.37	44.06	
	KGTPS	164.25	106.60	57.65	35.10	
	VGTPS-I	164.25	144.44	19.81	12.06	
	VGTPS-II	159.87	82.86	77.01	48.17	

(1)	(2)	(3)	(4)	(5)	(6)	(7)
2015-16	**TGTPS**	164.70	94.77	69.93	42.46	
	KGTPS	164.70	117.16	47.54	28.86	
	VGTPS-I	164.70	146.97	17.73	10.77	
	VGTPS-II	160.31	0.00	160.31	100.00	GT under shutdown due to vibration
2016-17	**TGTPS**	164.25	88.51	75.74	46.11	
	KGTPS	164.25	88.11	76.14	46.36	
	VGTPS-I	164.25	141.77	22.48	13.69	
	VGTPS-II	159.87	60.42	99.45	62.21	GT under shutdown due to vibration
Total		**3264.89**	**2010.75**			

ANNEXURE-12

(Referred to in Paragraph 2.1.21)

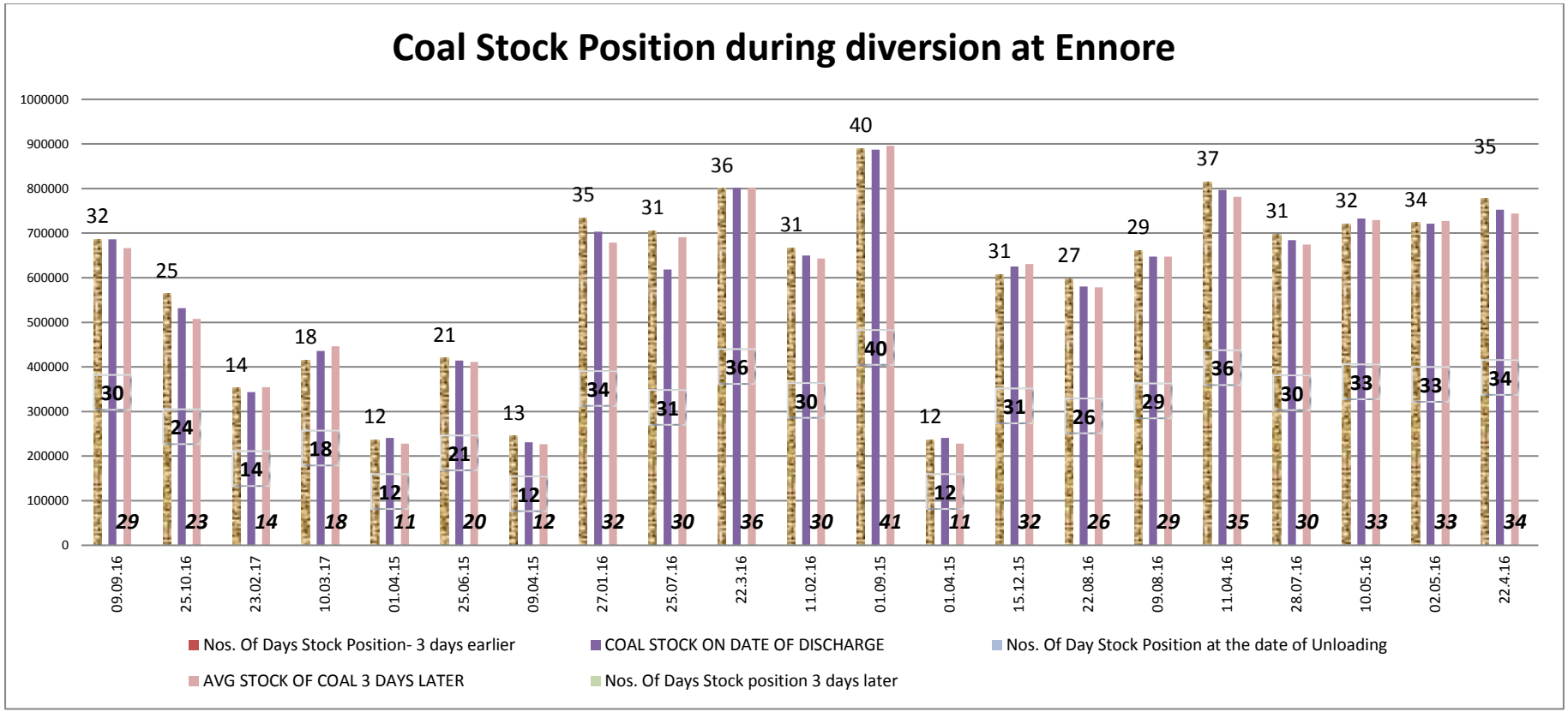
Statement showing loss of generation due to short supply of gas

Year	Name of the Station	Short supply compared to contracted quantity (million SCM)	Actual Heat rate (Kcal/Kwh)	Average calorific value of gas (Kcal)	Possible generation considering actual heat rate and calorific value (MU) ((2 x 4)/3)	Contribution per unit (In ₹)	Total loss of contribution – (₹ in crore) (5 x 6)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
2012-13	**TGTPS**	24.18	1,833	9,502	125.35	3.14	39.36
2013-14	**TGTPS**	58.27	2,051	9,579	272.14	2.51	68.31
	KGTPS	37.06	2,203	9,340	157.12	2.70	42.42
	VGTPS-I	16.80	1,777	8,874	83.90	2.68	22.48
2014-15	**TGTPS**	72.37	2,132	9,600	325.87	2.62	85.38
	KGTPS	57.65	2,428	9,334	221.62	2.70	59.84
	VGTPS-I	19.81	1,812	8,787	96.07	3.10	29.78
2015-16	**KGTPS**	47.54	2,380	9,544	190.64	3.15	60.05
	VGTPS-I	17.73	1,796	8,792	86.79	2.49	21.61
2016-17	**KGTPS**	76.14	2,200	9,401	325.36	3.89	126.56
	VGTPS-I	22.48	1,809	8,770	108.98	4.02	43.81
Total					**1,993.84**		**599.60**

ANNEXURE-13

(Referred to in Paragraph 3.1.8)

Graph showing coal stock position in Thermal Stations of Chennai and Mettur during diversion of vessels from Tuticorin to Ennore



ANNEXURE-14

(Referred to in Paragraph 3.1.11)

Statement showing avoidable pre-berthing charges

Sl.No.	Name of vessel	Charter party date	Charter rate(In ₹)	Date of arrival	Time of arrival	Date of berthing	Time of berthing	Period pre-berthing (In days)	Additional pre-berthing charges (In ₹)	Total (In ₹)
1.	MV Tamil Periyar	18.10.12	4,69,800	08.09.14	17.48	10.09.14	18.40	2.07	9,72,486	24,14,448
	MV Gem of Ennore		16,36,200	09.09.14	03.24	12.09.14	20.18	2.07	33,86,934	
2.	MV Tamil Kamaraj	18.10.12	4,69,800	22.09.14	15.00	23.09.14	19.00	0.59	2,77,182	6,88,176
	MV Gem of Ennore		16,36,200	22.09.14	14.30	24.09.14	09.12	0.59	9,65,358	
3.	MV Tamil Anna	21.01.17	4,22,500	18.03.17	02.24	27.03.17	17.42	1.49	6,29,525	1,13,985
	MV APJ Mahadev		4,99,000	18.03.17	06.30	29.03.17	05.24	1.49	7,43,510	
4.	MV Periyar	23.11.12	9,27,000	03.03.14	06.18	05.03.14	07.00	2.24	20,76,480	---
	MV APJ Suryavir		7,23,000	03.03.14	19.18	07.03.14	12.42	2.24	16,19,520	
5.	MV Tamil Periyar	23.11.12	9,27,000	17.03.14	05.18	20.03.14	07.30	0.30	2,78,100	---
	MV Suryavir		7,23,000	17.03.14	03.30	20.03.14	14.36	0.30	2,16,900	
6.	MV Tamil Anna	16.11.14	4,69,800	18.09.14	12.24	20.09.14	11.00	0.98	4,60,404	3,70,636
	MV APJ Jad		8,48,000	20.09.14	06.30	21.09.14	10.30	0.98	8,31,040	
7.	MV Tamil Kamaraj	23.11.12	5,79,500	05.12.14	12.50	08.12.14	10.06	1.05	6,08,475	1,50,675
	MV APJ Mahakali		7,23,000	07.12.14	00.00	09.12.14	11.12	1.05	7,59,150	
8.	MV Tamil Anna	18.10.12	4,53,000	12.12.15	23.24	14.07.15	14.30	1.94	8,78,820	22,95,408
	MV Gem of Ennore		16,36,200	14.12.15	13.00	16.07.15	13.00	1.94	31,74,228	
								TOTAL		**60,33,328**

ANNEXURE-15

(Referred to in Paragraph 3.2.1)

Statement showing status of the contracts awarded by TNRIDC

Sl. No.	Name of the work	Name of the contractor	Value of the contract (₹ in crore)	Value of work done (₹ in crore)	Date of Agreement	Due date of completion	Actual date of completion	Time over run (In months)	Remarks
	OICP – SingaperumalKoil - Sriperumpudur Road –(SH 57)								
	Phase I								
	Package-I (0-12 Kms)								
1.	Four laning of SingaperumalKoil - Sriperumpudur Road	M/s.RomanTarmat Limited	58.76	17.10	30.06.2008	30.09.2009	29.04.2011	19	The contract was terminated due to slow progress of work. The balance work was awarded to contractors as indicated in Sl.No 2 and 3 of the table.
2	Balance Work of Package -I - Four laning of SingaperumalKoil - Sriperumpudur Road	Thiru.S.Veluchamy	14.19	11.94	20.01.2012	21.07.2012	28.08.2014	25	Work completed in available work front.
3	Balance work in Reserve forest stretch package -I-Four laning of SingaperumalKoil - Sriperumpudur Road	M/s. S.P.K and Co.,	29.07	27.05	13.08.2014	21.11.2015	---	22	Work in progress.

Sl. No.	Name of the work	Name of the contractor	Value of the contract (₹ in crore)	Value of work done (₹ in crore)	Date of Agreement	Due date of completion	Actual date of completion	Time over run (In months)	Remarks
	Package-II (12- 24 kms)								
4	Four laning of Singaperumalkoil-Sriperumpudur road	M/s. SDCEPL & Co . (JV)	61.00	46.27	30.06.2008	30.09.2009	16.04.2013	43	The contract was foreclosed due to non-availability of work front. The balance work was awarded to contractor as indicated in Sl.No 5 of the table.
5	Residual Work of Four laning of Singaperumalkoil-Sriperumpudur road	M/s. Sunshine Infra Engineers India Private Limited	14.36	11.90	03.03.2014	02.01.2015		33	Work in progress.
	Package-III (34 -47 kms)								
	Oragadam Industrial Corridor – Vandalur – Wallajabad Road (SH 48)								
6	Four laning of Vandalur-Wallajabad Road	M/s. NAPC Limited	54.83	43.78	30.06.2008	29.09.2009	29.06.2013	45	The contract was foreclosed due to non-availability of work front. The balance work was awarded to contractor as indicated in Sl.No7 of the table.
7	Balance Work in Reserve Forest Stretch of four laning of Vandalur - Wallajabad road	M/s. SPK & Co.	13.01	12.93	16.07.2014	17.06.2015	22.04.2016	10	Work completed.

Sl. No.	Name of the work	Name of the contractor	Value of the contract (₹ in crore)	Value of work done (₹ in crore)	Date of Agreement	Due date of completion	Actual date of completion	Time over run (In months)	Remarks
	Package -IV (47-63/800 Kms)								
8.	Four laning of Vandalur - Wallajabad road	M/s.Roman Tarmat Limited	55.62	31.33	30.06.2008	30.09.2009	29.04.2011	19	The contract was terminated due to slow progress of work. The balance work in available work front was awarded to contractor as indicated in Sl.No 9 of the table.
9.	Balance work of four lane of Vandalur – Wallajabad road	M/s P.Janakiraman	12.27	8.26	13.10.2011	12.04.2012	27.05.2014	25	Work completed in available work front.
10.	Residual work of four lane to Vandalur – Wallajabad road	M/s SPK & Co.	23.77	22.09	23.01.2014	16.03.2015	24.08.2016	17	The contractor could not complete the work due to non-acquisition of land. Hence, the contract was foreclosed.
11.	Construction of grade separator at Oragadam junction at KM 47/4 of Vandalur – Wallajabad road	M/s East Coast Construction & Industries Limited	20.98	22.46	15.03.2010	14.09.2011	20.12.2014	39	Work completed.
	Phase-II								
	Oragadam Industrial Corridor – Singaperumalkoil - SriperumpudurRoad-SH 57 (12/6-24/6)								
12.	Four lane to six lane of SingaperumalKoil –	M/s Sunshine Infra Engineers India	96.4	91.76	24.06.2013	23.07.2015	30.03.2016	8	The contract was foreclosed due to non-availability of

Sl. No.	Name of the work	Name of the contractor	Value of the contract (₹ in crore)	Value of work done (₹ in crore)	Date of Agreement	Due date of completion	Actual date of completion	Time over run (In months)	Remarks
	Sriperumpudur Road	Private Limited							land.
	Phase-III								
	Oragadam Industrial Corridor – Singaperumalkoil - SriperumpudurRoad-SH -57 (0/6-12/6 kms)								
13.	Four lane to six lane at SingaperumalKoil – Sriperumpudur Road	M/s Sunshine Infra Engineers India Private Limited	88.43	84.57	12.06.2015	11.12.2016		9	Includes balance work of package I for ₹ 22.65 crore of which value of work done is ₹ 20.14 crore. Work in progress. 95% work completed.
14.	Four lane to six lane at SingaperumalKoil – Sriperumpudur Road	M/s SPK & Co.	43.29	40.96	19.06.2015	18.09.2016		12	Work in progress. 95% work completed.
	Phase-IV								
	Oragadam Industrial Corridor – Vandalur – Wallajabad Road SH 48 (30/40-47/00 KMs								
15.	Four lane to six lane of Vandalur – Wallajabad Road (SH 48) KM 30/400-47/000	M/s JSR Infra Developers Private Limited	159.53	91.98	26.02.2016	25.02.2018			Includes balance work of package III for ₹ 3.16 crore of which value of work done is NIL. Work in progress. 58% work completed.
16.	Madurai Ring Road	M/s Balaji Tollways (Madurai) Private Ltd.	77.00		29.02.2016	12.04.2019			Work in Progress. Financial closure achieved on 13 April 2017.

ANNEXURE-16

(Referred to in Paragraph 3.2.3)

Statement showing additional compensation paid for land acquisition

Sl. No.	Name of the Village	No of survey	Square Meter	Award Amount (₹ in lakh)	Total days	Additional amount (₹ in lakh)	Days of delay(More than 180 days)	Additional amount for delay (₹ in lakh)
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)=f-180	(i)=g*h/f
1	Thirukatchur	113	38,600	759.50	2,501	294.15	2,321	272.98
			2,672	41.13	2,366	15.39	2,186	14.22
2	Appur	61	22,447	687.65	2,426	261.39	2,246	242.00
3	Kolathur	5	6,750	33.91	615	4.56	435	3.23
4	Venkatapuram	1	450	1.6	385	0.14	205	0.08
5	Senthamangalam	34	9,024	148.42	763	34.82	583	26.61
		3	1,766	34.12	2,369	12.78	2,189	11.81
6	Perumalthangal	2	4,350	59.34	1,188	13.7	1,008	11.62
7	Valayankaranai	33	14,780	187.83	836	32.77	656	25.71
8	Sennakuppam	34	15,680	295.29	1,116	64.95	936	54.47
9	Oragadam	56	38,000	1,060.16	986	211.47	806	172.86
		17	5,805	253.95	2,554	105.7	2,374	98.25
10	Vadakkupattu	18	12,430	173.17	770	28.22	590	21.63
11	Pondur-C	105	1,04,510	2,605.67	946	502.93	766	407.24
12	Sirukalathur	19	9,060	123.05	756	19.75	576	15.05
13	Vallam-A	70	37,041	905.97	610	121.08	430	85.35

Sl. No.	Name of the Village	No of survey	Square Meter	Award Amount (₹ in lakh)	Total days	Additional amount (₹ in lakh)	Days of delay(More than 180 days)	Additional amount for delay (₹ in lakh)
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)=f-180	(i)=g*h/f
14	Pondur-B	105	59,510	987.26	617	133.26	437	94.38
15	Vallam –B	105	39,136	1,103.70	922	208.62	742	167.89
16	Mathur	128	2,096	107.09	2,387	40.3	2,207	37.26
			56,705	1,954.11	1,141	437.3	961	368.31
17	Vadagal	97	44,503	1,179.08	1,843	374.71	1,663	338.11
			4,335	107.95	1,674	32.09	1,494	28.64
18	Vandalur	91	10,082	1,298.29	2,485	500.81	2,305	464.53
19	Mannivakkam	92	12,544	887.45	703	133.96	523	99.66
20	Karasangal	5	784	29.19	560	3.62	380	2.46
21	Thundalkalani	11	2,736	122.69	840	21.49	660	16.89
22	Athanancheri	15	1,962	85.32	770	13.91	590	10.66
23	Vanjuvancheri	4	1,605	6.15	364	0.52	184	0.26
24	Salamangalam	20	3,618	97.35	1,383	25.21	1,203	21.93
		9	3,400	130.77	2,692	52.95	2,512	49.41
25	Serpancheri and Serpancheri additional	9	1,120	20.09	856	3.57	676	2.82
		13	1,325	93.08	1,861	29.78	1,681	26.90
26	Oragadam VW	64	51,056	1,796.48	2,064	615.93	1,884	562.22

Sl. No.	Name of the Village	No of survey	Square Meter	Award Amount (₹ in lakh)	Total days	Additional amount (₹ in lakh)	Days of delay(More than 180 days)	Additional amount for delay (₹ in lakh)
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)=f-180	(i)=g*h/f
27	Thiruvamputheri	7	2,140	34.05	543	4.11	363	2.75
28	Panappakkam	5	800	39.81	1,267	9.65	1087	8.28
29	Venpakkam	4	3353	43.77	982	8.71	802	7.11
30	Wallajabad	70	10,235	383.95	1,293	94.56	1,113	81.40
		10	1,204	84.61	2,524	32.95	2344	30.60
31	Thalayampattu	6	2,879	20.94	524	2.45	344	1.61
32	Periamadurapakkam	5	2,837	3.98	359	0.33	179	0.17
33	Devariambakkam	58	20,371	183.78	707	27.88	527	20.78
34	Panruti-B	108	34,010	225.17	864	40.36	684	31.95
35	Nathanallur	105	29,490	310.14	785	51.36	605	39.58
		5	1,710	17.42	2,507	11.03	2,327	10.24
36	Uthukadu	57	23,032	401.11	777	65.86	597	50.60
37	Varanavasi	78	11,935	204.15	1246	48.89	1,066	41.82
38	Ambakkam	25	9,811	86.99	793	14.53	613	11.23
			1,511	13.12	580	1.68	400	1.16
39	Karanithangal	62	18,410	313.53	569	39.44	389	26.96
	Total							**4,121.68**

ANNEXURE-17

(Referred to in Paragraph 3.2.9)

Statement showing excess provision of DBM in strengthening the road

Sl.No	From	To	Characteristic deflection (In mm)	Overlay thickness, (BM) adopted (In mm)	Adopting equivalency factor of 0.7 for DBM/BC (In mm)	DBM Adopted by Company (In mm)	Pavement design should have been adopted as per IRC 81-1981		Adopted & Executed by the Company		Difference in thickness (DBM) (In mm)	Length (In metres)	Width (In metres)	Total Quantity (In Cum)	Rate (In ₹)	Value of additional thickness (In ₹)
							BC (mm)	DBM (mm)	BC (mm)	DBM (mm)						
(a)	(b)	(c)	(d)	(e)	(f) = e*0.7	(g)	(h)	(i)	(j)	(k)	(l) = (k-i)/1000	(m)	(n)	(o) = l*m*n	(p)	(q) = o*p
1	30/835	31	1.301	145	101.5	108.75	40	65	40	70	0.005	165	5.8	4.785	5293	25327
2	31	32	1.346	145	101.5	108.75	40	65	40	70	0.005	1000	5.8	29	5293	153497
3	32	33	1.368	145	101.5	108.75	40	65	40	70	0.005	1000	5.8	29	5293	153497
4	33	34	1.13	158	110.6	110.6	40	70	40	70	0					
5	34	35	1.127	158	110.6	110.6	40	70	40	70	0					
6	35	36	1.117	154	107.8	108.6	40	70	40	70	0					
7	36	37	1.12	154	107.8	108.6	40	70	40	70	0					
8	37	38	1.144	154	107.8	108.6	40	70	40	70	0					
9	38	39	1.008	145	101.5	108.75	40	65	40	70	0.005	1000	5.8	29	5293	153497
10	39	40	1.065	145	101.5	102	40	65	40	70	0.005	1000	5.8	29	5293	153497
11	40	41	1.059	145	101.5	102	40	65	40	70	0.005	1000	5.8	29	5293	153497

Sl.No	From	To	Characteristic deflection (In mm)	Overlay thickness, (BM) adopted (In mm)	Adopting equivalency factor of 0.7 for DBM/BC (In mm)	DBM Adopted by Company (In mm)	Pavement design should have been adopted as per IRC 81-1981		Adopted & Executed by the Company		Difference in thickness (DBM) (In mm)	Length (In metres)	Width (In metres)	Total Quantity (In Cum)	Rate (In ₹)	Value of additional thickness (In ₹)
							BC (mm)	DBM (mm)	BC (mm)	DBM (mm)						
(a)	(b)	(c)	(d)	(e)	(f) = e*0.7	(g)	(h)	(i)	(j)	(k)	(l) = (k-i)/1000	(m)	(n)	(o) = l*m*n	(p)	(q) = o*p
12	41	42	1.011	142	99.4	99.4	40	60	40	70	0.01	1000	5.8	58	5293	306994
13	42	43	1.134	154	107.8	108.6	40	70	40	70	0					
14	43	44	1.115	154	107.8	108.6	40	70	40	70	0					
15	44	45	1.141	154	107.8	108.6	40	70	40	70	0					
16	45	46	1.149	154	107.8	108.6	40	70	40	70	0					
17	46	47	1.187	145	101.5	101.5	40	65	40	70	0.005	1000	5.8	29	5293	153497
18	47	48	1.153	154	107.8	108.6	40	70	40	70	0	1000	5.8	0	5200	---
19	48	49	1.211	145	101.5	108.75	40	65	40	70	0.005	1000	5.8	29	5200	150800
20	49	50	1.151	140	98	98	40	60	40	70	0.01	1000	5.8	58	5200	301600
21	50	51	1.202	145	101.5	108.75	40	65	40	70	0.005	1000	5.8	29	5200	150800
22	51	52	1.212	145	101.5	108	40	65	40	70	0.005	1000	5.8	29	5200	150800
23	52	53	1.22	145	101.5	108.75	40	65	40	70	0.005	1000	5.8	29	5200	150800
24	53	54	1.207	142	99.4	99.4	40	60	40	70	0.01	1000	5.8	58	5200	301600
25	54	55	1.193	140	98	98	40	60	40	70	0.01	1000	5.8	58	5200	301600
26	55	56	1.088	138	96.6	96.6	40	60	40	70	0.01	1000	5.8	58	5200	301600
27	56	57	1.207	142	99.4	99.4	40	60	40	70	0.01	1000	5.8	58	5200	301600

Sl.No	From	To	Characteristic deflection (In mm)	Overlay thickness, (BM) adopted (In mm)	Adopting equivalency factor of 0.7 for DBM/BC (In mm)	DBM Adopted by Company (In mm)	Pavement design should have been adopted as per IRC 81-1981		Adopted & Executed by the Company		Difference in thickness (DBM) (In mm)	Length (In metres)	Width (In metres)	Total Quantity (In Cum)	Rate (In ₹)	Value of additional thickness (In ₹)
							BC (mm)	DBM (mm)	BC (mm)	DBM (mm)						
(a)	(b)	(c)	(d)	(e)	(f) = e*0.7	(g)	(h)	(i)	(j)	(k)	(l) = (k-i)/1000	(m)	(n)	(o) = l*m*n	(p)	(q) = o*p
28	57	58	1.212	145	101.5	108.75	40	65	40	70	0.005	1000	5.8	29	5200	150800
29	58	59	1.06	138	96.6	96.6	40	60	40	70	0.01	1000	5.8	58	5200	301600
30	59	60	1.208	145	101.5	108.75	40	65	40	70	0.005	1000	5.8	29	5200	150800
31	60	61	1.403	155	108.5	108.5	40	70	40	70	0	1000	5.8	0	5200	0
32	61	62	1.173	140	98	98	40	60	40	70	0.01	1000	5.8	58	5200	301600
33	62	62/900	1.065	138	96.6	96.6	40	60	40	70	0.01	900	5.8	52.2	5200	271440
34	62/900	63/800	2.191	205	143.5	153.75	40	105	40	120	0.015	900	7	94.5	5200	491400
														963.485		**5032143**

ANNEXURE-18

(Referred to in Paragraph 3.2.11)

Statement showing avoidable expenditure on overlay during defect liability period

Sl. No	Name of the Work	KMs	Defect liability Period	Name of the Contractor & Date of agreement	Value of the Contract (₹ in crore)	DBM/BC/Tack coat already carried out in four lane stretch(Cum)	Unwarranted quantity provided/ executed in the same stretch during six lane	Rate per cum/sq.mts (in ₹)	Total (in ₹)
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(k)=(h*i)
1	**Phase-II** Six laning of SS Road (12/600-24/600 Kms)	12.00	16.04.2018	M/s.Sunshine Infra Engineers India Private Limited (24.06.13)	96.40	DBM-21966.24 BC-7811.61	BC-6482.6 cum Tack coat (TC)-162065 sq.mts	8660 10.85	56139316 1758405
2	**Phase-III** Six laning of SS Road (0/600-6/600 kms)	6.00	28.04.2016 and 28.08.2019	M/s.Sunshine Infra Engineers India Private Limited (12.06.15)	88.43	DBM:16039.54 BC:5294.09	BC: 252.88 cum TC: 6322 sq.mts	9643 19	2438522 120118
3	Six laning of SS Road (6/600-12/600 kms)	6.00		M/s.SPK & Co. (19.06.15)	43.29		BC: 2852.2 cum TC : 71305 sq.mts	8440 20	24072568 1426100
4	**Phaes-IV** Six laning of VW Road (30/830-47/000 kms)	16.17	30.09.2018	M/s. JSR Infra Developers Private Limited (26.02.16)	159.53	DBM: 34582 BC: 11171	DBM: 16693 cum BC: 8990 cum TC: 224750 Sq.mts	7240 8000 19	120857320 71920000 4270250
TOTAL									**283002599**
								Or	**28.30 crore**

ANNEXURE-19

(Referred to in Paragraph 3.2.12)

Statement showing adoption of different rates for same work

Sl. No	Description of work	Unit	KM 0/600 - 6/740 (Six Laning)	KM 0/600-1/900 & KM 5/416-6/740 (Balance Four laning)		Rate difference (In ₹)	Amount (In ₹)
			Rate (In ₹)	Quantity	Rate(In ₹)		
(a)	(b)	(c)	(d)	(e)	(f)	(g)=f-d	(h)=e*g
1.01	Site Clearance and Dismantling	Hectares	56253	2.8	57295	1042	2918
2.01	Earth Work - Excavation of roadwork in soil	Cum	48	501.58	49	1	502
2.02	Earth Work - Construction of embankment with approved material deposited at site from roadway cutting.	Cum	148	402	151	3	1206
2.03	Earth Work - Construction of embankment with approved material obtained from burrow pits.	Cum	516	125546	540	24	3013104
2.04	Earth Work - Construction of sub-grade and earthen shoulder.	cum	654	27946	666	12	335352
2.05	Earth Work - Loosening, leveling and compacting original ground	cum	45	6775	46	1	6775
3.01	Granular base and Sub-base - Construction of granular sub base by providing close graded material (Grading V)	Cum	1677	12404	1708	31	384524
4.01	Bituminous Course - Providing and applying primer coat	sqm	64	38311	65	1	38311

Sl. No	Description of work	Unit	KM 0/600 - 6/740 (Six Laning)	KM 0/600-1/900 & KM 5/416-6/740 (Balance Four laning)		Rate difference (In ₹)	Amount (In ₹)
			Rate (In ₹)	Quantity	Rate(In ₹)		
(a)	(b)	(c)	(d)	(e)	(f)	(g)=f-d	(h)=e*g
4.04	Dense Graded Bituminous macadam (75-100 mm thick)	cum	8526	2874	8685	159	456966
4.05	Dense Graded Bituminous macadam (50-70 mm thick)	cum	8553	1916	8712	159	304644
4.06	Bituminous Concrete	cum	9643	1533	9822	179	274407
5.02	Vibrated cement concrete – Foundation	cum	5642	484	5681	39	18876
5.03	Vibrated cement concrete - Raft for box culvert	cum	6718	1060	6753	35	37100
5.04	Vibrated cement concrete - Box culvert superstructure	cum	9329	1511	9364	35	52885
5.05	Vibrated cement concrete - PCC return Walla & Parapets	cum	10114	429	10149	35	15015
6.01	90 cm High octagon	No	6419	30	6423	4	120
7.1	Kerb- Construction of cement concrete	RM	1029	5016	1054	25	125400
7.12	Filling of median and island from burrow pits	cum	508	3115	517	9	28035
	Quoted Value						**5096140**
	Discount offered @ 8.26%						420941
	Total						**4675199**

Or ₹ 46.75 lakh

ANNEXURE-20

(Reference: Paragraph 3.3.4)

Statement showing non-payment of interest for the delayed release of GoI funds

GoI funds (₹ in lakh)	Date of receipt by GoTN	Due date for release	Actual date of release	Delay (in days)	Interest due (₹ in lakh)
2014-15					
2,534.59	27.01.2015	30.01.2015	27.02.2015	28	23.33
826.00	31.03.2015	03.04.2015	08.05.2015	35	9.50
3,360.59				**Total**	**32.83**
2015-16					
550.00	09.07.2015	12.07.2015	03.08.2015	22	3.98
923.21	09.07.2015	12.07.2015	03.08.2015	22	6.68
461.60	23.09.2015	26.09.2015	01.10.2015	5	0.76
1,373.50	29.02.2016	03.03.2016	18.03.2016	15	6.77
665.41	29.02.2016	03.03.2016	18.03.2016	15	3.28
3,973.72				**Total**	**21.47**
2016-17					
260.63	06.05.2016	09.05.2016	20.06.2016	42	3.60
911.85	10.05.2016	13.05.2016	20.06.2016	38	11.39
638.10	10.05.2016	13.05.2016	20.06.2016	38	7.97
642.15	25.05.2016	28.05.2016	18.08.2016	82	17.31
898.73	01.03.2017	04.03.2017	05.04.2017	32	9.46
1,047.00	01.03.2017	04.03.2017	05.04.2017	32	11.02
4,398.46				**Total**	**60.75**
				Grand Total	**115.05 (or) 1.15 crore**

ANNEXURE-21

(Referred to in Paragraph 3.5)

Statement showing the interest paid during the idle period and savings foregone in fuel cost

Sl.No.	Name of the STUs	Number of chassis procured	Number of buses constructed on the chassis	Number of buses purchased belatedly	Total cost of buses purchased (₹ in crore)	Savings in diesel foregone (₹ in crore)	Number of buses with fuel savings	Interest loss (at 10.5% p.a.) (₹ in crore)
1.	MTC, Chennai	550	550	422	122.99	0.75	162	3.02
2.	SETC, Chennai	725	725	440	182.19	0.21	171	1.40
3.	TNSTC, Villipuram	710	700	239	133.71	0.60	160	0.94
4.	TNSTC, Salem	401	369	128	66.68	0.14	54	0.67
5.	TNSTC, Coimbatore	602	480	190	88.33	0.55	150	0.77
6.	TNSTC, Kumbakonam	744	744	196	142.73	0.40	138	0.93
7.	TNSTC, Madurai	580	528	254	106.82	0.79	176	1.78
8.	TNSTC, Tirunelveli	294	261	151	47.95	0.50	84	0.78
	TOTAL	**4606**	**4357**	**2020**	**891.40**	**3.94**	**1,095**	**10.29**

ANNEXURE-22

(Referred to in Paragraph 3.10.1)

Statement showing details of value of tender, name of the suppliers, rates finalised, *etc*.

SL No.	Tender number and date	Total Budget Estimate (₹ crore)	Estimated Quantity (in MMT)		Order placed Quantity (in MMT)		L-1 rate finalised (USD per MT)		Name of the Suppliers (Quantity in MMT allotted)			
			Ennore	Tuticorin	Ennore	Tuticorin	Ennore	Tuticorin	Ennore		Tuticorin	
(1)	(2)	(3)	(4)	(5)	(6) = (10)+(11)	(7) = (12)+(13)	(8)	(9)	(10)	(11)	(12)	(13)
1	46/29.07.12	1,231	1.75	0.75	1.75	0.75	92.06	95.09	ADANI[142] (1.05)	MSTC[143] (0.70)	MSTC (0.45)	ADANI (0.30)
2	47/06.02.13	2,133	3.35	0.85	3.35	0.85	91.96	93.63	ADANI (2.01)	MSTC (1.34)	ADANI (0.51)	MMTC[144] (0.34)
3	48/31.10.13	2,200	2.80	0.90	2.80	0.90	91.05	92.72	ADANI (1.68)	MSTC (1.12)	KISPL[145] (0.54)	MSTC (0.36)
4	49/28.05.14	2,600	4.00	1.00	4.00	1.00	87.00	88.60	ADANI (2.40)	MSTC (1.60)	KISPL (0.60)	MSTC (0.40)
5	50/05.01.15	2,450	3.50	1.00	3.50	1.00	77.00	78.50	ADANI (2.10)	MSTC (1.40)	KISSPL[146](0.60)	MSTC (0.40)
6	51/05.12.15	2,321	3.50	1.00	0.40	0.20	62.00	63.50	Chettinad[147](0.40)	---	Chettinad (0.20)	---
7	52/05.02.16	1,662	3.10	0.80	3.10	0.80	61.00	62.50	ADANI (1.86)	MSTC (1.24)	KISSPL (0.48)	Chettinad (0.32)
		14,597	**22.00**	**6.30**	**18.90**	**5.50**						

142 Adani Global Pte Limited, Singapore.
143 MSTC (Metal Scrap Trade Corporation) Limited, Kolkata.
144 MMTC (Metals and Minerals Trading Corporation) Limited, New Delhi.
145 Knowledge Infrastructure Systems Private Limited, New Delhi.
146 Knowledge International Strategy Systems Pte Limited, Singapore (Subsidiary of KISL, New Delhi).
147 Chettinad Logistics Private Limited, Chennai

ANNEXURE-23

(Referred to in Paragraph 3.10.5)

Statement showing details of FOB price and freight payable by TANGEDCO under variable payment method

Tender No.	Total number of consignments	Number of consignment checked by Audit		FIRM Price accepted by TANGEDCO (USD per MT)		Price payable under variable price method (USD per MT)		Reduction in price under variable price method (USD per MT)		Total reduction in payment under variable price method (₹ in crore)	
		E	T	E	T	E	T	E	T	E	T
48-C	76	20	4	78.22	78.25	56.19 to 62.46	56.70 to 62.60	15.76 to 22.03	15.65 to 21.55	147.96	20.78
48-F	76	-	-	12.78	14.42	---	---	---	---	---	---
49-C	80	28	14	75.09	76.04	47.09 to 56.07	51.87 to 57.06	19.02 to 28.00	18.98 to 24.17	251.08	94.86
49-F	80	19	12	11.86	12.51	3.47 to 13.94	3.68 to 12.88	(2.08) to 8.39	(0.37) to 8.83	28.84	18.01
50-C	73	26	16	66.88	68.39	48.68 to 60.26	50.12 to 56.59	6.62 to 18.20	11.80 to 18.27	163.61	57.44
50-F	73	31	11	10.07	10.06	3.95 to 10.00	4.21 to 9.86	0.07 to 6.12	0.20 to 5.85	36.47	10.53
51-C	10	1	1	56.05	57.18	49.60	50.75	6.45	6.43	3.46	2.38
51-F	10	4	4	5.90	6.27	5.60 to 7.87	5.90 to 8.38	(1.97) to 0.30	(2.11) to 0.37	(0.40)	(0.90)
52-C	58	18	3	56.51	55.34	46.49 to 89.91	49.13 to 93.40	(33.40) to 10.02	(38.06) to 6.21	(40.44)	(17.38)
52-F	58	9	9	4.44	7.11	4.56 to 7.85	7.99 to 12.29	(3.41) to (0.12)	(0.88) to (5.18)	(19.10)	(11.07)
TOTAL										**571.48**	**174.65**
TOTAL										**746.13**	

E – Ennore Port; T – Tuticorin Port, C – Indexed FOB price & F – Indexed freight

(Note: Indonesian index for coal and Singapore CST freight index published in the 'Coal Trader International' were taken to work out the variable price of coal and freight)

ANNEXURE-24

(Referred to in Paragraph 3.14)

Statement showing undue benefit to the power producer

Sl.No.	Month and Year	Quantum of power supplied in units	Quantum of power supplied during crushing season	Amount paid under STOA (In ₹)	Tariff notified by TNERC (In ₹)	Amount payable as per TNERC tariff (In ₹)	Excess payment on total power supplied (In ₹)	Excess payment on power supplied during crushing season (In ₹)
1.	March 2015	3806000	3806000	20933000	3.52	13397120	7535880	7535880
2.	April 2015	9364579	9364579	51505185	3.52	32963318	18541867	18541865
3.	May 2015	9675791	9675791	53216851	3.52	34058784	19158067	19158066
4.	June 2015	8965835	8965835	49312093	3.52	31559739	17752354	17752353
5.	July 2015	6206795	0	34137373	3.52	21847918	12289455	0
6.	August 2015	4029377	0	22161574	3.52	14183407	7978167	0
7.	September 2015	6833146	0	37582303	3.52	24052674	13529629	0
8.	October 2015	4056928	0	22313104	3.52	14280387	8032717	0
9.	November 2015	851571	0	4300434	3.52	2997530	1302904	0
10.	December 2015	1226080	1226080	6191704	3.52	4315802	1875902	1875902
11.	January 2016	2384622	2384622	12042341	3.52	8393869	3648472	3648472
12.	February 2016	6426435	6426435	32453497	3.52	22621051	9832446	9832445
13.	March 2016	10580789	10580789	53432984	3.52	37244377	16188607	16188608
14.	April 2016	8314802	8314802	41989750	3.99	33176060	8813690	8813690
15.	May 2016	5314705	5314705	26839260	3.99	21205673	5633587	5633587
	TOTAL	**88037455**	**66059638**	**468411453**		**316297709**	**152113744**	**108980868**

Or ₹ 10.90 crore

Glossary of Abbreviations

Abbreviation	Description
ADA	Advanced Diagnostics Analysis
APM	Administered Price Mechanism
ATNs	Action Taken Notes
BBGTPS	Basin Bridge Gas Turbine Power Station
BC	Bituminous Course
BEE	Bureau of Energy Efficiency
BG	Bank Guarantee
BM	Bituminous Macadam
BMMU	Block Mission Management Units
BOD	Board of Directors
BOT	Built, Operate and Transfer
BQR	Bid Qualification Requirement
CAG, C&AG	Comptroller and Auditor General of India
CB	Coal Berth
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
CERC	Central Electricity Regulatory Commission
CERs	Carbon Emission Reduction Credits
CIF	Cost Insurance Freight
CIP	Central Issue Price
CL	Chlorides
CMDA	Chennai Metropolitan Development Authority
COO	Certificate of Country of Origin
COPU	Committee on Public Undertakings
DBM	Dense Bituminous Macadam
DBS	Decibels
DDMS	Drug Distribution Management System
DMMU	District Mission Management Unit
DPR	Detailed Project Report
DRO	District Revenue Officer
EMD	Earnest Money Deposit
EPOs	Energy Purchase Orders
FCI	Food Corporation of India
FO	Furnace Oil

Abbreviation	Description
GA	Government Analyst
GAIL	Gas Authority of India Limited
GBC	Gas Booster Compressor
GCV	Gross Calorific Value
GDP	Gross Domestic Product
GO	Government Order
GoI	Government of India
GoTN	Government of Tamil Nadu
GTPS	Gas Turbine Power Stations
HFHSD	High Flash High Speed Diesel oil
HO	Head Office
HT	High Tension
IRC	Indian Road Congress
IT	Information Technology
JV	Joint Venture
Kcal/SCM	Kilo Calories per Standard Cubic Metre
KGTPS	Kuttalam Gas Turbine Power Station
KMs	Kilometres
LD	Liquidated damages
LGB	Load Gear Box
LOI	Letter of Intent
MIS	Management Information System
MLD	Million Litre per Day
MMT	Million Metric Tonne
MoEFCC	Ministry of Environment, Forest and Climate Change
MOU	Memorandum of Understanding
MT	Metric Tonne
MU	Million Units
MW	Mega Watt
NH	National Highway
NIT	Notice Inviting Tender
NOC	No Objection Certificate
NOx	Nitrogen Oxides
NRLM	National Rural Livelihood Mission
NTADC	New Tiruppur Area Development Corporation Limited
NTECL	NTPC Tamil Nadu Energy Company Limited
NTPL	NLC Tamil Nadu Power Limited

Abbreviation	Description
OEM	Original Equipment Manufacturer
OMSS(D)	Open Market Sales Scheme (Distribution)
PA	Performance Audit
PAC	Public Accounts Committee
PCU	Passenger Car Units
PDS	Public Distribution System
PG	Performance Guarantee
PLF	Plant Load Factor
PLI	Public Liability Insurance
PO	Purchase Order
PPA	Power Purchase Agreement
PPC	Pozzolana Portland Cement
PSC	Poompuhar Shipping Corporation Limited
PSUs	Public Sector Undertakings
PWD	Public Works Department
QC	Quality Control
SD	Security Deposit
SEZ	Special Economic Zone
SGC	Specific Gas Consumption
SGSY	Swarna Jayanti Gram Swarozgar Yojana
SH	State Highway
SHG	Self Help Group
SHR	Station Heat Rate
SMMU	State Mission Management Unit
SPO	State Port Officer
SS	Sub-station
STG	Steam Turbine Generator
STOA	Short Term Open Access
STUs	State Transport Undertakings
TANCEM	Tamil Nadu Cements Corporation Limited
TANGEDCO	Tamil Nadu Generation and Distribution Corporation Limited
TCTL	Tuticorin Coal Terminal Private Limited
TDFC	Tamil Nadu Transport Development Finance Corporation Limited
TDS	Total Dissolved Solids
TGTPS	Thirumakottai Gas Turbine Power Station
TNCDW	Tamil Nadu Corporation for Devleopment of Women Limited
TNCSC	Tamil Nadu Civil Supplies Corporation

Abbreviation	Description
TNERC	Tamil Nadu Electricity Regulatory Commission
TNMSC	Tamil Nadu Medical Services Corporation Limited
TNPL	Tamil Nadu Newsprint and Papers Limited
TNRIDC	Tamil Nadu Road Infrastructure Development Corporation
TNSRLM	Tamil Nadu State Rural Livelihood Mission
TPDS	Targeted Public Distribution System
TPT	Tuticorin Port Trust
TWAD	Tamil Nadu Water Supply and Drainage Board
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Voluntary Carbon Standards
VCUs	Verified Carbon Units
VGTPS	Valuthur Gas Turbine Power Station
WIS	Warehouse Information System
WRO	Water Resources Organisation

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