

**BEFORE THE HONOURABLE TAMIL NADU ELECTRICITY
REGULATORY COMMISSION**

MP No 15 of 2011.

IN THE MATTER OF : Miscellaneous petition for filing a
comprehensive proposal to overcome the
power shortage in the State of Tamil Nadu
to enable the lifting of Restriction & Control
measures.

Tamil Nadu Generation and Distribution Corporation Ltd.,
No.144, Anna Salai,
Chennai-2.

.....Petitioner

--Nil--

.....Respondent

The petitioner named above respectively showeth under:

1.0 The Tamil Nadu Generation and Distribution Corporation Limited, the petitioner herein has filed the above petition before this Hon'ble Commission submitting a comprehensive proposal to overcome the power shortage in the State of Tamil Nadu to enable the lifting of Restriction & Control measures. Thereupon, in terms of the directions of this Hon'ble Commission on 11.07.2011, a revised petition was filed. However, by an interim order, dated 19.08.2011, this Hon'ble Commission was pleased to direct the petitioner TANGEDCO to amend the petition, among other things, taking into account the various aspects specified in paragraph 7 of the said interim order.

2.0 Hence, the petitioner herein is submitting this comprehensive proposal as under in terms of the said interim order of this Hon'ble commission.

3.0 Need:

It is respectfully submitted that the Hon'ble Tribunal for Electricity has issued directions to the effect that the Hon'ble Commission shall direct the Electricity Board/Utilities in the State of Tamil Nadu to submit a comprehensive proposal to overcome power shortage to enable to lift the R&C measures before the Commission within a time limit of six months. In order to comply with the direction of the Hon'ble APTEL and the Hon'ble Tamil Nadu Electricity Regulatory Commission, TANGEDCO is submitting this comprehensive proposal on the strategy to be adopted, among other things, to overcome the power shortage in the State of Tamil Nadu to enable the lifting of Restriction and Control measures.

4.0 Background:

In this connection, it is humbly submitted that there was a shortage of 2500 – 4000 MW and efforts were being taken to tide over the situation by making best use of internal resources and power purchase from external sources. However, due to non-availability of Transmission corridor for import of power to meet the accelerated demand, the prevailing grid condition dictates adoption of Restriction and Control measures.

Measures taken for revoking the R&C measures

5.0 Load forecast :

- 5.1 It is submitted that the load forecast would be reasonably accurate, if the actual load growth observed in the past few years is analysed and the projection for the future made accordingly. The growth in energy demand observed in the State during the last 6 years based on the energy consumption is submitted as Annexure 'A'. From the

available details, it is noted that the requirement of energy has been growing in the range of 6.75 to 9.75% except during the year 2006-07 when it grew at 13%. The compounded growth rate for the last 6 years is around 7.86%. Further, the increase in demand observed during the years 2005 to 2010 is submitted as Annexure – B. The compounded growth rate of Average demand during the 5 years is 7.51%. Hence, it is respectfully submitted that it would be reasonable to make the load forecast with 8% growth rate for the next 5 to 10 years. Based on the above, the load forecast has been made for the following cases:-

- (i) Projection for the next 5 years (up to 2016-17) is submitted as Annexure – C. From the projection, it is submitted that the projected demand varies between 12462 MW to 18311 MW during the period from 2011-12 to 2016-17. In the same period, the total generation availability would be increasing from 11263 MW to 20152 MW. The net deficit in generation availability after including the spinning reserve varies from 1907 MW to 4670 MW during the years 2011-12 to 2015-16 while there may a surplus of 531 MW during the year 2016-17.
- (ii) Projection for the next 10 years (up to 2021-22) is submitted as Annexure –D. The projections for the years 2011-12 to 2016-17 is same as in Annexure C. The projected demand increases from 19776 MW in 2017-18 to 26905 MW in 2021-22. In the corresponding period, the generation availability would be increasing from 24099 MW to 25900 MW. While there is a generation surplus during 3 years from 2017-18 to 2019-20, there is a deficit of 1110 MW & 2665 MW during the last two years 2020-21 & 2021-22 respectively.

(iii) It is also submitted that in the above two cases, the proposed medium term power purchases by TANGEDCO through Case I bidding has not been included. It is respectfully submitted that to manage the deficit expected in the projected demand during the years 2012-13 to 2015-16, TANGEDCO has proposed to procure power ranging from 900 MW to 3900 MW in stages through Case-I bidding. The details of medium term power purchases are discussed in detail under Generation. Hence, a projection for the next 10 years (up to 2021-22) has been made including Case – I power purchase and submitted as Annexure – E

6.0 Demand Side Management (DSM) Measures:

6.1 It is humbly submitted that the load reduction/energy savings due to adoption of various DSM measures cannot be exactly quantified. However, it is expected that the existing demand to reduce by atleast 5 % due to the adoption of various DSM measures. The projected availability for next 10 years including the reduction expected from DSM measures is submitted as Annexure – F.

The various DSM measures/ schemes adopted in TANGEDCO are submitted as below:

6.2 Reactive Power Management

6.2.1 Consumers are motivated to maintain a power factor close to unity in their services. For consumers failing to maintain a power factor of 0.9, the following penalty is levied for HT services,

SI No	Power factor	Penalty
1	Below 0.9 and up to 0.85	1% of the current consumption charges for every reduction of 0.01 in PF from 0.90
2	Below 0.85 and up to 0.75	1.5% of the current consumption charges for every reduction of 0.01 in PF from 0.90
3	Below 0.75	2% of the current consumption charges for every reduction of 0.01 in PF from 0.90

6.2.2 For L.T consumers, penalty is levied for power factor less than 0.85 as follows,

SI No	Power factor	Penalty
1	Below 0.85 and up to 0.75	1% of the current consumption charges for every reduction of 0.01 in PF from 0.90
2	Below 0.75	1.5% of the current consumption charges for every reduction of 0.01 in PF from 0.90

6.3 **Peak load Management**

6.3.1 During peak hours, to manage the varying demand, Hydro generation would be very much helpful. The peak potential from Hydro generation is around 1000 MW and during a very good monsoon year, power generation from Hydro sources is expected to be from 5500 to 6000 MU per annum. During the year 2010-11, Hydro generation was 5105 MU which is around 6.8% of the total energy generated. Hence it is respectfully

submitted that the available restricted sources are judiciously put into use to meet the additional requirement during peak hours.

6.3.2 Further, to manage the demand during peak hours, the consumers are motivated to reduce the consumption during peak hours and use the same during off peak hours. For this, Time of Day (TOD) metering has been done for all HT industrial services and extra levy of 20% on energy charges for the energy recorded during peak hours (i.e) 6.00 a.m to 9.00 a.m and 6.00 p.m to 10.00 p.m. is charged for peak hour consumption.

6.3.3 In addition, the Kadamparai pumped storage hydro electric system is used in pumping mode during off peak hours and operated as generator during peak hours to meet the demand.

6.4 **Valley filling**

It is submitted that, to encourage the usage of power during off peak hours, reduction of 5% on the energy charges for the consumption during off peak hours from 22.00 hrs to 05.00 hrs the next day is given as an incentive for night consumption.

6.5 **Staggering of loads**

It is also submitted that power supply is not extended during peak hours to agricultural services.

7.0 Energy Efficiency Measures :

- 7.1 It is submitted that, TANGEDCO envisages to implement the energy efficient lighting system in domestic sector through Bachat Lamp Yojana Scheme (BLY) scheme in TamilNadu. This scheme involves replacing the inefficient incandescent bulbs (ICB) by energy efficient Compact Fluorescent Lamps(CFL).

TANGEDCO has proposed to implement the scheme in Tamil Nadu comprising of about 1.40 Crores domestic consumers. Since the entire cost of the project is borne by the Project Developer, there is no financial commitment to TANGEDCO.

The contract for implementing the first phase of the BLY scheme in 60% of the project areas covering 22 circles of TANGEDCO comprising of 83 lakh consumers was awarded to the Project Developer (PD) M/s Silverfir Advisors Pvt Ltd, Noida.

In view of the current increase in the price of CFLs due to shortage of phosphor, the PD is not in a position to commit the commencing date for the pilot project . Hence further course of action is being contemplated in this regard.

- 7.2 To encourage the use of energy efficient electrical appliances, Bureau of Energy Efficiency (BEE) is working on creating awareness among consumers to go in for BEE star labeled domestic appliances like ceiling fans, refrigerators, AC units, tube light etc. TANGEDCO on its part, is also emphasizing the need to use star labeled appliances in all its seminars/ training / awareness programmes.

- 7.3 Further, LED lighting has also been recommended for installation in some of TANGEDCO's thermal Stations/ TANTRANSCO's substations and to replace the conventional fluorescent tube lights (FTL) by Energy Efficient lighting (T5 lamps) in the Offices /Substations of both TANGEDCO & TANTRANSCO.
- 7.4 It is submitted to the Hon'ble Commission that Commissioners of various Corporations have been requested to explore the usage of LED street lighting in the municipalities and corporations coming under their jurisdiction. They have also been requested to ensure burning of street lights alternatively in the late night hours, late switch ON and early switch OFF of street lights based on the day light saving principle and to provide automatic switching ON and OFF for the street lights using sunlight detection sensors.
- 7.5 In addition, Sakthi Foundation with their technical consultants M/s. The Energy and Resources Institute (TERI) is conducting a study on DSM action plan for the State of Tamil Nadu based on the load analysis and to evolve DSM measures. The same will also be considered for adoption in future, once the outcome of their study becomes available.
- 7.6 **Energy Conservation (EC) measures:**

It is respectfully submitted that regular Energy Conservation programmes are also being carried out in TANGEDCO with the support of Tamil Nadu Government.

The savings on account of implementation of the above measures is reflected in the demand to supply projection discussed in para 6.1

8.0 Planned capacity additions :-

8.1 Generation :-

- 8.1.1 To meet the ever increasing growth in demand for electricity, it is proposed to add around 9772 MW from State sector, 3028 MW as share from Joint venture projects, 6080 MW as share from Central sector Projects/Ultra mega power projects and 4075 MW from IPP during the next 10 years. The details of capacity addition from all the sectors are submitted as Annexure – G.
- 8.1.2 Due to unavoidable circumstances, some of the projects slated for commissioning during 2011-12 are moved to 2012-13. Due to this, the projection given earlier has been suitably modified. In addition the share to the State from Simhadhri Thermal power project stage – II (190 MW) is expected during this year 2011-12. But the Co-generation(183 MW) from modifying the 12 Nos. Sugar mills in the State are expected to be completed only during 2012-13. These changes have also been taken into account in the demand to availability projection.
- 8.1.3 The Ultra mega power projects proposed in Andhra Pradesh at Krishnapattinam and Tatiya are getting delayed and the schedule of commissioning has been suitably modified as per the latest projections available.
- 8.1.4 As instructed by the Hon'ble Commission, thermal plants to be set up by IPPs i.e, SPIC Electric power project (expected during 2013-14) and Cuddalore Power project (expected in 2015-16) have also been included in the projection.

8.1.5 Further, the pithead plant to be established by M/s LANCO Infratech at the coal block jointly allocated to TANGEDCO along with Maharashtra State Mining Corporation at Gare Pelma Sector – II have also been included in the projection. While the plant will be of 2000 MW capacity, the share from this plant to TANGEDCO is 630 MW.

8.1.6 It is submitted that, in spite of commissioning of projects under execution, there is a gap between the projected demand and the generation availability during the years 2011-12 to 2015-16. The deficit varies from 1907 MW during 2011-12 to a maximum of 4670 MW during the year 2014-15. Based on the initial projections, TANGEDCO has already called for tenders to purchase 900 MW of power through Case – I bidding for 5 years and the same is expected to be available to the State before May 2012. In addition, to manage the deficit projected during the years 2012-13 to 2015-16, the following power purchases on medium term through Case- I bidding has been proposed,

1. 1000 MW for 4 years starting from 2012-13 to 2015-16
2. Additional 1000 MW for 3 years starting from 2013-14
3. Another 1000 MW for 2 years starting from 2014-15.

8.1.7 Along with this, TANGEDCO is actively considering to purchase power through Case – II bidding from Projects to be established at Uppur.

8.1.8 In addition, it is submitted that, there are private promoters under Captive power/Merchant power plants route also setting up new units with various capacities in the State. The list of Captive power plants proposed to be established in the State is submitted as Annexure – H. Merchant power plants like Coastal Energen, Ind - bharath and IL&FS are also expected to start their generation soon. As most of these captive and Merchant power plants are expected to commence operation by 2013-14, it is likely that the power generated through these plants will be garnered by floating tenders through Case – I bidding. The list of Merchant power plants proposed to be established in the state is submitted as Annexure – I.

8.2 **Funding :**

It is submitted that regarding the funding of new projects to be taken up by TANGEDCO, Rural Electrification Corporation (REC) has already agreed to provide Rs. 18,000 crores. In addition, Power Finance Corporation (PFC) has also approached TANGEDCO for funding of new Projects to be taken up. Hence, it is considered that there will not be any difficulty in garnering funds for the above generating projects.

8.3 **Renewables :**

Wind :

8.3.1 It is submitted that the installed capacity of Wind generation in the State as on 31.03.2011 is 5887 MW. There are applications for installing another 10,000 MW additional capacity from various promoters. It is estimated that an additional 5000 MW

of wind generation capacity would be added in the State during the next 5 years. However, the capacity from Wind energy has not been included in the available capacity, since wind power is infirm. During last year 8707 MU of energy was generated from wind and this helps in bridging the gap between availability and demand. During this year, the generation from wind energy is expected to be around 9400 MU.

8.3.2 Through proper scheduling, it might be possible to convert part of the wind power as firm power atleast for part of the year. Once scheduling of wind power is implemented, the accuracy of forecasting will also improve. Over a period of time, with constant refining of scheduling, the accuracy can be further improved closer to reality.

8.3.3 Further, to address the issue of variability of Wind power, as pointed out by the Hon'ble Commission that some balancing schemes have to be evolved. In this connection, it is respectfully submitted that, TANGEDCO is contemplating to establish a flexible resource of 4 x 125 MW (500 MW) pumped storage project at Kundah. Investigations are on to find suitable locations where more such schemes can be put up. TANGEDCO is also open to take up other schemes like storage bank, air compressors etc., to even out the vagaries of wind power. However, the initial investment for these schemes are very huge and this will make the over all cost per unit on wind power to be prohibitively high.

8.3.4 It is submitted that, presently, the excess power being generated from wind is sold through UI mechanism which is not very much attractive to TANGEDCO. Incidentally, TANGEDCO is not even able to recover the cost of wind power.

8.3.5 In this scenario, it is submitted that, the reduction of Renewable Purchase Obligation (RPO) from 14% to 9% will help TANGEDCO in reducing the losses from Wind power. Once RPO is over, TANGEDCO will be able to purchase wind power at a lesser rate as the wind energy generators will be getting Renewable Energy Certificates (REC) in lieu of selling power at lesser rate. The Renewable Energy Certificates, then could be encashed in the market and the wind energy generators will also be able to recover in excess of the shortfall on account of selling at a lesser rate to TANGEDCO. In this way, both TANGEDCO and Wind energy generators will be able to benefit from REC mechanism.

8.4 **Transmission**

8.4.1 The installed Generating capacity of TANGEDCO as on 31.03.2011 is 10237 MW. Out of this, the internal generation from Thermal, Gas, Hydro and CPP/IPP/others account for 7376 MW while the balance 2861 MW is the share from Central Generating Stations(CGS).

8.4.2 For transmitting power at present, TANTRANSCO as on 31.03.2011 is having 3 Nos. 400 KV, 77 Nos. 230 KV, 707 Nos. 110 KV and 33 Nos. 66 KV Substations. Along with this TANTRANSCO has 10149 Ckt. Kms of 230 KV lines and 13868 Ckt. Kms of 110KV/66 KV lines to connect these substations

with the generating stations. The Central Transmission utility (CTU) M/s PGCIL has 10 Nos. 400 KV substations along with 5647 Ckt. Kms of 400 KV lines in the State for inter-state and intra state transmission of power.

8.4.3 It is submitted that, establishment of Transmission network adequate enough to evacuate the power generated from the proposed new power plants and also to distribute further down the line has also been taken up.

8.4.4 The Capacity addition expected during the next 5 years from state sector is 6372 MW (details enclosed as annexure J). In this connection, it is submitted that the power evacuation lines for all the state sector projects are being established by TANTRANSCO, while for Joint Venture/Central Generating Stations, the Central Transmission utility M/s Power Grid Corporation India Ltd (PGCIL) will be establishing the same. In respect of Merchant power plants coming in the coastal regions also, M/s PGCIL is setting up the ISTS lines. It may please be noted that 654 Ckt. Kms of 400 KV lines will be commissioned by TANTRANSCO for evacuating power from NCTPS Stage – II (2 x 600 MW) and MTPS Stage – III (600 MW). M/s PGCIL will be erecting 505.04 Ckt. Kms of 400 KV lines for evacuating power from JV projects at Vallur and Tuticorin and 444.78 Ckt Kms of 400 KV lines to be erected for evacuating power from PFBR Kalpakkam.

8.4.5 For taking the power generated to the load centres, establishment of 230 KV substations are being taken up. Major load centres have been identified and sites closer to such load

centres have also been identified for establishing 230 KV substations. It is proposed to establish around 55 Nos. 230 KV substations within the next 5 years. Lands for 25 Substations have already been identified and administrative approval has been accorded for 20 substations. It is submitted that, Maximum efforts are being made to establish the substations when lands are identified and to acquire the land for the rest of the places.

8.4.6 In addition to 230 KV substations, about 200 Nos. 110 KV substations are also proposed to be established in the state in the next 5 years.

8.4.7 Further, it is also submitted that, a main backbone network consisting of 3 new 400 KV substations and 1346 Ckt. Kms of 400 KV lines are also being taken up for effectively transmitting the power across the State from South to North and vice versa. The network will connect the following Substations,

“Kayathar (New SS)- Karaikudi (existing PGCIL SS) – Pugalur(existing PGCIL SS) – Singarapet (New SS) – Ottiyambakkam (New SS)”.

8.4.8 The State already has an installed capacity of 5887 MW from wind energy generation. Further, an additional capacity of 5000 MW is likely to be added in the next 5 years. In order to evacuate the power from the wind generators, a separate corridor with the following 400 KV substations with 730 Ckt kms of 400 KV lines are also proposed.

Kanarpatty (New SS) - Thappagundu (New SS) - Anaikadavu (New SS)

These substations will be connected to the proposed 765 KV substation being executed by PGCIL at Salem

8.4.9 For improving the power delivery mechanism to the Chennai city and its suburbs (Greater Chennai area), 4 Nos. 400 KV substations, 5 Nos. 230 KV substations, 3 Nos. 110 KV substations and 28 Nos. 33 KV substations have been proposed to be established.

8.4.10 It is also submitted that improvement works are under progress for facilitating evacuation of wind power, such as 230 KV Amudhapuram - Checkanoorani 2nd circuit and LILO of this line at the newly proposed Nallappanacikenpatty 230 KV SS(New) with connectivity of 110 KV Viswanathaperi SS by delinking the existing T.off arrangement in the 110 KV Kayathar – Periyar feeder. Similarly the 2nd circuit of 110 KV Arumuganeri – Radhapuram 110 KV line work is under progress and expected to be commissioned shortly.

8.4.11 Regarding the proposal for establishment of 100 Nos. 33 KV/ 110 KV substations by wind promoters for evacuating wind power, it is submitted that TANTRANSCO is already analyzing the optimum requirement of substations. The same has been discussed elaborately with CEA in SRPC meetings for evolving necessary transmission schemes. As the proposed capacity additions from wind power are huge, CEA is in the process of

issuing guidelines after discussing with M/s. PGCIL, POSOCO and all state utilities along with wind promoters.

8.5 **Funding :**

8.5.1 The main backbone 400 KV network to be established from Kayathar 400 KV SS to Ottiyambakkam 400 KV SS will be funded by Rural Electrification Corporation(REC).

8.5.2 It is submitted that, 3 Nos. 400 KV substations at Kanarpatty, Thappagundu and Anaikadavu and the 400 KV line to be commissioned for evacuation of wind power from Kanarpatty - Thappagundu – Anaikadavu 400 KV SS to Salem 765 KV (new PGCIL SS) is being proposed to be undertaken under the Public Private Partnership(PPP) mode.

8.5.3 Japan International Co-operation Agency(JICA) has been approached for funding the establishment of 6 Nos. 400 KV substations, 21 Nos. 230 KV substations and its associated transmission lines in various parts of the state totalling to Rs. 3590 Crores.

8.5.4 54 Nos. 33/11 KV substations are being executed under Part – B of R-APDRP scheme.

8.6 **Distribution:**

8.6.1 It is submitted that, to ensure effective distribution of energy generated, the load growth of each circle is studied in detail and a master plan covering the next 5 years is evolved.

8.6.2 In all 200 Nos. 110 KV substations and 100 Nos. 33 KV substations are planned to be added in the next 5 years.

8.6.3 **RESTRUCTURED ACCELERATED POWER DEVELOPMENT AND REFORMS PROGRAMME (R-APDRP)**

The Ministry of Power/GoI has launched the Restructured APDRP scheme under the 11th five year plan. The objectives of the Restructured APDRP Scheme are to provide quality and reliable power supply to the consumers and to bring down the AT&C losses below 15%.

The project area will be the towns and cities with a population of more than 30,000 as per 2001 census.

The project will be taken up in two parts where:

PART– A will include the projects for establishment of baseline data and Information Technology applications for energy accounting /auditing and Information Technology based consumer service centers, Supervisory Control and Data Acquisition (SCADA) and Distribution Management System (DMS) implementation in towns with population of more than 4 lakhs and annual energy consumption of more than 350 MUs.

The works are in progress in three pilot towns namely Gopichettyalayam, Bhavani and Sathyamangalam urban agglomeration town. In addition, the works have been taken up in 11 fast track towns.

PART- B will include regular distribution strengthening and improvement projects. The main objective of this scheme is to bring down the AT & C losses within 15 % for which erection of new and additional transformer, transformer capacity enhancement in 110 KV SS and 33 KV SS, erection of new 33 KV feeders/ bifurcation, reconductoring of 33 KV feeders, installation of remote switchable breakers/switches in 33 KV or 66 KV SS, Renovation and Modernisation of 33/11 KV SS, installation of distribution transformers, capacity enhancement of LT sub-stations, conversion of Low Voltage lines to High Voltage lines along with feeder separation is envisaged.

8.6.4 **Segregation of Feeders along with HVDS:**

It is also submitted that, out of the total losses, distribution line loss in the LT lines forms the major part. Hence, conversion of Low Voltage lines to High Voltage lines along with feeder separation could reduce the distribution line losses to a greater extent.

In Tamil Nadu there are about 2870 rural feeders. It is proposed to carry out segregation of agricultural loads from Industrial, Commercial and Domestic loads in about 2000 feeders along with implementation of HVDS. The cost of such segregation is estimated around Rs.6000 Crores.

It is respectfully submitted that, Segregation of feeders will be done in a phased manner. Initially, the segregation along with HVDS of about 100 feeders has been programmed to be taken up at an approximate cost of Rs.300 crores in Villupuram region.

8.6.5 **Capacitor Banks:**

It is submitted that, in all 175 MVAR of Capacitor banks have been proposed in various sub-stations up to the level of 11/22 KV at a total expenditure of Rs. 14.32 Crores, as per the recommendations of Southern Regional Power Committee(SRPC).

The overall losses are expected to be reduced by these measures along with improved voltage profile. The demand shall also be expected to come down to that extent.

8.6.6 **Metering and Energy audit :**

It is humbly submitted that, in order to account for the energy generated and pumped in to the system and also to monitor the revenue returns for the energy so generated, consumer metering is considered vital. TANGEDCO is having a consumer base of around 2.24 Crores. Out of these, there are 19.72 lakh agricultural consumers and 14.45 lakh hut service consumers.

Government of Tamil Nadu is subsidizing the energy consumed by these consumers at a flat rate of Rs. 250 Per HP per annum for agricultural consumers and Rs 10 per service per month for hut services. Only these two categories of

consumers have not been fully metered. All the other categories of consumers have been fully metered and regularly assessed.

In respect of other consumers also, the existing electro magnetic meters wherever available will be gradually replaced with Static meters. All the new services will be provided with static meters only.

It is also submitted that all H.T consumers will be fitted with AMR based meters with RF connectivity.

Around 43 Lakhs L.T consumers in the selected 110 towns / cities in the state are being provided with meters with AMR facility under the R-APDRP programme.

It is submitted that, the energy audit at present is being conducted with the energy reading taken from the meters available at all the substation end. But the main handicap is not being able to record the energy flow across the voltage levels at the same instant which would help in performing energy audit with reasonable accuracy. Now under the R-APDRP programme, meters with AMR based facility are being fixed up to the Distribution transformer level along with ring fencing. This will allow recording of energy at the same instant across the various voltage levels aiding the auditing of energy generated, transmitted and distributed. It is respectfully submitted that, based on the results of this programme, the same will be expanded to cover the entire state.

8.6.7 **Funding :**

It is submitted that, based on the substations and lines finalized under the master plan for 5 years, funding agencies like Rural Electrification Corporation(REC) and Power Finance Corporation(PFC) will be approached for funding the selected substations and associated distribution lines and other improvement works.

Under Part-A of RPADRP, the Government of India has sanctioned Detailed Project Reports (DPRs) for 110 towns at a total cost of Rs. 417 Crores for IT implementation in addition to Rs. 182.17 crores for SCADA and DMS implementation in seven eligible towns in the State. The above scheme is to be completed by 30.6.2012.

An amount of Rs 3279.56 crores under Part – B of RAPDRP for 87 towns had been sanctioned. The above scheme is to be completed by February 2014 of which sanction has been accorded and works are expected to be taken up shortly.

9.0 Finally, it is respectfully submitted that, TANGEDCO is taking all measures that are required to bridge the gap between demand and supply at the earliest. The present power crisis and shortage of supply is expected to last only for less than one year. All the restrictions will be eased gradually and normal supply will be ensured by June 2012. Within the next 5 years,

Tamil Nadu will turn out to be a state with surplus power and TANGEDCO will endeavor its best to achieve this objective.

10.0 Prayer:

The petitioner respectfully requests the Hon'ble Commission

- (i) To permit TANGEDCO to implement the Restriction and control measures until June 2012 when TANGEDCO is poised for self sufficiency.
- (ii) It is also submitted to the Hon'ble Commission that periodically the position will be placed for review by the Hon'ble Commission.
- (iii) It is also submitted that depending on the availability of power, partial relaxation will also be considered by the TANGEDCO whenever the situation permits.

Solemnly affirmed at Chennai,
On this the 19th day of September 2011
and signed his name in my presence

BEFORE ME

ADVOCATE: CHENNAI

**BEFORE THE HON'BLE TAMILNADU
ELECTRICITY REGULATORY
COMMISSION,CHENNAI**

M.P.No.15 / 2011

**Tamil Nadu Generation and
Distribution Corporation
Limited.,
No:144, Anna Salai,
Chennai – 600 002.**

Petitioner

Versus

NIL

..... Respondent

**Comprehensive Proposal to
overcome the power shortage in
the State of Tamil Nadu to enable
the lifting of Restriction &
Control measures.**

**P.H.VINODH PANDIAN
COUNSEL FOR PETITIONER**

ANNEXURE-A
**Growth rate based on energy consumption (with Load Shedding/ Power restriction
but without frequency correction)**

Sl. No.	Particulars	05-06	06-07	07-08	08-09	09-10	10-11
1	Domestic (MU)	11052	12034	12997	13294	15362	16343
2	Commercial (MU)	3967	4698	5024	5068	5737	6511
3	Public lighting & water works (MU)	1179	1295	1331	1353	1537	1600
4	Cottage Industries (MU)	967	903	965	949	605	122
5	Industries (MU)	15345	18334	20135	20080	19251	22721
6	Agriculture (MU)	9804	10610	10922	10528	12428	12201
7	Miscellaneous Sales (MU)	1268	1389	1475	1793	2857	1994
8	Sales with in State (add 1 to 7)	43582	49263	52849	53065	57777	61492
9	T&D Losses in MU (18%)	9566	10814	11581	11648	12578	13498
10	Energy Generated in MU	53148	60077	64430	64713	69878	74990
11	Load Shedding and R&C in MU				5493	5738	7992
12	Total energy requirement in MU	53148	60077	64430	70206	75616	82982
13	Sustained Demand Met (MW)	8209	8803	9121	9459	10046	10670
14	Load growth in %	6.7	13.0	7.2	8.9	7.7	9.7
Compounded Annual Growth Rate of last six years is 7.86%							

Annexure - B

Load Growth		
	Max	Average
2005	6503.4	5950.4
2006	6963.3	6515.1
2007	7629	7060.9
2008	8224.5	7630.4
2009	9312.5	8643.6
2010	10014.7	9180.7
Growth Percentage		
	Max	Average
2005-2006	7.07	9.49
2006-2007	9.56	8.38
2007-2008	7.81	8.07
2008-2009	13.23	13.28
2009-2010	7.54	6.21
Compound	7.48	7.51

Annexure - C

Power Supply-Demand Projection (2011-12 to 2016-17) (8% growth rate)

Year	Installed Capacity in MW	Expected availability from 10237 MW	Capacity Addition during the year in MW	Net Availability added during the year (MW)	Total Availability in MW	Projected Demand (MW)	Deficit/ Surplus (MW)	Spinning Reserve (MW)	Net Deficit (MW)
	B		C		D	E	F=(D-E)	G = (5% of B(I))	H= (F-G)
A	I	II	I	II					
2010-11	10237	8000			8000	11539			
2011-12	14155	8000	3918	3263	11263	12462	-1199	708	-1907
2012-13	15249	8000	1094	921	12184	13459	-1275	762	-2038
2013-14	15774	7592	525	446	12222	14536	-2314	789	-3103
2014-15	15774	7188			11818	15699	-3881	789	-4670
2015-16	18194	6726	2420	2069	13425	16955	-3530	910	-4440
2016-17	26194	6620	8000	6800	20119	18311	1808	1310	498

Seasonal and infirm capacity is not considered here

Availability is based on CEA norms that 85% for thermal & nuclear units and 88% for gas units and based on the water storage for hydro units.

Sustained peak met (10089 MW)+LS (800 MW)+20%power cut(400MW)+Agri relief(250MW) =11539MW on 15.03.2011

2013-14 Ennore TPS (250MW) retires and PPA withGMR Vasavi (196 MW) expires

2014-15 NLC TPS 1 (475 MW) retires

2015-16 TTPS retires (420MW) and PPA with SPC (105MW) expires

2016-17 PPA with MPC (106 MW) expires

Annexure - D

Power Supply-Demand Projection (2011-12 to 2021-22) (8% growth rate)

Year	Installed Capacity in MW	Expected availability from 10237 MW	Capacity Addition during the year in MW	Net Availability added during the year (MW)	Total Availability in MW	Projected Demand (MW)	Deficit/ Surplus (MW)	Spinning Reserve (MW)	Net Deficit (MW)
	B		C		D	E	F=(D-E)	G = (5% of B(I))	H= (F-G)
A	I	II	I	II					
2010-11	10237	8000			8000	11539			
2011-12	14155	8000	3918	3263	11263	12462	-1199	708	-1907
2012-13	15249	8000	1094	921	12184	13459	-1275	762	-2038
2013-14	15774	7592	525	446	12222	14536	-2314	789	-3103
2014-15	15774	7188			11818	15699	-3881	789	-4670
2015-16	18194	6726	2420	2069	13425	16955	-3530	910	-4440
2016-17	26194	6620	8000	6800	20119	18311	1808	1310	498
2017-18	30877	6620	4683	3980	24099	19776	4323	1544	2779
2018-19	31277	6620	400	340	24439	21358	3081	1564	1517
2019-20	31677	6620	400	340	24779	23067	1712	1584	128
2020-21	32577	6507	900	765	25431	24912	519	1629	-1110
2021-22	33192	6454	615	522	25900	26905	-1005	1660	-2665

Seasonal and infirm capacity is not considered here

Availability is based on CEA norms that 85% for thermal & nuclear units and 88% for gas units and based on the water storage for hydro units.

Sustained peak met (10089 MW)+LS (800 MW)+20%power cut(400MW)+Agri relief(250MW) =11539MW on 15.03.2011

2013-14 Ennore TPS (250MW) retires and PPA withGMR Vasavi (196 MW) expires

2014-15 NLC TPS 1 (475 MW) retires

2015-16 TTPS retires (420MW) and PPA with SPC (105MW) expires

2016-17 PPA with MPC (106 MW) expires

2020-21 PPA with Aban (113 MW) expires

2021-22 PPA with Pioneer Power Limited (53 MW) expires

This schedule requires periodical review

Annexure - E

Power Supply-Demand Projection (2011-12 to 2021-22) (8% growth rate with Case 1 Bidding)

Year	Installed Capacity in MW	Expected availability from 10237 MW	Capacity Addition during the year in MW	Net Availability added during the year (MW)	Power available from Case I	Total Availability in MW	Projected Demand (MW)	Deficit/ Surplus (MW)	Spinning Reserve (MW)	Net Deficit (MW)
	B		C		D	E	F	G=(E-F)	H = (5% of B(I))	I= (G-H)
A	I	II	I	II						
2010-11	10237	8000				8000	11539			
2011-12	14155	8000	3918	3263		11263	12462	-1199	708	-1907
2012-13	15249	8000	1094	921	1900	14084	13459	625	762	-138
2013-14	15774	7592	525	446	2900	15122	14536	586	789	-203
2014-15	15774	7188			3900	15718	15699	19	789	-770
2015-16	18194	6726	2420	2069	3900	17325	16955	370	910	-540
2016-17	26194	6620	8000	6800	900	21019	18311	2708	1310	1398
2017-18	30877	6620	4683	3980		24099	19776	4323	1544	2779
2018-19	31277	6620	400	340		24439	21358	3081	1564	1517
2019-20	31677	6620	400	340		24779	23067	1712	1584	128
2020-21	32577	6507	900	765		25431	24912	519	1629	-1110
2021-22	33192	6454	615	522		25900	26905	-1005	1660	-2665

Seasonal and infirm capacity is not considered here

Availability is based on CEA norms that 85% for thermal & nuclear units and 88% for gas units and based on the water storage for hydro units.

Sustained peak met (10089 MW)+LS (800 MW)+20%power cut(400MW)+Agri relief(250MW) =11539MW on 15.03.2011

2013-14 Ennore TPS (250MW) retires and PPA withGMR Vasavi (196 MW) expires

2014-15 NLC TPS 1 (475 MW) retires

2015-16 TTPS retires (420MW) and PPA with SPC (105MW) expires

2016-17 PPA with MPC (106 MW) expires

2020-21 PPA with Aban (113 MW) expires

2021-22 PPA with Pioneer Power Limited (53 MW) expires

Annexure - F

Power Supply-Demand Projection (2011-12 to 2021-22) (8% growth rate with Case I and DSM Measures)

Year	Installed Capacity in MW	Expected availability from 10237 MW	Capacity Addition during the year in MW	Net Availability added during the year (MW)	Power available from Case I	Total Availability in MW	Projected Demand (MW)	Reduction in demand expected to DSM measures	Projected Net Demand (MW)	Deficit/ Surplus (MW)	Spinning Reserve (MW)	Net Deficit (MW)
	B		C		D	E	F	G	H	G=(E-H)	H = (5% of B(I))	I= (G-H)
A	I	II	I	II								
2010-11	10237	8000				8000	11539	577	10962			
2011-12	14155	8000	3918	3263		11263	12462	623	11839	-576	708	-1284
2012-13	15249	8000	1094	921	1900	14084	13459	673	12786	1298	762	535
2013-14	15774	7592	525	446	2900	15122	14536	727	13809	1312	789	524
2014-15	15774	7188			3900	15718	15699	785	14914	804	789	15
2015-16	17094	6726	1320	1122	3900	16378	16955	848	16107	271	855	-584
2016-17	25094	6620	8000	6800	900	20072	18311	916	17395	2676	1255	1422
2017-18	29777	6620	4683	3980		23152	19776	989	18787	4365	1489	2876
2018-19	30177	6620	400	340		23492	21358	1068	20290	3202	1509	1693
2019-20	30577	6620	400	340		23832	23067	1153	21913	1919	1529	390
2020-21	31477	6507	900	765		24484	24912	1246	23666	818	1574	-756
2021-22	32092	6454	615	522		24953	26905	1345	25560	-607	1605	-2211

Seasonal and infirm capacity is not considered here

Availability is based on CEA norms that 85% for thermal & nuclear units and 88% for gas units and based on the water storage for hydro units.

Sustained peak met (10089 MW)+LS (800 MW)+20%power cut(400MW)+Agri relief(250MW) =11539MW on 15.03.2011

2013-14 Ennore TPS (250MW) retires and PPA withGMR Vasavi (196 MW) expires

2014-15 NLC TPS 1 (475 MW) retires

2015-16 TTPS retires (420MW) and PPA with SPC (105MW) expires

2016-17 PPA with MPC (106 MW) expires

2020-21 PPA with Aban (113 MW) expires

2021-22 PPA with Pioneer Power Limited (53 MW) expires

Annexure - G

Capacity addition during 2011-12 to 2021-22

Sl. No.	Name of the Projects	Type	Sector	Installed capacity/ Share	Availability	Targetted date of Commissioning
A	2011-2012					
1	Neyveli TS-II Units - I & II (2x250MW)	Thermal	Central	230	195.5	June-11 for Unit 1* Jan-12 for Unit 2
2	Bhavani Kattalai Barrage - II (2x15MW)	Hyd	State	30		Commissioned on 28.7.11(Unit -1), Sep -11 (Unit2)
3	Simhadhri Stage -2, Units - 3 & 4 (2x500MW)	Thermal	Central	190	161.5	Sep-11 for Unit 3 Jan-12 for Unit 4
4	Periyar vaigai SHEP -II (2.5MW)	Hyd	State	2.5		Sep-11
5	Periyar vaigai SHEP -IV (2.5MW)	Hyd	State	2.5		Sep-11
6	Kudankulam APS (2x1000MW)	Nuclear	Central	925	786.3	Oct-11 for Unit 1 March 12 for Unit 2
8	Bhavani Barrage - II (2x5MW)	Hyd	State	10		Dec-11
9	NTPC-TNEB at Vallur Stage - I (2x 500MW)	Thermal	JV	694	589.9	Dec-11(Unit -1), Mar-12 (Unit-2)
10	Periyar vaigai SHEP -III (2x2MW)	Hyd	State	4		Dec-11
11	Bhavani Kattalai Barrage - III (2x15MW)	Hyd	State	30		Feb-12(unit-1) Mar-12(unit-2)
12	North Chennai TPS Stage- 2 (2x600MW) Units 1 & 2	Thermal	State	1200	1020.0	Jan-12(unit-2) Feb-12 (unit-1)
14	Mettur TPS Stage - 3 (1x600MW)	Thermal	State	600	510.0	March-12
	Total A			3918	3263.2	
* The unit 1 has been synchronised with the grid, but yet to start commercial operation						
B	2012-13					
1	Bhavani Barrage - I (2x5MW)	Hyd	State	10		May-12
2	PFBR Kalpakkam (1x500MW)	Nuclear	Central	167	142.0	May-12
3	Modification of 12 Sugar Mills	Thermal	State	183	155.6	May/June - 12
4	NTPC-TNEB at Vallur Stage II (500MW)	Thermal	JV	347	295.0	Oct-2012
5	NLC-TNEB at Tuticorin (2x500MW)	Thermal	JV	387	329.0	Dec-12 (unit-1) Nov -12 (unit-2)
	Total B			1094	921	
C	2013-14					

Sl. No.	Name of the Projects	Type	Sector	Installed capacity/ Share	Availability	Targetted date of Commissioning
1	M/s SPIC Electric project, Tuticorin	Thermal	IPP	525	446.3	2013-14
	Total C			525	446.3	
D	2015-16					
1	ETPS Annexe (1x600MW)	Thermal	State	600	510.0	2015-16
2	Kundah Pumped Storage Scheme (4x125 MW)	Hydro	State	500	437.5	2015-16
3	M/s Cuddalore Power Project	Thermal	IPP	1320	1122.0	2015-16
	Total C			2420	2069.5	
E	2016-17					
1	North Chennai TPS Stage-3 STPS	Thermal	State	800	680.0	2016-17
2	TNEB-BHEL JV at Udangudi (1600MW)	Thermal	JV	1600	1360.0	Oct-2016 (Unit 1) Mar-2017 (Unit 2)
3	North Chennai TPS Stage-4 STPS	Thermal	State	1600	1360.0	June-16(Unit 1) Dec-16(Unit 2)
4	Tamil Nadu at Cheyyur (4000 MW)	Thermal	UMPP	1600	1360.0	2016-17
5	TTPS Stage 4	Thermal	State	800	680.0	2016-17
6	Uppur TPP at Ramanathapuram District (2x800MW)	Thermal	Tariff based competitive bidding	1600	1360.0	2016-17
	Total D			8000	6800	
F	2017-18					
1	NLC new TPS 2x500 MW (Retirement of NLC TPS-1 of 600 MW)	Thermal	Central	653	555.1	2017-18
2	Udangudi Expansion Stage II	Thermal	State	800	680.0	2017-18
3	Replacement of existing Ennore TPS	Thermal	State	600	510.0	2017-18
4	LNG based power plant at North Chennai	Gas	State	2000	1700	2017-18
5	M/s Lanco Infra tech	Thermal	IPP	630	535.5	2017-18
	Total E			4683	3980.6	
G	2018-19					
1	Krishnapatnam / AP, 3960MW, (6X660MW)	Thermal	UMPP	400	340.0	2018-19 for Unit 1, 2 & 3
	Total F			400	340	

Sl. No.	Name of the Projects	Type	Sector	Installed capacity/ Share	Availability	Targetted date of Commissioning
H	2019-20					
1	Krishnapatnam / AP, 3960MW, (6X660MW)	Thermal	UMPP	400	340.0	2019 - 20 for Unit 4, 5 & 6
	Total G			400	340	
I	2020-21					
1	Orissa Stage-1 Bedhabehal	Thermal	UMPP	300	255.0	2020-21
2	Orissa Stage-2 at Ghogarpalli	Thermal	UMPP	600	510.0	2020-21
	Total G			900	765	
J	2021-22					
1	Andhra Pradesh at Pragasam Dist., 4000 MW - Tatiya Andhra mega power ltd.,	Thermal	UMPP	115	97.8	2021-22
2	Kudigi STPS Stage-1 (3x800MW)	Thermal	Central	500	425.0	2021-22
	Total G			615	522.75	
	Total			22955	19449	

State	9772	8243
JV	3028	2574
Central/Share	6080	5168
IPP	4075	3464
Total	22955	19449

Note: Apart from the above additions, medium term purchase of 900 MW each year also is planned through case 1 bidding. This also can be considered as a capacity addition.

Annexure - H

Status of pending Open Access application(under process)

Sl.No	Application No	Date of receipt application	Applications Name	Date of approval	Pendency duration (days)	Capacity (MW)	Reason of pendency
1		5.1.2009	M/s Cauvery Power Generation Chennai Private Ltd(Formerly Elango Industries Ltd)			63 MW	Load flow study completed. Evacuation work is under progress..
2		21.1.2010	M/s Kamachi Sponge and Power Corporation Ltd			70 MW	Load flow study completed..Grid connectivity is being given..
3		19.9.2008	M/s Tannex Power Generation Ltd,Cuddalore			2X55 MW	The company has not accepted for revised load flow study.
4		24.11.2009	M/s Shree Rengaraj Ispat Pvt Ltd			30 MW	Load flow study completed. Evacuation work under progress.
5		8.12.2009	M/s India Cements Ltd			48 MW	Load flow study completed.Estimate sanction is under progress.
6		19.10.09	M/s Ind Barath Thermal Power Ltd			3X150 MW	Co. has filed MP42 of 2010 in TNERC regarding tower cost.TNERC orders passed.Further action is being taken.
7		18.2.2010	M/s Nagapattinam Energy			150 MW	Load flow study completed.. Estimate sanction under progress..
8		14.12.2009	M/s Accord Energy			2X80 MW	Load flow study completed.consent awaited from the co.
9		22.1.2010	M/s TCP Ltd			100 MW	Load flow study completed.consent awaited from the co.
10		22.2.2010	M/s OPG Power Gen			3X80 MW	Load flow study completed. Evacuation work is under progress.

11		12.4.2010	M/s ARS metals Ltd			2x60 MW	Load flow study completed Company requested alternate proposal for evacuation. Which is under scrutiny.
12		4.3.2010	M/s Suryadev			2X35+ 10 MW	Load flow study completed. consent awaited from the co.
13		13.5.2010	M/s Saheli Exports			18 MW	The company have stated that the capacity of the additional plant is 30 MW instead of 18 MW. Fresh application for 30 MW awaited.
14		11.6.2010	M/s Sterlite Industries Ltd			2X80 MW	Load flow study completed. Evacuation work under progress.
15		15.6.2010	M/s Arkay Energy(Rameswaram) Ltd			53 MW	Load flow study completed. Estimate sanction under progress.
16		2.8.2010	M/s Tulsyan NEC Ltd			2X35 MW	Load flow study completed Company requested alternate proposal for evacuation. Which is under scrutiny..
17		6.9.2010	M/s Seshasayee Paper Boards Ltd			16 MW	Load flow study completed. Estimate sanction under progress.
18		28.3.2011	M/s Madras Cements Ltd, Ariyalur			40 MW	Load flow study completed, The company has given consent for the estimated amount for carrying out the work towards transmission scheme.
19		30.3.11	M/s Manali Petro Chemical Ltd			2X1500 KVA 3.3 KV DG sets(2.7 MW)	Load flow study for grid connectivity alone under progress.

20		9.8.2011	M/s Bhatia Coke & Energy Ltd			12.5 MW	Load Flow Study under progress.
21			M/s Nagai Power			300 MW	Revised load flow study under progress as per company's request.

Annexure I**List of Merchant Power Plant Promoters in the state**

SL. No	Name of Company	Place	Capacity in MW	Investment
1	M/s. Coastal Energen Pvt. Ltd.,	Tuticorin	1000	Rs.4297 crs.
2	M/s. Tridem Port & Power Co. Pvt. Ltd.,	Nagapattinam	2000	Rs.9040 crs.
3	M/s. UDI Infrastructure Pvt. Ltd.	Cuddalore	2000	Rs.10,000 crs.
4	M/s. Sri City Infrastructure Dev. Pvt. Ltd.	Manapad	1000	US \$ 1125 million
5	M/s. Ind-Bharath Power (Madras) Pvt. Ltd.,	Tuticorin	1320	Rs.4860 crs.
3	M/s. PEL Power Ltd.	Nagapattinam	1320	Rs.5800 crs.
7	M/s. NSL Nagapatnam Power & Infratech Pvt. Ltd.	Nagapattinam	1500	Rs.6750 crs.
8	M/s. IL&FS Tamil Nadu Power co. Ltd.	Cuddalore	4000	Rs.250 billion
9	M/s. Apollo Infrastrcuture Projects Finance Co. Pvt. Ltd.	Marakkanam	2000	Rs.8000 crs.
10	M/s. SRM Energy Pvt. Ltd.,	Cuddalore	2000	Rs.4500 crs.
		Total	18140	

Annexure - J

Capacity addition in state sector during 2011-12 to 2016-17

Sl. No.	Name of the Projects	Type	Sector	Installed capacity/ Share	Availability	Targetted date of Commissioning
A	2011-2012					
1	Bhavani Kattalai Barrage - II (2x15MW)	Hyd	State	30		Commissioned on 28.7.11(Unit -1), Sep -11 (Unit2)
2	Periyar vaigai SHEP -II (2.5MW)	Hyd	State	2.5		Sep-11
3	Periyar vaigai SHEP -IV (2.5MW)	Hyd	State	2.5		Sep-11
4	Bhavani Barrage - II (2x5MW)	Hyd	State	10		Dec-11
5	Periyar vaigai SHEP -III (2x2MW)	Hyd	State	4		Dec-11
6	Bhavani Kattalai Barrage - III (2x15MW)	Hyd	State	30		Feb-12(unit-1) Mar-12(unit-2)
7	North Chennai TPS Stage- 2 (2x600MW) Units 1 & 2	Thermal	State	1200	1020.0	Jan-12(unit-2) Feb-12 (unit-1)
8	Mettur TPS Stage - 3 (1x600MW)	Thermal	State	600	510.0	March-12
	Total A			1879	1530.0	
B	2012-13					
1	Bhavani Barrage - I (2x5MW)	Hyd	State	10		May-12
2	Modification of 12 Sugar Mills	Thermal	State	183	155.55	May/June - 12
	Total B			193	155.55	
C	2015-16					
1	ETPS Annexe (1x600MW)	Thermal	State	600	510.0	2015-16
2	Kundah Pumped Storage Scheme (4x125 MW)	Hydro	State	500	437.5	2015-16
	Total C			1100	947.5	
D	2016-17					
1	North Chennai TPS Stage-3 STPS	Thermal	State	800	680.0	2016-17
2	North Chennai TPS Stage-4 STPS	Thermal	State	1600	1360.0	June-16(Unit 1) Dec-16(Unit 2)
3	TTPS Stage 4	Thermal	State	800	680.0	2016-17
	Total D			3200	2720	
	Total			6372	5353	