TAMIL NADU ELECTRICITY REGULATORY COMMISSION
(Constituted under section 82 (1) of the Electricity Act, 2003)
(Central Act 36 of 2003)

PRESENT:-

Thiru S. Akshayakumar …. Chairman

and

Thiru.G.Rajagopal …. Member

P.P.A.P.No.8 of 2011

Tamil Nadu Generation and Distribution
Corporation Ltd.
Represented by the Chief Engineer / NCES
144, Anna Salai
Chennai – 600 002.

… Petitioner
Thiru P.H.Vinod Pandian

Vs

1. M/s.M.R.Krishnamoorthy Co-operative
Sugar Mills Limited
Sethiathpe
Cuddalore District.

2. M/s.Cheyyar Co-operative Sugar Mills Ltd.
Anakavoor
Thiruvannamalai District.

3. M/s.Dharani Sugars & Chemicals Ltd.
No.57, Sterling Road
Nungambakkam
Chennai – 600 034.

4. M/s.Kothari Sugars & Chemicals Ltd.
115, Mahatma Gandhi Salai
Chennai – 600 034.

5. M/s.Terra Energy Ltd.
112, Uthamar Gandhi Salai
Chennai – 600 034.

6. M/s.Auro Energy Ltd.
(Merged with Shree Ambika Sugars Ltd.)
112, Uthamar Gandhi Salai, Chennai – 600 034.

7. Shree Ambika Sugars Ltd.
112, Uthamar Gandhi Salai
Chennai – 600 034.

8. M/s.EID Parry (India) Ltd.
“Dare House”, 234, N.S.C. Bose Road
Chennai – 600 001.

9. M/s.Subramaniya Siva Co-operative Sugar Mills Ltd.
Harur
Dharmapuri District.

10. M/s.Bannari Amman Sugars Ltd.
1212, Trichy Road
Coimbatore – 641 018.

11. M/s.Arunachalam Sugars Ltd.
Ariyur
Kandamangalam P.O.
Pondicherry.

12. M/s.Shakthi Sugars Limited
Sakthi Nagar 638 315
Erode District.

13. M/s.Rajashree Sugars & Chemicals Ltd.
338, Avinashi Road
Peelamedu
Coimbatore 641 004.

….Respondents
Thiru R.Bala Ramesh
(Counsel for Respondents 1, 2 and 9)
Thiru Rahul Balaji
(Counsel for the Respondents 3 to 8,
10,12 and 13)

Dates of hearing : **24-01-2012, 20-12-2012,12-02-2013**
29-01-2014, 25-03-2014, 21-04-2014
20-04-2015 and 05-10-2015.

Date of order : **31-03-2016**

The above P.P.A.P.No.8 of 2011 came up for final hearing before the Commission on 05-10-2015. The Respondents 3 to 8,10,12 and 13 have filed their respective counters in respect of the above PPAP filed by TANGEDCO and made their submission through their Counsel Thiru Rahul Balaji and orders were reserved by the Commission on 20-04-2015. While so, the Respondents 1, 2 and 9 who are Cooperative Sugar Mills and who have not filed their counter earlier have since filed I.As. with the prayer to re-open the matter to hear their side also before passing the final order. The Commission after hearing their submissions through their Counsel Thiru R.Bala Ramesh, allowed the I.As. and permitted the said Respondents to file their submissions by way of Written Submission. Accordingly, they filed their Written Submission through their Counsel and put forth their submissions in Open Court on 05-10-2015. The Commission upon perusing the above PPAP and the connected records and after hearing all the parties to the PPAP passes the following order:-

ORDER

1. Prayer of the Petitioner:-

The prayer of the Petitioner is to -

(a) fix power purchase tariff applicable for Bagasse based co-generation plants commissioned based on Power Purchase Agreements entered prior to 15-05-2006 without considering the interest on loan component for the plants completed 11 years service and without considering the fixed cost for the plants completed 20 years service.

(b) fix power purchase tariff for the sugar mill co-generation plants having tie up arrangement with TNPL for supply of bagasse on exchange of coal, thus using fossil fuel for power generation throughout the year (i.e.) during crushing and non-crushing seasons and commissioned based on the Power Purchase Agreements entered before 15-05-2006, without considering the interest on loan component for the plants completed 11 years service and without considering the fixed cost for the plants completed 20 years service.

2. Facts of the Case:-

Prior to the Electricity Act, 2003, the power purchase tariff for Bagasse based co-generation has been regulated by G.O.Ms.No.230, Ind., dated 16-06-1993, B.P. (FB) No.96, dated 31-03-1995 B.P. (FB) No.91, dated 10-06-1998, Per B.P.(F.B.)No.1, dated 11-01-2000, Per B.P. (FB) No.59, dated 11-04-2000, Per B.P. (FB)No.93, dated 16-05-2000 and Per B.P. (FB) No.92, dated 07-07-2001. The Tariff Order No.3 of 2006, made by the Commission was applicable to power plants covered under PPA, issued after 15-05-2006. Hence, present petition has been filed by the TANGEDCO for fixing tariff for power plants under PPA signed prior to 15-05-2006 for the unexpired period of PPA.

3. Contentions of the Petitioner in the PPAP:-

3.1. The Commission vide its order dated 11-07-2011 in P.P.A.P.No.3 of 2011 made the following direction to the TANGEDCO:-

(a) To submit the revised comments on fixation of power purchase tariff for Bagasse based co-generation plants commissioned prior to 15-05-2006.

(b) To furnish the list of Bagasse based co-generation plants commissioned based on Power Purchase Agreements entered after 10-06-2003.

(c) To submit a separate petition for Bio-mass generators and separate petition for bagasse based co-generators.

3.2. In sugar mill co-generation plant, bagasse produced from crushing the sugar cane is used for power generation during crushing season of the sugar mill. During non-crushing season either stored or bought out bagasse or coal is used for power generation. The surplus power available after their home load consumption is being supplied to the TANGEDCO. At present 28 Bagasse co-generation plants with a combined total capacity of 637.4 MW are in service across the State. Out of which, 16 sugar mill power plants with a total capacity of 297.6 MW have been commissioned over the period from 1992 to 2006 based on the Power Purchase Agreements entered before 15-05-2006.

3.3. The Government of Tamil Nadu have issued G.O.Ms.No.230, Industries, dated 16-06-1993 fixing power purchase tariff at HT industrial tariff rate less 2% towards transmission loss for sugar mill co-generation plants in Tamil Nadu.

3.4. In order to encourage NCES based power generation in Tamil Nadu, taking into consideration of guidelines dated 25-11-1994 issued by the MNES (presently MNRE) in which State Electricity Boards were conferred to fix the power purchase tariff, remunerative power purchase tariff of Rs.2.25 per unit was fixed for the year 1995-1996 with 5% annual escalation for the period of 5 years vide Permanent B.P. (FB) No.96 dated 31-03-1995. Out of power exported 2% is deducted towards line loss.

3.5. As per permanent B.P. (FB) No.1 dated 11-01-2000, power purchase tariff of Rs.2.73 per unit for the year 2000-2001 with 5% annual escalation for the period of nine years upto 2010, was fixed. It was stipulated therein that the price so fixed shall not exceed 90% of the prevailing HT industrial Tariff 1A which may be got revised from time to time. On attaining 90% of the HT industrial tariff rate (Rs.3.50 per unit), the power purchase tariff was plugged at Rs.3.15 per unit in the year 2003-2004.

3.6. As per permanent B.P. (FB) No.92 dated 07-07-2001, the following power purchase prices are fixed:-

(a) To apply Bagasse based co-generation rate contemplated vide B.P. (FP) No.1, dated 11-01-2000 only for that portion of energy exported by the sugar mills during the period from December to June of the succeeding year using bagasse as fuel with no provision of extension of season for claiming the above rate.

(b) To pay at captive power rate (i.e. Rs.2.48 per unit for 2000-2001 with 5% annual escalation for a period of nine years) as stipulated vide B.P. (FB) No.93 dated 16-05-2000 for the power received from sugar mills during the period from July to November, irrespective of the type of fuel used in the boiler including bagasse.

3.7. The power purchase tariff applicable for captive power plant is adopted for their sugar mill co-generation plants who had tie up arrangements with TNPL for supply of bagasse and using coal as fuel for power generation throughout the year i.e. during crushing and non-crushing seasons.

3.8. A batch of petitions filed by the various sugar mill companies in W.P.Nos.20624 – 20629 of 2010, W.P.Nos.20730 – 20733, 20820, 20821 of 2000 and W.P.Nos.21525–21529 of 2000 filed before the High Court of Madras with the prayer to direct the Tamil Nadu Electricity Board to fix the tariff payable to the sugar mills which have set up co-generating plants, in accordance with G.O.Ms.No.230 dated 16-06-1993, was dismissed.

3.9. The power purchase tariff applicable for Bagasse based co-generation plants for further period from 01-04-2010 has to be fixed. In Tariff Order No.3 of 2009, fixed cost for 20 years and interest on loan for 11 years, have been considered. For the plants served more than 11 years, the interest on loan component may not be considered. For the plants served more than 20 years, only fixed cost may not be considered for fixation of tariff.

4. Contentions of the Respondents 3-8, 10, 12 and 13 in their Counter dated 10-03-2012:-

A detailed counter has been filed by the Respondent 7, the contentions of which were adopted by the Respondents 3 to 6, 8, 10, 12 and 13 by way of adoption counter.

4.1. The promotion of energy from renewable sources of energy and / or co-generation is pursuant to international policies and treaties including U.N. General Assembly Resolutions. India is a party to the same. The object is to preserve environment and the natural resources of the planet and to achieve sustainable development and inter-generational equity. The Central Government and the State Governments are obliged and required to initiate and pursue policies for promotion of energy from renewable sources, including cogeneration by sugar mills and all instrumentalities of the State (including the TANGEDCO) are bound to act in accordance with all such policies and directions.

4.2. The Central Government is competent (Article 73 read with Article 253 of the Constitution) and is bound to initiate policies to implement the same, and the State Governments are required to act in consonance therewith. The first policy initiatives of the Central Government, including the enabling legislative measures, were first set out in the gazette Resolution dated 22-10-1991. Several other policy initiatives and guidelines were issued subsequently, also with regard to renewable sources of energy, and these were expected to be followed by the States and also the financial institutions and the statutory instrumentalities of the State.

4.3. The Government of India, Ministry of Power issued a policy on 22-10-1991 known as policy on private participation in the power sector. Clause 4.5 therein, inter-alia, provided that generating companies could enter into agreements for sale of electricity to any person with the consent of the competent Government. Section 43-A was introduced in the Electricity (Supply) Act, 1948 by Act 50 of 1991.

4.4. Consequent thereto, the Government of Tamil Nadu under G.O.Ms.No.724 (Industries MIC.I) Department, dated 23-12-1992, based on the D.O. letter No.11152/B1/89 dated 06-11-1992 and D.O. No.36429/E1/92, dt. 19-04-1993 from the Commissioner of Sugar, constituted a Committee known as “Co-generation (Sugar Mills) Committee” to go into the issues concerning co-generation of electricity in sugar mills and make suitable recommendations to the Government. Member (Generations), Tamil Nadu Electricity Board was also a member of the Committee.

4.5. Accepting the report of the Committee, the Government of Tamil Nadu issued G.O.Ms.No.230, Industries (MISC.I) Department, dt. 16-06-1993 wherein it has directed, inter-alia, as follows:-

"*(i)* ***Price of Co-generated Power:***

For the power supplied to the State grid by the co-generating sugar mills, Tamil Nadu Electricity Board shall pay a price equal to HT-1 tariff charged for industrial consumers less 2% for transmission cost.

(ii) ***Time limit for payment:***

The Tamil Nadu Electricity Board shall be required to make the payment for the power purchased from the co-generating mills within 30 days of the date of receipt of invoices from the mills with a suitable rebate / surcharge for earlier / later payments. The rebate / surcharge shall be decided taking into account the prevailing bank interest rates".

The said G.O. was a directive under section 78-A of the Electricity (Supply) Act, 1948.

4.6. On 01-01-1994 there were policy announcements by the Government of India, Ministry of Non-Conventional Energy Sources (MNES), on remunerative tariff for Non-Conventional energy sources as a part of the obligations to honour the International Treaty to which India was a signatory. On 25-11-1994, the Central Government issued following guidelines for fixation of purchase price for power produced from non-conventional energy:-

(i) The State Electricity Board will announce a base purchase price every year for the electrical energy purchased by it from non-conventional energy based power projects. These rates shall be valid from 1st April to 31st March of the following year. The base electrical energy purchase price valid for 1994-95 shall be a minimum of Rs.2.25/Kwh. The base price shall be escalated at a minimum rate of 5% every year. Announcement of the revised base prices shall be made by the SEB on

1st April every year. The base price shall be applicable to all non-conventional energy based power projects based on solar, wind, small hydro, biomass etc. for which Power Purchase Agreements are signed during a year.

(ii) A promoter / developer shall be entitled to receive the base price set out in the PPA for all electrical energy delivered from his project to the State Grid for the duration of the Power Purchase Agreement the rate shall be equal to base price in the year of signing of PPA, escalated at the rate of 5% per year for a period of 10 years, from the date of signing of the Power Purchase Agreement. From the end of the 10th year, and for the remaining duration of the Power Purchase Agreement, the new purchase price shall be equal to the purchase price at the end of the 10th year, or the High Tension (HT) tariff prevalent in the State at that time, whichever is higher.

4.7. The TNEB notified the tariff in B.P.(F.B.) No.96 on 31-03-1995. The tariff for the power purchased from the co-generating sugar mills was fixed @ Rs.2.25/unit from 01-04-1995 with the escalation of 5% each year for the period of 5 years and the rates were to be reviewed after 5 years. TNEB requested the GoTN to amend the G.O. No.230, dated 16-06-1993. This was contrary to the MNES guidelines referred above which provided for the tariff @ Rs.2.25 per unit for the year 1994-1995. Thus, TNEB not only deviated from the MNES guidelines but also did not follow G.O. Ms.230 which fixed the tariff at the rate equivalent to HT -1 tariff.

4.8. By B.P.(F.B.) No.1 dated 11-01-2000, TNEB fixed the power purchase tariff @ Rs.2.73 per unit from 01-04-2000 as against 01-04-1999 with 5% escalation each year and capped the tariff at 90% of the prevailing HT 1 tariff. The said tariff was to be paid for 10 years upto 31-03-2010. By B.P.(F.B.) No.93 dated 16-05-2000 TNEB introduced two part tariff i.e. season / non-season and fixed the tariff @ Rs.2.73 per unit for season (December–June) and Rs.2.48 per unit for off season (July – November).

4.9. G.O.Ms.No.230 makes no distinction between the energy generated during crushing season and off-season, and the rate determined therein is applicable to all the power generated by the cogeneration power plants established by the sugar mills. This was also the basis on which the TNEB issued B.P.(F.B.) No.91 dated 10-06-1998 wherein clause 3 (i) provides that the price for power generated during the off-season using lignite is at par with the rate for the bagasse based co-generated power. This was reiterated in clause 4 (ii) of B.P.(F.B.) No.1 of 11-01-2000. Therefore, TNEB vide its B.P.(F.B.) No.93 dated 16-05-2000 fixed different and lower price for power generated using alternate conventional fuel.

4.10. The rate paid by TNEB during 2003-04 for the power purchased from the bagasse based co-generators during season was Rs.3.15 per unit. TNEB continues to pay at that rate till date to all the sugar co-generating mills as the HT-1 tariff remained stagnant from 2003-2010 @ Rs.3.50 per unit and even after its revision thereof during August 2010 to Rs.4.00 per unit as per TNERC General Tariff Order No.3 of 2010. So also from 2005-06 onwards, the TNEB paid Rs.3.01 per unit during season for all the Captive Power Plants including Bagasse Based Co-gen plants having tie up with TNPL during off season. TNEB thus through its various Board Proceedings fixed the tariff arbitrarily against the MNES guidelines and G.O.Ms.No.230, Ind, dated 16-06-1993 and sugar mills who generated electricity using bagasse during off-season were paid a lesser rate @ Rs.3.01 per unit. As per the Power Purchase Agreement executed by TNEB the season, off season rate should have been @ Rs.4.24 per unit and Rs.3.84 per unit as on 31-03-2010.

4.11. The Electricity Act, 2003 provided for a National Electricity and Tariff Policy. On 12-02-2005, the National Electricity Policy was announced which set out the policy on the non-conventional energy sources, as follows:-

> *Sec. 5.2.20: Feasible, potential of non-conventional energy sources, mainly small hydro, wind and bio-mass would also need to be exploited fully to create additional power generation capacity with a view to increase the overall share of non-conventional energy sources in the electricity mix, efforts will be made to encourage private sector participation through suitable promotional measures.*
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> *Sec.5.12.1: Non-conventional Energy Sources being the most environment friendly there is an urgent need to promote generation of electricity based on such sources of energy. For this purpose, efforts need to be made to reduce the capital cost of the projects based on Non-Conventional and Renewable Sources of Energy. Cost of energy can also be reduced by promoting competition within such projects. At the same time, adequate promotional measure would also have to be taken for development of technology and sustained growth of these sources.*
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> *Sec.5.12.2: The Electricity Act, 2003 provides that co-generation and generation of electricity from non-conventional sources would be promoted by SERCs by providing suitable measures for connectivity with grid and sale of electricity to any person and also by specifying, for purchase of electricity from such sources, a percentage of the total consumption of electricity in the area of a distribution licensee. Such percentage for purchase of power from non-conventional sources should be made applicable for the tariffs to be determined by the SERCs at the earliest. Progressively the share of electricity from non-conventional sources would need to be increased as*

prescribed by State Electricity Regulatory Commissions. Such purchase by distribution companies shall be through competitive bidding process. Considering the fact that it will take some time before non-conventional technologies compete, in terms of cost, with conventional sources, the Commission may determine an appropriate differential in prices to promote these technologies.

Sec.5.12.3: Industries in which both process heat and electricity are needed are well suited for co-generation of electricity. A significant potential for co-generation exists in the country, particularly in the sugar industry. SERCs may promote arrangements between the co-generator and the concerned distribution licensee for purchase of surplus power from such plants. Co-generation system also need to be encouraged in the overall interest of energy efficiency and also grid stability.

4.12. National Tariff Policy: Policy of Government of India (Ministry of Power) relating to NCES provides as follows:-

Section5(3)(i): Tariff fixation for all electricity projects (generation, transmission and distribution) that result in lower Green House Gas (GHG) emissions than the relevant base line should take into account the benefits obtained from the Clean Development Mechanism (CDM) into consideration, in a manner so as to provide adequate incentive to the project developers.

Section 6.0: Accelerated growth of the generation capacity sector is essential to meet the estimated growth in demand. Adequacy of generation is also essential for efficient functioning of power markets. At the same time, it is to be ensured that new capacity addition should deliver electricity at most efficient rates to protect the interests of consumers. This policy stipulates the following for meeting these objectives.

Section 6.4(1): Pursuant to provisions of section 86(1) (e) of the Act, the appropriate Commission shall fix a minimum percentage for purchase of energy from such sources taking into account availability of such resources in the region and its impact on retail tariffs. Such percentage for purchase of energy should be made applicable for the tariffs to be determined by the SERCs latest by April 1, 2006. It will take some time before non-conventional technologies can compete with conventional sources in terms of cost of electricity. Therefore, procurement by distribution companies shall be done at preferential tariffs determined by the appropriate Commission.

Section 6.4(2): Such procurement by distribution licensees for future requirements shall be done, as far as possible, through competitive bidding process under section 63 of the Act within suppliers offering energy from same type of non-conventional sources. In the long term, these technologies would need to compete with other sources in terms of full costs.

4.13. It was G.O.Ms.No.230 notified and published by the State Government as a policy direction acted as an invitation and promise to the sugar mills with regard to the price, payment terms and facilities that would be accorded to them for setting up cogeneration power plants. The sugar mills established various co-generation plants in pursuance thereto.

4.14. As per Section 61 of the Electricity Act, 2003, before fixation of tariff, the terms and conditions therefor shall be determined by the State Commission by way of Tariff Regulations and in doing so, shall be guided by certain principles set forth in the said section. While so, the Commission has vide notification No.TNERC/NCES Regn./16/1, dated February 08, 2008 issued Regulations for the purpose of determination of tariff for New and Renewable Sources of Energy. However, the said Regulations apply only to cogeneration plants, for which Power Purchase Agreements / Contracts were signed on or after the 15-05-2006.

4.15. The Commission has so far issued two tariff orders for Bagasse based cogeneration plants, namely, Order No.3 of 2006 and Order No.3 of 2009. While Order No.3 of 2006 covered the tariff fixation for cogeneration plants which were set up during the control period of three years commencing 15-05-2006, Order No.3 of 2009 superseded Order No.3 of 2006 with effect from 19-09-2008 and covered cogeneration plants set up from that date till 31-03-2011.

4.16. Order No.3 of 2006 prescribes a single part tariff which comprises both variable cost and fixed cost (including interest, depreciation and ROC) distributed over a period of 12 years and a fixed tariff at a constant rate was fixed for the entire period of 12 years. While so, Order No.3 of 2009 prescribes a two part tariff, of which the variable cost is to be notified from time to time, and the fixed cost is absorbed equally over an extended time period of 20 years. In fact, vide this order, cogeneration plants set up on or after 19-09-2008 and which were governed by the earlier Order 3 of 2006 were also converted to a two part tariff.

4.17. Whether single part tariff or two part tariff, if it were to be determined by absorption of fixed overheads at a uniform rate, distributed over the entire time period, it gives a definite advantage in the initial period due to the time value of money. This means the same amount paid in the initial years is much more valuable than when paid later. Hence, if the same methodology were applied in the matter of fixation of tariff for existing cogeneration plants only for the unexpired period of PPA, irrespective of the fact whether it is a single part tariff or a two part tariff, it will place them at a disadvantage since the fixed cost absorption prior to 01-04-2010 would not have been at the same rate as will become applicable after the said date.

4.18. Even in the matter of fixing variable cost whether as part of single part tariff or as a component of two part tariff, for plants set up before 15-05-2006, one has to contend with variations not only in vintage of the plant but also in plant configuration, whether back pressure or extraction cum condensation turbines, differences in steam cycles ranging from 42 ata to 67 ata; and 87 ata to 108 ata. As a result, critical parameters like boiler efficiency, steam fuel ratio, specific steam consumption and the resultant Station Heat Rate vary widely from plant to plant, particularly in the context of the long time span of about 10 years over which these plants have come into existence. Accordingly, computation of variable and fixed cost becomes quite complex, rendering itself difficult to be bench-marked to a standard average as in the case of new power plants whose configuration is more standardized.

4.19. As TNEB had capped the tariff at 90% of the prevailing HT-I Tariff since 2000 and paid differential tariffs for season and off-season even with the usage of bagasse, the fixed costs would not have been absorbed fully. Having regard to the foregoing, it would be appropriate and equitable that the tariff structure as obtaining prior to 31-03-2010 is maintained and continued with 5% escalation without subjecting the same to any artificial ceiling, such as 90% of the HT-I tariff and without differentiating between season from December to June and off season from July to November.

4.20 In terms of both the National Electricity Policy and the National Tariff Policy, tariff for electricity from non-conventional energy sources has to be incentivized.

Subjecting the same to an artificial and unrelated ceiling is a contradiction. The original scheme of tariff outlined vide BP (FB) No.96, dt 31-03-1995 and BP (FB) No.91 dated 10-06-1998, in terms of which a uniform tariff of Rs.2.25 per KW/hr. was made applicable for bagasse based cogeneration, linked to a base date of April 01, 1995 and providing an annual escalation of 5% over the previous year's rate, be taken as the basis and the tariff for the balance period of the PPA commencing 01-04-2010 be worked out. While doing so, the tariff should not be subjected to any artificial ceiling, such as 90% of HT 1 tariff, as was the case with the tariff applicable prior to 31-03-2010.

4.21. In an identical situation where the Commission was called upon to fix the tariff for the unexpired portion of the PPA wherein there was an agreement for tariff for only the first 10 years, in PPAP No.03 of 2008 of *TCP Limited Vs. TNEB* decided earlier, the Commission saw merit in the aforesaid approach and accordingly fixed the tariff for an existing captive power plant, consistent with the PPA by providing for the balance period of the PPA, an annual escalation at the same rate of 5% over the last applicable tariff.

4.22. Even older plants call for periodical replacement of major equipments or their components much before their normative life which warrant availment of long term loans with con-commitment interest burden. Hence, the proposal of the Petitioner as contained in the petition seeking not to consider interest on loan component for plants that had served more than 11 years and fixed cost for plants that had served more than 20 years and distinguishing between plants more than 11 years old and recent plants are not based on any sound logic.

4.23. The assumption of the Petitioner that coal is fired through-out the year by the plants having tie-up with TNPL and hence the tariff should be fixed as per the rate applicable for Captive Power Plant is not correct for the following reasons:

i) Under the present arrangement for supply of coal in exchange for Bagasse, TNPL is taking only around 60% of the total Bagasse generated, leaving the balance 40% as Bagasse pith with the Sugar Co-generator, which is fired in ad-mixer with coal. Besides, inasmuch as Bagasse is released as valuable raw material for another core industry, (viz) paper, the sugar co-generator should not be penalized by subjecting them to a differential tariff.

ii) Further in order to be classified as Captive Power Plant, the Captive use of Power must be not less than 51% of the power generated on annual basis and such plant should supply atleast 5 MW for 250 days. While so, inasmuch as sugar co-generating plant does not use 51%, for its internal / captive consumption and cannot run for 250 days as the crushing is dependent upon the cane availability, it cannot be classified as Captive Power Plant.

4.24. The Commission may be pleased to follow the original scheme of tariff outlined vide BP (FB) No.96, dt. 31-03-1995 and BP (FB) No.91, dt. 10-06-1998, in terms of which a uniform tariff of Rs.2.25 per KW / hr. was made applicable for Bagasse based co-generation, linked to a base date of 01-04-1995 and providing an annual escalation of 5% over the previous year's rate, be taken as the basis and the tariff for the balance period of the PPA commencing 01-04-2010 be fixed. While doing so, the same be considered without subjecting the same to any artificial ceiling, such as, 90% of the HT-1 tariff and without differentiating between season from December to June and off season from July to November. The Commission may also consider the substituted Bagasse arrangement with TNPL be as Bagasse based co-generation and same methodology of tariff fixation as prayed for in the preceding paragraph be adopted for Bagasse based Co-generation plants having tie-up with TNPL for the balance period of the PPA.

5. The input details furnished by the Petitioner in the affidavit dated 25-03-2014:-

5.1. The National Co-operative Development Corporation while sanctioning the loan assistance to M/s.Cheyyar Co-operative Sugar Mills Ltd. for establishment of 7.5 MW sugar mill co-generation plant, has considered estimated cost of Rs.625.14 lakhs i.e. Rs.83.352 lakhs / MW (excluding land cost).

5.2. Taking into consideration of the above capital cost, the following capital cost has been considered for arriving power purchase tariff.

Sl. No.	The period during which power plants have been commissioned	Capital cost in Crores / MW (including land cost)	Power Purchase Tariff		
			Fixed Cost	Variable Cost	Tariff
1	1991 - 1995	Rs.1.00 crore	0.556	1.86	2.416
2	1996 - 2000	Rs.1.25 crore	0.686	1.86	2.546
3	2001 - 2006	Rs.1.5 crore	0.815	1.86	2.675

6. The input details furnished on behalf of Respondents 3 to 8, 10, 12 and 13 in the affidavit dated 21-04-2014:-

6.1. The bagasse based cogeneration plants owned and operated by the Respondents can be broadly classified into three categories based on their design configuration as follows:-

(i) Boilers operating at 42/43/67 ata steam pressure with back pressure (BP) turbines.

(ii) Boilers operating at 43/67 ata steam pressure with Double Extraction Cum Condensing turbines.

(iii) Boilers operating at 87 ata steam pressure with Double Extraction Cum Condensing (DECC) turbines.

The power plants comprised within these three categories are further differentiated by a time span (vintage) ranging from 1 to 10 years.

6.2. Three power plants set up during the earlier period with boilers operating at a steam pressure 42/67 ata, combined with back pressure (BP) turbines have low overall operating efficiency in terms of steam fuel ratio, specific steam consumption and the resultant station heat. Five power plants which were set up in the later years with boilers operating at steam pressure of 87 ata and Double Extraction Cum Condensing type turbines have a higher overall operating efficiency. The wide variation in the age and the residual life of the plants under consideration is readily borne out by the following:-

* 7 plants have been in operation for 16 – 17 years
* 4 plants have been in operation for 11 – 12 years
* 2 plants have been in operation for 8 – 9 years

Both these factors of varying vintage and differing configuration significantly impact the cost of power generation. Hence, any cost based tariff determination will have to reckon and accommodate such differences and in any case due to the heterogeneous nature and large population of plants, a singular tariff cannot meet the cost of generation in every case.

6.3. The tariff which was made applicable for these power plants since their inception till 31-03-2010 was determined by the Petitioner from time to time in terms of the power conferred upon them under the PPAs. Both the initial fixation and the subsequent revisions were made on an ad-hoc basis and without any reference whatsoever to cost of generation.

6.4. The tariff structure was altered from time to time, either by bringing in new ceilings or without giving effect to the annual escalations originally notified. And whenever the tariff structure was altered through Board Proceedings, the Respondents were asked to enter into fresh PPAs with a fresh tenure identical to that specified in the original / previous PPA, resulting in aggregate tenure of the PPAs being in excess of 15 years in 7 cases and as high as 24 years in one case. Under such circumstances, any attempt at determining tariff based on cost data for a truncated period being the unexpired tenure of the PPA, as what remains post 01-04-2010, will bring in a dichotomy which may render such tariff determination exercise for the residual period to be unjust and inequitable.

6.5. A substantial portion of the tenure of the respective PPAs has expired in most of the power plants even taking into account the extended tenure as per the fresh PPAs entered into from time to time based on revision in tariff schedule / structure notified through Board Proceedings issued by the Petitioner or changes in the corporate structure on account of merger / demerger etc. resulting in the extension of the tenure of PPAs well beyond the original period of 15 years. Under the circumstances, it may not be worthwhile to engage in a detailed exercise to determine plant-wise tariff, based on the cost of generation for a heterogeneous mix of power plants and that too for the remnant tenure of the PPA.

6.6. Having regard to the foregoing and in reiteration of their earlier plea made in the counter affidavit dated 10-03-2012, that instead of determining the tariff based on data relating to cost of generation, it would only be appropriate and equitable that the tariff entitlement as on 31-03-2010, without subjecting the same to any artificial ceiling such as 90% of the HT1 tariff or differentiating between season and off-season generation, is maintained and continued with 5% escalation annually. The original scheme of tariff outlined vide BP (FB) No.96 dated 31-03-1995 and BP (FB) No.91 dated 10-06-1998 in terms of which a uniform tariff of Rs.2.25 per KW/hr was made applicable for bagasse based cogeneration, linked to a base date of 01-04-1995 and providing an annual escalation of 5% over the previous year's rate, be taken as the basis and the tariff for the balance period of the PPA commencing from 01-04-2010 be determined. While doing so, the same should not be subjected to any artificial ceiling, such as, 90% of HT 1 tariff, as was the case with the tariff applicable from 01-04-2000 to 31-03-2010.

6.7. Having been entitled from 1995 to 2010 to tariff not determined on the basis of cost but on the basis of an ad-hoc formula, altered by the Petitioner unilaterally from time to time, it would not be equitable to determine a singular tariff from 01-04-2010 for the residual period of PPA on cost basis, when there are large differences between the plants in terms of vintage, configuration and residual tenure of PPA.

6.8. For the purpose of convenience, the bagasse based cogeneration plants are grouped into three categories on the basis of similarity in design configuration as already stated and the cost components in respect of which are arrived on the basis given below:-

(a) Capital Cost:-

On the basis of plant-wise capital cost per MW of installed capacity compiled from the respective books of accounts, the average capital cost per MW works out to:

(i) Back pressure 43/67 - Rs.1.70 crores
(ii) Double Extraction Cum Condensing 43/67 – Rs.3.24 crores
(iii) Double Extraction Cum Condensing 87 – Rs.3.30 crores

(b) Station Heat Rate:

On the basis of Station Heat Rate (SHR) actually recorded during the 2009-10 season plant-wise and depending upon the design and vintage of the power plant, the average SHR is widely varying as under:-

(i) Back pressure 42/67- 9040 kcal/kg.
(ii) Double Extraction Cum Condensing 42/67 - 4861 kcal/kg.
(iii) Double Extraction Cum Condensing 87 – 4196 kcal/kg.

(c) Calorific value of fuel:-

The average of the actual calorific value of fuel recorded plant-wise during the 2009-10 season works out to 2161 kcal/kg.

(d) Fuel Cost:

As regards fuel cost, there are varying methods of arriving at the same. In fact, this Commission has, in the past, adopted two different methods therefor as follows:-

(i) Equivalent coal cost arrived at heat value basis (Tariff Order No.3 of 2006)
(ii) Market value of bagasse (Tariff Order No.3 of 2009)
Since this accounts for a major portion of the variable component of the cost, two separate workings have been made adopting the above two different basis of fuel cost. For this purpose, the actual year-wise equivalent coal cost and market

price of bagasse for the period 2010-11 to 2013-14 have been considered with 5% annual escalation, thereafter.

(e) Others:

The rest of the parameters for the purpose of arriving at the cost of generation are adopted on the same basis as those considered in the Tariff Order No.3 of 2009.

6.9. Based on the various cost components set out above and following the methodology of tariff determination adopted in Tariff Order No.3 of 2009, an exercise has been made to determine the year-wise tariff commencing from 2010-11 till expiry of the respective PPAs in respect of each of the Respondent power plants. The tariff applicable to individual plants widely varies in the range of Rs.6.24 to Rs.12.57 per KWh under the "equivalent coal cost basis" and Rs.5.91 to Rs.11.46 per KWh under the "market value of bagasse basis". Under the circumstances, it will not be fair to fix a common tariff applicable to all power plants covered under the current exercise.

6.10. The capital cost adopted by the Petitioner in their affidavit is based on a small sized incidental co-generation power plant set up by M/s.Cheyyar Co-operative Sugar Mill in 1995-96 and taking this as the basis for estimating the capital cost of power plants set up during the subsequent periods. This approach suffers from a serious inconsistency as it does not relate to a typical bagasse based cogeneration power plant set up by the Respondents herein, comprising of a high efficiency multi-fuel boiler and a Double Extraction Cum Condensing type turbine with a view to optimize the net export of power per unit of bagasse generated. The capital cost figures furnished by the Petitioner should outright be rejected for the above reason. As far as the assumptions underlying the various components of costs considered for arriving at the tariff presented by the Petitioner, it is seen that the same, save and except the capital cost have been exactly adopted from the Tariff Order No.3 of 2009. Parameters relating to operational efficiencies such as Station Heat Rate and specific fuel consumption considered in the aforesaid tariff order relate to configurations of boiler / turbine that came up during the relevant control period, viz. 2009-11 and by inference relate to a much superior design and technology. To adopt such parameters for a power plant as old as and as less efficient as the one under reference namely Cheyyar Co-operative Sugar Mills (which has, ipso-facto, been considered as the basis for the capital cost) and on that basis arrive at the proposed tariff reveals a clever attempt on the part of the Petitioner to under estimate the cost and accordingly deprive the Respondents of a realistic and reasonable tariff for the power plants under reference.

6.11. The Commission may follow the original scheme of tariff outlined vide BP (FB) No.96 dated March 31, 1995 and BP (FB) No.91 dated June 10, 1998, in terms of which a uniform tariff of Rs.2.25 per KW / hr was made applicable for Bagasse based co-generation, linked to a base date of April 10, 1995 and providing an annual escalation of 5% over the previous year's rate, be taken as the basis and the tariff for the balance period of the PPA commencing April 01, 2010 be fixed, while doing so, the same be considered without subjecting the same to any artificial ceiling, such as, 90% of the HT-1 tariff and without differentiating between season from December to June and off season from July to November. The Commission may consider the substituted Bagasse arrangement with TNPL for treating as Bagasse based cogeneration and same methodology of tariff fixation adopted for Bagasse based cogeneration be adopted for plants having tie-up with TNPL for the balance period of PPA.

6.12. Since in the case of 7 out of 13 power plants, the original tenure of PPA of 15 years has already been completed and the subsisting PPAs have all been entered into in substitution of the original PPAs for a fresh term of 15 years, notwithstanding the tenure already having expired in respect of the original PPAs, and only at the instance of the Petitioner and arising out of revision in the tariff schedule / structure made by the Petitioner or changes in the corporate structure of the Respondent on account of merger / demerger, such of those power plants in respect of whom the original tenure of 15 years has been completed, the corresponding Respondents may be given an option to terminate the subsisting PPAs.

7. Submissions made on behalf of the Respondents 3 to 8, 10, 12 and 13 in Written Submission dated 23-04-2014:-

7.1. Pursuant to the National Policy notified in October 1991 for encouraging private sector participation in the power sector, the Government of Tamil Nadu announced in December 1992, a progressive policy to encourage the growth and development of bagasse based co-generation in the State. G.O.Ms.No.230,Ind, dated June 16, 1993 was issued fixing a price for purchase of power from sugar cogeneration plants equal to HT-1 tariff less 2% for transmission cost and requiring payment to be made for the power purchased within 30 days from the date of receipt of invoices. In response to the said initiative, a number of sugar mills in the State set up cogeneration plants notwithstanding the cost of scrapping the existing boiler and turbo generators and the related technological and financial barriers in the initial years.

7.2. Subsequently, pursuant to the policy pronouncement made regarding remunerative tariff for power from non-conventional energy sources, the Government of India, Ministry of Non-Conventional Energy Sources issued guidelines for tariff fixation on 25-11-1994, according to which, the basic power purchase price was fixed at a minimum of Rs.2.25 per kwh for 1994-95, to be escalated at a minimum of 5% per annum. It was made applicable for a period of 10 years and from the end of the 10^{th} year and for the remaining duration of the PPA, the price payable shall be equal to purchase price at the end of the 10^{th} year or the High Tension tariff prevalent in the State at that time, whichever is higher.

7.3. In terms of the PPAs entered into between the Petitioner and the cogeneration plants, the tariff for the power purchased under the PPAs was left to be determined by the Petitioner. In exercise of such power, the Petitioner notified vide BP(F.B.).No.96 dated 31-03-1995, the tariff at Rs.2.25 per unit with effect from 01-04-1995 with escalation of 5% each year for a period of five years which was to be reviewed after five years. The said tariff ran counter to the terms of the aforesaid G.O.No.230, notwithstanding the fact that it was a directive to the Petitioner under section 78-A of the Electricity Supply Act, 1948 which mandates that the Petitioner shall be bound in discharge of its functions by such directions on question of policy as may be given to it by the State Government and also was at variance with the guidelines issued by the Government of India.

7.4. In B.P.(F.B.) No.1 dated 11-01-2000, the Petitioner fixed a tariff at Rs.2.73 per unit from 01-04-2000 (which was the same rate prevailing on 01-04-1999) with escalation of 5% each year and capped the same at 90% of the prevailing HT-1 tariff. The said tariff was valid for a period of 10 years upto 31-03-2010, after which it was to be reviewed. Further, vide BP(F.B.) No.93 dated 16-05-2000, the Petitioner introduced a dichotomy between the tariff applicable for power purchased during the crushing season and during non-crushing season and fixed the tariff at Rs.2.73 per unit for season generation (December to June) and at Rs.2.48 per unit for off season generation (July to November). In the same B.P. the Petitioner fixed a tariff at Rs.2.48 per unit with effect from 01-04-2000 with 5% escalation per annum in respect of power generated, using alternate conventional fuel whether during season or during off season.

7.5. By virtue of the ceiling imposed with reference to HT-1 tariff vide B.P(F.B.) No.1 dated 01-04-2000, the tariff paid since 2003-04 season for the power purchased from cogeneration plants during season got frozen at Rs.3.15 per unit. This apart, with effect from 01-04-2005, the Petitioner imposed a cap on the tariff payable for off season at Rs.3.01 per unit, vide letter dated 10-06-2005 issued by the Chief Engineer, Non-Conventional Energy Sources. But for such artificial ceilings imposed subsequently, the tariff for power purchased during season would have been Rs.4.24 per unit and for power during off-season would have been Rs.3.84 per unit as on 31-03-2010 as against the actual tariff of Rs.3.15 and 3.01 per unit respectively, paid as on that date.

7.6. Though the G.O.No.230 dated 16-06-1993 which was notified by the State Government as a policy direction, purporting to be an invitation and promise to sugar mills to set up cogeneration plants, still holds the field and has not been withdrawn or cancelled by the Government as on date, the Petitioner had not only fixed power tariff which was totally at variance with the said G.O. but also modified it from time to time, to the disadvantage of the cogenerating plants.

7.7. Even as the tariff for cogeneration power was chartering through a checkered course as aforesaid, a total of 13 bagasse based cogeneration plants came to be set up in the private sector between 1995 and 2006. They varied widely in terms of capacity and design configuration, apart from the fact they were of varying vintage. All these plants entered into a standard PPA with the Petitioner, in terms of which the power to determine the tariff was vested with the Petitioner. Accordingly, all the cogeneration plants were entitled to a common tariff as notified by the Petitioner from time to time. As earlier stated, the tariff fixed by the Petitioner with effect from 01-04-2000 was to be in force for a period of 10 years till 31-03-2010. Accordingly, the tariff has to reviewed and re-determined for all the aforesaid bagasse based cogeneration plants with effect from 01-04-2010.

7.8. Under the Electricity Act, 2003 the power to determine tariff is vested with the State Electricity Regulatory Commission. As per section 61 of the Electricity Act, 2003 before fixation of tariff, the terms and conditions therefor shall be determined by the State Commission by way of Tariff Regulations and in doing so, it shall be guided by certain principles set forth in the said section. While so, the Commission has vide Notification No.TNERC/NCES Regn./16/1, dated 08-02-2008 issued Regulations for the purpose of determination of tariff for New and Renewable Sources of Energy. However, the said Regulations apply only to cogeneration plants, for which Power Purchase Agreements / Contracts were signed on or after the 15-05-2006. Accordingly, for fixation of tariff in respect of the Bagasse based cogeneration plants covered under the present petition, which have all entered into PPAs on various dates before 15-05-2006, no tariff regulations have so far been issued by the Commission.

7.9. The Commission for the first time issued a generic Tariff Order bearing No.3 of 2006, fixing the tariff for bagasse based cogeneration power which was made applicable to power plants covered under PPAs signed on or after 15-05-2006. All the power plants of the Respondents are covered by PPAs entered prior to 15-05-2006 and hence the tariff applicable to them which was expired on 31-03-2010 is now to be re-determined by the Commission for the unexpired tenure of the PPAs.

7.10. The Commission in the course of the hearing held on 29-01-2014 directed the Respondents to furnish data on cost of generation for the purpose of fixation of tariff. Section 61 of the Electricity Act, 2003 mandates that the tariff should, inter-alia, reflect the cost of supply of electricity. All the general tariff orders so far issued by the Commission for bagasse based cogeneration of power, such as Order No.3 of 2006, Order No.3 of 2009 and Order No.7 of 2012 have proceeded on this basis. In all such exercises, the Commission has determined the tariff for a future control period that too of a limited duration in which the power plants coming up will be of almost identical configuration. Besides, since the entire time span considered for the purpose of determining the cost based tariff is yet to enure, ensuring full absorption of cost, such exercise would be both realistic and reasonable.

7.11. There are lot of complexities underlying any exercise aimed at arriving at tariff for existing power plants such as those of the Respondents based on cost which are summarized below:-

(i) The power plants owned and operated by the Respondents, number 13 in total and widely differ from each other in terms of design configuration, capacity and vintage. Three power plants that came up in 1996 at Tirumandankudi, Theni and Kattur, incorporating boilers operating at a low steam pressure of 42/67 ata, combined with back pressure power turbines have a low overall efficiency. Five plants that were set up between 1995 and 2002 at Tirumandankudi, Nellikuppam, A Chittur, Polur and Kottur, consisting of boilers operating at a steam pressure of 43/67 ata, combined with Double Extraction Cum Condensing Turbines have a better operating efficiency. Five plants that were set up between 2002 and 2006 at Sathyamangalam, Pennadam, Appakudal, Mundaimbakkam and Pudukottai, incorporating boilers operating at 87 ata steam pressure combined with Double Extraction Cum Condensing Turbines are even more efficient. Depending upon the design configuration and vintage, operating parameters such as the steam fuel ratio, specific steam consumption and the resultant station heat rate vary widely from plant to plant which will impact the variable cost component. Hence, any cost based determination would have to reckon and accommodate such difference and in any case due to the heterogeneous nature and large population of plants, a singular tariff cannot meet the cost of generation in every case.

(ii) The tariff which was made applicable for these power plants since their inception till 31-03-2010 was determined by the Petitioner from time to time in terms of the power conferred upon them under the PPAs. Both the initial fixation and the subsequent revisions were made on an ad-hoc basis and without any reference whatsoever to cost of generation. Besides, the tariff structure was altered from time to time, either by bringing in new ceilings or without giving effect to the annual escalations originally notified. And whenever the tariff structure was altered through Board Proceedings, the Respondents were asked to enter into fresh PPAs with a fresh tenure identical to that specified in the original / previous PPA (instead of the residual tenure), resulting in aggregate tenure of the PPAs being far in excess of the original tenure of 15 years. Under such circumstances, any attempt at determining tariff based on cost data for a truncated period being the unexpired tenure of the PPA, as what remains post 01-04-2010, will bring in a dichotomy which may render such tariff determination exercise for the residual period to be unjust and inequitable.

(iii) In the case of most of the power plants, a substantial portion of the tenure of the respective PPAs has expired, even taking into account the extended tenure beyond the original period of 15 years, resulting from fresh PPAs entered into from time to time based on revision in tariff schedule / structure. Under the circumstances, it will not be reasonable to engage in a detailed exercise to determine plant-wise tariff, based on the cost of generation for a heterogeneous mix of power plants and that too for the remnant tenure of the PPA.

7.12. The cost data in respect of the Respondent plants varies widely in terms of both variable cost as well as fixed cost on account of wide difference in configuration, capacity and vintage, all of which have a significant impact on the cost of generation. Considering the actual capital cost and actual operating parameters of each plant and following the methodology adopted in Tariff Order No.3 of 2009, year-wise tariff commencing from 2010-11 till expiry of the respective PPAs in respect of each of the 13 power plants has been computed and already furnished. The tariff applicable to individual plants ranges from Rs.6.24 to Rs.12.57 per kwh under the “equivalent coal cost basis” and from Rs.5.91 to Rs.11.46 per kwh under the “market value of bagasse basis”. In both cases the upper end of the tariff range is around twice as much as the lower end. In the face of such extreme variation in range, it will not be fair to fix a common tariff applicable to all power plants covered under the current exercise.

7.13. Determination of a two part tariff on the basis of cost as normally done by the Commission is relevant for a future control period, since all cost parameters for the power plants likely to come up during such control period can be normalized and on that basis tariff arrived at. But in the instant case where the power plants are existing ones and the operating parameters are widely varying in respect of individual plants, determination of a two part tariff would warrant cost determination in the case of each individual plant, taking into consideration its actual capital cost as well as the actual operational parameters. Such an exercise will end up in fixing varying tariff for different plants for the unexpired tenure of PPAs after 01-04-2010, while all of them were entitled to a uniform tariff for the period till 31-03-2010. Accordingly, determination of a two part tariff based on cost of generation would be visited with serious incongruences and inconsistencies and hence should not be proceeded with.

7.14. The Petitioner has independently furnished details of capital cost and computation of power purchase tariff based on various parameters assumed by them, in respect of bagasse based cogeneration plants commissioned based on PPA entered into prior to 15-05-2006. The capital cost adopted therein is based on a small sized incidental cogeneration power plant that too excluding the cost of the boiler, set up by M/s. Cheyyar Co-operative Sugar Mill in 1995-96 and taking this as the basis for estimating the capital cost of power plants set up during the subsequent periods is patently wrong as it does not relate to a typical bagasse based cogeneration power plant set by the Respondents herein, comprising a high efficiency multi-fuel boiler and a double extraction cum condensing type turbine with a view to optimize the net export of power per unit of bagasse generated. Hence, the capital cost figures furnished by the Petitioner do not warrant any consideration. As far as the assumptions underlying the various components of costs considered for arriving at the tariff presented by the Petitioner, they have been adopted exactly as in the Tariff Order No.3 of 2009. Operational efficiencies such as Station Heat Rate and specific fuel consumption considered in the aforesaid tariff order relate to configurations or boiler / turbine that came up during the relevant control period, viz. 2009-11 and by inference relate to a much superior design and technology. Hence, to adopt such parameters for a power plant as old as and as less efficient as the one under reference, namely Cheyyar Co-operative Sugar Mills (which has, ipso-facto, been considered as the basis for the capital cost) and on that basis arrive at the proposed tariff would only lead to gross understatement of the cost and consequently distort the tariff.

7.15. Having regard to the foregoing, the Respondents pray that the original scheme of tariff outlined vide BP (FB) No.96, dated 31-03-1995 and BP (FB) No.91 dated 10-06-1998, in terms of which a uniform tariff of Rs.2.25 per KW/hr. was made applicable for Bagasse based cogeneration, linked to a base date of 01-04-1995 and providing an annual escalation of 5% over the previous year's rate, be taken as the basis and the tariff for the balance period of the PPA commencing 01-04-2010 be fixed, while doing so, the same be considered without subjecting the same to any artificial ceiling, such as, 90% of the HT-1 tariff and without differentiating between season from December to June and off season from July to November.

7.16. The Commission was called upon to fix the tariff for the unexpired portion of the PPA wherein there was an agreement for tariff for only the first 10 years, in PPAP No.03 of 2008 of *TCP Limited Vs. TNEB* decided earlier, the Commission saw merit in the aforesaid approach and accordingly fixed the tariff for an existing captive power plant, consistent with the PPA by providing for the balance period of the PPA, an annual escalation at the same rate of 5% over the last applicable tariff.

7.17. Since in the case of 7 out of 13 power plants, the original tenure of PPA of 15 years has already been completed and the subsisting PPAs have all been entered into in substitution of the original PPAs for a fresh term of 15 years, notwithstanding the tenure already having expired in respect of the original PPAs, and only at the instance of the Petitioner and arising out of revision in the tariff schedule / structure made by the Petitioner or changes in the corporate structure of the Respondent on account of merger / demerger, such of those power plants in respect of whom the original tenure of 15 years has been completed, the corresponding Respondents may be given an option to terminate the subsisting PPAs.

8. Contentions of the Respondents 1, 2 and 9 in their affidavits dated 05-05-2015:-

8.1. The Respondents 1,2 and 9 have made submissions identical to those of the other Respondents made in paras 4.1 to 4.24 above and furnished the details of their cost of production as below:-

The M.R.Krishanmurthy Co-operative Sugar Mills Limited, Senthiathope

Cost of Production:

Description	2010-11	2011-12	2012-13	2013-14	2014-15
Cost of Bagasse Rs.	14129000	7776000	6690000	6950000	7564000
Salaries Rs	3397000	4279000	4364000	4451000	4605000
Repairs Maint. (Rs.)	1500000	1485000	1495000	1510000	1525000
Cost of Lubricants Rs.	144000	142000	137000	139000	90000
Insurance Rs.	100000	110000	115000	120000	120000
Administrative Expenses Rs.	210000	220000	240000	240000	250000
Total Expenditure Rs.	19480000	14012000	13041000	13410000	14154000
Total Units exported	2766280	2040720	1755520	1824900	1860000
Cost of Production Rs.	7.04	6.87	7.42	7.35	7.60
Existing Power Charge	3.15	3.15	3.15	3.15	3.15

The Cheyyar Co-operative Sugar Mills Limited, Cheyyar

Cost of Production:

Description	2010-11	2011-12	2012-13	2013-14	2014-15
Cost of Bagasse Rs.	49808025	36743625	52257600	73160640	62055900
Salaries Rs	49808025	36743625	52257600	73160640	62055900
Repairs Maint. (Rs.)	1500000	1500000	1500000	1500000	1500000
Cost of Lubricants Rs.	123153	129635	136458	143640	151200
Insurance Rs.	100000	100000	100000	100000	100000
Administrative Expenses Rs.	260000	265000	255000	249000	255000
Total Expenditure Rs.	101599203	75481885	106506658	148313920	126118000
Total Units generated	10320000	10320000	10320000	10320000	10320000
Cost of Production Rs.	5.34	4.16	5.76	7.84	6.85
Existing Power Charge	3.15	3.15	3.15	3.15	3.15

Subramaniya Siva Co-operative Sugar Mills Limited

Cost of Production:

Description	2010-11	2011-12	2012-13	2013-14	2014-15
Cost of Bagasse Rs.	8335000	2960000	18761000	7011000	5193000
Salaries Rs	1862000	1930000	2253000	2212000	2250000
Repairs Maint. (Rs.)	1200000	1205000	1330000	1295000	1300000
Cost of Lubricants Rs.	110000	142000	161000	153000	190000
Insurance Rs.	100000	105000	110000	115000	120000
Administrative Expenses Rs.	210000	230000	255000	275000	260000
Total Expenditure Rs.	11817000	6572000	22870000	11061000	9313000
Total Units exported	2234760	1142680	3545800	1916830	1557440
Cost of Production Rs.	5.28	5.75	6.45	5.77	5.97
Existing Power Charge	3.15	3.15	3.15	3.15	3.15

8.2. The Commission may follow up the original scheme of tariff outlines vide BP (FB) No.96, dated March 31, 1996 and BP (FB) No.91, dated June 10, 1998, in terms of which a uniform tariff of Rs.2.25 per KW/hr. was made applicable for Bagasse based cogeneration linked to a base date of April 01, 1995, and providing an annual escalation of 5% over the previous year's rate, be taken as the basis and the tariff for the balance period of PPA commencing April 01, 2010 be fixed without subjecting the same to any artificial ceiling such as, 90% of the HT-1 tariff.

9. Findings of the Commission:-

We have considered the prayers of the petitioner, namely,

(a) fixing of power purchase tariff applicable for Bagasse based co-generation plants commissioned based on Power Purchase Agreements entered prior to 15-05-2006 without considering the interest on loan component for the plants completed 11 years of service and without considering the fixed cost for the plants completed 20 years of service.

(b) fixing of power purchase tariff for the sugar mill co-generation plants having tie up arrangement with TNPL for supply of bagasse on exchange of coal, thus using fossil fuel for power generation throughout the year (i.e.) during crushing and non-crushing seasons and commissioned based on the Power Purchase Agreements entered before 15-05-2006, without considering the interest on loan component for the plants completed 11 years of service and without considering the fixed cost for the plants completed 20 years of service.

Before going into the issue, it is necessary to understand the background leading to the filing of the present petition. The Commission has issued Order No.3 of 2006 on 15.5.2006 fixing Feed in Tariff (FIT) for Bagasse based co-generating plants. This tariff will apply for plants covered by PPA issued under the above order. Subsequently, the Commission has issued Order No. 3 of 2009 and Order No. 7 of

2012 for the respective control periods. Therefore, all plants commissioned after 15.5.2006 get covered under the respective tariff orders. However, certain plants commissioned prior to 15.5.2006 covered by PPA issued under certain Boards Proceedings of the erstwhile TNEB contained tariff upto 31.3.2010 only, subject to review and redetermination of tariff for the periods beyond 31.3.2010. The 13 number of plants of the Respondents are of such nature and therefore redetermination of tariff for the period beyond 31.3.2010 is called for and hence the petitioner TANGEDCO has filed above PPAP.

It is important to understand the provisions of certain Board's Proceedings that have a bearing on the tariff determination for the plants commissioned prior to 15.05.2006. These provisions are discussed hereunder:

(a) As per Board's Proceedings (FB) 96, a tariff of Rs.2.25/unit is payable for 1995-96 with 5% annual escalation for a period of 5 years.

(b) As per Board's Proceedings (FB) No.1 dt. 11.01.2000, a tariff of Rs.2.73/unit subject to 90% of HT Tariff IA is payable for 2000-01 with 5% annual escalation for a period of 10 years upto 2009-10.

(c) As per Board's Proceedings (FB) 93 dt. 16.5.2000, TNEB introduced a new concept of tariff for crushing season (December to June) at Rs.2.73/unit and tariff for non-crushing season (July to November) at Rs.2.48/unit. This tariff of Rs.2.48/unit was extended to Co-gen plants tied up with TNPL.

By virtue of the ceiling imposed at 90% of HT I tariff in B.P. (FB) 1 dt. 11.01.2000, the tariff paid since 2003-04 for co-gen plants was frozen at Rs.3.15/unit and as per CE/NCES letter dt. 10.06.2005, the tariff paid to co-gen plants tied up with TNPL was frozen at Rs.3.01/unit from 1.4.2005.

Under the background narrated above let us look into the matter on hand.

TANGEDCO in their petition has stated that the power purchase tariff applicable for Bagasse based co-generation plants for further period from 01-04-2010 has to be fixed. In Tariff Order No.3 of 2009, fixed cost for 20 years and interest on loan for 11 years, have been considered. For the plants served more than 11 years, the interest on loan component may not be considered. For the plants served more than 20 years, fixed cost may not be considered for fixation of tariff.

TANGEDCO in their subsequent affidavit dated 25.3.2014 has stated that the National Co-operative Development Corporation while sanctioning the loan assistance to M/s. Cheyyar Co-operative Sugar Mills Ltd. for establishment of 7.5 MW sugar mill co-generation plant, has considered estimated cost of Rs.625.14 lakhs i.e. Rs.83.352 lakhs / MW (excluding land cost).

Taking into consideration of the above capital cost, the following capital cost has been suggested by TANGEDCO for arriving at power purchase tariff.

Sl. No.	The period during which power plants have been commissioned	Capital cost in Crores / MW (including land cost)	Power Purchase Tariff (in Rs.)		
			Fixed Cost	Variable Cost	Tariff
1	1991 - 1995	Rs.1.00 crore	0.556	1.86	2.416
2	1996 - 2000	Rs.1.25 crores	0.686	1.86	2.546
3	2001 - 2006	Rs.1.50 crores	0.815	1.86	2.675

Per contra, the Respondents contended that the capital cost adopted by the Petitioner in their affidavit is based on a small sized incidental co-generation power plant set up by M/s. Cheyyar Co-operative Sugar Mill in 1995-96 and taking this as the basis for estimating the capital cost of power plants set up during the subsequent periods is not tenable. This approach suffers from a serious inconsistency as it does not relate to a typical bagasse based cogeneration power plant set up by the Respondents herein, comprising of a high efficiency multi-fuel boiler and a Double

Extraction Cum Condensing (DECC) type turbine with a view to optimize the net export of power per unit of bagasse generated. The capital cost figures furnished by the Petitioner should outrightly be rejected for the above reason.

The Respondents further contended that even older plants call for periodical replacement of major equipments or their components much before their normative life which warrant availment of long term loans with commitment for interest burden. Hence, the proposal of the Petitioner as contained in the petition seeking not to consider interest on loan component for plants that had served more than 11 years and fixed cost for plants that had served more than 20 years and distinguishing between plants more than 11 years old and recent plants are not based on any sound logic.

The Respondents have further represented that for plants set up before 15-05-2006, there are variations not only in vintage of the plant but also in plant configuration as a result, critical parameters like boiler efficiency, steam fuel ratio, specific steam consumption and the resultant Station Heat Rate vary widely from plant to plant. The respondents have broadly categorized their plants into three groups as;

(i) Plants operating with Boilers at 42/43/67 ata with Back Pressure Turbines;
(ii) Plants operating with Boilers at 43/67 ata with DECC Turbines and
(iii) Plants operating with Boilers at 87 ata with DECC Turbines

They have suggested different capital costs and different Station Heat Rates for the above three categories and furnished the resultant tariff for the individual plant ranging from Rs.6.24/unit to Rs.12.57 per unit under the equivalent coal cost basis and Rs.5.91/unit to Rs.11.46/unit under the market value methodology.

As computation of variable and fixed cost becomes quite complex, rendering itself difficult to be bench-marked to a standard average as in the case of new power plants whose configuration is more standardized they suggested that the tariff structure as obtained prior to 31-03-2010 is maintained and continued with 5% escalation without subjecting the same to any artificial ceiling, such as 90% of the HT-I tariff and without differentiating between crushing season (December to June) and off season (July to November) as decided by the Commission in PPAP 3/2008 in TCP Ltd. Vs. TNEB.

In respect of TNPL tied up Co-gen sugar plants, the Respondents contended that the assumption of the Petitioner that coal is fired through-out the year by the plants having tie-up with TNPL and hence the tariff should be fixed as per the rate applicable for Captive Power Plant is not correct since, TNPL is taking only around 60% of the total Bagasse generated, leaving the balance 40% as Bagasse pith with the Sugar Co-generator, which is fired in ad-mixer with coal and the sugar co-generator should not be penalized by subjecting them to a differential tariff as Bagasse is released as raw material for another core industry viz paper. Further in order to be classified as Captive Power Plant, the Captive use of power must be not less than 51% of the power generated on annual basis and such plant should supply atleast 5 MW for 250 days. As sugar co-generating plant does not use 51% for its internal / captive consumption and cannot run for 250 days as the crushing is dependent upon the cane availability, it cannot be classified as Captive Power Plant.

The Respondents have requested to consider the substituted Bagasse arrangement with TNPL as Bagasse based co-generation and the same methodology of tariff fixation as stated supra be adopted for Bagasse based Co-generation plants having tie-up with TNPL also for the balance period of the PPA.

The Respondents 1, 2 & 9 being Co-operative Sugar Mills, have made submissions identical to those of the other Respondents and furnished the details of their cost of production ranging from Rs.4.16/unit to Rs. 7.60/unit and requested the

Commission to follow the original scheme of tariff outlined in Board's Proceedings (FB) No.96 dated 31.3.1996 and Board's Proceedings (FB) No. 91 dated 10.6.1998 in terms of which a uniform tariff of Rs.2.25/unit was made applicable for Bagasse based co-generation plants linked to a base date of 1.4.1995 with an annual escalation of 5% be taken as the basis and the tariff for the balance period of PPA commencing from 1.4.2010 be fixed without subjecting the same to any artificial ceiling such as 90% of HT Tariff I, etc.

The contention of the Respondent that the tariff and other provisions of G.O. No. 230, dated 16.6.1993, was not adopted by TNEB in the PPAs and subsequent Board's Proceedings of TNEB have introduced several restrictions as to tariff and capping of tariff to 90% of HT I Tariff due to which they could receive only Rs.3.15 per unit or introduction of different tariffs for crushing season and non-crushing season, etc., are agreed terms between parties to the PPA and therefore now it cannot be reopened and therefore basic tariff at Rs.2.25/unit as on 1.4.1995 cannot be projected till 1.4.2010. Tariff from 1.4.2010 is to be determined afresh by the Commission as per the PPA.

It is relevant at this juncture to note that even for new plants commissioned after 2006 onwards the tariff fixed by the Commission in its Order No. 3 dated 15.5.2006 is at Rs.3.15/unit only upto the year 2018.

Guided by the section 86(i)e of the Electricity Act 2003 and the provisions of National Electricity Policy and National Tariff Policy with reference to renewables, the Commission has been fixing the tariff for various renewable energy sources based plants under section 62 of Electricity Act 2003 on cost plus basis only. In this case also the Commission decides to fix the tariff based on the normative cost and related parameters involved and applicable to the said plants.

As the existing tariff was fixed on adhoc basis at Rs.2.25/unit as on 1.4.1995 with an annual escalation of 5% without giving any cost parameters as Fixed Capacity Charges (FCC), Variable Cost (VC), initially the Commission has called for details of cost of generation from both the Petitioner and the Respondents to have an understanding of the cost structure of these old plants. TANGEDCO in their response have grouped the 13 plants of the Respondents into 3 categories based on vintage of the plant and suggested separate capital cost for each group and arrived at the tariff at Rs.2.42/unit to Rs. 2.68/unit. Per contra the Respondents have also grouped the above 13 plants into 3 groups, but in a different way based on vintage, boiler configuration, etc and suggested varying capital cost with varying SHR and arrived at a tariff ranging from Rs. 6.24/unit to Rs.12.57/unit under 'equivalent coal' cost basis and Rs.5.91/unit to Rs.11.46/unit under the 'market value of Bagasse' basis. The three Respondents representing Co-operative Sugar Mills furnished the actual cost of generation ranging from Rs.4.16/unit to Rs. 7.60/unit.

From these it can be seen that the tariff suggested by TANGEDCO is too low as it was far less than the then existing tariff of Rs. 3.15/unit which they were paying to the Respondents and therefore this is not tenable. Against this the tariff furnished by the respondents is too high which is far more than the then existing tariff at Rs.3.15/unit at which rate they have been supplying power to the petitioner TANGEDCO for quite some years. This may be due to inappropriate allocation of cost to different units of the Sugar mills. Hence, the Commission has decided to explore some other possibility for determination of the tariff for these old plants.

Commission notes that in the case of most of the plants, a substantial portion of the PPA has expired, even taking into account the extended tenure beyond the original period of 15 years and therefore it is not worthy to go into the details of each of the 13 heterogeneous old plants and decide the tariff parameters.

Commission also notes that a similar situation was handled by the Commission in 2006 in Order No. 3 of 2006 dated 15.5.2006 where the tariff of wind energy was determined by the Commission at Rs.2.90/unit for new plants to be commissioned after 15.5.2006 assuming a capital cost of Rs.5 crores per MW and the tariff for the old plants commissioned prior to 15.5.2006 was fixed at a little lower level at Rs.2.75/unit assuming a lesser capital cost of Rs.4.50/MW even though there were huge differences in the vintage, technical configurations etc., across the old plants. On the same analogy, a capital cost of Rs.2.5 crores/MW is proposed to be considered for these old plants against the cost Rs.3.5 crores/MW considered for the proposed plants in Order No. 3 of 2006 dated 15.5.2006 and the tariff determined in the same fashion as was done in the earlier orders of the Commission. The table showing the resultant annual FCC is placed in the annexure to this Order which are to be adopted for these plants based on the year of operation of the respective plant.

The contention of the Respondent, that if yearly FCC is allowed to them, it may not be adequate to cover the actual FCC as their plants are old and FCC for later years will be much less compared to earlier years is considered by the Commission and in order to address the same, the Commission has decided to levelise the FCC and allow the same which works out to Rs.1.23/unit at the weighted average cost of post-tax interest and post-tax ROE.

The Respondents claim that the configuration, cost and other normative parameters widely vary with vintage of the plants and in case cost plus tariff is considered, these factors are to be accounted for and separate tariffs fixed for these plants based on their vintage. The Commission has been following the method of fixing a single uniform generic tariff for each renewable. As stated supra while fixing the tariff for wind energy generators in 2006 all the units commissioned prior to 2006 were considered as a single group and only a single tariff was fixed. Further, despite the differences in various parameters, all the Respondents were agreeable for and getting a single uniform rate irrespective of the year of installation or type of configuration. Therefore, the Commission does not feel it fit to fix separate tariffs based on vintage or configuration or capacity.

The variable cost that may be issued by the Commission from time to time may be adopted for their plants also. The capital cost of older plants will be lesser compared to capital cost of plants commissioned in later periods in view of the improved efficiency parameters. Hence in respect of the older plants, the FCC may be less but variable cost will be more. The reverse is true in respect of plants commissioned in later periods. Therefore much difference may not be there if both FCC & Variable Cost is taken together across all these old plants with different vintage and varying configuration. Commission believes this will settle the issue as older plants will gain in FCC and lose in variable cost while the reverse is true for improved plants commissioned in later periods but as a package i.e. total cost will address the issue.

Board's Proceedings (FB) 93, dt. 16.5.2000, contemplates a tariff of Rs. 2.73/unit for crushing season and Rs. 2.48/unit for non-crushing season which works out to 9.16%. On the same analogy, the above tariff determined in this order will be applicable for crushing season and 90% of the same will be applicable for non-crushing season.

For such of those plants which have completed 20 years of operation but still has a subsisting PPA in force requiring them to supply power to the petitioner TANGEDCO, the fixed cost could not be totally denied as claimed by the petitioner, since the generator would continue to incur certain fixed cost to keep the operations on. As these plants have depreciated to the extent of 90%, Return on Equity and Insurance is calculated on 10% of the Project Cost with applicable O & M Charges and Interest on Working Capital and the Fixed Capacity Charges (FCC) for the 21st year works out to Rs.0.84 per unit. This FCC is allowed at a flat rate plus Variable Cost as applicable from time to time.

Regarding the co-gen plants tied up with TNPL, it is observed that Commission has been issuing tariff order for sources like Wind, Biomass, Bagasse based co-gen sugar plants, Solar plants, CPP, etc., from time to time and the licensee can purchase power after entering into the contract (PPA) within the scope of these orders but in the case of TNPL tied up co-gen plants, a barter system of exchange of Bagasse with coal is made between sugar mills and TNPL and therefore it is beyond the scope of any of the tariff orders of the Commission and therefore the Commission is not inclined to determine the tariff for these plants. However, as these contracts have been entered into prior to Electricity Act, 2003 and continued for years after 2003 also, Commission proposes to concede to the prayer of TANGEDCO to fix the tariff for TNPL tied up co-gen plants. Commission notes that whatever power purchase is made by TANGEDCO from such plants, it cannot be accounted for RPO compliance for TANGEDCO. This aspect is to be factored into the Tariff payable to such plants. Previously a different tariff of Rs.3.01/unit was adopted for the TNPL tied up plants while the tariff for a Bagasse based Co-generation plants was at Rs.3.15/unit which works out to a reduction of 4.4% on Rs.3.15/unit i.e. overall tariff. Hence a 5% reduction in the overall tariff may be effected for the co-gen plants tied up with TNPL.

In view of the fact that clause (iv) of the BP (FB) No. 1, dt. 11.1.2000, clearly provides that till such review is made and a new rate is finalized, the 10th year rate will be continued to be paid if the company/sugar mill supplies its surplus power to TNEB, this order shall normally take effect prospectively from the date of this order.

However, as TANGEDCO has filed this petition on 21.11.2011, this order shall take effect from the above date of petition filed by TANGEDCO with the Commission.

The parties of these PPAs are given liberty to exit PPA in case the continued operation of those PPAs is considered not workable.

10. Appeal:-

An appeal against this order shall lie before the Appellate Tribunal for Electricity under section 111 of the Electricity Act, 2003 within a period of 45 days from the date of receipt of a copy of this order by the aggrieved person.

(Sd…….)
(**G.Rajagopal)**
Member

(Sd…….)
(S.Akshayakumar)
Chairman

/ True Copy /

Secretary
Tamil Nadu Electricity
Regulatory Commission

ANNEXURE

Capital cost	**25000000**	**Rs.2.50 Cr./MW**
Debt	17500000	
Equity	7500000	
PLF	55%	
Rate of Interest on Debt	9%	
Depreciation on CC	7.84%	
O & M 4.5% on CC with annual escalation of 5%	4.50%	
Insurance0.75% for five years and reduction of 0.5% every year thereafter	0.75%	
Return on Equity (pre-tax)	16%	
Working Capital Components	2 months fuel and 2 months O & M	
Interest on W.Cap.	11%	
Life of Plant	20 years	
Residual value (10%)	2500000	
Aux.consump.	9%	
Discount factor	0.0736374	
Tariff Details		

Years	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Gross Generation	4818000	4818000	4818000	4818000	4818000	4818000	4818000	4818000	4818000	4818000
Auxiliary	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
Net Generation	4384380	4384380	4384380	4384380	4384380	4384380	4384380	4384380	4384380	4384380
Fuel Cost	4432560	4654188	4886897.4	5131242.3	5387804.4	5657194.6	5940054.3	6237057	6548909.9	6876355.4
2 months fuel stock	738760	775698	814482.9	855207.05	897967.4	942865.77	990009.06	1039509.5	1091485	1146059.2
2 months O & M	187500	196875	206718.75	217054.69	227907.42	239302.79	251267.93	263831.33	277022.9	290874.04
Interest on Debt	1575000	1575000	1417500	1260000	1102500	945000	787500	630000	472500	315000
ROE	1200000	1200000	1200000	1200000	1200000	1200000	1200000	1200000	1200000	1200000
Depreciation	1960000	1960000	1960000	1960000	1960000	1960000	1960000	1960000	1960000	1960000
O & M Expenses	1125000	1181250	1240312.5	1302328.1	1367444.5	1435816.8	1507607.6	1582988	1662137.4	1745244.2
Insurance	187500	187500	187500	187500	187500	186562.5	185629.69	184701.54	183778.03	182859.14
Interest on Working	101889	106983	112332	117949	123846	130039	136540	143367	150536	158063
Total fixed cost	**6149389**	**6210733**	**6117645**	**6027777**	**5941291**	**5857418**	**5777278**	**5701057**	**5628951**	**5561166**
Tariff	1.40	1.42	1.40	1.37	1.36	1.34	1.32	1.30	1.28	1.27
Discount factor	1.00	0.93	0.87	0.81	0.75	0.70	0.65	0.61	0.57	0.53
Present Value	1.40	1.32	1.21	1.11	1.02	0.94	0.86	0.79	0.73	0.67
Levellized Tariff	**1.23**									

Years	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Gross Generation	4818000	4818000	4818000	4818000	4818000	4818000	4818000	4818000	4818000	4818000
Auxiliary	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
Net Generation	4384380	4384380	4384380	4384380	4384380	4384380	4384380	4384380	4384380	4384380
Fuel Cost	7220173.2	7581181.8	7960240.9	8358253	8776165.6	9214973.9	9675722.6	10159509	10667484	11200858
2 months fuel stock	1203362.2	1263530.3	1326706.8	1393042.2	1462694.3	1535829	1612620.4	1693251	1777914	1866809.7
2 months O & M	305417.74	320688.63	336723.06	353559.21	371237.17	389799.03	409288.99	429753.4	451241.11	473803.16
Interest on Debt	157500									
ROE	1200000	1200000	1200000	1200000	1200000	1200000	1200000	1200000	1200000	1200000
Depreciation	1960000	940000								
O & M Expenses	1832506.5	1924131.8	2020338.4	2121355.3	2227423	2338794.2	2455733.9	2578521	2707446.6	2842819
Insurance	181944.85	181035.12	180129.95	179229.3	178333.15	177441.48	176554.28	175671.5	174793.15	173919.18
Interest on Working	165966	174264	182977	192126	201732	211819	222410	233531	245207	257467
Total fixed cost	**5497917**	**4419431**	**3583446**	**3692711**	**3807489**	**3928055**	**4054698**	**4187723**	**4327447**	**4474206**
Tariff	1.25	1.01	0.82	0.84	0.87	0.90	0.92	0.96	0.99	1.02
Discount factor	0.49	0.46	0.43	0.40	0.37	0.34	0.32	0.30	0.28	0.26
Present Value	0.62	0.46	0.35	0.33	0.32	0.31	0.30	0.29	0.27	0.26
Levellized Tariff										