



TAMIL NADU ELECTRICITY REGULATORY COMMISSION

Comprehensive Tariff Order for Bagasse based Co-generation plants

Order No. 4 of 2018, dated 28-03-2018



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

Present : **Thiru S. Akshaya Kumar** - **Chairman**
 Thiru G. Rajagopal - **Member**
 Dr.T. Prabhakara Rao - **Member**

Order No. 4 of 2018, dated 28-03-2018

In the matter of : Power procurement by Distribution Licensee from Bagasse based Co-generation plants and allied issues relating to captive use and third party sale.

In exercise of powers conferred by Section 181 read with Section 61 (h), 62 and 86(1) (e) of the Electricity Act 2003, (Central Act 36 of 2003), and after taking into account the stipulations in the National Electricity Policy and the Tariff Policy and in accordance with the Power Procurement from New and Renewable Energy Sources Regulations, 2008 of the Commission and after examining the comments received from the stakeholders, after considering the views of the State Advisory Committee meeting held on 21-03-2018 in accordance with section 88 of the Electricity Act 2003, after examining the comments received from the stakeholders as per Section 64 of Electricity Act 2003, the Tamil Nadu Electricity Regulatory Commission, hereby, passes this order to determine the tariff and other conditions for power procurement by Distribution Licensee from Bagasse based Co-generation plants and allied issues relating to captive use and third party sale.

This Order shall take effect on and from the **1st of April 2018.**

Sd/-
(Dr.T.Prabhakara Rao)
Member

Sd/-
(G.Rajagopal)
Member

Sd/-
(S.Akshaya Kumar)
Chairman

(By Order of the Commission)

Sd/-
Secretary,
Tamil Nadu Electricity Regulatory
Commission.

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TAMIL NADU ELECTRICITY REGULATORY COMMISSION

“Comprehensive Tariff Order for Bagasse based Co-generation plants”

ORDER ON POWER PROCUREMENT BY DISTRIBUTION LICENSEE FROM BAGASSE BASED CO-GENERATION PLANTS AND ALLIED ISSUES RELATING TO CAPTIVE USE AND THIRD PARTY SALE

1.0 Overview

1.1 Commission in exercise of the powers vested under the Electricity Act, 2003 and in compliance with the mandate of the Act to promote renewable energy has so far issued seventeen tariff orders in respect of various sources of renewable energy. These orders on renewable energy sources covered tariff determination for purchase of power by the Distribution licensee, issues related to open access and its promotional aspects.

1.2 The conducive policies of the Central and State Government for promotion of renewable power has helped the sector achieve remarkable progress.

1.3 The total capacity of renewable power in the state is 10789 MW(upto February 2018) of which Bagasse based Co-generation power constitutes 685.4 MW (as on 16-02-2018). The last of the generic tariff order of the Commission in the case of Bagasse based Co-generation power was issued on 31.3.2016 vide Order No.4 of 2016. The control period of this Order No.4 of 2016 on Bagasse based co-generation power plants expires on 31.3.2018.

2.0 Importance of Non-Conventional Energy Sources:

2.1 Non-Conventional Energy Sources are pollution free. Global concern over

pollution problems caused by the increase in greenhouse gasses emission and consequent climate changes have resulted in paradigm shift in the approach towards development of energy sector in all the countries. The need for adoption of clean technology, improving end use efficiency and diversifying energy bases, etc. have all been seriously considered by the Government of India since Sixth Five Year Plan. Renewable energy sources such as wind, solar, mini hydro power project, biomass and bagasse based co-generation are abundant and they augment the energy generation.

2.2 Electricity Act 2003, National Electricity Policy, Tariff Policy have all addressed the necessity for promotion of the co-generation and generation of electricity from renewable sources of energy.

3.0 Commission's Regulation on New and Renewable Energy Sources

3.1 The Commission notified the "Power Procurement from New and Renewable Sources of Energy Regulations 2008" on 08-02-2008 in accordance with the powers vested under Section 61 of the Electricity Act 2003 (Central Act 36 of 2003) which stipulates that the State Electricity Regulatory Commissions shall specify the terms and conditions for the determination of tariff.

3.2 Regulation 4 (2) of the Power Procurement from New and Renewable Sources of Energy Regulation, 2008, specifies as follows:

"(2) While deciding the tariff for power purchase by distribution licensee from new and renewable sources based generators, the Commission shall, as far as possible, be guided by the principles and methodologies specified by:

- (a) Central Electricity Regulatory Commission*
- (b) National Electricity Policy*
- (c) Tariff Policy issued by the Government of India*
- (d) Rural Electrification Policy*
- (e) Forum of Regulators (FOR)*
- (f) Central and State Governments*

(3) *The Commission shall, by a general or specific order, determine the tariff for the purchase of power from each kind of new and renewable sources based generators by the distribution licensee. ...*

Provided where the tariff has been determined by following transparent process of bidding in accordance with the guidelines issued by the Central Government, as provided under section 63 of the Act, the Commission shall adopt such tariff.”

(4) *While determining the tariff, the Commission may, to the extent possible consider to 'permit an allowance / disincentive based on technology, fuel, market risk, environmental benefits and social impact etc., of each type of new and renewable source.*

(5) *While determining the tariff, the Commission shall adopt appropriate financial and operational parameters.*

(6) *While determining the tariff, the Commission may adopt appropriate tariff methodology. “*

3.3 Regulation 4 of the Power Procurement from New and Renewable Sources of Energy Regulation, 2008 issued by the Commission specifies as follows on determination of tariff and pricing methodology:

“4. Determination of tariff

(1) *The Commission shall follow the process mentioned below for the determination of tariff for the power from new and renewable sources based generators, namely:.*

(a) *initiating the process of fixing the tariff either suo motu or on an application filed by the distribution licensee or by the generator.*

(b) *inviting public response on the suo motu proceedings or on the application filed by the distribution licensee or by the generator.*

(c) *(omitted)*

(d) *issuing general / specific tariff order for purchase of power from new and renewable sources based generators.*

(2) *While deciding the tariff for power purchase by distribution licensee from new and renewable sources based generators, the Commission shall, as far as possible, be guided by the principles and methodologies specified by:*

(a) *Central Electricity Regulatory Commission*

(b) *National Electricity Policy*

(c) *Tariff Policy issued by the Government of India*

(d) *Rural Electrification Policy*

(e) *Forum of Regulators (FOR)*

(f) *Central and State Governments*

(3) *The Commission shall, by a general or specific order, determine the tariff for the purchase of power from each kind of new and renewable sources based generators by the distribution licensee. ...*

Provided where the tariff has been determined by following transparent process of bidding in accordance with the guidelines issued by the Central Government, as provided under section 63 of the Act, the Commission shall adopt such tariff.”

3.4 The provisions in Commission’s Power Procurement Regulations on Control period is as follows:

“6. Agreement and Control period

The tariff as determined by the Commission by a general or specific order for the purchase of power from each type of renewable source by the distribution licensee as referred to in clause 4(3) shall remain in force for such period as specified by the Commission in such tariff orders. The control period may ordinarily be two years. When the Commission revisits the tariff, the revision shall be applicable only to the generator of new and renewable energy sources commissioned after the date of such revised order.”

4.0 Commission’s order on NCES based generation and allied issues.

4.1 The Commission issued Order No.3 dated 15-05-2006 on “Power purchase and allied issues in respect of Non-Conventional Energy Sources based Generating Plants and Non-Conventional Energy Sources based Co-generation Plants”. The said Order stipulated tariff rates for power procurement by the Distribution Licensee from Wind Energy Generators (WEGs), Biomass based generators and Bagasse based generators. This was the first Order issued by the Commission on NCES based power plants.

4.2 The Commission issued Order No.3 of 2009 dated 06-05-2009 on “**Comprehensive Tariff Order for Bagasse based Co-generation Plants**”. This Order covered tariff rates for power procurement by the Distribution Licensee from Bagasse based co-generators. In the said Order, the Commission fixed the validity of the Order upto 31-03-2011. By Tariff Order No.3 of 2011, the said Order was

extended upto 31-12-2011 and it was further extended upto 30-06-2012 by Tariff Order No.6 of 2011 dated 21-12-2011. This Order was again extended upto 31-07-2012 in Tariff Order No. 4 of 2012 dated 30-06-2012.

4.3 The Commission issued Order No.7 of 2012 dated 31-07-2012 on **“Comprehensive Tariff Order for Bagasse based Co-generation plants”**. This Order covered tariff rates for power procurement by the Distribution Licensee from Bagasse based co-generators. In the said Order, the Commission fixed the validity of the Order upto 31-07-2014. Commission in Order No. 4 of 2014, dated 28-07-2014 has extended the validity of the Order till the issue of next order.

4.4 The Commission issued Order No. 4 of 2016, dated 31-03-2016 on **“Comprehensive Tariff Order for Bagasse based Co-generation plants”**. This Order covered tariff rates for power procurement by the Distribution Licensee from Bagasse based co-generators.

5.0 Floating of Consultative Paper:

5.1 The Commission floated a Consultative Paper to elicit the views of the stakeholders before issuing a generic tariff order and hosted it in the Commission's website on 02-03-2018 inviting views/suggestions from the stakeholders.

5.2 The list of stakeholders who submitted written comments is placed in **Annexure-I.**

5.3 A meeting of the State Advisory Committee (SAC) was also held on **21-03-2018** to elicit their views. The list of SAC members who participated in the meeting

is placed in Annexure II.

5.4 Taking into account the views of various stakeholders and the views of the SAC members, the Commission issues this comprehensive Tariff Order on Bagasse based co-generation plants.

6.0 Legal Provisions:

6.1 Related Provisions of the Electricity Act, 2003:

6.1.1. Relevant Provisions of Electricity Act, 2003 are reproduced below:

“Section 3(1): The Central Government shall, from time to time, prepare the National Electricity Policy and tariff policy, in consultation with the State Governments and the Authority for development of the power system based on optimal utilization of resources such as coal, natural gas, nuclear substances or materials, hydro and renewable sources of energy.

Section 61 – *“The Appropriate Commission shall, subject to the provisions of this Act, specify the terms and conditions for the determination of tariff and in doing so, shall be guided by the following namely:-*

.....

The promotion of co-generation and generation of electricity from renewable sources of energy;

(a) The National Electricity Policy and tariff policy:”

Section 62(1): The Appropriate Commission shall, subject to the provisions of this Act for –

(a) Supply of electricity by a generating company to a distribution licensee:

Section 62(2): The Appropriate Commission may require a licensee or a generating company to furnish separate details, as may be specified in

respect of generation, transmission and distribution for determination of tariff.

Section 62(5): The Commission may require a licensee or a generating company to comply with such procedure as may be specified for calculating the expected revenues from the tariff and charges which he or it is permitted to recover.

Section 63: Notwithstanding anything contained in section 62, the Appropriate Commission shall adopt the tariff if such tariff has been determined through transparent process of bidding in accordance with the guidelines issued by the Central Government.

Section 86(1)(e): "Promote cogeneration and generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid and sale of electricity to any person, and also specify, for purchase of electricity from such sources, a percentage of the total consumption of electricity in the area of a distribution licensee;"

6.2 Related Provisions of the National Electricity Policy:

6.2.1 The guidelines stipulated in the National Electricity Policy on NCES, which are relevant, are reproduced below:

*"(1) **Clause 5.2.20:** Feasible potential of non-conventional energy resources, mainly small hydro, wind and biomass 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.*

(2) Clause 5.12.1: Non-conventional sources of energy 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 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 measures would also have to be taken for development of technologies and a sustained growth of these sources.

(3) Clause 5.12.2: The Electricity Act 2003 provides that co-generation and generation of electricity from non-conventional sources would be promoted by the 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. “

6.3 Related Provisions in the Tariff Policy

6.3.1. The Commission is also guided by the following specific provisions of the

Tariff Policy of Government of India (Ministry of Power) relating to NCES:

*“ (1) **Clause 5(11) (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.*

*(2) **Clause 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.*

*(3) **Clause 6.4(1):** Pursuant to provisions of section 86(1)(e) of the Act, the appropriate Commission shall fix a minimum percentage of the total consumption of electricity in the area of a distribution licensee for purchase of energy from renewable energy sources, taking into account availability of such resources and its impact on retail tariffs. Cost of purchase of renewable energy shall be taken into account while determining tariff by SERCs. Long term growth trajectory of Renewable Purchase Obligations (RPOs) will be prescribed by the Ministry of Power in consultation with MNRE.*

*(4) **Clause 6.4(2):** States shall endeavor to procure power from renewable energy sources through competitive bidding to keep the tariff low, except from the waste to energy plants. Procurement of power by Distribution Licensee from renewable energy sources from projects above the notified capacity, shall be done through competitive bidding process, from the date to*

be notified by the Central Government.

However, till such notification, any such procurement of power from renewable energy sources projects, may be done under Section 62 of the Electricity Act, 2003. While determining the tariff from such sources, the Appropriate Commission shall take into account the solar radiation and wind intensity which may differ from area to area to ensure that the benefits are passed on to the consumers.

7.0 Applicability of this Order:

7.1. The Order shall come into force with effect **from 01-04-2018**. The tariff proposed to be fixed shall be applicable to all Bagasse based Co-generation Plants commissioned during the control period of the Order. The tariff is applicable for purchase of bagasse based co-gen power by Distribution Licensee from Bagasse based Co-generators conforming to this Order. The open access charges and other terms and conditions specified in this Order shall be applicable to all the Bagasse based co-generators, irrespective of their date of commissioning.

7.2. South Indian Sugar Mills Association in its letter dated March 23, 2018 has requested the Commission to extend the time for submission of comments stating the reason that due to unprecedented drought in the year 2017, their capacity utilization was around 20% and cash flows are so low that mills could not even pay the salaries to their employees. Further, the members are preoccupied with meeting with Banks and Government authorities and members were not in a position to finalize and submit their response to the Consultative Paper within the date prescribed.

7.3. With respect to the above representation, Commission wrote to SISMA stating that the control period of the present order, Order No. 4 of 2016, dated 31-03-2016 expires on 31-03-2018 and a sufficient time of twenty one days has already been given for stakeholders to offer their comments/suggestion . It was further stated that any comments received either from SISMA or from any of the members of its association before finalization of the tariff order on Bagasse based Co-generation plant for the next control period will be taken to account by the Commission. But no comments have been received either from SISMA or from its members of the association.

8.0 Tariff Methodology

8.1. Cost-Plus Tariff Determination

8.1.1 Cost-plus tariff determination is a more practicable method but it discourages competition and efficiency. However, to encourage the setting up of new co-gen plants and till the competitive bidding is introduced, Cost plus Tariff method is followed. As it can be easily designed to provide adequate return to the investor as assured return will lead to larger investment in renewable power. Accordingly, the Commission proposes the Cost plus Tariff approach in this Order.

8.2 Single Part vs. Two Part Tariff

8.2.1 In the Commission's Order No. 4 of 2016, dated 31-03-2016, Commission adopted the "**Cost plus two part tariff**". Generally, the two part tariff is adopted when the fuel cost varies from time to time and the fuel cost is considered as pass through. The variable component of tariff would take care of such price escalation and in order to accommodate the fuel cost escalations appropriately two part tariff is adopted in this Order also.

9.0 Tariff Components:

9.1 The Power Procurement from New and Renewable Sources of Energy Regulation, 2008 specifies that while determining the tariff, the Commission shall adopt appropriate financial and operational parameters for the tariff determined in a cost-plus scenario. The Commission has carried out a detailed analysis of the existing policies/procedures and commercial mechanisms in respect of Bagasse based co-generation.

9.2 The following important factors have been considered to arrive at the tariff and other related issues for Bagasse based co-generation.

1. Capital cost per MW
2. Plant Load Factor (PLF)
3. Debt – Equity ratio
4. Term of Loan and Interest
5. Return on Equity(RoE)
6. Life of plant and machinery
7. Depreciation
8. Operation & Maintenance (O & M) Expenses
9. Interest and Components of working capital
10. Station Heat rate
11. Gross calorific value(GCV) of the fuel
12. Specific fuel consumption(SFC)
13. Fuel cost
14. Auxiliary consumption

9.3 Capital cost per MW:

9.3.1. The Commission adopted Rs.5.20 Crores / MW as the Capital Cost for Order No. 4 of 2016, dated 31-03-2016. In the Consultative Paper Commission proposed a Capital Cost of Rs.4.925 Crores/MW. The capital cost includes evacuation cost upto the inter-connection point. The Commission apportions the capital cost on plant and machineries and land and civil works as 85% and 15% respectively.

9.3.2. TANGEDCO concurred with the proposal of the Commission for a Capital Cost of Rs.4.925 Crores/MW inclusive of evacuation cost upto interconnection point. The capital cost on machineries and land and civil works – 85% and 15% respectively.

The capital cost considered by other Commissions are as follows:

Sl. No.	Order of ERCs	Capital Cost
1.	CERC's Regulation(RE-Tariff-2017-2020), dated 17-4-2017	Rs.4.925 Cr/MW for entire control period
2.	Maharashtra ERC's Order dated. 28-4-2017 (for FY2017-18)	Rs.4.829 Cr./MW
3.	Karnataka ERC's Order dated 01-01-2015 (upto FY2017-18)	Rs.4.75 Crore/MW

9.3.3 In CERC's (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2017, it has been stated that the normative capital cost for the non-fossil fuel based co-generation projects shall be Rs.492.5 Lakh/MW for high boiler pressure projects for the first year of Control Period (i.e. FY2017-18), and will remain valid for the entire duration of the control period unless reviewed earlier by the Commission.

9.3.4. It is evident from the CERC's Statement of Reasons (SOR) dated 18th April 2017 for the Control Period 2017-2020, that CERC has analysed the

normative capital cost for various boiler pressure (ata) and has discussed the data on the normative capital cost from Sugar Development Fund (Ministry of Consumer Affairs, Food & PD). The said data in respect of normative capital cost is Rs.442 Lakh/MT for 87 to 109 (ata) high pressure boiler and Rs.543.00 Lakh/MT for 110 (ata) and above high pressure boiler. Considering the above, by averaging the normative cost for High Boiler Pressure projects (above 87 ata) CERC has arrived at a capital cost of Rs.492.5 Lakh/MW for FY2017-18. Further, CERC has stated that the higher capital cost of Rs.492.5 Lakh/MW is provided to encourage and ensure deployment of high pressure boilers which are more efficient in nature. This capital cost will remain valid for the entire duration of the control period unless reviewed earlier by the Commission.

9.3.5. Though CERC has fixed a capital cost of Rs.4.925 Crores /MW for the control period from 2017-18 to 2019-2020, in view of the above declining trend in the capital cost for the high pressure boilers, Commission decided to retain the existing capital cost of Rs.5.20 Crores/MW for this control period too. The capital cost includes evacuation cost upto the interconnection point. Commission apportions the capital cost on machineries and land and civil works at 85% and 15% respectively.

9.4 Plant Load Factor (PLF):

9.4.1 Commission in all previous Orders has adopted a PLF of 55%. Commission proposed to retain the existing PLF of 55 % for the next control period too.

9.4.2 TANGEDCO concurred with the proposal of the Commission for a PLF of 55%.

9.4.3 The PLF considered by other Commissions are as follows:

Sl. No.	Order of ERCs	PLF
1.	CERC's Regulation(RE-Tariff-2017-2020), dated 17-4-2017	60% (in respect of Tamil Nadu)
2.	Maharashtra ERC's Order dated. 28-4-2017 (for FY2017-18)	60%
3.	Karnataka ERC's Order dated 01-01-2015 (upto FY2017-18)	60%

9.4.4 Some of the sugar mills also use fossil fuel during off seasons. Even during the crushing season if the sugarcane is not available supplementary fuel is used therefore the Commission would like to continue with the PLF of 55% on annual basis. The PLF is an annual phenomenon for the purpose of fixed cost recovery.

9.4.5 In some cases, generation may go beyond 55% PLF. Once the annual fixed charges or the capital cost recovery is achieved at the normative PLF of 55%, for any generation beyond the normative PLF of 55%, an incentive would be adequate for the additional efforts and to meet the wear and tear of the plant and equipment. Therefore, Commission allows an incentive of Rs.0.25 per unit which is already in practice in respect of the Conventional Power Stations.

9.4.6. In the existing order also, Commission decides to adopt a normative PLF of 55% for Bagasse based Co-generation plants. For any generation beyond the normative PLF, an incentive of Rs.0.25 per unit would be adequate for the additional efforts and to meet the wear and tear of the plant and equipment. In view of the above, for any generation beyond the normative PLF of 55%, Commission allows Variable Cost and also an incentive of 25 paise per unit.

9.5 Debt – Equity Ratio:

9.5.1 The Tariff Policy lays down a debt-equity ratio of 70:30 for power projects.

Commission in its previous orders also adopted a Debt Equity Ratio of 70:30.

9.5.2 TANGEDCO accepts the Debt Equity Ratio of 70:30.

9.5.3 The Commission decides to adopt this ratio as specified in its Tariff Regulations 2005 and as adopted in the earlier Orders on the new and renewable power.

9.6 Term of Loan and Rate of Interest:

9.6.1. The Commission in its Consultative Paper has proposed a term of loan as ten years plus one year moratorium period and the rate of interest as 9.95% p.a.. Commission arrived at the rate based on the MCLR of 1 year of 7.95% notified by the State Bank of India in February 2018 plus 200 basis points which is 9.95%

9.6.2. TANGEDCO requested that the latest MCLR of 1 year of 7.95% notified by SBI in February 2018 plus 100 basis points which is 8.95% may be taken for calculation of Interest on Loan.

9.6.3. Further, in the SAC Meeting, CMD/TANGEDCO has requested the Commission to consider the comments given by TANGEDCO while determining the tariff.

9.6.4. The term of loan and rate of interest considered by other ERCs are as follows:

Sl. No.	Order of ERCs	Term of Loan and rate of interest
1.	CERC's Regulation(RE-Tariff-2017-2020), dated 17-4-2017	13 years and normative interest rate of two hundred (200) basis points above the average State Bank of India MCLR (one year tenor) prevalent during the last available six months.

		Interest rate for FY2018-19 proposed by CERC vide draft Order dated 01-03-2018 is 9.97%
2.	Maharashtra ERC's Order dated. 28-4-2017 (for FY2017-18)	11.00%
3.	Karnataka ERC's Order dated 01-01-2015 (upto FY2017-18)	12.50%

9.6.5. Commission has considered the latest rate available at the time of issuing of the Consultative Paper and the rate of interest adopted by the Commission is reasonable one related to the market conditions.

9.6.6. Commission decides to continue with a term of loan of 10 years plus one year moratorium as adopted in the previous orders of Bagasse based cogeneration plants. The prevalent lending rate being the marginal cost of funds based lending rate at which the bank prices all its loans.

9.6.7. Hence, in the present order Commission decides to adopt the latest MCLR (Marginal Cost of funds based Lending Rate) of 1 year of 7.95% notified by the State Bank of India in February 2018 plus 200 basis points which is 9.95% p.a. as Interest on Term loan.

9.7 Return on Equity (RoE):

9.7.1. In the Consultative Paper Commission proposed a RoE of 17.56% pre-tax as adopted by CERC. CERC in its Explanatory Memorandum for Terms and Conditions for determination of Tariff for Renewable Energy Sources, February 2017, has stated that in view of the fact that the Minimum Alternate Tax/Corporate Tax are expected to be lowered and the CERC has observed that the effective tax rate is lower than the Corporate Tax rate. For certainty of regulatory principles, the return on equity shall be grossed up by Minimum Alternate Tax prevailing as on 1st April 2017 for the entire useful life of the project.

9.7.2 TANGEDCO concurred with the proposal of the Commission.

9.7.3 The Return on Equity considered by other ERC's are as follows:

Sl. No.	Order of ERCs	RoE
1.	CERC's Regulation(RE-Tariff-2017-2020), dated 17-4-2017	17.56%.
2.	Maharashtra ERC's Order dated. 28-4-2017 (for FY2017-18)	For first 10 years @ 16% grossing up with MAT rate of 21.34% and after first 10 years @16% grossing up with Income Tax rate of 34.61%
3.	Karnataka ERC's Order dated 01-01-2015 (upto FY2017-18)	16% RoE and any Tax paid on RoE is allowed as a pass through which shall be claimed separately from ESCOMs furnishing proof of payments.

9.7.4 Commission decides to adopt normative return on equity of 17.56% pre-tax as adopted by CERC in its RE Regulations of 2017 as well as in RE draft Order dated 01-03-2018 for FY2018-19.

9.8. Life of Plant and Machinery:

9.8.1 Commission in 2012 Order and in 2016 Order considered the life of a plant as 20 years for tariff determination process, therefore in the present order too Commission considers the useful life of the plant as 20 years.

9.9 Depreciation :

9.9.1. In the Consultative Paper Commission has proposed the rate of Depreciation as adopted in the earlier orders dated 31-07-2012 and 31-03-2016 in respect of Bagasse based Co-generation plants which is 4.50% p.a. Straight Line Method on plant and machinery. The accumulated depreciation shall however be limited to 90% of the cost of plant and machinery.

9.9.2. TANGEDCO concurred with the proposal of the Commission.

9.9.3 The rate of depreciation considered by other Commissions are as follows:

Sl. No.	Order of ERCs	Depreciation
1.	CERC's Regulation(RE-Tariff-2017-2020), dated 17-4-2017	5.28% per annum for first 13 years; Balance spread over remaining useful life i.e. at 3.05%.
2.	Maharashtra ERC's Order dated. 28-4-2017 (for FY2017-18)	5.83% for the first 12 years and 2.50% thereafter for remaining useful life of 8 years
3.	Karnataka ERC's Order dated 01-01-2015 (upto FY2017-18)	5.83% for the first 12 years and balance spread over the life of the plant.

9.9.4 In respect of the rate of depreciation, in the present order also Commission decides to continue with the existing methodology of depreciation as in its earlier Orders which is 4.5% p.a. Straight Line Method on plant and machinery by reckoning 85% of the capital cost as the cost of plant and machinery. The accumulated depreciation shall however be limited to 90% of the cost of plant and machinery.

9.10 Operation and Maintenance (O & M) Expenses:

9.10.1. In the Consultative Paper Commission proposed an O & M Expenses including insurance at Rs.22.33 Lakh/MW with an annual escalation of 5.72% from the second year onwards.

9.10.2. TANGEDCO concurred with the proposal of the Commission.

9.10.3 The O & M Expenses considered by other Commissions are as follows:

Sl. No.	Order of ERCs	O & M Expenses
1.	CERC's Regulation(RE-Tariff-2017-2020), dated 17-4-2017	Rs.21.13 Lakh/MW for FY2017-18 and thereafter escalated at 5.72% per annum. Rs.22.34Lakh/MW has been proposed by CERC in the draft Order dated 01-03-2018.
2.	Maharashtra ERC's Order dated. 28-4-2017 (for FY2017-18)	Rs.18.69 Lakh/MW for FY2017-18
3.	Karnataka ERC's Order	3.0% of Capital Cost with an escalation of

	dated 01-01-2015 (upto FY2017-18)	5.72%
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9.10.4 In the present order Commission fixes O & M expenses including insurance at Rs.22.34 Lakh/MW with an annual escalation of 5.72% p.a. from the second year onwards.

9.11. Interest and Components of working capital:

9.11.1 The Commission in its Order No. 4 of 2016, dated 31-03-2016, fixed the components of working capital on the following norms and also proposed the same in the Consultative Paper which are as follows:

- a. Fuel stock of one month
- b. O & M Expenses for one month
- c. Receivables equivalent to two months

9.11.2. While submitting their comments, TANGEDCO requested the Commission to consider one month fuel stock, one month O & M Expenses and one month Receivables as components of working capital. Further, they requested for a rate of interest at 9.45% which is 150 basis points above the average SBI MCLR (1 year tenor) rate.

9.11.3 The rate of interest and components considered by other Commission for calculating the Interest on Working Capital are as follows:

Sl. No.	Order of ERCs	Interest and components of Working Capital
1.	CERC's Regulation(RE-Tariff-2017-2020), dated 17-4-2017	Fuel Cost for four months equivalent to normative PLF, O & M expenses for one month, receivables equivalent to two (2) months of fixed and variable charges for sale of electricity calculated on the target PLF and Maintenance spare @ 15% of O & M expenses. Rate of Interest - 300 basis points above the average State Bank of

		India MCLR (one year tenor).
2.	Maharashtra ERC's Order dated. 28-4-2017 (for FY2017-18)	Fuel Cost for four months equivalent to normative PLF, O & M expenses for one month, receivables equivalent to two (2) months of fixed and variable charges for sale of electricity calculated on the target PLF and Maintenance spare @ 15% of O & M expenses. Rate of Interest - 11.00%
3.	Karnataka ERC's Order dated 01-01-2015 (upto FY2017-18)	13.25%

9.11.4. As Commission is consistently following the above components of working capital in its previous tariff orders, in the present order too, Commission decides to continue with the same components of working capital viz. one month fuel stock, one month O & M and two months receivables.

9.11.5. As regards the rate of interest for calculating the Interest on working capital, the same is considered as 300 basis points above the average State Bank of India MCLR (one year tenor) rate and fixes the same at 10.95% p.a.

9.12. Station Heat Rate (SHR):

9.12.1 In the Consultative Paper Commission has proposed a SHR of 3240 kCal/kWhr.

9.12.2. TANGEDCO concurred with the proposal of the Commission.

9.12.3. The Station Heat Rate considered by other Commissions are as follows:

Sl. No.	Order of ERCs	Station Heat Rate
1.	CERC's Regulation(RE-Tariff-2017-2020), dated 17-4-2017	3600 kCal/kWhr
2.	Maharashtra ERC's Order dated. 28-4-2017 (for FY2017-18)	3600 kCal/kWhr

9.12.4 In R.A. No. 3 OF 2014, Order dated February 23, 2016, Commission adopted a Station Heat Rate of 3240 Kcal/kWhr. Further, in Order No. 4 of 2016, dated 31-03-2016 too Commission adopted the same Station Heat Rate of 3240 Kcal/kWhr. In the present order too Commission decides to adopt a SHR of 3240 kCal/kWhr.

9.13 Gross Calorific Value (GCV) of the fuel:

9.13.1 In the Consultative Paper Commission proposed a GCV of 2300kCal/kg.

9.13.2. The GCV considered by other Commissions are as follows:

Sl. No.	Order of ERCs	GCV for Bagasse
1.	CERC's Regulation(RE-Tariff-2017-2020), dated 17-4-2017	2250 kCal/kg
2.	Maharashtra ERC's Order dated. 28-4-2017 (for FY2017-18)	2250 kCal/kg

9.13.3. In the present Order also Commission decides to continue with the same GCV of 2300 kCal/kg.

9.14 Specific Fuel Consumption (SFC) :

9.14.1 In the Consultative Paper Commission proposed a SFC of 1.41 kg/kWhr.

9.14.2. The Specific fuel consumption considered by other Commissions are as follows:

Sl. No.	Order of ERCs	Specific fuel consumption
1.	CERC's Regulation(RE-Tariff-2017-2020), dated 17-4-2017	1.60 kg/kWhr
2.	Maharashtra ERC's Order dated. 28-4-2017 (for FY2017-18)	1.60 kg/kWhr
3.	Karnataka ERC's Order dated 01-01-2015 (upto FY2017-18)	1.60 kg/kWhr

9.14.3. Specific fuel consumption is the resultant of Station Heat Rate and Gross Calorific Value of the fuel. With the above Station Heat Rate at 3240 kCal/kWh and GCV at 2300 kCal/kg the SFC is 1.41 kg/kWh and the Commission decides to continue with the same SFC.

9.15 Fuel Cost:

9.15.1. In the Consultative Paper Commission has proposed a fuel cost of Rs.1834.35/MT. with an escalation of 5% from the 2nd year onwards.

9.15.2 The fuel cost considered by the other Commissions are as follows:

Sl. No.	Order of ERCs	Fuel Cost and escalation factor
1.	CERC's Regulation(RE-Tariff-2017-2020), dated 17-4-2017	Rs.1747.51/MT(FY2017-18) for Tamil Nadu and the fuel cost shall be escalated at 5% for subsequent years. In the draft Order dated 01-03-2018, CERC has specified Rs.1834.89/MT for FY2018-19.
2.	Maharashtra ERC's Order dated. 28-4-2017 (for FY2017-18)	Rs.2273.75/MT for FY2017-18
3.	Karnataka ERC's Order dated 01-01-2015 (upto FY2017-18)	Rs. 1600/MT escalation @ 5.72%

9.15.3. TANGEDCO concurred with the proposal of the Commission.

9.15.4. CERC fixed the price of Bagasse for the first year of the Control Period (i.e. FY2017-18) as Rs.1747.51 /MT in its CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2017, dated 17th April 2017. Commission escalated the cost of fuel by 5% over the fuel cost notified for FY2017-18 to arrive at the fuel cost for FY2018-19 which is Rs.1834.35 / MT with an escalation of 5% p.a.

9.16. Auxiliary Consumption:

9.16.1 Commission in its Order No. 4 of 2016, dated 31-03-2016 adopted an Auxiliary consumption of 8.50%.

9.16.2. TANGEDCO concurred with the Auxiliary Consumption proposed by the Commission.

9.16.3. Auxiliary consumption considered by other Commissions are as follows:

Sl. No.	Order of ERCs	Auxiliary consumption
1.	CERC's Regulation(RE-Tariff-2017-2020), dated 17-4-2017	8.50%
2.	Maharashtra ERC's Order dated. 28-4-2017 (for FY2017-18)	8.50%
3.	Karnataka ERC's Order dated 01-01-2015 (upto FY2017-18)	9.00%

9.16.4. In the present order Commission decides to continue with the Auxiliary Consumption of 8.5%.

10. Tariff Determinants:

10.1 The financial and operational parameters in respect of Bagasse based Cogeneration Power projects considered in the present order are tabulated below:

Tariff Components	Values
Capital Cost	Rs.5.20 Crore/MW
PLF	55%
Debt Equity Ratio	70:30
Term of Loan	10 years with one year moratorium period

Interest on Loan	9.95%
Return on Equity	17.56% (pre-tax)
Life of Plant and Machinery	20 years
Depreciation	4.5% per annum SLM on 85% of the Capital Cost
O & M Expenses	Rs. 22.34 Lakh/MW with an annual escalation of 5.72% from 2 nd year onwards
Components and Interest on Working Capital	Components: a) One month Fuel Stock b) One month O & M Expenses c) Two months Receivables Rate of Interest – 10.95%
Station Heat Rate(SHR)	3240 kCal/kWh
Gross Calorific Value (GCV)	2300 kCal/kg
Specific Fuel Consumption (SFC)	1.41
Fuel Cost (Rs. PMT)	Rs. 1834.35/MT
Auxiliary Consumption	8.5%
Variable Cost	
2018-19	Rs.2.83/- per unit
2019-20	Rs.2.97/- per unit
Fixed Cost	
2018-19	Rs.2.53/- per unit
2019-20	Rs.2.56/- per unit
Total Cost	
2018-19	Rs.5.36/- per unit
2019-20	Rs.5.53/- per unit

11. Tariff:

11.1 Bagasse based Power Generation tariff is computed with reference to the determinants listed above.

11.2 Fixed Cost:

11.2.1 The fixed Cost per unit for the whole project life of 20 years is as follows:

(Rs./Unit)

Year	FCC	Year	FCC
1	2.53	11	2.21
2	2.56	12	2.19
3	2.51	13	2.25
4	2.47	14	2.31
5	2.42	15	2.38
6	2.38	16	2.46
7	2.34	17	2.53
8	2.31	18	2.61
9	2.27	19	2.70
10	2.24	20	2.79

11.2.2 The fixed capacity charges specified in this Order will be applicable with reference to the date of commissioning of the plant.

11.3 Variable Cost:

11.3.1 The variable cost for the financial year 2018-19 will be Rs.2.83/- per unit and for the financial year 2019-20 will be Rs.2.97/- per unit as discussed supra.

11.3.2. The variable cost will be applicable with reference to the financial year. The variable cost shall apply for all plants commissioned on or after 15-05-2006.

12 Use of Fossil Fuel:

12.1. In the Consultative Paper issued by the Commission, it was proposed to restrict the use of fossil fuels to 15% of total fuel consumption on annual basis.

12.2. TNPL requested the Commission not to restrict the use of fossil fuel to 15% of total fuel consumption on annual basis during drought condition. During drought condition, TNERC/TANGEDCO may exempt fossil fuel restriction as the Sugar Mills which will be useful to TNPL to get Bagasse from those who have already entered PPA with TANGEDCO in the larger interest of protecting the industrial wellness of the State. As TNPL requires large quantity of Bagasse, it is not possible to procure the same from the open market. TNPL has therefore, entered into long term tie-up arrangements with various Sugar Mills from the year 1984. During normal condition, the Bagasse available at the regular tied up Sugar Mills is sufficient for TNPL and during drought condition, it is essential to have additional short term tie up arrangements with few new Sugar Mills having high cane potential. Due to Fossil fuel restriction, TNPL cannot enter into tie up arrangements with Sugar Mills.

12.3. With respect to use of fossil fuel without restriction during drought condition, Commission has already allowed the use of fossil fuel to the extent of 15% on annual basis considering the availability of the bagasse during non-crushing season. Commission has also considered a lower PLF of 55% for recovery of fixed cost though CERC has specified a PLF of 60% for Tamil Nadu. Since the Bagasse based co-generation power plants are considered under NCES and tariff and other related issued are being determined by this Commission, allowing over and above 15% of fossil fuel cannot be encouraged

as the very purpose of categorizing the bagasse based sugar plants under NCES will be defeated.

12.4 Hence, in the present order also Commission decides to continue with the use of fossil fuel to the extent of 15% on annual basis.

13. Monitoring Mechanism for the use of fossil fuel:

13.1 The Project developer shall furnish to the State Nodal Agency, a monthly fuel usage statement and monthly fuel procurement statement duly certified by Chartered Accountant to the beneficiary (with a copy to appropriate agency appointed by the Commission for the purpose of monitoring the fossil and non-fossil fuel consumption) for each month, along with the monthly energy bill. The statement shall cover details such as -

- a) Quantity of fuel (in tone) for each fuel type (bagasse and fossil fuels) consumed and procured during the month of power generation purposes,
- b) Cumulative quantity (in tonne) of each fuel type consumed and procured till the end of that month during the year,
- c) Actual (gross and net) energy generation (denominated in units) during the month,
- d) Cumulative actual (gross and net) energy generation (denominated in units) until the end of that month during the year,
- e) Opening fuel stock quantity (in tonne),
- f) Receipt of fuel quantity (in tonne) at the power plant site and
- g) Closing fuel stock quantity (in tonne) for each fuel type (bagasse and fossil fuels) available at the power plant site.

13.2 Non-compliance with the condition of fossil fuel usage by the project developer, during any financial year, shall result in withdrawal of applicability of tariff for such bagasse based power project.

14. Related Issues:

The following are the related issues for energy generation from bagasse based cogeneration plants:

1. Transmission and wheeling charges & Scheduling and system operation
2. Cross Subsidy Surcharge
3. CDM Benefits
4. Reactive power charges
5. Grid availability charges
6. Adjustment of energy generated
7. Application fees and agreement fees
8. Billing and payments
9. Payment security and Security deposit
10. Power factor
11. Metering
12. Connectivity and Evacuation of energy
13. Energy Purchase and Wheeling Agreement
14. Parallel Operation Charges
15. Tariff review period / Control period
16. Quantum of power purchase by the Distribution Licensee

14.1 The above charges / terms are applicable to all bagasse based co-gen plants irrespective of their year of installation. These are discussed in detail in the following paragraphs.

14.2. Transmission and Wheeling Charges & Scheduling and System Operation Charges:

14.2.1. Transmission, Wheeling and Scheduling & System Operation Charges are generally regulated by the Commission's Tariff regulations, Grid Connectivity & Open Access regulations and Commission's order on open access charges issued from time to time. However, as a promotional measure, under sections 61 and 86(1)(e) of the Act, Commission in the tariff orders of 2012 and 2016 fixed 60% of the charges applicable to conventional power to the Bagasse based Cogeneration plants. The concessions granted are being subsidized by other users of the network and ultimately borne by the consumers.

14.2.2 In the Consultative Paper Commission proposed 70% of the transmission, wheeling and scheduling and system operation charges applicable for conventional power for Bagasse based Cogeneration plants.

14.2.3. TANGEDCO concurred with charging 70% of applicable charges to conventional power.

14.2.4 With regard to scheduling and system operation charges, the work done by SLDC is the same as in the case of conventional power. SLDC has to monitor the grid operations effectively on real time basis. The scheduling and system operation charges have to be determined in a non-discriminatory manner with reference to the functions of SLDC and there cannot be any concession.

14.2.5 Commission does not want to take away all the concessions at one go, and therefore decides that Transmission, Wheeling and Scheduling and System

Operation charges are decided to be charged at 70% of that applicable for conventional power plants notified by the Commission from time to time.

14.2.6. Apart from these charges, actual line losses in kind as specified in the respective Order of the Commission and as amended from time to time are also payable for the captive use and third party sale. For generators who are availing Renewable Energy Certificate (REC), 100% of the respective charges as specified in the relevant orders shall apply.

14.3. Cross Subsidy Surcharge:

14.3.1. The Commission in its other tariff orders related to different renewable power and in the orders for solar power, has ordered to levy 50% of the cross subsidy surcharge from third party open access consumers. In the consultative paper, Commission proposed withdrawal of incentives in phases and proposed levy of 60% of cross subsidy surcharge as applicable for conventional power plants. The Distribution licensee has sought levy of 100% of cross subsidy surcharge. However, in this order, Commission decides to levy of 60% of cross subsidy surcharge applicable to conventional power.

14.4. CDM Benefits:

14.4.1 In the earlier orders issued on renewable energy, the Commission adopted the following formula for sharing of CDM benefits as suggested by the Forum of Regulators (FOR):

“The CDM benefits should be shared on gross basis starting from 100% to developers in the first year and thereafter reducing by 10% every year till the sharing becomes equal (50:50) between the developer and the consumer in the

sixth year. Thereafter, the sharing of CDM benefits will remain equal till such time the benefits accrue.”

14.4.2. The Commission accepted the formula recommended by the Forum of Regulators in its earlier order. The Commission decides to adopt the same formula. The generators shall furnish details of receipts of CDM to the distribution licensee and the distribution licensee shall account for the CDM receipts in the next ARR filing.

14.5 Reactive Power Charges:

14.5.1. Commission decides to adopt the reactive power charges for bagasse based co-generating plants as specified in its Order on Open Access charges issued from time to time.

14.6. Grid Availability Charges:

14.6.1 The charges for startup power of generators shall be as per Commission’s Grid Connectivity and Intra-State Open Access Regulations, 2014, Deviation Settlement Mechanism and other orders of the Commission in force.

14.6.2. Similarly, if adequate generation does not materialize or if drawal by the captive / third party consumer exceeds generation, the energy charges and demand charges shall be regulated as specified in the Commission’s Grid Connectivity and Intra-State Open Access Regulations, 2014 and Deviation Settlement Mechanism and other relevant orders.

14.7. Adjustment of energy generated:

14.7.1. The Commission decides that the adjustment of energy shall be as per the Commission's Open Access Regulations, Deviation Settlement Mechanism (DSM) and other relevant orders.

14.8. Application Fees and Agreement Fees:

14.8.1. The Commission in its Order No.4 of 2016, dated 31-03-2016 had stated that the Intra State Open Access Regulations 2005 of the Commission was amended in 2008 to provide for concession in application fees and agreement fees for generators of non-conventional and renewable sources of energy.

14.8.2. The application fees and agreement fees for the Energy Purchase Agreement (EPA) and Energy Wheeling Agreement (EWA) shall be as specified in the Commission's Intra State Open Access Regulations, 2005 and Fees and Fines Regulations, 2004 in force. The fees of EPA shall be collected by the licensee and passed on to the Commission. Whenever the Commission revises the above fees, the revised fees shall be payable by the Bagasse based co-generators.

14.8.3. Whenever there is a change in the usage of energy from bagasse based co-gen or a change in the drawl point, etc., there will be extra work to the licensee. Therefore, an additional fees equivalent to the application fees and agreement fees shall be leviable by the licensee on the generator.

14.8.4. The Commission decides to continue the same as in the Order No.4 of 2016, dated 31-03-2016.

14.8.5. Prior approval of the Commission shall be taken whenever any change in PPA is proposed to be made even if mutually agreed between the parties.

14.9. Billing and payment:

14.9.1 The Commission in its Order No.4 of 2016, dated 31-03-2016 had specified that when a renewable energy generator sells power to the distribution licensee, the generator will raise a bill every month for the net energy sold after deducting the charges for startup power and reactive power. The bill amount is due only after one month. If the distribution licensee makes the payment within a period of one month of presentation of bills by a generating company, a rebate of 1% shall be allowed. Any delayed payment beyond 60 days is liable for interest at the rate of 1% per month.

14.9.2. TANGEDCO while submitting their comments has requested the Commission to consider the interest for the delayed period may be adopted @ 0.75% per month in view of the prevailing reduction in the interest rate.

14.9.3 Commission now decides to continue with the above dispensation of levying an interest @ 1% per month followed earlier.

14.9.4. Energy Accounting shall be regulated by the Commission's Regulation/Orders on Open Access, Deviation Settlement Mechanism and Order on Open Access. Till such time the DSM is implemented in the State, if a bagasse based co-generator utilizes the power for captive use or if he sells it to a third party, the distribution licensee shall raise the bill at the end of the month for the net energy supplied. The licensee shall record the slot wise generation and consumption during the billing period. Slot wise adjustment shall be made for the billing period. However, Peak hour generation can be adjusted to normal hour or off peak hour consumption of the billing period. Normal hour generation shall be adjusted against normal hour consumption. Excess consumption will

be charged at the tariff applicable to the consumer subject to the terms and conditions of supply.

14.9.5. When DSM is implemented, the licensee shall record the time block-wise generation and consumption during the billing period. Time block wise adjustment shall be made for the billing period. Excess consumption will be charged at the tariff applicable to the consumer subject to the terms and conditions of supply.

14.9.6. Appropriate transmission and wheeling charges, scheduling and system operation charges and cross subsidy surcharge, wherever applicable, shall be recovered from the open access consumers. The net amount recoverable from the consumer shall be raised in the bill as per their normal billing schedule.

14.9.7. Peak, Off-peak and normal hours shall be as defined in Terms & Conditions for Determination of Tariff Regulations, 2005 as amended from time to time. Presently, as per Clause 11 (2) of the Terms and Conditions for determination of Tariff Regulations, 2005 – defines Peak hour as “ *the time between 06.00 hrs and 09.00 hrs and between 18.00 hrs and 21.00 hours*”. Clause 11(3) of the Terms and Conditions for determination of Tariff Regulations, 2005 defines off-peak hour as “*the duration between 22.00 hours and 05.00 hours*”. Balance hours are normal hours.

14.10. Payment Security and Security Deposit:

14.10.1. In Commission’s Order No.4 of 2016, dated 31-03-2016, the Commission had stated that the Tariff Policy calls for adequate and bankable security arrangement to the generating companies. This mechanism has been found impractical, as there are more number of generators and the monolith distribution

licensee is unable to offer security for such numbers. In the said Order, it had been stated that the interest for delayed payment by the licensee at 1% per month would serve the ends of justice.

14.10.2. With respect to the security deposit to be paid by captive/third party user, Commission decides that two times the maximum net energy supplied by the distribution licensee in any month in the preceding financial year shall be taken as the basis for the payment of security deposit.

14.10.3. TANGEDCO requested Commission to consider the interest for delayed period may be adopted at 0.75% per month in view of the prevailing reduction in interest rate. Further, TANGEDCO has stated that the SD clause is accepted.

14.10.4. As stated in the Consultative Paper, Commission now decides to continue with the existing system in respect of the payment security and security deposit.

14.11. Power factor:

14.11.1. Power factor disincentive may be regulated for the power factor recorded in the meter at the user end as specified in the relevant regulations/orders in force.

14.12 Metering:

14.12.1. The Commission in its Order No.4 of 2016, dated 31-03-2016 had decided to adopt the metering and communication in accordance with the following Regulations/ Codes, as amended from time to time:

- (a) Central Electricity Authority (Installation and Operation of Meters)
Regulations 2006

- (b) Tamil Nadu Electricity Distribution Code 2004
- (c))Tamil Nadu Grid Code 2004
- (d) Tamil Nadu Electricity Regulatory Commission - Intra State Open Access Regulations, 2005.

14.12.2. In the present order also Commission decides to continue the same.

14.13. Connectivity and Evacuation of energy:

14.13.1. The Commission in its Order No.4 of 2016, dated 31-03-2016 had ruled that the connectivity and power evacuation system shall be provided as per the Act, Codes, Regulations and Orders in force.

14.13.2. In the present order also Commission decides to continue the same as in the previous Order.

14.14. Energy Purchase and Wheeling Agreement:

14.14.1. The Commission in its Order No.4 of 2016, dated 31-03-2016 had decides that the format of the Energy Purchase Agreement (EPA) shall be evolved as specified in the Commission's Regulations in force. The agreement shall be valid for a minimum period of twenty years. The distribution licensee shall execute the Energy Purchase Agreement within a month of receipt of application from the generator. The parties to the agreement may be given the option of exiting in case of violation with three months' notice to the other party.

14.14.2. The format of Energy Wheeling Agreement (EWA) shall be evolved as specified in the Commission's Regulations in force. The period and other terms of agreement shall be as per the terms of Open Access Regulations issued by the Commission.

14.15. Parallel Operation Charges

14.15.1. Commission proposes that in respect of Bagasse based power generators who consumes power on captive basis in the same location may opt for paralleling of their generators with the grid without actually wheeling their power. Such generators shall have to pay 50% of applicable parallel operation charges to the respective distribution licensee as specified in the relevant regulations.

14.15.2. TANGEDCO has stated that as REC plants are to be treated on par with conventional plants, it is suggested that 100% of applicable parallel operation charges may be leveled.

14.15.3. As TANGEDCO has suggested for 100% of applicable parallel operation charges like conventional power plants and since it was newly included in the consultative paper, as requested by TANGEDCO, the levy of applicable parallel operation charges may be collected as done previously.

14.16. Control Period / Tariff Review Period:

14.16.1 Clause 6 of the Power Procurement from New and Renewable Sources of Energy Regulations, 2008 of the Commission specifies that the tariff as determined by the Commission shall remain in force for such period as specified by the Commission in such tariff orders and the control period may ordinarily be two years.

14.16.2. The Commission decides a control period of two years from April 1, 2018 and the tariff period is twenty years.

14.17. Quantum of power purchase by the Distribution Licensee:

14.18.1 The distribution licensee can purchase bagasse based cogen power at the rate determined by the Commission from the bagasse based cogen generators to

meet the Renewable Power Purchase Obligations (RPO) requirement. It is open to the distribution licensee to procure the same through competitive bidding route following the guidelines of Government of India if it can realize a more competitive rate than the one determined by Commission's order. For any procurement in excess of RPO, specific approval shall be obtained from the Commission.

15. Acknowledgement

15.1. The Commission would like to place on record and acknowledge with thanks, the contributions of the officers and staff of the Commission and the valuable guidance provided by the experts and members of the State Advisory Committee. The Commission also recognizes the input of TANGEDCO in finalizing this Tariff Order.

Sd/-
(Dr.T.Prabhakara Rao)
Member

Sd/-
(G.Rajagopal)
Member

Sd/-
(S.Akshaya Kumar)
Chairman

(By Order of the Commission)

Sd/-
Secretary,
Tamil Nadu Electricity
Regulatory Commission.

ANNEXURE – I

Abstract of comments received from various stakeholders on “Consultative Paper on Comprehensive Tariff Order for Bagasse based Co-generation plants”.

1. Tamil Nadu Generation and Distribution Corporation Ltd. (TANGEDCO).
2. Tamil Nadu Newsprint and Papers Limited.
3. South Indian Sugar Mills Association.

I. TARIFF COMPONENTS

1. Capital Cost

TANGEDCO concurred with the Capital Cost of Rs.4.925 Crores/MW as proposed by the Commission.

2. Plant Load Factor (PLF)

TANGEDCO concurred with the PLF of 55% proposed by the Commission.

3. Debt Equity Ratio

TANGEDCO concurred with the Debt Equity Ratio of 70:30 proposed by the Commission.

4. Term of loan

TANGEDCO concurred with the term of loan of ten years with one year as moratorium period.

5. Interest rate for the loan

TANGEDCO suggested for latest MCLR of 1 year if 7.95% notified by SBI in February 2018 plus 100 basis points which is 8.95%.

6. Return on Equity

TANGEDCO concurred with the Return on Equity of 17.56% p.a. (Pre-Tax) as proposed by the Commission.

7. Life of Plant and Machinery

TANGEDCO concurred with the Life of Plant and Machinery i.e. 20 years.

8. Depreciation

TANGEDCO concurred with the Depreciation of proposed by the Commission in the Consultative Paper of 4.5% p.a. SLM on plant and machinery by considering 85% of the capital cost as the cost of plant machinery. The accumulated depreciation would be limited to 90% of the cost of plant and machinery.

9. Operation and Maintenance (O & M) Expenses

TANGEDCO concurred with the O & M of Rs.22.33 Lakh/MW with an annual escalation of 5.72% from the second year onwards.

10. Station Heat Rate (SHR)

TANGEDCO concurred with the SHR proposed by the Commission.

11. Gross Calorific Value(GCV) of the fuel

TANGEDCO concurred with the GCV proposed by the Commission.

12. Specific Fuel Consumption (SFC)

TANGEDCO concurred with the SFC proposed by the Commission.

13. Components of Working Capital

TANGEDCO agreed to the components of working capital as proposed by the Commission which is as follows:

- a) Fuel Stock of one month
- b) O & M of one month and
- c) Receivables one month

14. Interest on Working Capital

TANGEDCO proposed for 150 basis points above the average SBI MCLR (1 year tenor) at 9.45%.

15. Fuel Cost per MT

TANGEDCO concurred with the Fuel Cost of Rs.1834.35/MT with 5% annual escalation as proposed by the Commission.

16. Auxiliary Consumption

TANGEDCO concurred with the proposal of the Commission.

17. Tariff categorization

TNPL requested to fix a separate tariff categorization of TNPL tied-up Sugar Mills and while renewing the Power Purchasing Agreements of the Sugar Mills (covered under Order No. P.P.A.P.No.8 of 2011, dated 31-03-2016) already tied up with TNPL for supply of Bagasse on Fuel Bagasse exchange basis, PPA may be renewed with the existing Tariff and terms.

TNPL has further stated the barter system adopted by TNPL and the Sugar Mills are an example of inter-industry co-operation. As the bagasse collected from the Sugar Mills are used for manufacture of paper with value addition and the coal substituted in place of bagasse is used for co-generation, this as an inter-industry co-generation. Sugar Mill co-generation plants do not use fossil fuel alone as fuel in their boilers to generate steam and that bagasse consists of fiber and pith. Pith is a non-fibrous material and has to be removed at the source itself. TNPL has installed Depithing plants at the sugar mills and the pith separated is added back into the sugar mill's boiler for firing along with fossil fuel. Therefore, the component of power generated using pith has to be accounted even as biomass based power and the tariff for a bagasse based

co-generation plant having tie-up with TNPL is to be worked out taking the above into account.

18. Use of fossil fuel

TNPL requested the Commission not to restrict the use of fossil fuel to 15% of total fuel consumption on annual basis. The reason being, during the drought condition TNERC/TANGEDCO may exempt fossil fuel restriction through the Sugar Mills which will be useful to TNPL to get Bagasse from those who have already entered PPA with TANGEDCO in the larger interest of protecting the industrial wellness of the State. As TNPL requires large quantity of Bagasse, it is not possible to procure the same from the open market. TNPL has therefore, entered into long term tie up arrangements with various Sugar Mills from the year 1984. During normal condition, the Bagasse available at the regular tied up Sugar Mills is sufficient for TNPL and during drought condition, it is essential to have additional short term tie up arrangements with few new Sugar Mills having high cane potential. Due to Fossil fuel restriction, TNPL cannot enter into tie up arrangements with Sugar Mills.

19. South Indian Sugar Mills Association vide their letter dated March 23, 2018 requested Commission to extend ten days time to offer their comments. They have stated that the Tamil Nadu sugar industry is facing headwinds due to low cane availability resulting from unprecedented drought in the year 2017. The capacity utilization is around 20% and cash flows are so low that mills could not even pay salaries to their employees. On the other hand, banks are threatening to take punitive action.

20. Since members are preoccupied with meetings with Banks and Government authorizes they were unable to finalize and submit their response to the above Consultative Paper within the date prescribed.

RELATED ISSUES:

1. Transmission and Wheeling Charges:

TANGEDCO concurred with the proposal of the Commission for 70% of the transmission and 70% of the wheeling charges of conventional power.

2. Scheduling and System Operation Charges

TANGEDCO concurred with the proposal of the Commission for 70% of the Scheduling and System Operation Charges applicable for the conventional power.

3. Cross Subsidy Surcharge

TANGEDCO suggested for 100% of the applicable Cross Subsidy Surcharges.

4. CDM Benefits

TANGEDCO has stated that the developers have so far not declared the receipt of CDM benefits. Hence, it is suggested a suitable clause to verify the receipt of CDM may be included in the order.

5. Reactive Power Charges

TANGEDCO accepted the proposal of the Commission.

6. Grid Availability Charges

TANGEDCO accepted the proposal of the Commission.

7. Adjustment of generated energy

TANGEDCO accepted the proposal of the Commission.

8. Application fees and agreement fees

TANGEDCO accepted the proposal of the Commission.

9. Billing and payment

TANGEDCO requested that the interest for the delayed period may be adopted @ 0.75% per month in view of the prevailing reduction in interest rate.

10. Payment security and Security Deposit

TANGEDCO requested for the interest for the delayed period may be adopted at 0.75% per month in view of the prevailing reduction in interest rate.

11. Power factor

TANGEDCO accepted the proposal of the Commission.

12. Metering

TANGEDCO accepted the proposal of the Commission.

13. Connectivity and Evacuation of energy

TANGEDCO accepted the proposal of the Commission.

14. Energy Purchase and Wheeling Agreement

TANGEDCO accepted the proposal of the Commission.

15. Scheduling of Power Generation

TANGEDCO accepted the proposal of the Commission.

16. Parallel Operation Charges

TANGEDCO has suggested for levy of 100% of applicable parallel operation charges as REC plants are to be treated on par with conventional plants.

17. Control Period

TANGEDCO accepted the proposal of the Commission.

ANNEXURE - II

LIST OF THE 32nd STATE ADVISORY COMMITTEE (SAC) MEETING OF TAMIL NADU ELECTRICITY REGULATORY COMMISSION HELD ON 21st MARCH 2018 AT HOTEL SAVERA, CHENNAI

Members Present :

1. Thiru. S.Akshaya Kumar, Chairman, TNERC
 2. Thiru. G.Rajagopal, Member, TNERC
 3. Thiru. Dr.T.Prabhakara Rao, I.A.S., (R), Member, TNERC
 4. Thiru. Vikram Kapur, I.A.S., CMD, TANGEDCO Ltd., and Chairman, TANTRANSOCO, and Principal Secretary to Government, Energy Department.
 5. Dr.Jagmohan Singh Raju, I.A.S., Chairman and Managing Director, Tamil Nadu Energy Development Agency.
 6. Thiru. S.Ramasubbu, Chief Electrical Engineer, Southern Railways.
 7. Thiru G.S.Rajamani
 8. Thiru. K.Kathirmathiyon, Secretary, Coimbatore Consumer Cause.
 9. Thiru. M.R.Krishnan, Deputy Director, Consumer Association of India.
 10. Thiru.Gurunathan, Confederation of Indian Industry on behalf of Thiru. M.Ponnuswamy.
 - 11.Thiru. K.Alagu, Vice-President, Tamil Nadu Chamber of Commerce and Industry.
 12. Dr.K.Selvaraj.
 13. Thiru. T.Vijayarangan, Secretary, Anna Labour Union.
 14. Thirumathi. Valchalal, Anna University on behalf of Dr.G.Uma, Professor and Head of Department, Electrical and Electronics Engineering, Anna University.
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PARAMETERS		VALUES
Capital Cost (in Rs.)		52000000
Debt - 70% (in Rs.)		36400000
Equity - 30% (in Rs.)		15600000
Interest on Debt		9.95%
Depreciation- SLM at 4.5% on 85% of Capital Cost - (in Rs.)		1989000
Interest on Working Capital		10.95%
Components of working capital		
Fuel Cost	1month	
O & M	1month	
Receivables	2 months	
Return on Equity	17.56%	
(ROE as per CERC)		
O & M Expenses - (in Rs.)	2233895	
Gross generation @ 55% PLF (in	4818000	
Auxiliary Consumption	8.50%	
Net Generation (in Units)	4408470	
Fuel Cost (Rs./MT)	1834.35	
Station Heat Rate kCal/kWh	3240	
GCV kCal/kg	2300	
SFC kg/kWh	1.41	

ANNEXURE - III

WORKING SHEET FOR TARIFF COMPUTATION FOR BAGASSE BASED CO-GENERATION PLANTS

Year	O & M charges (Rs)	Interest on loan (Rs)	Depreciation (Rs)	Fuel cost (Rs)	Working capital (Rs)					Return on Equity (Rs)	Total Fixed Cost (Rs)	Units generated Less Auxilliary	Fixed Cost (Rs / unit)	Variable Cost (Rs / unit)	Total Cost per unit (Rs /
					O & M expenses	Fuel	Receivables	Total Working Capital	Interest on Working Capital						
1	2233895	3621800	1989000	12461437	186158	1038453	3935080	5159691	564986	2739360	11149042	4408470	2.53	2.83	5.36
2	2361674	3621800	1989000	13084508	196806	1090376	4063711	5350893	585923	2739360	11297757	4408470	2.56	2.97	5.53
3	2496762	3259620	1989000	13738734	208064	1144894	4137446	5490404	601199	2739360	11085941	4408470	2.51		
4	2639577	2897440	1989000	14425671	219965	1202139	4218108	5640212	617603	2739360	10882980	4408470	2.47		
5	2790561	2535260	1989000	15146954	232547	1262246	4306055	5800847	635193	2739360	10689373	4408470	2.42		
6	2950181	2173080	1989000	15904302	245848	1325358	4401659	5972865	654029	2739360	10505649	4408470	2.38		
7	3118931	1810900	1989000	16699517	259911	1391626	4505314	6156851	674175	2739360	10332366	4408470	2.34		
8	3297334	1448720	1989000	17534493	274778	1461208	4617434	6353420	695699	2739360	10170113	4408470	2.31		
9	3485941	1086540	1989000	18411217	290495	1534268	4738455	6563218	718672	2739360	10019514	4408470	2.27		
10	3685337	724360	1989000	19331778	307111	1610982	4868834	6786927	743169	2739360	9881226	4408470	2.24		
11	3896139	362180	1989000	20298367	324678	1691531	5009052	7025261	769266	2739360	9755945	4408470	2.21		
12	4118998		1989000	21313285	343250	1776107	5159615	7278972	797047	2739360	9644405	4408470	2.19		
13	4354604		1989000	22378950	362884	1864912	5382541	7610337	833332	2739360	9916296	4408470	2.25		
14	4603688		1989000	23497897	383641	1958158	5616904	7958703	871478	2739360	10203526	4408470	2.31		
15	4867019		1989000	24672792	405585	2056066	5863292	8324943	911581	2739360	10506960	4408470	2.38		
16	5145412		1989000	25906432	428784	2158869	6122324	8709978	953743	2739360	10827515	4408470	2.46		
17	5439730		1989000	27201753	453311	2266813	6394652	9114775	998068	2739360	11166158	4408470	2.53		
18	5750882		1989000	28561841	479240	2380153	6680959	9540352	1044669	2739360	11523911	4408470	2.61		
19	6079833		1989000	29989933	506653	2499161	6981965	9987778	1093662	2739360	11901854	4408470	2.70		
20	6427599		1989000	31489430	535633	2624119	7298427	10458179	1145171	2739360	12301130	4408470	2.79		