GUJARAT ELECTRICITY REGULATORY COMMISSION

Gandhinagar

Order No. 1 of 2018

In the matter of: Determination of Tariff for Procurement of Power by the Distribution Licensees and Others from Biomass based Power Projects and Bagasse based Co-generation Projects for Control Period upto FY 2019-20.

In exercise of the powers conferred under Sections 61(h), 62(1)(a) and 86(1)(e) of the Electricity Act, 2003 and all other powers enabling it in this behalf, the Gujarat Electricity Regulatory Commission (hereinafter referred to as "the Commission") determines the tariff for procurement of power by the Distribution Licensees and Others in Gujarat from biomass based power projects and bagasse based co-generation projects.

The Commission had issued generic tariff order for procurement of power by distribution licensees and others, from biomass and bagasse based co-generation projects in Gujarat on 8th August 2013. The control period of the order was up to 31st March 2016. Subsequently, the Commission through a suo-moto petition No. 1565 of 2016, dated 24.05.2016, decided to extend the control period of the Order No. 4 of 2013 dated 8.08.2013 till the new tariff order is issued by the Commission.

The present order on biomass based power projects and bagasse based co-generation projects is the culmination of an elaborate consultative process after considering the suggestions/objections received from various stakeholders is valid upto FY 2019-20.

1. BACKGROUND

1.1 Potential for Biomass Power and Bagasse Co-generation Projects

The potential assessment study carried out by the Ministry of New and Renewable Energy (MNRE) in the State indicates grid connected biomass power potential and bagasse co-generation potential in the order of 1014 MW and 350 MW respectively. The installed capacity of grid connected biomass based power projects in the State is 41.10 MW as on 31st March 2016; 9.9 MW biomass power project of M/s Abellon Clean Energy Ltd was commissioned during the control period of previous tariff order dated 8.8.2013. There are six operational bagasse based co-generation projects in the State and all of them were set up for meeting the

captive power requirement of sugar factories and therefore, do not sell electricity to the distribution licensees.

1.2 GERC Multi Year Tariff Regulations, 2016

The Commission had notified 'Multi Year Tariff Regulations, 2016' on 29th March, 2016, which is applicable for determination of tariff for all existing and future Generating Companies, Transmission Licensees, Distribution Licensees, and their successors, if any. It is through the framework of these Regulations, the Commission determines tariffs for various cases including supply of electricity by a Generating Company to a Distribution licensee, intra-state transmission of electricity, intra-state wheeling of electricity, retail supply of electricity, etc. The objectives of MYT Regulations are:

- Provide regulatory certainty to the utilities, investors and consumers.
- Address the risk sharing mechanism between utilities and consumers based on controllable and uncontrollable factors.
- Ensure financial viability of the sector to attract investment, ensure growth and safeguard the interest of the consumers.
- Review operational norms for generation, transmission, distribution and supply.
- Promote operational efficiency and rationalize tariffs.

The Commission within the framework of these regulations and the broad principles outlined in the Tariff Policy issued by the Central Government has determined the tariff for procurement of power by distribution licensees and others from Biomass based Power Projects and Bagasse based Co-generation projects.

1.3 Renewable Purchase Obligation (RPO) in Gujarat

The Commission has amended the Principal GERC (Procurement of Energy from Renewable Sources) Regulations, 2010 on 4th March 2014 as GERC (Procurement of Energy from Renewable Sources) (First Amendment) Regulations, 2014 (Notification No. 2 of 2014) and specified the RE technology specific RPO targets for FY 2013-14 to FY 2016-17. Thereafter, the Commission has proposed amendment as draft GERC (Procurement of Energy from Renewable Sources) (Second Amendment) Regulations, 2017. The draft regulations specify the RPO target of 0.5% from other energy sources, i.e. biomass, bagasse, small hydro power projects etc. during FY 2017-18 to FY 2020-21 out of total RPO percentages specified for the year.

The Regulations recognise the certificates issued within the scope of Central Electricity Regulatory Commission's (CERC) Notification No. L-1/12/2010-CERC dated 14th January 2010 as valid instruments for discharge of the mandatory obligations set out in these regulations for the obligated entities to purchase electricity from renewable energy sources termed as Renewable Energy Certificates (REC).

The RPO targets specified under above regulations are applicable to distribution licensees and other captive and open-access users consuming electricity (i) generated from conventional captive generating plant having capacity of 5 MW and above for their own use and/or (ii) procured from conventional generation through open access and third-party sale.

1.4 GERC Biomass and Bagasse based Co-generation Projects Tariff Order 2013

GERC, in its Order No. 4 of 2013 dated 8th August 2013, determined generic tariff for procurement of power by Distribution Licensees and others from biomass based power projects and bagasse based co-generation projects to be commissioned during the control period of the order. In case of biomass based power projects two separate tariffs were specified by the Commission (i) for using water-cooled condensers and (ii) for using air-cooled condensers.

The fixed cost component of the tariff was levellised over the life of the plant, whereas the variable cost component of tariff was worked out for three years of the control period by considering annual escalation of 5% on fuel cost. As these projects were allowed to account for the accelerated depreciation (AD) benefits, GERC had determined two separate tariffs with and without AD.

Subsequently, the Commission through Petition No. 1565 of 2016, dated 24.05.2016 extended the applicability of generic tariff Order No. 4 of 2013 dated 8.8.2013 and decided that the tariff and other commercial terms as determined by the Commission in Order No. 4 of 2013 dated 8.08.2013 shall be applicable to all biomass power projects and bagasse based co-generation projects commissioned beyond 31.03.2016 upto the date of this order.

1.5 GERC Discussion Paper on Determination of Tariff for Biomass based Power Projects and Bagasse based Co-generation Projects

The Commission prepared a discussion paper on "Determination of Tariff for Procurement of Power by Distribution Licensees and others from Biomass based Power Projects and Bagasse based Co-generation Projects for the state of Gujarat" during the new control period starting from date of issue of the new tariff order. The discussion paper was placed on the website of the Commission on 24th May 2016 for inviting comments and suggestions from the

stakeholders. The list of stakeholders who have filed written objections and suggestions is provided in Annexure-I.

1.6 Public Hearing

A public hearing was held on 20th June 2016 to hear the stakeholder's views/suggestions /objections on the discussion paper. The list of stakeholders who participated in the hearing and made oral submission during the hearing is provided in Annexure-II.

2. DETERMINATION OF TARIFF FOR PROCUREMENT OF POWER FROM BIOMASS BASED POWER PROJECTS AND BAGASSE BASED CO-GENERATION PROJECTS

2.1 Tariff Determination Methodology

The Commission has determined the tariff for the biomass based power projects and bagasse based co-generation projects based on the broad principles contained in the (i) GERC (Multi Year Tariff) Regulations, 2016, (ii) GERC (Procurement of Energy from Renewable Sources) Regulations, 2010, GERC (Procurement of Energy from Renewable Sources) (First Amendment) Regulations, 2014, (iii) Draft GERC (Procurement of Energy from Renewable Sources) (Second Amendment) Regulations, 2017, and (iii) CERC (Terms and Conditions for Tariff Determination from Renewable Energy Sources) Regulations, 2012.

2.2 Process of Determination of Tariff

The Commission notes that the revised Tariff Policy notified by the Central Government on 28 January 2016 in pursuance of the Section 3 of the Act has stipulated that the Appropriate Commission may determine preferential tariff for procurement of power by the distribution licensees from non-conventional sources of energy till issue of notification for procurement of power from renewable energy sources through competitive bidding by the Central Government. The relevant extract of para 6.4 of the Tariff Policy is given below.

".....(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.

(3) The Central Commission should lay down guidelines for pricing intermittent power, especially from renewable energy sources, where such procurement is not through competitive bidding. The tariff stipulated by CERC shall act as a ceiling for that category."

As the guidelines for competitive bidding are yet to be notified by the Central Government, the Commission decides to continue with the cost-plus approach/methodology as adopted in the previous tariff orders issued by the Commission during the years 2010 and 2013 for determination of tariff for procurement of electricity from biomass based power projects and bagasse based co-generation projects by the distribution licensees in the State during the next control period from the date of issue of this tariff order.

2.3 Preferential Tariff

Clause 6.4(1) of the Tariff Policy, 2016 provides that the State Electricity Regulatory Commissions shall fix minimum percentage of power purchase from non-conventional energy sources, taking into account availability of such resources in the region and its impact on retail tariff. Clause 6.4(2) of Tariff Policy provides that states shall endeavor to procure power from renewable energy sources through competitive bidding from the date of notification to this effect from the Central Government. However, till such notification any such procurement of power from renewable energy sources may be done under Section 62 of the Electricity Act 2003. Keeping in view provisions of the Tariff Policy, and larger objectives with reference to climate change and global warming, the Commission has adopted an approach of determination of preferential tariff on cost-plus basis for procurement of power generated from biomass based and bagasse based power projects by the Distribution Licensees and others.

With regard to the structure and design of the tariff, following two approaches are possible:

i) Single-Part Tariff Vs Two-Part Tariff

In case of renewable energy technologies, single-part tariff is adopted where no fuel cost component is involved in power generation whereas two-part tariff is generally adopted in case of RE technologies where fuel cost is involved in power generation. In the case of biomass based power projects and bagasse based co-generation projects, biomass and bagasse are used as a fuel for generation of power. Hence the variable cost i.e. fuel cost is linked to the

generation. Therefore, the Commission has decided to adopt two-part tariff for procurement of electricity from biomass based power projects and bagasse based co-generation projects by the distribution licensees and others in the State during the new control period starting from the date of issue of this order.

ii) Project Specific Tariff Vs Generic Tariff

A generic tariff mechanism would provide incentives to the investors for use of most efficient equipment to maximize returns and for selecting the most efficient site, while project-specific tariff would provide each investor, irrespective of the machine type and the site selected, the stipulated return on equity and it would shield the investor from the uncertainties involved in capacity utilization due to machine choice and site location. Considering the small capacities and diverse ownership of the biomass based power projects and bagasse based co-generation projects, the Commission decides to determine the generic tariff, rather than go for a project specific tariff on case-to-case basis.

Tariff Design

The generic tariff in this order is determined on levellised basis. Levelisation of fixed cost has been carried out over the useful life of the biomass based power project and bagasse based co-generation project, whereas variable cost tariff is specified for the period equivalent to the control period defined in this order. For the purpose of computation of levellised tariff, discount rate as specified in this order has been considered.

2.4 Computation of Tariff

2.4.1 General Principles

a. Control Period

The Commission in the discussion paper had proposed the control period from date of issue of order to 31st March 2019.

Suggestions of the Objectors

No suggestions were received from the stakeholders on the control period.

Commission's Decision

For long-term regulatory certainty to the investors, and in order to make the control period co-terminus with the financial year, and considering the lapse of almost 22 months since the publication of discussion paper, the Commission decides the Control Period from the date of issue of this order up to 31st March 2020.

b. Useful Life of Plant and Tariff Period

The Commission in the discussion paper had proposed useful life and tariff period equal to 20 years for the biomass based power projects and bagasse based co-generation projects to be commissioned during the new control period starting from date of issue of order.

Suggestions of the Objectors

No suggestions were received from the stakeholders about the useful life of plants.

Commission's Decision

The CERC in its RE Tariff Regulations 2012 has also considered project life of 20 years for biomass based power projects and bagasse based co-generation projects. The Commission in its earlier tariff order dated 08.08.2013 had considered 20 years as useful life as well as tariff period for biomass power projects and bagasse based co-generation projects. In view of above, the Commission decides to retain the useful life and tariff period as 20 years for biomass based power projects and bagasse based co-generation projects.

c. Tariff structure & design

The Commission in the discussion paper had proposed two-part tariff for biomass based power projects and bagasse based co-generation projects commissioned during the next control period starting from the date of order. Fixed component of tariff shall be levellised over the life of the plant. The variable cost component of tariff was proposed to be specified for 3 years of the control period by considering annual fuel cost escalation @ 5% during the control period. At the end of control period, the Commission shall re-assess the fuel price and re-determine the variable component of tariff which will be specified in the subsequent tariff orders to be issued by the Commission. All the biomass based power and bagasse based co-generation projects commissioned during the next control period will be eligible to get the variable component of tariff as per the subsequent tariff orders of the Commission.

Suggestions of the Objectors

No suggestions were received from the stakeholders on the tariff structure and design.

Commission's Decision

The Commission decides to adopt the two-part tariff methodology for procurement of power generated from biomass based power projects and bagasse based co-generation projects commissioned during the control period of this order. Further, it has been decided that the fixed component of tariff will be levellised over the life of plant and the variable charge component will be specified for the period equivalent to the control period of this order and thereafter re-determined for the new control period.

d. Eligibility Criteria

The Commission in its discussion paper has specified that biomass based power project based on rankine cycle technology, gasification technology and bagasse/non-fossil fuel based co-generation projects, all using new turbine generators and associated auxiliaries commissioned after the issue of tariff order for the new control period will be eligible to sell power to distribution licensees of Gujarat as per the tariff determined by the Commission in the new tariff order. The bagasse/non fossil-fuel based co-generation projects to be commissioned during the control period starting from date of issue of order have to fulfil the minimum qualification requirements as stated below:

I. Ministry of Power, GoI in its resolution dated 6 November 1996 has defined cogeneration as: "A Co-generation facility is defined as one, which simultaneously produces two or more forms of useful energy such as electrical power and steam, electric power and shaft (mechanical) power etc."

II. Topping cycle mode of co-generation: Any facility that uses non-fossil fuel input for the power generation and also utilizes the thermal energy generated for useful heat applications in other industrial activities simultaneously.

III. Provided that for the co-generation facility to qualify under topping cycle mode, the sum of useful power output and one half the useful thermal output be greater than 45% of the facility's energy consumption, during the season.

Explanation

(a) 'Useful power output' is the gross electrical output from the generator. There will be auxiliary consumption in the co-generation plant itself (e.g. the boiler feed pump and the FD/ID fans). In order to compute the net power out-put it would be necessary to subtract the auxiliary consumption from the gross output. For simplicity of calculation, the useful power output is defined as the gross electricity (kWh) output from the generator.

(b) 'Useful thermal output' is the useful heat (steam) that is provided to the process by the co-generation facility.

(c) 'Energy consumption' of the facility is the useful energy input that is supplied by the fuel (normally bagasse or other such biomass fuel).

Suggestions of the Objectors

No suggestions were received from the stakeholders on the eligibility criteria specified in the discussion paper.

Commission's Decision

The Commission decides to retain the eligibility criteria as proposed above for setting up of biomass based power projects and bagasse based co-generation projects commissioned during the control period of this order.

e. Scheduling of Power and applicability of Intra-State ABT

Generation from biomass power and bagasse based co-generation projects is predictable and hence, can be scheduled in accordance with the intra-state ABT guidelines. The Commission had included the generation from the biomass power and bagasse based co-generation projects under the ambit of intra-state ABT from the last tariff order dated 08th August 2013 and had exempted biomass power projects up to 4 MW capacity from the provision of scheduling due to its small size and difficulties of monitoring by the SLDC. The Commission had proposed to continue with the same provision of scheduling in the discussion paper.

Suggestions of the Objectors

The Gujarat Biomass Energy Developers Association has submitted that scheduling of biomass power is difficult considering the variability of biomass fuel, calorific value, moisture content etc. The present biomass power projects are finding it difficult to predict power generation on

day ahead basis. Further, biomass fuel being of low density and fibrous in nature, there have been frequent choking of the fuel feeding system resulting in unpredictable disruptions in the boiler operations. These three biomass power plants have been levied penalties by SLDC for not complying with scheduled generation which is affecting the project viability. They have submitted that biomass plants up to 10 MW should be exempted from intrastate ABT order or a variation should be allowed in the scheduled power generation up to 30%.

Commission's Decision

The Commission noted that generation from biomass based power projects and bagasse based co-generation projects is predictable and can be scheduled on day ahead basis. The Commission decides that the provisions of the GERC (Terms and Conditions of Intra-State Open Access) Regulations, 2011 as well as GERC ABT orders shall be applicable to such projects. The exemption from scheduling requirements for the smaller capacity biomass based power projects having installed capacities up to 4 MW has been kept considering their smaller size and difficulties of monitoring by the SLDC. Relaxation from scheduling the generation cannot be extended to the biomass based power projects and bagasse based co-generation projects up to 10 MW capacity due to the reasons stated above.

f. Applicability of merit order despatch principle

The biomass power and bagasse based co-generation projects irrespective of the plant capacity shall be treated as 'MUST RUN' power plants and shall not be subjected to merit order despatch principles.

Suggestions of the Objectors

M/s Gujarat Urja Vikas Nigam Ltd. (GUVNL) requested the Commission to clarify that the "MUST RUN" status for Biomass and Bagasse based co-generation projects shall be subject to grid availability and not applicable in the case of system constraints/congestion. M/s ACEL has supported the Commission's proposal to extend 'MUST RUN' status and exemption from the merit order despatch principle.

Commission's Decision

Like other RE technologies the Biomass based power projects and Bagasse based co-generation projects are provided with MUST RUN status and exempted from the principle of Merit Order Despatch. However, the project operator should follow the instructions of the grid operator in view of overall security of the grid.

g. Interconnection point and Metering point

In the discussion paper it was proposed that the interconnection point will be at the line isolator on outgoing feeder on HV side of generator transformer and the metering point will be at the interconnection point of the generator bus-bar with the transmission or distribution system concerned, as the case may be.

Suggestions of the Objectors

No suggestions were received from the stakeholders on the interconnection and metering point.

Commission's Decision

The Commission decides to retain the definition of interconnection point and metering point as proposed above.

h. Subsidy or Incentive by State or Central Government

In the discussion paper it was proposed that the Commission while calculating the tariff shall take into account any incentive or subsidy offered by the Central and State Government, including the AD benefit, if availed by the generating company, for the biomass power projects and bagasse based co-generation projects. The Commission in the discussion paper elaborated the methodology for ascertaining the Income tax benefit on account of accelerated depreciation if availed by the project developer. In case the developers avail any grant/subsidy from the government, the distribution licensee, on such information received from the State Nodal Agency, is entitled to deduct the same from the subsequent energy bills raised by the particular project developer towards sale of electricity in suitable installments or within such period as may be stipulated by the Commission.

Suggestions of the Objectors

No suggestions were received from the stakeholders on the treatment of subsidy or incentive by Central and State Government.

Commission's Decision

The Commission decides to retain the provisions related to factoring in the Accelerated Depreciation, subsidy or incentive from the State or Central Government as proposed in the Discussion Paper.

2.4.2 Operational and Financial Parameters

The following operational and financial parameters have been considered while determining the tariff under the cost-plus approach for biomass based power project and bagasse based co-generation project:

a. Capital cost

b. Power Evacuation System cost

c. Operations & Maintenance Charges

d. Plant Load Factor (PLF)

e. Auxiliary Consumption

f. Station heat rate

g. Gross Calorific Value of Fuel

h. Cost of Fuel including fuel mix and type

i. Debt-Equity Ratio

j. Loan Tenure and Rate of Interest on Term Loan

k. Depreciation

l. Working Capital and Interest on Working Capital

m. Return on Equity

n. Discount Rate

a. Capital Cost

i) Biomass based power projects using Rankine Cycle Technology: Capital cost is the most critical component while determining tariff in a regulated environment. The main cost components of biomass based power project are (i) boiler, (ii) turbine and generators, (iii) condenser, (iv) control cabinets, (v) chimney for flue gases, (vi) transformer and associated equipments, (vii) land and its development, (viii) processing fee of Gujarat Energy Development Agency (GEDA), (ix) erection and commissioning charges, (x) creation of evacuation system up

to the interconnection point. The above components can be grouped into four important categories i.e. (i) plant and machinery, (ii) land cost (iii) evacuation infrastructure and (iv) associated service charges.

The Commission under its biomass power Tariff Order dated 8th August 2013 had specified the capital cost of Rs. 4.68 Cr/MW for biomass power project using water-cooled condenser and Rs. 4.98 Cr/MW for biomass power projects using Air-Cooled condenser. It was decided that GETCO/DISCOM shall be responsible for laying the power evacuation line beyond the interconnection point to the nearest GETCO/DISCOM sub-station.

In order to arrive at the benchmark capital cost for biomass power projects in the new control period, the capital cost data of similar projects commissioned in the state during last control period, capital cost data of projects registered with UNFCCC, projects financed by IREDA as well as capital cost benchmark considered by CERC as well as other SERCs have been carefully studied. The WPI of steel and E&M for FY 2012-13 to FY 2015-16 as per data published by the Office of Economic Advisor, Ministry of Commerce and Industry, GoI indicates no major change in the cost of steel and E&M equipment which constitute a major part of capital cost.

After considering all the above aspects, in the discussion paper it was proposed to fix benchmark capital cost of Rs 4.77 Cr/MW for biomass power projects using water cooled condenser. An additional allowance of amount of Rs 30 lakh/MW was proposed for biomass power projects using air cooled condenser considering their design requirements and additional features. Hence benchmark capital cost of Rs 5.07 Cr/MW was proposed for biomass power projects using air cooled condenser for tariff determination in the new control period.

Suggestions of the Objectors

M/s Abellon Clean Energy Limited submitted that biomass power projects require biomass processing equipment for sizing of biomass. Also fuel feeding equipment needs to be customised to match the flowability of the specific type of fuel. They requested the Commission to consider these aspects and allow an additional cost of Rs. 1 Cr/MW on account of pre-processing equipment in the capital cost.

Commission's Decision

The benchmark capital cost proposed in the discussion paper was arrived at based on various studies like the capital cost benchmark under regulatory approach, actual cost analysis of projects commissioned in the State during the last control period, capital cost considered for the projects registered for availing CDM benefit, etc. The Commission noted that the CERC has

defined the interconnection point at line isolator on outgoing feeder on HV side of the generator transformer and included the evacuation line cost up to interconnection point under capital cost. It is well known fact that the capital cost of biomass power project varies with the system configuration viz. size of the project, low pressure steam cooling system (e.g. air-cooled condenser/water-cooled condenser), configuration of boiler steam temperature and pressure, suitability of boiler for variety of biomass, combustion system (e.g. stoker grate, travelling grate, fluidized bed combustion system) etc.

The benchmark capital has been derived after verifying the change in WPI of steel and E&M during the last control period. For new control period an appropriate escalation factor is considered over the base capital cost. In view of above, the Commission decided to fix the benchmark capital cost of Rs. 4.77 Cr/MW and Rs. 5.07 Cr/MW for determination of tariff for procurement of power generated from biomass power projects using water-cooled condenser and biomass power projects using air cooled condenser respectively for the new control period starting from date of issue of this order. The said capital cost also includes the evacuation line cost up to the interconnection point as defined in this order.

ii) Biomass based power projects based on gasification technology: The Commission noted that, the CERC under its RE Tariff Order for FY 2015-16 has considered benchmark capital cost of Rs. 5.92 Cr/MW for biomass based power projects based on gasification technology. After considering the MNRE subsidy of Rs. 1.5 Cr / MW, CERC has considered Rs 4.42 / MW as capital cost for the biomass projects based on gasification technology. The Commission has observed that very few bio-mass based power projects based on gasification technology are operational in India and the capital cost of such projects varies based on the type of gas engine used for power generation. In view of the limited data and the absence of operational experience of biomass gasification based power projects, the Commission is not inclined towards specifying the generic tariff for this technology at this stage and decides to continue with its earlier approach to allow such projects to sell electricity to the utilities at the tariff determined for biomass based power projects using water-cooled condensers.

However, the investors opting for gasification technology can approach the Commission for a project-specific tariff with the supporting documents in case the investor feels that the tariff specified by the Commission for biomass based power projects using water-cooled condensers is not remunerative.

iii) Bagasse based co-generation: The capital cost components of bagasse based co-generation projects are similar to that of biomass power project. The GERC in its tariff order dated 8.8.2013 had specified capital cost of Rs. 4.57 Cr/MW for bagasse based co-generation projects. Like

biomass power projects, the benchmark capital cost for bagasse based cogeneration project proposed in the discussion paper was based on careful study of the approach followed by CERC, and other SERCs, verification of change in WPI of steel and E&M. The Commission has noted that the cost of boiler and steam turbine cannot be fully loaded on the power plant capital cost since the co-generation projects in sugar industry are primarily designed for processing of sugar. In view of above, the Commission has proposed a benchmark capital cost of Rs. 4.66 Cr/MW for bagasse based co-generation projects to be commissioned during the new control period starting from date of issue of this order.

Suggestions of the Objectors

No suggestion was received on the capital cost proposed for bagasse based cogeneration projects from any of the stakeholders.

Commission's Decision

The Commission decides to fix benchmark capital cost of Rs 4.66 Cr/MW for bagasse based co-generation projects to be commissioned during the new control period starting from date of issue of this order. The said capital cost also includes the evacuation line cost up to the interconnection point as defined in this order.

b. Power Evacuation System Cost

In the tariff order dated 8.8.2013, the Commission had considered the cost associated with erection of the transformer, associated equipment and creation of power evacuation infrastructure up to the interconnection point as part of the capital cost. GETCO/DISCOM was made responsible for laying the evacuation infrastructure beyond interconnection point and hence the cost associated with same is not included in the capital cost. In the discussion paper, the Commission proposed to continue with the same approach for the next control period starting from the date of order. It was proposed that the evacuation infrastructure facility has to be made available to the developers by GETCO/DISCOM.

Suggestions of the Objectors

GETCO submitted that in line with other renewable energy sources, the responsibility of constructing the evacuation facility/transmission line up to nearest GETCO sub-station should be assigned to the Developer at its own cost. GUVNL in their submission urged the Commission to add the normative cost of evacuation facility in the capital cost and let the developers to construct the evacuation facility from project location to the nearest GETCO sub-station like in

the case of wind and solar. Otherwise the project developer would select the site as per their convenience without considering the cost of laying the evacuation facility and RoW issues.

Commission's Decision

The Commission is of the opinion that unlike the wind and solar power projects, biomass power and bagasse co-generation projects are relatively small in size (between 1-10 MW) and also not remotely located. Therefore, such projects require to lay comparatively shorter power evacuation lines which can be taken up by GETCO. As far as selection of site is concerned, GEDA, the nodal agency, should first ascertain the suitability of site from the point of view of availability of biomass, proximity to GETCO sub-station and RoW issues, if any, before giving in-principle approval to such projects.

The Commission decides to continue with the same approach as in the previous order. The investor /developer of biomass power /bagasse cogeneration projects shall bear the cost associated with erection of the transformer, associated equipment and creation of power evacuation infrastructure up to the interconnection point which is already considered as part of capital cost by the Commission. GETCO/DISCOM shall be responsible for laying the evacuation infrastructure beyond interconnection point at their own cost.

c. Operations & Maintenance Charges

Operations and Maintenance (O&M) cost consists of the statutory charges, spares, employee cost, administrative and general expenses, consumables, repairs and maintenance, and insurance expenses, etc.

In case of biomass based power projects, the Commission in its tariff order dated 8.8.2013 had considered the O&M charges as 5% of the capital cost in the first year of project commissioning with an escalation of 5.72% per annum thereafter.

In case of bagasse based co-generation projects, the Commission in its tariff order dated 8.8.2013 had considered the O&M charges as 3% of the capital cost in the first year of project commissioning with an escalation of 5.72% per annum thereafter. The Commission in its discussion paper proposed to retain the same O&M charges for biomass and bagasse based co-generation projects during the new control period starting from the date of order. Further, in line with the GERC MYT Regulations, the annual O&M escalation for biomass power and bagasse based co-generation project was considered at 5.72%.

Suggestions of the Objectors

No suggestion is received from any of the stakeholders on O&M charges.

Commission's Decision

The Commission has decided to retain the O&M charges as 5% of the capital cost for biomass based power projects and 3% of capital cost for bagasse based co-generation projects in line with its tariff order dated 8.8.2013 for the projects to be commissioned during new control period starting from the date of order. In line with the GERC MYT Regulations 2016, the annual escalation in O & M charges for biomass based power projects and bagasse based co-generation projects shall be @ 5.72%.

d. Plant Load Factor (PLF)

The Commission in its earlier biomass tariff order dated 8.8.2013 had considered a PLF of 70% during 1st year of commissioning covering the stabilization period and 80% from 2nd year onwards. The CEA report on 'operating norm for biomass based power projects', September 2005 recommended PLF of 80% for recovery of the full fixed cost. The Commission in its discussion paper had proposed to retain the normative PLF as specified in previous tariff order dated 8.8 2013. i.e. 70% in 1st year and 80% from 2nd year onwards.

The Commission in its earlier bagasse based co-generation tariff order dated 8.8.2013 had considered the plant load factor of 60%. This was based on the estimate that co-generation plant operates for 240 days (180 days of season and 60 days of off-season) at load factor of 92%, which comes to around 60% of plant load factor on annual basis. The Commission in its discussion paper had proposed to retain the normative PLF as specified in previous tariff order dated 8.8 2013.

Suggestions of the Objectors

M/s Gujarat Biomass Energy Developers Association has proposed to consider 60% PLF in the first year and 70% from second year onwards for biomass based power projects. M/s Abellon Clean Energy Limited has requested to consider PLF as 75% for biomass based power projects.

Commission's Decision

The Commission noted that the stakeholder's submission for revision of normative PLF is not substantiated with real time data and facts. The Commission has studied the approach followed

by CERC and other SERCs in this regard and relied upon the report titled 'Operating norms of biomass project report prepared by CEA. In view of above, the Commission decides to retain the PLF for biomass based power projects as 70% in the first year of operation and 80% from the second year onwards.

The PLF for bagasse based co-generation projects been proposed on the basis of analysis of operating data of sugar factories in Gujarat including duration of crushing season for the last three years. Hence the Commission decides to retain the PLF of 60% for bagasse based co-generation projects for the next control period.

e. Auxiliary Consumption

The Commission in the discussion paper had proposed auxiliary consumption equal to 10% of gross generation for biomass based power projects using water-cooled and air-cooled condenser. CERC and most of the other SERCs have also specified same normative auxiliary consumption in their respective orders. CEA also has recommended 10% auxiliary consumption for biomass based power projects. Similarly, in case of bagasse based co-generation projects the auxiliary consumption was proposed @ 8.5% of gross generation.

Suggestions of the Objectors

No suggestions were received from the stakeholders on auxiliary consumption for biomass based power projects and bagasse based co-generation projects. Some of the objectors have submitted that in Air Cooled condenser biomass based project the Auxiliary Consumption is 12% which may be kindly considered by the Commission.

Commission's Decision

The Commission decides to retain the auxiliary consumption of 10% for biomass based power projects with Water Cooled Condenser as well as for Air Cooled Condenser and 8.50% for bagasse based co-generation projects.

f. Station Heat Rate (SHR)

The Commission in the previous tariff order dated 8.8.2013 had considered SHR of 3800 kCal/kWh for biomass based power projects using water-cooled condenser. In case of the biomass based power projects using air-cooled condensers, SHR of 3950 kCal/kWh was considered by recognizing the fact that the condenser pressure in such projects is required to be kept at high level which results in higher SHR than the water-cooled condenser. The

Commission in its discussion paper proposed to retain same normative SHR as considered in previous tariff order during new for the control period starting from the date of order.

In case of bagasse based cogeneration projects, Station Heat Rate of 3600 kCal/kWh was considered by the Commission in previous tariff order dated 8th August 2013. In the discussion paper, Commission proposed to retain SHR of 3600 kcal/kWh for the purpose of tariff determination of bagasse based co-generation projects during control period starting from the date of order.

Suggestions of the Objectors

M/s Abellon Clean Energy Limited has submitted that the SHR varies with the capacity of the plant and variations of the steam parameters. They further submitted that the SHR is affected by the deration of the plant and proposed to consider higher SHR of 4400 kCal/kWh. Gujarat Biomass Energy Developers Association requested the Commission to consider the SHR of 4200 kCal/kWh as considered by CERC. GEDA in their submission mentioned that the SHR considered by the Commission should be in line with the neighboring State like Rajasthan which is climatically similar to Gujarat and requested the Commission to fix normative SHR of 4126 kCal/kg for biomass power.

No suggestions were received from the stakeholders with regard to the Station Heat Rate of Bagasse based Co-generation project.

Commission's Decision

The Commission is of the opinion that the Station Heat Rate is a key performance parameter which depends on factors such as plant capacity, plant design and its configuration, technology employed, O&M practices and quality of fuel received. The Commission while fixing normative SHR, has to keep in mind that the plant operates efficiently and at the same time the consumers are not burdened with inefficient operation of plant. Most of the SERCs have specified the SHR in the range of 3800-4300 kCal/kWh for biomass power projects using travelling grate type boilers which are commonly used in biomass power projects. The Commission feels that revision of SHR is not necessary as it is a standard technical parameter relating to the performance of the plant. The Commission decides to fix the SHR of 3800 kCal/kWh and 3950 kCal/kWh for biomass power projects using water-cooled condenser and air-cooled condenser respectively during new control period starting from the date of order.

The Commission in its earlier tariff order had considered the SHR as 3600 kCal/kWh for bagasse based co-generation projects and decides to retain the same for the next control period starting from the date of this order.

g. Gross calorific value (GCV) of Fuel

The weighted average calorific value of 3396 kCal/kg proposed for the representative surplus biomass in the State was arrived at based on study of type and quantity of surplus biomass available in the State for power generation from the data provided by the Directorate of Agriculture, Government of Gujarat together with Biomass resource assessment study conducted by the Indian Institute of Science, (IISC) Bangalore. Based on the data, the commission in the discussion paper had proposed calorific value of representative surplus biomass as 3396 kCal/kg for the purpose of determination of tariff for the next control period.

In case of bagasse based co-generation projects, the Commission in its discussion paper had proposed the GCV of 2250 kCal/kg for determination of tariff for the next control period.

Suggestions of the Objectors

M/s Abellon Clean Energy Limited submitted that high and variable amounts of moisture, ash, and dirt content in biomass lowers the GCV. The proposed GCV of 3396 kCal/kg is based on fresh biomass, which has not undergone natural decomposition. They submitted to consider the GCV of 3200 kCal/kg, considering the time lag between harvest and use of biomass. Gujarat Biomass Energy Developers Association suggested to consider GCV of 3100 kCal/kg as considered by CERC.

Commission's Decision

The Commission has as per decision and Direction of Hon'ble Supreme Court in its Judgement dated 05/07/2016 in Civil Appeal No. 1973 and 1974 of 2014 which confirmed the decision of Hon'ble APTEL's Judgment dated 02/12/2013 in Appeal No. 132 and 133 of 2012, decided to carry out scientific study on the availability of bio-mass and its price in the State. The Commission has therefore, engaged The Energy and Research Institute (TERI), New Delhi, for independent and scientific field study of GCV, availability and price of Biomass in Gujarat.

TERI submitted its draft report on 15.05.2017 which covers Biomass availability, Gross Calorific Value and its cost after consulting the various Government officials, study of the primary and secondary data and also approaching the relevant persons who are associated with the biomass

industries and its utilization in six districts of the State which are the biomass potential districts and it includes the districts where the existing biomass plants are set up.

The Commission had issued public notice and hosted the TERI Report on its website and invited comments and suggestions from the stakeholders. The Commission also kept hearing on the aforesaid TERI Report on 7.07.2017. TERI has in its study report recorded that in the State of Gujarat, Cotton Stalk, Castor Stalk, Groundnut Shell, Castor & Pigeon Pea, and Paddy Husk biomass available in different districts depending upon the cropping pattern of the particular district. TERI has also recorded that the different biomass available in different districts having different usages and the availability of surplus biomass in such districts. During the aforesaid proceedings 5 Nos. of stakeholders have given their comments which have been considered by the Commission.

After considering suggestions and objections on TERI Report the Commission has issued Order dated 9.02.2018 declaring availability of biomass in the State, weighted average GCV of 4423 Kcal/kg and weighted average cost of biomass of Rs. 3764 per tonne for tariff determination purpose for the new control period starting from the date of issue of this Order.

The Commission also notes that as stated in the discussion paper 15% of total quantum of energy allowed from the coal for generation of electricity in biomass/bagasse based co-generation plant. Therefore, it is necessary to consider the GCV of the coal used in biomass plant and its cost. The Commission has determined the tariff of the Gujarat State Electricity Corporation Limited which is having different thermal plants utilizing coal as fuel. As the utilization of coal permitted in biomass plant is limited to 15% of total energy requirement for generation of electricity, the Commission has decided to consider the GCV of indigenous coal being used in GSECL plant and its price for FY 2017-18 at Ukai Station.

Similarly, the Commission also decides to retain the GCV of bagasse as 2250 Kcal/kg as proposed in the discussion paper and as per TERI Report with weighted average cost of Rs. 2025 per tonne as per the Commission's Order dated 9.02.2018 for the purpose of tariff determination for bagasse based cogeneration projects during the new control period starting from the date of issue of this order.

h. Cost of fuel

In the discussion paper the Commission had proposed to follow equivalent heat value approach for determination of cost of biomass. The Commission had considered the landed cost of coal at GSECL and Torrent thermal power plant during FY 2014-15 based on GERC truing-up tariff order

of GSECL and Torrent Power for FY 2014-15. The landed cost of biomass is determined by subtracting the average freight charges from the landed cost of coal and adding appropriate allowance to take care of loading/unloading and local transport of biomass from nearby areas. Thus by using equivalent heat value methodology the cost of biomass was worked to Rs. 2736 per MT. The cost of coal was proposed as Rs. 3138 per MT.

In case of bagasse based co-generation project the cost of bagasse was worked to Rs. 1580 per MT by adopting the equivalent heat value approach like in case of biomass. The cost of coal was proposed as Rs. 3138 per MT.

Suggestions of the Objectors

M/s. ACEL had submitted to review the methodology adopted for determination of fuel cost. The CERC has stated the base cost of fuel applicable in 2012-13 and the indexing mechanism to be used in subsequent years at the option of the project developer. CERC has not determined the cost of biomass based on equivalent heat value basis but only used the later for indexing purposes. Various factors like processing, degradation and incomplete combustion of biomass increase the cost of fuel by 15% and the same needs to be accounted for. M/s ACEL requested the Commission to review the methodology for determination of biomass cost and base it on the actual data with reference from Rajasthan/Maharashtra.

Gujarat Biomass Energy Developers Association (GBEDA) submitted that determination of biomass cost based on equivalent heat value approach of landed cost of coal is unreasonable since it is not only the price that is relevant but also the consistency of firing that differentiates coal from biomass. In handling of biomass as well as in storage, the heat value is lost due to degradation to an extent of 20% and this is an important factor that cannot be ignored. A Government agency has conducted a survey and gave the prevailing biomass prices to the Commission whose weighted average worked out to Rs. 3132/- per ton in their submissions to GERC on 28.02.2014. It is preferable to take the government agency data for the determination of the prices of various biomass fuels instead following indirect method of comparing it with heat content in coal. GBEDA requested the Commission to direct GEDA to conduct a fresh survey and consider the biomass price. They have also proposed to consider the fuel cost data from agencies like GEDA for determination of biomass price.

GEDA in its submission dated 20.06.2016 opined that Coal is a commodity linked to global prices whereas biomass prices are impacted by the local conditions and cost of agriculture etc. GEDA further submitted that the Commission had escalated biomass cost by 5% per year during the previous control period. The biomass cost in the new control period should not be lower

than what it was in the previous control period. GEDA requested the Commission to escalate the biomass cost at 5% per annum from 2013 onward and fix it as Rs 3155 /per MT for base year of new control period.

Commission's Decision

Commission has carefully gone through the suggestion received from various stakeholders and noted the following important points with regard to the cost of biomass:

- The biomass procurement is carried out through an unorganized market and there is lack of availability of authentic data. The GCV of biomass is affected by the moisture content, malpractices in procurement, leakages in transportation, inclusion of debris etc. and it is the responsibility of developer to procure the biomass of desired quality at appropriate price and quantity received at its doorstep as it is the responsibility of the generator to arrange the fuel to generate the electricity and supply to its procurers.
- The CERC while finalizing RE Tariff Regulations 2012 had put Gujarat in the Other States category in the absence of authentic data to justify the cost of biomass. The CERC has specified the biomass price of Rs 2476 /MT for base year of 2012-13 with normative escalation at the rate of 5% per annum at the option of biomass project developer. The above price determined by the CERC without any authenticated data with regard to price of biomass within Gujarat State.
- ACEL's submission is not supported with authentic data and documents. The Commission cannot consider the data of adjoining states for fixation of biomass price for the State of Gujarat.
- GEDA which is the State nodal agency has also not submitted any details with regard to availability of various type of biomass in the State in different months of the year, its utilization, the price of such biomass, alternate usage of biomass, its quantum in different parts of the State, etc. GEDA has also not carried out any scientific study with regard to GCV of various types of biomass and also not submitted the pricing of such biomass. GEDA has proposed the price of biomass for the control period of this order by escalating the price of biomass considered by the Commission for the earlier control period of the order dated 08.08.2013 in Order No. 3 of 2013.
- The Commission carried out the exercise of finding out the biomass price prevailing in the State. In this regard, the Commission had appointed TERI to study the availability of biomass, its GCV and price in the State of Gujarat. TERI in its report has analyzed the biomass price data and presented a representative biomass price for each district covered in their study. The price was collected after conducting the ground level survey across the selected districts.

After considering the suggestions from stakeholders and the price given in the TERI Report, the Commission decides to fix the normative cost of biomass as Rs 3764 per MT and GCV as 4423Kcal/Kg as per the Commission's Order dated 09.02.2018. Similarly, in respect of coal, the Commission decides to consider the cost of Indigenous coal of Rs. 3578/MT available at the GSECL Ukai station with GCV of 3870 Kcal/Kg for the base year of the new control period starting from the date of issue of this order.

In case of bagasse, the Commission decides to adopt the GCV of 2250 Kcal/Kg as per TERI Report, and the cost of bagasse as Rs 2075 per MT. The fuel cost is arrived at considering various factors like manpower cost, transportation cost, and loading & unloading cost, agent's commission etc. Considering various factors which go into arriving at the fuel cost and the market conditions the Commission decides to provide escalation @ 5% per annum on the same from second year onwards.

i. Debt-Equity Ratio

GERC Multi Year Tariff (MYT) Regulations 2016 provide for the normative debt-equity ratio of 70:30 for Generating Company/Licensees. The Commission proposed the debt equity ratio as 70:30 in the discussion paper as considered in the previous tariff orders.

Suggestions of the Objectors

No suggestions were received from the stakeholders on the debt-equity ratio.

Commission's Decision

The Tariff Policy formulated by the Ministry of Power, Govt. of India, stipulates debt-equity ratio of 70:30 for power projects. GERC Multi Year Tariff (MYT) Regulations, 2016 notified by the Commission also provide that the debt-equity ratio should be kept as 70:30. Hence, the Commission decides to retain the debt-equity ratio as 70:30 for the new control period starting from the date of order.

j. Loan Tenure and Rate of Interest on Term Loan

The Commission in the earlier biomass and bagasse based co-generation power projects tariff order dated 8th August 2013 had stipulated loan tenure of 10 years. In the discussion paper the Commission has proposed to continue its earlier practice of considering 10 years as loan tenure.

While considering the interest rate of loan, the Commission noted the trend of SBI Base Rate from February 2013 to February 2016. It has been noted that the base rate has been decreasing from April 2015. In view of this, the Commission had proposed to use the current Base Rate of SBI with a spread of 300 basis points above the current SBI Base Rate for fixing the interest on loan for tariff determination purpose.

Suggestions of the Objectors

M/s GUVNL has suggested to consider interest rate at 11.80% i.e. SBI Base Rate plus 250 basis points, in line with GERC MYT Regulations 2016.

Commission's Decision

The Commission has noted that the project financing interest rates are typically indicated by SBI Base Rate. A reasonably sound project could avail funding at 250 basis points above the base rate of 8.90% (SBI). The Commission also notes that the Commission has passed Generic Tariff Order for small, mini and micro hydro power projects vide Order No. 5 of 2016 dated 14.12.2016, in which the interest rate is considered as 11.40%. Hence, the Commission decides the interest rate on term loan as SBI base rate plus 250 basis points which works out to 11.40% for computation of interest on term loan and loan repayment period as 10 years for determination of tariff.

k. Depreciation

CERC, in the CERC (Terms and Conditions for Tariff Determination from Renewable Energy Sources) Regulations, 2012 considered the capital cost of the assets admitted by the Commission as the base value for the purpose of determination of depreciation. Further, the salvage value of the assets is considered as 10% and depreciation is allowed up to a maximum of 90% of the capital cost of the assets. Depreciation per annum shall be based on 'Differential Depreciation Approach' over loan tenure and the depreciation beyond loan tenure shall be computed over useful life on 'Straight Line Method' (SLM).

The Commission in its previous biomass and bagasse based co-generation power projects tariff order dated 08 August 2013 had considered higher rate of depreciation (6%) as a promotional measure and to facilitate loan repayment during the loan tenure of 10 years and the balance depreciation @ 3% from 11^{th} to 20^{th} year. In the discussion paper the Commission had proposed depreciation rate of 6% per annum for the first 10 years, and 3% from 11th to 20th year for tariff determination purpose.

Suggestions of the Objectors

No suggestions were received from the stakeholders on the depreciation methodology proposed in the discussion paper.

Commission's Decision

GERC Multi Year Tariff (MYT) Regulations, 2016 notified by the Commission provide that depreciation rate should be calculated based on Straight Line Method. The MYT Regulations further provide that asset is to be depreciated up to 90% of its initial value (considering residual value as 10% of its initial value) over the entire asset life. To facilitate the principal loan repayment, the Commission decides to consider the depreciation rate as 7% per annum during the loan repayment period i.e. first 10 years; and beyond the loan tenure, the depreciation is allowed as per 'Straight Line Method' over the remaining useful life of the plant i.e. depreciation at rate of 2% per annum from 11^{th} to 20^{th} year.

l. Working Capital and Interest Rate on Working Capital

The Commission in the discussion paper had considered the following components of working capital for Biomass based power projects:

1) Fuel stock for 30 days.
2) O&M expenses for one month.
3) Receivables of one month charges for sale of electricity.
4) Maintenance spares at 1% of the capital cost escalated at 5% per annum.

For Bagasse based co-generation projects:

1) O&M expenses for one month.
2) Receivables of one month charges for sale of electricity.
3) Maintenance spares at 1% of the capital cost escalated at 5% per annum.

Same components were considered as a part of working capital for determination of tariff in previous tariff order dated 8 August 2013.

The Commission had proposed the interest on working capital equal to the SBI Base rate plus 200 basis points i.e. 11.30%. for the purpose of tariff determination for new control period starting from the date of order.

Suggestions of the Objectors

No suggestions were received from the stakeholders on working capital components and rate of interest on working capital.

Commission's Decision

The Commission has noted that the working capital requirement by the project developer would be generally on short term basis and can be managed at 250 basis points above the base rate of 8.90 % (SBI). The Commission also notes that the Commission has passed Generic Tariff Order for small, mini and micro hydro power projects vide Order No. 5 of 2016 dated 14.12.2016, in which the interest rate is considered as 11.40%. Hence, the Commission decides the interest rate on working capital as 11.40% for determination of tariff.

m. Return on Equity (RoE)

The equity base for computing return is considered as 30% of the project capital cost by the Commission. If the equity employed by the project developer is more than 30%, the amount of equity for the purpose of determining the tariff will be limited to 30% only and the rest is treated as loan. In case the equity employed is less than 30%, the actual equity employed will be considered.

In line with the GERC Multi Year Tariff Regulations, 2016, the Commission in its discussion paper had considered RoE as 14% per annum.

Suggestions of the Objectors

No suggestions were received from the stakeholders on the RoE.

Commission's Decision

The Commission follows the principle of allowing 14% RoE plus the applicable tax payment for conventional and renewable power projects. The Commission decides to consider RoE of 14% and the tax payment of MAT @ 21.34% per annum for first 10 years and corporate tax @ 34.61% per annum for the next 15 years as a cost for the purpose of computing the tariff for the new control period starting from date of this order.

n. Discount Rate

The Commission in the discussion paper had calculated the annual levellized tariff based on the discount rate of 10.40%. As per the standard methodology followed by CERC and other and other SERCs, the discount rate proposed as weighted average cost of capital (WACC) for the purpose of levellized tariff calculation.

Suggestions from Objectors:

GUVNL has requested to revise the discount factor, considering the rate of interest on loan at 11.80%.

Commission's Decision

CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 has recommended post tax weighted average cost of capital (WACC) as discount rate for determination of levellized tariff. Generally, the developer considers post tax WACC as the discount rate to post tax incremental cash flows to arrive at the NPV of the project. WACC is the addition of cost of debt and cost of equity. The cost of debt is calculated based on market interest rate, MAT and corporate tax rate, while the cost of the equity is calculated based on the return on equity. The computation of WACC is as given below:

WACC = Cost of Debt + Cost of Equity

Where, Cost of Debt (For first 10 Years) =0.70 x (Market Rate of Interest) x (1- MAT)

Cost of Debt (11th Year to 20th Year) =0.70 x (Market Rate of Interest) x (1- Corporate tax)

Cost of Equity = 0.30 x Return on Equity (i.e. 14%)

Resulting WACC = {(WACC For first 10 Years X 10) + (WACC 11th Year to 20th Year X 10)}/ (10 + 10)

Cost of Debt (For first 10 Years) = 0.70 x 11.40% x (1- 21.34%) = 6.28%

Cost of Debt (11th Year to 20th Year) = 0.70 x 11.40% x (1- 34.61%) = 5.22%

Cost of Equity = 0.30 x 14% = 4.2%

The discount rate accordingly is 9.95%.

Hence, the Commission decides the discount rate as 9.95% while determining the tariff for the next control period starting from the date of issue of this order.

2.4.3 Subsidy and Incentive by the Central/State Government

Benefit due to Accelerated Depreciation:

The Commission noted that Government of India had allowed biomass power project and bagasse based co-generation power project owners to avail accelerated depreciation at the rate of 40% in the first year on written-down value (WDV) basis as per Union Budget FY 2016-17. In addition to this, the amendment in the Finance Act 2012 allowed an additional depreciation of 20% to the power generation projects during the first year of commissioning of project. With this the biomass power project and bagasse based co-generation project owners can avail 60% depreciation in first year of commissioning. The Commission, therefore, in the discussion paper had proposed two tariffs (i) with and (ii) without accelerated depreciation benefit, for procurement of power by utilities from biomass power project and bagasse based co-generation power projects.

Suggestions from Objectors:

No comments have been received from the objectors.

Commission's Decision

The Commission has reviewed the present depreciation rate under Income Tax Act 1961 and Rules framed thereunder and additional depreciation available in the first year of commissioning as per the Finance Act. The Commission noted that at present the biomass and bagasse based cogeneration power project developers can avail 40% depreciation under Income Tax Act 1961 with an additional 20% depreciation during first year of project commissioning (Total 60%). Following principles have been considered for ascertaining the Income Tax benefit on account of accelerated depreciation for the purpose of tariff determination:

(a). The assessment of benefit shall be based on normative Capital Cost, accelerated/ additional depreciation rate as per the relevant provisions of the Income Tax Act and the Corporate Income Tax rate;

(b). Capitalization of RE Projects for the full financial year;

(c). Per-unit benefit shall be derived on levellised basis at a discounting factor equivalent to the weighted average cost of capital as determined above.

In view of above, the Commission decides to specify the tariff (i) with and (ii) without considering the AD benefit for the new control period starting from the date of issue of this order. In case of any changes in tax regime / rules during the control period, the Commission shall verify the same and determine the tariff at appropriate time in accordance with the law.

3. Tariff Determination

Based on the foregoing discussion, the operational and financial parameters considered by the Commission for determination of biomass based power projects tariff are given in the table below:

Table 3.1: Benchmark parameters for tariff computation of biomass based power projects

Parameters	Biomass based Power Projects with Water-Cooled Condensers	Biomass based Power Projects with Air-Cooled Condensers
Project Cost and O&M		
Total Project Cost (Land + Plant & Machinery + Erection Cost + Evacuation Infrastructure Cost up to Interconnection Point) (Rs. Lakh/MW)	477	507
Normative O&M Cost for first year (Rs. Lakh/MW)	5%	5%
Escalation in O&M (per annum from 2nd year)	5.72%	5.72%
Performance Parameters		
CUF	70% for 1st year & 80% from 2nd year onwards	70% for 1st year & 80% from 2nd year onwards
Auxiliary Consumption	10%	10%
Project Life in Years	20	20
Station Heat Rate kCal/kWh	3800	3950
Gross Calorific Value of Biomass in kCal/kg	4423	4423
Gross Calorific Value of Coal in kCal/kg	3870	3870
Cost of Fuel	Rs. 3764 per MT for biomass and Rs. 3578 per MT for coal	Rs. 3764 per MT for biomass and Rs. 3578 per MT for coal
Fuel Cost Escalation	5%	5%

Parameters	Biomass based Power Projects with Water-Cooled Condensers	Biomass based Power Projects with Air-Cooled Condensers
Financial Parameters		
Debt-Equity ratio	70:30	70:30
Term of Loan in Years	10	10
Interest on Term Loan	11.40%	11.40%
Interest on Working Capital	11.40%	11.40%
Depreciation	7% (up to 10 years) 2% (11 to 20 years)	7% (up to 10 years) 2% (11 to 20 years)
Minimum Alternate Tax	21.34%	21.34%
Corporate Income Tax	34.61%	34.61%
Return on Equity	14%	14%
Tariff	Levelised Fixed component of tariff for 20 years *(a). without AD benefit: Rs. 1.80 /kWh (b). with AD benefit: Rs. 1.65/kWh Energy Charge/Variable cost **FY 2017-18 – Rs. 3.63/kWh,** **FY 2018-19 – Rs. 3.82/kWh,** **FY 2019-20-Rs. 4.01/kWh,**	Levelised Fixed component of tariff for 20 years *(a). without AD benefit: Rs. 1.91/kWh (b). with AD benefit: Rs. 1.75 /kWh Energy Charge/Variable cost **FY 2017-18 – Rs.3.78/kWh,** **FY 2018-19 – Rs. 3.97/kWh,** **FY 2019-20 – Rs. 4.17/kWh,**

Table 3.2 : Benchmark parameters for tariff computation of bagasse based co-generation projects

Parameters	Bagasse based Co-generation Projects
Project Cost and O&M	
Total Project Cost (Land + Plant & Machinery + Erection Cost + Evacuation Infrastructure Cost up to Interconnection Point) (Rs. Lakh/MW)	466
Normative O&M Cost for First Year (Rs. Lakh/MW)	3% of project cost
Escalation in O&M (per annum from 2nd year)	5.72%
Performance Parameters	
CUF	60%
Auxiliary Consumption	8.50%
Project Life in Years	20

Parameters	Bagasse based Co-generation Projects
Station Heat Rate kCal/kWh	3600
Gross Calorific Value of Bagasse kCal/kg	2250
Gross Calorific Value of Coal kCal/kg	3870
Cost of Fuel	Rs. 2075 per MT for bagasse and Rs. 3578 per MT for coal
Fuel Cost Escalation	5%
Financial Parameters	
Debt-Equity Ratio	70:30
Term of Loan in Years	10
Interest on Term Loan	11.40%
Interest on Working Capital	11.40%
Depreciation	7% (up to 10 years) 2% (11 to 20 years)
Minimum Alternate Tax	21.34%
Corporate Income Tax	34.61%
Return on Equity	14%
Tariff	Levelised fixed component of tariff for 20 years *(a). without AD benefit: Rs. 1.90 /kWh (b). with AD benefit: Rs. 1.74/kWh Energy Charge/Variable cost **FY 2017-18 – Rs. 3.63/kWh,** **FY 2018-19 – Rs. 3.81/kWh,** **FY 2019-20 – Rs. 4.00/kWh**

**The biomass based power projects/bagasse based co-generation projects owner opting tariff without AD benefit should submit an undertaking at the time of signing the PPA that AD benefit will not be availed for the generating plant/unit. In addition, a certificate from a CAG empanelled Chartered Accountant (CA) along with the income tax return filed with Income Tax department indicating that AD benefit is not claimed need to be submitted to GUVNL/DISCOM every year.*

The generating companies who set up the plant during the aforesaid period are eligible for the fixed cost as determined by the Commission in the aforesaid tables for 20 years and eligible only for energy charge/variable charge as determined above for the period upto FY 2019-20 which may continue till the new energy charge is determined by the Commission for the new control period.

4. Other Commercial Issues

4.1 Transmission and Wheeling Charges

The Commission in its Discussion Paper had allowed wheeling of power for third party sale on payment of transmission charges, transmission losses, wheeling charges and losses of the energy fed into grid, as applicable to normal open access consumer with 25% cross subsidy surcharge as applicable to normal open access consumers. Wheeling of power for captive consumption has been allowed at 66 kV and above voltage level on payment of transmission charges and transmission losses as applicable to normal open access consumer. Wheeling of power for captive consumption, below 66 kV voltage level, was allowed on payment of transmission charges and transmission losses applicable to normal open access consumers and 50% of wheeling charges and 50% of distribution losses of the energy fed into the grid as applicable to normal open access consumers. Wheeling of electricity generated by small investors, having capacity below 4 MW, for self-consumption was allowed on payment of normal open access charges and transmission and distribution losses at 7% of the energy fed into the grid. The losses should be shared by the transmission and distribution licensee in the ratio of 4:3. For wheeling of electricity for self-consumption, when injection at 11 kV level and drawal at 11 kV or below in the same distribution licensee area, the user has to pay 50% of wheeling charges and 50% of wheeling losses of the energy fed into the grid as applicable to normal open access consumers.

For wheeling of electricity to more than one location for captive use/third party sale, the commission has allowed the same on payment of 5 Paisa/kWh on energy fed into the grid to the distribution company concerned in whose area power is consumed in addition to above mentioned transmission charges and losses, as applicable.

Suggestions from Objectors

M/s ACEL has submitted to consider wheeling charges for third party sale in line with charges applicable for captive use. ACEL has requested complete waiver of the cross subsidy surcharge considering the proposed amendments in EA 2003. They also submitted that recent increase in CSS and further reduction in HT tariff makes third party sale unviable.

They have requested to allow wheeling to more than one location of a consumer in third party sale, if the sum of contract demand of such locations of the same consumer is at least 1 MW by payment of additional 5 paise/kWh in addition to applicable normal open access charges. In

case of wheeling for captive use below 66 kV, they requested wheeling and distribution losses to be kept at 30% of losses applicable to normal open access customers.

In case of wheeling for captive use where injection is at 11kV and drawal at 11 kV in the same distribution area, they requested wheeling and distribution losses to be kept at 30% of losses applicable to normal open access customers. Further, they submitted that to remove ambiguity, the Commission may further state that in case the plant and the consumer are in the same distribution area, the state transmission losses and charges shall not be applicable. They also submitted that they could not sell power under third party mechanism due to system congestion, and have requested biomass plants be given priority for third party sale.

GBEDA has also submitted to waive off the cross subsidy surcharge as open access transaction will be unviable for third party sale with 25% CSS.

Torrent power has requested that projects availing captive use should be treated on par with other generators, other open access consumers and thereby, levying wheeling and transmission charges, including charges in cash & kind. Further, they have requested to treat the CSS on third party sale at par with the other OA customers to avoid any burden on retail consumers.

GUVNL has requested to modify the provisions related to wheeling of power as per Govt of Gujarat Solar Policy 2015.

Commission's Decision

The Commission recognizes the fact that the cost of transmission/distribution assets created for evacuation of power from any generating project should be recovered to, a reasonable extent, from such generators. Otherwise, it will amount to cross-subsidizing such generators by other consumers. The category of consumer who generally source power through open access can afford to pay normal transmission and wheeling charges from the savings made through such transactions. Therefore, the Commission decides that the biomass and bagasse based co-generation projects availing open access for third-party sale shall be liable to pay the following:

i. Wheeling of power for third party sale from the biomass and bagasse based co-generation projects shall be allowed on payment of transmission charges, wheeling charges and losses of energy fed to the grid, as applicable to normal open access consumers. Set off of wheeled energy at recipient unit(s) shall be carried out in the same 15-minute time block.

ii. Further, the biomass and bagasse based co-generation projects who desire to wheel electricity under third party open access has to pay 50% of CSS and additional surcharge as applicable to normal open access consumers.

However, in case of biomass and bagasse based cogeneration projects opting for wheeling of power for self use, the Commission decides to allow lower transmission / wheeling charges. Therefore, the Commission decides that the transmission and wheeling charges applicable to captive open access users shall be as under:

i. Wheeling of power to consumption site at 66 kV voltage level and above: Wheeling of electricity generated from biomass and bagasse based co-generation projects within the State shall be allowed on payment of transmission charges and transmission losses as applicable to normal open access consumer.

ii. Wheeling of Power to consumption site below 66 kV voltage level: In case the injection of power is at 66 kV or above and drawal is below 66 kV, wheeling of electricity generated from biomass and bagasse based co-generation projects within the State, shall be allowed on payment of transmission charges and transmission losses applicable to normal open access consumers and 50% of wheeling charges and 50% of distribution losses of the energy fed into the grid as applicable to normal open access consumers.

iii. Wheeling of electricity for injection at 11 kV and drawal at 11 kV and below voltage level within the same distribution area: When the point of injection is at 11 kV and drawal is at 11 kV or below, and the injection point as well as the drawal point lies within the same distribution area, the charges levied on the user shall be 50% of wheeling charges and 50% of wheeling losses of the energy fed to the grid as applicable to normal open access consumers. No other charges shall be levied on such transaction.

iv. Injection at 11 kV and drawal at 11 kV and below voltage level in different distribution area: When the point of injection is at 11 kV and drawal is at 11 kV or below, and the injection and drawal is in different distribution area, the charges levied on the user shall be 50% of wheeling charges and 50% of wheeling losses of the energy fed in to the grid as applicable to normal open access consumers. In addition, transmission charges and transmission losses as applicable to normal open access consumer shall be payable.

Further, the Commission specifies that biomass and bagasse based co-generation power project owners, who wheel the electricity for captive use / third party sale, to more than one location, shall pay 5 Paisa/kWh of energy fed into the grid to the concerned distribution company in the

area, in which the power is consumed in addition to above mentioned transmission charges and losses applicable.

4.2 State Energy Metering

In the discussion paper it was proposed that, the developers of biomass power and bagasse based co-generation projects shall provide energy metering and communication facility in accordance with the following regulations/codes/orders and their subsequent amendments.

1) Central Electricity Authority (Installation and Operation of meters) (Amendment) Regulations 2010 and its subsequent amendments
2) Gujarat Electricity Grid Code 2004 and its subsequent amendments
3) GERC (Terms and Conditions of Intra-State Open Access) Regulations, 2011 and its subsequent amendments
4) GERC Distribution Code 2004 and its subsequent amendments

However, for the purpose of energy accounting, such projects shall have to provide ABT compliant meters at generators and if the power is to be wheeled to consumer's premises, then ABT compatible meter is to be installed at the consumer premises also.

Suggestions from Objectors

No suggestions received from the stakeholders on energy metering.

Commission's Decision

The Commission decides to retain the provisions related to Energy Metering as proposed in the discussion paper. The Commission has defined the interconnection point and metering point in para 2.4.1 (g) of this order. In order to have uniformity in metering standards irrespective of the installed capacity of power generation projects, the Commission directs that the biomass based power projects and bagasse based co-generation projects should install ABT compliant meters at the point of metering. The ABT meters shall conform to the Central Electricity Authority (Installation and Operation of meters) (Amendment) Regulations 2010 and its subsequent amendments. The project developers will have to install Remote Terminal Unit (RTU) for transferring the real time data to SLDC for its monitoring purpose.

4.3 Pricing of Reactive Power

In the discussion paper it was proposed that biomass power and bagasse based co-generation projects shall have reactive energy charges at par with that of other renewable energy generation sources. Hence, the reactive energy tariff approved by the Commission for the RE technologies like wind and solar shall be made applicable to biomass based power projects and bagasse based co-generation projects.

Suggestions from Objectors

GETCO has submitted that grid connectivity is not strong in locations where RE resources are available, resulting in heavy voltage fluctuations due to RE generation variations and poor short circuit levels in these locations. This results in additional investments by GETCO towards reactive power management. GETCO has requested to increase the reactive charges, in line with other SERCs. The reactive charges proposed by them are:

25 paisa/kVARh – For the drawal of reactive energy at 10% or less of the net energy exported.

50 paise/kVARh – For the drawal of reactive energy at more than 10% of the net active energy exported.

Commission's Decision

The Commission decides that for the purpose of having uniformity the following reactive energy charges shall be applicable to all biomass based power projects and bagasse based co-generation power projects from the date of issue of this order:

"10 paise/kVARh – For the drawal of reactive energy at 10% or less of the net energy exported.

50 paise/kVARh – For the drawal of reactive energy at more than 10% of the net active energy exported".

4.4 Sharing of Clean Development Mechanism (CDM) Benefits

In the discussion paper, the Commission proposed to retain the provisions for sharing of CDM benefits in line with the recommendations made by the Working Group on Renewable Energy Generation constituted by the Forum of Regulators for the next control period. However, such projects availing CDM benefit shall share the net CDM proceeds annually, by 31 March of every year with an affidavit stating the annual energy generation (date of commissioning as starting point of the first year), CER generated, gross receipts, and net receipts.

Suggestions from Objectors

No comments have been received from the Objectors.

Commission's Decision

Considering the initial cost of registering CDM projects and long time frame taken to realize the CDM benefits, the Commission decides that the sharing of net proceeds on account of CDM benefits realized through sale of CER generated from corresponding annual energy generation from biomass based projects and bagasse based co-generation projects shall be as follows:

- 100% of net proceeds through sale of CER generated from the energy generation in the first year after the date of commercial operation of the project shall be retained by the beneficiary/developer.

- In the second year, the share of the beneficiary shall be 10% which shall be progressively increased by 10% every year till it reaches 50% in the sixth year; thereafter the proceeds shall be shared in equal proportion by the power generating company and the beneficiary.

Biomass based projects and bagasse based co-generation projects availing CDM benefit shall share the net CDM proceeds annually as per above, by 31 March of every year with affidavit stating the annual energy generation (date of commissioning as starting point of the first year), CER generated, gross receipts, and net receipts.

4.5 Banking of Surplus Energy

Biomass based power projects and bagasse based co-generation projects generate power with controlled supply of fuel and hence the power generated from such projects can be predicted and scheduled to maintain grid discipline. Hence, such projects are required to schedule their power. The Commission in its discussion paper had proposed that like earlier tariff order dated 8.8.2013 banking facility would not be given to biomass based power projects and bagasse based co-generation projects either selling power to third party or wheeling for self-use.

Suggestions from Objectors

Gujarat Urja Vikas Nigam Limited submitted that energy settlements for consumption of power by recipient unit from Biomass/Bagasse based co-generation project shall be governed by the provisions of Open Access Regulations.

Commission's Decision

Biomass based power projects and bagasse based co-generation projects generate power with controlled supply of fuel and hence the power generated from such projects can be predicted and scheduled in line with loads. The Commission, therefore, decides not to allow any banking facility to biomass based power projects and bagasse based co-generation projects either selling power to third party or wheeling for self-use.

4.6 Purchase of surplus power from biomass based power projects and bagasse based co-generation projects opting for captive use and third party sale under open access.

Biomass based power projects and bagasse based co-generation projects wheeling power for captive use or for third party sale are required to schedule the power. The Commission in its discussion paper had proposed that the surplus power over and above the settlement as per schedule given by the captive users and those opting for third-party sale of power from biomass based power project and bagasse based power projects of 4 MW and above capacity shall be treated as per the provisions of the intra-state ABT order in force, for the next control period.

Suggestions from Objectors

No comments have been received from the Objectors.

Commission's Decision

The Commission decides to retain the provisions specified in the discussion paper related to purchase of surplus power from the biomass based power projects and bagasse based co-generation projects. Therefore, the settlement as per schedule given by the captive users and those opting for third-party sale of power from biomass based power project and bagasse based power projects of 4 MW and above capacity shall be treated as per the provisions of the intra-state ABT order in force.

4.7 Renewable Energy Certificates for Third-Party Sale and Captive Use of power generated from biomass power projects and bagasse based co-generation projects

In the discussion paper it was proposed that qualification of the biomass power and bagasse based co-generation projects opting open access for sale of electricity / captive use for availing REC benefit shall be governed by the CERC (Terms and Conditions for Recognition and Issuance of REC) 2010 and the subsequent amendments till date.

Suggestions from Objectors

Gujarat Urja Vikas Nigam Limited has submitted that the provisions related to eligibility for participation of captive biomass / bagasse based co-generation projects in REC mechanism as contained in the discussion paper may be modified as per amendment dated 28.3.2016 in the CERC REC Regulations, 2010.

Commission's Decision

The Commission has specified the concessional treatment available to the captive and third party biomass and bagasse based co-generation projects not registered under REC mechanism. The qualification of captive and third party biomass and bagasse based co-generation projects registering in the REC mechanism, in case they avail any concessional benefits, is governed by the CERC REC Regulations and its amendments if any, and the same shall also be applicable to the projects commissioned in Gujarat.

The captive projects set up in the State of Gujarat and meeting the eligibility conditions, specified in CERC (Terms and Conditions for Recognition and Issuance of REC) Regulations, 2010 and the subsequent amendments are only eligible for availing RECs. As the Intra-state ABT is implemented in the State from 05.04.2010, the energy settlement for the projects registered under REC scheme will be done according to the provisions of the Intra-state ABT orders in force.

4.8 Security Deposit

In the discussion paper the Commission had proposed to retain the provision and amount of security deposit of Rs. 5 Lakhs/MW as a security deposit to GETCO in the form of bank guarantee to assure GETCO about the project developer's seriousness in developing the project. Further, it was proposed that in case of default in setting up the project within 4 years from the date of sanction of the power evacuation line the said amount shall be forfeited by GETCO**.**

Suggestions from Objectors

Gujarat Urja Vikas Nigam Limited has requested to incorporate a provision of submission of Bank Guarantee / Security Deposit of at least Rs. 25 lacs / MW at the time of signing of PPA with Distribution licensee on the lines of Solar tariff order.

Commission's Decision

In the previous tariff order, Bank Guarantee of Rs 5 lakh/MW as security deposit from the developer to GETCO was specified. Bank Guarantee is essential to assure GETCO about the seriousness of biomass and bagasse project developers. As such, considering the size and potential of biomass based power projects and bagasse based co-generation projects, the Commission decides to retain the provision of bank guarantee of Rs 5 lakh / MW by the project developers to GETCO. Project developers are required to commission the project within 4 years from the date of sanction of the power evacuation line. The bank guarantee shall be encashed by GETCO if the project is not commissioned within the specified time period. In case of delay in commissioning the project beyond the prescribed time period due to unforeseen reasons beyond the control of project developer, the developer may approach the Commission for time limit extension approval.

4.9 Contract Demand for Commissioning/Start-up Power

In earlier tariff order on biomass based power projects and bagasse based co-generation projects dated 8.8.2013, it was specified that energy charges for the start-up power and stand-by power used by the biomass power projects would be at par with the energy charges applicable to the HT industrial consumer of similar connected load / category. In the discussion paper, for start-up and stand-by power used by the biomass based power projects, following tariff was proposed to be levied during new control period:

(i) Exemption from payment of demand charges

(ii) Energy charges equal to HT industrial consumer tariff / category having similar connected load.

In case of bagasse based co-generation projects, such requirement of stand-by power is proposed to be met from the existing power supply available for the sugar factory.

Suggestions from Objectors

GBEDA has requested to exempt the contract demand charges for the projects commissioned during the control period of Order 5 of 2010. Further, plants commissioned during the first control period are paying monthly Rs.3.35 lakhs contract demand charges, which is an enormous burden. M/s ACEL supported the proposal of exemption from payment of demand charges.

Gujarat Urja Vikas Nigam Limited has submitted that in case the project developer is not selling the power to the State Utilities, or wheeling electricity through open access, they may not be entitled to claim any benefit of exemption from Demand Charges. Biomass/ Bagasse based generating station can utilize start-up / stand-by power requirement under temporary tariff

provision by payment of demand charges on daily basis as per actual utilization of power from Discoms.

Commission's Decision

The plants commissioned during the earlier control period are liable to pay relevant charges as of the provisions of the respective orders of the Commission. If the developers have any concern in this regard, they may approach the Commission separately with a petition.

The Commission cannot discriminate, by exempting those developers who sell to the State utilities and levying demand charges on those selling through open access. Hence, the Commission decides to levy charges as provided in the discussion paper. For start-up and stand-by power used by the biomass based power projects, the Commission decides that demand charges will be exempted and energy charges will be equal to HT industrial consumer tariff / category having similar connected load. The bagasse based co-generation projects can meet the start-up / stand-by power requirement from the existing power supply available at the sugar factory.

4.10 Parallel Operation Charges

In the discussion paper, the Commission had proposed that the parallel operation charges levied by distribution licensees would be exempted in case of biomass power projects and bagasse based co-generation projects set up for captive use.

Suggestions from Objectors

M/s ACEL supported the proposition of exemption from payment of parallel operation charges.

Commission's Decision

Considering the submission of the stakeholders, the Commission decides to retain the provision specified in the discussion paper. The biomass power projects and bagasse based co-generation projects set up for captive use are exempted from the payment of parallel operation charges.

4.11 Monitoring Mechanism for the use of fossil and non-fossil fuel

In the discussion paper, the Commission had proposed to retain the provisions related to monitoring mechanism for the use of fossil and non-fossil fuel in the biomass and bagasse based co-generation projects as per the previous tariff order dated 08.08.2013.

Suggestions from Objectors

No such suggestion has been received from the stakeholders in this regard.

Commission's Decision

In order to ensure continuous supply of fuel for such projects the Ministry of New and Renewable Energy has allowed use of certain percentage of fossil fuel along with the main biomass fuel. However, to restrict such projects to use the allowed minimum percentage of fossil fuel and to keep check on the same, the Commission decides that the generators shall submit on quarterly basis the details of monthly fuel usage to GEDA and distribution licensees with whom PPA has been signed at the beginning of each quarter for the previous quarter in accordance with the details to be submitted under '[A] Fuel Usage Statement' below. The Commission has nominated GEDA as the nodal agency for monitoring the usage of fossil fuel by the Biomass power and bagasse based cogeneration projects set up in the State. The biomass based power project and bagasse based co-generation project developers shall submit the following information duly certified by a practising Chartered Accountant empanelled by C&AG:

[A] Fuel Usage Statement

The biomass based power project and bagasse based co-generation project developers shall furnish a fuel usage statement and fuel procurement statement for each month, along with the monthly energy bill. The statement should cover the following details:

i. Quantity of fuel (in tonnes) for each fuel type (non-fossil fuel and fossil fuel) consumed and procured during the month for power generation purposes,

ii. Cumulative quantity (in tonnes) of each fuel type (non-fossil fuel and fossil fuel) consumed and procured till the end of that month during the year,

iii. Actual (gross and net) energy generation (denominated in units) during the month,

iv. Cumulative actual (gross and net) energy generation (denominated in units) until the end of that month during the year,

v. Opening fuel stock quantity (in tonnes),

vi. Receipt of fuel quantity (in tonnes) at the power plant site and,

vii. Closing fuel stock quantity (in tonnes) for each fuel type (non-fossil fuel and fossil fuel) available at the power plant site.

Non-compliance to the condition regarding limited use of fossil fuel, during any financial year shall result in withdrawal of "Preferential tariff" as per this Order for such biomass and bagasse based co-generation project.

[B] Information System for Creation of Database

The Commission decides to continue the maintenance of data-base for further review of the technical/financial parameters for the next tariff order. Hence, the biomass based power project and bagasse based co-generation project developers are advised to keep the records of the following data and provide the same to GEDA and the Commission annually to create data-base for future.

i. Number and categories of employees for different purposes.

ii. Administrative and General Expenses.

iii. Repair and Maintenance work carried out during the year specifying activities carried out with time period and spare/ material replaced and its cost.

iv. Details of Spare parts of the plant / machines replaced during the year with justification and cost.

4.12 Other Issues

(i) Power Factor and EHV Rebate on Third Party sale and Captive Consuption

Suggestions from Objectors

M/s Abellon clean energy limited submitted that that the DISCOMs are not passing the Power Factor Rebate and EHV Rebate to the customers on the quantum of electricity procured from biomass source under third party/captive mechanism. They have requested to direct DISCOMs to pass on such benefit to consumers availing biomass power through open access. Further, they have requested clarification on PF rebate. They requested the Commission to direct Discoms to provide PF rebate to consumers availing open access and refund those who have been wrongly denied such benefit. They have also requested to the Commission to pass on EHV rebate similarly, to the consumer.

Commission's Decision

The treatment of Power Factor and EHV Rebate will be as per provisions of the distribution tariff orders passed by the Commission. Hence, the provision as given in the distribution tariff order will be applicable for the consumers sourcing power through open access. If distribution utilities are not following appropriate provisions while billing the consumers, then the same can be reviewed according to the provisions specified in the distribution tariff orders. If required, the consumers can approach the respective CGRF in this regard.

(ii) Renewable Purchase Obligation

Suggestions from Objectors

M/s Abellon clean energy limited has submitted that RPO for other category is only 0.5%. They have requested to revise these obligations as there will not be any mandate for DISCOMs to purchase power from biomass power plants and consequently the sector will continue to remain underdeveloped.

Commission's Decision

The proposed objection is out of the preview of this proceeding. The objector may submit its objections / suggestions during the proceedings on amendment of GERC (Procurement of Energy from Renewable Sources) Regulations, 2010.

(iii) Group Captive Mechanism

Suggestions from Objectors

GUVNL has requested to allow Group Captive by specifying that the entire amount of equity in the biomass / bagasse based project is to be held by captive users and entire power shall be consumed in the ratio of their equity amount with a variation in consumption not exceeding + 10% of equity amount on annual basis.

Commission's Decision

The eligibility conditions for qualification as Captive / Group Captive project is governed by the provisions of the Electricity Rules 2005 notified by Ministry of Power, Government of India. Accordingly, the eligibility of such projects set up in the State shall also be governed by the provisions of the Electricity Rules, 2005.

(iv) Part-PPA

Suggestions from Objectors

M/s ACEL has requested the Commission to direct DISCOM to sign part PPAs as needed and not insist on an all or nothing approach.

Commission's Decision

The Commission decides that the signing of part PPA is not a part of the present proceeding and the objector may approach the Commission separately with case specific facts and figures.

4.13 Applicability of the Order

In the discussion paper it was proposed that, the fixed and variable component of the tariff proposed in this discussion paper will be made applicable for the biomass based power projects and bagasse based co-generation projects commissioned during the control period starting from the date of order up to 31st March 2019. Similarly, the biomass based power projects and bagasse based co-generation projects commissioned during the control period of previous Tariff Order No. 4 of 2013 dated 8.8.2013 shall get the variable component of tariff as proposed in this discussion paper during the control period of this order. The proposed tariff will be applicable to the biomass based power projects using rankine cycle technology with water-cooled condensers or air-cooled condensers and to the qualified topping cycle based bagasse based non fossil fuel based co-generation projects. The bagasse based co-generation projects shall have to undertake annual energy audit through the energy auditors empaneled by the State nodal agency.

Suggestions from Objectors

M/s ACEL has submitted that the provisions related to "Other Commercial Issues" (including open access charges, third party sale, captive sale, cross subsidy surcharge etc) for the new control period shall also be applicable to biomass projects that were commissioned in the previous control period and continue to sell the power to third party / captive consumers in the new control period. Non-applicability of the same shall result in conflict at multiple levels and unfair treatment for plants commissioned in previous control period that were already selling to third-party/captive users.

Commission's Decision

The tariff determined by the Commission in this order shall be applicable to all the biomass based power projects and bagasse based co-generation projects commissioned from the date of issue of this order. The biomass based power projects and bagasse based co-generation projects commissioned during the control period of previous tariff orders shall get the variable component of tariff decided in this tariff order. The tariff determined by the Commission in this order shall be applicable to the projects for which PPA would be signed and project would be commissioned from the date of issue of this order. For the older projects, all the provisions as given in their generic tariff orders for their respective control period shall prevail. The Commission also decides that the bagasse based co-generation projects shall have to undertake annual energy audit through the energy auditors empaneled by the State nodal agency.

The Commission expects that the developers of Biomass / Bagasse based power projects to ensure that there is no lapse in meeting the specified environmental norms for such project so as to keep the environment clean.

Sd/-	**Sd/-**	**Sd/-**
Shri P. J. Thakkar	**Shri K. M. Shringarpure**	**Shri Anand Kumar**
Member	**Member**	**Chairman**

Place: Gandhinagar

Date: 15 /03/2018

Annexure I

List of Stakeholders who have submitted written suggestions/objections on the Discussion Paper.

Sr. No	Name of Stakeholder
1	Gujarat Biomass Energy Developers Association
2	Abellon Clean Energy Limited
3	Gujarat Energy Transmission Corporation Ltd. (GETCO)
4	Gujarat Urja Vikas Nigam Limited (GUVNL)
5	Torrent Power Ltd. (TPL)
6	Gondal Chamber of Commerce & Industries

Annexure II

List of stakeholders, who have attended the public hearing on 20 June 2016.

Sr. No	Name of Stakeholder
1	Abellon Clean Energy Limited
2	Gujarat Energy Transmission Corporation Ltd. (GETCO)
3	Gujarat Urja Vikas Nigam Limited (GUVNL)
4	Torrent Power Ltd. (TPL)
5	Gujarat Energy Development Agency
6	Madhya Gujarat Vij Company Limited

Annexure III

Tariff for biomass based power project with water-cooled condenser

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Net Energy sold (lakh kWhs)	55.19	63.07	63.07	63.07	63.07	63.07	63.07	63.07	63.07	63.07	63.07	63.07	63.07	63.07	63.07	63.07	63.07	63.07	63.07	63.07
Costs																				
O&M	23.85	25.21	26.66	28.18	29.79	31.50	33.30	35.20	37.22	39.35	41.60	43.98	46.49	49.15	51.96	54.93	58.08	61.40	64.91	68.62
Depreciation (SLM)	33.39	33.39	33.39	33.39	33.39	33.39	33.39	33.39	33.39	33.39	9.54	9.54	9.54	9.54	9.54	9.54	9.54	9.54	9.54	9.54
Interest on term loan	36.16	32.35	28.55	24.74	20.94	17.13	13.32	9.52	5.71	1.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on working capital	5.75	6.54	6.79	7.06	7.34	7.63	7.95	8.28	8.63	9.00	9.21	9.65	10.13	10.62	11.14	11.69	12.26	12.87	13.50	14.17
Return on Equity	20.03	20.03	20.03	20.03	20.03	20.03	20.03	20.03	20.03	20.03	20.03	20.03	20.03	20.03	20.03	20.03	20.03	20.03	20.03	20.03
Tax on equity	4.28	4.28	4.28	4.28	4.28	4.28	4.28	4.28	4.28	4.28	6.93	6.93	6.93	6.93	6.93	6.93	6.93	6.93	6.93	6.93
Fixed cost (Rs lakh)	123.47	121.81	119.70	117.68	115.77	113.96	112.27	110.70	109.26	107.95	87.31	90.14	93.12	96.28	99.61	103.13	106.85	110.77	114.92	119.30
Fuel Cost	200.59	240.71	252.74																	
Tariff																				
Fixed tariff (Rs / kWh)	2.24	1.93	1.90	1.87	1.84	1.81	1.78	1.76	1.73	1.71	1.38	1.43	1.48	1.53	1.58	1.64	1.69	1.76	1.82	1.89
Variable Tariff (Rs / kWh)	3.63	3.82	4.01																	
Levelised Fixed Tariff (Rs / kWh)	1.80																			

Tariff:

Levellized Fixed Cost Tariff	Tariff in Rs./kWh
1 to 20 years	1.80
AD Benefit	0.15
Variable Cost tariff	3.63 (FY 2017-18), 3.82 (FY 2018-19), 4.01 (FY 2019-20)

Annexure IV

Tariff for biomass based power project with air-cooled condenser

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Net Energy sold (lakh kWhs)	55.19	63.07	63.07	63.07	63.07	63.07	63.07	63.07	63.07	63.07	63.07	63.07	63.07	63.07	63.07	63.07	63.07	63.07	63.07	63.07
Costs																				
O&M	25.35	26.80	28.33	29.95	31.67	33.48	35.39	37.42	39.56	41.82	44.21	46.74	49.42	52.24	55.23	58.39	61.73	65.26	68.99	72.94
Depreciation (SLM)	35.49	35.49	35.49	35.49	35.49	35.49	35.49	35.49	35.49	35.49	10.14	10.14	10.14	10.14	10.14	10.14	10.14	10.14	10.14	10.14
Interest on term loan	38.44	34.39	30.34	26.30	22.25	18.21	14.16	10.11	6.07	2.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on working capital	6.03	6.84	7.11	7.38	7.67	7.98	8.31	8.66	9.02	9.41	9.62	10.08	10.58	11.09	11.64	12.21	12.81	13.44	14.10	14.80
Return on Equity	21.29	21.29	21.29	21.29	21.29	21.29	21.29	21.29	21.29	21.29	21.29	21.29	21.29	21.29	21.29	21.29	21.29	21.29	21.29	21.29
Tax on equity	4.54	4.54	4.54	4.54	4.54	4.54	4.54	4.54	4.54	4.54	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7.37
Fixed cost (Rs lakh)	131.14	129.36	127.11	124.96	122.92	121.00	119.19	117.52	115.98	114.58	92.63	95.63	98.80	102.14	105.67	109.40	113.34	117.50	121.90	126.54
Fuel cost (Rs lakh)	208.51	250.21	262.72																	
Tariff																				
Fixed tariff (Rs / kWh)	2.38	2.05	2.02	1.98	1.95	1.92	1.89	1.86	1.84	1.82	1.47	1.52	1.57	1.62	1.68	1.73	1.80	1.86	1.93	2.01
Variable Tariff (Rs / kWh)	3.78	3.97	4.17																	
Levellized Fixed Tariff (Rs / kWh)	1.91																			

Tariff:

Levellized Fixed Cost Tariff	Tariff in Rs./kWh
1 to 20 years	1.91
AD Benefit	0.16
Variable Cost tariff	3.78 (FY 2017-18), 3.97 (FY 2018-19), 4.17 (FY 2019-20)

Annexure V

Tariff for bagasse based co-generation projects

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Net Energy sold (lakh kWhs)	48.09	48.09	48.09	48.09	48.09	48.09	48.09	48.09	48.09	48.09	48.09	48.09	48.09	48.09	48.09	48.09	48.09	48.09	48.09	48.09
Costs																				
O&M	13.98	14.78	15.63	16.52	17.46	18.46	19.52	20.64	21.82	23.06	24.38	25.78	27.25	28.81	30.46	32.20	34.04	35.99	38.05	40.22
Depreciation (SLM)	32.62	32.62	32.62	32.62	32.62	32.62	32.62	32.62	32.62	32.62	9.32	9.32	9.32	9.32	9.32	9.32	9.32	9.32	9.32	9.32
Interest on term loan	35.33	31.61	27.89	24.17	20.45	16.73	13.02	9.30	5.58	1.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on working capital	3.36	3.45	3.55	3.65	3.76	3.88	4.00	4.14	4.28	4.43	4.41	4.62	4.84	5.06	5.30	5.56	5.82	6.10	6.39	6.70
Return on Equity	19.57	19.57	19.57	19.57	19.57	19.57	19.57	19.57	19.57	19.57	19.57	19.57	19.57	19.57	19.57	19.57	19.57	19.57	19.57	19.57
Tax on equity	4.18	4.18	4.18	4.18	4.18	4.18	4.18	4.18	4.18	4.18	6.77	6.77	6.77	6.77	6.77	6.77	6.77	6.77	6.77	6.77
Fixed cost (Rs lakh)	109.03	106.21	103.43	100.71	98.04	95.44	92.91	90.44	88.04	85.72	64.46	66.06	67.75	69.54	71.43	73.42	75.53	77.76	80.11	82.59
Fuel cost (Rs lakh)	174.60	183.33	192.50																	
Tariff																				
Fixed tariff (Rs / kWh)	2.27	2.21	2.15	2.09	2.04	1.98	1.93	1.88	1.83	1.78	1.34	1.37	1.41	1.45	1.49	1.53	1.57	1.62	1.67	1.72
Variable Tariff (Rs / kWh)	3.63	3.81	4.00																	
Levellized Fixed Tariff (Rs / kWh)	1.90																			

Tariff:

Levellized Fixed Cost Tariff	Tariff in Rs./kWh
1 to 20 years	1.90
AD Benefit	0.16
Variable Cost tariff	3.63 (FY 2017-18), 3.81 (FY 2018-19), 4.00 (FY 2019-20)