BEFORE THE GUJARAT ELECTRICITY REGULATORY COMMISSION AT AHMEDABAD

Order No. 4 of 2010

In the matter of : "Determination of tariff for Procurement of Power by Distribution Licensees from Bagasse based co-generation Power Plants and Other Commercial Issues".

In exercise of the powers conferred under sections 61(h), 62(1)(a) and 86(1)(e) of the Electricity Act, 2003 (36 of 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 Distribution Licensees and Others in Gujarat from Bagasse based co-generation Power Plants.

This order is the second order on Bagasse based Co-generation. This order is culmination of an elaborate consultative process after considering the suggestions received from various stakeholders.

1. Background

1.1 Discussion paper on determination of tariff for Procurement of Power by Distribution Licensees from Bagasse based co-generation Power Plants.

1.2 Public Hearing

1.1 Discussion paper on determination of tariff for Procurement of Power by Distribution Licensees from Bagasse based Co-generation Power Plants.

The Commission prepared a discussion paper on "Determination of Tariff for Procurement of Power by Distribution Licensees from Bagasse based power projects and other Commercial Issues", and placed it on the website of the Commission on 10.2.2010 for inviting comments and suggestions. The list of those who have communicated their views is given in **Annexure-I.**

1.2 Public Hearing

A public hearing was held on 29.3.2010. List of the participants who participated in the hearing and expressed their views is given in **Annexure-II.**

2. General Approach

2.1 Commission's Regulations on Procurement of Power from Renewable Energy Sources

The Commission had notified Regulation No.15 titled the "Gujarat Electricity Regulatory Commission (Power Procurement from Renewable Sources) Regulations, 2005" on 29th October, 2005. By the said Regulations, the Commission fixed the Renewable Power Purchase Obligations (RPO) of the Distribution Licensees for the years 2006-07, 2007-08 and 2008-09. For the subsequent period, the Commission prepared a draft regulations viz. "The Gujarat Electricity Regulatory Commission (Power Procurement from Renewable Sources) Regulations, 2009 and issued Public Notice inviting comments/suggestions from the stakeholders. In the said draft regulations, the

Commission proposed higher percentage of power purchase obligation by Distribution Licensees and it was also proposed to extend the scope of applicability of these regulations to captive and open access user(s)/consumer(s). This draft regulations was challenged by some of the stakeholders before the Hon'ble High Court of Gujarat and the Hon'ble High Court of Gujarat disposed of the petition on 9.11.2009 by vacating the interim stay which had been granted earlier. Thereafter the Commission came out with new draft Regulations on "Power Procurement from Renewable Energy Sources in January 2010". Public Hearing on the above Regulations was held on 4.3.2010. The Commission has notified the regulations for procurement of energy from renewable sources, vide notification no. 3 of 2010 dated 17th April, 2010.The Commission has specified separate RPO for projects other than Solar and Wind projects, which includes Bagasse based cogeneration.

2.2 Control period

The Commission had, vide its Order No.1 of 2007 dated 3rd January, 2007, determined the Bagasse based power generation Tariff for a period of three years, i.e. upto 2nd January,2010.

The discussion paper for the present order was published on 06.2.2010 and it was proposed to be effective from date of this order.

Suggestion of the Stakeholders

Gujarat Energy Transmission Corporation Limited have suggested that Control period should coincide with the MYT control period.

Commission's Decision

The Commission finds no justification for linking the tariff for renewable sources of energy with the MYT control period. The current MYT period will continue only till March 2011. Moreover, the control period of previous order on tariff for Bagasse based co-generation power plants was up to 2nd January, 2010, which could be made applicable till the issuance of the present order. Hence, based on the discussion paper, the Commission decides that the control period for this order will be for a period of three years from 1st June, 2010 to 31st May, 2013.

2.3 Process of Determination of Tariff

The Commission has determined the tariff for Bagasse based co-generation projects based on broad principles contained in Commission's regulations on "Terms & Conditions of Tariff" and "Procurement of Power from Renewable Energy Sources by the Distribution Licensees". The Commission has also considered provisions of the CERC (Terms & Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2009 notified on 16th September, 2009 and CERC suo-moto order dated 26.04.2010 in petition no. 53 of 2010. Prior to final decision on the tariff, the Commission invited comments/ suggestions from the stakeholders and also held public hearing and considered the suggestions of various stakeholders.

2.4 Preferential Tariff

Clauses 6.4(1) of the Tariff Policy 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 determine the preferential tariff for non-conventional energy sources. Distribution companies may procure such energy at preferential tariff determined by the State Commission till such time as the non-conventional technologies become competitive. The Working Group constituted by the Forum of Regulators (FOR) for Policies on Renewable have in their recommendation suggested that a cost-plus tariff based on reasonable norms should be adopted for Renewable Energy (RE).

Keeping in view provisions of the Tariff Policy, recommendations of the Working Group of FOR, and larger objectives with reference to climate change and global warming, the Commission has adopted an approach of preferential treatment to energy from renewable sources.

3. Components of Tariff

While determining the Bagasse based power generation tariff, it is essential to adopt financial and operational parameters. In the context of tariff determined on a cost-plus basis, it significantly depends on the following financial and operational parameters:

3.1 Capital cost
3.2 Evacuation Cost
3.3 Tenure of Loan
3.4 Interest on loan
3.5 Return on Equity
3.6 Life of plant and machinery and Agreement Period.
3.7 Depreciation
3.8 Debt-Equity Ratio
3.9 Operations and Maintenance expenses
3.10 Interest on Working Capital

3.11 Plant Load Factor (PLF)
3.12 Auxiliary Consumption
3.13 Station Heat Rate (SHR)
3.14 Fuel Related Assumptions

a) Fuel Mix and types.
b) Gross Calorific Value (GCV)
c) Price of fuel.

3.1 Capital Cost

The capital cost of Bagasse based power plant comprises the cost of (i) boiler, (ii) turbine and generators, (iii) condenser, (iv) control cabinets, (v) chimney for flue gases, (vi) transformer and associated equipments, (viii) land and its development, (ix) processing fee of Gujarat Energy Development Agency, (x) erection and commissioning charges and (xi) creation of transmission system upto interconnection point of State Transmission Utility. The above components are grouped into four important categories, i.e. (i) Plant and Machinery, (ii) Land Cost, (iii) Evacuation Infrastructure and (iv) Associated service charges.

In the discussion paper, the Commission had analyzed the capital cost considered by the CERC and various other State Commissions. Based on above analysis, the Commission proposed the capital cost of Rs. 4.15 Crores/MW for the control period of the order. This capital cost did not include the evacuation cost.

Suggestions of the Stakeholders

The National Federation of Co-operative sugar factories and Gujarat State Federation of Co-operative sugar factories have submitted that the sugar

factories in Gujarat are very old and in need of major modifications. They have therefore suggested that the capital cost be considered at Rs. 5.5 Cr/MW, including cost of modernization. Cogeneration Association of India has proposed capital cost of Rs. 6.0 to 6.5 Cr/MW, including cost of modernization and evacuation cost. GUVNL has submitted that equipment for Bagasse based cogeneration projects are of proven technology and its cost needs no upward revision. They have proposed a capital cost of Rs. 4.15 Cr/MW inclusive of evacuation Cost. GETCO has suggested to adopt Rs. 3.98 Cr/MW as capital cost as per CERC order dated 26.04.2010.

Commission's Decision

In the discussion paper, capital cost of Rs. 4.15 Crore was proposed after considering the norms adopted by various SERCs and the CERC. The Commission had in earlier order no. 1 of 2007 adopted a capital cost of Rs. 3.75 per/MW against Rs. 4.15 Crore per MW proposed now, which indicates an increase of Rs. 40 lacs per MW i.e 10.66 % rises in the Capital cost due to increase in labour, plant and machinery. It is also essential to protect the interest of consumers by not burdening them with exorbitant tariff hike. The Commission, therefore, decides to adopt Rs. 4.15 Cr/MW as capital cost for Bagasse based co-generation projects.

3.2 Evacuation Cost

Section 86(1) (e) of the Electricity Act, 2003 stipulates that the State Commission should take suitable measures for providing grid connectivity to the renewable energy sources. The Working Group constituted by the Forum of Regulators has also in its report on "Renewable Policy" recommended that grid connectivity be provided by the transmission and distribution licensees

for renewable energy sources in an optimal manner. The size of Bagasse plant is in the range of 1 to 25 MW, which is quite small in comparison with conventional power plant. Hence, power generated from such plants can be evacuated through 11 KV, 33 KV or 66 KV lines. The Commission had in its Order No.1 of 2007 dated 3.1.2007 allowed Rs. 25 lakhs per MW as development charge including grid interface charges for evacuation arrangements. Considering the overall price escalation, in the discussion paper, evacuation cost was proposed at Rs.29.00 lakhs per MW for Bagasse based co-generation projects.

Suggestion of the Stakeholders

National Federation of Cooperative Sugar Factories Ltd and Gujarat State Federation of Co Operative Sugar Factories Ltd suggested that the evacuation cost of Rs. 29 lakhs/MW proposed by the Commission is sufficient for creation of necessary infrastructure within the plant premises only and requested that an additional cost of Rs. 25 lakh/MW/ K.M be allowed for creating transmission line up to GETCO sub-station. Gujarat Urja Vikas Nigam Limited has suggested that the evacuation cost should be included in the proposed capital cost of Rs. 4.15 Cr/MW. Gujarat Energy Transmission Corporation Limited have suggested to reduce the cost of evacuation allowed to Rs. 20 lakh per MW. They have submitted that the sugar factories of Gujarat are located in south and Central Gujarat, where the transmission network is well developed and the project authorities will not have to draw long lines; as is required for Wind or Solar plants. Hence, the cost for creation of such line will be within Rs. 20 lakh/MW.

Commission's Decision

The Commission had in its previous order considered Rs. 25 lakhs/MW as evacuation cost, which is now enhanced to Rs. 29 lakhs/MW to address the increase in cost of material, labour etc. The Bagasse based co-generation project size is small (upto 25 MW) and as indicated by GETCO, the transmission network in South & Central Gujarat is well developed. Hence, the transmission lines required to be erected shall not be very long and as such the extra cost of Rs. 25 lakh/km of evacuation lines is not justified. The Commission, therefore, decides to adopt Rs. 29 lakhs/MW as the evacuation cost, including supervision changes of GETCO, if any.

3.3 Tenure of Loan

The Commission in its earlier order dt.3rd January, 2007 had considered the loan tenure as 10 years with repayment in equal installments. The CERC also in its order dated 26th April, 2010 adopted normative loan tenure of 10 years. It has therefore, been proposed to continue the tenure of term loan as ten years with repayment in equal installments.

Suggestion of the Stakeholders

National Federation of Cooperative Sugar Factories Ltd and Gujarat State Federation of Co operative sugar factories Ltd. have suggested that the Tenure of Loan should be 10 years with one year moratorium after commissioning of the power plant or 2 years moratorium from the 1st disbursement of loan.

Commission's Decision

The Terms and Conditions of Tariff Regulations, 2005 notified by the Commission provides that tenure of loan as 10 years without moratorium

period. Hence, for the purpose of tariff determination, we decide to keep loan repayment period as 10 years from the date of commercial operation of the plant.

3.4 Interest on Loan

The Commission had considered the prevailing prime lending Rates of the banks/ financial institutions on such projects in the market and in line with Commission's approach in case of Wind and Solar Power Tariffs, the Commission proposed interest on loan at 10.75%. This is equal to the SBI PLR minus 1 (one) percent.

Suggestion of the Stakeholders

National Federation of Cooperative Sugar Factories Ltd and Gujarat State Federation of Co operative sugar factories Ltd have suggested that the interest on loan should be SBI PLR plus one percent. Gujarat Energy Transmission Corporation Limited has suggested that interest on loan is quite reasonable.

Commission's Decision

The Commission had considered an interest rate of 10.25% in its earlier order no. 1 of 2007 dated 03.1.2007. Some of the objectors have suggested to consider higher interest rate. The Commission had proposed interest on loan as 10.75% which is line with wind and solar order and the same is equal to SBI PLR minus 1 %. The Commission feels that the tariff is a preferential tariff with assured return and the distribution licensees are under obligation to purchase power from renewable sources resulting in no market risks. However, it has been submitted by the project developers that unlike the solar or wind project developers, the Bagasse project developers are smaller SPVs

and are not able to get loan at rates below PLR. The Commission, therefore, decides to allow the interest on loan at SBI PLR, viz. 11.75%.

3.5 Return on Equity

The Commission had proposed a rate of return on equity at 14% with proposal to allow MAT @ 16.995% per annum for the initial 10 years of the project from commercial operation date of the plant and Corporate Tax @ 33.99% from the 11th year to 20th year of the plant on the Return on Equity.

Suggestion of the Stakeholders

National Federation of Co-operative Sugar Factories Ltd and Gujarat State Federation of Co- operative sugar factories Ltd have suggested that the return on equity be allowed for initial 10 year at the rate of 19% and from 11th to 20th year, it should be considered at 24% as per the guidelines of the CERC.

Commission's Decision

Commission's regulations on terms and conditions of Tariff, provide RoE at 14%. Thus, RoE proposed in the discussion paper is in accordance with the Regulations notified by the Commission. The Commission, therefore, decides to retain the RoE @ 14% per annum with provision of MAT for initial 10 years and Corporate Tax for the subsequent period at appropriate rates.

3.6 Life of Plant and Machinery and Agreement Period

As proposed in the discussion paper, the Commission decides to adopt a plant life of 20 years for this order. The Bagasse based co-generation project developers/ Distribution Licensees who are willing to supply/ purchase power shall sign a Power Purchase Agreement (PPA) for a period of 20 years.

3.7 Depreciation

Depreciation provision provides cash flow and thereby helps loan repayment. The loan repayment period is considered by the Commission as 10 years. Hence, the requirement of cash flow in the initial 10 years is more to match with the loan repayment. The Commission, therefore, proposed to allow 6% of the capital cost per annum as depreciation for initial 10 years and 3% per annum from 11th to 20th year of the plant life.

The provisions of Accelerated Depreciation are provided in the Income Tax Act, 1961 and Rules framed thereunder. A person who qualifies under the above statutory provisions is entitled to get benefits of the Accelerated Depreciation. Hence, the Commission proposed to determine the tariff taking into account the benefit of accelerated depreciation available under Income Tax Act, 1961 and Rules framed under it.

Suggestion of the Stakeholders

National Federation of Cooperative Sugar Factories Ltd and Gujarat State Federation of Co operative sugar factories Ltd have suggested to allow 7 % of the capital cost per annum as depreciation for initial 10 years and 2% per annum from the 11th to 20th year.

Commission's Decision

The terms and conditions of the Tariff Regulations, 2005 notified by the Commission provides that depreciation should be calculated on straight line method for 90 % of asset leaving salvage value of 10%. Accordingly the depreciation rate works out to be 4.5% per annum. However, the Commission

has allowed depreciation rate @ 6% per annum for initial 10 years and 3% for the 11th year onwards which provides comfort to the project developers to fulfill the loan repayment requirement to a large extent. Based on the above observation, we decide to retain the depreciation rate at 6% for initial 10 years and 3% from 11th year onwards.

The Commission also recognizes the apprehension regarding applicability of accelerated depreciation and decides to determine different tariffs for projects availing accelerated depreciation and those not availing this facility.

3.8 Debt-Equity Ratio

In line with Clause 5.3(b) of the Tariff Policy notified by the Ministry of Power, Government of India the Commission decides to adopt a debt-equity ratio of 70:30 for Bagasse based power projects.

3.9 Operation and Maintenance Expenses

Operation and Maintenance (O & M) costs consist of statutory charges, spares, employee cost, administrative & general expenses, repairs and maintenance and insurance expenses.

The CERC in its Order dated 3rd December, 2009 had adopted O & M expenses as Rs.13.35 lakhs per MW for FY 2009-10 to be escalated at the rate of 5.72% per annum thereafter. Various State ERCs have considered O&M expenses varying between 2.5% to 4.5% of the capital cost with annual escalation @ 4 to 5% thereafter.

Based on above observations, the Commission had proposed O&M cost including insurance cost at the rate of 3.0% of the capital cost for the first year, to be escalated at 5% per annum thereafter.

Suggestion of the Stakeholders

National Federation of Cooperative Sugar Factories Ltd and Gujarat State Federation of Co operative sugar factories Ltd., have suggested that O & M expenses be allowed at 4.5 % of the capital cost for the first year, to be escalated @ 5% per annum. Gujarat Urja Vikas Nigam Limited have suggested that the O & M expenses as 2.75%, of capital cost per annum, because the power plant auxiliaries are utilized partly by the sugar mill also.

Commission's Decision

Based on the analysis furnished in the discussion paper, the Commission had proposed to allow O & M cost for the first year @ 3% of the capital cost. However, some of the stakeholders have suggested a higher percentage. In this connection, the Commission observes that in case of a cogeneration project, there are several common expenses between the host sugar factory and cogeneration unit. Also, the bagasse is available in the premises of sugar factories itself and hence does not require additional manpower and the associated handling charges are negligible. The Commission, therefore, decides to retain the O & M expenses @ 3 % of the capital cost for the first year with 5% escalation thereafter.

3.10 Interest on Working Capital

Bagasse is a byproduct available from sugar mills and it is available whenever sugar mills are in operation. Hence, co-generation plants utilizing Bagasse as fuel do not incur any cost towards purchase of Bagasse. Based on above, the interest on working capital has been proposed on:

i. O&M expenses for one month,
ii. Receivables equivalent to one month charges for sale of electricity and

iii. Maintenance spare at 1% of the capital cost for first year and escalated @ 5% per annum thereafter.

The Commission had proposed to allow interest on working capital at the rate of 11.75% as considered for similar cases.

Suggestion of the Stakeholders

National Federation of Cooperative Sugar Factories Ltd and Gujarat State Federation of Co operative sugar factories Ltd have suggested the Interest on working capital should be 13.79% as the IREDA generally finances @ 13 to 14 %. GUVNL suggested that maintenance spare should be allowed 15% of O & M cost instead of 1 % of capital cost in line with the provision made by the CERC.

Commission's Decision

The Commission had proposed to allow interest on working capital at the rate of 11.75% per annum, which is equivalent to SBI PLR as considered in the cases of other renewable energy sources. Based on above, we decide to retain interest on working capital at 11.75% per annum.

So far as maintenance spare @ 15% of O&M expenses are concerned, it is clarified that the type of technology employed in the Bagasse based cogeneration plant is similar to the conventional coal based power plant. Therefore the maintenance spare requirement would be similar to the conventional power plant. Hence, the provision to be made for maintenance spare is not required to be different. As such, we decide to retain maintenance spare @ 1% of capital cost for first year with 5% per escalation thereafter.

3.11 Plant Load Factor (PLF)

As mentioned in the discussion paper, the crushing season in the sugar mills in the State continues for about 180 days. It is also expected that Bagasse would be available for another 60 days during the off-season. Moreover, mixing of 15% of fossil fuel is also allowed as per MNRE guidelines. Thus, the operating days for the co-generation plant are estimated to be about 240 days in a year (180 days for the co-generation plant in crushing season and 60days during off-season). With 240 days of operation and load factor of 92%, the PLF works out to 60%. Hence, Commission had proposed the PLF of 60% for determination of tariff from Bagasse based co-generation plant.

Suggestion of the Stakeholders

National Federation of Cooperative Sugar Factories Ltd and Gujarat State Federation of Co operative sugar factories Ltd have suggested to consider plant load factor as 55% instead of 60%. Directorate of Sugar, Govt. of Gujarat, suggested that 60% of PLF considered by the Commission is

reasonable. GUVNL & GETCO have suggested that PLF should be considered at 85% by allowing fossil fuel mix of 25%.

Commission's Decision

The Plant Load Factor (PLF) of a Bagasse based cogeneration plant will depend on the number of operating days considering the operations during crushing season and off-season. The CERC, in its order dated 26th April, 2010 has considered the PLF at 53% for States other than UP, AP, TN, and Maharashtra. While arriving at this figure, they have considered operating period of 210 days (150 days in crushing season & 60 days in off-season) with load factor of 92%.

The Directorate of Sugar, Government of Gujarat had confirmed that PLF of 60% proposed by the Commission is reasonable. So far as the issue of allowing 25% of fossil fuel as mix is concerned, it is to clarify that MNRE guidelines allow mixing of 15% of fossil fuel for a project to qualify as non-conventional generation project. As such, proposed increase in the permissible mix to 25% cannot be accepted. Hence, we decide to retain PLF at 60% for Bagasse based co-generation power projects.

3.12 Auxiliary Consumption

Based on the analysis of figures adopted by various Commissions, the discussion paper had proposed Auxiliary Consumption at 8.5% for determination of tariff for Bagasse based co-generation projects.

Suggestion of the Stakeholders

National Federation of Cooperative Sugar Factories Ltd and Gujarat State Federation of Co operative sugar factories Ltd have suggested to consider the auxiliary consumption at 10%.

Commission's Decision

In the conventional coal based thermal plants, the equipment used in coal and ash handling consume considerable amount of power. In the Bagasse based co-generation plants, these equipment are relatively smaller and as such, the Commission decides to retain the auxiliary consumption at 8.5%.

3.13 Station Heat Rate (SHR)

Station Heat Rate (SHR) is a key performance parameter for a power plant. The SHR depends on several factors such as plant capacity, plant design and configuration, technology (boiler type and pressure levels etc.), plant operations and maintenance practices, and operational parameters under varying load conditions.

The CERC, in its order dated 3rd December, 2009 in Suo-Motu Petition No.284 of 2009 considered normative Station Heat Rate of 3600 Kcal/Kwh for computation of tariff for non-fossil fuel based cogeneration. The Commission had proposed to adopt the same.

Suggestion of the Stakeholders

National Federation of Cooperative Sugar Factories Ltd & Gujarat State Federation of Co operative sugar factories Ltd. have suggested to consider SHR between (4000-4200 Kcal/KWH) because during the season a major part of steam flows towards the process and the Bagasse based boilers are manufactured with comparability lower pressure/ temperature parameters.

Commission's Decision

The Commission had proposed the Station Heat Rate of 3600 Kcal/Kwh as per CERC Regulations with consideration of the type of technology employed in it. The objectors have suggested for higher SHR due to wet condition of the Bagasse. The Commission has considered the GCV of the Bagasse as 2200 kcal/kg due to the wet condition of the Bagasse. Hence, further effect on SHR is not required to be given. If higher SHR is allowed, it leads to burden on consumers tariff and allows inefficient operation of plant. Hence, we decide to retain the SHR at 3600 Kcal/Kwh, which is line with CERC's latest order dated 26th April, 2010.

3.14 Fuel Related Assumptions

(a) Fuel Mix and Types

As provided in the guidelines issued by the Ministry of New and Renewable Energy (MNRE) the Commission proposed to allow use of fossil fuel upto 15% use of total energy consumption in kCal on annual basis.

Suggestion of the Stakeholders

National Federation of Cooperative Sugar Factories Ltd and Gujarat Federation of Cooperative Sugar Factories Ltd have suggested that coal, lignite or any bio-mass be allowed in the fuel mix.

Commission's Decision

The mixing of coal/lignite and biomass upto 15% of total energy consumption in kCal is allowed as fuel mix as the same is in consonance with Ministry of New & Renewable Energy guidelines. However, if any generator which utilizes biomass, other than bagasse, to the extent of more than 15 % of the total energy consumption in kCal on an annual basis will not be eligible for the tariff determined by this order and will be entitled only to the tariff determined by the Commission for Biomass based power generation.

(b) Gross Calorific Value (GCV)

The Gross Calorific Value (GCV) is the heat produced in kCal by complete combustion of one Kg of fuel.

The CERC in its order dated 26th April, 2010 in Suo-Motu Petition No.53 of 2010 considered normative Gross Calorific Value as 2,250 Kcal/Kg for Bagasse. Various ERCs have considered GCV of Bagasse varying between 2250 to 2300 Kcal/Kg.

Based on the above, the Commission decides the GCV of Bagasse as 2250 kCal/kg on "as such" basis i.e. wet basis considering in-house generation of Bagasse (in sugar mills) with moisture content.

(c) Bagasse Price and Escalation Rate

Based on the analysis given in the discussion paper, the Commission had proposed average cost of Bagasse as fuel at Rs.1, 200/MT and of Coal at Rs.1775/MT with 5% escalation per annum.

Suggestion of the Stakeholders

Gujarat Urja Vikas Nigam Ltd suggested that the Bagasse does not require any transportation because it is waste of the sugar mill. Hence, the Commission may consider the cost of Bagasse as Rs. 1000/MT.

Commission's Decision

Since Bagasse does not have an organized market, its price cannot be easily ascertained. But it is a saleable commodity being used as raw material in some other industries like paper, cardboard etc. and hence, has an opportunity cost.

The economic or opportunity cost of Bagasse could be determined on the principle of avoided cost of coal/ oil burnt for getting equivalent amount of heat in a thermal generating station.

Based on above analysis, we decide to retain the cost of Bagasse at Rs.1200/MT and for cost of coal at Rs. 1775/MT for 1st year and escalation of 5% per annum thereafter.

4. Tariff for Bagasse based co-generation power projects

Based on the various parameters as described in the discussion paper, the levelised tariff including RoE of bagasse based co-generation using a discounting rate of 10.19% worked out to Rs.4.69 per kWh.

However, the Commission felt that it would be appropriate to determine tariff for two sub-periods: one tariff for initial 10 years and another tariff from 11th year onward upto 20th year. Hence, the Commission proposed the tariff for generation of electricity from bagasse based cogeneration Power project at **Rs. 4.50** per kWh for the initial 10(ten) years starting from the date of Commercial operation of the project and **Rs. 4.90/KWh** from the 11th (Eleventh) year to 20th (twentieth) year.

The above tariff was proposed after taking into account benefit of accelerated depreciation under Income Tax Act and Rules. It was proposed that for a project that does not get such benefit, separate tariff would be determined by the Commission, on a specific petition by the developers.

Suggestion of the Stakeholders

National Federation of Cooperative Sugar Factories Ltd and Gujarat State Federation of Co-operative sugar factories association have suggested that if any subsidy is given by the Government, it would be given under certain obligations and commitments. Hence, the same is not passed on to the distribution licensee. Gujarat Urja Vikas Nigam Limited suggested to consider discounting rate of 16.45% for the levelised tariff calculations. National Federation of Cooperative Sugar Factories Ltd, Co generation Association of India and Gujarat State Federation of Co operative sugar factories Ltd have

suggested tariff rates for Bagasse based cogeneration should be allowed @ Rs. 5.00 per kWh to Rs.5.5/kWh. Torrent Power Limited have observed that significant increase in RPO coupled with increase in tariff for power procurement from Bagasse based Cogeneration energy will have a sizable impact on retail tariff to the Consumers.

Commission's Decision

As discussed in Clause 4 above, for determination of tariff for Bagasse based co-generation projects, the Commission decides to adopt various parameters as under:

Parameters for determination of tariff

No	Parameter	17th August 2007 Order	Considered in present order
Project Cost			
1	Land+ Plant & Machinery + Erection cost (in lakhs of Rs./MW)	375	415
2	Evacuation Infrastructure (in lakhs of Rs./MW)	25	29
	Total Capex (in lakhs of Rs./MW)		444
Operational parameters			
3	Debt-Equity ratio	70:30	70:30
4	Interest on Loan (tenure 10 years)	10.25%	11.75%
5	Return on Equity	14%	14%
6	O&M expenses (% of project cost-including Insurance cost)	2.5%	3.0%
7	Escalation on O&M after first year	5%	5%
8	PLF (at 100% grid & m/c availability)	80%	60%
9	Actual machine availability	100%	100%
10	Actual grid availability	100%	100%
11	Depreciation	4.5%	6.0% for initial 10years and 3% from 11th year to 20th year.
12	Auxiliary Consumption	8%	8.5%

13	Project life (years)	20	20
14	Minimum Alternate Tax (MAT) for initial 10 years of the plant	11.33%	16.995%
15	Corporate Income Tax from 11th year to 20th year of the plant.	33.66%	33.99%
16.	Interest on Working Capital	10.75%	11.75%
	(i) O&M expenses for one month		
	(ii) Receivables equivalent to one month charges for sale of electricity calculated and		
	(iii) Maintenance spare at 1% of the capital cost escalated @ 5% per annum.		
16	Gross Calorific Value(kCal/kg) of Bagasse	3300	2250
16.A	Gross Calorific Value(kCal/kg) of coal		3300
17	Price of Bagasse in (Rs/Tonne) for the first year	1000	1200
18	Price of Coal (Rs/Tonne)for the first year	1000	1775
19	Station Heat Rate (kCal/ kwh)	4250	3600

Based on the various parameters, the levelised tariff for Bagasse based co-generation using a discounting rate of 10.19% works out to Rs.4.65 per kWh. This tariff assumes the benefit of accelerated depreciation for all new projects. However, based on the submission made by some of the stakeholders, the Commission now decides to determine separate tariff for availing accelerated depreciation and those not availing the same.

Accordingly, the levelised tariff for projects with accelerated depreciation works out to Rs. 4.65 per kWh, while for the projects without accelerated depreciation, it works out to Rs. 4.71 per kWh. Further, as proposed in the discussion paper, the Commission decides to determine the tariff for two sub-periods, and the final tariff for Bagasse based co-generation

projects to be commissioned in the state of Gujarat during the control period of this order is determined as under.

Tariff	**Initial 10 years**	**11th year onwards**
With accelerated depreciation	Rs. 4.55/kWh	Rs. 4.90/kWh
Without accelerated depreciation	Rs. 4.61/kWh	Rs. 4.96/kWh

However, in case a project developer receives any capital subsidy from the Government or any statutory authority, it will be passed on to the distribution licensee concerned.

Further, the Commission recognizes the fact that the tariff for Bagasse based co-generation comprises of two components: fixed cost and variable or fuel cost. As such, the Commission decides to give option to the project developers, either to go for the single-part tariff as determined above or to go for a two-part tariff. In the two-part tariff, while the fixed component can be levelised over the stipulated life of the project, the variable component could be allowed an escalation rate of 5%. Accordingly, the Commission has determined the two-part tariff for Bagasse based co-generation projects to be commissioned during various years of the control period, which is given in Annexures III, IV and V.

The project developer will have the choice either to opt for fixed (single part) tariff determined above, which shall remain constant for the relevant period, or go for the two-part tariff as given in the Annexure.

This tariff rate shall be applicable for purchase of Bagasse based power by GUVNL/Distribution Licensees in Gujarat for complying with the Renewable Purchase Obligation (RPO) specified in the Regulations of this Commission from time to time. This tariff shall be applicable to Bagasse based power generators who will commission new Bagasse based power plants and equipments during the control period of this order.

5. Other Commercial Issues

5.1 Transmission and wheeling charges.
5.2 Security Deposit
5.3 Sharing of CDM benefit
5.4 Pricing of Reactive Power
5.5 Third party sales and Cross-subsidy Surcharge
5.6 Metering
5.7 Applicability of Intra-State ABT.
5.8 Merit order/ Must run station
5.9 Monitoring Mechanism for the use of Fossil and Non-fossil fuel
(A) Fuel usage statement
(B) Information system for creation of Database

5.1 Transmission and Wheeling charges

Whenever the power is sold to a Distribution Licensee, the generator will supply power at the interconnection point of generator with the STU/ distribution licensees. Thereafter, the transmission/ wheeling charges will be borne by the distribution licensee.

For wheeling of power for self use (captive use) or third party sale, the Commission had proposed transmission and wheeling charges in line with those for the wind energy generators.

Suggestion of the Stakeholders

- National Federation of Co-operative Sugar Factories Ltd and Gujarat State Federation of Co operative sugar factories Ltd have suggested wheeling charges should be levied at 2% of energy injected into the grid. Banking facility should also be allowed to the cogenerator for own consumption upto 12 months.
- SLDC suggested that applicability of losses for Bagasse based power plant should be the same as that applicable to open access users, so that SLDC can implement scheduling procedure accordingly and reduce the consequent complexity in energy accounting.
- Gujarat Urja Vikas Nigam Ltd and Torrent Power Limited have suggested that extra 10% of wheeling loss up to 11kv level and 18.75% below 11kv be allowed. GUVNL have also suggested the wheeling charge of 14 paise/unit up to 11kv level and 45 paise/unit below 11kv level.
- GETCO and Torrent Power Limited have suggested that non-levy of transmission and wheeling charges for renewable power purchase by the distribution licensee will not benefit of the distribution licensee. It would increase the retail tariff and cross-subsidy. The present order is silent on wheeling charges to be levied by the distribution licensee for captive use and third party sale. They suggested that according to commercial principles such consumers are at par with other consumers and any relaxation of wheeling charges may be contrary to the provisions of section 42 of Electricity Act, 2003.
- The Torrent Power Limited suggested that no banking facility should be allowed for self use or for third party sales.

Commission's Decision

The Commission had proposed the transmission and wheeling charges in line with the Wind and Solar energy tariff.

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. As such, the Commission decides that the transmission and wheeling charges applicable to captive users as well as third party sale shall be as proposed in the discussion paper, which is as under:

(a) Wheeling of power to consumption site at 66 KV voltage level and above.

The wheeling of electricity generated from the Bagasse based co-generation to the desired location(s) within the State shall be allowed on payment of transmission charges and transmission losses applicable to normal Open Access Consumer.

(b) Wheeling of power to consumption site below 66 KV voltage level

(i) The wheeling of electricity generated from the Bagasse based co-generation, to the desired location(s) within the State, shall be allowed on payment of transmission charges, applicable to normal Open Access Consumer and transmission and wheeling loss @ 10% of the energy fed to the grid. The above loss is to be shared between the transmission and distribution licensees in the ratio of 4:6.

(ii) The wheeling of electricity generated by small investors, having capacity of below 5 MW in the State, to the desired location(s), shall be allowed on payment of transmission charges, applicable to normal open access consumer, and transmission and wheeling

losses @ 7% of the energy fed to the grid. The above losses are to be shared between the transmission and distribution licensees in the ratio of 4:3.

Bagasse based co-generation plant owner, who desires to wheel electricity to more than two locations shall pay 5 paise per unit on energy fed in the grid to the Distribution company concerned in whose area power is consumed in addition to above mentioned transmission charges and losses, as applicable.

(c) Injection at 11 KV and drawl at 11 KV and below voltage level

When the point of injection and drawl at 11 KV or below voltage level lies within the same distribution area, the user shall bear wheeling loss at 6% and pay wheeling charges at 5 paise per unit.

The transmission losses for wheeling of power generated by Bagasse based co-generation plants at 66 KV and above levels, has been kept the same as that applicable to other Open Access users. However, for wheeling at lower voltage levels, the applicable losses are kept lower in view of the small size of plants and to promote generation from such renewable sources.

So far banking of Bagasse based cogeneration is concerned, it is to clarify that the Bagasse based cogeneration is firm in nature and schedulable. Hence, no banking is allowed on it.

5.2 Security Deposit

GETCO, being the State Transmission Utility (STU), is responsible for development of transmission network in the state. At the same time to utilize the resources optimally, it is essential to ensure seriousness of the project developers towards Commission of project in time. While timely completion

of power evacuation system for such Bagasse based cogeneration project is essential, timely execution of Bagasse based co-generation project is also equally important. Non-completion of or delays in execution of projects leads to idling of transmission resources. Thus, to assure GETCO about seriousness of Bagasse based generation projects, it has been proposed that the project developer shall be required to furnish a Bank Guarantee of Rs. 5 lakhs/MW to GETCO. The Bank guarantee shall be forfeited if the project is not commissioned within four years.

Suggestion of the Stakeholders

National Federation of Co-operative Sugar Factories Ltd and Gujarat State Federation of Co-operative sugar factories Ltd. have suggested that Co-operative institutions need not be required to pay the security deposit. Gujarat Urja Vikas Nigam Ltd and Gujarat Energy Transmission Corporation Limited suggested that the period for completion of Bagasse based cogeneration projects cannot be more than 6 months and Commission may revise the tenure of 4 years to 6 months. GUVNL suggested distribution licensee/GUVNL may be allowed to collect additional security deposit of Rs. 5 lakhs/MW and the security deposit will be forfeited if project developer failed to achieve Scheduled Commercial Operation Date.

Commission's Decision

While it is the duty of GETCO to create necessary infrastructure for transmission system for evacuation of power generated by Bagasse based co-generators, in case the project developers fails to complete the project and evacuation system up to GETCO interconnection point within the stipulated time frame, the infrastructure created by GETCO remains unutilized and the

burden of network charges is borne by other consumers. Hence the Commission does not agree to any change in the provisions regarding security deposit.

So far as the time period for completion of the project is concerned, the biomass based power projects consist of boiler, turbines, condensers and other ancillary units like conventional power plants and their gestation period is about 3-4 years. Hence the time period provided in the discussion paper for security deposit is essential to match gestation period.

So far as additional deposit for distribution licensees is concerned it is unfair to impose security deposit on above count because the energy generated from such project is consumed by the existing consumers and no additional distribution network are to be created. As such, the Commission does not agree to collection of any additional security deposit by the distribution licensee.

5.3 Sharing of CDM benefit

The Commission decides that the mechanism for sharing of CDM benefits shall be as per the recommendation made by the Working Group for Renewable Energy Generation constituted by the Forum of Regulators and as per the CERC (Tariff for Renewable Energy Sources) Regulations, 2009, which is as under:

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

the developers and the consumers, in the sixth year. Thereafter, the sharing of CDM benefits should remain equal till the time that benefit accrues."

5.4 Pricing of Reactive Power

The Commission had proposed that the reactive energy pricing should be uniform for all types of renewable sources. As such, the Commission decides that the tariff for reactive energy drawl by Bagasse based cogeneration shall be the same as that for solar or wind generators, which is as under.

10 paise/ KVARH	For the drawl of reactive energy at 10% or less of the net energy exported.
25 paise/kVARH	For the drawl of reactive energy at more than 10% of the net active energy exported.

5.5 Third Party Sale and Cross-subsidy Surcharge

It has been proposed that third party sale under Open access transactions carried out using generation from renewable sources shall be exempted from levy of cross-subsidy surcharge under section 42 (2) of the Electricity Act, 2003. However, no banking facility shall be provided for third party sale.

Suggestion of the Stakeholders

GUVNL and Torrent Power Ltd have suggested that cross-subsidy surcharge for third-party sale under open access transactions should be made applicable.

Commission's Decision

Keeping in view the climate change issue, promotion of non conventional energy sources is required to be encouraged. Hence, the Commission decides that no cross subsidy surcharge is to be levied on third party sale/ purchase of Bagasse based cogeneration.

5.6 Metering

Metering and communication facilities shall be provided by the project developer in accordance with the following:

1. Central Electricity Authority (Installation and Operation of Meters) Regulations 2006.
2. Intra-State ABT Order dt.11th August, 2006 and subsequent amendments dated 3.04.2010.
3. Grid Code, 2004 (Notification No.5 of 2004) of GERC.
4. Distribution Code, 2004 (Notification No.6 of 2004) of GERC
5. Open Access Regulation, 2005.

ABT compatible energy meter is to be installed at generators' end and if the power is to be wheeled to consumer premises, then ABT compatible meter is to be installed at the consumer premises also.

Suggestion of the Stakeholders

Gujarat Energy Transmission Corporation Limited suggested that RTU which is installed by the project developer requires to link with communication link up to nearest GETCO Sub Station where PLCC(Power line carrier communication) /Radio link connectivity exists. The maintenance of these RTU and communication link their connectivity, up to GETCO substation shall be responsibility of the Bagasse developers.

Commission's Decision

The Commission finds no justification in allowing any deviations from the regulations and codes prescribed by the CEA and the Commission.

As regards the suggestions of GETCO relating to maintenance of RTU and connectivity up to GETCO, the Commission agrees that maintenance of any equipment/ system is the responsibility of the party providing and owning such equipment/ system.

5.7 Applicability of Intra-State ABT

Generation from Bagasse based cogeneration projects is predictable and hence, can be scheduled in accordance with ABT guidelines. Bagasse based cogeneration plants are, therefore, covered under the ambit of Intra-State ABT order. In other words, they are governed by the provisions of the Intra-State ABT Order of the Commission. Such plants have to install Intra-state ABT Compliant meters at their place for energy accounting and Remote Terminal Unit (RTU) to facilitate SLDC in real time monitoring.

5.8 Merit Order Dispatch/ Must Run Status

The Commission has considered that although the Bagasse based co-generation projects will need to follow the scheduling and dispatch procedure as per the Intra-State ABT order of the Commission, Merit Order Dispatch principles will not be applied to such projects on account of the small size of the plants and promotional aspect of renewable sources of energy.

Suggestion of the Stakeholders

Gujarat Urja Vikas Nigam Limited and SLDC have suggested that the Bagasse based power plant of 10 MW and higher size should be covered under merit order principle, scheduling and dispatch procedure and UI mechanism as per CERC Regulations. SLDC suggested that in case whenever frequency is above 50.3 Hz and when emergency appears, SLDC may be allowed to restrict generation from such plants.

Commission's Decision

According to the Electricity Act 2003, promotion of cogeneration and generation from renewable sources of energy is one of the important tasks assigned to the SERCs. Bagasse based cogeneration is also important to address the climate change issue. As such, the Commission do not favour to put such generation under merit order dispatch. Regarding, SLDC's suggestion, this is to clarify that under emergency situations, the SLDC is supreme authority for secure operation of the State Power System. But this power has to exercised only in emergency situations and the generation from Bagasse based cogeneration plants cannot be restricted to control high frequency operation in day to day operations.

5.9 Monitoring Mechanism for the use of Fossil and Non-fossil fuel

In order to ensure that the use of fossil fuel is within the prescribed limits, it is essential to create necessary mechanism for monitoring the usage of fossil and non-fossil fuel utilized by the Bagasse based cogeneration projects. Accordingly the Commission prescribes the following:

Fuel usage statement

[A] The Commission nominates the Gujarat Energy Development Agency (GEDA) as the nodal agency for monitoring the usage of fossil fuels by the Bagasse based co-generators. The project developer shall furnish a monthly fuel usage statement and monthly fuel procurement statement duly certified by Chartered Accountant to the procurer and the nodal agency for each month, along with the monthly energy bill. The statement should cover details, such as:

i. Quantity of fuel (in tonnes) for each fuel type (Bagasse fuel and fossil fuel) consumed and procured during the month for power generation purposes,
ii. Cumulative quantity (in tonnes) of each fuel type (Bagasse 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 tones),
vi. Receipt of fuel quantity (in tonnes) at the power plant site and,
vii. Closing fuel stock quantity (in tonnes) for each fuel type (Bagasse 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 Bagasse based co-generation project.

[B] Information system for creation of Database

It is necessary to create data-base for further review of the technical/ financial parameters for next tariff order. Therefore, project developers shall have to keep records of the following items 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.

Suggestion of the Stakeholders

The GUVNL suggested to specify penalty equivalent to 1.5 times of difference between cost paid by distribution licensee for sourcing renewable energy from alternate source to meet the RPO Obligation minus preferential tariff determined by Commission.

Commission's Decision

It is already provided in the discussion paper that the project developer should provide the data to GEDA whom the Commission proposed as nodal agency. So far as penalty is concerned, the same should be decided by the Commission in accordance with the provisions of the Act. It is also provided

that in case of non-compliance observed by the Nodal Agency, they will report it to the Commission and the Commission will decide about the compensation, if any, after seeking the views of all concerned.

6.0 Applicability of the Order

This order shall be applicable with effect from **1st June, 2010**. The tariff determined by this order shall be applicable to all the Bagasse based power projects commissioned during the control period of this order.

Sd/-

[Dr. P.K.MISHRA]
Chairman

Sd/-

[PRAVINBHAI PATEL]
Member (T)

Place: Ahmedabad
Date: 31/05/2010

Annexure I

Comments received from the following Stakeholders for the Bagasse based cogeneration projects.

1. National Federation of Cooperative Sugar Factories Ltd
2. Gujarat Urja Vikas Nigam Limited
3. Cogeneration Association of India
4. Gujarat State Federation of Co operative sugar factories Ltd.
5. Gujarat Energy Transmission Corporation Limited/
6. State Load Dispatch Centre
7. Torrent Power Ltd.

Annexure II

List of participants in the hearing on tariff for Bagasse based cogeneration projects

1. **National Federation of Cooperative Sugar Factories Ltd**

   Shri D.K.Jauhri

   Shri A.K.Jain

2. **Gujarat Urja Vikas Nigam Limited**

   Shri N.A.Patel

   Shri A.N.Khambhata

3. **Gujarat State Federation of Co operative sugar factories Ltd.**

   Shri A.B.Patel

   Shri M.M. Patel

   Shri K.V.Patel

4. **Gujarat Energy Transmission Corporation Ltd/State Load Dispatch Centre**

   Shri J.D.Tamhane

   Shri N.H.Suthar

   Shri K.J.Bhuva

5. **Directorate of Sugar, Gandhinagar**

   Shri J.K.Fakir

ANNEXURE III

Two-part Tariff for the Bagasse based cogeneration projects to be commissioned during FY 2010-11				
Year	Fixed Levelised Tariff	Fuel Cost	Total Tariff	
			Without Tax Benefit	With Tax Benefit
1	1.66	2.10	3.76	3.71
2	1.66	2.21	3.87	3.82
3	1.66	2.32	3.98	3.93
4	1.66	2.43	4.09	4.04
5	1.66	2.55	4.21	4.16
6	1.66	2.68	4.34	4.29
7	1.66	2.82	4.48	4.43
8	1.66	2.96	4.62	4.57
9	1.66	3.10	4.76	4.71
10	1.66	3.26	4.92	4.87
11	1.66	3.42	5.08	5.03
12	1.66	3.59	5.25	5.20
13	1.66	3.77	5.43	5.38
14	1.66	3.96	5.62	5.57
15	1.66	4.16	5.82	5.77
16	1.66	4.37	6.03	5.98
17	1.66	4.59	6.25	6.20
18	1.66	4.82	6.48	6.43
19	1.66	5.06	6.72	6.67
20	1.66	5.31	6.97	6.92

ANNEXURE IV

Two-part Tariff for the Bagasse based cogeneration projects to be commissioned during FY 2011-12				
Year	Fixed Levelised Tariff	Fuel Cost	Total Tariff	
			Without Tax Benefit	With Tax Benefit
1	1.66	2.21	3.87	3.82
2	1.66	2.32	3.98	3.93
3	1.66	2.43	4.09	4.04
4	1.66	2.55	4.21	4.16
5	1.66	2.68	4.34	4.29
6	1.66	2.82	4.48	4.43
7	1.66	2.96	4.62	4.57
8	1.66	3.10	4.76	4.71
9	1.66	3.26	4.92	4.87
10	1.66	3.42	5.08	5.03
11	1.66	3.59	5.25	5.20
12	1.66	3.77	5.43	5.38
13	1.66	3.96	5.62	5.57
14	1.66	4.16	5.82	5.77
15	1.66	4.37	6.03	5.98
16	1.66	4.59	6.25	6.20
17	1.66	4.82	6.48	6.43
18	1.66	5.06	6.72	6.67
19	1.66	5.31	6.97	6.92
20	1.66	5.57	7.23	7.18

ANNUXURE V

Two-part Tariff for the Bagasse based cogeneration projects to be commissioned during FY 2012-13				
Year	Fixed Levelised Tariff	Fuel Cost	Total Tariff	
			Without Tax Benefit	With Tax Benefit
1	1.66	2.32	3.98	3.93
2	1.66	2.43	4.09	4.04
3	1.66	2.55	4.21	4.16
4	1.66	2.68	4.34	4.29
5	1.66	2.82	4.48	4.43
6	1.66	2.96	4.62	4.57
7	1.66	3.10	4.76	4.71
8	1.66	3.26	4.92	4.87
9	1.66	3.42	5.08	5.03
10	1.66	3.59	5.25	5.20
11	1.66	3.77	5.43	5.38
12	1.66	3.96	5.62	5.57
13	1.66	4.16	5.82	5.77
14	1.66	4.37	6.03	5.98
15	1.66	4.59	6.25	6.20
16	1.66	4.82	6.48	6.43
17	1.66	5.06	6.72	6.67
18	1.66	5.31	6.97	6.92
19	1.66	5.57	7.23	7.18
20	1.66	5.85	7.51	7.46