Uttar Pradesh Electricity Regulatory Commission

2nd Floor, Kisan Mandi Bhawan, Vibhuti Khand, Gomti Nagar, Lucknow – 226010

Order on suo moto proceedings in the matter of Terms and Conditions of Supply and Tariff for Captive Generating Plants and Renewable and NCE source based plants

1. Background

The existing Practice Directions for Captive Power Generation and Practice Directions for Renewable Energy Source Based Independent Power Producers were issued on 28.7.2000 for a period of five years. U.P. Electricity Regulatory Commission initiated the process of review of these Practice Directions in exercise of the powers conferred by Section 181 read with Section 9, 61, 86(b) & 86(e) of the Electricity Act, 2003 (Act 36 of 2003) and circulated a draft of the proposed U.P. Electricity Regulatory Commission (Practice Directions for Generation from Captive Generating Plants, Co-Generation, Renewable Sources of Energy and other Non-Conventional Sources of Energy) Regulations, 2005 for inviting comments, suggestions and objections from all the stakeholders.

2. Consultative Process

A notice was published in the newspapers on 8.4.2005 and simultaneously the draft was posted on Commission's website along with the concept paper. The Commission also circulated an approach paper on determination of tariff for Captive Generating Plants, Co-Generation, Renewable Sources of Energy and other NCE Source based Plants for inviting comments from all stakeholders.

All existing captive generating plant(s) and plants generating electricity from co-generation, renewable source of energy and other non-conventional energy sources were also requested to submit the data/information in respect of their operations in the prescribed formats. The comments on the Draft Regulations and the information required for the purpose of tariff were to be submitted within twenty days of publication of the public notice. On a request made by some stakeholders for extension of time for submission of comments, the Commission by public notice dated 3rd May 2005 extended the deadline for submission of comments on the draft regulations and the approach paper to 13.5.2005. Since the concerned generating plants had not submitted the desired information, the Commission also issued a notice under section 11(6) of the U.P. Electricity Reforms Act, 1999 read with section 94 of the Electricity Act, 2003 on 3.5.2005 directing all captive generating plant(s) and plants generating electricity from co-generation, renewable source of energy and other non-conventional energy sources to submit the required information by 13.5.2005. A list of public notices issued by the Commission in this regard is given is given in Annexure – I.

2.1 The following parties submitted their comments on the Draft Regulations:

1. UP Power Corporation Ltd (UPPCL) vide its Letter No.330/GM dated 13.5.2005. UPPCL also submitted a detailed proposal of tariff for co-generation of electricity from bagasse suggesting some modifications in their earlier proposal submitted vide letters No.678 dated 19.10.04, No.669 dated 15.10.2004 and No.617 dated 14.9.2004.

2. Triveni Engineering & Industries Ltd. submitting information vide letter dated 13.5.2005.

3. M/s K.M Sugar Mills Pvt. Ltd. submitting information vide letter dated 16.5.2005.

4. Co-generation Association of India submitting comments vide Letter dated 13.4.2005

5. UP Sugar Mills Cogen Association submitting comments on draft Practice Direction vide letters dated 10.5.2005 & 13.5.2005.

6. Noida Power Company Ltd. submitting comments on draft Practice Direction vide letter dated 5.5.2005.

7. M/s Continental Carbon India Ltd. submitting comments on draft Practice Direction vide letter dated 27.4.2005.

8. M/s Reliance Energy Limited vide letter dated 28.5.2005

2.2 The approach paper for determination of tariff for the aforesaid generating plants was circulated on 3rd June 2005 for inviting comments/objections/suggestions, supported with relevant data, from the interested parties and stakeholders within 15 days of publication of the public notice. The following parties submitted their comments on the Approach Paper:

1. Mr. B.B Jindal vide letter dated 17.6.2005
2. UP Sugar Mills Co-gen Association vide letter dated 20.6.2005 and 30.6.2005.
3. UPPCL vide letter dated 30.6.2005 referred to their letter No.330/GM dated 13.5.2005 for consideration.

2.3 The Commission, by a public notice dated 30.6.2005 published in the newspapers, fixed the public hearing in the matter of draft Practice Direction and the approach paper for determination of tariff as per the following schedule:

i. Bagasse Based Co-gen Plants - 5th July,05 at 11:00 Hrs.
ii. Captive, Renewable and NCE Plants - 5th July,05 at 15:00 Hrs.

3. Summary of Submissions made during the public hearing

The public hearing was held on 5th July 2005 in the Commission's Office at Kisan Mandi Bhawan. A list of participants is attached as Annexure – II

During the public hearing, Mr. Amit Kapur appeared on behalf of UP Sugar Mills Co-gen Association and made the following submissions:

a. The crushing season varies significantly across different parts of the state. The average crushing period is about six months and the plants could operate for another 1.5 to 2 months by storing/ procuring bagasse from alternate sources. The Commission should consider this aspect while fixing the target PLF and link the PLF with incentive and disincentive congruent to the industry practice,

b. The Commission should consider Auxiliary consumption at 10%,

c. The Commission should allow banking of power and specify the banking and the wheeling charges. The frequency for banking of power and drawing back may also be specified making the provision of banking effective and easy to implement,

d. The Commission should impose must run condition for operation of co-generation plant as they would be operating in the base load of the demand curve,

e. The plant might be allowed incentive to run on conventional fuels in off-season period when bagasse is not available.

f. The Commission should not apply competitive bidding guidelines in case of bagasse based co-generating plants as the Govt. of India in National Electricity Policy is not specific to co-generation and non-conventional sources of energy for procurement of power through competitive bidding.

g. The Commission should consider capital cost as Rs. 4 Cr./ MW because the actual capital cost is in the range of Rs. 3.5 Cr. to 3.65

Cr./MW for M/s. Triveni Engineering & Industries plants and Rs. 4.5 Cr. in case of M/s. EID Parry (India) Ltd.,

h. The Commission should consider Debt equity ratio of 70:30 for tariff determination.

i. Return on equity should be considered as 16% as Andhra Pradesh Electricity Regulatory Commission and the Karnataka Electricity Regulatory Commission have allowed such higher return. He also mentioned that Maharashtra Electricity Regulatory Commission has allowed 20% Return on Equity.

j. Interest on loan should be considered at 11%.

k. O & M Expenditure should be allowed at 3.5% of the capital cost.

l. The installation of transmission lines, its ownership and responsibility of O & M be specified and normative capital cost and O & M expenditure be fixed taking into consideration the cost to be incurred by the co-gen plants in constructing dedicated transmission lines because earlier the cost of transmission lines was shared equally between the plant and the licensee but in the present draft proposal it is fully loaded on the co-gen plants.

m. Depreciation @ 7.84% should be allowed as has been allowed by Andhra Pradesh Electricity Regulatory Commission.

n. Two months receivables should be considered for computing working capital and interest on working capital should be allowed at 12.5%.

o. The Commission may consider Station heat rate for the co-gen plants as 3700 Kcal/kWh.

p. Cost of bagasse be considered at current rate of Rs. 1000 to 1200 per MT

q. Incentive for generation might be allowed for bridging gap of demand and supply in peak and off peak and to meet transportation cost involved in procurement of bagasse from alternate sources.

r. Calorific value of bagasse may be considered as 2275 Kcal/kg.

s. Specific fuel consumption may be considered as 1.6 Kg/KWh.

t. Clear guidelines for payment of bills may be issued and payment through ESCROW might be considered.

u. The bagasse based co-gen plants should not be covered in the purview of ABT mechanism and if at all it is considered necessary to include these plants in the purview of ABT mechanism, the conditions for its applicability may be clearly defined.

The Commission observed that the O & M Expenditure proposed by the developers is significantly high as compared to conventional thermal plants. The representative of M/s. Triveni Engineering and Industries Ltd. clarified that the O & M Expenditure is high due to hiring of skilled staff for operation of the plant. The Commission directed the developers to justify the requirement of higher O & M expenditure at 3.5% of the capital cost in comparison of O & M expenditure required in the conventional plants. Mr. B.B Jindal submitted that there are common manpower resources in bagasse based co-gen plants and the sugar mill and as such high O&M was not justified. Mr. Jindal also argued that since the co-gen plant is a part of sugar mill, the capital cost of Rs. 4 Cr/MW is also not justified as some of the costs are shared with sugar mill. Mr. M.P Sharma, who appeared on behalf of NEDA, informed that Department of Sugar, Government of Uttar Pradesh gives 10% capital subsidy to the sugar mills and the same should be considered while fixing the Capital Cost.

NEDA submitted that existing guidelines for payment are sufficient but there are instances where these guidelines are not honored by UPPCL and requested the Commission to direct UPPCL to comply with the provisions of the existing Practice Directions till the time new directions come into force.

The Commission observed that the norms proposed for tariff of bagasse based co-gen plants are on higher side and directed the Association through Mr. Amit Kapur Advocate and the representative of the co-gen plants present in the hearing to submit the actual data in respect to their plants in the formats already provided to them.

The Commission provided an opportunity to UPPCL to make submission in view of the submissions made by Mr. Amit Kapur, Advocate. Mr. C.S Sharma, ED, UPPCL submitted that UPPCL had already submitted its proposal on tariff and the same might be considered. Mr. Sharma stated that 60% PLF might be considered against 52.5 % proposed by Mr. Amit Kapur since the plants operate at 95% capacity during crushing season and could achieve 60% PLF without any great difficulty. On enquiry from the Commission, Mr. Sharma denied to have actual data of PLF in respect to these plants. Mr. Amit Kapur submitted that it is possible to achieve 60% PLF by procuring bagasse from alternate sources. The Commission directed Mr. Amit Kapur and Mr. Kapur agreed to provide unit wise PLF of these plants. UPPCL submitted that 6 paisa incentive might be allowed for the non-seasonal generation.

The Commission also observed that the proposed station heat rate of 3700 Kcal/KWh was significantly high and amounts to wastage of fuel and did not reflect efficiency in operation by these generating plants. UPPCL submitted that the SHR of M/s. Triveni Engineering & Industries Ltd. is very low and the same might be considered. The representative of M/s. Triveni Engineering & Industries Ltd. submitted that the figure quoted by UPPCL was based on DPR, which stand revised to 3600 Kcal/KWh. On enquiry from the Commission, the representative of M/s. Triveni Engineering & Industries Ltd. clarified that the steam produced in the generating plant is extracted for use in sugar mill before feeding it to the turbine. Mr. Amit Kapur submitted that the Commission while deciding SHR should also consider the orders of other SERCs who have allowed SHR in the same range.

The Commission observed that the auxiliary consumption proposal for 10% was not an efficient proposition and industry should work towards bringing efficiency in its operations. The representative of M/s. Triveni Engineering & Industries Ltd. submitted that the auxiliary consumption in their plants is in the order of 10%. UPPCL submitted that the Commission may consider auxiliary consumption at 9% for fixing tariff. Mr. B.B Jindal argued that high percentage of auxiliary consumption should not be allowed because the sugar plants have some auxiliary equipment common to the sugar mill and the generating plant and as such the auxiliary consumption should be decided after deduction of the consumption meant for the sugar mill.

The Commission raised queries on the appropriate price of bagasse. As per Balrampur Sugar Mills, the price of bagasse ranges from Rs. 132 to 135 per Quintal and such a high price of the bagasse was due to the high demand created in the market by the paper mills. The Commission added that the concept in co-gen is to use the by-product for generation of electricity to realize better value. The representative of M/s Balrampur Sugar Mills submitted that they are purchasing 50% of the their bagasse requirement at higher price and bearing the transportation cost as well.

UPPCL submitted that the of bagasse was Rs. 500/MT during 2004-05 and normally 90% of bagasse requirement is met from the sugar operations and balance 10% is purchased from outside. Mr. M.P Sharma representing NEDA supported the high opportunity cost of bagasse proposed by the Association for determination of tariff.. Mr. Amit Kapur submitted that the price of the bagasse was based on the invoices submitted by the Association before the Commission along with the written submission on approach paper on tariff.

Mr. B.B. Jindal submitted that the recovery of Income Tax as passed through in tariff was contrary to the Law as it is the liability of the the firm to pay tax and its recovery through tariff would amount to generation of additional income in the hands of the Co-gen Plant Owner and would be liable to income tax. Mr. Amit Kapur defended the proposal for reimbursement of income tax at actual by citing the case of central generating stations where CERC has allowed similar practice. The Commission directed Sri. Kapur, Advocate to submit the exact position of law on the issue of income tax, raised by Mr. B.B Jindal. The Commission allowed seven days time to the Association to submit all the information.

Mr. M P Sharma, Specialist, NEDA submitted that UP has fair potential of canal based hydroelectric generation and it has engaged IIT, Roorkee for conducting a study and prepare detailed DPR's for development of such power stations with capacities below 3 MW. He requested the Commission to specify tariff for sale of electricity from such plants to the distribution licensees.

4. Renewable and NCE Plants

4.1. Background

The Electricity Act, 2003 specifically provides for promotion of Renewable and NCE sources and the role of the Commission as envisaged in the act under different sections is as follows:

a) Section 86 (1) (e) of the Electricity Act, 2003 provides that State Regulatory Commission would promote renewable and NCE sources.

b) Sec 86 (1) (e) of the Electricity Act, 2003 also provides the Commission would fix the quantity of non-conventional energy to be purchased as a percentage of total purchase from all sources by the licensee.

c) Section 86 (1) (a) of the Electricity Act, 2003 empowers the State Commission to fix the tariff for generating stations in the State.

The Commission is vested with power to make Regulation and Rules consistent with the Act to carry out the provisions of the Act under section 181 of the Electricity Act, 2003.

The Commission initiated the process for framing the regulations for Renewable and NCE sources based power plants and circulated the Draft Regulations and Approach Paper for inviting comments and objections from all stakeholders. The Commission is keen to frame the regulations and determine tariff for NCE sources broadly in line with the following principles:

- Transparency and interaction with the public, utility and developers.
- Balancing the interest of all stakeholders
- Consistency in approach
- Reducing Regulatory Uncertainties

4.2. Key Issues

The key issues involved in framing the regulations have been discussed in the following paragraphs.

4.2.1. Purchase of Power from NCE Plants

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

The Commission, in order to fix a reasonable percentage for the purpose of Section 86 (1) (e), has reviewed the proportion of electricity that is currently being procured from Renewable and other NCE sources and the available potential of generation of electricity from such sources.

NEDA, the Nodal agency for promotion of NCE projects in Uttar Pradesh, in its submission before the Commission, has indicated that the State has a potential of more than 1000 MW for Bagasse based Cogeneration Plants and the current installed capacity is around 100 MW which is likely to increase to 150 MW by the end of the current financial year. In terms of power procurement from these sources, UPPCL is currently purchasing around 170 MUs from cogeneration plants out of its total power consumption of around 41000 MUs, which works out to around 0.43%. In its proposal to the Commission, NEDA has recommended that it should be made obligatory for the distribution licensee to procure 10% of its total power consumption from Renewable and NCE source based plants.

The Commission after considering the potential of generation of electricity from renewable and NCE sources and the current installed capacities in the state, is of the view that it would be appropriate to make it obligatory for the distribution licensees to purchase 5 % of its total power consumption from Renewable and NCE sources based plants located within the state of Uttar Pradesh. Such purchase by distribution licensees shall however be subject to availability of power from such sources and therefore the distribution licensees shall not be penalized for failure to procure power from Renewable and NCE sources merely on account of non-availability of power from such sources.

4.2.2. Banking

The earlier practice directions issued by the Commission provided for banking of energy. The Commission is of the view that Banking of energy was necessary in the earlier practice directions as the developers had to avail this facility in absence of assured off take. Now, since the Commission has made it mandatory for the distribution licensee to purchase 5% of its power consumption from Renewable and NCE sources, the provision for banking of power would not be required.

4.2.3. ABT Implementation

In the draft regulations, the Commission has proposed to include Renewable and NCE source based plants in the ambit of intra-state ABT mechanism as and when it is introduced in the state. In its submissions before the Commission, UP Sugar Mills Cogen Association has requested the Commission to keep these plants outside the purview of ABT mechanism, as these are small projects.

The Commission is of the firm view that ABT mechanism is an effective mechanism for maintaining grid discipline and therefore all the plants and beneficiaries connected to the grid have to abide by the principle of ABT mechanism. The Commission would however consider the issue in greater detail while implementing ABT mechanism in the state and appropriate exceptions shall be made for solar and wind farm projects, as these projects would not be able to comply with the scheduling requirements due to their inherent characteristics.

4.2.4. Term of PPA

The Commission intends to formulate a Model PPA for all Renewable and NCE plants and the term of PPA would be a key issue while formulating the Model PPA. This becomes crucial in view of the front-loading of depreciation to enable the developers to repay the loans. The Commission would like to pass on the benefit of lower tariffs in the subsequent years to the consumers within the state and has therefore decided to fix the term of PPA as 20 years from the year of commissioning. The existing PPAs would be renewed in line with the Model PPA and such renewed PPAs shall be valid till 20 years from the year of commissioning of the plant.

4.2.5. Grid Connectivity & Dedicated Transmission Lines

The Commission has proposed grid connectivity at 132 KV for plants having a capacity of more than 10 MW and 33 KV for plants having lower installed capacity. NEDA, in its submissions during the hearing has requested for connectivity of solar projects at lower voltage (400V) for promoting the technology. UPPCL, in response to NEDA's submissions has suggested that NEDA should use these projects for supplying power to bulk consumers, as there would be operational issues in connecting these plants at lower voltage. The Commission has, therefore, decided to allow connectivity at 11 KV for renewable and NCE sources, in exceptional case except for bagasse based co-generation plants.

5. Tariff Determination for Renewable and NCE Sources based Plants

The Commission has considered the comments received on the approach paper and has also considered the submissions made during the public hearing. The Commissions decision on various issues raised in the objection and during the public hearing are as follows:

Bagasse/Biomass based Co-generation Plants

5.1. Capital Cost

UP Sugar Mills Cogen Association indicated a project cost of Rs. 4.0 Crs / MW, while UPPPCL considered a capital cost of Rs. 3.25 Crs / MW as reasonable for co-gen projects. M/s. Triveni Engineering and Industries Limited has furnished data for its co-gen plant commissioned in 2004-05 and the capital cost for the project works out to be Rs. 3.40 crs per MW.

The Commission in its discussions with the developers has also come across the issue of sharing of cost of dedicated transmission lines. The developers submitted before the commission that in past there have been delays in project implementation on account of delay in erection of dedicated transmission lines. The commission is of the view of that the project implementation will be faster in case the erection of dedicated transmission line is under the control of the developers. The Commission has, therefore, considered the capital cost per MW at Rs. 3.50 crore for Bagasse based Co-generation projects including the cost of dedicated transmission line including the cost of the electrical bay at the receiver's end.

5.2. Debt Equity Ratio

UP Sugar Mills Cogen Association as well as UPPCL have indicated a debt-equity ratio of 70:30 in their proposal. Financial Institutions consider debt-equity ratio as one of the key parameter for approving project loans. As most of the Financial Institutions insist on debt-equity ratio of 70:30, the Commission has considered debt-equity ratio of 70:30 for determination of Tariff.

5.3. Return on Equity

UP Sugar Mills Cogen Association has sought 16% Return on Equity (ROE) whereas UPPCL has proposed 14% return on equity.

During the public hearing, a clarification was sought on whether the ROE proposed by the Association and UPPCL is pre-tax or post-tax. The developers clarified that they have assumed that the distribution licensee shall reimburse income tax at actual, as is the practice in case of central generating stations.

The Commission is of the view that since the revenue from sale of power is a small proportion of the total revenue of the Sugar Plant, it will not be feasible for the distribution licensee to segregate the tax pertaining to the power generation activity. The Commission has therefore decided to consider ROE at 16% with an assumption that the additional cushion provided in ROE would take care of the income tax liabilities.

5.4. Interest on Term Loan

UP Sugar Mills Cogen Association has considered the interest on term loan at 11% whereas UPPCL has considered Interest on Loan as 10%. UPPCL has quoted lower interest rate on account of falling interest rates. Since the impact of falling interest rates is not being reflected in the interest rates of old projects, the association has considered slightly higher rate. The Commission is of the view that it would be appropriate to benchmark the rate of interest on term loan with the prime-lending rate of State Bank of India.
In view of the above, the Commission has considered 10.25% rate of interest on Term Loans for bagasse based cogen projects.

5.5. Plant Load Factor

UPPCL initially proposed 80 % PLF for recovery of full fixed cost but subsequently revised it to 60 % as these co-gen plants operate for 6-8 months. UP Sugar Mills Cogen Association has proposed 52.5% PLF based on 7 months of operations (Season period – 6 months and Off-season period – 1 month) at 90

% efficiency. However during the public hearing, the Association submitted that it is possible to achieve 60% PLF by purchasing bagasse from alternate sources. The Commission has therefore considered 60% PLF for determination of tariff for these plants.

5.6. Auxiliary Consumption

The Commission has examined the information filed by various developers in the this regard. As per these details, the auxiliary consumption varies from 8% to 11% for different projects. The Commission is of the view that compared to conventional power projects; the cogeneration projects have lesser auxiliary system. These projects should be operated efficiently to minimize losses and maximize production as provided in the Energy Conservation Act. Hence the Commission has decided to consider the auxiliary consumption at 8.5% only.

5.7. Fuel Price

The fuel for bagasse based co-gen plants is the Bagasse produced by crushing of sugar cane in the manufacture of sugar. UPPCL in its proposal has considered Bagasse price as Rs. 550/ MT (subsequently revised to Rs. 900/MT) while developers have sought price of Bagasse as Rs. 1000 to Rs. 1200 per MT. The Commission appreciates that the price of bagasse is the key parameter, which determines the viability of the co-generation project. The fuel for the Co-generation plant is virtually free during the crushing season. However, there is an opportunity cost involved in using bagasse for power generation.

The Commission appreciates that it will not be feasible to derive a linkage between price of sugar cane that is being fixed by the Government and the price of Bagasse. It was mentioned by one of the objectors that since the total cost of sugarcane is factored while fixing price of sugar, bagasse must be available at zero cost. The developers submitted that the Bagasse is also used in other industries like paper, cattle feed etc. and the price which they could fetch from sale of bagasse to other industries is an opportunity cost for the developers.

In the information furnished by the developers and UPPCL, the Gross Calorific Value of the Bagasse is around 2272 - 2290 Kcal / Kg except for KM Sugar Mills which has reported a GCV of 1800 Kcal/Kg. The Commission has considered Gross Calorific Value of Bagasse as 2275 Kcal / Kg as proposed by UPPCL tariff determination in its tariff proposal.

For determination of Bagasse price, Commission has considered equivalent heat value of coal. The Commission has considered the pithead coal cost of Rs. 900 per MT and calorific value of coal as 3400 kcal/kg to arrive at the fuel price linked to heat content. The fuel price in terms of Rupee/tonne equivalent to gross calorific value of 2275 kcal / kg works out to around Rs. 602 / MT. M/s. Triveni Engineering has submitted the average cost of Bagasse as Rs. 500 / MT in its Detailed Project Report. However, it has reported the actual purchase price of bagasse as Rs. 1318 /MT. The Commission appreciates that the developers have to purchase bagasse in the off-season period to achieve the generation targets and therefore would like to consider the weighted average of the notional cost of bagasse for crushing season and the purchase price of bagasse for off season as the effective cost of bagasse assuming purchase bagasse from alternate sources for 1.5 months. The Commission has therefore decided to consider price for Bagasse as Rs. 740 / MT.

5.8. Fuel Price Escalation

UPPCL and U. P. Sugar Mills Cogen Association have considered escalation in the fuel cost at the rate of 5%. Since the current rate of inflation is around 4%, the

Commission has decided to consider the escalation for fuel price at the rate of 4%.

5.9. Station Heat Rate

The Commission has examined the information furnished by the developers and the submissions made by UPPCL and have found that the station heat rate varies from 3000 Kcal/Kwh to 4493 Kcal/Kwh. Since the detailed project reports indicate that 20-30% of the steam produced from bagasse is used for the sugar manufacturing process, prorata adjustment for such usage need to be done to arrive at the cost of the power generation. The Commission has therefore decided to consider SHR as 3300 Kcal/Kwh for determination of tariff.

5.10. O & M Expenditure

UPPCL and UP Sugar Mills Cogen Association have proposed O & M Expenditure as 3 % and 3.5 % respectively. The amount proposed by UPPCL was based on a capital cost of Rs. 3.25 crore per MW whereas the amount proposed by UP Sugar Mills Cogen Association was based on a capital cost of Rs. 4 crore per MW. The CERC Guidelines for determination of tariff for Thermal Generating Stations provide for O & M Expenditure as 2.5 % of the capital cost. The Commission is of the view that the O & M Expenditure for Bagasse based Cogeneration Plants should not be significantly different from coal based thermal plants. The Commission provided an opportunity to the Association to submit the details of actual O & M Expenditure for existing plants and highlight the reasons to justify a higher rate of O & M Expenditure. The Commission has not received appropriate response from the developers for justifying higher O & M Expenditure. The Commission has therefore decided to consider O & M expenditure as 2.5 % of the project cost for the financial year 2005-06.

5.11. Escalation of O & M Expenditure

UPPCL and UP Sugar Mills Cogen Association have considered 5% annual escalation in O & M Expenditure. The Commission would however like to consider an escalation rate based on the current inflation rate. The current inflation rate is around 4% and therefore the Commission has decided to consider an annual escalation of 4% per annum which is in line with the escalation provided by CERC in its Guidelines for Tariff for Thermal Power Stations.

5.12. Depreciation and Advance against Depreciation

UP Sugar Mills Cogen Association has considered depreciation @ 7.84 % p.a. covering 90% of the value of the assets whereas UPPCL has proposed depreciation @ 7% p.a. for the first ten years and spreading the balance 20% depreciable cost over the remaining useful life of the asset. The Commission is of the view that the approach followed by UPPCL is in line with the CERC guidelines, which provide for advance against depreciation in the first ten years to enable loan repayments. The Commission has however decided to follow the approach prescribed in CERC guidelines and has considered depreciation @ 7.0 % inclusive of the provision for advance against depreciation for the first ten years and spread the remaining depreciable cost equally over the remaining useful life of the plant.

5.13. Interest on Working Capital

UP Sugar Mills Cogen Association has proposed interest on working capital @ 12.5% on two months bills receivable. The Commission is of the view that since the regulations provide for payment though Letter of Credit, the average realization period would be 45 days instead of 60 days proposed by the Association. The Commission has therefore considered 1.5 month bills receivables for working capital computation. Besides this, the Commission has considered one month O & M Expenditure as a part of the working capital as per CERC guidelines. Since bagasse is a by-product of the sugar manufacturing business, the cost of bagasse has not been considered in the working capital computation. The Commission has considered interest on the total working capital @ 10.25 % p.a. based on the Short term PLR of State Bank of India as on 1.04.2005.

5.14. Tariff

Taking into account the technical and financial parameters considered by the Commission in the preceding paragraphs, the fixed cost tariff for bagasse based co-generation plants would be as follows:

Year of operation	Non-escalating Fixed Cost (Rs / Unit)
1st	1.39
2nd	1.34
3rd	1.29
4th	1.24
5th	1.18
6th	1.13
7th	1.08
8th	1.03
9th	0.98
10th	0.93
11^{th} & above	0.53

The Escalating Fixed Cost for O&M for the financial year 2005-06 would be Rs. 0.18 per unit. The escalating fixed cost would be increased by 4% for every subsequent year.

The variable cost for bagasse based cogeneration plants is estimated as follows:

Financial Year	Variable Cost (Rs / Unit)
2005-2006	1.28
2006-2007	1.33
2007-2008	1.39
2008-2009	1.44
2009-2010	1.50

The Bagasse based cogeneration plants shall be entitled to a tariff with the component of non- escalating fixed cost based on the year of operation (n^{th} year) and escalating fixed cost and variable cost corresponding to the financial year of the operation.

Illustration : The tariff for a plant in the first year of its operation during 2005-06 would be Rs. 2.85 per unit i.e. sum of Non-escalating fixed cost (Rs. 1.39), Escalating fixed cost (Rs. 0.18) and Rs. Variable Cost (Rs. 1.28) and for the same year the tariff for a plant in third year of its operation would be Rs. 2.75 per unit i.e. sum of Non-escalating fixed cost (Rs. 1.29), Escalating fixed cost (Rs. 0.18) and Rs. Variable Cost (Rs. 1.28).

Mini/Micro hydel Plants

5.15. Capital Cost

During the presentation, M/s. NEDA submitted that the state has fair potential for canal based hydropower projects and it has engaged IIT Roorkee to conduct a detailed study and prepare a detailed project report for these projects. NEDA submitted that these projects have a slightly high capital cost but these are still viable as there is no fuel cost. The Commission agrees to the fact that the cost of smaller projects is likely to be more than that of the larger projects due to economies of scale. At the same time, the Commission is also aware of the fact that there is no major Relocation and Rehabilitation cost involved in such projects. The Commission has therefore considered a capital cost of Rs. 4.5 Crs / MW for such projects.

5.16. Plant Load Factor

NEDA has submitted that in case of Hydel power plants, the PLF depends mostly on monsoon, rainfall in the catchment area, changes in hydrology factor etc, apart from the size of the plant. NEDA has indicated a PLF of 35% as the generation of power is subject to the extent of water made available through the canal by the department for irrigation. However, the commission has come across cases in other states where such small hydro projects are operating at 90% PLF.

The Commission, therefore proposes a two tier tariff, distinguishing the plants which are operating up to 35% and above 35% PLF. The Commission has decided to consider a benchmark parameter of 35% as reasonable for computation of tariff based on cost plus approach.

5.17. Other Operational Parameters

The Commission has considered the following norms for the operational and financial parameters to determine tariff for such plants:

Parameter	Norm
PLF	35%
Auxiliary Consumption	1%
O & M Expense	2.5% for first year of operation with 4% escalation per annum for subsequent years
Debt Equity Ratio	70:30
Interest on Loan & Interest on Working Capital	10.25%
Working Capital	1.5 months billing
Useful life of the Project	20 years
Depreciation	SLM rate – 7 % p.a. for first ten ears and 2% p.a. for subsequent ten years

5.18. Tariff

Taking into account the technical and financial parameters considered by the Commission, the tariff for mini/Micro hydel power plants is estimated as follows.

Year of operation (n^{th} year)	**Tariff Rs / Unit**	**Year of operation (n^{th} year)**	**Tariff Rs / Unit**
1^{st}	3.39	11^{th}	1.64
2^{nd}	3.29	12^{th}	1.67
3^{rd}	3.19	13^{th}	1.69
4^{th}	3.09	14^{th}	1.72
5^{th}	2.99	15^{th}	1.75
6^{th}	2.89	16^{th}	1.77

7th	2.79	17th	1.80
8th	2.69	18th	1.84
9th	2.60	19th	1.87
10th	2.50	20th	1.90

The plants shall be entitled to a tariff based on the year of operation (n^{th} year). The above tariff is exclusive of the Royalty. The Commission has considered Royalty charges as pass-through and they will be paid directly by the Distribution licensees to GoUP. These charges have therefore not been factored in the tariff computation. The Commission would like to advise NEDA to follow up with the state government for waiver of royalty charges to encourage canal based hydro generating plants.

The Tariff indicated above will be applicable for the Power Plants up to PLF of 35% and where PLF during a settlement period exceeds 35%, only an amount of 21.5 paise (in place of the tariff indicated above) shall be paid for every unit delivered in excess of 35% PLF at generator terminals i.e. including captive and auxiliary consumption.

Other NCE Projects (except Bagasse/Bio-mass and Mini/Micro Hydel Plants.

5.19. Existing Tariff structure

The existing tariffs for other Renewable and NCE source based plants namely Wind, Solar, Bio-gas, Industrial Waste etc. are based on the Ministry of Power Guidelines. The existing guidelines provide for a tariff of Rs. 2.53 per unit for all other Renewable and NCE Source based Plants for 2001-02 as the base year with an escalation of 5 % p.a. for subsequent years.

5.20. Approved Tariff for other NCE Plants

The Commission has examined the feasibility of determining source specific tariff for these plants. Such determination of tariff would require sufficient data for such plants to determine the norms for their efficient operation. Since location of the plants have a significant bearing on their operating efficiency, it would not be possible to use data from other states to set norms for operation of these plants. Till date, very few such projects have been commissioned in the state and therefore it would appropriate to determine source specific tariff at a later date when sufficient data is available in respect of these projects. Till such time, the Commission has decided to approve Rs. 2.50 per unit for the year 2005-06 with an escalation of 4% per annum for subsequent years. The Commission appreciates that the cost of generation from few projects mainly Solar Energy Projects will be higher than the proposed tariff but the Commission is not in a position to allow a higher tariff as that will put additional burden on the consumers within the state.

6. Captive Generating Plants

6.1. Background

The Electricity Act, 2003 has liberal provisions with respect to setting up of captive power plants to secure reliable, quality and cost effective power and also to facilitate creation of employment opportunities through speedy and efficient growth of industry. The National Electricity Policy has recognized that a large number of captive and standby generating stations in India have surplus capacity that could be supplied to the grid continuously or during certain time periods. The policy recognizes the need of appropriate commercial arrangements between licensees and the captive generators for harnessing of spare capacity energy from captive power plants. Section 86 (1) (b) of the Electricity Act, 2003 provides that State Regulatory Commission would regulate electricity purchase and procurement process of distribution licensees including the price at which electricity shall be procured from the generating companies or licensees or from other sources through agreements for purchase of power for distribution and supply within the State. The Commission is vested with power to make Regulation and Rules consistent with the Act to carry out the provisions of the Act under section 181 of the Act, 2003.

The Commission has initiated the process for framing the regulations for Captive Generating Plants and circulated the Draft Regulations and Approach Paper for inviting comments and objections from all stakeholders. The Commission is keen to frame the regulations and determine tariff for Captive Generating Plants broadly in line with the following principles:

- Transparency and interaction with the public, utility and developers.
- Balancing the interest of all stakeholders
- Consistency in approach
- Reducing Regulatory Uncertainties

6.2. Tariff for Captive Generating Plants

6.2.1. Operating Parameters

The Commission has issued Generation Tariff Regulations and the operating parameters for plants having generating units with installed capacity of 200 MW and 500 MW have been specified therein. The Commission had issued these regulations after following due consultative process and examining comments received from all the stakeholders. The Commission has therefore decided to consider the operating and financial parameters for the captive generating plants in these categories based on the Generating Tariff Regulations. The Parameters considered for determining the tariff are as follows.

S. No.	Particular	Unit	200/210/250 MW Sets	500 MW and above sets
1	PLF	%	80	80
2	SHR	Kcal/kWH	2500	2450
3	Auxiliary Consumption	%	9	8
4	Specific Oil Consumption	ML/kWH	2	2
5	Debt Equity Ratio		70:30	70:30

The Commission has considered following norms for plants with lower installed capacities, as these plants are slightly inefficient in comparison to plant with higher installed capacities:

S. No.	Parameter	Unit	Below 200 MW
1	PLF	%	80
2	SHR	Kcal/kWH	2800
3	Auxiliary Consumption	%	10
4	Specific Oil Consumption	ML/kWH	4
5	Debt Equity Ratio		70:30

6.2.2. Capital Cost

The Commission has considered capital cost for the captive generating plants as Rs. 3.5 crore per MW.

6.2.3. Depreciation

The Generation Tariff Regulations provide for depreciation at the prescribed rates and over and above the regulations provide for advance against depreciation where the accumulated depreciation is lower than the accumulated loan repayment. The Commission intends to adopt similar principle for determining tariff for captive generating plants. This would result in an effective straight-line depreciation rate of 7% per annum for first ten year and spreading the remaining depreciable cost equally over the remaining useful life of the assets. This would facilitate repayment of loans by the captive users.

6.2.4. Return on Equity

The Generation Tariff Regulations provide for return on equity @ 14 % per annum. The Commission has examined this aspect in view of the fact that the Captive Generating Plants are commissioned by the captive users primarily with the purpose of consuming the power for self-use. The industrial users prefer these plants to the grid connections for better quality of supply. However form an overall prospective, these plants are inefficient when compared to higher capacity plants. This results in sub-optimal utilization of national resources. Moreover, as these plants are commissioned for supplying power for captive use, the full fixed cost is factored in the cost of the industrial operations or in a way is a sunk cost for the captive user. The Commission would not like to encourage additional capacities in this category by providing return on equity in line with the return assured to independent power producers. The Commission has therefore considered 9% return on equity for determination of tariff.

6.2.5. Interest on Loan

The Commission has considered interest on term loans as 10.25% for the captive generating plants, which is the current prime lending rate of State Bank of India.

6.2.6. Working Capital and Interest on Working Capital

The Commission has considered following components for computing the working capital requirement:

(i) Cost of Coal equivalent to one month consumption

(ii) Cost of secondary fuel equivalent to two months consumption

(iii) O & M Expenses for one month

(iv) Receivable equivalent to 1.5 months billing.

The Commission has considered interest on the total working capital @ 10.25 % p.a. based on the Short term PLR of State Bank of India as on 1.04.2005.

6.2.7. Fuel Cost

While most of the captive power plants with installed capacity of 3 MW and above use coal as the primary fuel, there are few diesel-based plants as well. The issues involved in determining tariff for diesel based captive plants are discussed separately. The Commission has considered coal cost as Rs. 900 per MT with a Gross Calorific Value of 3400 kcal/Kg as most of the captive plants are located at coal pitheads. However, the Commission would consider specific tariff approval for captive generating plants located at other locations. The commission has considered secondary fuel cost as Rs. 13000/KL and the GCV of secondary Fuel has been considered as 10,000 kcal/Ltr. The Commission has considered 4% escalation in the coal and oil prices in line with the current inflation rate.

6.2.8. Final Tariff for Firm (based on long term PPA) power

Taking into account the technical and financial parameters considered by the Commission in the preceding paragraphs, the fixed cost tariff for captive plants would be as follows:

Year of operation	Non-escalating Fixed Cost (Paisa / Unit)		
	Below 200 MW	200/210/ 250 MW Sets	500 MW and above sets
1st	95.07	93.77	92.71
2nd	91.13	89.85	88.86

3rd	87.19	85.95	85.01
4th	83.15	82.04	81.17
5th	79.72	78.14	77.33
6th	75.39	74.24	73.49
7th	71.47	70.35	69.66
8th	67.54	66.46	65.84
9th	63.63	62.57	62.02
10th	59.72	58.69	58.21
11th & above	30.00	29.00	29.00

The Escalating Fixed Cost for 2005-06 ~~the first year of operation~~ for different capacity of plants would be as given in the table below. The escalating fixed cost would be increased by 4% for every subsequent year of operation.

	Below 200 MW	**200/210/ 250 MW Sets**	**500 MW and above sets**
Escalating Fixed Cost (Paisa/unit)	13.87	13.72	13.57

The variable cost for coal based captive generating plants is estimated as follows:

Financial Year	**Variable Cost (Paisa/Unit)**		
	Below 200 MW	**200/210/ 250 MW Sets**	**500 MW and above sets**
2005-2006	86.95	75.00	72.74
2006-2007	90.43	78.00	75.65
2007-2008	94.05	81.12	78.68
2008-2009	97.81	84.36	81.83

2009-2010	101.72	87.74	85.10

The Captive Generating Plants shall be entitled to a tariff with the component of non escalating fixed cost based on the year of operation (n^{th} year) ~~charge~~ and escalating fixed cost ~~charge~~ ~~based on the year of operation (n^{th} year)~~ and variable charge corresponding to the financial year of the operation.

Illustration : The tariff for a 200 MW plant in the first year of its operation during 2005-06 would be Rs. 1.82 per unit i.e. sum of Non-escalating fixed cost (93.77 Paisa), Escalating fixed cost (13.72 Paisa) and Variable Cost (75 Paisa) and for the same year the tariff for a plant in third year of its operation would be Rs. 1.75~~6~~ per unit i.e. sum of Non-escalating fixed cost (85.95 Paisa), Escalating fixed cost (13~~4~~.72~~84~~ Paisa) and Rs. Variable Cost (75 Paisa).

6.2.9 Treatment of Surplus Power

In case of short term surplus power available for supply to distribution licensee over and above the supply committed in PPA or otherwise, the plant shall intimate the State Load Despatch Center (SLDC) about the availability of such surplus which shall in turn inform the same to the distribution Licensees . The distribution Licensees intending to purchase such power shall communicate their requisition to SLDC. The SLDC shall draw a schedule and confirm to the plant and the concerned Distribution Licensee (s). The payment for such surplus shall be made in the manner, the payment is done for unscheduled interchange of power under ABT except at rate specified in para 6.3.2 of this order.

6.3. Other Issues

6.3.1. Tariff for Diesel based Captive Generating Plants

There are few diesel based captive plants, which might be willing to supply their surplus power to the grid. The Commission has done preliminary analysis of the fuel cost of such plants based on the parameters specified by the Central Electricity Authority vide its Office Memorandum no. 1-3(2)/95-Secy/947 dated 14th December 1995. The per unit variable cost works out to around Rs. 4.00 and on adding the fixed component of Rs. 1.00 to Rs. 1.25 per unit, the effective tariff would be in the range of Rs. 5.00 to Rs. 5.25 per unit. The Commission is of the view that it will not be feasible for the Commission to allow the distribution licensees to procure power at such high rate, as this will unnecessarily burden the consumers of the state. The Commission however would allow the distribution licensees to buy power from such plants at the tariff applicable for purchase of infirm power from coal-based captive generating plants.

6.3.2. Tariff for Infirm Power

The Commission appreciates that the captive generating plants might have surplus power available for supply to the distribution licensees over and above the units committed in the PPA. Since the total fixed cost has been considered for determining tariff for supply of units agreed under the power purchase agreement, the additional cost for such supply would only be the fuel cost. The Commission is of the view that it needs to provide suitable incentive to the captive generating plants to encourage to work efficiently and generate more power. The Commission has therefore decided to determine the tariff for infirm power at the pooled variable cost for the state plants plus an incentive of Rs. 0.35 per unit. The pooled variable cost tariff for 2004-05 as per tariff order for 04-05 is Rs. 1.03 per unit. The same shall be increased by 4% for every subsequent year. Accordingly the tariff for 2005-06 would be Rs. 1.42 per unit.

(R.D. Gupta)	**(P.N. Pathak)**	**(Vijoy Kumar)**
Member	Member	Chairman

Place: Lucknow
Dated: 18th July, 2005

Annexure – I

Details of Public Notices Issued by the Commission

Public Notice	***Issue***	***Newspapers***
Dated 8.4.2005	Comments on Draft UPERC (Practice Direction for generation from captive generating plants, co-generation, renewable sources of energy and other Non-conventional sources of energy) Regulations,2005 & submission of information	Hindustan-Lucknow Amar Ujala-Agra, Meerut, Moradabad, Kanpur, Varanasi, Allahabad, Jhansi & Bareilly
Dated 3.5.05	Extension of time for providing Comments on Draft UPERC (Practice Direction for generation from captive generating plants, co-generation, renewable sources of energy and other Non-conventional sources of energy)Regulations,2005	Times of India-Lucknow Amar Ujala-Meerut, Bareilly, Agra Aaj-Varanasi Danik Jagran-Lucknow Kanpur
Dated 3.5.05	Extension of time for submission of information	Times of India-Lucknow Amar Ujala-Meerut, Bareilly, Agra Aaj-Varanasi Danik Jagran-Lucknow Kanpur
Dated 3.6.05	Comments on Approach paper for determination of tariff for captive generation, non-conventional amd renewable energy	Times of Indiaall editions Amar Ujala-all editions

	sources	
Dated 30.6.05	Oral Submission in the above matters.	Hindustan-Lucknow edition Dainik Jagran-Lucknow edition

Annexure – II

List of People who were present in the hearing on 5th July 2005

(a) Hearing on issues relating to co-generation

(i) Sri. Ashish Agarwal, Sri. Rakesh Seth and Sri. Sameer Sinha on behalf of M/s. Triveni Engineering and Industries Ltd.,

(ii) Sri. Amit Kapur, Advocate on behalf of M/s UP Sugar Mills Co-gen Association,

(iii) Sri. Rajesh Verma on behalf of M/s Ramgarh Chini Mill,

(iv) Sri. R.K Chakravarti, Secretary, UP Sugar Mills Co-gen Association ,

(v) Sri. B.D Banerjee on behalf of M/s Balrampur Chini Group,

(vi) Sri. R.K Gupta on behalf of M/s K.M Sugar Mills Ltd.,

(vii) Sri. D.S Verma, Executive Director and Sri. HarishChandra , Advisor (Power) on behalf of IIA,

(viii) Sri. M.P Sharma, Specialist, NEDA,

(ix) Sri. Durga Prasad,

(x) Sri. B.B Jindal, Freelancer Consultant,

(xi) Sri. Alok Agarwal, Executive Engineer, UPPCL,

(xii) Sri. O.P Malhotra, GM (PPA), UPPCL, and

(xiii) Sri. G.S Dhirani, Secretary General, Cold Storage Association, UP.

(b) For hearing on issues relating to Captive, Renewable and Non-Conventional Sources of Energy

(i) Sri. S.P Dixit, DGM (Commercial), Sri. O.P Malhotra, GM (PPA), Sri. C.D Gupta, Executive Engineer (Commercial) and Sri. S.P Pandey Executive Engineer (PPA) on behalf of UPPCL,

(ii) Sri. Amit Mohan Prasad, Director and Sri. M.P Sharma Specialist, on behalf of NEDA, and

(iii) Sri. G. S. Dhirani, Secretary General, Cold Storage Association, UP.