Before the Karnataka Electricity Regulatory Commission, Bangalore

Dated 11th December, 2009

Present:
1. K.P. Pandey, Chairman
2. Sri Visvanath Hiremath, Member
3. Sri K. Srinivasa Rao, Member

In the matter of Determination of Tariff in respect of Renewable Sources of Energy

Preamble;

1. Section 62(1) of the Electricity Act 2003 empowers the Commission to determine the tariff for supply of electricity by a Generating Company to a Distribution Licensee in accordance with the provisions of the Act. Section 61 of the said Act further provides that, the Commission shall specify the terms and conditions for determination of tariff and in doing so, shall be guided by the principles listed in clauses (a) to (i) of the said section. Accordingly, and in pursuance of section 86(1)(e) read with section 181 of the Electricity Act 2003, the Commission has issued KERC (Power Procurement from Renewable Sources by Distribution Licensee) Regulations 2004 vide Notification No. S/03/1 dated 27th September 2004. The Regulation was amended vide Notification dated 23rd January 2008.

2. Clause 5.6 of the said regulations stipulates that, the following procedure shall be followed by the Commission for determination of Tariff for renewable energy projects:

i. Invite tariff proposals from Licensees/Generating companies for various categories of renewable energy projects;

ii. Inviting Public response on the proposals of the Licensee/ Generating Companies;

iii. Public hearing on the above;

iv. Issue order on the Tariff for the purchase of electricity from renewable sources.

3. As per clause 5.8 of the KERC (Power Procurement from Renewable Sources by Distribution Licensee) Regulations 2004, the Tariff determined by the Commission is subject to review after 5 years. The revised tariff shall be applicable to agreements to be entered into after the date of review.

4. Pursuant to Clause 5.6 (i) of KERC (Power Procurement from Renewable Sources by Distribution Licensee) Regulations 2004 and all other powers enabling it under the EA 2003, the Commission, duly complying with the procedure, had determined the tariff applicable to renewable sources of energy namely wind, mini-hydel, Co-generation & Bio-Mass projects vide its order dated 18.1.2005 as under:

   Wind: Rs. 3.40 per unit without escalation,

   Mini-Hydel; Rs. 2.80 per unit without escalation,

   Co-generation : Rs. 2.80 per unit with 2% per annum simple escalation,

   Bio-Mass: Rs. 2.85 per unit with 2% per annum simple escalation

While determining the above tariff, the Commission had adopted the following parameters:

Parameter	Mini-Hydel	Wind	Co-Gen	Bio-mass
Project Cost-Rs. Lakhs/MW	390	425	300	400
Debt: equity	70:30	70:30	70:30	70:30
RoE	16%	16%	16%	16%
Interest on Term Loan	11%	11%	11%	11%
Depreciation Rate	7% SLM	7% SLM	7% SLM	7% SLM
MAT on RoE	7.5%	7.5%	7.5%	7.5%
PLF	30%	26.5%	60%	75%
O& M expense including insurance as % of project cost	1.5%	1.25%	3%	4%
O & M escalation per annum	5%	5%	5%	5%
Interest on working capital on two months bill	12.5%	12.5%	12.5%	12.5%
Auxiliary Consumption	0.5%	0.5%	8%	9%
Fuel price-Rs./ Metric Ton	NA	NA	800	1000
Fuel Cost escalation per annum	NA	NA	5%	5%
Specific fuel Consumption-kg/unit	NA	NA	1.6	1.16

The tariff so determined in the order is applicable for a period of 10 years from the date of commercial operation of the plants.

5. As per the Regulations mentioned in para-3, the Commission shall specify the quantum of purchase of electricity from renewable sources of energy by a distribution licensee in his area of supply. The quantum specified is as under:

BESCOM,MESCOM &CESC- 10%
HESCOM, GESCOM & Hukeri Society 7%

6. The Central Electricity Regulatory Commission has issued CERC (Terms & Conditions for Tariff Determination from renewable energy sources) Regulations 2009, on 16th September 2009 in exercise of its powers conferred under section 61 read with section 178 of the Electricity Act 2003 and clause 6.4 of the tariff Policy.

7. M/s REDAK, has filed a petition No. OP/28/2008, praying for initiating action to invite tariff proposals for mini-hydel projects as per Regulation 5.61 of KERC (Power Procurement from Renewable Sources by Distribution Licensee)

Regulations, 2004. taking into account the period of review of 5 years fixed in the Regulations. The Commission also decided to dispose of the petition filed by REDAK along with the issue of order fixing the new tariff for all the renewable sources of energy.

8. The Commission, after considering the submissions of REDAK and requirement to review the rates determined by the Commission as per the Regulations, ordered to invite tariff proposals for various categories of renewable energy projects, namely, Wind, Mini-Hydel, Co-generation & Biomass projects, from the Stakeholders, vide its notification-dated 09.02.2009. The Commission also published the notice in the following newspapers:

    a. Times of India dated 10.02.2009.
    b. Deccan Herald dated 10.02.2009.
    c. Samyuktha Karnataka dated 10.02.2009.
    d. Udayavani dated 10.02.2009.
    e. Vijay Karnataka dated 10.02.2009.

9. In response to the above invitation, 37 companies /Associations/ Developers including KPTCL/KREDEL/ESCOMs, have filed their tariff proposals/suggestions. A list of companies, which have filed the tariff proposals/suggestions, is enclosed as **Annexe-1**. KREDL, the nodal agency in the State, has furnished operational and financial parameters for renewable sources.

10. To elicit detailed views on the written submission/ suggestion, the Commission held public hearing on 09.10.2009. The representatives of the Developers/ Associations/ Generating Companies made oral submissions in addition to the written submission. The list of persons who made oral submissions in the hearing, is enclosed vide **Annexe-2.**

11. The Commission appreciates the active participation of stakeholders in these proceedings. However, it is regrettable to note that except sending written

views, the ESCOMs of the State have not taken any interest, which was expected of them. ESCOMs shall have to keep in mind that, they are public utilities and have a duty to protect public interest in general and consumers in particular. The Commission, however, has endeavoured to give a fair deal to all the stakeholders, bearing in mind the consumers' interest of getting the quantity & quality power at a reasonable cost.

In the above context & circumstances, the Commission directs ESCOMs to commence maintaining the database of PLF of renewable sources from whom the power purchase is made. They are also directed to maintain the data relating to capital cost of all future plants with whom, ESCOMs may sign the PPAs. For this purpose the generators shall furnish to ESCOMs, the audited data of completed cost of the project. These details shall be made use of by ESCOMs as and when required.

12. **After duly considering written & oral submissions of all the stakeholders, the Commission hereby issues the following Order:**

O R D E R

I. Scope of the present Tariff determination:

a) The Tariff determined in this order is applicable to all the new renewable energy projects, which are entering into power purchase agreements on or after 01.01.2010. The Commission, in this Order, has also decided about the tariff applicable to the projects, which have completed 10 years of agreement period, as no agreed tariff is available after 10 years.

b) This order shall not be applicable to electricity generated by Solar, Bio-mass (gasification technology), waste-to-energy projects and projects not specifically covered under this order.

II. Common Issues:

The following issues are common to all the four categories of the renewable sources of energy. The decision of the Commission on each of the issues is indicated as under:

(i) Tariff to be single part or two part:

Considering the size of the projects/ fuel used in the generation of renewable energy, the Commission decides to continue the existing single part tariff for all renewable sources of energy including Co-generation projects.

(ii) Factoring of Incentives allowed by the Government in tariff computations

The Commission in its earlier order had decided not to factor in the incentives/subsidies for tariff Computations as a promotional measure. The Commission continues with the same policy while passing this order.

(iii) Sharing of Clean Development Mechanism (CDM) benefits-

The Commission in its earlier order dated 18.01.2005 had decided not to introduce a mechanism for sharing of CDM benefits between developers & the purchasers. However, the Central Electricity Regulatory Commission (CERC), in its Regulations dated 16.09.2009 has introduced sharing of CDM benefits. The Commission decides to adopt the same, which are detailed below:

a) 100% of gross proceeds on account of CDM benefit are to be retained by project developer in the first year after the date of commercial operation of the generating station,

b) In the second year, the share of beneficiaries shall be 10% which shall be progressively increased by 10% every year till it reaches 50%, where after, the proceeds shall be shared in equal proportion by the generating companies and the beneficiaries.

(iv) Wheeling charges, Surcharges, Banking in the case of third party sales-

For the third party sale of the energy generated through the renewable sources of energy, the charges as determined by the Commission from time to time shall be applicable.

(v) Merit Order Dispatch

The Commission, in its earlier order had decided that, merit order despatch principle shall not be applied for power purchases from renewable sources for the reasons that the tariff determined is a single part tariff and applying the merit order would not be conducive to the promotion of these sources of energy.

Further, CERC in its Regulations dated 16th September 2009, have specified that, except for Biomass power plants with an installed capacity of 10 MW and above, and non-fossil fuel based co-generation plants shall be treated as must run power plants and shall not be subject to merit order dispatch.

In view of the above, the Commission decides not to apply Merit order dispatch for all types of renewables. However, Biomass power plants and Co-generation plants with an installed capacity of 25 MW & above, shall be subject to scheduling.

III. Commission's Analysis on Tariff Proposals:

The Commission has analysed the proposals/suggestions of the KPTCL/ESCOMs, KREDL and other stakeholders, duly keeping in view, the comments/views received through written submissions and oral submissions made during the public hearing.

A. Common Parameters:

In respect of the following financial parameters, which are common to all the categories of renewable sources of generation, the Commission has decided to apply them uniformly for all renewable sources.

(1) Debt Equity Ratio (DE Ratio):

The Commission had adopted a debt equity ratio of 70:30 in its earlier order. Most of the stakeholders have submitted in favour of the above DE Ratio. KREDL has also proposed a DE Ratio of 70:30 The CERC Regulations also specify the same.

In view of the above, the Commission decides to continue the existing Debt Equity Ratio of 70:30.

(2) Return on Equity (RoE)

The rate of return as per CERC Regulations, as proposed by KREDL & other Stakeholders are as under:

Organisations/Stakeholders	Wind	Mini-Hydel	Bio-mass	Co-Generation
CERC	Pre-tax 19% per annum for first 10 years Pre-tax 24% per annum from 11th year onwards.			
KREDL	16%	16%	14%	15%
Developers/Associations	16%- 24% Pre-tax	16%- 17.5% Post-tax	16%- 24%	16% post-tax
ESCOMs	15.5%	15.5%	15.5%	15.5%
KPCL	16%	16%	16%	-

The following developers have submitted the proposals on RoE as follows:

a. M/s Aura Mira: As CERC has modified RoE to 15.5 % for conventional plants, keeping a differential return of 2%, it has proposed RoE of 17.5% .
b. IWTMA: As per CERC Regulations for renewable.
c. InWEA: To give preferential treatment, RoE to be higher say 16% p.a. than that considered by CERC for Conventional Plants.
d. IWPA: A preferential tariff is only possible if extra RoE is provided. As CERC has specified 16% RoE for conventional plants, for renewables 17% shall be considered.
e. NSPL & Others: 18% shall be provided keeping 2% differential with respect to CERC norms as done earlier.
f. SISMA has requested to adopt CERC norms.
g. RKPPL has proposed 24%. Higher RoE is proposed to cover the risks associated with fuel.
h. MPPL, as per CERC norms.
i. ESCOMs: As CERC has modified RoE to 15.5 % for conventional plants, the RoE may be revised to 15.5%.

However, during the public hearing, stakeholders like IWPA etc., have requested the Commission to adopt RoE as per CERC Regulations.

The RoE approved in the neighbouring States is as under:

KSERC	TNERC	APERC	MERC
14%	19.85%	16%	20% for C0-gen & 16% for others.

The Commission had allowed post tax RoE of 16% in its earlier order.

Commission's decision:

The Commission had fixed 16% as RoE in its earlier order. This has been implemented by all the stakeholders. RoE has to be kept higher than interest on debt to cover some of the risks involved in the investment. Hence, the RoE of 16% is considered to be adequate to meet the risks. As such the Commission approves a RoE of 16%. Further, the Commission has decided to allow tax as a pass through as tax rates keep on varying.

(3) Interest on Term Loan:

The rates as per CERC, and as proposed by KREDL & other Stakeholders are as under:

Organisations/Stakeholders	Interest rate proposed
CERC	LTPLR + 150 basis points
KREDL	11% for Mini-hydel, 11.5% for wind, 12% for Biomass & Co-gen
KPCL	11%
Wind Developers/Associations	13% to 14%
Mini-Hydel Developers/ REDAK	12.25% to 13%
Biomass developers	11% to 15.25% or SBI PLR+2%. [some of the developers have stated that additional 5% to be allowed as being charged by IREDA for default in payments]
Co-Gen developers/Association	12%
ESCOMs	9 % to 10.5% or PLR

Developers have quoted the following reasons:

a. **M/S Aura Mira**: Interest rates have escalated over past few years & bankers are demanding 2-3% higher rates than PLR depending on perceived risk. IREDA is also charging 12.15% - 13.15%.

b. REDAK has proposed 12.25%, which is the SBI PLR with effect form 12.01.2009. Commenting on KPCL's proposal of 11% and ESCOMs proposal of

10.5%, Redak has stated that it is lower than PLR and usually bankers charge over and above PLR depending on risk factors. IREDA is lending at 13.5%.

c. IWPA: Due to the recent episode of sub-prime crisis and credit crunch, it is difficult to get loans. Interest on term loan is global phenomenon & considering present situation 13% shall be allowed.

d. IWTMA: Considering the prevailing SBI-PLR of 11.75%, normative interest shall be at least 13%.

e. InWEA: Interest to be indexed to PLR. Hence specify interest rate at 100 basis points above SBI-PLR.

f. NSL & others: Rate of term-loan for Wind Energy Generators [WEGs] is in the range of 12% -14%. Therefore, 14% to be allowed.

g. SISMA has proposed LTPLR of SBI plus 100 basis points.

h. RKPPL has proposed SBI PLR plus 2%.

i. vvMPPL has proposed interest as per CERC norms.

The interest rates approved in the neighbouring States is as under:

KSERC	TNERC	APERC	MERC
9%	12%	12%	9% -13%

The Commission had approved a uniform interest rate of 11 % on term loans for all projects of renewable energy, in its earlier order.

Commission's Decision

The Commission, in its earlier order, had allowed 11%as interest rate, based on the prevailing interest rates. The Commission is of the view that, the interest on term loan would be dependent upon various factors including nature of the project, financial strength of the developers and the risk profile apart from other factors. The Commission notes that the PLR furnished by some of the stakeholders pertain mostly to private sector banks and the data pertains to 2008/Jan 2009.

The Commission is not in favour of indexing the interest rate to PLR, as it requires frequent tariff resetting as & when PLR changes and the same would bring in uncertainty. **Therefore, the Commission decides to consider the interest rate of 11.75% on term-loans following the existing SBI PLR, for all the types of renewable projects.**

(4) Depreciation:

The rates proposed as per CERC and as proposed by KREDL & other Stakeholders are as under:

Organisations/Stakeholders	Depreciation rate
CERC-Regulations	7% for first 10 years & remaining spread over useful life
KREDL	20 yrs, every year equally for the period of PPA for Mini-hydel, Co-Gen & Biomass. 7% SLM for Wind
KPCL	7%
Wind Developers/Associations	4.5% for 20 years-IWEA 7%-IWPA
Mini-Hydel Developers/REDAK	7% to 7.84%
Biomass developers	7.0 to 7.84%
Co-Gen developers/Association	7%
ESCOMs	4.5%

Some of the mini-hydel developers, based on APERC order, have proposed a depreciation rate of 7.84%. However, it is seen that most of the stakeholders have suggested a depreciation rate of 7%. CERC has also specified 7% as depreciation rate.

BESCOM has stated that depreciation should be calculated excluding the land cost.

The depreciation rates approved in the neighbouring States is as under:

KSERC	TNERC	APERC	MERC

Mini-hydel: 3.6% for 25 yrs. & others: 4.5% for 20 yrs	4.5% to be calculated on plant & machinery cost	7.84%	3% for Minihydel for 30 years others: 5.28%

The Commission in its earlier order had approved 7% depreciation per annum under SLM for all renewable sources.

Commission's Decision

The Commission notes that the moratorium on repayment of loans and period of debt repayment varies from project to project depending upon various factors. However, there is a need to provide a uniform rate of depreciation for all the projects of renewable energy sources, so that, the loan repayment is covered in a fixed period. The Commission is of the view that, with a debt: equity ratio of 70: 30, and considering normative debt repayment period as 10 years, a uniform rate of 7% depreciation under Straight Line Method would be proper and would fully cover the debt repayment obligation. **Accordingly, the Commission decides to provide 7% depreciation per annum under SLM for all the renewable energy projects.**

(5) Minimum Alternative Tax (MAT):

KPCL has proposed MAT of 11.33% or corporate tax of 33.99%.

Some of the developers like Aura Mira have stated that, rate of MAT has increased to 16.545% [15% base rate, 10% surcharge & 3% cess] in FY10 as per the union budget for FY10.

Redak & several biomass developers have stated that, tax exemption under section 80 I (A) of IT Act 1961 is available for the projects commissioned on or before 31.3.2010. Hence, they are requesting the Commission to consider the normal tax rate at 33.99%, while computing RoE. It is also stated that, at present, MAT is at 17% including surcharge & cess.

Wind developers have proposed MAT at 7.5%.

SISMA has proposed that, as per existing IT-norms, the rate of MAT would be15.45%.

Ravikiran power has proposed 11.33% and RKPPL at 15% plus surcharge.

The Commission, in its earlier order, had approved uniform MAT at 7.5% on the RoE for all renewable sources.

Commission's Decision

The Commission, in its earlier order had factored in MAT for the Tariff Computations. Income tax [IT], surcharge & cess are statutory payments and would vary from year to year, depending upon IT policy of the GoI. **Hence, the Commission decides to allow Income tax, surcharge & cess as a pass through without factoring in the same for tariff computations.**

The amount of tax, surcharge & cess that has to be claimed, shall be worked out considering the amount of RoE approved in this order and the tax rate [including surcharge & cess] prevailing in the relevant years and shall be claimed separately from the ESCOMs.

B. Parameters as applicable to various Renewable Energy Projects:

Issues, which are specific to the type of renewable projects, such as project cost, PLF, O & M Cost, Fuel Cost etc. are discussed below, category wise.

(i) Mini-Hydel Projects:

a) **Project Cost**:

The project cost proposed by CERC, KREDL & other Stakeholders are as under:

Organisations/Stakeholders	Rs. Crs. Per MW
CERC	5.5 for below 5 MW plants & 5.0 for 5 MW & Above
KREDL	5.0
M/s Aura Mira Energy Company/AMR/JASPER	5.5
REDAK	5.4
KPCL	4.0

The Stakeholders have cited the following reasons in support of their claim:

i. Aura Mira: Cost of Civil works, equipments, land and labour have increased manifold in the last 5-years. Justifying its stand, it is stated that, WPI in Oct 2008 was 1.32 times that in Oct 2003 and CPI in Jan 2009 was 1.36 times that in Jan 2004. Further, in Karnataka, potential exists in run of the river schemes with low head where the capital cost is considerably higher.

The firm has furnished the cost estimate for its 13.5 MW plant, which is Rs.75.29 Crs. Thus, the cost/MW is estimated at Rs.5.5 Crs.

The firm has stated that, if project cost escalation is not indexed, the cost of Rs. 5.75 Crs shall be considered for the entire period of 5-years.

Subsequently, they have furnished the cost of another project, whose cost works out to Rs. 6.0 Crs/MW and has requested to deviate from CERC norms to provide relaxation to low head schemes.

It is also commented that, the project cost of Rs. 4.00 Crs., considered by KPCL, is based on historical cost, without considering the present state of affairs and even cost of high head projects cannot be as low as Rs.4.00 Crs/MW.

ii. REDAK: Cost of Civil works, equipments, land and labour have increased manifold in the last 5-years. Justifying their stand, it is stated that, WPI in 2008 has gone up to 214.10 from 187.30 in 2004. Cost of Forest land has increased. There is a steep increase in KREDL fees & deposits. Cement price has increased by 49.69% &, Iron &Steel prices have increased by 93.8%.

REDAK has also commented that, the project cost of Rs. 4.00 Crs., considered by KPCL, is based on historical cost without considering the present state of affairs and even cost of high head projects cannot be as low as Rs.4.00 Crs/MW. It is also submitted that, KPCL is yet to commission a minihydel project.

iii. Jasper/AMR: Cost of Civil works, equipments, land and labour have increased manifold. SEBs & NTPC have increased project costs from Rs.4.75 Crs/MW to Rs.6.00 Crs/MW for conventional power projects.

iv. ESCOMs**:** It is submitted that, in order to arrive at a benchmark capital cost, IPPs should to be directed to furnish data to create a data bank. It is also suggested that, the Cost/MW needs to be standardised.

The project cost/MW approved in the neighbouring States is as under:

Rs. Crs.

KSERC	APERC	MERC
4.88 incl. Transmission	3.63	4.40

The Commission, in its earlier order, had approved a project cost of Rs. 390 lakhs per MW, for Mini Hydel Projects.

Commission's Decision:

The Commission has carefully considered the proposals of various stakeholders. The Commission notes that, while referring to WPI & CPI, the stakeholders have considered the indices for a particular month instead of considering these indices on an annual average basis. Considering the earlier approved cost of 3.90 Crs/MW and the annual inflation rates, the cost/MW works out to Rs. 4.75 Crs/MW. The Commission is of the view that Rs.4.75 Crs/MW is reasonable and **hence, the Commission decides to adopt a capital cost of Rs.4.75 Crs. Per MW.**

b) Plant Load Factor (PLF):

The PLF proposed by CERC, KREDL & other Stakeholders are as under:

Organisation/ Stakeholders	% PLF
CERC	30%
KREDL	35%
M/s Aura Mira Energy Company/REDAK/Jasper/AMR	30%

Developers have proposed 30% and CERC has also approved 30% in its regulations.

The PLF approved in the neighbouring States is as under:

KSERC	APERC	MERC
30%	35%	30%

The Commission, in its earlier order, had approved normative PLF of 30% for all mini-hydel projects based on the information available and had noted that the average PLF was 31%.

Considering the fact that, all potential mini-hydel sources are likely to have been largely exploited, the future projects that may come up may not have PLF higher than 30%. **Hence, the Commission approves a PLF of 30%.**

c) Operation and Maintenance Expenses (O & M Expenses):

The O & M cost proposed by CERC, KREDL & other Stakeholders are as under:

Organisation/ Stakeholders	O & M Cost	Escalation
CERC	Rs.17 Lakhs/MW- below 5 MW [3.09% of CC] Rs. 12 lakhs/MW- 5 MW &above [2.4% of CC]	5.72%
KREDL	3%	5%
M/s Aura Mira Energy Company	2.5%	5%
REDAK	2.5%	5.72%
AMR/JASPER	3.0%	5%
KPCL	1.5% on CC	5%

The Stakeholders have quoted the following reasons:

i. Aura Mira: Spares cost and insurance premium have increased considerably. CERC has approved 2% as O & M cost for conventional plant. Relative O & M cost would increase as size of plant decreases and therefore, higher percentage than specified by CERC needs to be allowed.

ii. Redak: O & M shall be 2.5% based on parameters specified by CERC for Conventional plants.

iii. AMR/Jasper: O & M Cost/MW would be higher than that for conventional plants, as the manpower costs will not reduce proportionately as the MW capacity reduces.

The O & M cost approved in the neighbouring States is as under:

KSERC	APERC	MERC
1.5% of CC	1.5% of CC	2.5% of CC

The Commission, in its earlier order, had approved O&M expenses at 1.5 % of the project cost, including insurance and had provided an annual escalation of 5%.

Commission's Decision:

The Commission in its earlier order had considered 1.5% of the Capital Cost (CC) as O & M cost which all the stakeholders have accepted. The O &M expenses cannot increase, as a percentage for new plants, as claimed by stakeholders. Stakeholders have not substantiated their stand with adequate facts.

In view of the above, the Commission decides to consider O & M expense at 1.5% of Capital Cost including insurance. The annual escalation in O & M expenses is retained at 5.0%, as the average inflation in last five years has not exceeded 5%.

d) Interest on working capital:

Stakeholders Views:

i. **Aura Mira**: Has requested to consider factors for computing WC as per CERC norms. Further, it is requested to continue the loading of 1.5% on interest on term-loans. I.e. WC interest at 14.75%.

ii. **Redak**: Has proposed to retain existing rate of 12.5%.

iii. **Jasper/AMR**: Considering the prevailing rates, average rate of 13.5% may be considered.

iv. KPCL has considered 12.5% interest and the following factors:

   i. 1-month O & M expenses
   ii. 1% of CC as spares
   iii. 2-months receivables

v. **ESCOMs** have proposed 10.5% or PLR on 2-months bill.

The IWC approved in the neighbouring States is as under:

KSERC	APERC	MERC
7%	12%	11%

CERC in its order has considered the following factors for Computation of WC:

j. O & M expense for 1-month
ii. Receivables equivalent to 2-months of energy charges for sale of electricity calculated at normative CUF
iii. Maintenance spare at 15% of O & M expenses.

Further, the interest on WC is specified as previous year's short-term SBI PLR plus 100 basis points.

The nodal agency in the State, namely KREDL, has proposed 12.5% on 2-months' bills.

The Commission, in its earlier order, had considered interest on working capital (WC) at the rate of 12.5% on two month's bills.

Commission's Decision:

The Commission has examined the proposals of stakeholders carefully. The Commission, in its earlier order, had computed the IWC on 2-months' bills. Since working capital is required to carry out the day-to-day business, the Commission is of the view that, an amount equivalent to two months' bills shall be adequate to meet the working capital requirement. **Hence, the Commission decides to consider an amount equivalent to two months' bills as working capital.**

Regarding the interest rate on Working Capital, the Commission had earlier allowed Interest on Working Capital (IWC) at 1.5% above the rates approved for term-loans, in view of the fact that interest rate on short-term loans is higher than that of term-loans. **The Commission decides to retain IWC at 1.5% above rates approved for term-loans. Thus IWC to be allowed would be 13.25% p.a.**

e) Auxiliary Consumption:

The auxiliary consumption proposed by CERC, KREDL & other Stakeholders are as under:

Organisation/ Stakeholders	% Aux. Consp.
CERC	1.0% including Transformation loss
KREDL	2%
M/s Aura Mira Energy Company	1.5% including transformation losses.
REDAK/ AMR/JASPER	1.5% for aux. And 1% for transmission loss
KPCL	1.0%

Reasons furnished by Stakeholders:

a) **REDAK/ AMR/JASPER**: with 0.5%, even the minimum auxiliaries requirement can't be met. Justifying the stand, REDAK has furnished calculation for a typical plant.

b) **Aura Mira**: Transformation loss itself is in the range of 0.6 to 0.7%. Apart from this, the auxiliary requirement for continuous load is in the range of 0.6% to 1%.

The auxiliary consumption approved in the neighbouring States is as under:

KSERC	APERC	MERC
0.50%	1.0%	0.50%

Considering the transformation loss and auxiliary requirement, the Commission had approved 0.5% auxiliary consumption in the earlier tariff order.

Commission's Decision:

The Commission notes that, as per the information furnished by stakeholders, the transformation loss itself would be around 0.5%. CERC has stated that, the auxiliary consumption for SHP is lesser when compared to that of large size hydro plants and has approved 1%. On the basis of this, the Commission approves auxiliary consumption of 1% for Mini-hydel projects, which includes transformation loss.

f) Approved Tariff:

Tariffs proposed by various agencies based on their proposed norms are as follows:

CERC/KREDEL: Has not worked out any specific tariff rate.
KPCL: Rs.3.26/unit average or Rs. 3.33/unit levelised
GESCOM: Rs. 2.90/unit without escalation
REDAK: Rs. 4.76 per unit average for 10 years
Aura Mira: Rs.4.81 per unit average for 10 years or Rs. 4.95 /unit levelised

Jasper/AMR: Rs. 5.04 per unit average for 10 years

Considering the parameters as approved by the Commission in the preceding paragraphs, the Commission has worked out tariff for mini hydel projects and the year wise tariff so worked out as below:

Year	Tariff (Rs./unit)
1st Year	3.99
2nd Year	3.86
3rd Year	3.72
4th Year	3.58
5th Year	3.45
6th Year	3.32
7th Year	3.18
8th Year	3.05
9th Year	2.92
10th Year	2.79
Average Tariff for the above 10 years	3.39 rounded off to Rs.3.40 per unit

Accordingly, the Commission determines the tariff for mini hydel projects at Rs.3.40 per unit without any escalation for the first 10-year period from the date of signing of PPA

(ii) Wind Projects:

a) Project Cost :

The project cost proposed by CERC, KREDL & other Stakeholders are as under:

Organisation/Stakeholders	**Rs. Crs. Per MW**
CERC	5.15
KREDL	5.52
IWPA	5.50
IWTMA	5.50
INWEA	5.75
NSL & Other developers	CC of Rs. 5.6 Crs & Turnkey cost of Rs. 6.6 crs
KPCL	6.00

Stakeholders have justified the rates by citing the following reasons:

i. IWPA: Cost of metals, cement and transportation have increased manifold in the last 5-years. IWPA has furnished the details of WPI for iron & steel, Cement and copper bars & rods from FY96 to FY08. They have also stated that, due to devaluation of rupee against Euro/dollar, the costs are more.

ii. IWTMA: Cost of steel has increased by 45% and that of cement by 46% during 2004-2009. In Karnataka, additional charges are levied by the State for Forest land (26 L/MW), Network augmentation charges to KPTCL (5L/MW), Application fee, DPR processing fee, 1% of CC as transfer fee etc working out to 18 Lakhs/MW.

iii. InWEA: Cost of wind turbine has increased due to increase in steel & cement costs. The cost appraised by various Financial Institutions like SBI , IREDA are in the range of Rs. 4.5-5.5 Crs. Cost of Wind projects per MW, awarded through competitive bidding is Rs. 5.17 Crs in 2006 and Rs.5.76 Crs in 2007 and through tendering process is Rs.5.05 Crs- 6.18 Crs.

iv. NSL & Others: Cost of land, raw materials & statutory fees have increased. WEG cost alone is in the range of Rs. 5.53 Crs to Rs. 6.04 Crs/MW. Cost of transmission related infrastructure cost is Rs. 1 Cr/MW. Also TNERC & RERC have approved Rs.5.35 Crs & Rs. 5.25 crs excluding cost of infrastructure for evacuation.

The project cost approved in the neighbouring States is as under:

KSERC Order Dtd 24.06.2006	MPERC Order Dtd Nov. 2007	APERC Order Dtd. 01.05.2009	TNERC Order Dt 20.03.2009	GERC Order Dtd 11.08..2006	MERC Order dtd 24.11.2003 upheld in subsequent orders
Rs.4.40 Crs.	Rs.4.60 Crs	Rs. 4.70 Crs.	Rs.5.35 Crs.	Rs.4.65 Crs Inl.	Rs. 4.0 Crs. Per MW

incl. Transmission Cost	per MW Including Tr. Cost	Per MW incl. Transmission Cost	per MW excluding transmission	Transmission Cost	[50% transmission cost to be borne by developers

The Commission, in its earlier order had approved a project cost of Rs. 425 lakhs per MW, for Wind Projects. By Applying the inflation rates on the earlier approved cost of Rs.4.25 Crs/MW, the Cost/MW works out to Rs. 5.18 Crs.

Commission's Decision:

The Commission notes that except TNERC the cost approved by other Commissions is in the range of Rs4 Crs to Rs.4.70 Crs. It may be noted that about 85% of the capital investments would account for plant and machine cost. Since similar types of plant & machineries are used, the cost should not vary widely among the states especially when the same developers are involved in putting up the plants. Further in the last five years, there is technological advancement in the WEG, which has resulted in manufacturing of high capacity wind turbine generators.

Considering the above aspects, the Commission is of the view that the cost per MW of Rs.4.70 Crs., as adopted by APERC in its recent order would be most reasonable. **Hence, the Commission approves Rs.4.70 Crs/MW as the capital Cost including Transmission infrastructure costs.**

b) Plant Load Factor (PLF):

The PLF proposed by CERC, KREDL & other Stakeholders are as under:

Organisation/Stakeholders	% PLF
CERC	200-250 W/m2: 20% 250-300 W/m2: 23% 300-400 W/m2: 27% >400 W/m2: 30%
KREDL	25.08%
IWPA	24%
IWTMA	24%

INWEA	26%
BCIC	25%
NSL & Other developers	21%
KPCL	26.5%

Reasons furnished by developers:

a. **IWPA/IWTA**: Current PLF is in the range of 23-24%. Only 3 to 4 sites in the State have achieved 26% PLF. Every 5-years, deration factor of 1.25% in PLF needs to be factored. Windy sites in the State have already been exhausted. As per C-WET, wind power density in Karnataka is in the range of 200-300 W/sq.m. This indicates that, potential sites have PLF of 20-23%. Further, data certified by KREDL indicates PLF of 25.08%.

b. **INWEA**: Advancement of technology has positive impact on increased energy generation which is off-set by poor wind regime. Windy sites in the State have already been exhausted. CUF for advance class machines with proper micro-siting is in the range of 23%- 27%. In view of this maximum CUF of 26% shall be considered.

c. **NSL & Other developers**: Since only class 3 & 4 sites are left out, PLF of 20-22% can only be achieved.

The PLF approved in the neighbouring States is as under:

KSERC	TNERC	MERC
22%	27.15%	20%

The Commission, in its earlier order, had approved normative PLF of 26.5% for all wind projects considering the proposals and examining the actual PLF achieved by the plants in operation.

Commission's Decision:

The Commission notes that, KREDL has proposed a PLF of 25.08%. InWEA has proposed 26% stating that with advance class of machines & proper micro-siting maximum PLF of 26% is achievable.

The Commission notes that, in the past five years, significant technological advancement in wind based generation has taken place. With the advanced technology, higher efficiency WEGs turbines and with proper micro sitting, it would be possible to achieve a PLF of 26.5%. Hence, the Commission approves a PLF of 26.5% for Wind projects.

c) Operation and Maintenance Expenses(O & M Expenses):

The O & M cost proposed by CERC, KREDL & other Stakeholders are as under:

Organisation	O & M Cost	Escalation
CERC	Rs. 6.5 lakhs/MW [1.26% of CC]	5.72%
KREDL	1.5%	5%
IWPA	2%	5%
IWTMA	6.5 lakhs/MW	5.72%
INWEA	1.5%	5%
BCIC	2%	7.5%
NSL & Other developers	2% + 0.75% for insurance	5%
KPCL	1.25% on CC	5%

Stakeholders have quoted the following justifications:

a. **IWPA/IWTMA**: O& M cost has increased over years, especially the insurance cost. They have referred to TNERC order where insurance is allowed at 0.75% on 85% of CC, O & M at 1.1% on 85% CC and for maintenance of land/civil works, 0.22% on 15% of CC is allowed.

b. **INWEA**: factors typical to wind generators such as pitch control, yoke control has to be monitored and attended to continuously which affects O & M costs.

Internationally O & M expense is around 1.0-1.2% excluding insurance which is around 0.3-0.5%.

c. **NSL & others**: TNERC has allowed insurance charges at 0.75%. Due to wear & tear O & M expense increases over years. Wages/salaries of supervisory staff have increased substantially.

The O & M expense approved in the neighbouring States is as under:

KSERC	TNERC	MERC
1.3% of CC	1.1% on 85% of CC & 0.22% on 15% of CC	1.5% for first 3- yrs. 2% for 4th yr. & 5% escalation thereafter.

The Commission, in its earlier order, had approved O&M expenses at 1.25 % of the project cost, including insurance and had provided an annual escalation of 5%.

Commission's Decision:

The Commission, in its earlier order, had approved 1.25% of Capital Cost (CC) as O & M cost. The Commission notes that, none of the Stakeholders have not substantiated their stand with adequate facts. **Hence, the Commission decides to retain the O &M expenses at 1.25% of Capital Cost including insurance, with annual escalation of 5.0%. The annual escalation is retained at 5% as the average inflation in the last five years has not exceeded 5%.**

d) Interest on working capital:

Stakeholders' Submission:

a. IWTMA has proposed 12.5% as IWC.

b. InWEA has proposed interest equivalent to SBI on :

i. 1-month's O & M Expense
ii. 1.5 month's receivables

iii. Spares at 15% of O & M cost.

c. KPCL has considered 12.5% interest and the following factors:

iv. 1-month's O & M expenses

v. 1% of CC as spares

vi. 2-months' receivables

d. ESCOMs have proposed 10.5% or PLR on 2-months bill.

KSERC has approved 7% as IWC.

CERC, in its order, has considered the following factors for Computation of WC:

i. O & M expense for 1-month

ii. Receivables equivalent to 2-months of energy charges for sale of electricity calculated at normative CUF

iii. Maintenance spare at 15% of O & M expenses.

Further, the interest on WC is specified as previous year's short-term SBI PLR plus 100 basis points.

The nodal agency, KREDL, has proposed 12.5% on 2-months bills.

The Commission, in its earlier order, had approved interest on working capital (WC) at the rate of 12.5% on two months' bills.

Commission's Decision

The Commission has carefully examined the proposals of stakeholders. The Commission had earlier computed the IWC on 2-months bills. Since working capital is required to carry out the day-to-day business, working capital equivalent to 2-months' receivables would be adequate.

Regarding the interest rate on Working Capital, the Commission had earlier allowed Interest on Working Capital (IWC) at 1.5% above the rates approved for term-loans, in view of the fact that interest rate on short-term loans is higher than that of term-loans. **The Commission decides to retain IWC at 1.5% above rates approved for term-loans. Thus IWC to be allowed would be 13.25% p.a.**

e) Auxiliary Consumption:

The auxiliary consumption proposed by KREDL & other Stakeholders are as under:

Organisation/Stakeholders	% Aux. Consp.
KREDL	0.5%
IWTMA	0.5%
InWEA	0.5%
KPCL	0.5%

KSERC has approved 0.5% as auxiliary Consumption.

CERC has not indicated any auxiliary consumption in its Regulations for wind power.

Considering the transformation loss and auxiliary consumption requirement, the Commission had approved 0.5% auxiliary consumption in the earlier tariff order.

Commission's Decision:

As all the stakeholders have proposed the existing auxiliary consumption of 0.5% itself, the Commission has decided to retain the same.

f) Approved Tariff:

The tariff proposed by various stakeholders based on their proposed norms are as follows:

CERC/KREDL has not proposed any tariff rate

KPCL: Rs. 4.50/unit average or Rs.4.60/unit levelised.

GESCOM: Rs.3.50/unit without escalation

IWPA: Rs.4.25/unit levelised for 20 years

IWTMA: Rs.4.59/unit levelised for 20 years

InWEA: Rs.4.52/unit levelised for 13years

NSL & Others: Rs. 4.50/unit

BCIC: Rs. 4.70/unit /unit levelised for 20 years

Centre for Advancement of Wind Energy & Weather Modification and farmers wind power Resources Pvt. Ltd.: For farmers' owned projects Rs. 1.00 /unit over & above that fixed for other wind generators.

Considering the parameters as approved by the Commission in the preceding paragraphs, the Commission has worked out tariff for wind projects and the year wise tariff is indicated below:

Year	Tariff (Rs./unit)
1st Year	4.40
2nd Year	4.25
3rd Year	4.10
4th Year	3.94
5th Year	3.79
6th Year	3.64
7th Year	3.49
8th Year	3.34
9th Year	3.19
10th Year	3.04
Average Tariff for the above 10 years	3.72
Rounded off to	**3.70**

Hence, the Commission determines the tariff for wind projects at Rs.3.70 per unit without any escalation for the first 10-year period from the date of signing of PPA.

iii) Co-Generation Projects:

a) Project Cost :

The project cost proposed by CERC, KREDL & other Stakeholders are as under:

Organisation	Rs. Crs. Per MW

CERC	4.45
KREDL	5.00
SISMA	5.25
Renuka sugars	4.45

The Stakeholders have quoted the following reasons:

i. **Renuka sugars**: As per CERC Guidelines

ii. **SISMA**: The cost is proposed based on estimated cost of 25 MW, **Algawadi Bireswar Sugars Pvt. Ltd** of Rs.134.50 Crs,. It is stated that, the Cost/MW of Co-Gen projects operating in the State varies between Rs. 4.75-5.50 Crs/MW. TNERC has approved Rs.4.96 Crs/MW. The above costs exclude transmission & evacuation costs. Therefore, for base year Rs.5.25 Crs/MW shall be considered with suitable increase for subsequent years.

The project cost approved in the neighbouring States is as under:

Rs. Crs.

KSERC	TNERC	APERC
3.50	4.67 excluding evacuation cost	3.25

The Commission, in its earlier order, had approved a project cost of Rs. 300 lakhs per MW, for Co-Gen Projects.

SISMA had challenged the above order before the Hon'ble ATE. While partly allowing the appeal, Hon'ble ATE in its order dated 14th May 2007 in Appeal No.41 of 2006,had directed the Commission to adopt project cost of 350 lakhs/MW. However, the ESCOMs have challenged the ATE's order before the Hon'ble Supreme Court. Hon'ble Supreme Court has stayed the orders of the Hon'ble ATE.

Commission's Decision:

The Commission notes that, SISMA has proposed the Capital cost based on estimates of a single project. Even though SISMA has stated that, cost varies between Rs. 4.75-5.50 Crs/MW, it has not substantiated the same.

Considering the annual inflation rate & the cost/MW of Rs.3.00 Crs approved by Commission in 2005, the Cost/MW works out to Rs. 3.65 Crs/MW. The Commission is of the view that, the same is reasonable. **Hence, the Commission approves an amount of Rs.3.65 Crs/MW as the capital Cost including transmission infrastructure cost for Co-Gen plants.**

b) Plant Load Factor (PLF):

The PLF proposed by CERC, KREDL & other Stakeholders are as under:

Organisation/stakeholders	% PLF
CERC	53%
KREDL	60%
SISMA	55%
Renuka sugars	92% with Coal usage

Reasons furnished by developers:

i. SISMA:

SISMA in its initial filing, had estimated 270 days of operation and thus had projected PLF of 75%. Subsequently, in the revised filing, SISMA has stated that Co-gen plants cannot run beyond 240 days [180 days season + 60 days off-season] in Karnataka, as boilers are prone to frequent failures and need regular maintenance. Thus, the revised PLF proposed by SISMA is 55% considering 80% availability during operating period.

ii. Renuka sugars has proposed 92% PLF considering 180 days of season and use of Coal during non-season.

The PLF approved in the neighbouring States is as under:

KSERC	TNERC	APERC
55%	55%	55%

The Commission, in its earlier order, had approved normative PLF of 60.0% for all Co-gen projects on the basis of suggestions from KREDL.

Commission's Decision:

SISMA has consistently stated that, the seasonal period would be 180 days. For 180 days of season and 60 days of off-season, CERC has specified PLF of 60%. KREDL, the state nodal agency, has also furnished 60% as PLF. The Commission in its earlier order had approved a PLF of 60%.

Considering the above factors, the Commission approves a PLF of 60% for Co-gen projects.

c) Operation and Maintenance Expenses(O & M Expenses):

The O & M cost proposed by CERC, KREDL & other Stakeholders are as under:

Organisation/stakeholders	O & M Cost	Escalation
CERC	Rs. 13.35 Lakh/MW [3.5% of CC]	5.72%
KREDL	8%	5%
SISMA	Rs. 630 Lakh/MW @ 5% of Project cost	-
Renuka sugars	Rs.13.35 Lakh/MW	-

Stakeholders have quoted the following reasons:

a. SISMA has stated that, at 5% of project cost, O & M works out to 630 lakhs /MW. They have not proposed any escalation specifically for O & M.

b. Renuka sugars: as per CERC norms.

The O & M expense approved in the neighbouring States is as under:

KSERC	TNERC	APERC
1.5% of CC	4.5% on 85% of CC & 0.90% on 15% of CC	3% on CC

The Commission in its earlier order had approved O&M expenses at 3.0 % of the project cost, including insurance and had provided an annual escalation of 5%.

Commission's Decision:

The Commission notes that, the cost computed by SISMA is erroneous. Considering the cost of Rs. 5.25 Crs./ MW as proposed by SISMA and applying 5% as per SISMA, the O & M costs works out to Rs. 26.25 Lakhs/MW and not Rs. 630 lakhs.

The Commission, in its earlier order, had approved 3.00% of Capital Cost (CC) as O & M cost. The Commission notes that, none of the Stakeholders have not substantiated their stand with adequate facts. . **Hence, O & M expense is retained at 3.0% of Capital Cost including insurance, with an annual escalation of 5.00%, for the reasons stated earlier.**

d) Interest on working capital:

Stakeholders Views:

a. SISMA, in their revised filing, have requested to adopt CERC norms for computing IWC.

b. Renuka sugars has considered 13% as rate of IWC.

CERC in its order has considered the following factors for Computation of WC:

i. O & M expense for 1-month

ii. Receivables equivalent to 2-months of energy charges for sale of electricity calculated at target PLF

iii. Maintenance spare at 15% of O & M expenses.

iv. Fuel Costs for four months equivalent to normative PLF

Further, the interest on WC is specified as previous year short-term SBI PLR plus 100 basis points.

The nodal agency KREDL has proposed 12.5% on 2-months bills.

The IWC approved in the neighbouring States is as under:

TNERC	APERC
12%	12%

The Commission, in its earlier order, had approved interest on working capital (WC) at the rate of 12.5% on two months bills.

Commission's Decision

The Commission has carefully examined the proposals of stakeholders. The Commission, in its earlier order, had computed the Working Capital (WC) equal to two month's bills. Since working capital is required to carry out the day-to-day business, working capital equivalent to 2-months' receivables would be adequate.

Regarding the interest rate on Working Capital, the Commission had earlier allowed Interest on Working Capital (IWC) at 1.5% above the rates approved for term-loans, in view of the fact that interest rate on short-term loans is higher than that of term-loans. **The Commission decides to retain IWC at 1.5% above rates approved for term-loans. Thus IWC to be allowed would be 13.25% p.a.**

e) Auxiliary Consumption:

The auxiliary consumption proposed by CERC, KREDL & other Stakeholders is as under:

Organisation/Stakeholders	% Aux. Consp.
CERC	8.5%
KREDL	13%
SISMA	10%
Renuka sugars	8.5%

SISMA has stated that, since during the off-season, other fuels are used, for fuel handling and preparation needs additional auxiliary consumption, which needs to be provided. Hence, they have proposed an auxiliary consumption of 10%.

The auxiliary consumption approved in the neighbouring States is as under:

TNERC	APERC
10%	9%

The Commission had approved 8% auxiliary consumption in the earlier tariff order.

Commission's Decision:

Neither KREDL nor SISMA have substantiated their claim supported by documentary evidence. CERC while approving Auxiliary consumption of 8.5% has opined that bagasse requires less processing compared to biomass. The Commission in its earlier order had held that, fuel processing is lower in the case of co-generation plants, as compared to the conventional coal based thermal plants. **Considering all the aspects and need for energy conservation, the Commission retains the auxiliary consumption at 8.0%.**

f) Fuel Price:

SISMA had proposed a price of Rs. 2000/MT based on equivalent heat value of coal. Subsequently, SISMA has proposed Rs. 1350/MT as baggasse price based on the actual price paid for sugar cane. Further, for off-season (E/F grade Coal and equivalent biomass fuels), they have requested to consider GCV of 3700 kcal/kg @ Rs. 3500/MT.

Renuka sugars has considered Rs. 2000/MT as Bagasee cost and Rs. 4000/MT as coal cost during Off-season.

CERC has specified an amount of Rs.1163/MT for States other than Andhra Pradesh, Haryana, Maharashtra, Madhya Pradesh, Punjab, Tamil Nadu & Uttarpradesh. The maximum price allowed by CERC is Rs. 1411/MT for Haryana. For southern states the highest price is Rs. 1243/ MT in respect of Tamil Nadu and lowest price in respect of Andhra Pradesh is Rs. 899/MT.

KREDL has proposed Fuel price in the range of 1000-1200/MT.

The fuel price/MT approved in the neighbouring States is as under:

TNERC	APERC
Rs.1000 incl. Of transportation	Rs. 950

The Commission, in its earlier order, had approved fuel price at Rs.800/- per MT with annual escalation of 5%, for the purpose of tariff determination of co-generation plants.

Commission's views:

The Commission notes that as per Electricity Act, 2003, Co-generation is defined as under:

"   "Cogeneration " means a process which simultaneously produces two or more forms of useful energy (including electricity)".

Thus the Sugar factories work as Cogeneration plants only during season and during off-season there is no cogeneration ie. During off-season there is only electricity generation and there is no usage of steam for process. However, CERC in their regulation – CERC [Terms & Conditions for Tariff determination from Renewable Energy Sources] Regulations, 2009, has considered 60 days of off-season power generation while computing the PLF. Therefore, the purchase of bagassee/biofuels is resorted to only during off-season and to the extent of shortage of fuel during season. The Bagassee produced during the season is available free of cost. From accounting point of view, there is no expenditure actually incurred for in-house bagasee. Thus, the fuel cost allowed by the Commission for in-house bagassee during season is only notional. The rates indicated by generators are applicable only for off-season fuel purchases. Thus, on an annual basis the cost of fuel on weighted average basis would be significantly less than the rates indicated by the generators.

Considering the escalation rate of 5% and price of Rs. 800/ MT approved earlier, the Price works out to Rs. 1025/ MT. The escalation rate of 5% has been accepted by all the stakeholders. Keeping in view the rates claimed by the stakeholders, the fuel prices adopted by the neighbouring states & CERC and considering the aspects as discussed above, the Commission is of the view that the fuel price of Rs.1025 per MT would be most reasonable. **Hence, the Commission approves baggasse price at Rs. 1025/ MT.**

g) Fuel Cost escalation:

SISMA has asked for 5% escalation in tariff every year over the base year tariff. Specific escalation for Fuel Cost is not requested for.

CERC has adopted indexation mechanism for fuel price. Alternately, as an option, CERC has provided for 5% escalation in variable charges every year.

The Commission, in its earlier order, has determined the fuel cost escalation at 5% per annum.

For the reasons stated earlier, the Commission is not in favour of indexation of fuel prices. **Hence, the Commission decides to continue the existing escalation rate of 5% per annum on the fuel cost.**

h) Fuel Consumption:

SISMA has requested to consider GCV of 2000-2300 kcal/kg maximum and SHR of 5000 kcal/unit during season and to apportion the fuel requirement in 70:30 ratio for power & sugar process. Based on this, specific fuel consumption would be 1.52 kg/unit to 1.75 kg/unit for power.

Renuka sugars have proposed the fuel consumption as per CERC norms.

CERC has specified Station heat rate of 3600 kcal/unit and calorific value of 2250 kcal/kg. Thus the fuel consumption per unit works out to 1.60-kg/ unit.

KREDL has proposed 1.65 kg/unit. However, KREDL has not furnished any details.

The specific fuel consumption approved in the neighbouring States is as under:

kg/unit

TNERC	APERC
1.67	1.60

The Commission, in its earlier order, after considering the views of stakeholders, had approved 1.60 kg/unit as the reasonable specific fuel consumption.

Considering the above factors, the Commission decides to retain the existing specific consumption of 1.60 kg/unit.

i) Approved Tariff:

CERC/KREDL has not proposed any specific tariff rate.

GESCOM: Rs. 2.95/unit with 2% annual escalation [without cumulative)

SISMA Rs. 7.78/unit, which was subsequently revised during public hearing to Rs. 8.68/unit with 25% coal usage. With 100% coal, the tariff proposed is Rs.7.09/unit. 5% escalation every year is proposed.

Renuka Sugars: Rs. 5.43 to Rs. 5.49 per unit for the base year with use of coal to achieve 92% PLF.

Considering the parameters as approved by the Commission in the preceding paragraphs, the Commission has worked out and approved the following tariff for Co-generation projects and the year wise tariff is indicated below:

Year	Tariff (Rs./unit)
1st Year	3.59
2nd Year	3.63
3rd Year	3.67
4th Year	3.72
5th Year	3.77
6th Year	3.83
7th Year	3.90
8th Year	3.97
9th Year	4.05
10th Year	4.14

j) Applicability of the revised Rates to new PPAs:

As per the existing approved Model PPA, the approved tariff for the first year is applicable from the date of commercial Operation (CoD) for a ten year period, irrespective of the date of signing of PPA, as a result they will not get the benefit of increase in rates during the period from the date of signing of PPA to the date of Commercial Operation. This was challenged by some of the generators before the Hon'ble ATE in Appeal No.129/2005 and the Hon'ble ATE has held that such an approach is not reasonable because the entrepreneurs will be denied legitimate escalation upto the year of commissioning.

In view of the above the Commission has now decided that the first year tariff shall be applicable with reference to the date of signing of PPA and to allow the escalation in tariff upto the date of Commercial Operation. Consequently, the relevant clause of the model PPA approved by the Commission earlier, stands modified.

iv) Bio-mass Projects:

a) Project Cost :

The project costs proposed by CERC, KREDL & other Stakeholders are as under:

Organisation/Stakeholders	Rs. Crs. Per MW
CERC	4.50
KREDL	5.50
CEA report	4.00
RKPPL/Koppal green power/MPPL/ Konark Power/RAVIKIRAN/Hassan biomass/Power nicks	5.50
Koganti	6.00
KPCL	4.00

The Stakeholders have quoted the following reasons:

i) All the developers have stated that, there is steep increase in raw material cost & labour cost. Also, conventional plant cost of NTPC has increased from the existing cost of Rs4.75 Crs/MW to Rs.6.00 Crs/MW. Biomass projects are more complicated and require more storage space, increasing the cost/MW. Justifying their stand, some of the stakeholders have furnished the details of WPI & wages of labour. They have stated that, during FY03 to FY08, WPI for cement has increased by 49.69% and that of steel & iron by 93.80%. The minimum wages have also increased during FY03 to FY10 for all categories of construction workers.

ii. ESCOMs have requested to revise the cost downwards. However, developers have countered that licensee's claim is baseless. Further, developers have furnished CEA report regarding operation norms for biomass plants justifying their stand.

The project cost approved in the neighbouring States is as under:

Rs. Crs.

TNERC	APERC	MERC
4.87	4.00	4.00

The Commission in its earlier order had approved a project cost of Rs. 400 lakhs per MW, for Biomass Projects.

The Biomass project developers had challenged the above order before the Hon'ble ATE in Appeal no.129 of 2005 & 41of 2006. While partly allowing the appeal, Hon'ble ATE in its order in Appeal 129/2005 & 41/2006 dated 14.05.2007 had also decided the project cost as 400 lakhs/MW. However, KPTCL/ESCOMs have challenged the said order before the Hon'ble Supreme Court. The Hon'ble Supreme Court has stayed the operation of orders of the Hon'ble ATE.

Commission's Decision:

The Commission notes that, some of the stakeholders have referred to WPI of cement and Steel & iron to justify their stand of increased capital cost. However, stakeholders have not furnished detailed working in this regard.

Considering the annual inflation rate & the cost/MW of Rs.4.00 Crs approved by Commission in the year 2005, the Cost/MW works out to Rs. 4.87 Crs/MW. Further, CEA in its 2005 report has arrived at an average cost of 4.0 Crs/MW based on the costs of 15-plants selected for study [cost/MW varied from Rs3.33 Crs to 4.33 Crs/MW]. CERC has approved Rs.4.50 Crs/MW, after analysing costs of projects developed through funding assistance from IREDA & also projects which are registered with UNFCC. CERC has also undertaken pooled cost approach, actual cost approach etc for benchmarking the capital cost.

Considering all the above factors, the Commission is of the view that the project cost of Rs. 4.87 Crs/MW would be most reasonable**. Hence, the Commission approves Rs.4.87 Crs/MW as the capital Cost including transmission infrastructure costs.**

b) Plant Load Factor (PLF):

The PLF proposed by CERC, KREDL & other Stakeholders are as under:

Organisation/Stakeholders	% PLF
CERC	During Stabilisation: 60% 1st year after stabilisation:70% 2nd year onwards: 80%
KREDL	60%
CEA	80%
KPCL	75%
RKPPL/MPPL/konark Power/Ravikiran/Hassan Bio-mass	40%
KOGANTI power	48% without auxiliary deduction
Indra power/koppal green power/poweronicks	70%

Reasons furnished by developers:

i. RK Power gen has furnished data of 4-plants to substantiate its stand. Further, it is stated that there is lot of uncertainty in respect of biomass fuel supply and availability of fuel for power has reduced due to biomass usage by other industries**.**

ii. MPPL/Indra power/Koppal Green Power/ Konark power/Ravikiran power projects/Hassan biomass have stated that, non-availability of biomass & frequent maintenance stoppages as the reasons for a lower PLF.

iii. Koganthi Power has furnished data from Nov-05 to Dec07 to substantiate their stand.

iv. Koppal Green power has furnished generation details from March'06 to February' 09

The PLF approved in the neighbouring States is as under:

TNERC	APERC	MERC
80%	80%	70% in first yr. & 80% second year onwards

The Commission, in its earlier order, had approved normative PLF of 75.0% for all Biomass projects, considering the suggestions of KREDL and the other stakeholders.

The Hon'ble ATE, in its order dated 14th May 2007 in Appeal No.41 of 2006, has directed to adopt PLF of 80% for recovery of full fixed cost. However, KPTCL/ESCOMs have challenged the ATE's order before the Hon'ble Supreme Court. Hon'ble Supreme Court has stayed the ATE's order.

Commission's Decision:

M/s RK Powergen has furnished data for 3-months in case of 3 out of 4 plants for which data is furnished, based on which, annual PLF cannot be determined. MPPL/Indrapower/Konark power/Ravikiran Power projects /Hassan Bio-mass/ Poweronicks have not substantiated their claim with documentary evidence.

From the data provided by M/s Koganthi power, it is noted that, from July'07 to April'08, there was no generation for 6-months and in the remaining months, PLF was in the range of 4-12%. No reasons have been furnished by the firm for no or insignificant level of generation during these months. Excluding the above months, the average PLF would be 65%.

As per the data furnished by Koppal Green power, average PLF works out to 85%.

The Commission notes that, the stakeholders have proposed PLF ranging from 40% to 70%. Based on the details furnished by some of the developers, the PLF is in the range of 65% to 85%. The CEA has proposed 80% based on study of PLF of 14 plants [PLF range is 58.4% to 96.82%]. CERC has specified the norms based on the inputs from MNRE.

Corroborating the data of CEA report, CERC Regulations and the actual data furnished by developers, the Commission is of the view that Biomass plants can achieve 75% PLF. **Hence, the PLF is retained at 75%.** The Commission is not in favour of adopting different PLFs for different periods as suggested by CERC.

c) Operation and Maintenance Expenses(O & M Expenses):

The O & M cost proposed by CERC, KREDL & other Stakeholders are as under:

Organisation/stakeholders	O & M Cost	Escalation
CERC	Rs. 20.25 lakh/MW [4.5% of CC]	5.72%
KREDL	8%	5%
KPCL	4%	5%
CEA	7%	-
RKPPL/MPPL/Koppal Green power/konark power/hassan biomass/poweronicks	8%	5%
Koganthi Power	12%	-

The Stakeholders have quoted the following reasons:

a. Due to use of different biomass fuels, there is increased maintenance due to corrosion & erosion.

b. Huge manpower is required for fuel handling.

c. Frequent replacement of boiler and other machine parts is required making O & M expensive.

The O & M expense approved in the neighbouring States is as under:

TNERC	APERC	MERC
4.5% on 85% of CC & 0.90% on 15% of CC	4% of CC	4% of CC

The Commission, in its earlier order, had approved O&M expenses at 4.0 % of the project cost, including insurance and had provided an annual escalation of 5%.

The Hon'ble ATE in its order, dated 14th May 2007 in Appeal No.41 of 2006, had directed to adopt 7% of capital cost as O & M expenses. However, KPTCL/ESCOMs have challenged the ATE's order before the Hon'ble Supreme Court. Hon'ble Supreme Court has stayed the ATE's order.

Commission's Decision:

The Commission, in its earlier order, had approved 4.00% of Capital Cost (CC) as O & M cost. The Commission notes that none of the Stakeholders have not substantiated their stand with adequate facts. . **Hence, O & M expense is retained at 4.0% of Capital Cost including insurance, with annual escalation of 5.00% for the reasons stated earlier.**

d) Interest on working capital:

Stakeholders Views:

a. KPCL has considered 12.5% as IWC on the following:

  a. 1-month's O & M expense

b. Spares @ 1% of CC

c. 2-months' receivables**.**

b. RKPPL/Koganthi/Konark power/Hassan Biomass have suggested SBI's PLR plus 2%, which works out to 14.75%. RKPPL has furnished SBI's letter, wherein it is indicated that, SBAR is 13.75% p.a.

c. M/s Ravikiran power projects have proposed IWC at 14.75%.

d. MPPL countering ESCOMS suggestions to reduce interest rate to 10.5%, has stated that, WC interest rate should be SBI PLR plus 2% considering the latest CERC norms.

CERC, in its order, has considered the following factors for Computation of WC:

i. O & M expense for 1-month

ii. Receivables equivalent to 2-months of energy charges for sale of electricity calculated at target PLF

iii. Maintenance spares at 15% of O & M expenses.

iv. Fuel Costs for four months equivalent to normative PLF

Further, the interest on WC is specified as previous year's short-term SBI PLR plus 100 basis points.

The nodal agency KREDL has proposed 12.5% on 2-months' bills.

The IWC approved in the neighbouring States is as under:

TNERC	MERC
12%	13%

The Commission, in its earlier order, had approved interest on working capital (WC) at the rate of 12.5% on two months' bills.

Commission's Decision

The Commission has carefully examined the proposals of the stakeholders. The Commission earlier had computed the IWC on 2-months' bills. Since working capital is required to carry out the day-to-day business, working capital equivalent to 2-months' receivables would be adequate.

Regarding the interest rate on Working Capital, the Commission had earlier allowed Interest on Working Capital (IWC) at 1.5% above the rates approved for term-loans, in view of the fact that interest rate on short-term loans is higher than that of term-loans. **The Commission decides to retain IWC at 1.5% above rates approved for term-loans. Thus IWC to be allowed would be 13.25% p.a.**

e) Auxiliary Consumption:

The auxiliary consumption proposed by CERC, KREDL & other Stakeholders are as under:

Organisation/Stakeholders	% Aux. Consp.
CERC	10%
KREDL	13%
KPCL	9%
Developers	13%

All the developers have proposed auxiliary consumption of 13%. Most of the them have furnished a typical layout of fuel processing machines with kW details of motors to justify their stand. It is stated that, due to use of various fuel processing machines coupled with multiple handling & non-continuous operation, auxiliary consumption is higher.

The auxiliary consumption approved in the neighbouring States is as under:

TNERC	APERC
9%	9%

The Commission had approved 9% auxiliary consumption in the earlier tariff order.

Hon'ble ATE, in its order dated 14th May 2007 in Appeal No.41 of 2006, has directed to adopt 10% as auxiliary consumption. However, KPTCL/ESCOMs have challenged the ATE's order before the Hon'ble Supreme Court. Hon'ble Supreme Court has stayed the said ATE order.

Commission's Decision:

Even though typical layouts of fuel processing machines with kW details of motors are furnished by the developers, the duration of usage is not specified. CERC, while approving auxiliary consumption of 10.0%, has opined that, auxiliary consumption vary according to need of pre-processing of biomass-fuel and considering this aspect, typical size of the plant and drive towards energy conservation, CERC has specified 10% as auxiliary consumption. The Commission, in its earlier order, had held that, in the case of biomass plants, the auxiliary consumption would be slightly higher as compared to co-generation plants, due to processing of the biomass.

In view of the above and keeping the energy conservation aspects in view, the Commission approves 9% as the auxiliary consumption.

f) Fuel Price:

KPCL has proposed Rs.2000/kg.

Ravikiran has proposed Rs.3500/ MT and has produced the bill for FEB/March 2009 in which cost/MT is indicated as Rs.2000/--2500/MT. Koganthi has proposed Rs.3200/MT on as received basis excluding loading/unloading & drying charges.

cash vouchers and roadways receipts for the month of February/March 2009. The cost of firewood/MT as indicated in the vouchers is in the range of Rs.2050-2300/MT, other fuels in the range of Rs. 1500–2500/MT and transportation charges of Rs.950- Rs.1000/MT.

MPPL /RKPPL/Hassan bio-mass have stated that fuel cost has increased due to increased demand for biomass fuels by other industries like textile etc. Further, cost of transportation & loading/unloading has increased. The Fuels cost/unit thus would be Rs.4.31.

Koppal Green has furnished bills for January/February 2009 indicating cost of fuels is in the range of Rs.1923-Rs.2050/MT.

Konark power projects have proposed 3200/MT and have furnished bills for the month of February indicating a fuel cost of Rs.1900-Rs.2500.

Substantiating the stand, most of the developers have furnished cost of fuel as computed by Biomass power producers of Karnataka.

CERC has specified Rs.1797/MT for States other than Andhra Pradesh, Haryana, Maharashtra, Madhya Pradesh, Punjab, Rajasthan, TamilNadu & Uttarpradesh. The maximum price allowed by CERC is Rs. 2168/MT for Haryana. For southern states, the highest price is Rs. 1823/ MT for Tamil Nadu and the minimum price is Rs. 1301 for Andhra Pradesh. CERC has stated that, to compute biomass fuel price for respective states, equivalent heat value approach for landed cost of coal for thermal power stations has been adopted. Landed cost & calorific value is as approved by respective SERCs.

KREDL has proposed Fuel price in the range of 1500-2000MT.

The Fuel price approved in the neighbouring States is as under:

Rs./MT

TNERC	APERC	MERC
2000	2000	1075 for main biomass, 960 for secondary biomass & 1118 for coal

The Commission, in its earlier order, had approved fuel price at Rs.1000/- per MT for the purpose of tariff determination of biomass plants.

Commission's views:

From the computations of Biomass power producers of Karnataka as furnished by the developers, the Commission notes that, they have considered 14-types of fuels and for each type of fuel, the total cost per ton has been worked out to achieve calorific value of 3300 kcal/kg [as per ATE's order]. SHR has been considered at 4500 kcal/unit as per ATE's order to arrive at fuel consumption/unit for each type of fuel. For each type of fuel, certain calorific value has been estimated, for which no documentary evidence is furnished. Based on the above methodology, fuel cost/unit is arrived at Rs.4.31 per unit.

As already stated, the Hon'ble ATE's order has been challenged by the ESCOMS before the Hon'ble Supreme Court and the court has stayed ATE's order dated 14th May 2007. Since the ATE's order has not reached its finality, making assumptions based on the said order and computing the fuel cost is not appropriate.

The Commission also notes that, the bills furnished are only for few months. To work out the average cost, developers should have furnished the bills pertaining to purchases of fuel made during the financial year. Alternatively, they could have filed the audited annual accounts to justify their stand. Hence, by considering the data for a few months, one cannot arrive at the correct fuel price for the entire year.

Considering the fuel escalation rate of 5% on the basic price of Rs. 1000/ MT approved earlier, the Price works out to Rs. 1280/ MT (after rounding off). **Hence, the Commission approves biomass price at Rs. 1280/ MT.**

g) Fuel Cost escalation:

CERC has adopted indexation mechanism for fuel price. Alternatively, as an option , CERC has provided for 5% escalation in variable charges every year.

The Commission in its earlier order has determined the fuel cost escalation at 5%per annum.

The Commission is not in favour of indexation of fuel cost prices, for the reasons stated earlier. **Hence, the Commission decides to retain the existing fuel cost escalation rate of 5% per annum.**

h) Fuel Consumption:

The proposals by developers are as under:

Ravikiran Power Projects /RKPPL/MPPL/ Konark power projects/Hassan Biomass/: 2.21 kg/unit. Considering 3300 kcal/kg and SHR of 4500 kcal/unit [as per ATE order, which is based on CEA report], the specific consumption works out to 1.36 kg/unit on dry basis. However, on as received basis, the fuel has moisture content between 30% to 80% and therefore specific fuel consumption will increase. Based on the estimates furnished by biomass power producers of Karnataka, they have proposed specific consumption of 2.21.kg/unit on as received basis.

As already stated, the Hon'ble ATE's order has been challenged by ESCOMS before the Hon'ble Supreme Court and the Hon'ble Supreme Court has stayed the Hon'ble ATE's order. Since the ATE's order has not reached its finality, making assumptions based on the said order and computing the fuel requirement would not be appropriate

The Specific Fuel consumption approved in the neighbouring States is as under:

kg/unit

TNERC	APERC
1.20	1.16

CERC has specified a Station heat rate of 3800 kcal/unit and calorific value of 3467 kcal/kg. Thus the fuel consumption works out to 1.10-kg/ unit. CERC has stated that, GCV is for the mix of biomass fuels available in a particular State and the calorific value of individual biomass fuel has been considered as maintained by IISC, Bangalore. Regarding SHR, it is stated that, while design efficiency is of the order of 3400-3600 kcal/unit, the operational efficiency is significantly lower due to several factors. Keeping this in view & stakeholder's submissions, CERC has arrived at SHR of 3800 kcal/unit.

KREDL has proposed 1.80 kg/unit and KPCL has proposed 1.23 kg/unit. However, KREDL and KPCL have not furnished any details.

The Commission, in its earlier order, after considering the views of stakeholders, had approved 1.16 kg/unit as the reasonable specific fuel consumption.

Considering all the above factors, the Commission retains fuel requirement at 1.16 kg/unit.

i) Approved Tariff:

CERC/KREDL has not proposed any specific tariff rate.

KPCL has proposed levelised tariff of Rs.4.40/unit and average tariff of 4.51/unit.

GESCOM: Rs.3.00/unit with 2% annual escalation(without cumulative)

Developers have proposed tariff of 5.50/unit with 5% escalation p.a. Some of the developers have requested for 20% escalation p.a.

Considering the parameters as approved by the Commission in the preceding paragraphs, the Commission has worked out and approved the following tariff for Bio-mass projects and the year wise tariff is indicated below:

Year	Tariff (Rs./unit)
1st Year	3.66
2nd Year	3.69
3rd Year	3.72
4th Year	3.77
5th Year	3.81
6th Year	3.86
7th Year	3.92
8th Year	3.99
9th Year	4.06
10th Year	4.13

j) Applicability of the revised Rates to new PPAs:

As per the existing approved Model PPA, the approved tariff for the first year is applicable from the date of commercial Operation (CoD) for a ten year period, irrespective of the date of signing of PPA, as a result they will not get the benefit of increase in rates during the period from the date of signing of PPA to the date of Commercial Operation. This was challenged by some of the generators before the Hon'ble ATE in Appeal No.129/2005 and the Hon'ble ATE has held that such an approach is not reasonable because the entrepreneurs will be denied legitimate escalation upto the year of commissioning.

In view of the above the Commission has now decided that the first year tariff shall be applicable with reference to the date of signing of PPA and to allow the relevant escalated rate as on the date of Commercial Operation. Consequently, the relevant clause of the model PPA approved by the Commission earlier, stands modified.

13. **Tariff for the existing Plants, which have completed 10 years of PPA period**

The Commission, during the course of public hearing, had directed the existing plants, which have completed the initial PPA period of 10 years, to file proposals for fixation of tariff after the completion of 10 years.

IWPA had filed a proposal requesting the Commission to fix a tariff of Rs.3.70 per unit in respect of wind power projects. Konark Power projects Ltd. has proposed a tariff of Rs.6.82 per unit. Both IWPA & Konark Power have adopted different parameters as compared to the Commission approved parameters.

In view of the fact that, after completion of 10 years debt servicing will have been fully met and the only increase (marginal) would be in respect of O & M expenses, but at the same time the opportunity cost of the power has gone up, the Commission decides to allow the rate equal to the rate at the end of the tenth year, without escalation for the next ten years for all renewable projects. This tariff is also applicable to such PPAs in which ten years period is already completed but no tariff has been determined.

14. **Date of effect of this order**:

i) The tariff as determined by the Commission in the present order shall be applicable to all the Power Purchase Agreements submitted to the Commission for approval on or after **01.01.2010**, for a period of **10 years** from the date of signing of PPA.

ii) The Tariff determined by the Commission in this order will be reviewed after 5 years as per Section 5.8 of the KERC (Power Procurement from Renewable Sources by Distribution Licensee) Regulations, 2004, which shall be applicable to agreements to be entered into after that date.

15. In respect of the Power Purchase Agreements already approved by the Commission and in respect of PPAs received in the Commission before 01.01.2010, the tariff and all the terms and conditions as per those PPAs shall hold good for the period specified in the PPAs.

16. In view of this Order, petition No. OP/28/2008filed by REDAK stands disposed of.

This order is signed dated and issued by Karnataka Electricity Regulatory Commission on this 11th day of December 2009.

Sd/-	Sd/-	Sd/-
K.P.Pandey	**Visvanath Hiremath**	**K.Srinivasa Rao**
Chairman	**Member**	**Member**