Central Electricity Regulatory Commission

(Terms and Conditions for Tariff Determination from Renewable Energy Sources)


<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Description</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Control Period or Review Period</td>
<td>3 - Years (in which first year shall be the financial year 2017-18).</td>
</tr>
<tr>
<td>2.</td>
<td>Scope and extent of application</td>
<td>These regulations shall apply for a generating station or a unit thereof commissioned during the Control Period and based on renewable sources of energy.</td>
</tr>
<tr>
<td>3.</td>
<td>Tariff Period/Useful Life</td>
<td>Sr. No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.</td>
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<td>2.</td>
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<td>3.</td>
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<td></td>
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<td>4.</td>
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<td>5.</td>
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<td>6.</td>
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<td>7.</td>
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<td></td>
<td></td>
<td>8.</td>
</tr>
<tr>
<td>4.</td>
<td>Project Specific Tariff</td>
<td>Project specific tariff, on case to case basis, shall be determined by the Commission such as Solar PV and Solar Thermal, Wind Energy, Biomass, Biogas, Municipal Solid Waste, other Hybrid projects.</td>
</tr>
<tr>
<td>5.</td>
<td>Tariff Structure</td>
<td>1. The tariff for renewable energy technologies shall be single part tariff consisting of the following fixed cost components: (a) Return on equity; (b) Interest on loan capital; (c) Depreciation; (d) Interest on working capital; (e) Operation and maintenance expenses; 2. For RE technologies having fuel cost component, like biomass power projects and non-fossil fuel based cogeneration, single part tariff with two components, fixed cost component and fuel cost component, shall be determined.</td>
</tr>
<tr>
<td>6.</td>
<td>Tariff Design</td>
<td>1. The generic tariff shall be determined considering the year of commissioning of the project, on levelised basis for the Tariff Period. 2. Levellisation shall be carried out for the ‘useful life’ of the Renewable Energy project.</td>
</tr>
<tr>
<td>7.</td>
<td>Discount Factor for Levelised Tariff</td>
<td>Discount factor equivalent to Post Tax weighted average cost of capital.</td>
</tr>
<tr>
<td>8.</td>
<td>Despatch Principles</td>
<td>1. All renewable energy power plants except for biomass power plants with installed capacity of 10 MW and above, and non-fossil fuel based cogeneration plants shall be treated as ‘MUST RUN’ power plants and shall not be subjected to ‘merit order despatch’ principles.</td>
</tr>
</tbody>
</table>
2. The biomass power generating station with an installed capacity of 10 MW and above and non-fossil fuel based co-generation projects shall be subjected to scheduling and despatch code.

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Region</th>
<th>Renewable Energy Source</th>
<th>Project Size</th>
<th>Capital Cost (Rs. Lakh/MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>-</td>
<td>Wind Energy</td>
<td>-</td>
<td>determined by the commission</td>
</tr>
<tr>
<td>2.</td>
<td>Himanchal Pradesh, Uttarakhand, West Bengal and North Eastern States</td>
<td>Small Hydro Project</td>
<td>Below 5 MW</td>
<td>1000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5 MW to 25 MW</td>
<td>900</td>
</tr>
<tr>
<td></td>
<td>Other States</td>
<td></td>
<td>Below 5 MW</td>
<td>779</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5 MW to 25 MW</td>
<td>707</td>
</tr>
<tr>
<td>3.</td>
<td>Biomass Rankine Cycle Projects</td>
<td>Project [other than rice straw and juliflora (plantation) based project] with water cooled condenser</td>
<td>559.03</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Project [other than rice straw and juliflora (plantation) based project] with air cooled condenser</td>
<td>600.44</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>For rice straw and juliflora (plantation) based project with water cooled condenser</td>
<td>610.80</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>For rice straw and juliflora (plantation) based project with air cooled condenser</td>
<td>652.20</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Non-fossil fuel based Cogeneration Projects</td>
<td>492.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Solar PV Power Project</td>
<td>determined by the commission</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Solar Thermal Power Project</td>
<td>determined by the commission</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Biomass Gasifier Power Projects</td>
<td>592.88</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Biogas based Power Projects</td>
<td>1185.76</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sl. No</td>
<td>Region</td>
<td>Renewable Energy Source</td>
<td>Project Size</td>
<td>CUF/PLF</td>
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<tr>
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</tr>
<tr>
<td>1.</td>
<td>Wind Power (Density (W/m²))</td>
<td>Upto 220</td>
<td>22%</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>221-275</td>
<td>24%</td>
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<td></td>
<td></td>
<td>276-330</td>
<td>28%</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>331-440</td>
<td>33%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; 440</td>
<td>35%</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Small Hydro Project</td>
<td>Other States</td>
<td>30%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Himachal Pradesh, Uttarakhand, West Bengal and North Eastern States</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Biomass Power Projects based on Rankine Cycle Technology</td>
<td>During Stabilisation</td>
<td>60%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>During the remaining period of the first year (after stabilization):</td>
<td></td>
<td>70%</td>
<td></td>
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<tr>
<td></td>
<td>From 2 Year onwards</td>
<td></td>
<td>80%</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Non-fossil fuel based Cogeneration Projects</td>
<td>Andhra Pradesh and Uttar Pradesh</td>
<td>45%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tamil Nadu and</td>
<td></td>
<td>60%</td>
<td></td>
</tr>
</tbody>
</table>

9. Municipal Solid Waste / Refuse Derived Fuel and based on Rankine cycle technology determined by the commission.

10. Debt Equity Ratio: 70:30. If the equity actually deployed is more than 30% of the capital cost, equity in excess of 30% shall be treated as normative loan.

11. Loan and Finance Charges: Loan Tenure – 13 Years. For the purpose of computation of tariff, normative interest rate of two hundred (200) basis points above the average State Bank of India Marginal Cost of Funds based Lending Rate (MCLR) (one year tenor) prevalent during the last available six months shall be considered.

12. Depreciation:

1. The value base for the purpose of depreciation shall be the Capital Cost of the asset admitted by the Commission. The Salvage value of the asset shall be considered as 10% and depreciation shall be allowed up to maximum of 90% of the Capital Cost of the asset.

2. Depreciation rate of 5.28% per annum for first 13 years and remaining depreciation to be spread during remaining useful life of the RE projects considering the salvage value of the project as 10% of project cost shall be considered.

13. Return on Equity:

1. The value base for the equity shall be 30% of the capital cost or actual equity (in case of project specific tariff determination).

2. (2) The normative ROE shall be 14%, to be grossed up by prevailing Minimum Alternate Tax (MAT) as on 1st April of previous year for the entire useful life of the project.

14. Interest on Working Capital: Interest on Working Capital shall be at interest rate equivalent to the normative interest rate of three hundred (300) basis points above the average State Bank of India MCLR (One Year Tenor) prevalent during the last available six months for the determination of tariff.

15. Capacity utilization Factor/Plant Load Factor:
5. Solar PV Power Project
6. Solar Thermal Power Project
7. Biomass Gasifier Power Projects
8. Biogas based Power Projects
9. Municipal Solid Waste / Refuse Derived Fuel and based on Rankine cycle technology

16. Operation and Maintenance Expenses

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Renewable Energy Source</th>
<th>Project Size</th>
<th>O&amp;M Expense (Rs. Lakh / MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Wind Energy</td>
<td></td>
<td>determined by the commission</td>
</tr>
<tr>
<td>2.</td>
<td>Small Hydro Project</td>
<td>Below 5 MW</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 MW to 25 MW</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Himachal Pradesh, Uttarakhand, West Bengal and North Eastern States</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other States</td>
<td>Below 5 MW</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 MW to 25 MW</td>
<td>21</td>
</tr>
<tr>
<td>3.</td>
<td>Biomass Power Projects based on Rankine Cycle Technology</td>
<td></td>
<td>40</td>
</tr>
<tr>
<td>5.</td>
<td>Solar PV Power Project</td>
<td></td>
<td>based on prevailing market trends</td>
</tr>
<tr>
<td>6.</td>
<td>Solar Thermal Power Project</td>
<td></td>
<td>based on prevailing market trends</td>
</tr>
<tr>
<td>7.</td>
<td>Biomass Gasifier Power Projects</td>
<td></td>
<td>52.83</td>
</tr>
<tr>
<td>8.</td>
<td>Biogas based Power Projects</td>
<td></td>
<td>52.83</td>
</tr>
<tr>
<td>9.</td>
<td>Municipal Solid Waste / Refuse Derived Fuel and based on Rankine cycle technology</td>
<td></td>
<td>based on prevailing market trends</td>
</tr>
</tbody>
</table>
17. **Interest on Working Capital**

Interest on Working Capital shall be at interest rate equivalent to the normative interest rate of three hundred (300) basis points above the average State Bank of India MCLR (One Year Tenor) prevalent during the last available six months for the determination of tariff.

18. **Rebate**

1. For payment of bills of the generating company through letter of credit, a rebate of 2% shall be allowed.  
2. Where payments are made other than through letter of credit within a period of one month of presentation of bills by the generating company, a rebate of 1% shall be allowed.

19. **Late Payment Surcharge**

3. In case the payment of any bill for charges payable under these regulations is delayed beyond a period of 60 days from the date of billing, a late payment surcharge at the rate of 1.25% per month shall be levied by the generating company.

20. **Sharing of CDM**

The proceeds of carbon credit from approved CDM project shall be shared between generating company and concerned beneficiaries in the following manner, namely

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

b) In the second year, the share of the 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 company and the beneficiaries.

21. **Subsidy or incentive by the Central / State Government**

The Commission shall take into consideration any incentive or subsidy offered by the Central or State Government, including accelerated depreciation benefit if availed by the generating company, for the renewable energy power plants while determining the tariff under these Regulations.

22. **Taxes and Duties**

Tariff determined under these regulations shall be exclusive of taxes and duties as may be levied by the appropriate Government.

23. **Auxiliary Consumption**

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Renewable Energy Source</th>
<th>Auxiliary Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Small Hydro Project</td>
<td>1.0%</td>
</tr>
<tr>
<td>2.</td>
<td>Biomass Power Projects based on Rankine Cycle Technology</td>
<td>During 1\textsuperscript{st} Year</td>
</tr>
<tr>
<td></td>
<td>Project using water cooled condenser</td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td>Project using air cooled condenser</td>
<td>13%</td>
</tr>
<tr>
<td>3.</td>
<td>Non-fossil fuel based Cogeneration Projects</td>
<td>8.5%</td>
</tr>
<tr>
<td>4.</td>
<td>Solar PV Power Project</td>
<td>0.25%</td>
</tr>
<tr>
<td>5.</td>
<td>Solar Thermal Power Project</td>
<td>10%</td>
</tr>
<tr>
<td>6.</td>
<td>Biomass Gasifier Power Projects</td>
<td>10%</td>
</tr>
<tr>
<td>7.</td>
<td>Biogas based Power Projects</td>
<td>12%</td>
</tr>
<tr>
<td>8.</td>
<td>Municipal Solid Waste / Refuse Derived Fuel and based on Rankine cycle technology</td>
<td>15%</td>
</tr>
</tbody>
</table>

24. **Station Heat rate**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>RE Technology</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Biomass Power Projects based on Rankine Cycle Technology</td>
<td></td>
</tr>
</tbody>
</table>
For projects using travelling grate boilers 4200 kCal/kWh
For projects using AFBC boilers 4125 kCal/kWh

2. Non-fossil fuel based Cogeneration Projects 3600 kCal / kWh
3. Municipal Solid Waste / Refuse Derived Fuel and based on Rankine cycle technology 4200 kcal/kWh.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>RE Technology</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Biomass Power Projects based on Rankine Cycle Technology</td>
<td>3100 kCal/kg</td>
</tr>
<tr>
<td>2.</td>
<td>Non-fossil fuel based Cogeneration Projects (Bagasse)</td>
<td>2250 kCal/kg.</td>
</tr>
<tr>
<td>3.</td>
<td>Municipal Solid Waste / Refuse Derived Fuel and based on Rankine cycle technology</td>
<td>2500 kcal/kg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>RE Technology</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Biomass Power Projects based on Rankine Cycle Technology</td>
<td>FY2017-18</td>
</tr>
<tr>
<td></td>
<td>Andhra Pradesh</td>
<td>2873.22</td>
</tr>
<tr>
<td></td>
<td>Haryana</td>
<td>3270.39</td>
</tr>
<tr>
<td></td>
<td>Maharashtra</td>
<td>3344.85</td>
</tr>
<tr>
<td></td>
<td>Punjab</td>
<td>3420.56</td>
</tr>
<tr>
<td></td>
<td>Rajasthan</td>
<td>2854.60</td>
</tr>
<tr>
<td></td>
<td>Tamil Nadu</td>
<td>2826.05</td>
</tr>
<tr>
<td></td>
<td>Uttar Pradesh</td>
<td>2922.86</td>
</tr>
<tr>
<td></td>
<td>Other States</td>
<td>3073.05</td>
</tr>
<tr>
<td>2.</td>
<td>Non-fossil fuel based Cogeneration Projects (Bagasse Price)</td>
<td>Same as Biomass Power Projects based on Rankine Cycle</td>
</tr>
<tr>
<td>3.</td>
<td>Biomass Gasifier Power Projects</td>
<td>Same as Biomass Power Projects based on Rankine Cycle</td>
</tr>
<tr>
<td>4.</td>
<td>Biogas based Power Projects</td>
<td>1228.72 /MT</td>
</tr>
<tr>
<td>6.</td>
<td>Refuse Derived Fuel and based on Rankine cycle technology</td>
<td>1800/MT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>RE Technology</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Biomass Gasifier Power Projects</td>
<td>1.25 kg per kWh</td>
</tr>
<tr>
<td>2.</td>
<td>Biogas based Power Projects</td>
<td>3 kg of substrate mix per kWh</td>
</tr>
</tbody>
</table>