

# ASSAM ELECTRICITY REGULATORY COMMISSION

## (Terms and Condition for Tariff Determination from Renewable Energy Sources), Regulations, 2017, Dated: 04-09-2018

Sl. No.	Description	Summary																											
1.	Control Period or Review Period	3 – Years (FY: 2017-18)																											
2.	Tariff Period/Useful Life	<table border="1"> <thead> <tr> <th>Sl. No.</th> <th>RE Technology</th> <th>Useful Life (in Years)</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Wind energy power project</td> <td>25 years</td> </tr> <tr> <td>2.</td> <td>Bio mass power project with Rankine cycle technology</td> <td>20 years</td> </tr> <tr> <td>3.</td> <td>Non-fossil fuel cogeneration project</td> <td>20 years</td> </tr> <tr> <td>4.</td> <td>Small Hydro Plant</td> <td>35 years</td> </tr> <tr> <td>5.</td> <td>Municipal Solid Waste (MSW)/ and Refuse Derived Fuel (RDF) based power project</td> <td>20 years</td> </tr> <tr> <td>6.</td> <td>Solar PV/Solar thermal power project</td> <td>25 years</td> </tr> <tr> <td>7.</td> <td>Biomass Gasifier based power project</td> <td>20 years</td> </tr> <tr> <td>8.</td> <td>Biogas based power project</td> <td>20 years</td> </tr> </tbody> </table>	Sl. No.	RE Technology	Useful Life (in Years)	1.	Wind energy power project	25 years	2.	Bio mass power project with Rankine cycle technology	20 years	3.	Non-fossil fuel cogeneration project	20 years	4.	Small Hydro Plant	35 years	5.	Municipal Solid Waste (MSW)/ and Refuse Derived Fuel (RDF) based power project	20 years	6.	Solar PV/Solar thermal power project	25 years	7.	Biomass Gasifier based power project	20 years	8.	Biogas based power project	20 years
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3.	Project Specific Tariff	<ol style="list-style-type: none"> <li>1. Project specific tariff, on case to case basis, shall be determined by the Commission.</li> <li>2. Determination of Project specific tariff for generation of electricity from such renewable energy sources shall be in accordance with such terms and conditions as stipulated under relevant Orders of the Commission.</li> <li>3. No annual generic tariff shall be determined for the technologies mentioned in this Regulation. Financial and Operational norms as may be specified would be the ceiling norms while determining the project specific tariff.</li> </ol>																											
4.	Tariff Structure	<ol style="list-style-type: none"> <li>1. The tariff for renewable energy technologies shall be single part tariff consisting of the following fixed cost components: <ol style="list-style-type: none"> <li>a. Return on equity;</li> <li>b. Interest on loan capital;</li> <li>c. Depreciation;</li> <li>d. Interest on working capital;</li> <li>e. Operation and maintenance expenses;</li> </ol> </li> <li>2. For renewable energy 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.</li> </ol>																											
5.	Tariff Design	<ol style="list-style-type: none"> <li>1. The generic tariff shall be determined considering the year of commissioning of the project, on levellised basis for the Tariff Period.</li> <li>2. For the purpose of levellised tariff computation, the discount factor equivalent to Post Tax weighted average cost of capital shall be considered.</li> <li>3. Levellisation shall be carried out for the “useful life” of the Renewable Energy project.</li> <li>4. The above principles shall also apply for project specific tariff.</li> </ol>																											

6.	<b>Despatch Principals</b>	<ol style="list-style-type: none"> <li>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.</li> <li>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 as specified under Indian Electricity Grid Code and Central Electricity Regulatory Commission Regulations, 2014 including amendments thereto.</li> <li>3. Scheduling of wind and solar energy shall be governed as per the aforesaid provisions of Central Electricity Regulatory Commission Regulations, 2015 and AERC Regulations, 2004 and AERC Regulations, 2004 as amended from time to time.</li> </ol>																																								
7.	<b>Capital Cost</b>	<p>Capital cost shall be inclusive of all capital work including plant and machinery, civil work, erection and commissioning, financing and interest during construction, and evacuation infrastructure up to inter-connection point.</p> <table border="1" data-bbox="602 716 1453 1879"> <thead> <tr> <th data-bbox="602 716 662 783">Sl. No</th> <th data-bbox="662 716 894 783">Renewable Energy Source</th> <th data-bbox="894 716 1182 783">Project Size</th> <th data-bbox="1182 716 1453 783">Capital Cost (Rs. Lakh/MW)</th> </tr> </thead> <tbody> <tr> <td data-bbox="602 783 662 852">1.</td> <td data-bbox="662 783 894 852">`Wind Energy</td> <td data-bbox="894 783 1182 852">-</td> <td data-bbox="1182 783 1453 852">determined by the commission</td> </tr> <tr> <td data-bbox="602 852 662 936" rowspan="2">2.</td> <td data-bbox="662 852 894 936" rowspan="2">Small Hydro Project</td> <td data-bbox="894 852 1182 894">Below 5 MW</td> <td data-bbox="1182 852 1453 894">1000</td> </tr> <tr> <td data-bbox="894 894 1182 936">5 MW to 25 MW</td> <td data-bbox="1182 894 1453 936">900</td> </tr> <tr> <td data-bbox="602 936 662 1541" rowspan="4">3.</td> <td data-bbox="662 936 894 1541" rowspan="4">Biomass Rankine Cycle Projects</td> <td data-bbox="894 936 1182 1104">Project [other than rice straw and juliflora (plantation) based project] with water cooled condenser</td> <td data-bbox="1182 936 1453 1104">559.03</td> </tr> <tr> <td data-bbox="894 1104 1182 1272">Project [other than rice straw and Juliflora (plantation) based project] with air cooled condenser</td> <td data-bbox="1182 1104 1453 1272">600.44</td> </tr> <tr> <td data-bbox="894 1272 1182 1398">For rice straw and juliflora (plantation) based project with water cooled condenser</td> <td data-bbox="1182 1272 1453 1398">610.80</td> </tr> <tr> <td data-bbox="894 1398 1182 1541">For rice straw and juliflora (plantation) based project with air cooled condenser</td> <td data-bbox="1182 1398 1453 1541">652.20</td> </tr> <tr> <td data-bbox="602 1541 662 1671">4.</td> <td data-bbox="662 1541 894 1671">Non-fossil fuel based Cogeneration Projects</td> <td data-bbox="894 1541 1182 1671"></td> <td data-bbox="1182 1541 1453 1671">492.5</td> </tr> <tr> <td data-bbox="602 1671 662 1745">5.</td> <td data-bbox="662 1671 894 1745">Solar PV Power Project</td> <td data-bbox="894 1671 1182 1745"></td> <td data-bbox="1182 1671 1453 1745">determined by the commission</td> </tr> <tr> <td data-bbox="602 1745 662 1818">6.</td> <td data-bbox="662 1745 894 1818">Solar Thermal Power Project</td> <td data-bbox="894 1745 1182 1818"></td> <td data-bbox="1182 1745 1453 1818">determined by the commission</td> </tr> <tr> <td data-bbox="602 1818 662 1879">7.</td> <td data-bbox="662 1818 894 1879">Biomass Gasifier Power Projects</td> <td data-bbox="894 1818 1182 1879"></td> <td data-bbox="1182 1818 1453 1879">592.88</td> </tr> </tbody> </table>	Sl. No	Renewable Energy Source	Project Size	Capital Cost (Rs. Lakh/MW)	1.	`Wind Energy	-	determined by the commission	2.	Small Hydro Project	Below 5 MW	1000	5 MW to 25 MW	900	3.	Biomass Rankine Cycle Projects	Project [other than rice straw and juliflora (plantation) based project] with water cooled condenser	559.03	Project [other than rice straw and Juliflora (plantation) based project] with air cooled condenser	600.44	For rice straw and juliflora (plantation) based project with water cooled condenser	610.80	For rice straw and juliflora (plantation) based project with air cooled condenser	652.20	4.	Non-fossil fuel based Cogeneration Projects		492.5	5.	Solar PV Power Project		determined by the commission	6.	Solar Thermal Power Project		determined by the commission	7.	Biomass Gasifier Power Projects		592.88
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		8.	Biogas based Power Projects		1185.76
		9.	Municipal Solid Waste/Refuse Derived Fuel and based on Rankine cycle technology		determined by the commission
8.	<b>Debt Equity Ratio</b>	<p>1. For generic tariff to be determined based on suo-motu petition, the debt equity ratio shall be 70:30.</p> <p>2. For Project specific tariff, the following provisions shall apply:- If the equity actually deployed is more than 30% of the capital cost, equity in excess of 30% shall be treated as normative loan.</p>			
9.	<b>Loan and Finance Charges</b>	<p>Loan Tenure-13 Years</p> <p>Interest Rate-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.</p>			
10.	<b>Depreciation</b>	<p>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.</p>			
11.	<b>Return on Equity</b>	<p>1. The value base for the equity shall be 30% of the capital cost or actual equity (in case of project specific tariff determination) as determined under Regulation.</p> <p>2. The normative Return on Equity 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.</p>			
12.	<b>Operation and Maintenance Expenses</b>	<p>Normative O&amp;M expenses allowed during first year of the Control Period (i.e. FY 2017-18) under these Regulations shall be escalated at the rate of 5.72% per annum over the Tariff Period.</p>			
		<b>Sl. No</b>	<b>Renewable Energy Source</b>	<b>Project Size</b>	<b>O&amp;M Expense (Rs. Lakh / MW)</b>
		1.	Wind Energy		determined by the commission
		2.	Small Hydro Project	Below 5 MW	36
				5 MW to 25 MW	27
		3.	Biomass Power Projects based on Rankine Cycle Technology		40
		4.	Non-fossil fuel based Cogeneration Projects		21.13
		5.	Solar PV Power Project		based on prevailing market trends
		6.	Solar Thermal Power Project		based on prevailing market trends
		7.	Biomass Gasifier Power Projects		52.83
8.	Biogas based Power Projects		52.83		

		9.	Municipal Solid Waste / Refuse Derived Fuel and based on Rankine cycle technology		based on prevailing market trends	
13.	<b>Rebate</b>	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 30 days of presentation of bills by the generating company, a rebate of 1% shall be allowed.				
14.	<b>Late Payment Surcharge</b>	In case the payment of any bill for charges payable under these regulations is delayed beyond a period of 30 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.				
15.	<b>Subsidy</b>	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.				
16.	<b>Capacity utilization factor/Plant Load Factor</b>	<b>Sl. No</b>	<b>Year</b>	<b>Renewable Energy Source</b>	<b>Project Size</b>	<b>CUF/PLF</b>
		1.		Wind Power (Density (W/m <sup>2</sup> ))	Upto 220	22%
					221-275	24%
					276-330	28%
					331-440	33%
					> 440	35%
		2.		Small Hydro Project		45%
		3.	During Stabilisation	Biomass Power Projects based on Rankine Cycle Technology		60%
			During the remaining period of the first year (after stabilization):			70%
			From 2 Year onwards			80%
		4.		Non-fossil fuel based Cogeneration Projects		53%
		5.		Solar PV Power Project		19%
		6.		Solar Thermal Power Project		23%
		7.		Biomass Gasifier Power Projects		85%
8.		Biogas based Power Projects		90%		
9.	During Stabilisation	Municipal Solid Waste / Refuse Derived Fuel and based on Rankine		65% (for both MSW & RDF)		
	During the			65%(for both		

			remaining period of the first year (after stabilization)	cycle technology		MSW & RDF)
<b>17.</b>	<b>Auxiliary Consumption</b>	<b>Sl. No</b>	<b>Renewable Energy Source</b>		<b>Auxiliary Consumption</b>	
		1.	Wind Energy		-	
		2.	Small Hydro Project		1.0%	
		3.	Biomass Power Projects based on Rankine Cycle Technology		Project using water cooled condenser	Project using air cooled condenser)
			During 1 <sup>st</sup> Year		11%	13%
			2 <sup>nd</sup> year Onwards		13%	12%
		4.	Non-fossil fuel based Cogeneration Projects		8.5%	
		5.	Solar PV Power Project		0.25%	
		6.	Solar Thermal Power Project		10%	
		7.	Biomass Gasifier Power Projects		10%	
		8.	Biogas based Power Projects		12%	
		9.	Municipal Solid Waste / Refuse Derived Fuel and based on Rankine cycle technology		15%	
<b>18.</b>	<b>Station Heat Rate</b>	1.	Biomass Power Projects based on Rankine Cycle Technology			
		(a)	For projects using travelling grate boilers		4200 kCal/kWh	
		(b)	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	
<b>19.</b>	<b>Calorific Value</b>	1.	Biomass Power Projects based on Rankine Cycle Technology		3100 kCal/kg	
		2.	Non-fossil fuel based Cogeneration Projects		2250 kCal/kg.	
			Municipal Solid Waste / Refuse Derived Fuel and based on Rankine cycle technology		2500 kcal/kg	
<b>20.</b>	<b>Fuel Cost</b>	1.	Biomass Power Projects based on Rankine Cycle Technology		3073.05 /MT	
		2.	Non-fossil fuel based Cogeneration Projects (Bagasse)		1964.71/MT	

		3.	Biomass Gasifier Power Projects	3073.05 /MT
		4.	Biogas based Power Projects	1228.72 /MT
		5.	Municipal Solid Waste / Refuse Derived Fuel and based on Rankine cycle technology	1,800 per MT
<b>21.</b>	<b>Specific Fuel Consumption</b>	1.	Biomass Gasifier Power Projects	1.25 kg per kWh
		2.	Biogas based Power Projects	3 kg of substrate mix per kWh