# NAGALAND ELECTRICITY REGULATORY COMMISSION

## Nagaland ERC - (Terms and Conditions for Determination of Generation Tariff for Renewable Energy) Regulations, 2011 Dated 30th August, 2011

## Summary of Order

| Sl. No | Description | Summary of Regulations |
|---|---|---|
| 1. | **Title** | Nagaland ERC (Terms and conditions for determination of generation tariff for Renewable Energy) Regulations, 2011 dated 30th, August, 2011 |
| 2 | **Date of enforcement** | To come into force from the date of their publication in the Official Gazette of Nagaland. |
| 3 | **Applicability** | To the whole of the State of Nagaland<br>Applicable to all cases where tariffs for generation and sale of electricity from Renewable Energy Sources to the distribution licensees are to be determined by the Commission under Section 62 of the Act. within the State of Nagaland, subject to the fulfillment of eligibility criteria |
| 4 | **Useful Life** | (i) Wind energy power project 25 years<br>(ii) Mini/Micro/Small Hydro Plant 35 years<br>(iii) Biomass power project 20 years<br>(iv) Non-fossil fuel cogeneration 20 years<br>(v) Solar PV/Solar thermal power plants 25 years<br>(vi) Solar rooftop PV systems and small ground mounted PV systems 25 years |
| 6 | **Eligibility Criteria** | • Wind power project(s) located at the wind sites having minimum annual mean wind Power Density (WPD) of 200 Watt/$m^2$ measured at hub height of 50 meters and using turbine generators<br>• Small hydro project(s) using new plant and machinery<br>• Biomass power project based on Rankine cycle technology using biomass fuel and using new plant and machinery provided use of fossil fuel is restricted only to 15% of total fuel consumption on annual basis<br>• Non-fossil fuel based co-generation project using new plant and machinery (For more details refer Regulations)<br>• Solar power projects based on Technologies approved by MNRE<br>• Municipal waste based power plants based on Technologies approved by MNRE<br>• No license is required for generation and distribution of power in notified rural areas. Hence, stand alone solar PV power project and solar thermal power project supplying to rural areas will not have the tariffs determined by Regulator. |
| 7 | **Obligations and duties of the Generating Station** | Refer Regulations |
| 8 | **Sale of Power** | • All RE Stations allowed to sell power, after their own use, to the distribution licensee/ local rural grids/ /any consumer having open access at the rates determined by the Commission<br>• To any person at mutually agreed rates<br>• Distribution licensee to enter into PPA and sign the PPA within two months of offer made by the generating company, failing which the generating company may approach the Commission for suitable remedy |
| 9 | **Open Access** | • Allowed to all RE based Generating stations and Co-generating Stations for captive use<br>• May use State Transmission System for carrying electricity from his plant by using transmission lines and associated facilities subject to payment of transmission charges and adjustment of average Transmission Losses in kind determined by the Commission. |

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| | | • Open access to State distribution system shall be subject to payment of wheeling charges and adjustment of average distribution losses in kind as determined by the Commission. |
| **10** | **Control Period** | • Three years ending FY 2014-15.<br>• Tariff determined as per these Regulations for the RE projects commissioned during the Control Period shall continue to be applicable for the entire duration of the Tariff Period as specified in Regulation 11 below.<br>• In case Regulations for the next Control Period are not notified until commencement of next Control Period, the tariff norms as per these Regulations shall continue to remain applicable until notification of the revised Regulations subject to adjustments as per revised Regulations. |
| **11** | **Tariff Period** | • Tariff Period to be considered from the date of commercial operation of the generating station<br>• Tariff Period for RE projects except Small hydro projects below 5 MW, Mini/Micro Hydro projects, Solar PV, Solar thermal power projects, Solar rooftop PV and other small Solar power projects shall be thirteen (13) years.<br>• In case of Small hydro projects below 5 MW and Mini/Micro Hydro projects, the Tariff Period shall be thirty five (35) years.<br>• In case of Solar PV, Solar thermal power projects, Solar rooftop PV and other small Solar power projects, the Tariff Period shall be twenty five years (25) years.<br>• Tariff determined as per these regulations shall be applicable for Renewable Energy power projects, only for the duration of the Tariff Period |
| **12** | **Project Specific tariff** | Project specific tariff, on case to case basis, shall be determined by the Commission |
| **13** | **Petition and proceedings for determination of tariff** | As detailed in these Regulations |
| **14** | **Tariff Structure** | Single part Tariff consisting of the following fixed cost components:<br>• Return on equity;<br>• Interest on loan capital;<br>• Depreciation;<br>• Interest on working capital;<br>• Operation and maintenance expenses;<br>Provided that 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 |
| **15** | **Tariff Design** | • Tariff to be determined on levellised basis for the Tariff Period.<br>• Provided that for RE technologies having two components tariff with two components, tariff shall be determined on levellised basis considering the year of COD of the project for fixed cost component while the fuel cost component to be specified on year of operational basis.<br>• For the purpose of levellised tariff computation, the discount factor equivalent to Post Tax weighted average cost of capital shall be considered.<br>• Levellisation shall be carried out for the 'useful life' of the project while tariff shall be specified for the period equivalent to "Tariff Period". |
| **16** | **Despatch principles for electricity generated from RE Sources:** | • All RE 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<br>• 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 |
| | **FINANCIAL PRINCIPLES** | |
| **17** | **Capital Cost** | Detailed under **Technology Specific Parameters** for Different RE sources and shall be inclusive of all capital work including plant and machinery, civil work, erection and commissioning, financing costs preliminary and pre-operative expenses, interest during construction, and evacuation infrastructure up to inter-connection point.<br>Provided that for project specific tariff determination, the generating company shall submit the break-up of capital cost items along with its petition |

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| **17** | **Debt equity ratio** | 70:30 |
| **18** | **Interest Rate on Loan Capital** | Tenure of loan 10 years<br>• The normative loan outstanding as on April 1st of every year shall be worked out by deducting the cumulative repayment up to March 31st of previous year from the gross normative loan.<br>• For computation of tariff, the normative interest rate shall be considered as average State Bank of India (SBI) Base rate prevalent during the previous year of the tariff determination plus 150 basis points<br>• Notwithstanding any moratorium period availed by the generating company, the repayment of loan shall be considered from the first year of COD and shall be equal to the annual depreciation allowed |
| **19** | **Depreciation** | • Value base shall be capital cost of the assets<br>• Depreciation to be calculated annually on straight-line method<br>• Salvage value to be 10% and depreciation up to maximum 90% of the capital cost of the asset.<br>• Depreciation rate for the first 10 years of the Tariff Period to be 7% per annum and the remaining depreciation shall be spread over the remaining useful life of the project<br>• Depreciation shall be chargeable from the first year of commercial operation. In case of commercial operation of the asset for part of the year, depreciation shall be charged on pro rata basis.<br>• Capital subsidy received by the generator shall not be reduced from the capital cost for depreciation purposes |
| **20** | **Return on equity** | • Value base for the equity shall be 30% of the capital cost or actual equity in case of project specific tariff determination<br>• Normative Return on Equity: Pre-Tax 19% per annum for the first 10 years and 24% per annum 11$^{th}$ years onwards |
| **21** | **Interest on working capital** | To be computed as under:<br>1. **Small Hydro Power /Solar PV/Wind**<br>• O & M expenses for one month<br>• Receivables equivalent to 2 months of energy charges for sale of electricity calculated on the normative CUF;<br>• Maintenance spare @ 15% of O & M expenses<br>2. Biomass Power<br>• Fuel costs for four months equivalent to normative PLF;<br>• O & M expenses for one month<br>• Receivables equivalent to 2 months of fixed and variable charges for sale of electricity calculated on the target PLF;<br>• Maintenance spare @ 15% of O & M expenses<br>Interest on Working Capital shall be at interest rate equivalent to the average State Bank of India Base Rate during the previous year plus 100 basis points. |
| **22** | **O & M expenses** | • O&M expenses shall comprise repair and maintenance (R&M), establishment including employee expenses, and administrative and general expenses<br>• Shall be determined for the Tariff Period based on normative O&M expenses for the first Year of Control Period.<br>• Normative O&M expenses allowed during first year of the Control Period to be escalated at the rate of 5.72% per annum over the Tariff Period. |
| **23** | **Rebate** | • For payment of bills through LC: 2%<br>• Payments made other than through LC within a period of one month of presentation of bills: 1% |
| **24** | **Late Payment Surcharge** | In case the payment of any bill for charges 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. |
| **25** | **Sharing of CDM Benefits** | Proceeds of carbon credit from approved CDM project to be shared between generating company and concerned beneficiaries as follows:<br>• 100% by project developer in the first year after the date of commercial operation of the generating station. |

<table>
<tr><td></td><td></td><td>• 2nd year – share of beneficiaries @ 10% to progressively increase by 10% every year up to 50% where after to be shared in equal proportion, by the generating company and the beneficiaries<br>• CDM benefits shall not be considered for determination of levellised or yearly tariff and total amount of proceeds shall be remitted directly by the generating company to the distribution licensee for each financial year within one month of its receipt along with auditor's certification in accordance with above provisions.</td></tr>
<tr><td>26</td><td>Subsidy or incentive by the Central / State Government</td><td>• Commission to consider any incentive/grant/ subsidy offered by the Central/ State Government and income tax benefit on account of accelerated depreciation, if availed by the generating company while determining the project specific tariff.<br>• In case any Central Government / State Government specifically provides for any Generation based Incentive over and above tariff, the same shall not be factored in while determining Tariff.</td></tr>
<tr><td>27</td><td>Taxes and Duties</td><td>• Tariff determined shall be exclusive of taxes and duties as may be levied by the appropriate Government provided the Government allows the same as pass through on actual incurred basis.</td></tr>
<tr><td></td><td colspan="2">Technology Specific Parameters</td></tr>
<tr><td></td><td colspan="2">Wind Energy Projects</td></tr>
<tr><td>28</td><td>Capital Cost</td><td>Rs. 4.67 Crore / MW (during first year of Control Period) and shall be revised for the projects to be commissioned in each subsequent year as per Capital Cost Indexation Mechanism stipulated under CERC RE Tariff Regulations..<br>Note: Capital Cost to include WTG, its auxiliaries, land cost, site development charges and other civil works, transportation charges, evacuation cost up to inter-connection point, financing charges and IDC.</td></tr>
<tr><td>29</td><td>Capacity Utilisation Factor (CUF)</td><td>Benchmark CUF norm for wind energy projects for FY 2010-11 measured at 50 metre hub height is as given below:
<table>
<tr><th>Annual Mean Wind Power Density (W/M$^2$) at 80m hub height meter hub-height</th><th>CUF</th></tr>
<tr><td>200-250</td><td>20 %</td></tr>
<tr><td>250-300</td><td>23 %</td></tr>
<tr><td>300-400</td><td>27 %</td></tr>
<tr><td>Above 400</td><td>30 %</td></tr>
</table></td></tr>
<tr><td>30</td><td>O & M expenses</td><td>Rs. 6.87 Lakh per MW(for the first year of Control Period) to be escalated at the rate of 5.72% per annum over the tariff period to compute the levellised tariff.</td></tr>
<tr><td></td><td colspan="2">Small Hydro Project</td></tr>
<tr><td>31</td><td>Capital Cost</td><td>The normative capital cost during FY 2010-11 shall be as follows:
<table>
<tr><th>Project Size</th><th>Capital Cost (Rs. Lakh/MW)</th></tr>
<tr><td>below 5 MW</td><td>635</td></tr>
<tr><td>5 MW to 25 MW</td><td>571</td></tr>
</table>
The capital cost for subsequent years shall be determined on the basis of indexation formula as outlined in the Regulations.</td></tr>
<tr><td>32</td><td>Capacity Utilisation Factor</td><td>30%</td></tr>
<tr><td>33</td><td>Normative Auxiliary Consumption</td><td>1%</td></tr>
<tr><td>34</td><td>O & M expenses</td><td>Normative O&M expenses for the FY 2010-11 shall be as follows.<br>• For projects below 5 MW - Rs. 22.20 Lakh/MW<br>• For projects 5 MW to 25 MW - Rs. 15.86 Lakh/MW<br>Normative O&M expenses shall be escalated @ of 5.72% per annum for the Tariff Period for the purpose of determination of levellised tariff.</td></tr>
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| | **Biomass Power Projects based on Rankine Cycle Technology using Water Cooled Condenser.** | |
| **35** | **Capital Cost** | Rs. 403 Lakh/MW (FY 2010-11) and shall be linked to indexation formula as outlined in the Regulations |
| **36** | **Plant Load Factor** | (a) During Stabilization : 60%<br>(b) During the remaining period of the first year : 70% (after stabilization)<br>(c) From 2nd Year onwards : 80 %<br>Note: stabilization period shall not be more than 6 months from the date of COD |
| **37** | **Auxiliary Consumption** | 10% |
| **38** | **Station Heat Rate** | 3800 kcal/kWh |
| **39** | **O & M expenses** | • Normative O&M expenses for the FY 2010-11shall be Rs. Rs.21.41 Lakh/MW.<br>• Normative O&M expenses shall be escalated @ of 5.72% per annum for the control Period |
| **40** | **Fuel Mix** | • The biomass power plant shall be designed in such a way that it uses different types of non-fossil fuels available within the vicinity of the project such as crop residues, agro-industrial residues, forest residues etc. and other biomass fuels as may be approved by MNRE.<br>• Generating Companies shall ensure fuel management plan to ensure adequate availability of fuel to meet the respective project requirements. |
| **41** | **Use of Fossil Fuel** | Use of fossil fuels shall be limited to the extent of 15% of total fuel consumption on annual basis or as amended by MNRE from time to time |
| **42** | **Monitoring Mechanism for the use of fossil fuel** | As detailed in the Regulations |
| **43** | **Calorific Value** | 3467 Kcal/kg |
| **44** | **Fuel Cost** | • Biomass fuel price during the FY 2010-11 shall be Rs. 1855 per MT and shall be linked to index formulae as specified in the Regulation.<br>• Alternatively, for each subsequent year of Tariff period, the normative escalation factor of 5% per annum shall be applicable at the option of the biomass project developer |
| | **Technology specific parameters for Non-fossil fuel based Cogeneration Projects** | |
| **45** | **Capital Cost** | Rs. 398 Lakh/MW (FY 2010-11) during first year of Control Period and shall be linked to indexation formula as outlined in the Regulations |
| **46** | **Capacity Utilisation Factor** | For determining fixed charges plant load factor to be computed on the basis of plant availability for number of operating days (Refer Regulations) |
| **47** | **Auxiliary Consumption** | 8.5% |
| **48** | **Station Heat Rate** | 3600 kCal/ kWh |
| **49** | **Calorific Value** | 2250 Kcal/kg(bagasse) |
| **50** | **Fuel Cost** | • Biomass fuel price during first year of the Control Period (i.e. FY 2010-11) shall be Rs. 1221 per MT (bagasse) and shall be linked to index formulae as specified in the Regulation.<br>• Alternatively, for each subsequent year of Tariff period, the normative escalation factor of 5% per annum shall be applicable at the option of the biomass project developer |
| **51** | **Fuel Mix** | • The power plant shall be designed in such a way that it uses different types of non-fossil fuels available within the vicinity of the project such as crop residues, agro-industrial residues, forest residues etc. and other biomass fuels as may be approved by MNRE.<br>• Generating Companies shall ensure fuel management plan to ensure adequate availability of fuel to meet the respective project requirements. |
| **52** | **Use of Fossil Fuel** | Use of fossil fuels shall be on Kcal basis of total fuel consumption as per MNRE guidelines which is presently 15% |

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| **53** | **O & M expenses** | • Normative O&M expenses for the first year of the control period (i.e. FY 2010-11 ) shall be Rs. 14.11 Lakh/MW.<br>• Normative O&M expenses shall be escalated @ of 5.72% per annum for the control Period |
| | **Solar PV Power Projects** | |
| **54** | **Technology Aspects** | Applicable for grid connected PV systems that directly convert solar energy into electricity and are based on the technologies such as crystalline silicon or thin film etc. as may be approved by MNRE |
| **55** | **Capital Cost** | Benchmark capital cost Rs.1690 lakh /MW (break up details of land, civil works, PV modules etc detailed in the Regulations) |
| **56** | **Capacity Utilisation Factor** | 19% to 21% |
| **57** | **O&M Expenses** | Rs.9.0 Lakhs/MW for the first year of operation to be escalated at the rate of 5.72% per annum. |
| **58** | **Tariff for solar roof PV and other small solar power** | To be higher by Rs 0.50/kWh/higher amount as may be stipulated by Commission over and above the tariff applicable for Solar PV power projects |
| | **Solar Thermal Power Projects** | |
| **59** | **Technology Aspects** | To be applicable for Concentrated solar power (CSP) technologies approved by MNRE |
| **60** | **Capital Cost** | Benchmark capital cost 1530lakh /MW (break up details of land, civil works etc detailed in the Regulations) |
| **61** | **Capacity Utilisation Factor** | 23%. |
| **62** | **O&M Expenses** | Rs. 13.0 Lakhs/MW for the first year of operation to be escalated at the rate of 5.72% per annum. |
| **63** | **Auxiliary Consumption** | 10% |
| | **Miscellaneous** | |
| **64** | **Power to Relax** | Vested with the Commission |
| **65** | **Power to Amend** | Vested with the Commission |
| **66** | **Power to remove difficulties** | Vested with the Commission |