JOINT ELECTRICITY REGULATORY COMMISSION
FOR MANIPUR & MIZORAM
AIZAWL ::: MIZORAM

N O T I F I C A T I O N

Dated Aizawl, the 8th August , 2014

No.H.13011/17/10-JERC: In exercise of powers conferred under Section 61 read with Section 181 (2) (zd) of the Electricity Act, 2003 (36 of 2003), and all other powers enabling it in this behalf, the Joint Electricity Regulatory Commission for Manipur and Mizoram hereby makes the following regulations to amend the Joint Electricity Regulatory Commission for Manipur & Mizoram (Terms and Conditions for Tariff Determination from Renewable Energy Sources) Regulations, 2010 (hereinafter referred to as "the Principal Regulations"), namely:

1. Short title and commencement:

1. These regulations may be called the Joint Electricity Regulatory Commission for Manipur & Mizoram (Terms and Conditions for Tariff Determination from Renewable Energy Sources) (First Amendment) Regulations, 2014.

2. These Regulations shall apply in relation to all matters falling within the jurisdiction of the Commission.

3. These Regulations shall come into force in respective States from the date of its publication in the Official Gazettes of Manipur and Mizoram respectively.

2. Amendment of Regulation 2(1) of the Principal Regulations:

(1) Clause (d) and (e) shall be added after Clause (c) of the Principal Regulations as under:

"(d) 'Biomass gasification' means a process of incomplete combustion of biomass resulting in production of combustible gases consisting of a mixture of Carbon monoxide (CO), Hydrogen (H2) and traces of Methane (CH4), which is called producer gas;

(e) 'Biogas' means a gas created when organic matter like crop residues, sewage and manure breaks down in an oxygen-free environment (ferments);"

(2) Clause (d) of the Principal Regulations shall be substituted as under:

"(f) 'Capital cost' means the capital cost as defined in regulations 12,24, 28, 34, 47, 57, 61, 66 and 76;"

(3) Clause (y) of the Principal Regulations shall be substituted as under:

"(aa) **'Useful Life'** in relation to a unit of a generating station including evacuation system shall mean the following duration from the date of commercial operation (COD) of such generation facility, namely:-

(a)	Wind energy power project	25 years
(b)	Biomass power project with Rankine cycle technology	20 years
(c)	Non-fossil fuel cogeneration project	20 years
(d)	Small Hydro Plant	35 years
(e)	Solar PV/Solar thermal power project	25 years
(f)	Biomass Gasifier based power project	20 years
(g)	Biogas based power project	20 years"

(4) Clauses (e), (f), (g), (h), (i), (j), (k), (l), (m), (n), (o), (p), (q), (r), (s), (t), (u), (v), (w), (x), (y) and (z) of the Principal Regulations shall be read as (g), (h), (i), (j), (k), (l), (m), (n), (o), (p), (q), (r), (s), (t), (u), (v), (w), (x), (y),(z),(aa) and (ab) respectively

3. Amendment of Regulation 4 of the Principal Regulations:

"(normally biogases or other such biomass fuel)" at Regulation 4(4)(c) of the Principal Regulations shall be substituted as under:

"(d) '<u>topping cycle</u>' means a cogeneration process in which thermal energy produces electricity followed by useful heat application in industrial activities."

4. Amendment of Regulation 5 of the Principal Regulations:

The first para of Regulation 5 of the Principal Regulations shall be substituted as under:

"The Control Period or Review Period under these Regulations shall be of Five years, of which the first year shall be the financial year 2012-13."

5. Amendment of Regulation 7 of the Principal Regulations:

(1) Clause (1) of Regulation 7 of the Principal Regulations shall be substituted as under:

"(1) Project specific tariff, on case to case basis, shall be determined by the Commission for the following types of projects:

i. Municipal Solid Waste Projects;

ii. Solar PV and Solar Thermal Power projects, if a project developer opts for project specific tariff:

Provided that the Commission while determining the project specific tariff for Solar PV and Solar Thermal shall be guided by the provisions of Chapters 8 & 9 of these Regulations.

iii. Hybrid Solar Thermal Power plants;

iv. Other hybrid projects include renewable–renewable or renewable– conventional sources, for which renewable technology is approved by MNRE;

v. Biomass project other than that based on Rankine Cycle technology application with water cooled condenser;

vi. Any other new renewable energy technologies approved by MNRE."

(2) "Chapter-2" at clause (2) of Regulation 7of the Principal Regulations shall be read as "Chapter-3"

6. Amendment of Regulation 11 of the Principal Regulations:

The following Regulations shall be added after clause (2) of Regulation 11 of the Principal Regulations, namely:

"(3) Wind power generation plants where the sum of generation capacity of such plants connected at the connection point to the transmission or distribution system is 10 MW and above and connection point is 33 kV and above shall be subjected to scheduling and despatch code as specified under Indian Electricity Grid Code (IEGC) -2010, as amended from time to time.

(1) Solar generating plants with capacity of 5 MW and above and connected at the connection point of 33 kV level and above shall be subjected to scheduling and despatch code as specified under Indian Electricity Grid Code (IEGC) -2010, as amended from time to time."

7. Amendment of Regulation 14 of the Principal Regulations:

(1) Clause (1) of Regulation 14 of the Principal Regulations shall be substituted as under:

"(1) LoanTenure: For the purpose of determination of tariff, loan tenure of 12 years shall be considered."

(2) Clause (2)(b) of Regulation 14 of the Principal Regulations shall be substituted as under:

"(b) For the purpose of computation of tariff, the normative interest rate shall be considered as average State Bank of India (SBI) Base rate prevalent during the first six months of the previous year plus 300 basis points."

8. Amendment of Regulation 15 of the Principal Regulations:

Clause (2) of Regulation 15 of the Principal Regulations shall be substituted as under:

"(2) Depreciation per annum shall be based on 'Differential Depreciation Approach' over loan tenure and period beyond loan tenure over useful life computed on 'Straight Line Method'. The depreciation rate for the first 12 years of the Tariff Period shall be 5.83% per annum and the remaining depreciation shall be spread over the remaining useful life of the project from 13th year onwards."

9. Amendment of Regulation 16 of the Principal Regulations:

(1) Clause (1) of Regulation 16 of the Principal Regulations shall be substituted as under:

"(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 13."

(2) Clause (2) of Regulation 16 of the Principal Regulations shall be substituted as under:

"(2) The normative Return on Equity shall be:

a) 20% per annum for the first 10 years.

b) 24% per annum 11th years onwards."

10. Amendment of Regulation 17 of the Principal Regulations:

Clause (3) of Regulation 17 of the Principal Regulations shall be substituted as under:

"(3) Interest on Working Capital shall be at interest rate equivalent to the average State Bank of India Base Rate prevalent during the first six months of the previous year plus 350 basis points."

11. Amendment of Regulation 18 of the Principal Regulations:

Clause (3) of Regulation 18 of the Principal Regulations shall be substituted as under:

"(3) Normative O&M expenses allowed during first year of the Control Period (i.e. FY 2012-13) under these Regulations shall be escalated at the rate of 5.72% per annum over the Tariff Period."

12. Amendment of Regulation 24 of the Principal Regulations:

Clause (2) of Regulation 24 of the Principal Regulations shall be substituted as under:

"(2) The capital cost for wind energy projects shall be Rs 575/- Lakh/MW (FY 2012-13 during first year of Control Period) and shall be linked to indexation formula as outlined under Regulation 25."

13. Amendment of Regulation 25 of the Principal Regulations:

Regulation 25 of the Principal Regulations shall be substituted as under:

"**25 Capital Cost Indexation Mechanism**

The following indexation mechanism shall be applicable in case of wind energy projects for adjustments in capital cost over the Control Period with the changes in Wholesale Price Index for Steel and Electrical Machinery.

$CC_{(n)} = P\&M_{(n)} * (1+F_1+F_2+F_3)$

$P\&M_{(n)} = P\&M_{(0)} * (1+d_{(n)})$

$d_{(n)} = [a*\{(SI_{(n-1)} /SI_{(0)})– 1\} + b*\{(EI_{(n-1)} /EI_{(0)}) – 1\}]/(a+b)$

Where,

$CC_{(n)}$ = Capital Cost for n^{th} year

$P\&M_{(n)}$ = Plant and Machinery Cost for n^{th} year

$P\&M_{(0)}$ = Plant and Machinery Cost for the base year

Note: $P\&M_{(0)}$ is to be computed by dividing the base capital cost (for the first year of the control period) by $(1+F_1+F_2+F3)$ i.e. Rs.575 lakh per MW / 1.25 = Rs. 460 Lakh per MW.

$d_{(n)}$ = Capital Cost escalation factor for year (n) of Control Period

$SI_{(n-1)}$ = Average WPI Steel Index prevalent for calendar year (n-1) of the Control Period

$SI_{(0)}$ = Average WPI Steel Index prevalent for calendar year (0) at the beginning of the Control Period i.e. April 2011 to March 2012.

$EI_{(n-1)}$ = Average WPI Electrical Machinery Index prevalent for calendar year (n- 1) of the Control Period

$EI_{(0)}$ = Average WPI Electrical and Machinery Index prevalent for calendar year (0) at the beginning of the year of the Control Period i.e. April 2011 to March 2012.

a = Constant to be determined by Commission from time to time, (In default it is 0.6), for weightage to Steel Index

b = Constant to be determined by Commission from time to time, (In default it is 0.4), for weightage to Electrical Machinery Index

F_1 = Factor for Land and Civil Works (0.08)

F_2 = Factor for Erection and Commissioning (0.07)

F_3 = Factor for IDC and Financing Cost (0.10)”

14. Amendment of Regulation 26 of the Principal Regulations:

(1) Clause (1) of Regulation 26 of the Principal Regulations shall be substituted as under:

"(1) CUF norms for this control period shall be as follows:

Annual Mean Wind Power Density (W/m2)	**CUF**
Upto 200	20%
201-250	22%
251-300	25%
301-400	30%
> 400	32%

(2) Clause (2) of Regulation 26 of the Principal Regulations shall be substituted as under:

"(2) The annual mean wind power density specified in sub-regulation (1) above shall be measured at 80 meter hub-height."

(3) Clause (3) of Regulation 26 of the Principal Regulations shall be substituted as under:

"(3) For the purpose of classification of wind energy project into particular wind zone class, as per MNRE guidelines for wind measurement, wind mast either put-up by C-WET or a private developer and validated by C-WET would be normally extended 10 km from the mast-point to all directions for uniform terrain and limited to appropriate distant in complex terrain with regard to complexity of the site. Based on such validation by C-WET, State Nodal Agency should certify zoning of the proposed wind farm complex."

15. Amendment of Regulation 27 of the Principal Regulations:

Clause (1) of Regulation 27 of the Principal Regulations shall be substituted as under:

"(1) Normative O&M expenses for the first year of the Control Period (i.e. FY 2012-13) shall be Rs 9/- Lakh per MW."

16. Amendment of Regulation 28 of the Principal Regulations:

Clause (1) of Regulation 28 of the Principal Regulations shall be substituted as under:

"(1) The normative capital cost for small hydro projects during first year of Control Period (FY 2012-13) shall be as follows:

Sl. No	**Project Size**	**Capital Cost (Rs in Lakh/MW)**
1	Below 5 MW	770
2	5 MW to 25 MW	700

17. Amendment of Regulation 29 of the Principal Regulations:

Regulation 29 of the Principal Regulations shall be substituted as under:

"**29 Capital Cost Indexation Mechanism**

The following indexation mechanism shall be applicable in case of small hydro power projects for adjustments in capital cost over the Control Period with the changes in Wholesale Price Index for Steel and Electrical Machinery.

$CC_{(n)} = P\&M_{(n)} * (1+F_1+F_2+F_3)$

$P\&M_{(n)} = P\&M_{(0)} * (1+d_{(n)})$

$d_{(n)} = [a*\{(SI_{(n-1)}/SI_{(0)}) - 1\}+ b*\{(EI_{(n-1)}/EI_{(0)}) -1\}]/(a+b)$

Where,

$CC_{(n)}$ = Capital Cost for n^{th} year

$P\&M_{(n)}$ = Plant and Machinery Cost for n^{th} year

$P\&M_{(0)}$ = Plant and Machinery Cost for the base year

Note: $P\&M_{(0)}$ is to be computed by dividing the base capital cost (for the first year of the control period) by $(1+F_1+F_2+F_3)$ i.e.

Small hydro Project	Base Capital Cost (Rs. Lakh/MW)	Factor $(1+F_1+F_2+F_3)$	P&M (0) (Rs. Lakh/MW)
SHP (<5MW)	770	1.40	550
SHP (5 - 25 MW)	700	1.40	500

$d_{(n)}$ = Capital Cost escalation factor for year (n) of Control Period

$SI_{(n-1)}$ = Average WPI Steel Index prevalent for calendar year (n-1) of the Control Period

$SI_{(0)}$ = Average WPI Steel Index prevalent for calendar year (0) at the beginning of the Control Period i.e. April 2011 to March 2012

$EI_{(n-1)}$ = Average WPI Electrical Machinery Index prevalent for calendar year (n-1) of the Control Period

$EI_{(0)}$ = Average WPI Electrical and Machinery Index prevalent for calendar year (0) at the beginning of the Control Period i.e. April 2011 to March 2012

a = Constant to be determined by Commission from time to time, (In default it is 0.6), for weightage to Steel Index

b = Constant to be determined by Commission from time to time, (In default it is 0.4), for weightage to Electrical Machinery Index

F_1 = Factor for Land and Civil Work (0.16)

F_2 = Factor for Erection and Commissioning (0.10)

F_3 = Factor for IDC and Financing Cost (0.14)"

18. Amendment of Regulation 30 of the Principal Regulations:

Capacity Utilisation factor for the small hydro projects in Manipur and Mizoram shall be read as 45% instead of 40% under Regulation 30 of the Principal Regulations.

19. Amendment of Regulation 32 of the Principal Regulations:

Clause (1) of Regulation 32 of the Principal Regulations shall be substituted as under:

"(1) Normative O&M expenses for the first year of the Control period (i.e. FY 2012- 13) shall be as follows.

Sl. No	Project Size	O&M Expense (Rs Lakh/ MW)
1	Below 5 MW	25
2	5 MW to 25 MW	18

20. Amendment of Regulation 34 of the Principal Regulations:

Regulation 34 of the Principal Regulations shall be substituted as under:

"**34 Capital Cost**

The normative capital cost for the biomass power projects based on Rankine cycle shall be as under:

a. Rs 540 lakh/MW for project [other than rice straw and juliflora (plantation) based project] with water cooled condenser;

b. Rs 580 lakh/MW for Project [other than rice straw and Juliflora (plantation) based project] with air cooled condenser;

c. Rs 590 lakh/MW for rice straw and juliflora (plantation) based project with water cooled condenser;

d. Rs 630 lakh/MW for rice straw and juliflora (plantation) based project with air cooled condenser."

21. Amendment of Regulation 35 of the Principal Regulations:

Regulation 35 of the Principal Regulations shall be substituted as under:

"**35 Capital Cost Indexation Mechanism**

The following indexation mechanism shall be applicable in case of biomass power projects for adjustment in capital cost over the Control Period with the changes in Wholesale Price Index for Steel and Electrical Machinery,

$CC_{(n)} = P\&M_{(n)} * (1+F_1+F_2+F_3)$

$P\&M_{(n)} = P\&M_{(0)} * (1+d_{(n)})$

$d_{(n)} = [a*\{(SI_{(n-1)} / SI_{(0)}) -1\} + b*\{(EI_{(n-1)}/EI_{(0)}) -1\}]/(a+b)$

Where,

$CC_{(n)}$ = Capital Cost for nth year

$P\&M_{(n)}$ = Plant and Machinery Cost for nth year

$P\&M_{(0)}$ = Plant and Machinery Cost for the base year

Note: $P\&M_{(0)}$ is to be computed by dividing the base capital cost (for the first year of the control period) by $(1+F_1+F_2+F_3)$

$d_{(n)}$ = Capital Cost escalation factor for year (n) of Control Period

$SI_{(n-1)}$ = Average WPI Steel Index prevalent for calendar year (n-1) of the Control Period

$SI_{(0)}$ = Average WPI Steel Index prevalent for calendar year (0) at the beginning of the Control Period i.e. April 2011 to March 2012

$EI_{(n-1)}$ = Average WPI Electrical Machinery Index prevalent for calendar year (n-1) of the Control Period

$EI_{(0)}$ = Average WPI Electrical and Machinery Index prevalent for calendar year (0) at the beginning of the Control Period i.e. April 2011 to March 2012

a = Constant to be determined by Commission from time to time, (In default it is 0.7), for weightages to Steel Index

b = Constant to be determined by Commission from time to time, (In default it is 0.3), for weightages to Electrical Machinery Index

F_1 = Factor for Land and Civil Works (0.10)

F_2 = Factor for Erection and Commissioning (0.09)

F_3 = Factor for IDC and Financing Cost (0.14)"

22. Amendment of Regulation 37 of the Principal Regulations:

Regulation 37 of the Principal Regulations shall be substituted as under:

"37. Auxiliary Consumption

The auxiliary power consumption shall be as under:

(a) For the project using water cooled condenser:

(i) During first year of operation: 11%;

(ii) From 2nd year onwards: 10%.

(b) For the project using air cooled condenser:

(i) During first year of operation: 13%;

(ii) From 2nd year onwards: 12%."

23. Amendment of Regulation 38 of the Principal Regulations:

Regulation 38 of the Principal Regulations shall be substituted as under:

"38. Station Heat Rate

The Station Heat Rate for biomass power projects shall be as under:

(a) 4200 kcal/kWh for project using travelling grate boilers;

(b) 4125 kcal/kWh for project using AFBC boilers."

24. Amendment of Regulation 39 of Principal Regulations:

(1) Clause (1) of Regulation 39 of the Principal Regulations shall be substituted as under:

"(1) Normative O&M expenses for the second year of the Control period (i.e. FY 2013-14 shall be Rs 40 lakh/MW."

(2) Clause (2) of Regulation 39 of the Principal Regulations shall be

substituted as under:

"(2) Normative O&M expenses allowed at the commencement of the Control Period (i.e. FY 2012-13) under these Regulations shall be escalated at the rate of 5.72% per annum."

25. Amendment of Regulation 41 of the Principal Regulations:

Regulation 41 of the Principal Regulations shall be substituted as under:

"41. Use of Fossil Fuel

The use of fossil fuels shall not be allowed."

26. Amendment of Regulation 43 of the Principal Regulations:

Regulation 43 of the Principal Regulations shall be substituted as under:

"43. Calorific Value

The Calorific Value of the biomass fuel used for the purpose of determination of tariff shall be at 3100 kcal/kg."

27. Amendment of Regulation 44 of the Principal Regulations:

Regulation 44 of the Principal Regulations shall be substituted as under:

"**44 Fuel Cost**

Biomass fuel price during first year of the Control Period (i.e. FY 2012-13) shall be Rs. 2476/- per tonne and shall be linked to index formulae as specified under Regulation 45. Alternatively, for each subsequent year of the Tariff Period, the normative escalation factor of 5% per annum shall be applicable at the option of the biomass project developer. Alternatively, biomass fuel price shall be decided annually by the appropriate Regulatory Commission through an independent survey which could be carried out by constituting a State level committee consisting of representatives of State Nodal Agency, State Government, Distribution Licensees, biomass power producers

association and any other organization."

28. Amendment of Regulation 45 of the Principal Regulations:

Regulation 45 of the Principal Regulations shall be substituted as under:

"**45 Fuel Price Indexation Mechanism**

(1) In case of biomass power projects, the following indexing mechanism for adjustment of fuel prices for each year of operation will be applicable for determination of applicable variable charge component of tariff, in case developer wishes to opt for indexing mechanism:

$P_{(n)} = P_{(n-1)} * \{a * (WPI_{(n)}/WPI_{(n-1)}) + b * (1+IRC_{(n-1)}) + c * (Pd_{(n)}/Pd_{(n-1)})\}$

Where

$P_{(n)}$ = Price per ton of biomass for the n^{th} year to be considered for tariff determination

$P_{(n-1)}$ = Price per ton of biomass for the $(n-1)^{th}$ year to be considered for tariff determination. P_1 shall be Biomass price for FY 2012-13 as specified under Regulation 44.

a = Factor representing fuel handling cost

b = Factor representing fuel cost

c = Factor representing transportation cost

$IRC_{(n-1)}$ = Average Annual Inflation Rate for indexed energy charge component in case of captive coal mine source (in %) to be applicable for $(n-1)^{th}$ year, as may be specified by CERC for 'Payment purpose' as per Competitive Bidding Guidelines

Pd_n = Weighted average price of HSD for nth year.

Pd_{n-1} = Weighted average price of HSD for $(n-1)^{th}$ year.

WPI_n = Whole sale price index for the month of April of n^{th} year

WPI_{n-1} = Wholesale price index for month of April of $(n-1)^{th}$ year.

Where a, b & c will be specified by the Commission from time to time. In default, these factors shall be 0.2, 0.6 & 0.2 respectively.

(2) Variable Charge for the nth year shall be determined as under:

i.e. $VC_n = VC_1 x (P_n / P_1)$ or $VC_n = VC_1 \times (1.05)^{(n-1)}$ (optional)

Where,

VC_1 represents the Variable Charge based on Biomass Price $P_1$for FY 2012 -13 as specified under Regulation 44 and shall be determined as under:

$$VC_1 = \frac{\text{Station Heat Rate (SHR)}}{\text{Gross Calorific Value (GCV)}} \times \frac{1}{\text{(1–Aux Consum. Factor)}} \times \frac{P1}{1000}$$

(3) The biomass base price shall be revised at the end of third year of the control period and same shall also be applicable to project commissioned under this Control Period."

29. Amendment of Regulation 47 of the Principal Regulations:

Regulation 47 of the Principal Regulations shall be substituted as under:

"**47 Capital Cost**

The normative capital cost for the non-fossil fuel based cogeneration projects shall be Rs.420 Lakh/MW for the first year of Control Period (i.e. FY 2012 -13), and shall be linked to indexation formula as outlined under Regulation 48."

30. Amendment of Regulation 48 of the Principal Regulations:

Regulation 48 of the Principal Regulations shall be substituted as under:

"48 Capital Cost Indexation Mechanism

The following indexation mechanism shall be applicable in case of non-fossil fuel based cogeneration projects for adjustments in capital

cost with the changes in Wholesale Price Index for Steel and Electrical Machinery,

$CC_{(n)} = P\&M_{(n)} * (1+F_1+F_2+F_3)$

$P\&M_{(n)} = P\&M_{(0)} * (1+d_{(n)})$

$d_{(n)} = [a*\{(SI_{(n-1)} / SI_{(0)}) -1\} + b*\{(EI_{(n-1)} / EI_{(0)}) - 1\}]/(a+b)$

Where,

$CC_{(n)}$ = Capital Cost for n^{th} year

$P\&M_{(n)}$ = Plant and Machinery Cost for n^{th} year

$P\&M_{(0)}$ = Plant and Machinery Cost for the base year

Note: $P\&M_{(0)}$ is to be computed by dividing the base capital cost (for the first year of the control period) by $(1+F_1+F_2+F_3)$

$d_{(n)}$ = Capital Cost escalation factor for year (n) of Control Period

$SI_{(n-1)}$ = Average WPI Steel Index prevalent for fiscal year (n-1) of the Control Period

$SI_{(0)}$ = Average WPI Steel Index prevalent for calendar year (0) at the beginning of the Control Period i.e. April 2011 to March 2012

$EI_{(n-1)}$ = Average WPI Electrical Machinery Index prevalent for calendar year (n-1) of the Control Period

$EI_{(0)}$ = Average WPI Electrical and Machinery Index prevalent for calendar year (0) at the beginning of the Control Period i.e. April 2011 to March 2012

a = Constant to be determined by Commission from time to time, (In default it is 0.7), for weightages to Steel Index

b = Constant to be determined by Commission from time to time, (In default it is 0.3), for weightages to Electrical Machinery Index

F_1 = Factor for Land and Civil Work (0.10)

F_2 = Factor for Erection and Commissioning (0.09)

F_3 = Factor for IDC and Financing Cost (0.14)"

31. Amendment of Regulation 53 of the Principal Regulations:

Clause (1) of Regulation 53 of the Principal Regulations shall be substituted as under:

"(1) The price of Bagasse shall be Rs. 1583/-per M.T and shall be linked to index formulae as outlined under Regulation 54. Alternatively, for each subsequent year of the Control Period, the normative escalation factor of 5% per annum shall be applicable at the option of the project developer."

32. Amendment of Regulation 54 of the Principal Regulations:

Regulation 54 of the Principal Regulations shall be substituted as under:

"**54 Fuel Price Indexation Mechanism**

(1) In case of non-fossil fuel based cogeneration projects, the following indexing mechanism for adjustment of fuel prices for each year of operation will be applicable for determination of applicable variable charge component of tariff, in case developer wishes to opt for indexing mechanism:

$$P_{(n)} = P_{(n-1)} * \{a * (WPI_{(n)} / WPI_{(n-1)}) + b * (1+IRC_{(n-1)}) + c * (Pd_{(n)} / Pd_{(n-1)})\}$$

Where

$P_{(n)}$ = Price per ton of Bagasse for the n^{th} year to be considered for tariff determination

$P_{(n-1)}$ = Price per ton of Bagasse for the $(n-1)^{th}$ year to be considered for tariff determination. P1 shall be Biomass price for FY 2012 -13 as specified under Regulation 53.

a = Factor representing fuel handling cost

b = Factor representing fuel cost

c = Factor representing transportation cost

$IRC_{(n-1)}$= Average Annual Inflation Rate for indexed energy charge component in case of captive coal mine source (in %) to be

applicable for (n- 1)th year, as may be specified by CERC for 'Payment purpose' as per Competitive Bidding Guidelines

Pd_n = Weighted average price of HSD for nth year.

Pd_{n-1} = Weighted average price of HSD for $(n-1)^{th}$ year.

WPI_n = Whole sale price index for the month of April of n^{th} year

WPI_{n-1} = Wholesale price index for month of April of (n-1)th year.

Where a, b & c will be specified by the Commission from time to time. In default, these factors shall be 0.2, 0.6 & 0.2 respectively.

(2) Variable Charge for the nth year shall be determined as under:

i.e. $VC_n = VC_1 \times (P_n / P_1)$ or $VC_n = VC_1 \times (1.05)^{(n-1)}$ (optional)

Where,

VC_1 represents the Variable Charge based on bagasse Price P_1 for FY 2012-13 as specified under Regulation 55 and shall be determined as under:

$$VC_1 = \frac{\text{Station Heat Rate (SHR)}}{\text{Gross Calorific Value (GCV)}} \times \frac{1}{(1 - \text{Aux Consum. Factor})} \times \frac{P1}{1000}"$$

33. Amendment of Regulation 55 of the Principal Regulations:

Regulation 55 of the Principal Regulations shall be substituted as under:

"**55 Operation and Maintenance Expenses**

(1) Normative O&M expenses during first year of the Control period (i.e. FY 2012 - 13) shall be Rs. 16.0 Lakh per MW.

(2) Normative O&M expenses allowed at the commencement of the Control Period (i.e. FY 2012 -13) under these Regulations shall be escalated at the rate of 5.72% per annum."

34. Amendment of Regulation 57 of the Principal Regulations:

Regulation 57 of the Principal Regulations shall be substituted as under:

"**57 Capital Cost**

The normative capital cost for setting up Solar Photovoltaic Power Project shall be Rs. 1000 Lakh/MW for FY 2012-13.

Provided that the Commission may deviate from above norm in case of project specific tariff determination in pursuance of Regulation 7 and Regulation 8."

35. Amendment of Regulation 61 of the Principal Regulations:

Regulation 57 of the Principal Regulations shall be substituted as under:

"**61 Capital Cost**

The normative capital cost for setting up Solar Thermal Power Project shall be Rs.1300 Lakh/MW for FY 2012 -13.

Provided that the Commission may deviate from the above norm in case of project specific tariff determination in pursuance of Regulation 7 and Regulation 8."

36. Additional amendment of Regulations of the Principal Regulations:

Chapter-10, Regulation 65 and Regulation 66 of the Principal Regulations shall be read as Chapter-12, Regulation 84 and Regulation 85 respectively and the following new Chapter-10 & 11 shall be added in the Principal Regulations, namely:

CHAPTER – 10

TECHNOLOGY SPECIFIC PARAMETERS FOR BIOMASS GASIFIER POWER PROJECT

65. Technology Aspect

The norms for tariff determination specified hereunder are for biomass gasifier power projects based.

66. Capital Cost

The normative capital cost for the biomass gasifier power projects based on Rankine cycle shall be Rs 550/- Lakh/MW (FY 2012-13 during first year of Control Period) and shall be linked to indexation formula as outlined under Regulation 67. After taking into account of capital subsidy net project cost shall be Rs 400/-Lakh/MW for FY 2012-13.

67. Capital Cost Indexation Mechanism

(1) The following indexation mechanism shall be applicable in case of biomass gasifier power projects for adjustment in capital cost over the Control Period with the changes in Wholesale Price Index for Steel and Electrical Machinery,

$CC_{(n)} = P\&M_{(n)} * (1+F_1+F_2+F_3)$ $P\&M_{(n)} = P\&M_{(0)} * (1+d_{(n)})$

$d_{(n)} = [a*\{(SI_{(n-1)}/SI_{(0)}) - 1\} + b*\{(EI_{(n-1)}/EI_{(0)}) - 1\}]/(a+b)$

Where,

$CC_{(n)}$ = Capital Cost for n^{th} year

$P\&M_{(n)}$ = Plant and Machinery Cost for n^{th} year

$P\&M_{(0)}$ = Plant and Machinery Cost for the base year

Note: $P\&M_{(0)}$ is to be computed by dividing the base capital cost (for the first year of the control period) by $(1+F_1+F_2+F_3)$

$d_{(n)}$ = Capital Cost escalation factor for year (n) of Control Period

$SI_{(n-1)}$ = Average WPI Steel Index prevalent for calendar year (n-1) of the Control Period

$SI_{(0)}$ = Average WPI Steel Index prevalent for calendar year (0) at the beginning of the Control Period i.e. April 2011 to March 2012

$EI_{(n-1)}$ = Average WPI Electrical Machinery Index prevalent for calendar year (n-1) of the Control Period

$EI_{(0)}$ = Average WPI Electrical and Machinery Index prevalent for calendar year (0) at the beginning of the Control Period i.e. April 2011 to March 2012

a = Constant to be determined by Commission from time to time, (In default it is 0.7), for weightages to Steel Index

b = Constant to be determined by Commission from time to time, (In default it is 0.3), for weightages to Electrical Machinery Index

F_1 = Factor for Land and Civil Works (0.10)

F_2 = Factor for Erection and Commissioning (0.09)

F_3 = Factor for IDC and Financing Cost (0.14)

68. Plant Load Factor

Threshold Plant Load Factor for determining fixed charge component of Tariff shall be 85%.

69. Auxiliary Consumption

The auxiliary power consumption factor shall be 10% for the determination of tariff.

70. Specific fuel consumption

Normative specific fuel consumption shall be 1.25 kg per kWh.

71. Operation and Maintenance Expenses

(1) Normative O&M expenses for the first year of the Control period (i.e. FY 2012-13 shall be Rs 40/- Lakh per MW.

(2) Normative O&M expenses allowed at the commencement of the Control Period (i.e. FY 2012-13) under these Regulations shall be escalated at the rate of 5.72% per annum.

72. Fuel Mix

(1) The Biomass Gasifier based power plant shall be designed in such a way that it uses different types of non-fossil fuels available within the vicinity of biomass power project such as crop residues, agro-industrial residues, forest residues etc. and other biomass fuels as may be approved by MNRE.

(2) The Biomass Gasifier based Power Generating Companies shall ensure fuel management plan to ensure adequate availability of fuel to meet the respective project requirements.

73. Fuel Cost

Biomass fuel price during first year of the Control Period (i.e. FY 2012-13) shall be as per Regulation 44 and shall be linked to indexation formula as specified under Regulation 74. Alternatively, for each subsequent year of the Tariff Period, the normative escalation factor of 5% per annum shall be applicable at the option of the Biomass Gasifier project developer.

74. Fuel Price Indexation Mechanism

(1) In case of Biomass Gasifier power projects, the following indexing mechanism for adjustment of fuel prices for each year of operation will be applicable for determination of applicable variable charge component of tariff, in case developer wishes to opt for indexing mechanism:

$$P_{(n)} = P_{(n-1)}*\{a*(WPI_{(n)}/WPI_{(n-1)}) + b*(1+IRC)_{(n-1)} + c*(Pd_{(n)}/Pd_{(n-1)})\}$$

Where,

$P_{(n)}$ = Price per tonne of biomass for the n^{th} year to be considered for tariff determination

$P_{(n-1)}$ = Price per tonne of biomass for the $(n-1)^{th}$ year to be considered for tariff determination. P_1 shall be Biomass price for FY 2012-13 as specified under Regulation 44.

a = Factor representing fuel handling cost b = Factor representing fuel cost

c = Factor representing transportation cost

$IRC_{(n-1)}$ = Average Annual Inflation Rate for indexed energy charge component in case of captive coal mine source (in %) to be applicable for $(n-1)^{th}$ year, as may be specified by CERC for 'Payment purpose' as per competitive Bidding Guidelines

Pd_n = Weighted average price of HSD for nth year.

Pd_{n-1} = Weighted average price of HSD for $(n-1)^{th}$ year.

WPI_n = Whole sale price index for the month of April of n^{th} year

WPI_{n-1} = Wholesale price index for month of April of $(n-1)^{th}$ year.

Where a, b & c will be specified by the Commission from time to time. In default, these factors shall be 0.2, 0.6 & 0.2 respectively.

(2) Variable Charge for the nth year shall be determined as under:

i.e. $VC_n = VC \times (P_n / P_1)$ or $VC_n = VC \times (1.05)^{(n-1)}$ (optional)

Where,

VC_1 represents the Variable Charge based on Biomass Price P_1 for FY 2012-13 as specified under Regulation 44 and shall be determined as under:

$$VC_1 = \frac{\text{Station Heat Rate (SHR)}}{\text{Gross Calorific Value (GCV)}} \times \frac{1}{(1 - \text{Aux Cons. Factor})} \times \frac{P1}{1000}$$

(3) The biomass base price shall be revised at the end of the control period for the next Control Period and same shall also be applicable to project commissioned under this Control Period.

CHAPTER – 11

TECHNOLOGY SPECIFIC PARAMETERS FOR BIOGAS BASED POWER PROJECTS

75. Technology Aspect

The norms for tariff determination specified hereunder are for grid connected biogas based power projects that uses 100% Biogas fired engine, coupled with Biogas technology for co-digesting agriculture residues, manure and other bio waste as may be approved by MNRE.

76. Capital Cost

The normative capital cost for the biogas based power shall be Rs 1100/- Lakh/MW (FY 2012-13 during first year of Control Period) and shall be linked to indexation formula as outlined under Regulation 77. After taking into account of capital subsidy net project cost shall be Rs 800/- Lakh/MW for FY 2012-13.

77. Capital Cost Indexation Mechanism

(1) The following indexation mechanism shall be applicable in case of biogas based power projects for adjustment in capital cost over the Control Period with the changes in Wholesale Price Index for Steel and Electrical Machinery,

$CC_{(n)} = P\&M_{(n)} * (1+F_1+F_2+F_3)$ $P\&M_{(n)} = P\&M_{(0)} * (1+d_{(n)})$

$d_{(n)} = [a*\{(SI_{(n-1)}/SI_{(0)}) - 1\} + b*\{(EI_{(n-1)}/EI_{(0)}) - 1\}]/(a+b)$

Where,

$CC_{(n)}$ = Capital Cost for n^{th} year

$P\&M_{(n)}$ = Plant and Machinery Cost for n^{th} year

$P\&M_{(0)}$ = Plant and Machinery Cost for the base year

Note: $P\&M_{(0)}$ is to be computed by dividing the base capital cost (for the first year of the control period) by $(1+F_1+F_2+F_3)$

$d_{(n)}$ = Capital Cost escalation factor for year (n) of Control Period

$SI_{(n-1)}$ = Average WPI Steel Index prevalent for calendar year (n-1) of the Control Period

$SI_{(0)}$ = Average WPI Steel Index prevalent for calendar year (0) at the beginning of the Control Period i.e. April 2011 to March 2012

$EI_{(n-1)}$ = Average WPI Electrical Machinery Index prevalent for calendar year (n-1) of the Control Period

$EI_{(0)}$ = Average WPI Electrical and Machinery Index prevalent for calendar year (0) at the beginning of the Control Period i.e. April 2011 to March 2012

a = Constant to be determined by Commission from time to time, (In default it is 0.7), for weightages to Steel Index

b = Constant to be determined by Commission from time to time, (In default it is 0.3), for weightages to Electrical Machinery Index

F_1 = Factor for Land and Civil Works (0.10)

F_2 = Factor for Erection and Commissioning (0.09)

F_3 = Factor for IDC and Financing Cost (0.14)

78. Plant Load Factor

Threshold Plant Load Factor for determining fixed charge component of Tariff shall be 90%.

79. Auxiliary Consumption

The auxiliary power consumption factor shall be 12% for the determination of tariff.

80. Operation and Maintenance Expenses

(1) Normative O&M expenses for the first year of the Control period (i.e. FY 2012-13 shall be Rs 40/- Lakh per MW.

(2) Normative O&M expenses allowed at the commencement of the Control Period (i.e. FY 2012-13) under these Regulations shall be escalated at the rate of 5.72% per annum.

81. Specific Fuel Consumption

Normative specific fuel consumption shall be 3 kg of substrate mix per kWh.

82. Fuel Cost (Feed stock Price)

Feed stock price during first year of the Control Period (i.e. FY 2012-13) shall be Rs. 990/MT for FY 2012-13 (net of any cost recovery from digester effluent).

83. Fuel Price Indexation Mechanism

(1) In case of biomass power projects, the following indexing mechanism for adjustment of fuel prices for each year of operation will be applicable for determination of applicable variable charge component of tariff, in case developer wishes to opt for indexing mechanism:

$$P_{(n)} = P_{(n-1)} * \{a*(WPI_{(n)}/WPI_{(n-1)}) + b*(1+IRC)_{(n-1)} + c*(Pd_{(n)}/Pd_{(n-1)})\}$$

Where,

$P_{(n)}$ = Price per tonne of biomass for the n^{th} year to be considered for tariff determination

$P_{(n-1)}$ = Price per tonne of biomass for the $(n-1)^{th}$ year to be considered for tariff determination. P_1 shall be Feed stock price for FY 2012-13 as specified under Regulation 82

A = Factor representing fuel handling cost

B = Factor representing fuel cost

C = Factor representing transportation cost

$IRC_{(n-1)}$= Average Annual Inflation Rate for indexed energy charge component in case of captive coal mine source (in %) to be applicable for $(n-1)^{th}$ year, as may be specified by CERC for 'Payment purpose' as per Competitive Bidding Guidelines

Pd_n = Weighted average price of HSD for nth year.

Pd_{n-1} = Weighted average price of HSD for $(n-1)^{th}$ year.

WPI_n = Whole sale price index for the month of April of n^{th} year

WPI_{n-1} = Wholesale price index for month of April of $(n-1)^{th}$ year.

Where a, b & c will be specified by the Commission from time to time. In default, these factors shall be 0.2, 0.6 & 0.2 respectively.

(2) Variable Charge for the nth year shall be determined as under:

i.e. $VC_n = VC_1 \times (P_n / P_1)$ or $VC_n = VC_1 \times (1.05)^{(n-1)}$ (optional)

Where,

VC_1 represents the Variable Charge based on Biomass Price P_1 for FY 2012-13 as specified under Regulation 44 and shall be determined as under:

$$VC_1 = \frac{\text{Station Heat Rate (SHR)}}{\text{Gross Calorific Value (GCV)}} \times \frac{1}{(1 - \text{Aux Cons. Factor})} \times \frac{1}{1000}$$

(3) The biomass base price shall be revised at the end of third year of the control period and same shall also be applicable to project commissioned under this Control Period."

By Order of the Commission,

(RICHARD ZOTHANKIMA)
Assistant Secretary

Note: The Principal Regulations were published in the Official Gazettes Extraordinary of Manipur and Mizoram No. 158 dt. 16.06.2010 and No. 183 dt. 02.06.2010 respectively.