



**DRAFT GENERIC TARIFF ORDER FOR RENEWABLE ENERGY SOURCES FOR FY  
2019-2020**

**Coram**

**Shri M.K Goel, Chairperson  
Smt. Neerja Mathur, Member**

**Suo-moto Petition No.:**

**Draft Order**

**Dated: 2<sup>nd</sup> August, 2019**

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## Abbreviations

<b>Acronyms</b>	<b>Expanded Form</b>
CUF	Capacity Utilisation Factor
COD	Commercial Operation Date
CPI	Consumer Price Index
FY	Financial Year
GW	Gigawatt
IT Act	Income Tax Act
kWh	kilowatt hour
MW	Megawatt
MAT	Minimum Alternative Tax
MNRE	Ministry of New & Renewable Energy
O&M	Operation and Maintenance
PV	Photo Voltaic
PLF	Plant Load Factor
RE	Renewable Energy
RoE	Return on Equity
SHP	Small Hydro Plant
WPI	Wholesale Price Index

## 1 BACKGROUND

1.1.1 The Commission has notified the Joint Electricity Regulatory Commission (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2019 (Renewable Energy Tariff Regulations, 2019) for determination of Tariff of eligible RE Projects selling electricity to Distribution Licensees, on 25<sup>th</sup> July, 2019. The Regulations specify the terms and conditions and the procedure for determination of Generic Tariff in respect of the following types of Renewable Energy (RE) Generation Projects:

- (a) Solar PV (for Gross Metering);
- (b) Wind Energy based projects;
- (c) Small hydro based projects:

1.1.2 Regulation 9.1 of the Renewable Energy Tariff Regulations, 2019 requires the Commission to determine the Generic Tariffs for RE Technologies for which the norms have been specified in the Regulations:

*“9.1 The Commission shall determine the generic tariff at the beginning of each year of the Control Period for Renewable Energy technologies mentioned at Regulation 7 for projects to be commissioned in that year”*

1.1.3 In discharge of its mandate under Regulation 9.1 and through this draft Order, the Commission proposes to determine the Generic Tariff for RE Technologies for FY 2019-20 to be applicable for the RE Projects, which would be commissioned during that year. The Commission invites public comments, objections and suggestions on the draft Order.

1.1.4 The Ministry of New & Renewable Energy (MNRE), Government of India has set an ambitious target of achieving 175 GW target for installed grid connected RE capacity by 2022. Guidelines have been issued for carrying out competitive bidding for various RE projects and Tariffs discovered by competitive bidding are considerably lower than the RE Generic Tariffs. Over the years, maturing RE Technologies achieving higher CUF at lower costs and innovative financial engineering in project costing have reduced the gap between Tariffs of conventional power projects and RE projects.

- 1.1.5 It has been observed that since the rates discovered by competitive bidding process are considerably lower than the Generic Tariffs determined in the earlier years, many of the Distribution Companies have been procuring RE power by way of competitive bidding rather than power purchase at RE Generic Tariff.
- 1.1.6 In this regard, second proviso to Regulation 10.1 of Renewable Energy Tariff Regulations, 2019 specifies as follows:

*“Provided further that in case the Distribution Licensee opts to procure power from Renewable Energy Projects through competitive bidding process in accordance with the guidelines issued by the central government, the Generic Tariff determined by the Commission shall act as a ceiling tariff and for such procurement of power, the Distribution Licensee shall file the Petition for adoption of tariff under Section 63 of the Act;”*

## **2 GENERAL PRINCIPLES**

### **2.1 Tariff Structure**

- 2.1.1 Regulation 11 of Renewable Energy Tariff Regulations, 2019 specifies that the tariff for Renewable Energy technologies shall be single-part tariff consisting of the following fixed cost components:

- a) Operation and maintenance expenses;*
- b) Interest on loan capital;*
- c) Depreciation;*
- d) Interest on working capital;*
- e) Return on equity;*

*Provided that for Renewable Energy technologies like biomass power projects having fuel cost component, single-part tariff with two components, fixed cost component and fuel cost component, shall be determined.”*

### **2.2 Tariff Design**

- 2.2.1 As per Regulation 12 of Renewable Energy Tariff Regulations, 2019, the Tariff Design for RE Generating Stations is as under:

*“12.1 The generic tariff shall be determined considering the year of commissioning of the project, on levelized basis for the Tariff Period”*

*Provided that for Renewable Energy technologies having single-part tariff with two components, tariff shall be determined on levelized basis considering the year of commissioning of the project for fixed cost component while the fuel cost component shall be determined on the basis of year of operation.*

*12.2 For the purpose of levelized tariff computation, the discount factor equivalent to Post Tax weighted average cost of capital shall be considered.*

*12.3 Levelization shall be carried out for the ‘useful life’ of the Renewable Energy project.”*

2.2.2 Accordingly, the Commission has computed the Generic Tariff in this Order for Projects to be commissioned after the date of issuance of this order in FY 2019-20,, which will be applicable for the entire useful life of the Project.



### **3 FINANCIAL PRINCIPLES (RENEWABLE ENERGY TARIFF REGULATIONS, 2019)**

#### **3.1 Debt Equity Ratio**

3.1.1 As per Regulation 14 of Renewable Energy Tariff Regulations, 2019, the Debt Equity ratio shall be as under, for tariff determination

*“14.1 Debt Equity ratio of 70:30 shall be considered”*

#### **3.2 Loan and Finance Charges**

3.2.1 Regulation 15.1 of Renewable Energy Tariff Regulations, 2019 specifies loan tenure of 12 years for determination of the Generic Tariff for RE Projects. Regulation 15.2 provides for consideration of the rate of interest on loan as follows:

- **Mainland-** SBI MCLR (One-year tenor) prevalent during the last available six months + 200 basis points, which works out to  $8.52\% + 2\% = 10.52\%$
- **Island-** SBI MCLR (One-year tenor) prevalent during the last available six months + 300 basis points, which works out to  $8.52\% + 3\% = 11.52\%$

#### **3.3 Depreciation**

3.3.1 Regulation 16.3 of Renewable Energy Tariff Regulations, 2019 specifies that rate of depreciation of 5.83% per annum shall be considered for first 12 years and remaining depreciation shall be spread during remaining useful life of the RE projects considering the salvage value of the project as 10% of project cost. The Commission has computed the depreciation in accordance with the provisions of Regulations.

#### **3.4 Return on Equity**

3.4.1 Regulation 17.2 of Renewable Energy Tariff Regulations, 2019 specifies the normative Return on Equity of 14% for Mainland areas and 16% for Island areas, to be grossed up by prevailing Minimum Alternate Tax (MAT) rate as on 1<sup>st</sup> April of available year at the time of determination of tariff for the entire useful life of the project. The Effective MAT rate as on 1<sup>st</sup> April of 2019 is 21.55%, as shown in the Table below:

**Table 1: MAT Rate**

Particulars		MAT
Base Tax Rate		18.50%
Surcharge	12%	2.22%
Tax Rate + surcharge		20.72%
Health & Education Cess	4%	0.83%
Effective Tax Rate		21.55%

3.4.2 Accordingly, the Commission has computed the RoE in accordance with the provisions of Regulations by grossing up the normative rate of RoE with effective MAT rate of 21.55%.

### 3.5 Rate of Interest for Interest on Working Capital

3.5.1 Regarding Interest Rate for Interest on Working Capital, Regulation 18.3 specifies as follows:

*“18.3 Normative Rate of Interest on Working Capital shall be considered as follows:*

#### *Normative Working Capital Interest Rate*

<i>Particulars</i>	<i>Interest Rates</i>
<i>Mainland</i>	<i>State Bank of India MCLR (One-Year Tenor) prevalent during the last available six months + 300 basis points</i>
<i>Island</i>	<i>State Bank of India MCLR (One-Year Tenor) prevalent during the last available six months + 400 basis points</i>

3.5.2 Accordingly, the Commission has considered the normative rate of Interest on Working Capital considering the MCLR as 8.52%, as follows:

- Mainland Areas-  $8.52\% + 3\% = 11.52\%$
- Island Areas-  $8.52\% + 4\% = 12.52\%$

### 3.6 Levelized Tariff

3.6.1 In accordance with the provisions of Renewable Energy Tariff Regulations, 2019, the Levelized Tariff is computed by undertaking levelization over the Useful Life of each RE technology considering a discount factor equivalent to the normative post-tax weighted average cost of capital, to represent the time value of money.

### **3.7 Discount Factor**

3.7.1 The discount factor considered is 9.42% for Mainland Areas and 10.52% for island Areas, which is equal to the normative post-tax weighted average cost of capital on the basis of the normative debt-equity ratio of 70:30 specified in the Regulations, and the weighted average rates for the debt and equity components.

3.7.2 The Interest Rate considered for the loan component (i.e., 70%) of Capital Cost for mainland areas and Island Areas is 10.52% and 11.52%, respectively. For the equity component (i.e., 30%), the rate of RoE is considered is 14% for mainland areas and 16% for Island Areas.

### **3.8 Escalation Rate for O&M Expenses**

3.8.1 As per Regulation 20.3 of Renewable Energy Tariff Regulations, 2019, Normative O&M expenses allowed during first year of the Control Period (i.e., FY 2019-20) under these Regulations shall be escalated at average inflation factor of previous three years considering 60% weightage for the actual point to point inflation over Wholesale Price Index (WPI) numbers as per Office of Economic Advisor, Ministry of Commerce and Industry, Government of India and 40% weightage for the actual Consumer Price Index (CPI) for Industrial Workers (all India) as per Labour Bureau, Government of India in the previous three years. Accordingly, the escalation rate has been computed considering the WPI and CPI inflation for FY 2016-17, FY 2017-18 and FY 2018-19 in the ratio of 60:40, which works out to 3.71%.

### **3.9 Accelerated Depreciation**

3.9.1 Regulation 24.1 of Renewable Energy Tariff Regulations, 2019 specifies as follows:  
*“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:*

*Provided that the following principles shall be considered for ascertaining Income Tax benefit on account of accelerated depreciation, if availed, for the purpose of tariff determination:*

- *Assessment of benefit shall be based on normative Capital Cost, accelerated depreciation rate as per relevant provisions under Income Tax Act and corporate Income Tax rate;*
- *Capitalization of RE project during second half of the fiscal year;*

- *Per unit benefit shall be derived on levelized basis at discount factor equivalent to weighted average cost of capital."*

3.9.2 Accordingly, for Projects availing the benefit of accelerated depreciation, the applicable Corporate Income Tax rate of 29.12% (25% Income Tax rate + 12% surcharge + 4% Health & Education Cess) has been considered. As per the Circular dated 7 November, 2016 of the Income Tax Department, the accelerated depreciation rates have been revised to 40% from FY 2017-18. Moreover, additional 20% depreciation in the initial year is proposed to be extended to new assets acquired by Generation Companies vide the amendment to Section 32 (1) (ii a) of the Income Tax Act.

3.9.3 For determining the net depreciation benefits, depreciation @ 5.28% as per the StraightLine Method (book depreciation as per the Companies Act, 2013) has been compared with depreciation as per the Income Tax Act, i.e., 40% under the Written Down Value method. The tax benefit has been worked out as per the Corporate Income Tax rate on the net depreciation benefit. The 'per unit levelized accelerated depreciation benefit has been computed considering the weighted average cost of capital as per the discounting, as detailed in para. 3.7.1 of this Order.

### **3.10 Applicability of Tariff Order**

3.10.1 This Order shall be applicable from the date of issuance of Order to 31<sup>st</sup> March 2020. The tariff determined under this Order shall be applicable for Renewable Energy Projects commissioned after the issuance of this Order in FY 2019-20 for the entire duration of the Tariff Period.

3.10.2 The following Sections of this Order outline the technology-wise norms and corresponding Generic Tariffs for RE Projects to be commissioned in FY 2019-20 based on following RE Technologies:

- Solar PV
- Wind Energy
- Small Hydro

## **4 GENERIC TARIFF FOR SOLAR PV POWER PROJECTS (FOR GROSS METERING)**

4.1.1 The Generic Tariff for Solar PV Power Projects (for Gross Metering) has been computed for FY 2019-20 based on General and Financial principles as discussed above and Technology Specific parameters for Solar PV Power Projects.

### **4.2 Useful Life**

4.2.1 The Useful Life specified for Solar Photo Voltaic Based Projects under Regulation 2.4 (44) of the RE Tariff Regulations, 2019 is 25 Years from COD.

### **4.3 Tariff Period**

4.3.1 As per Regulation 6.1, the Tariff Period for Solar PV power project is same as Useful Life of the project, i.e., 25 Years from COD.

### **4.4 Capital Cost**

4.4.1 The Commission has considered the normative Capital Cost for Solar PV Power Projects (for Gross Metering) as specified in Regulation 35.1 of Renewable Energy Tariff Regulations, 2019, as follows:-

- a) Solar PV Projects in Mainland Areas: Rs.5.00 Crore/MW (without capital Subsidy);
- b) Solar PV Projects in Island Areas: Rs. 6.00 Crore/MW (without capital Subsidy).

### **4.5 Debt:Equity Ratio**

#### **Mainland Areas**

4.5.1 In accordance with Regulation 14.1 of Renewable Energy Tariff Regulations, 2019, the debt and equity components for Solar PV Power Projects (for Gross Metering) work out to Rs. 350 lakh per MW and Rs. 150 lakh per MW (i.e., 70% and 30% of the Capital Cost), respectively.

## Island Areas

4.5.2 In accordance with Regulation 14.1 of Renewable Energy Tariff Regulations, 2019 , the debt and equity components for Solar PV Power Projects (for Gross Metering) for Island Area work out to Rs. 420 lakh per MW and Rs. 180 lakh per MW (i.e., 70% and 30% of the Capital Cost), respectively.

## 4.6 Return on Equity

4.6.1 In accordance with Regulation 17.2 of Renewable Energy Tariff Regulations, 2019, the RoE works out as shown in the Table below:

**Table 2 Return on Equity for Solar PV (Mainland Areas)**

Particulars	Solar PV Power Projects (for Gross Metering) of 1MW
Opening Equity (in Rs lakh per MW)	150.00
Return on Equity @14% grossing up with MAT rate of 21.55% (Rs lakh per MW)	26.77

**Table 3 Return on Equity for Solar PV (Island Areas)**

Particulars	Solar PV Power Projects (for Gross Metering) of 1MW
Opening Equity (in Rs lakh per MW)	180.00
Return on Equity @16% grossing up with MAT rate of 21.55% (Rs lakh per MW)	36.71

## 4.7 Interest on loan

### Mainland Areas

4.7.1 The interest rate of 10.52% has been taken for Solar PV Power Projects (for Gross Metering), with a gross opening loan amount of Rs. 350 lakh per MW for Projects in Mainland Areas.

### Island Areas

4.7.2 The interest rate of 11.52% has been taken for Solar PV Power Projects (for Gross Metering), with a gross opening loan amount of Rs. 420 lakh per MW for projects in Island Areas.

#### 4.8 Depreciation

4.8.1 In accordance with Regulation 16.3 of Renewable Energy Tariff Regulations, 2019, the depreciation for Solar PV Power Projects (for Gross Metering) has been worked out at rate of 5.83% for the first 12 years and at rate of 1.54% thereafter for the remaining Useful Life of 13 years.

#### 4.9 Operation and Maintenance Expenses

4.9.1 As regards Operation and Maintenance Expenses, Regulation 37.1 of Renewable Energy Tariff Regulations, 2019 specifies as follows:

*“The normative O&M expenses for the first year of the Control Period, i.e., FY 2019-20, shall be:*

- a) 1.5% of Capital Cost for first year, for Solar PV Projects in Mainland Areas;*
- b) 2.0% of Capital Cost for first year, for Solar PV Projects in Island Areas.”*

4.9.2 The Commission has accordingly worked out the O&M Expenses for FY 2019-20 as follows:

**Table 4 O&M Expenses for Mainland Areas (Rs. Lakh)**

Solar PV	O&M Expenses FY 2019-20
Solar PV Projects	7.50

**Table 5 O&M Expenses for Island Areas (Rs. Lakh)**

Solar PV	O&M Expenses FY 2019-20
Solar PV Projects	12.00

4.9.3 As discussed earlier, the escalation rate for projecting O&M expenses for subsequent years work out to 3.71% and the same has been considered for projecting the O&M Expenses for subsequent years till the useful life of the Project.

#### 4.10 Interest on Working Capital

4.10.1 The year-wise Working Capital Requirement has been computed in accordance with Regulation 18.1 of Renewable Energy Tariff Regulations, 2019, which specifies as follows:

*“The Working Capital requirement in respect of Wind energy projects, Small Hydro Power, Solar PV and Solar thermal power projects shall be computed in accordance with the following:*

- a) Operation & Maintenance expenses for one month;*
- b) Receivables equivalent to 2 (Two) months of energy charges for sale of electricity calculated on the normative Capacity Utilisation Factor (CUF / PLF) as applicable;*
- c) Maintenance spares @ 15% of Operation and Maintenance expenses.”*

4.10.2 As discussed earlier, as per Regulation 18.3, the Commission has considered the normative interest rate on working capital as 11.52% for Mainland Areas and 12.52% for Island Areas for working out the year-wise Interest on Working Capital.

#### **4.11 Capacity Utilization Factor**

4.11.1 In accordance with Regulation 36, CUF considered for determination of Tariff for Solar PV Power Projects is as follows:

**Table 6 CUF for Solar PV**

<b>State / Union Territory</b>	<b>CUF %</b>
Puducherry	18%
Dadra & Nagar Haveli	18%
Lakshadweep	17%
Andaman & Nicobar Islands	17%
Daman	18%
Diu	18%
Chandigarh	17%
Goa	18%

#### **4.12 Auxiliary Power Consumption**

4.12.1 In accordance with Regulation 38 of Renewable Energy Tariff Regulations, 2019, Normative Auxiliary Consumption of 0.25% of the gross generation has been considered for determination of Tariff.



**4.13 Generic Tariff for Solar PV Power Projects (for Gross Metering)**

4.13.1 Considering the above parameters and the discount factor of 9.42% for Mainland Areas and 10.42% for Island Areas for levelization of Tariff, Tariffs during the applicable period of this Order for Solar PV Power Projects (Gross Metering) commissioned between the date of issuance of this Order to 31 March, 2020 have been determined as under:

**Table 7 Generic Tariff for Solar PV Power Projects (Rs./kWh)**

States/Union Territories	Tariff Period (Years)	Levelized Tariff	Benefit of Accelerated Depreciation (if availed)	Net Levelized Tariff (upon adjusting for accelerated depreciation benefit, if availed)
Goa	25	4.98	0.37	4.61
Chandigarh	25	5.27	0.39	4.88
Dadra & Nagar Haveli	25	4.98	0.37	4.61
Daman	25	4.98	0.37	4.61
Puducherry	25	4.98	0.37	4.61
Diu	25	4.98	0.37	4.61
Andaman & Nicobar Island	25	7.16	0.53	6.63
Lakshadweep	25	7.16	0.53	6.63

## **5 GENERIC TARIFF FOR WIND ENERGY BASED PROJECTS**

5.1.1 The Generic Tariff for Wind Energy Based Projects has been computed for FY 2019-20 based on General and Financial principles as discussed above and Technology Specific parameters for Wind Energy Based Projects.

### **5.2 Useful Life**

5.2.1 The Useful Life specified for Wind Energy Based Projects under Regulation 2.4 (44 a) of the RE Tariff Regulations is 25 Years from COD.

### **5.3 Tariff Period**

5.3.1 As per Regulation 6.1 the Tariff Period is equal to the Useful Life of the project, i.e., 25 Years from COD.

### **5.4 Capital Cost**

5.4.1 The Commission has considered the normative Capital Cost for Wind Energy Based Projects as specified in Regulation 26.2 of Renewable Energy Tariff Regulations, 2019, as follows:-

- |                                      |                    |
|--------------------------------------|--------------------|
| a) Mainland area:                    | Rs. 5.25 Crore/MW; |
| b) Island areas (Andaman & Nicobar): | Rs. 6.25 Crore/MW; |
| c) Island areas (Lakshadweep):       | Rs. 7.00 Crore/MW; |

### **5.5 Debt: Equity Ratio**

#### **Mainland Areas**

5.5.1 In accordance with Regulation 14.1 of Renewable Energy Tariff Regulations, 2019 the debt and equity components for Wind Energy Based Projects work out to Rs. 367.50 lakh per MW and Rs. 157.50 lakh per MW (i.e., 70% and 30% of the Capital Cost), respectively.

#### **Island Areas (Andaman & Nicobar)**

5.5.2 In accordance with Regulation 14.1 of Renewable Energy Tariff Regulations, 2019, the debt and equity components for Wind Energy Based Projects work out to Rs. 437.50 lakh per MW and Rs. 187.50 lakh per MW (i.e., 70% and 30% of the Capital Cost), respectively.

**Island Areas (Lakshadweep)**

5.5.3 In accordance with Regulation 14.1 of Renewable Energy Tariff Regulations, 2019, the debt and equity components for Wind Energy projects work out to Rs. 490 lakh per MW and Rs. 210 lakh per MW (i.e., 70% and 30% of the Capital Cost), respectively.

**5.6 Return on Equity**

5.6.1 In accordance with Regulation 17.2 of Renewable Energy Tariff Regulations, 2019, the RoE works out as shown in the Table below:

**Table 8 RoE for Mainland Areas**

<b>Particulars</b>	<b>Wind Energy</b>
Opening Equity (in Rs lakh per MW)	157.50
Return on Equity @14% after grossing up with MAT rate of 21.55% (Rs lakh per MW)	28.11

**Table 9 RoE for Island Areas (Andaman & Nicobar)**

<b>Particulars</b>	<b>Wind Energy</b>
Opening Equity (in Rs lakh per MW)	187.50
Return on Equity @16% after grossing up with MAT rate of 21.55% (Rs lakh per MW)	38.24

**Table 10 RoE for Island Areas (Lakshadweep)**

<b>Particulars</b>	<b>Wind Energy</b>
Opening Equity (in Rs lakh per MW)	210.00
Return on Equity @16% after grossing up with MAT rate of 21.55% (Rs lakh per MW)	42.83

## 5.7 Interest on loan

### Mainland Areas

5.7.1 The interest rate of 10.52% has been taken for Wind Energy Power Projects, with a gross opening loan amount of Rs. 367.50 lakh per MW for Projects in Mainland Areas.

### Island Areas (Andaman & Nicobar)

5.7.2 The interest rate of 11.52% has been taken for Wind Energy Power Projects, with a gross opening loan amount of Rs. 437.50 lakh per MW for Projects in Island Areas (Andaman & Nicobar).

### Island Areas (Lakshadweep)

5.7.3 The interest rate of 11.52% has been taken for Wind Energy Power Projects, with a gross opening loan amount of Rs. 490.00 lakh per MW for Projects in Island Areas (Lakshadweep).

## 5.8 Depreciation

5.8.1 In accordance with Regulation 16.3 of Renewable Energy Tariff Regulations, 2019, the depreciation for Wind Energy Based Projects has been worked out at rate of 5.83% for the first 12 years and at rate of 1.54% thereafter for the remaining Useful Life of 13 years.

## 5.9 Operation and Maintenance Expenses

5.9.1 As regards Operation and Maintenance Expenses, Regulation 28.1 of Renewable Energy Tariff Regulations, 2019 specifies as follows:

*“The normative O&M expenses for the first year of the Control Period, i.e., FY 2019-20, shall be:*

- a) 1.5% of Capital Cost for Wind Energy Projects in Mainland Areas;*
- b) 2.0% of Capital Cost for Wind Energy Projects in Island Areas.”*

5.9.2 The Commission has accordingly worked out the O&M Expenses for FY 2019-20 as follows:

**Table 11 O&M Expenses for Mainland Areas (Rs. Lakh/MW)**

Particulars	O&M Expenses FY 2019-20
Wind Energy Projects	7.88

**Table 12 O&M Expenses for Island Areas Andaman & Nicobar (Rs. Lakh/MW)**

Particulars	O&M Expenses FY 2019-20
Wind Energy Projects	12.50

**Table 13 O&M Expenses for Island Areas Lakshadweep (Rs. Lakh/MW)**

Particulars	O&M Expenses FY 2019-20
Wind Energy Projects	14.00

5.9.3 As discussed earlier, the escalation rate for projecting O&M expenses for subsequent years works out to 3.71%, and the same has been considered for projecting the O&M Expenses for subsequent years till the Useful Life of the Project.

## 5.10 Interest on Working Capital

5.10.1 The year-wise Working Capital Requirement has been computed in accordance with Regulation 18.1 of Renewable Energy Tariff Regulations, 2019, which specifies as follows:

*“The Working Capital requirement in respect of Wind energy projects, Small Hydro Power, Solar PV and Solar thermal power projects shall be computed in accordance with the following:*

- a) Operation & Maintenance expenses for one month;
- b) Receivables equivalent to 2 (Two) months of energy charges for sale of electricity calculated on the normative Capacity Utilisation Factor (CUF / PLF) as applicable;
- c) Maintenance spares @ 15% of Operation and Maintenance expenses.”

5.10.2 As discussed earlier, as Per Regulation 18.3, the Commission has considered the normative interest rate on working capital as 11.52% for Mainland Areas and 12.52% for Island Areas for working out the year-wise Interest on Working Capital.

### 5.11 Capacity Utilization Factor

5.11.1 In accordance with Regulation 27, CUF considered for determination of Tariff for Wind Energy Projects is as follows:

**Table 14 CUF for Wind Energy Projects**

State / Union Territory	CUF %
Goa	18%
Andaman & Nicobar Islands	18%
Puducherry	21%
Lakshadweep	20%
Daman	19%
Chandigarh	18%
Dadra & Nagar Haveli	18%
Diu	26%

### 5.12 Auxiliary Power Consumption

5.12.1 In accordance with Regulation 29 of Renewable Energy Tariff Regulations, 2019, Normative Auxiliary Consumption of 0.25% of the gross generation has been considered for determination of Tariff.

### 5.13 Generic Tariff for Wind Energy Based Projects

5.13.1 Considering the above parameters and the discount factor of 9.42% for Mainland Areas and 10.52% for Island areas for levelization of Tariff, tariffs during the applicable period of this Order for Wind Energy Power Projects commissioned between the date of issuance of this Order to 31 March, 2020 have been determined as under:

**Table 15 Generic Tariff for Wind Energy Power Projects (Rs./kWh)**

States/Union Territories	Tariff Period (Years)	Levelized Tariff	Benefit of Accelerated Depreciation (if availed)	Net Levelized Tariff (upon adjusting for accelerated depreciation benefit, if availed)
GOA	25	5.21	0.41	4.80
Chandigarh	25	5.21	0.41	4.80
Dadra & Nagar Haveli	25	5.21	0.41	4.80
Daman	25	4.94	0.41	4.53

States/Union Territories	Tariff Period (Years)	Levelized Tariff	Benefit of Accelerated Depreciation (if availed)	Net Levelized Tariff (upon adjusting for accelerated depreciation benefit, if availed)
Puducherry	25	4.47	0.41	4.06
Diu	25	3.61	0.41	3.20
Andaman & Nicobar Island	25	7.02	0.49	6.53
Lakshadweep	25	7.08	0.55	6.53

## 6 SMALL (INCLUDING MINI/MICRO) HYDRO POWER PROJECTS

6.1.1 The Generic Tariff for Small Hydro Projects has been computed for FY 2019-20 based on General and Financial principles as discussed above and Technology Specific parameters for Small Hydro Projects.

### 6.2 Useful Life

6.2.1 The Useful Life specified for Small Hydro Projects, under Regulation 2.4 (44) of the RE Tariff Regulations, 2019, is 35 years from COD.

### 6.3 Tariff Period

6.3.1 As per Regulation 6.1, the Tariff Period is equal to Useful Life of the project, i.e., 35 years from COD.

### 6.4 Capital Cost of Small Hydro Projects

6.4.1 The Commission has considered the normative Capital Cost for Small Hydro Projects as specified in Regulation 30.1 of Renewable Energy Tariff Regulations, 2019, as follows:

#### Projects in Mainland Areas:

- a. Below 5 MW: Rs. 7.79 Cr/MW,
- b. 5 MW to 25 MW: Rs. 7.07 Cr/MW

#### Projects in Island Areas:

- a. Below 5 MW: Rs. 10.50 Cr/MW,
- b. 5 MW to 25 MW: Rs. 9.00Cr/MW

## 6.5 DEBT-EQUITY RATIO

### Mainland Areas

6.5.1 In accordance with Regulation 14.1 of Renewable Energy Tariff Regulations, 2019, the debt and equity components for SHPs with capacities below or equal to 5 MW work out to Rs. 545.30 lakh per MW and Rs 233.70 lakh per MW (i.e., 70% and 30% of the Capital Cost), respectively. For Projects of capacities above 5 MW and lower than or equal to 25 MW, the debt and equity components work out to Rs. 494.90 lakh per MW and Rs. 212.10 lakh per MW, respectively.

### Island Areas

6.5.2 In accordance with Regulation 14.1 of Renewable Energy Tariff Regulations, 2019, the debt and equity components for SHPs with capacities below or equal to 5 MW work out to Rs. 735.00 lakh per MW and Rs. 315.00 lakh per MW (i.e., 70% and 30% of the Capital Cost), respectively. For Projects of capacities above 5 MW and lower than or equal to 25 MW, the debt and equity components work out to Rs.630.00 lakh per MW and Rs. 270.00 lakh per MW, respectively.

## 6.6 Return on Equity

6.6.1 In accordance with Regulation 17.2 of Renewable Energy Tariff Regulations, 2019, the RoE works out as shown in the Table below:

**Table 16 RoE for Mainland Areas**

Particulars	below or equal to 5 MW	> 5 MW and lower than or equal to 25 MW
Opening Equity (in Rs lakh per MW)	233.70	212.10
Return on Equity @14% grossing up with MAT rate of 21.55% (Rs lakh per MW)	41.70	37.85

**Table 17 RoE for Island Areas**

Particulars	below or equal to 5 MW	> 5 MW and lower than or equal to 25 MW
Opening Equity (in Rs lakh per MW)	315.00	270.00
Return on Equity @16% grossing up with MAT rate of 21.55% (Rs lakh per MW)	64.24	55.07



## 6.7 INTEREST ON LOAN

### Mainland Areas

6.7.1 The interest rate of 10.52% has been taken for SHPs with capacities lower than or equal to 5 MW, with a gross opening loan amount of Rs. 545.30 lakh per MW; and for SHPs above 5 MW and lower than or equal to 25 MW, with a gross opening loan amount of Rs. 494.90 lakh per MW for Projects in Mainland Areas.

### Island Areas

6.7.2 The interest rate of 11.52% has been taken for SHPs with capacities lower than or equal to 5 MW, with a gross opening loan amount of Rs. 735.00 lakh per MW; and for SHPs above 5 MW and lower than or equal to 25 MW, with a gross opening loan amount of Rs. 630.00 lakh per MW for Projects in Island Areas.

## 6.8 Depreciation

6.8.1 In accordance with Regulation 16.3 of Renewable Energy Tariff Regulations, 2019, the depreciation for Small Hydro Projects has been worked out at rate of 5.83% for the first 12 years and at rate of 0.87% thereafter for the remaining Useful Life of 23 years.

## 6.9 Operation and Maintenance Expenses

6.9.1 As regards Operation and Maintenance Expenses, Regulation 33.1 of Renewable Energy Tariff Regulations, 2019 specifies as follows:

*“The normative O&M expenses for the first year of the Control Period, i.e., FY 2019-20, shall be:*

- a) 2% of Capital Cost for Small hydro Projects, in Mainland Areas;*
- b) 2.5% of Capital Cost for Projects in Island Areas.”*

6.9.2 The Commission has accordingly worked out the O&M Expenses for FY 2019-20 as follows:

**Table 18 O&M Expenses for Mainland Areas**

Project Size	O&M Expense Norm	O&M Expenses (Rs. lakh/MW)
Lower than or equal to 5 MW	2% of the Capital Cost	15.58
5MW lower than or equal to 25MW	2% of the Capital Cost	14.14

**Table 19 O&M Expenses for Island Areas**

Project Size	O&M Expense Norm	O&M Expenses (Rs. lakh/MW)
Lower than or equal to 5 MW	2.5% of the Capital Cost	26.25
5MW lower than or equal to 25MW	2.5% of the Capital Cost	22.50

6.9.3 As discussed earlier, the escalation rate for projecting O&M expenses for subsequent years works out to 3.71%, and the same has been considered for projecting the O&M Expenses for subsequent years till the useful life of the Project.

### 6.10 Interest on Working Capital

6.10.1 The year-wise Working Capital Requirement has been computed in accordance with Regulation 18.1 of Renewable Energy Tariff Regulations, 2019, which specifies as follows:

*“The Working Capital requirement in respect of Wind energy projects, Small Hydro Power, Solar PV and Solar thermal power projects shall be computed in accordance with the following:*

- d) Operation & Maintenance expenses for one month;*
- e) Receivables equivalent to 2 (Two) months of energy charges for sale of electricity calculated on the normative Capacity Utilisation Factor (CUF / PLF) as applicable;*
- f) Maintenance spares @ 15% of Operation and Maintenance expenses.”*

6.10.2 As discussed earlier, as Per Regulation 18.3, the Commission has considered the normative interest rate on working capital as 11.52% for mainland Areas and 12.52% for Island Areas for working out the year-wise Interest on Working Capital.

### 6.11 Capacity Utilization Factor

6.11.1 In Accordance with Regulation 31, a CUF of 30% has been considered for determination of Tariff for Small Hydro Based Projects.

## 6.12 Auxiliary Power Consumption

6.12.1 In accordance with Regulation 32 of Renewable Energy Tariff Regulations, 2019, normative Auxiliary Consumption of 1.0% of the gross generation has been considered for determination of Tariff.

## 6.13 Generic Tariff for Small Hydro Projects

6.13.1 Considering the above parameters and the discount factor of 9.42% for Mainland Areas and 10.42% for Island Areas for levelization of Tariff, Tariffs during the applicable period of this Order for Small Hydro Projects (Mainland Areas & Island Areas) commissioned between the date of issuance of this Order to 31 March, 2020 have been determined as under:

**Table 20 Generic Tariff for Mainland Area (Rs./kWh)**

Type of SHP	Tariff Period (Years)	Levelized Tariff	Benefit of Accelerated Depreciation (if availed)	Net Levelized Tariff (upon adjusting for accelerated depreciation benefit, if availed)
Lower than or equal to 5 MW	35	4.77	0.32	4.45
Above 5 MW and lower than or equal to 25 MW	35	4.33	0.29	4.04

**Table 21 Generic Tariff for Island Areas (Rs./kWh)**

Type of SHP	Tariff Period (Years)	Levelized Tariff	Benefit of Accelerated Depreciation (if availed)	Net Levelized Tariff (upon adjusting for accelerated depreciation benefit, if availed)
Lower than or equal to 5 MW	35	7.29	0.50	6.80
Above 5MW and lower than or equal to 25MW	35	6.25	0.43	5.82

(Smt. Neerja Mathur)

Member

(Shri M.K Goel)

Chairperson