

**No. 238/9/2018-Wind**  
**Ministry of New and Renewable Energy**  
**Atal Akshyay Urja Bhawan, Lodhi Road, New Delhi- 110003**

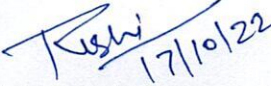
Dated: 17<sup>th</sup> October, 2022

**Circular**

**Subject: Draft 'National Repowering Policy for Wind Power Projects, 2022'–  
Reg.**

A Policy for Repowering of the Wind Power Projects was issued on 5th August, 2016 by this ministry. Based on the feedback from stakeholders on the same the policy has been modified and a draft 'National Repowering Policy for Wind Power Projects, 2022' has been prepared.

2. The revised draft is attached as **Annexure** for stakeholders consultation.
3. It is requested that the comments on the draft may be provided to this ministry within 15 days, i.e. latest by 01.11.2022, to the undersigned through email at **rishikesh.mnre@gov.in**.

  
17/10/22

Rishikesh Vaishnav  
Scientist 'B', MNRE  
Email: rishikesh.mnre@gov.in

To,  
All Concerned.

Copy To:  
1. PSO to Secretary, MNRE  
2. PPS to JS (Wind)  
3. Sci-D (PKD)

## DRAFT POLICY FOR REPOWERING OF THE WIND POWER PROJECTS

### 1. Introduction

India started harnessing Wind power in the late eighties and as on 31st August 2022 the total Wind power capacity installed in the country has reached 41.4 GW. India's Wind power sector is led by indigenous Wind power manufacturing industry which has shown consistent progress since its inception. The share of Wind power in the total installed capacity mix in the country has also increased from 21.1 GW in March, 2014 to 40.3 GW in March, 2022

The Wind turbine generator technology has evolved over and individual rated capacities of Wind turbines have increased from sub MW scale to multi MW scale. Most of the Wind-turbines installed in India up to the year 2000 are of sub MW capacity and are at sites having high Wind energy potential. Some of the old Wind turbines have already completed their design life while some are approaching the end of their design life. These Wind turbines are not only inefficient in comparison to the latest technology but also have lower hub heights (in the range of 30- 60m) in comparison to hub heights of 120-140 m range being installed these days. The lower hub height Wind turbines are not able to harness the higher Wind speeds available at higher hub heights. Therefore, it is essential to repower these older, smaller Wind turbines with higher capacity and higher efficiency turbines, in order to optimally utilize the Wind energy resource available at the respective site.

The Ministry of New and Renewable Energy had issued 'Policy for Repowering of the Wind Power Projects' on 5th August 2016 in order to create a facilitative framework for repowering. However, the majority of old Wind power projects with sub MW scale Wind turbines are yet to be repowered. Therefore, a revised policy has been drafted taking into account representations received from various stakeholders and subsequent deliberations.

### 2. Repowering Potential

National Institute of Wind Energy has estimated repowering potential of the country to be 25.406 GW considering Wind turbines below capacity 2 MW. The state wise details of repowering potential is as under:

States	Total Capacity below 0.5 MW	Total Capacity between 0.5-1 MW	Total Capacity between 1-1.5 MW	Total Capacity between 1.5-2 MW	Total Capacity below 02 MW
Tamil Nadu	1181	2919	1813	1473.5	4100
Maharashtra	243	1068	1389	731.35	1311

Karnataka	0.3	954	652	1417.05	954.3
Gujarat	51	1457	1352	1805.35	1508
Rajasthan	39	1192	788	914.9	1231
Madhya Pradesh	0	290	260	1012	290
Kerala	0	18	0	10	18
Andhra Pradesh	92	378	195	1701.2	470
<b>Total</b>	<b>1610</b>	<b>8280</b>	<b>6449</b>	<b>9067</b>	<b>25406</b>

Since the latest Wind turbine technology of 3+ MW capacity is being manufactured in the country, the repowering of Wind turbine of below 2 MW capacity must be considered. National Institute of Wind Energy will issue a repowering potential map of the country considering below 2 MW capacity Wind turbines.

### 3. Title and Enforcement

This policy will be known as the 'National Repowering Policy for Wind Power Projects – 2022'. The policy is being issued in supersession of 'Policy for Repowering of the Wind Power Projects' issued on 5th August 2016 and will be effective from the date of issuance.

### 4. Objective

The objectives of the Repowering Policy are optimum utilization of Wind energy resource by maximizing energy (kWh) yield per sq.km of the project area and utilizing the latest state-of-the-art onshore Wind turbine technologies.

### 5. Eligibility

This policy lays out conditions for developers to go for repowering of their old Wind turbines. The following Wind turbines are eligible for repowering under the policy:

- i. All Wind turbines as identified in accordance with the quality control order issued by this ministry under the relevant BIS Act ;
- ii. The Wind turbines of rated capacity below 2 MW;
- iii. Wind turbines which have completed their design life; and
- iv. A set of existing Wind turbines over an area shall also be eligible for Repowering provided:
  - Project area is a geographically contiguous land area
  - All turbines considered for repowering are connected to a single Polling Sub Station (PSS)

- More than 90% of total capacity of the project should have completed its design life.

**Note:** These conditions shall not apply to such Wind turbines which are replaced or repowered within its design life due to malfunctioning, issues in workmanship, safety issues etc.

## **6. Repowering Project**

A Repowering Project is a project which satisfies one or more of the eligibility conditions mentioned at clause 5 above and the capacity of the repowered Wind turbines is enhanced by at least 1.5 times of its aggregate capacity of old turbines.

A repowering project can be classified into two types:

- i. Standalone Project – A Wind power project having a single or group of Wind turbines owned by a single entity
- ii. Aggregation Project – A Wind power project having a group of Wind turbines owned by multiple owners with shared common infrastructure.

## **7. Implementation Arrangements**

The repowering projects would be implemented through the respective State Nodal Agency/Organization involved in promotion of Wind energy in the State or the Central Nodal Agency appointed by the Central Government as detailed under:

### **(i) Standalone Project**

- a. State Nodal Agencies (SNAs)/Central Nodal Agency (CNA) shall identify the potential turbines for repowering and elicit interest from the potential Project Owner.
- b. Project Owner may submit the Detailed Project Report (DPR) for repowering the old project to concerned SNA/CNA for verification.
- c. Based on the DPR, the SNA/CNA will coordinate with the respective STU/ CTU for availability/ augmentation of the transmission capacity, if required.
- d. On scrutiny of the project and transmission capacity availability, SNA/CNA may provide consent letter to Project Owner/Developer after obtaining in principle consent of the incumbent DISCOM.

### **(ii) Aggregation Project**

In case of aggregation projects, the following modalities shall be adopted for development of the repowering projects;

- a. SNAs/CNA may identify the potential turbines for repowering. In such cases SNAs/CNA either nominate any State/Central PSEs as Wind Repowering Project Aggregators (WRPA) to repower the project or elicit interest from private developers for the same. The selection of the private developer as WRPA shall be transparent based on minimum technical criteria and submission of consent letters from all the identified turbine owners.
  - b. A private developer may identify potential turbines for repowering and submit a proposal to the SNAs/CNA along with consent letters from all the identified turbine owners. In such cases the SNAs/CNA shall nominate the private developer as the WRPA.
- **Responsibilities of WRPA:**
    - a. Preparation of a detailed project report (DPR) for land acquisition and development of the site for repowering project.
    - b. Acquisition/ leasing/ purchase of additional land, if required.
    - c. Acquisition of all assets at the site including Wind turbine and associated equipment, internal transmission infrastructure, land and power evacuation rights, compensate asset owners for their future loss of revenue for the balance life of the project, if any. The valuation of such functional/non-functional projects assets shall be done in accordance with the standard market practices. In this regard an indicative methodology for valuation of assets is annexed.
    - d. WRPA shall also be responsible for decommissioning of the existing assets, removal and lawful disposal of all scrap from the site, including disposal of the Wind turbine blades. The turbine blades to be disposed as per the applicable norms of MoEFCC and CPCB/ SPCB and a certificate from appropriate authority need to be produced to that effect.
    - e. Prepare the site without any encumbrances for development of Wind project as if it is a Greenfield project.

Procedure followed shall be as follows:

- WRPA shall submit the Detailed Project Report to concerned SNA.
- Based on the DPR, the SNA/CNA shall coordinate with the respective STU/CTU for availability/ augmentation of the transmission capacity, if required, and facilitate the acquisition of additional land, if required.
- On scrutiny of the project and transmission capacity availability, SNA/CNA shall provide consent letter to Project Owner/Developer after obtaining in principle consent of the incumbent DISCOM.

Note:

1. In case of In-STS connected Wind turbines, SNA shall identify the potential turbines for repowering and carry out required activities as mentioned.

2. In case of ISTS connected Wind turbines, CNA shall identify the potential turbines for repowering and carry out required activities as mentioned.

## **8. Repowering Implementation Framework**

Within one month of announcement of this policy, MNRE shall appoint a monitoring and advisory committee (named as “Wind Repowering Committee (WRC)”) in accordance with the provisions of this policy to assist MNRE in implementation of the Repowering Policy.

The Members of the Committee shall include:

Joint Secretary (Wind), MNRE - Chairman

Representatives of IREDA, SECI – Member

Representative of Central Transmission Utility – Member

Representative of respective SNAs – Member

Three independent experts from Wind sector –Member (nominated by MNRE)

Representative of NIWE – Member Secretary

## **9. Arrangement for Power Purchase**

- a. The power generated corresponding to average of last three years’ generation prior to repowering would continue to be procured as per the terms of PPA in-force till the PPA tenure. In the case the PPA tenure is less than the standard PPA tenure i.e. 25 Years, the concerned DISCOM shall make arrangements to extend the tenure of the PPA for a period of 25 Years from the date of COD of the original project & continue to procure the quantum of power generated (average of last three years generation) for the remaining tenure of the PPA
- b. The project developer(s) shall be at liberty to sell additional Wind power capacity (MW)/ generation to the incumbent DISCOMs or to any other entity through Open Access subject to refusal of concerned DISCOM. The power off take by concerned DISCOM shall be at the discovered tariff of the project.
- c. A Wind farm/turbine undergoing repowering would be exempted from supplying Power to the Purchasing entity (DISCOM) during the period of execution of repowering, subject to that repowering period shall not exceed 2 years from the date of commencement of execution of re-powering.
- d. The project developer(s) shall be at liberty to seek early termination by mutual consent of both the parties.
- e. Incumbent DISCOM shall neither have any right over the additional power generated nor shall have any obligation to purchase the additional power generated after repowering.

- f. In case of repowering of captive/ third party sale Wind power project, the consumer shall be allowed to purchase power from grid (through DISCOMs or any other available source) during the period of execution of repowering, as per relevant rules & regulation. SNA/CNA may coordinate with DISCOMs for facilitating such connection/ load for temporary period, as per existing provisions of DISCOMs.

## **10. Incentive**

- i. For repowering projects Indian Renewable Energy Development Agency (IREDA) will provide an additional interest rate rebate of 0.25% over and above the interest rate available to the new Wind projects being financed by IREDA.
- ii. All fiscal and financial benefits available to the new Wind projects shall be available to the repowering project as per applicable conditions.
- iii. Central or State Government may consider a scheme to provide additional financial incentives to the repowering projects, in order to support the additional investment required for repowering project (for decommissioning and acquisition of existing asset) in comparison with the greenfield projects. Repowering sites can also be considered under other relevant schemes available such as RE park scheme and avail the benefits under the same.
- iv. The Wind RPO compliance of concerned states in which the repowering project is situated shall be exempted for the remaining period till the commissioning of repowered project. (For the purpose of calculations PLF from such projects shall be the average PLF's over the last three years before which the project was taken for Repowering).
- v. An enhanced RPO multiplier shall be provided to the repowered project for remaining period of PPA.

$$\text{RPO Multiplier} = \frac{X + Y}{Y}$$

Where

'X' is the average of last three years generation before repowering and

'Y' is the yearly generation of repowered project for the particular year for which RPO is calculated.

## **11. Data Management**

- i. NIWE shall create and maintain a project data base of all old projects with relevant information about the project such as ownership, technology, turbine details, connected PSS, land ownership etc.
- ii. NIWE shall also collect performance related data for all the sites and analyse to identify poor performing sites for repowering in accordance with the IWTCQ
- iii. SNAs/CNA along with SLDCs shall provide necessary cooperation to NIWE to collate

this data.

- iv. NIWE shall coordinate with SNAs/CNA and maintain data of decommissioned projects which shall be updated on quarterly basis.

**12. Power to amend and review**

MNRE reserves the right to amend and review the policy from time to time to ensure effective implementation of this policy.



## Annexure-I

It is noted that the PPAs for Wind power projects are generally signed for long time period (20/25 years) or renewed up to 25 years on short term basis (1 or 2 years). In such cases, the existing owners deciding to go for repowering may be losing the future revenue from their projects. Such potential financial loss needs to be compensated. In addition, Wind Repowering Project Aggregator (WRPA) would incur cost on decommissioning and disposal of the old Wind assets. The said cost may be partly compensated by the income from sale of scrap material. Accordingly, following equations may be considered for 'Repowering Site Preparation Cost (RSPC)'.

**RSPC = Terminal Valuation + Decommissioning Cost – Income from sale of scrap material**

Where:

**Terminal Valuation = PPA Value + PPA Termination Incentive**

“PPA value” can be estimated as an amount equal to the Net Present Value (NPV) of net revenue from the anticipated generation in the remaining years (as per PPA).

$$\text{PPA value} = \text{NPV of } \sum_{k=0}^n [(t * G_k) - (OM_k)]$$

wherein;

**t = Tariff** as per PPA in case of sale to DISCOM or third party. In case of captive consumption, tariff as per tariff order(s) of the appropriate commission for the year commissioning of project may be considered. In case of absence of both PPA and tariff order, a nominal tariff such as APPC of the concerned state for the project may be considered.

**G= Average annual generation** which may be calculated using the energy delivered at the delivery point (as defined in the PPA) or the PSS level data for the last 3 years.

**OM= Annual O& M cost (OM)** may be considered as per SERC/CERC tariff Orders. In case of absence of the appropriate SERC/CERC tariff orders O&M expenses for the first year of the control period shall be 2% of the wind turbine original capital cost (CAPEX) and shall be escalated at the rate of 5% per annum over the tariff period.

**n =** No of remaining years for completion of PPA

**k=** 1,2,3.....n

**PPA Termination Incentive** means the incentive provided to the asset owner over and above the PPA value. The incentive will be maximum upto 5% of PPA Value.

**Decommissioning cost** would include costs associated with dismantling Wind turbines, site clearance and disposal of blades.

**Decommissioning cost = DS +SC+ DB**

Wherein;

DS = Cost incurred for dismantling Wind turbine

SC = Cost incurred for clearing the site

DB = Cost incurred for disposal of blades.

**Income from sale of scrap material** may be considered on the basis of SERC/CERC tariff orders. In case of absence of appropriate order, the income shall be assumed to be 10% of the capital cost.

### Indicative Valuation Model

**(Model, Costs and calculations given below are indicative only and may not be considered as benchmark.)**

Assumptions:

Project Type:	Sale to Utility
Type of Turbine:	1000 KW
PLF:	12.3%
Annual Generation:	1077480 kWh
O & M Expense:	9 Lakhs
O & M Escalation:	5%
PPA Tariff (t):	3.00 (INR/kWh)
Escalation rate for Decommissioning Cost:	3%
Discount Rate for NPV:	10%
PPA Termination Incentive:	5% of (NPV of PPA Value)

Expected revenue (For last 10 year of PPA)		16 <sup>th</sup> YEAR	17 <sup>th</sup> YEAR	18 <sup>th</sup> YEAR	19 <sup>th</sup> YEAR	20 <sup>th</sup> YEAR	21 <sup>st</sup> YEAR	22 <sup>nd</sup> YEAR	23 <sup>rd</sup> YEAR	24 <sup>th</sup> YEAR	25 <sup>th</sup> YEAR
Annual Generation in MWh	<b>A</b>	1077.4	1077.4	1077.4	1077.4	1077.4	1077.4	1077.4	1077.4	1077.4	1077.4
O&M (INR Lakhs)	<b>B</b>	18.71	19.65	20.63	21.66	22.74	23.88	25.07	26.33	27.64	29.03
Revenue (INR Lakhs)	<b>C=t*A</b>	32.32	32.32	32.32	32.32	32.32	32.32	32.32	32.32	32.32	32.32
PPA Value (INR Lakhs)	<b>D=C-B</b>	13.61	12.68	11.70	10.66	9.58	8.44	7.25	6.00	4.68	3.30
No. of year left in PPA		10	9	8	7	6	5	4	3	2	1
NPV of PPA Value @ 10% discount rate ( INR Lakhs)	<b>E</b>	59.42	51.75	44.24	36.97	30.00	23.42	17.32	11.80	6.98	3.00
PPA Termination Inc. (INR	<b>F</b>	2.97	2.59	2.21	1.85	1.50	1.17	0.87	0.59	0.35	0.15

Lakhs)											
NPV + PPA Termination Incentive (INR Lakhs)	<b>G=E+F</b>	<b>62.39</b>	<b>54.33</b>	<b>46.45</b>	<b>38.82</b>	<b>31.50</b>	<b>24.59</b>	<b>18.18</b>	<b>12.39</b>	<b>7.33</b>	<b>3.15</b>

Decommissioning cost (INR Lakhs)	<b>H</b>	25.00	25.75	26.52	27.32	28.14	28.98	29.85	30.75	31.67	32.62
Income from sale of scrap (INR Lakhs)	<b>I</b>	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
Terminal value (INR Lakhs)= NPV + Termination Inc. + Income from Scrap - Decommissioning cost	<b>J=G+I-H</b>	87.39	78.58	69.93	61.50	53.36	45.61	38.33	31.64	25.66	20.53

Valuation in Rs Lakh/MW		87.39	78.58	69.93	61.50	53.36	45.61	38.33	31.64	25.66	20.53
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