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

Dated: 7th December, 2023

CIRCULAR

Subject: National Repowering & Life Extension Policy for Wind Power Projects - reg.

Ministry of New & Renewable Energy had issued 'Policy for Repowering of the Wind Power Projects' on 5th August 2016. Based on the stakeholders' consultation, the policy has been revised in order to enable repowering/replacement of older generation turbines with newer generation more efficient turbines and refurbishment of wind turbines for life extension beyond design life subject to safety and performance assessment as per relevant standards.

2. In supersession to the 'Policy for Repowering of the Wind Power Projects' dated 5th August 2016, the Ministry hereby issues 'National Repowering & Life Extension Policy for Wind Power Projects -2023' (attached).

(Dr. Rahul Rawat)
Scientist 'C'

To,

All Concerned.

NATIONAL REPOWERING & LIFE EXTENSION POLICY FOR WIND POWER PROJECTS

1. Introduction

India started harnessing Wind power in the late eighties backed by indigenous 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 as on March 2014 to 44.29 GW as on October 2023.

The Wind turbine generator technology has evolved over these years 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 now. In order to optimally utilize the Wind energy resource available at the respective sites it felt necessary to formulate a policy to enable these old wind energy turbines to be repowered or refurbished with technological advancements to increase its operational life and efficiency, while considering due safety aspects.

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. A review of the policy has been carried out taking into account representations received from various stakeholders, subsequent deliberations and stakeholders' consultation and a revised policy has been prepared. This policy enables repowering/replacement of older generation turbines with newer generation more efficient turbines even before the design life is over, if the developers/owners choose to do so. The revised policy considers refurbishment of wind turbines for life extension beyond design life subject to safety and performance assessment as per relevant standards. Refurbishment may be done by suitable modifications in the turbine components such as gearbox, blades, generator, controller etc.

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 are 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 2 MW**
Tamil Nadu	1181	2919	1813	1473.5	7386.5
Maharashtra	243	1068	1389	731.35	3431.35
Karnataka	0.3	954	652	1417.05	3023.35

Gujarat	51	1457	1352	1805.35	4665.35
Rajasthan	39	1192	788	914.9	2933.9
Madhya Pradesh	0	290	260	1012	1562
Kerala	0	18	0	10	28
Andhra Pradesh	92	378	195	1701.2	2366.2
Total	**1610**	**8280**	**6449**	**9067**	**25406**

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 & Life Extension Policy for Wind Power Projects – 2023'. The policy is being issued in super-session 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 objective of the repowering & life extension policy is 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 or refurbishment for ensuring life extension of old Wind turbines. The following Wind turbines are eligible for repowering/refurbishment under the policy:

i. All Wind turbines which are not in compliance with the quality control order issued by this Ministry; or

ii. have completed their design life as certified under the Type Test Certificate in accordance with the applicable relevant standards; or

iii. The Wind turbines of rated capacity below 2 MW;

iv. Based on commercial/voluntary consideration after 15 years of installation.

Note: Wind turbines which are to be replaced within the period of its design life due to malfunctioning, issues in workmanship, safety etc., shall also require to be repowered or refurbished.

6. Repowering/Refurbished Project

A repowering/refurbished project is a project which satisfies one or more of the eligibility conditions mentioned at clause 5 above and the annual energy generation

of the repowered/refurbished wind project is enhanced by at least 1.5 times as compared to actual generation of the old wind power project;

Note: For the purpose of arriving at the actual generation of the old wind power project, the actual average generation for the last three years (from the date of disconnection from the grid) before which the project was taken for repowering/refurbishment will be considered and such repowered/refurbished project shall satisfy the above condition within a maximum period of 3 years from the date of commissioning.

A repowering project can be classified into two categories:

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.

In case the project owner opts for life extension of the wind turbines, then in such a case the refurbishment carried out for ensuring life extension shall be considered under the category of standalone project.

7. Implementation Arrangements

The repowering or refurbishment 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.

(i) Standalone Project

a. Project owner may submit the Detailed Project Report (DPR) for repowering/refurbishment the old project to concerned SNA/CNA for verification; or

b. State Nodal Agencies (SNAs)/Central Nodal Agency (CNA) shall also identify the potential turbines for repowering and elicit interest from the potential Project Owner to submit the DPR.

c. The refurbishment of turbines for ensuring life extension shall be done by the developer with the consent from SNA. The turbine shall be assessed and certified by the certification agency for quality and safe operation. The assessment of the turbines shall be carried out as per the UL 4143: Wind Turbine Generator Lifetime Extension standard or any such standards issued by the BIS. Subsequent to the assessment a separate type certificate or extension of the previous type certificate shall be issued by the certification body. In no case, the total operational life of the refurbished turbines shall exceed 40 years from the date of commissioning.

d. Based on the DPR, the SNA/CNA will coordinate with the respective STU/ CTU for availability/ augmentation of the transmission capacity. The additional transmission augmentation shall be provided by the respective STU/CTU as per available provisions/schemes, if required. Developer shall issue a notice

to CTU/STU 2 (two) years in advance for enhancing the transmission capacity as per the proposed repowered capacity of the wind power project. Appropriate transmission charges shall be payable as per the prevailing regulations.

e. On scrutiny of the project, transmission capacity availability and availability of in principle consent of the incumbent DISCOM, SNA/CNA shall provide consent letter to Project Owner/Developer.

f. A Notice of the repowering shall be sent to committee being set up under Para 8 including DPR. After examining the repowering process, the committee will grant a moratorium on supply of power under the PPA for the period of repowering up to maximum 02 years.

(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 through a transparent mechanism based on minimum technical & financial criteria. The indicative parameters for selection of WRPA may include Quality Assurance Certificate, Financial turnover, Experience, Repowering plan, Old asset evaluation, Consent agreement from the existing owners, Indication of land rights arrangement, Asset disposal plan etc.

b. Amongst the existing owners of wind power projects any one owner/developer may act as WRPA with or without partnership with other project developer. The proposing owner shall identify potential turbines for repowering and submit a proposal to the SNAs/CNA along with consent letters from all the identified turbine owners.

- **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. Obtaining clearance from state/ centre or any other concerned agency for decommissioning/ development of the project.

d. 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 given at **Annex**.

e. 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 shall 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.

f. 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/CNA.
- 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. The additional transmission augmentation shall be provided by the respective STU/CTU as per available provisions/schemes, if required. Developer shall issue a notice to CTU/STU 2 (two) years in advance for enhancing the transmission capacity as per the proposed repowered capacity of the wind power project. Appropriate transmission charges shall be payable as per the prevailing regulations.
- On scrutiny of the project and transmission capacity availability, SNA/CNA shall provide consent letter to concerned WRPA after obtaining in principle consent of the incumbent DISCOM.
- The repowering may be carried out by the WRPA either through open bids or by themselves on EPC basis. A Notice of the repowering shall be sent to committee being set up under Para 8 including DPR. After examining the repowering process, the committee will grant a moratorium on supply of power under the PPA for the period of repowering up to maximum 02 years.

Note:

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

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/Refurbishment Policy. The broad terms of reference of the WRC will include the following;

i. To act as a bridge between industry stakeholders and state/central Govt. organizations
ii. To facilitate the ministry in effective implementation of the repowering policy

iii. To recommend specific policy/regulatory interventions in order to realize the repowering potential.
iv. To monitor the progress of various repowering/refurbishment projects under this policy.

The Members of the Committee shall include:

i. Joint Secretary (Wind), MNRE - Chairman
ii. Representatives of IREDA, SECI – Member
iii. Representative of Central Transmission Utility – Member
iv. Three independent experts from Wind sector –Member (to be nominated by MNRE)
v. Representative of NIWE – Member Secretary

The committee will co-opt members from the respective state while taking up specific issues on repowering/refurbishment project of a particular state.

9. Arrangement for Power Purchase

a. The power generated corresponding to average of last three years generation (measured at metering point) prior to repowering/refurbishment would continue to be procured as per the terms of PPA in-force till the tenure of the PPA.

b. The existing PPA tenure shall be extended by a period equal to the repowering/refurbishment or a period of maximum period of two (2) years excluding Force Majeure events whichever is lower.

c. 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/refurbishment.

d. The additional power generated can be sold by the developer/owner as per his will – in the power exchange, or through bilateral agreement or by entering into short/medium/ long term PPA as per the existing laws/rules. There will be no obligation to compulsorily supply the power to any DISCOM/procurer at any fixed rates.

e. A Wind farm/turbine undergoing repowering/refurbishment would be exempted from supplying Power to the Purchasing entity (DISCOM) during the period of execution of repowering on the recommendation of the committee set up under para 8, subject to that the repowering period shall not exceed 2 years excluding Force Majeure events from the date of consent letter issued by CNA/SNA.

f. The DISCOMs/PPA owners will be given at least 1 year notice before the repowering work begins by the developer, so that they can tie up alternate sources of power for the intervening period.

g. The old PPA can be terminated with mutual consent.

10. Benefits/Incentives:

i. REC/PFC/IREDA will provide loans for repowering on the same terms and conditions as laid down for new projects.

ii. In addition, 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. IREDA may also devise a suitable financial product catering to debt financing for repowering of wind power projects.

iii. All fiscal and financial benefits available to the new Wind projects shall be available to the repowering project as per applicable conditions.

iv. The developer will have the liberty for micro siting based on an optimized energy output.

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 SS, land ownership etc.

ii. NIWE shall also collect performance related data for all the sites and analyse to identify poor performing sites for repowering/refurbishment in accordance with the IWTQCO.

iii. SNAs/CNA along with SLDCs shall provide all necessary data to NIWE for this purpose

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

12. Project Commissioning Schedule:

The repowering/refurbishment projects shall be commissioned within a period of 24 (twenty-four) months from the date of consent letter from CNA/SNA or consumer entity. Part commissioning and early commissioning of the project shall be allowed.

13. Power to amend and review

If any difficulty arises in giving effect to any provision of this Policy or interpretation of the Policy or modification to the Policy, Ministry of New & Renewable Energy is empowered to do the same, with the approval of Minister, New & Renewable Energy. Further, Ministry of New & Renewable Energy may review the policy from time to time to ensure effective implementation of this policy.

Annex

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).

$$\text{PPA value} = NPV\ of \sum_{k=1}^{n} [(t * G_k) - (OM_k)]$$

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 may be calculated by taking the average of energy delivered in last three (3) years at the delivery point (as defined in the PPA) or at SS level.

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 rate of incentive will be as mutually agreed by both the parties, preferably 10 % 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 original 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: 10% of PPA Value

Expected revenue (For last 10 year of PPA)		16th Yr	17th Yr	18th Yr	19th Yr	20th Yr	21st yr	22nd Yr	23rd Yr	24th Yr	25th Yr
Annual Generation in MWh	**A**	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**	18.71	19.65	20.63	21.66	22.74	23.88	25.07	26.33	27.64	29.03
Revenue (INR Lakhs)	**C=t*A**	32.32	32.32	32.32	32.32	32.32	32.32	32.32	32.32	32.32	32.32
Net Revenue (INR Lakhs)	**D=C-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
PPA Value @ 10 % discount rate (INR Lakhs)	**E**	59.42	51.75	44.24	36.97	30.00	23.42	17.32	11.80	6.98	3.00
PPA Termination Inc. (INR Lakhs)	**F**	5.94	5.17	4.42	3.70	3.00	2.34	1.73	1.18	0.70	0.30
PPA Value + PPA Termination Incentive (INR Lakhs)	**G=E+F**	**65.36**	**56.92**	**48.67**	**40.67**	**33.00**	**25.76**	**19.05**	**12.98**	**7.68**	**3.30**
Decommissioning cost (INR Lakhs)	**H**	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)	**I**	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00

Terminal value (INR Lakhs)= PPA Value + Termination Inc. + Income from Scrap - Decommissioning cost	**J=G+I-H**	**90.36**	**81.17**	**72.14**	**63.35**	**54.86**	**46.78**	**39.20**	**32.23**	**26.01**	**20.68**
Valuation in Rs (Lakh/MW)		**90.36**	**81.17**	**72.14**	**63.35**	**54.86**	**46.78**	**39.20**	**32.23**	**26.01**	**20.68**