ANNEXURE III

Ref: NIWE/OSWH&IB/EMPL/2015-16 **Date: 11.02.2016**

Sub: Modified Procedure for empanelment of small wind turbines with MNRE / NIWE – Reg.

Small wind turbines manufacturers who wish to get their models empanelled with MNRE / NIWE must submit the documents to NIWE along with the advance fee , as applicable, as per Annexure-I.

The time limit of submission of the aforesaid documents is 3 months from the date of application. The process of review of documentation will begin only after submission of all the required documents as per Annexure-I.

Models applying for empanelment will be considered for empanelment under two categories:

1. **Models with valid Type Test reports** will be considered for empanelment, based on the recommendations of the Committee for empanelment formulated by MNRE, after successfully completing the review process provided the said models have the type testing reports from NIWE or Internationally recognised testing agencies duly accredited by their corresponding national accreditation bodies affiliated to International Laboratory Accreditation Cooperation (ILAC) under Mutual Recognition Arrangement (MRA). The review process fees to be charged by NIWE shall be finalized shortly by the SWT Empanelment Committee constituted by MNRE.

2. Models without valid Type Test reports shall apply for empanelment with a documentation review fee of Rs. 1.00 lakh plus statutory levies as applicable .The manufacturer after successfully completing the review process will have to sign an agreement for type testing of the wind turbine at WTRS, Kayathar for which an additional fee of Rs. 1.0 lakh plus statutory levies as applicable upto 10 kW will be charged. After successful completion of the type testing at WTRS Kayathar, model will be considered for empanelment based on the recommendations of Committee for empanelment formulated by MNRE. The testing fees for models above 10 kW will be finalized shortly by the SWT Empanelment Committee constituted by MNRE.

Encl: As above.

Annexure-I

APPLICATION FOR EMPANELMENT OF
MODEL NAME..... ,RATING.....
(Strikeout whichever is not applicable)

S.No	Document Type	Whether submitted or not	
		To be filled in by manufacturer	**To be verified by NIWE with remarks if any.**
MODELS WITH VALID TYPE TEST REPORT			
I.	**In the case of "Empanelment" for manufacturers with a valid type test report from accredited laboratory* :**		
1	Registration certificate showing legal identity of the company		
2	QMS Adhering to ISO 9001		
3	Technical specification of the turbine (as per Format-I)		
4	Product manual covering details of installation, maintenance, routine inspection and personnel safety.		
5	Type test reports for power performance measurement, Safety & function tests and duration test. In the case of grid connected model, a power quality test report as per IEC 61400-21 also needs to be furnished		
6	In case of Joint Venture, agreement with the Principal		
MODELS WITHOUT VALID TYPE TEST REPORT			
II.	**In the case of "Empanelment" for manufacturers without a valid type test report from accredited laboratory *:**		
1	Registration certificate showing legal identity of the company		
2	Proof of having applied for ISO 9001 / QMS adhering to ISO 9001		
3	Technical specification of the turbine (as per Format-I)		
4	Product manual covering details of installation, maintenance, routine inspection and personnel safety.		
5	Minimum simplified design document (as per Format-II)		
6	Number of installations and its performance (as per Format-III)-OPTIONAL		
7	In case of Joint Venture, agreement with the Principal		

* Any laboratory duly accredited by their corresponding national accreditation bodies affiliated to International Laboratory Accreditation Cooperation (ILAC) under Mutual Recognition Arrangement (MRA).

(Authorized Signatory of manufacturer)

Format I

TECHNICAL SPECIFICATIONS OF SMALL WIND TURBINE		
Small Wind Turbine Configuration and Operation Data		
General Configuration	Make, Model	
	Axis of rotation	Horizontal / vertical
	Orientation	Upwind/ Downwind
	Number of blades	
	Rotor diameter (m)	
	Hub height (m)	
Design class	As per IEC 61400-2	
Performance	Rated Electrical Power (W)	
	Rated wind speed (m/s)	
	Cut-in wind speed(m/s)	
	Cut-out wind speed (m/s)	
Rotor	Swept area (m^2)	
	Rotational Speed (rpm)	
	Direction of rotation	
	Over-speed control	
Yaw System	Wind Direction Sensor	
	Yaw control method	
Tower	Type	
	Height (m)	
Battery Charger	Model	
	Manufacturer	
	Nominal Battery Voltage (V) DC	
	Maximum output power (W)	
Inverter details (in case of grid connected model- to be submitted in lieu of Battery charger)	Maximum/ peak output power (W)	
	Rated power (W)	
	No. of phases	
	Rated voltage (V)	
	Operating frequency	
Manufacturer's Power		

Format II

Simplified Design details required for Small Wind Turbine Documentation.

1.0		General Aero-generator/ Turbine Description	Drawings	Analysis	Description (D) Specifications (Sp) Schematics (Sch)	Remarks
(1)			(2)	(3)	(4)	
	1.1	General Turbine Characteristics and Configuration Description				
		Turbine description and general specifications	▸		D, Sp	
		Major component weights and centres of gravity	▸		Sp	
		Operational limits			Sp	
		Electrical power system			D, Sch	
	1.2	External conditions and design class			D	
	1.3	Control and protection philosophy			D	
	1.4	Codes and standards			D	
	1.5	Co-ordinate Systems	▸		D, Sch	
2.0		**Control and Protection System**				
	2.1	Description and component specifications including transducers and sensors (for measurement of voltage, rpm etc)			D, Sp	
	2.2	Detailed control logic flow chart			Sch	
	2.3	Set point list			Sp	
	2.4	Remote control/ monitoring			D, Sch, Sp	
	2.5	Protection system logic		▸	D, Sch	
	2.6	Over-speed sensing			Sp, Sch	
	2.7	Overpower/current sensing			Sp, Sch	
	2.8	Emergency stop button			D, Sch	

Note: Shaded portion is optional

3.0		**Loads and Load Cases**				
	3.1	General analysis approach		▸	D	
	3.2	System dynamics model description :				
		Degrees of freedom			D, Sch	
		Mass and stiffness distributions			Sp	
		Aerodynamic inputs (airfoil tables, blade geometry, etc.)		▸	Sch, Sp	
	3.3	Partial safety factors		▸	Sp	
	3.4	Validation of calculation models:		▸		
		Analytical		▸		
	3.5	Dynamic behaviour of the system and of individual major components:		▸		
		Mode shapes & frequencies		▸		
	3.6	Load cases:				
		Fatigue load cases		▸		
		Ultimate load cases		▸		
		Failure modes		▸		
	3.7	Loads for structural components:				
		Blade		▸		
		Hub		▸		
		Locking device(s)		▸		
		shaft and bearings		▸		
		Mainframe and gearbox structure		▸		
		Gearing and drive train (including gen., brake & couplings)		▸		
		Tower top/yaw bearing		▸		
		Tower		▸		
		Tower connection to foundation		▸		
		Foundation		▸		
		Other		▸		
	3.8	Critical deflection (blade/tower)		▸		

Note: Shaded portion is optional

4.0		**Components**				
	4.1	System Level Descriptions:				
		Assembly drawings	▸			
		Material properties			Sp	
		Rotor				
	4.2	Blade:				
		Structure	▸	▸	D, Sp	
		Root	▸	▸		
		Blade/hub joint	▸	▸		
		Aerodynamic brake mechanism	▸	▸	Sp	
	4.3	Hub:				
		Structure	▸	▸		
		Teeter system	▸	▸	Sp	
		Hub/low speed shaft joint	▸	▸		
	4.4	Low speed shaft:	▸	▸		
		Structure	▸	▸		
		Bearings	▸	▸	Sp	
		Bearing mountings	▸	▸	Sp	
	4.5	Structure:	▸	▸		
		Main frame	▸	▸		
		Enclosure	▸	▸		
	4.6	Gearbox:	▸	▸		
		Housing structure	▸	▸		
		Gearbox/mainframe connection	▸	▸		
		Gearbox/generator coupling	▸	▸	Sp	
		Gearing, bearings, cooling, lubrication, shafting & couplings	▸	▸	Sch, Sp	
		Nacelle				
	4.7	Generator:				
		Structure	▸	▸		
		Generator/nacelle connection	▸	▸		
	4.8	Yaw system:				
		Bearing & connections	▸	▸	Sp	
		Tower and Foundation				
	4.9	Tower:				
		Structure	▸	▸		
		Connections	▸	▸		
		Cable twist			D, Sp	
		Ladders	▸	▸	Sp	

Note: Shaded portion is optional

	4.10	Foundation:				
		Structure	☑	☑		
		Connection to tower	☑	☑		
		Other				
	4.11	Brake	☑	☑	Sp	
5.0		**Electrical**				
	5.1	Power circuit protection	☑		Sch	
	5.2	Power Converter/ Charge controller	☑		D, Sp, Sch	
	5.5	Generator electrical	☑		Sch	
	5.6	Disconnection devices			Sp	
	5.7	Earthing			Sp	
	5.8	Lightning Protection			Sp	
6.0		**Component Test Reports**				
	6.1	Component tests (other than generator)		☑	D	
	6.2	Generator test report giving rpm versus power from an			D	
7.0		**Plans**				
	7.1	Manufacturing plan			D, Sch, Sp	
	7.2	Installation plan			D, Sch, Sp	
	7.3	Maintenance plan			D, Sch, Sp	
8.0		**Personnel safety**				
	8.1	Workplace			D	
	8.2	Emergency stop			D, Sch	
	8.3	Locking devices			Sch	
	8.4	Safety instructions			D	

Note: Shaded portion is optional

Note:

1. **Drawings** are typically engineering drawings that clearly define dimensions of components or electrical schematics. They can also include material specifications, fabrication instructions or finish specifications when referring to a specific component contained within the drawing.
2. **Analysis** usually refers to engineering calculations such as stress analysis or calculations of structural loads or of electrical loads as well as statistical analysis. Analysis is the basis of specifications for structural, material, electrical and mechanical component requirements. This also includes plots of results and comparisons with test results.
3. **Specifications** (Sp) are written requirements for certain components of the wind turbine. These could include performance and dimensional specifications for a gear-box, finish requirements for gearing, bearing descriptions, electrical demands for electrical components, dimensional requirements for mechanical components, performance specifications for a hydraulic auxiliary power supply or quality documentation.
4. **Schematics** (Sch) are data plots, flow charts, diagrams and other illustrations (electric, pneumatics, and hydraulics).
5. **Descriptions** (D) consist of text describing relevant tasks, functions, components etc.
6. A check mark (☑) indicates that Drawings or Analysis are expected in the documentation for the element in the left-hand column.

FORMAT-III

INSTALLATION DETAILS OF SMALL WIND TURBINES

Name of the organisation:
Address:
Email-id:
Details of contact person:

Sl. No.	Name of the model	Capacity kW	No. of install-ations	Date of commis-sioning	Location Details (specify state & district)	Latitude, Longitude and altitude	Wind speed m/s Annual Avg.	Battery specification DC voltage & Ah.	Inverter Capacity kVA	** Energy generation kWh/year (Wind)	** Energy generation kWh/year (Hybrid)	Remarks

Note:

1) ** The manufacturer may preferably provide the monthly generation (kWh) from January – December for the complete year for each of the models listed above (format enclosed)

2) In case manufacturer has wind –solar-hybrid system facility, power output from solar will be taken as 4 kWh/day per kW of SPV installed so as to arrive at actual generation output of aero generator.

Signature and Seal of Managing Director

MONTHLY GENERATION DETAILS

Name of the organization:

Address:

Email-id:

Details of contact person:

SYSTEM CONFIGURATION

Solar PV System : Model no_____Capacity _____ kW

Aerogenerator : Model no_____Capacity _____ kW

Month	Avg. Solar Insolation W/m2	Solar Generation kWh	Avg. Wind Speed m/s	Wind Generation kWh	Total Generation (wind + solar)
January					
February					
March					
April					
May					
June					
July					
August					
September					
October					
November					
December					

Note: The format is to be filled in separately for each model.

Signature and Seal of Managing Director