



National Electric Power Regulatory Authority Islamic Republic of Pakistan

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Web: www.nepa.org.pk, E-mail: registrar@nepa.org.pk

Registrar

No. NEPRA/R/LAG-351/ 18595-601

October 04, 2019

Mr. Khurram Sayeed,
Chief Executive Officer,
Iran-Pak Wind Power (Private) Limited,
Suite # 214, 2nd Floor, Progressive Plaza, Beaumont Road,
Karachi.

Subject: **Grant of Generation Licence No. WPGL/45/2017
Licence Application No. LAG-351
Iran-Pak Wind Power (Private) Limited (IPWPPL)**

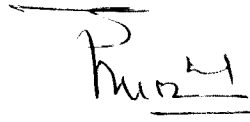
Reference: *IPWPPL's LPM submitted vide letter dated March 28, 2019 (received on April 08, 2019)*

It is intimated that the Authority has approved Modification in Generation Licence No. WPGL/45/2017 dated June 30, 2017 in respect of Iran-Pak Wind Power (Private) Limited (IPWPPL), pursuant to Regulation 10(11)(a) of the NEPRA Licensing (Application and Modification Procedure) Regulations 1999.

2. Enclosed please find herewith determination of the Authority in the matter of Licensee Proposed Modification in the Generation Licence of IPWPPL along with Modification-I in the Generation Licence No. WPGL/45/2017 as approved by the Authority.

Encl: As above




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(Syed Safer Hussain)

Copy to:

1. Secretary, Power Division, Ministry of Energy, A-Block, Pak Secretariat, Islamabad.
2. Managing Director, NTDC, 414-WAPDA House, Lahore.
3. Chief Executive Officer, CPPA-G, ENERCON Building, Sector G-5/2, Islamabad.
4. Chief Executive Officer, Alternative Energy Development Board (AEDB), 2nd Floor, OPF Building, G-5/2, Islamabad
5. Chief Executive Officer, Hyderabad Electric Supply Company Limited (HESCO), WAPDA Offices Complex, Hussainabad, Hyderabad
6. Director General, Environment Protection Department, Government of Sindh, Complex Plot No. ST-2/1, Korangi Industrial Area, Karachi.

National Electric Power Regulatory Authority
(NEPRA)

Determination of the Authority
in the Matter of Licensee Proposed Modification in the
Generation Licence of Iran Pak Wind Power (Pvt.) Limited

October 04, 2019
Case No. LAG-351

(A). Background

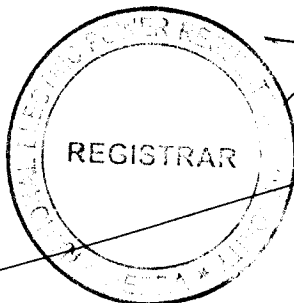
(i). In terms of Section-14B (previously Section-15) of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (the "NEPRA Act"), the Authority granted a generation licence (No. WPGL/45/2017 dated June 30, 2017) to Iran-Pak Wind Power (Pvt.) Limited (IPWPPL).

(ii). Under the above mentioned generation licence, the 49.50 MW generation facility/wind power plant proposed to be located at Jhimpir wind corridor, district Thatta, in the province of Sindh, is based on fifteen (15) wind turbine generators (WTGs) of Vestas (V126-3.3 MW), with a hub height of 80m.

(B). Communication of Modification

(i). IPWPPL in accordance with Regulation-10(2) of the NEPRA Licensing (Application & Modification Procedure) Regulations, 1999 (the Licensing Regulations), communicated a Licensee Proposed Modification (LPM) in its existing generation licence on April 08, 2019.

(ii). In the "text of the proposed modification", IPWPPL proposed to change the wind turbine generators (WTG) from Vestas (V126-3.3 MW) to Siemens Gamesa G114-2.0 along with relevant parameters. Regarding the "statement of the reasons in support of the modification", IPWPPL submitted that the generation licence is being modified because the previously selected WTG (i.e. Vestas V126-3.3 MW) has been discontinued. The modification will result in having the latest technology. Moreover, the change in configuration is to ensure more efficient and effective WTG with respect to site selection and performance. Further, the proposed modification is in line with the tariff petition filed by the company before the Authority.



(iii). About the "statement of the impact on the tariff, quality of service and the performance by the licensee of its obligations under the licence", IPWPPL submitted that there would be no adverse impact on the tariff, quality of service and obligations of the licensee under the generation licence.

(C). Processing of LPM

(i). After completion of all the required information as stipulated under the Regulation-10(2) and 10(3) of the Licensing Regulations, by IPWPPL, the Registrar published the communicated LPM on April 19, 2019, in one (01) Urdu (Daily Jang) and one (01) English (Business Recorder) newspaper, informing the general public about the communicated LPM and inviting their comments within a period of fourteen (14) days from the date of the said publication.

(ii). Apart from the above, separate letters were also sent to other stakeholders including Government Ministries and their attached departments, various representative organization, individual experts and others, on April 22, 2019. Through the said letters, the stakeholders were informed about the communicated LPM and publication of its notice in the press. Further, the said entities were invited to submit their views and comments in the matter, for assistance of the Authority.

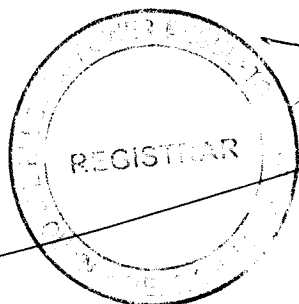
(D). Comments of Stakeholders

(i). In reply to the above, the Authority did not receive any comment from the stakeholders. Accordingly, it was considered appropriate to proceed further with the communicated LPM as stipulated in the Licensing Regulations and the NEPRA Licensing (Generation) Rules, 2000 ("the Generation Rules").

(E). Evaluation/Findings

(i). The Authority examined the entire case in details including the already granted generation licence, the communicated LPM, relevant provisions of the Policy for Development of Renewable Energy for Power Generation 2006 ("the RE Policy"), comments of the stakeholder and relevant rules & regulations.

(ii). In this regard, the Authority has observed that in terms of Regulation-10(5) of the Licensing Regulations, the Authority is entitled to modify a licence

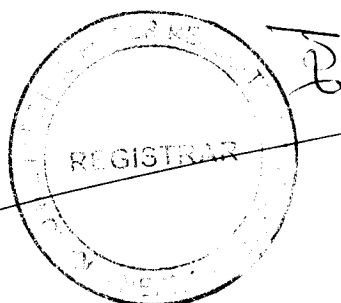


subject to and in accordance with such further changes as the Authority may deem fit if, in the opinion of the Authority such modification (a). does not adversely affect the performance by the licensee of its obligations; (b). does not cause the Authority to act or acquiesce in any act or omission of the licensee in a manner contrary to the provisions of the NEPRA Act or the rules or regulations made pursuant to it; (c). is or is likely to be beneficial to the consumers; (d). is reasonably necessary for the licensee to effectively and efficiently perform its obligations under the licence; and (e). is reasonably necessary to ensure the continuous, safe and reliable supply of electric power to the consumers keeping in view the financial and technical viability of the licensee.

(iii). Regarding main features of the case/application under consideration, the Authority has observed that originally a generation licence (No. WPGL/45/2017 dated June 30, 2017) was granted to IPWPPL for setting up a 49.50 MW wind power plant at Jhimpir wind corridor, district Thatta, in the province of Sindh. According to the said generation licence, the wind power plant was proposed to be based on fifteen (15) WTGs of Vestas (V126-3.3 MW) with relevant parameters of the said WTGs.

(iv). The Authority has observed that through the communicated LPM, IPWPPL proposed to change the WTG technology from Vestas (V126-3.3 MW) to Siemens Gamesa G114-2.0. With the proposed changes, the number of WTGs will change from fifteen (15) to twenty five (25) and the installed capacity will change from 49.50 MW to 50.00 MW. IPWPPL proposed the change of WTG technology as the previously selected WTGs of Vestas have been discontinued. Further, the proposed WTGs of Siemens-Gamesa are state of the art WTGs and have been proposed to ensure more efficient and effective wind turbine with respect to site selection.

(v). Regarding the impact of the communicated LPM on the tariff, the Authority has observed that currently no tariff has been granted to IPWPPL. It is further clarified that under Section-7(3)(a) of the NEPRA Act, determining tariff, rate and charges etc. is the sole prerogative of the Authority. In this regard, IPWPPL has already submitted an application for determination of cost plus tariff based on the



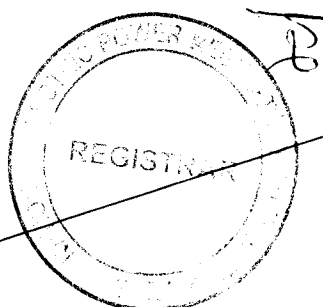
WTGs of Siemens-Gamesa G114-2.0 and installed capacity of 50 MW which has been admitted by the Authority for further processing and the communicated LPM is in line with the parameters stated in the said tariff petition.

(vi). Regarding term of the generation licence, the Authority has observed that under Rules-5(1) of the Generation Rules the term of generation licence is to commensurate with the maximum expected useful life of the units comprised in a generation facility, except where an applicant for a generation licence consents to a shorter term. As per international benchmark, the useful life of wind turbine generators is considered normally as 20 to 25 years. Although the WTGs of Gamesa have designed useful life upto 30 years (if maintained properly), but the Licensee has mentioned a shorter term of 25 years. Further, the tariff petition filed by IPWPPL and the cost plus tariff granted to similar WPPs also envisage a control period of 25 years. Therefore, the Authority is of the view that the 25 years useful life of the generation facility is in-line with the said standards for useful life of WTGs.

(vii). In view of the above, the Authority is of the considered opinion that the proposed LPM will not have any adverse effect on the performance of IPWPPL of its obligations, instead its performance will be improved. Further, the LPM will not cause the Authority to act or acquiesce in any act or omission of the Licensee in a manner contrary to the provisions of the NEPRA Act or the rules or regulations made pursuant to the NEPRA Act. The LPM will be beneficial to the consumers in general as more amount of clean electricity will be available to the power purchaser, that too at very low price as compared to existing thermal power plants. The Authority considers that the LPM is reasonably necessary for the Licensee to effectively and efficiently perform its obligations under the Licence. Further, to the said the LPM is necessary to ensure the continuous, safe and reliable supply of electric power to the consumers keeping in view the financial and technical viability of the Licensee.

(F). Approval of LPM

(i). In view of the above, the Authority is satisfied that the Licensee has complied with all the requirements of the Licensing Regulations pertaining to the modification. Therefore, the Authority in terms of Regulation-10(11) of the Licensing Regulations approves the communicated LPM without any changes.



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(ii). Accordingly, the Generation Licence (No. WPGL/45/2017 dated June 30, 2017) granted to IPWPPL is hereby modified. The changes made in the generation licence are attached as annexure to this determination. The approval of the LPM is subject to the provisions contained in the NEPRA Act, relevant rules framed there under, terms & conditions of the generation licence and other applicable documents.

Authority

Rafique Ahmed Shaikh
(Member)

Rafique
26/9/19

Rehmatullah Baloch
(Member)

27/9/19

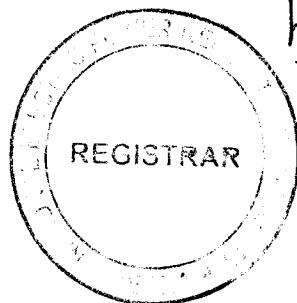
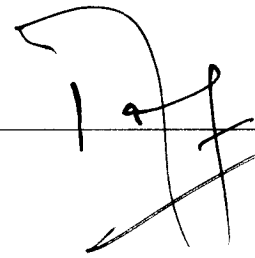
Saif Ullah Chattha
(Member)

(Did not Attend the meeting-Away)

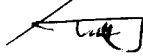
Engr. Bahadur Shah
(Member/Vice Chairman)



Tauseef H. Farooqi
(Chairman)



26/9/19
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**National Electric Power Regulatory Authority
(NEPRA)
Islamabad – Pakistan**

GENERATION LICENCE

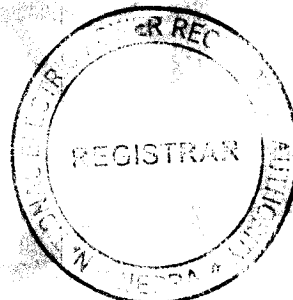
No. WPGL/45/2017

In exercise of the Powers conferred under Section-26 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997, the Authority hereby modifies the Generation Licence (No. WPGL/45/2017 dated June 30, 2017 granted to Iran-Pak Wind Power (Pvt.) Limited, to the extent of changes mentioned hereunder:

- (a). Changes made in **Articles** of the generation licence are attached as **Revised/Modified Articles**.
- (b). Changes made in **Schedule-I** of the generation licence are attached as **Revised/Modified Schedule-I**.
- (c). Changes made in **Schedule-II** of the generation licence are attached as **Revised/Modified Schedule-II**.

This **Modification-I** is given under my hand on this 04th day of October Two Thousand & Nineteen


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Registrar



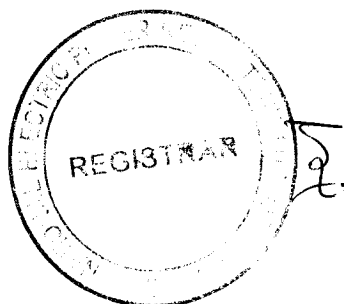
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Article-1
Definitions

1.1 In this Licence

- (a). "Act" means the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 as amended or replaced from time to time;
- (b). "AEDB" means the Alternative Energy Development Board or any other entity created for the like purpose established by the GOP to facilitate, promote and encourage development of renewable energy in the country;
- (c). "Applicable Documents" mean the Act, the NEPRA rules and regulations, any documents or instruments issued or determinations made by the Authority under any of the foregoing or pursuant to the exercise of its powers under the Act, the grid code, the applicable distribution code, if any, or the documents or instruments made by the licensee pursuant to its generation licence, in each case of a binding nature applicable to the licensee or, where applicable, to its affiliates and to which the licensee or any of its affiliates may be subject;
- (d). "Applicable Law" means all the Applicable Documents;
- (e). "Authority" means the National Electric Power Regulatory Authority constituted under Section-3 of the Act;
- (f). "Bus Bar" means a system of conductors in the generation facility/Wind Power Plant/Wind Farm of the Licensee on which the electric power of all the wind turbine generators or WTGs is collected for supplying to the Power Purchaser;

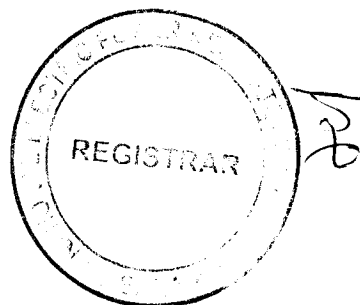
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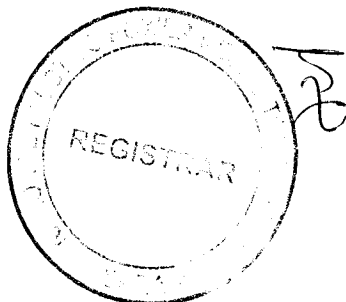
- (g). "Carbon Credits" mean the amount of Carbon Dioxide (CO₂) and other greenhouse gases not produced as a result of generation of energy by the generation facility/Wind Power Plant/Wind Farm and other environmental air quality credits and related emissions reduction credits or benefits (economic or otherwise) related to the generation of energy by the generation facility/Wind Power Plant/Wind Farm, which are available or can be obtained in relation to the generation facility/ wind power plant after the COD;
- (h). "Commercial Operations Date (COD)" means the day immediately following the date on which the generation facility/Wind Power Plant/Wind Farm of the Licensee is commissioned;
- (i). "CPPA-G" means Central Power Purchasing Agency (Guarantee) Limited or any other entity created for the like purpose;
- (j). "Distribution Code" means the distribution code prepared by XW-DISCO(s) and approved by the Authority, as it may be revised from time to time with necessary approval of the Authority;
- (k). "Energy Purchase Agreement" means the energy purchase agreement, entered or to be entered into by and between the Power Purchaser and the Licensee, for the purchase and sale of electric energy generated by the generation facility/Wind Power Plant/Wind Farm, as may be amended by the parties thereto from time to time;
- (l). "Generation Rules" mean the National Electric Power Regulatory Authority Licensing (Generation) Rules, 2000 as amended or replaced from time to time;
- (m). ""Grid Code" means the grid code prepared and revised from time to time by NTDC with necessary approval of the Authority;

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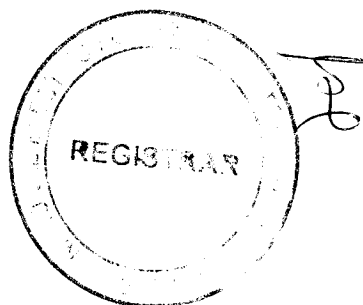
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- (n). "GoP" means the Government of Pakistan acting through the AEDB which has issued or will be issuing to the Licensee a LoS for the design, engineering, construction, insuring, commissioning, operation and maintenance of the generation facility/Wind Power Plant/Wind Farm;
- (o). "HESCO" means Hyderabad Electric Supply Company Limited and its successors or permitted assigns;
- (p). "IEC" means the International Electro-technical Commission and its successors or permitted assigns;
- (q). "IEEE" means the Institute of Electrical and Electronics Engineers and its successors or permitted assigns;
- (r). "Implementation Agreement (IA)" means the implementation agreement signed or to be signed between the GoP and the Licensee in relation to this particular generation facility/Wind Power Plant/Wind Farm, as may be amended from time to time;
- (s). "Letter of Support (LoS)" means the letter of support issued or to be issued by the GoP through the AEDB to the Licensee;
- (t). "Licensee" means Iran-Pak Wind Power (Pvt.) Limited and its successors or permitted assigns;
- (u). "Licensing Regulations" mean the National Electric Power Regulatory Authority Licensing (Application & Modification Procedure) Regulations, 1999 as amended or replaced from time to time;
- (v). "Net Delivered Energy" means the net electric energy expressed in kWh generated by the generation facility/Wind Power Plant/Wind Farm of the Licensee at its outgoing Bus Bar and delivered to the Power Purchaser;



- (w). "NTDC" means National Transmission and Despatch Company Limited and its successors or permitted assigns;
- (x). "Policy" means the Policy for Development of Renewable Energy for Power Generation, 2006 of GoP as amended from time to time;
- (y). "Power Purchaser" means the CPPA-G purchasing electric power on behalf of XW-DISCO(s) from the Licensee, pursuant to an Energy Purchase Agreement for procurement of electricity;
- (z). "SCADA System" means the supervisory control and data acquisition system for gathering of data in real time from remote locations to control equipment and conditions;
- (aa). "Wind Power Plant/Wind Farm" means a cluster of WTGs situated in the same location of a generation facility/Wind Power Plant/Wind Farm used for production of electric energy;
- (bb). "Wind Turbine Generator (WTG)" means the machines installed at the generation facility/Wind Power Plant/Wind Farm with generators for conversion of wind energy into electric energy;
- (cc). "Rules" mean the National Electric Power Regulatory Authority Licensing (Generation) Rules, 2000 as amended or replaced from time to time;
- (dd). "XW DISCO" means an Ex-WAPDA distribution company engaged in the distribution of electric power.

1.2 Words and expressions used but not defined herein bear the meaning given thereto in the Act or rules and regulations issued under the Act.



Article-2
Applicability of Law

This Licence is issued subject to the provisions of the Applicable Law, as amended from time to time.

Article-3
Generation Facilities

3.1 The location, size (capacity in MW), technology, interconnection arrangements, technical limits, technical and functional specifications and other details specific to the generation facility/Wind Power Plant/Wind Farm of the Licensee are set out in Schedule-I of this Licence.

3.2 The net capacity/Net Delivered Energy of the generation facility/Wind Power Plant/Wind Farm of the Licensee is set out in Schedule-II of this Licence. The Licensee shall provide the final arrangement, technical and financial specifications and other specific details pertaining to its generation facility/ wind power plant before its COD.

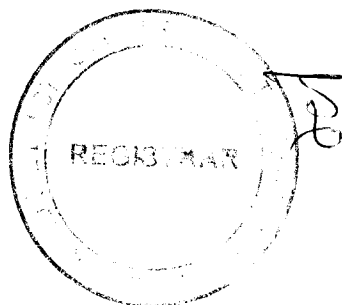
Article-4
Term of Licence

4.1 This licence shall become effective from the date of its issuance and will have a term of twenty five (25) years from the COD of the generation facility/Wind Power Plant/Wind Farm of the Licensee, subject to provisions of Section-14B of the Act.

4.2 Unless suspended or revoked earlier, the Licensee may apply for renewal of this licence ninety (90) days prior to the expiry of the above term, as stipulated in the Regulations.

Article-5
Licence fee

The Licensee shall pay to the Authority the Licence fee as stipulated in the National Electric Power Regulatory Authority (Fees) Rules, 2002 as amended or replaced from time to time.



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Article-6
Tariff

The Licensee shall charge only such tariff from the Power Purchaser which has been determined, approved or specified by the Authority.

Article-7
Competitive Trading Arrangement

7.1 The Licensee shall participate in such manner as may be directed by the Authority from time to time for development of a Competitive Trading Arrangement. The Licensee shall in good faith work towards implementation and operation of the aforesaid Competitive Trading Arrangement in the manner and time period specified by the Authority. Provided that any such participation shall be subject to any contract entered into between the Licensee and another party with the approval of the Authority.

7.2 Any variation or modification in the above-mentioned contracts for allowing the parties thereto to participate wholly or partially in the Competitive Trading Arrangement shall be subject to mutual agreement of the parties thereto and such terms and conditions as may be approved by the Authority.

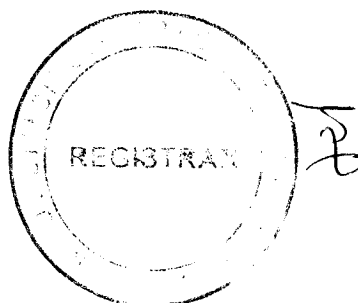
Article-8
Maintenance of Records

For the purpose of sub-rule (1) of Rule-19 of the Rules, copies of records and data shall be retained in standard and electronic form and all such records and data shall, subject to just claims of confidentiality, be accessible by authorized officers of the Authority.

Article-9
Compliance with Performance Standards

The Licensee shall comply with the relevant provisions of the National Electric Power Regulatory Authority Performance Standards (Generation) Rules 2009 as amended from time to time.

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Article-10
Compliance with Environmental Standards

10.1 The Licensee shall comply with the environmental standards as may be prescribed by the relevant competent authority from time to time.

10.2 The Licensee shall provide a certificate on a bi-annual basis, confirming that the operation of its generation facility is in line with environmental standards as prescribed by the relevant competent authority.

Article-11
Power off take Point and Voltage

The Licensee shall deliver power to the Power Purchaser at the outgoing bus bar of its grid station. The up-gradation (step up) of generation voltage up to the required dispersal voltage level will be the responsibility of the Licensee.

Article-12
Performance Data of Wind Power Plant

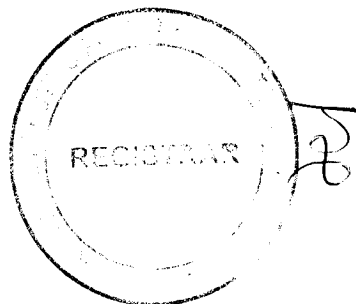
12.1 The Licensee shall install monitoring mast with properly calibrated automatic computerized wind speed recording meters at the same height as that of the WTG.

12.2 The Licensee shall install SCADA System or compatible communication system at its generation facility/Wind Power Plant/Wind Farm as well as at the side of the Power Purchaser.

12.3 The Licensee shall transmit the wind speed and power output data of its generation facility/Wind Power Plant/Wind Farm to the control room of the Power Purchaser.

Article-13
Provision of Information

In accordance with provisions of Section-44 of the Act, the Licensee shall be obligated to provide the required information in any form as desired by the Authority without any exception.



Article-14
Emissions Trading /Carbon Credits

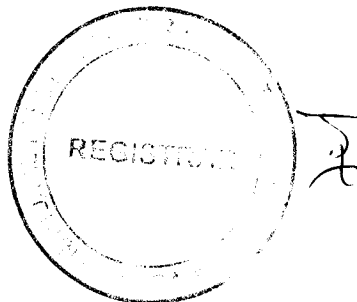
The Licensee shall process and obtain expeditiously the Carbon Credits admissible to the generation facility/Wind Power Plant/Wind Farm. The Licensee shall share the said proceeds with the Power Purchaser as per the Policy.

Article-15
Design & Manufacturing Standards

15.1 The WTGs and other associated equipment of the generation facility/Wind Power Plant/Wind Farm shall be designed, manufactured and tested according to the latest IEC, IEEE standards or any other equivalent standard in the matter. All the plant and equipment of the generation facility/Wind Power Plant/Wind Farm shall be unused and brand new.

Article-16
Power Curve

The power curve for the WTG provided by the manufacturer and as mentioned in Schedule-I of this generation licence, shall form the basis in determining the cumulative power curve of the generation facility/Wind Power Plant/Wind Farm.

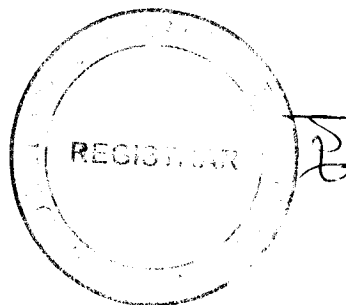


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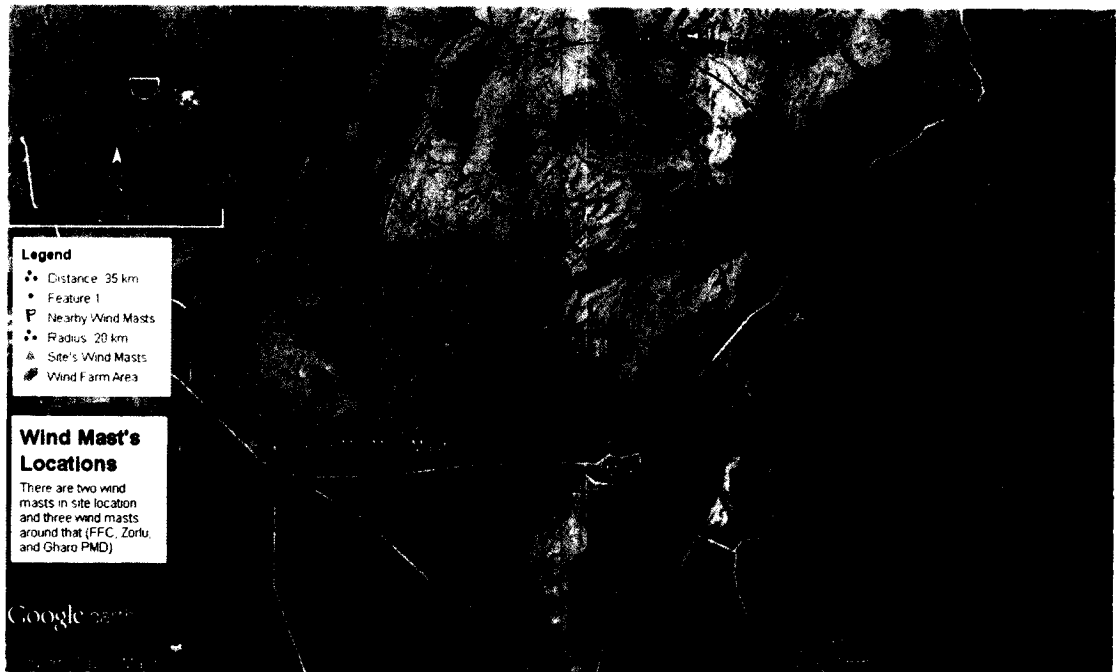
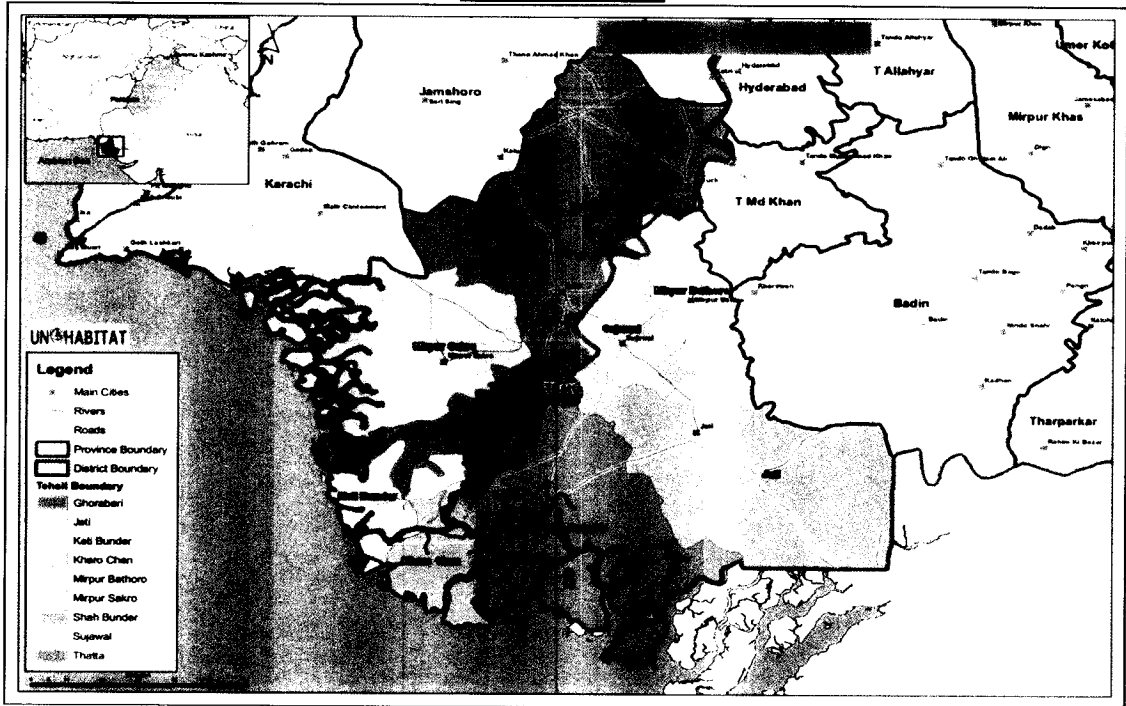
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SCHEDULE-I
Revised/Modified

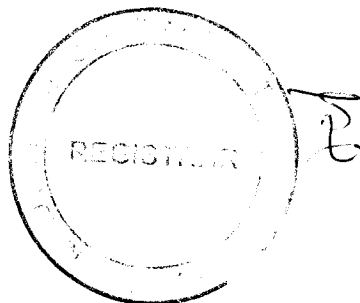
The Type of Technology, Technical/Functional Specifications and other details specific to the Generation Facility/Wind Power Plant/Wind Farm of the Licensee are described in this Schedule.



Location Map Of the Generation Facility/Wind Power Plant/ Wind Farm

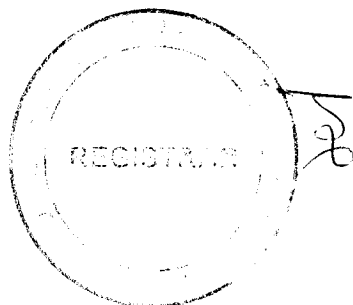


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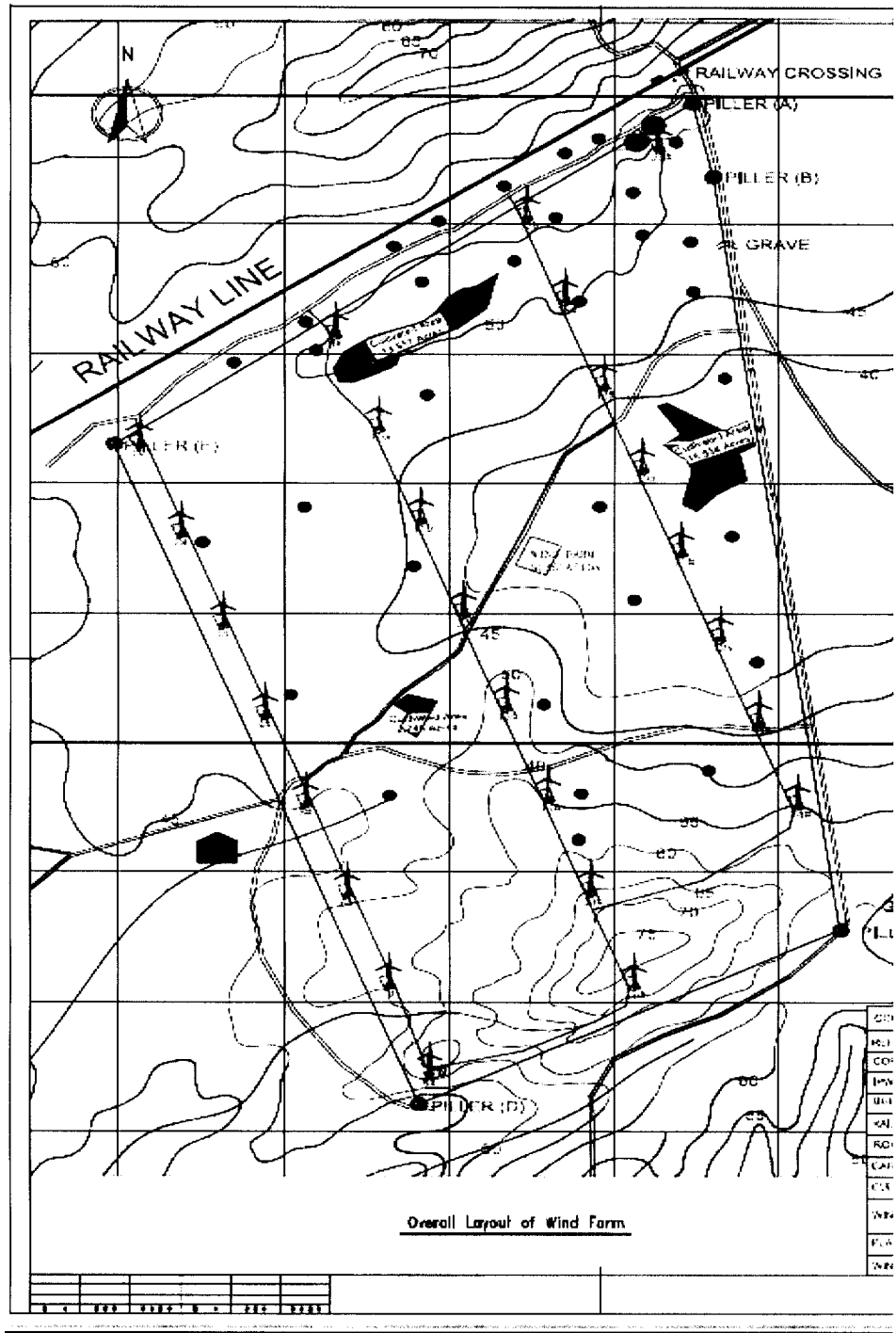
Layout
Of the Generation Facility/Wind Power Plant/
Wind Farm



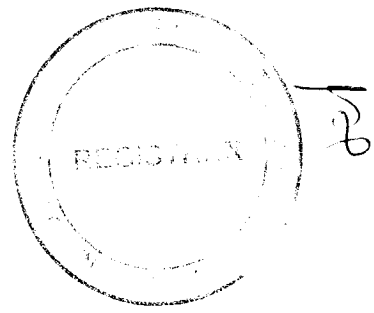
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Micro-Sitting Of the Generation Facility/Wind Power Plant/ Wind Farm

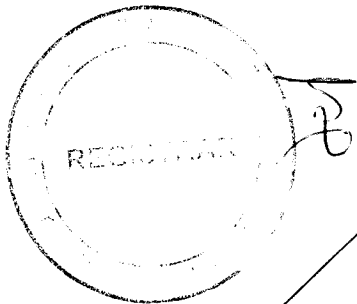


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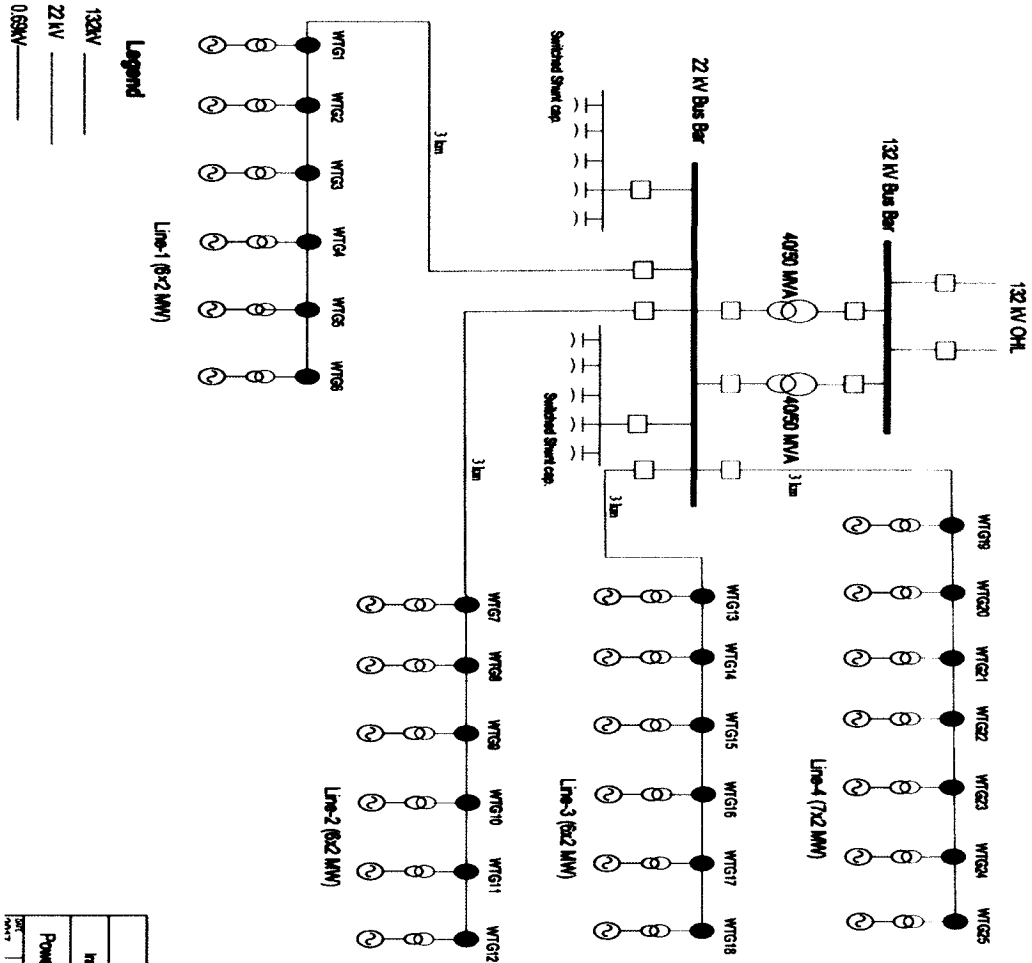
50MW IRAN PAK WIND POWER PROJECT		
TURBINES COORDINATES (UTM WGS 84)		
No.	N (X)	E (Y)
1	808648.934	2125564.244
2	808301.870	2125689.574
3	807954.806	2125814.904
4	807607.742	2125940.234
5	807260.678	2126065.564
6	806913.614	2126190.893
7	806566.550	2126316.223
8	806219.486	2126441.553
9	809071.940	2126155.734
10	808713.589	2126285.140
11	808355.238	2126414.545
12	807996.888	2126543.951
13	807638.537	2126673.356
14	807280.186	2126802.762
15	806921.836	2126932.167
16	806563.488	2127061.572
17	809525.273	2126736.272
18	809200.783	2126853.450
19	808876.292	2126970.628
20	808551.801	2127087.807
21	808227.310	2127204.985
22	807902.820	2127322.163
23	807578.329	2127439.341
24	807253.806	2127556.531
25	809795.166	2127135.935



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Single Line Diagram (Electrical System) Of the Generation Facility/Wind Power Plant/ Wind Farm



Legend

132kV _____
 22 kV _____
 0.69kV _____

Sketch-3
 Iran Pak Wind Power Plant
 Power Planners International



**Details Of Generation Facility/Wind Power Plant/
Wind Farm**

(A). General Information

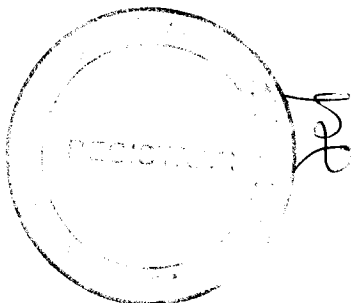
(i).	Name of the Company/Licensee	Iran Pak Wind Power (Pvt.) Limited
(ii).	Registered/Business Office of the Company	Suite # 214, 2 nd Floor Progressive Plaza Beaumont Road, Karachi
(iii).	Location of the Generation Facility	De Kohistan, Tapo Jungshahi, Taluka and District Thatta, in the province of Sindh
(iv).	Type of Generation Facility	Wind Power Plant

(B). Wind Farm Capacity & Configuration

(i).	Wind Turbine Type, Make & Model	Siemens-Gamesa G114 – 2.0 MW
(ii).	Installed Capacity of the Generation Facility	50 MW
(iii).	Number of Units/Size of each Unit	25 x 2.0 MW

(C). Wind Turbine Details

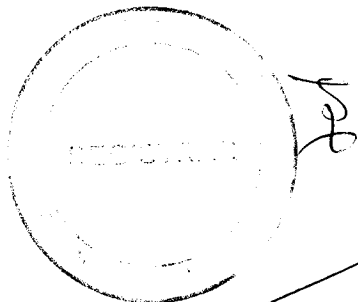
(a). <u>Rotor</u>		
(i).	Number of Blades	3
(ii).	Rotor Diameter	114 m
(iii).	Swept Area	10207 m ²
(iv).	Power Regulation	Combination of blade pitch angle adjustment, and generator/converter torque control
(v).	Cut-in wind speed	3 m/s
(vi).	Cut-out wind speed	25 m/s
(vii).	Survival wind speed	59.5 m/s



RP

(viii).	Pitch regulation	Electric motor drives a ring gear mounted to the inner race of the blade pitch bearing.
(b). <u>Blades</u>		
(i).	Blade Length	56 m
(ii).	Material	Composite material reinforced with fiberglass through resin infusion technology.
(c). <u>Gear Box</u>		
(i).	Type	3 combined sages ; 1 stage planetary , 2 parallel shift gears
(ii).	Gear ratio	1:128:5
(iii).	Main shaft	Cast Shaft
(d). <u>Generator</u>		
(i).	Nominal Power	2070 (kW)
(ii).	Voltage	690 V
(iii).	Type	Doubly fed with coil rotor and slip rings
(iv).	Degree of Protection	IP54 Turbine — IP21 Ring Body
(v).	Coupling	Main Shaft: Cone Collar, High Speed Shaft: Flexible coupling.
(vi).	Power Factor	0.95
(e). <u>Yaw System</u>		
(i).	Yaw Bearing	PETP
(ii).	Brake	Active Yaw
(iii).	Yaw Drive	Motor Drive
(iv).	Speed	0.42°/s controlling speed

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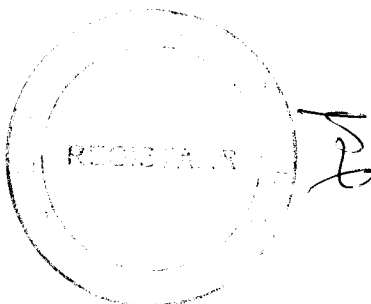


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(f). <u>Control System</u>		
(i).	Type	Automatic or manually controlled
(ii).	Scope of Monitoring	Remote monitoring of different parameters, e.g. temperature sensors, pitch parameters, speed, generator torque, wind speed and direction, etc.
(iv).	Recording	Production data, event list, long and short term trends
(g). <u>Brake</u>		
(i).	Design	Mechanical brakes
(ii).	Operational Brake	Aerodynamic brake achieved by feathering blades.
(iii).	Secondary Brake	Mechanical brake on (high speed) shaft of gearbox.
(h). <u>Tower</u>		
(i).	Type	Conical barrel tube
(ii).	Hub Heights	93 m

(D). Other Details

(i).	COD of the Generation Facility (Anticipated)	December 31, 2021
(ii).	Expected Life of the Generation Facility Project from COD	25 years

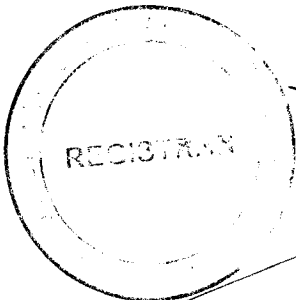


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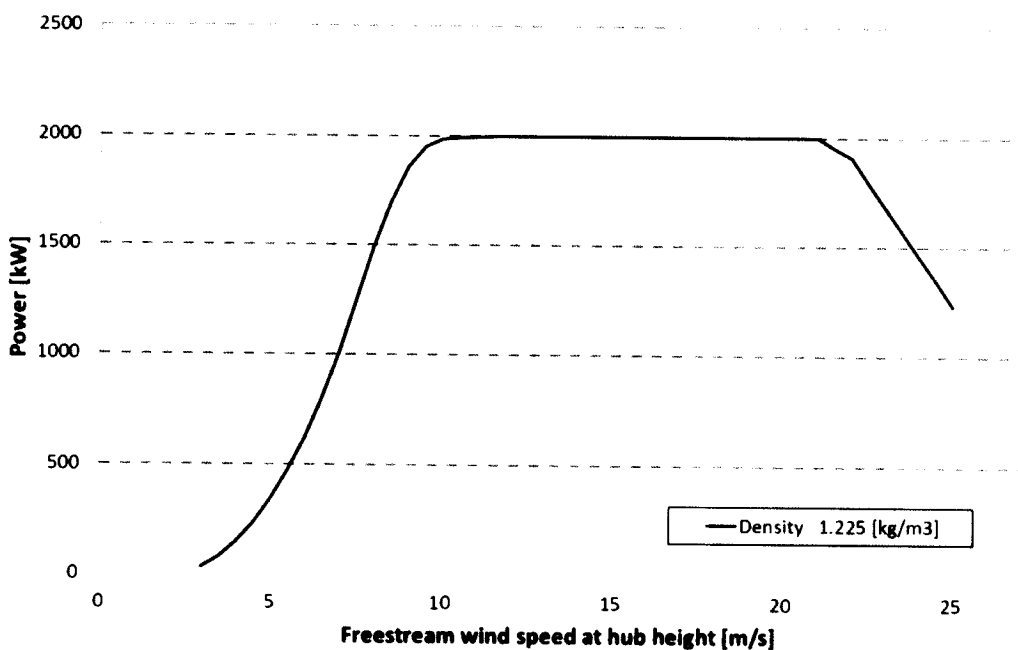
Power Curve
of Wind Turbine Generator
G114 – 2.0 MW
(Tabular)

<u>Ws [m/s]</u>	<u>Power (kW)</u>
3	29
4	135
5	319
6	581
7	943
8	1408
9	1804
10	1977
11	1993
12	1999
13	2000
14	2000
15	2000
16	2000
17	2000
18	2000
19	2000
20	2000
21	2000
22	1906
23	1681
24	1455
25	1230



RD

Power Curve
of Wind Turbine Generator
G114 – 2.0 MW
(Graphical)



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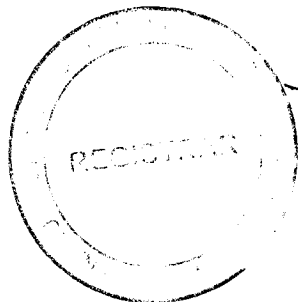
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SCHEDULE-II
Revised/Modified

The Total Installed/Gross ISO Capacity (MW), Total Annual Full Load Hours, Average Wind Turbine Generator (WTG) Availability, Total Gross Generation of the Generation Facility/Wind Farm (in GWh), Array & Miscellaneous Losses (GWh), Availability Losses (GWh), Balance of Plant Losses (GWh) and Annual Energy Generation (GWh) of the Generation Facility/Wind Power Plant/Wind Farm of Licensee is given in this Schedule



SCHEDULE-II

(1).	Total Installed Gross ISO Capacity of the Generation Facility /Wind Farm (MW)	50 MW
(2).	Total Annual Full Load Hours	3329 Hrs
(3).	Average Wind Turbine Generator (WTG) Availability	97%
(4).	Total Gross Generation of the Generation Facility/Wind Farm (in GWh)	195,339 GWh
(5).	Array & Miscellaneous Losses GWh	18.88 GWh
(6).	Availability Losses GWh	7.00 GWh
(7).	Balance of Plant Losses GWh	4.72 GWh
(8).	Annual Energy Generation (20 year equivalent Net AEP) GWh	164.8 GWh
(9).	Net Capacity Factor	38 %

Note

All the above figures are indicative as provided by the Licensee. The Net energy available to Power Purchaser for dispatch will be determined through procedures contained in the EPA.

