National Electric Power Regulatory Authority
Islamic Republic of Pakistan

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Registrar

No. NEPRA/R/LAG-76/ 324-30

January 09, 2017

Mr. Zia Khaleeli
Chief Executive Officer
Zephyr Power (Private) Limited (ZPPL)
68-B, Sindhi Muslim Housing Society,
Karachi
Tel: 021-34315646

Subject: **Modification-I in Generation Licence No: WPGL/17/2012**
Licence Application No. LAG-76
Zephyr Power (Private) Limited (ZPPL)

Reference: Your application vide letter No. ZPL/NEPRA/4/2016, dated July 25, 2016 (received on July 26, 2016).

It is intimated that the Authority has approved "Licensee Proposed Modification" in Generation Licence No. WPGL/17/2012 (issued on July 27, 2012) in respect of Zephyr Power (Private) Limited (ZPPL), pursuant to Regulation 10(11)(a) of the NEPRA Licensing (Application and Modification Procedure) Regulations 1999.

2. Enclosed please find herewith Modification-I in the Generation Licence No. WPGL/17/2012, as approved by the Authority. Further, the determination of the Authority in the matter is also attached.

Encl:/As above

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
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09.01.17

(Syed Safeer Hussain)

Copy to:

1. Secretary Ministry of Water & Power, 'A' Block, Pak Secretariat, Islamabad.
2. Chief Executive Officer, Alternative Energy Development Board (AEDB), 2nd Floor, OPF Building, G-5/2, Islamabad
3. Chief Executive Officer, NTDC, 414-WAPDA House, Lahore
4. Chief Executive Officer, CPPA-G, 6th Floor, Shaheed-r-Millat Secretariat, Jinnah Avenue, Blue Area, 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 of Zephyr Power (Private) Limited

December 30, 2016
Case No. LAG-76

(A). Background

(i). The Authority granted a generation licence (No. WPGL/17/2012 dated July 27, 2012) to Zephyr Power (Private) Limited (ZPPL) in terms of Section-15 of Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 ("the NEPRA Act").

(ii). Under the abovementioned generation licence, the 49.50 MW generation facility/wind power plant proposed to be located at Deh Kalra Sarkari (Bhambore), Taluka Mir Pur Sakro, District Thatta, in the Province of Sindh, is comprised of thirty three (33) wind turbine generators of Sinovel (SL-82/1.5 MW) each of 1.50 MW.

(B). Communication of Modification

(i). ZPPL 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 July 26, 2016.

(ii). In the "Text of the Proposed Modification", ZPPL submitted that it intends to change 33X1.5 MW wind turbine generators of Sinovel (SL-82/1.5 MW) to 25X2 MW wind turbine generators of Gamesa (G114-2.0 IEC-IIIA), which will result in an overall increase in the installed capacity of the wind power plant from 49.50 MW to 50 MW. Regarding the "Statement of the Reasons in Support of the Modification", ZPPL has, stated that due to financial crisis faced by Sinovel Wind Group, it has indicated its inability to supply required wind

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turbine generators for the project. Therefore, the company had to change its technology and select a new wind turbine generators manufacturer for the project. In this regard, after carrying out the required due diligence and obtaining quotations from various wind turbine generators manufacturers, the company has selected Gamesa Corporacion Technologica of Spain as the wind turbine generators supplier for the project.

(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", ZPPL submitted that the proposed change of wind turbine generators will not have any adverse impact on the tariff, quality of service and its performance under the 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 ZPPL, the Registrar published the communicated LPM on August 11, 2016, in one (01) Urdu and one (01) English newspaper, informing the general public about the communicated LPM and inviting 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 organizations and individual experts etc, on August 12, 2016. Through the said letters, the stakeholders were informed about the communicated LPM and publication of its notice in the press. Further, the said stakeholders 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 received comments from four (04) stakeholders. These included Board of Investment, Karachi Shipyard &

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Engineering Works Limited, Central Power Purchasing Agency (Guarantee) Limited (CPPA-G) and Ministry of Water & Power. The summary of comments given by the said stakeholders is as follows:-

(a). Board of Investment stated that energy sector is priority of the Government of Pakistan to cater the short fall in the country. Being an investment promoting and facilitating agency, Board of Investment has also been making efforts to attract investment in the said sector. Board of Investment understands that affordable and smooth supply of energy is the backbone for industrial growth as well as attracting Foreign Direct Investment in the country. As such proposed project proposals are supported subject to consumer friendly/competitive tariff and completion of all codal/technical formalities under rules & regulations;

(b). Karachi Shipyard & Engineering Works Limited communicated its no objection regarding approval of the communicated LPM;

(c). CPPA-G in its comments stated that ZPPL has selected wind turbine generators of Gamesa (G114-2.0 IEC-IIIA) of 2 MW capacity, whereas, higher capacity wind turbine generators can also be installed at the same hub height. Further, ZPPL needs to ensure that their proposed plant complies with the provisions of the grid code approved by NEPRA, as amended in April 2010 for grid integration of wind power plants already enforced within the national grid and directions given by GM Planning Power NTDC vide letter dated February 23, 2016; and

(d). Ministry of Water & Power submitted that NEPRA may ask ZPPL for reason and justification for submitting the LPM after lapse of two (02) years of expected date of commissioning i.e. July 2014. NEPRA may confirm the updated interconnection

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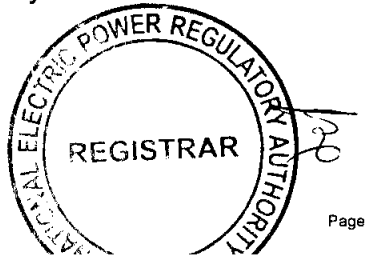
scheme development status which is essential for optimum power dispatch of this project.

(ii). The above comments of the stakeholders were examined and generally found in favor of the communicated LPM except a few observations of CPPAG and Ministry of Water & Power. Therefore, the Authority considered it appropriate to seek perspective of ZPPL on the observations of CPPAG and Ministry of Water & Power.

(iii). In response to the comments of CPPA-G, ZPPL submitted that it has selected Gamesa (G114-2.0 IEC-IIIA) 2 MW wind turbine as the preferred technology and secured Gamesa (technology provider) & Sumec (contractor) consortium as the Engineering, Procurement and Construction (EPC) contractor and thereafter, Gamesa as the Operations and Maintenance (O&M) provider. Further, Gamesa is one of the biggest manufacturers of wind turbines in the world. It is certified and qualified wind turbine generator which meets all the requirements of NEPRA, NTDC, CPPA-G and the Grid Code and the same has been approved by AEDB for the project. Further, ZPPL informed that due to selection of the said wind turbine generator the project will exceed the target benchmark of 35% Capacity Factor and IRR set by NEPRA. ZPPL confirmed that it will ensure and comply with all the provisions of the Grid Code, approved by NEPRA as amended in April 2010 for grid integration of wind power plants which is already enforced within the national grid. Moreover, ZPPL will adhere to the recommendations/directions of NTDC and CPPA-G and the same can be discussed at stage of signing the Energy Purchase Agreement (EPA).

(iv). In its reply to the comments of Ministry of Water & Power, ZPPL submitted that:-

(a). ZPPL was granted generation license No. WPGL/17/2012 on July 27, 2012 NEPRA, under Section-15 of the NEPRA Act, for its wind power generation facility at Deh Kalra Sarkari (Bhambore), Taluka Mir Pur Sakro, District Thatta, Sindh. The project was designed with a capacity of 49.5 MW based on 33



wind turbine generators of Sinovel (SL-82/1.5 MW). At the time of selection, Sinovel was a leading wind technology manufacturer of China. ZPPL received Letter of Support (LOS) from AEDB on January 17, 2013 and was expected to achieve financial close by January 16, 2014. Accordingly, the date of commissioning of the project was to be eighteen (18) months i.e. July 2015 and its LPM is communicated after fourteen (14) months after original expected date of commissioning and not twenty four (24) months as stated in the letter of Ministry of Water & Power.

(b). However, in 2013, Sinovel Wind Group was charged by the U.S. Federal Bureau of Investigations with stealing trade secrets from its U.S. supplier. Sinovel Wind Group collapsed and became un-bankable. Therefore, ZPPL had to change its technology vendor and selected the Vestas V100 2.0 MW turbines after a competitive selection process. ZPPL submitted the cost plus tariff application and LPM to NEPRA on November 12 & 19, 2014 respectively, which is seven (07) months before original date of commissioning (i.e. July 2015). However, NEPRA rejected the tariff and LPM on September 15, 2015 and October 06, 2015 respectively.

(c). Meanwhile, Vestas also decided to support the 3.3 MW platforms in Pakistan instead of 2.0 MW platforms. Due to the discontinuation of Vestas 2.0 MW platforms and the new tariff regime (i.e. cost plus tariff to upfront tariff), ZPPL conducted a new competitive bid process and selected Gamesa Wind Tianjin Co. Limited of China as the wind turbine generator supplier for its project and the company submitted the upfront tariff application to NEPRA based on the Gamesa (G114-2.0 IEC-IIIA) 2 MW platform on January 28, 2016.

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(d). In view of the earlier experiences, the company decided to apply for the LPM after receiving Upfront Tariff from NEPRA. NEPRA has awarded the upfront tariff on May 13, 2016, based on the Gamesa wind turbine generators and ZPPL is required to achieve the financial close within 12 months from the same. NTDC has also assured the availability of grid interconnection in the first quarter of 2018. ZPPL is expecting to achieve the financial close by May 2017 and COD by third quarter of 2018, which synchronizes with the timeline given by NTDC for availability of grid interconnection. Accordingly, ZPPL communicated LPM in its generation license based on Gamesa (G114-2.0 IEC-IIIA) 2 MW.

(v). The above submissions of the ZPPL were examined and found plausible. Foregoing in view, the Authority considered it 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). Analysis of the Authority

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

(ii). In this regard, the Authority observes that in terms of Regulation-10(5) of the 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

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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). The Authority granted a generation licence (No. WPGL/17/2012 dated July 27, 2012) to ZPPL with an installed capacity of 49.50 MW based on 33 wind turbine generators of Sinovel (SL-82/1.5 MW). Now, ZPPL intends to implement the project with 25 wind turbine generators of Gamesa (G114-2.0 IEC-IIIA) 2 MW. This will increase the installed capacity of ZPPL from 49.50 MW to 50.00 MW.

(iv). The Gamesa (G114-2.0 IEC-IIIA) 2 MW wind turbine generator is an upgraded latest generation (106-114) doubly fed induction machine with improved performance and output. The output power of a single turbine is 2000 KW. Gamesa (G114-2.0 IEC-IIIA) 2 MW contains the upgraded version of machine control software Gamesa WindNet, the new SCADA System developed by Gamesa, which allows the regulation of active and reactive power by injection of rotor currents with variable amplitude, frequency and phase. With less than 25% of the generated power passing through the converter doubly fed induction machine technology guarantees that the harmonics generated are minimized.

(v). In view of the above explanation, it can be easily construed that proposed wind turbine generator will not have any adverse impact on the project. In fact the annual energy production and capacity factor of the plant will be increased substantially resulting in significant increase in the performance. Further, due to improved design of the wind turbine generator reliability and availability of the plant will also increase. Moreover, same land will be utilized for producing 50 MW instead of 49.50 MW thereby resulting in better utilization of the allocated land.

(vi). Regarding evacuation of additional/enhanced capacity of 0.50 MW, the Authority observes that despite the increase in capacity there will be no

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change in the proposed interconnection arrangement as in the original interconnection arrangement NTDC has already envisaged evacuation of upto 50 MW power from the generation facility of ZPPL.

(vii). The Authority has also examined the impact of the communicated LPM on the tariff and observed that the up-front tariff granted to ZPPL (through determination No. NEPRA/TRF-353/ZPPL-2016/6503-6505, dated May 13, 2016) is applicable to the projects with installed capacity of upto 250 MW and does not specify the technology of wind turbines to be installed by the project developers. Therefore, the Authority is of the opinion that the communicated LPM of ZPPL will not have any adverse impact on its existing tariff.

(viii). In consideration of the above, the Authority is of the considered opinion that the proposed LPM will not have any adverse effect on the performance of the Licensee of its obligations, instead its performance will be improved as the upgraded and more reliable wind turbine generators will be installed. 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 electricity will be available to the power purchaser by installing better wind turbine generators. The LPM is reasonably necessary for the licensee to effectively and efficiently perform its obligations under the licence. 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 ZPPL has complied with all the requirements of the Licensing Regulations pertaining to the modification. Therefore, the Authority in terms of Regulation-10(11)(a) of the Licensing Regulations approves the communicated LPM without any changes.

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(ii). Accordingly, the already granted generation licence (WPGL/17/2012 dated July 27, 2012) to ZPPL is hereby modified. The changes in "Face Sheet", "Articles", "Schedule-I" and "Schedule-II" of the generation licence are attached as annexures to this determination. The approval of the LPM will be subject to the provisions contained in the NEPRA Act, relevant rules framed thereunder, terms & conditions of the generation licence and other applicable documents.

Authority:

Maj. (R) Haroon Rashid
(Member)

Syed Masood-ul-Hassan Naqvi
(Member)

Himayat Ullah Khan
(Member/Vice Chairman)

Tariq Saddozai
(Chairman)

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09.01.17

National Electric Power Regulatory Authority
(NEPRA)
Islamabad – Pakistan

GENERATION LICENCE
No. WPGL/17/2012

In exercise of the powers conferred upon the National Electric Power Regulatory Authority (NEPRA) under Section-26 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997, the Authority hereby modifies the Generation Licence granted to **ZEPHYR POWER (PRIVATE) LIMITED** (issued on July 27, 2012 and expiring on July 30, 2034), to the extent of changes mentioned as here under:-

(i). The Installed Capacity of the Licensee appearing on the Face Sheet of the Original Licence is changed from 49.50 MW to 50.00 MW;

(ii). The validity date of the Generation Licence is changed from July 30, 2034 to November 11, 2038;

(iii). Changes in the Articles of the Generation Licence attached as Revised/Modified Articles of the Generation Licence;

(iv). Changes in Schedule-I attached as Revised/Modified Schedule-I; and

(v). Changes in Schedule-II attached as Revised/Modified Schedule-II.

This **Modification-I** is given under my hand on 9th day of **January Two Thousand & Seventeen.**

09.01.17

Registrar

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
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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 ";

(b). "Applicable Documents" have the same meaning as defined in the Rules

(c). "Authority" means "the National Electric Power Regulatory Authority constituted under Section-3 of the Act";

(d). "Bus Bar" means a system of conductors in the generation facility/Wind Power Plant of the Licensee on which the electric power of all the Wind Turbine Generators or is collected for supplying to the Power Purchaser;

(e). "Carbon Credits" mean the amount of Carbon Dioxide (CO_2) and other greenhouse gases not produced as a result of generation of energy by the generation facility/Wind Power Plant, 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, which are available or can be obtained in relation to the generation facility/Wind Power Plant after the COD;

(f). "Commercial Operations Date (COD)" means the day immediately following the date on which the generation facility of the Licensee is Commissioned;

(g). "CPPA-G" means "Central Power Purchasing Agency

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(Guarantee) Limited" or any other entity created for the like purpose;

(h). "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 the any necessary approval by the Authority;

(i). "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, as may be amended by the parties thereto from time to time

(j). "Grid Code" means the grid code prepared by NTDC and approved by the Authority, as it may be revised from time to time by NTDC with the approval by the Authority;

(k). "HESCO" means Hyderabad Electric Supply Company Limited and its successors or permitted assigns;

(l). "IEC" means "the International Electro-technical Commission and its successors or permitted assigns;

(m). "IEEE" means the Institute of Electrical and Electronics Engineers and its successors or permitted assigns;

(n). "Law" means the Act, relevant rules and regulations made there under and all the Applicable Documents;

(o). "Licensee" means **ZEPHYR POWER (PRIVATE) LIMITED** and its successors or permitted assigns;

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(p). "NTDC" means National Transmission and Despatch Company Limited and its successors or permitted assigns;

(q). "Policy" means "the Policy for Development of Renewable Energy for Power Generation, 2006" of Government of Pakistan as amended from time to time;

(r). "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;

(s). "Regulations" mean "the National Electric Power Regulatory Authority Licensing (Application & Modification Procedure) Regulations, 1999 as amended or replaced from time to time";

(t). "Rules" mean "the National Electric Power Regulatory Authority Licensing (Generation) Rules, 2000";

(u). "Wind Power Plant" means "a cluster of Wind Turbines in the same location used for production of electric power";

(v). "Wind Turbine Generator" means the machines installed at the generation facility/Wind Power Plant with generators for conversion of wind energy into electric power/energy;

(w). "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.

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Article-2
Applicability of Law

This Licence is issued subject to the provisions of the 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 of the Licensee are set out in Schedule-I of this Licence.

3.2 The net capacity of the generation facility/Wind Power Plant of the Licensee is set out in Schedule-II hereto.

3.3 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 The Licence is granted for a term of twenty (20) years from the COD of the generation facility/Wind Power Plant.

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

After the grant of this licence, the Licensee shall pay to the Authority the Licence fee, in the amount, manner and at the time set out in the National Electric Power Regulatory Authority (Fees) Rules, 2002.

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Article-6
Tariff

The Licensee shall charge only such tariff 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

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

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

The Licensee shall install monitoring mast with properly calibrated automatic computerized wind speed recording meters at the same height as that of the wind turbine generators and a compatible communication/SCADA system both at its Wind Power Plant and control room of the Power Purchaser for transmission of wind speed and power output data to the control room of the Power Purchaser for record of data.

Article-13
Provision of Information

13.1 The obligation of the Licensee to provide information to the Authority shall be in accordance with Section 44 of the Act.

13.2 The Licensee shall in addition to 13.1 above, supply information to the Power Purchaser regarding the wind data specific to the site of the Licensee and other related information on a regular basis and in a manner required by it.

13.3 The Licensee shall be subject to such penalties as may be specified in the relevant rules made by the Authority for failure to furnish such information

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as may be required from time to time by the Authority and which is or ought to be or has been in the control or possession of the Licensee.

Article-14
Emissions Trading /Carbon Credits

The Licensee shall process and obtain emissions/Carbon Credits expeditiously and credit the proceeds to the Power Purchaser as per the Policy.

Article-15
Design & Manufacturing Standards

15.1 The Wind Turbine Generator and other associated equipments of the generation facility/Wind Power Plant shall be designed, manufactured and tested according to the latest IEC, IEEE standards or other equivalent standards in the matter.

15.2 All the plant and equipment of the generation facility/Wind Power Plant shall be unused and brand new.

Article-16
Power Curve

The power curve for the individual Wind Turbine Generator 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.

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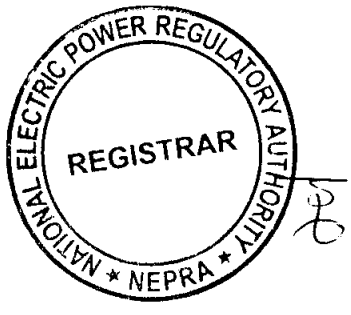
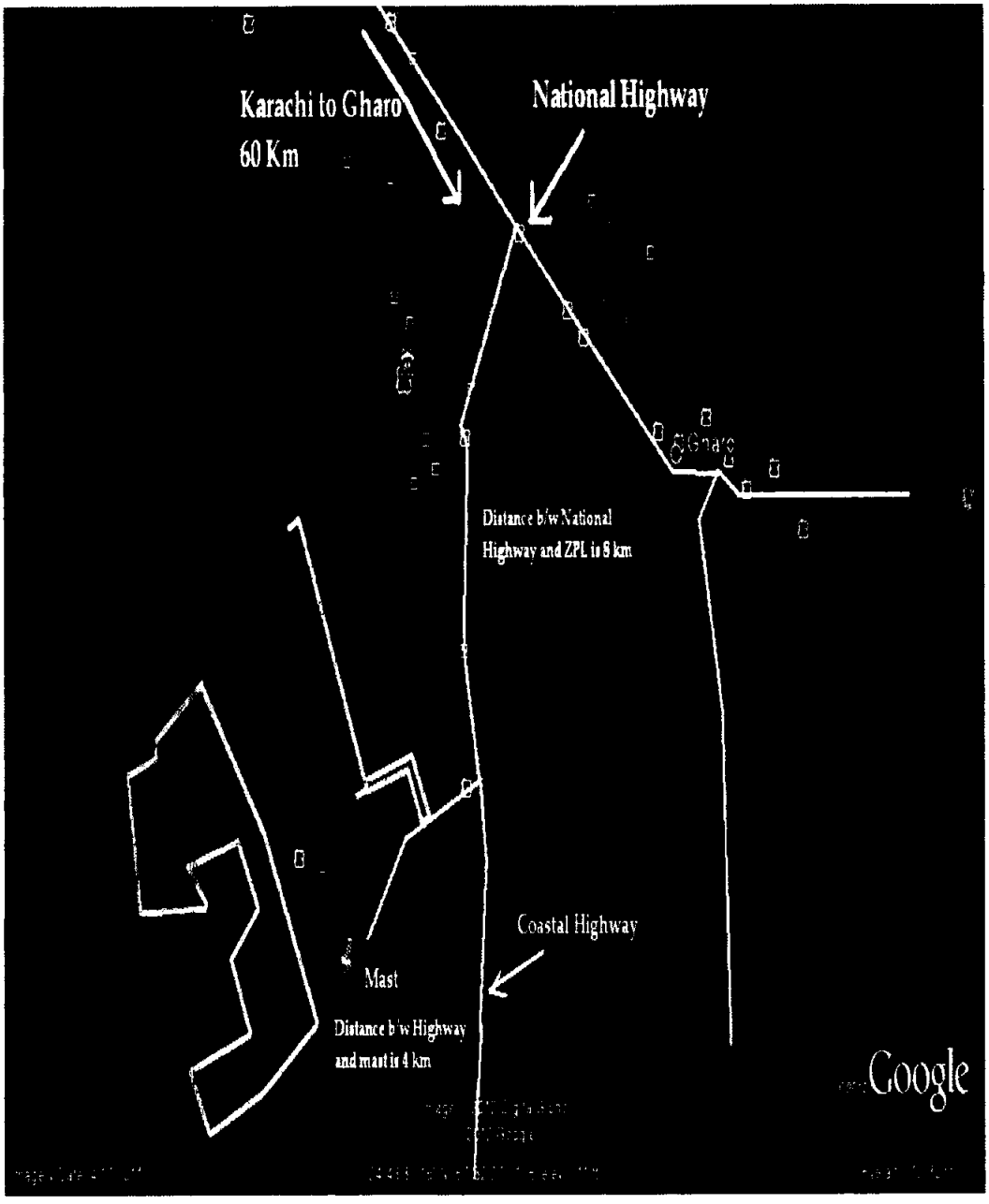
Revised/Modified
SCHEDULE-I

The Location, Size (i.e. Capacity in MW), Type of Technology, Interconnection Arrangements, Technical Limits, Technical/Functional Specifications and other details specific to the Generation Facility of the Licensee are described in this Schedule.



Location
of the Generation Facility/Wind Power Plant



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Lay Out
of the Generation Facility/Wind Power Plant

Land Coordinates

1	24°42'49.74"N	67°27'19.04"E
2	24°42'54.93"N	67°27'43.69"E
3	24°43'2.69"N	67°27'42.35"E
4	24°43'21.21"N	67°28'22.33"E
5	24°42'18.11"N	67°29'7.55"E
6	24°41'55.33"N	67°29'20.16"E
7	24°40'57.86"N	67°29'45.52"E
8	24°40'35.32"N	67°29'0.93"E
9	24°40'22.48"N	67°28'22.78"E
10	24°40'48.45"N	67°28'9.91"E
11	24°40'56.33"N	67°28'51.73"E
12	24°41'30.47"N	67°28'36.86"E
13	24°41'48.12"N	67°29'2.22"E
14	24°42'15.21"N	67°28'47.19"E
15	24°42'9.05"N	67°28'3.96"E
16	24°41'50.73"N	67°28'19.58"E
17	24°41'52.56"N	67°27'22.05"E
18	24°42'13.04"N	67°31'21.79"E
19	24°42'14.08"N	67°31'25.48"E
20	24°42'34.48"N	67°31'10.91"E
21	24°42'38.43"N	67°31'13.05"E
22	24°42'28.00"N	67°30'35.46"E
23	24°42'31.15"N	67°30'34.07"E
24	24°43'48.23"N	67°29'59.78"E
25	24°44'19.57"N	67°29'43.39"E
26	24°44'16.87"N	67°29'35.88"E
27	24°42'26.29"N	67°30'28.02"E

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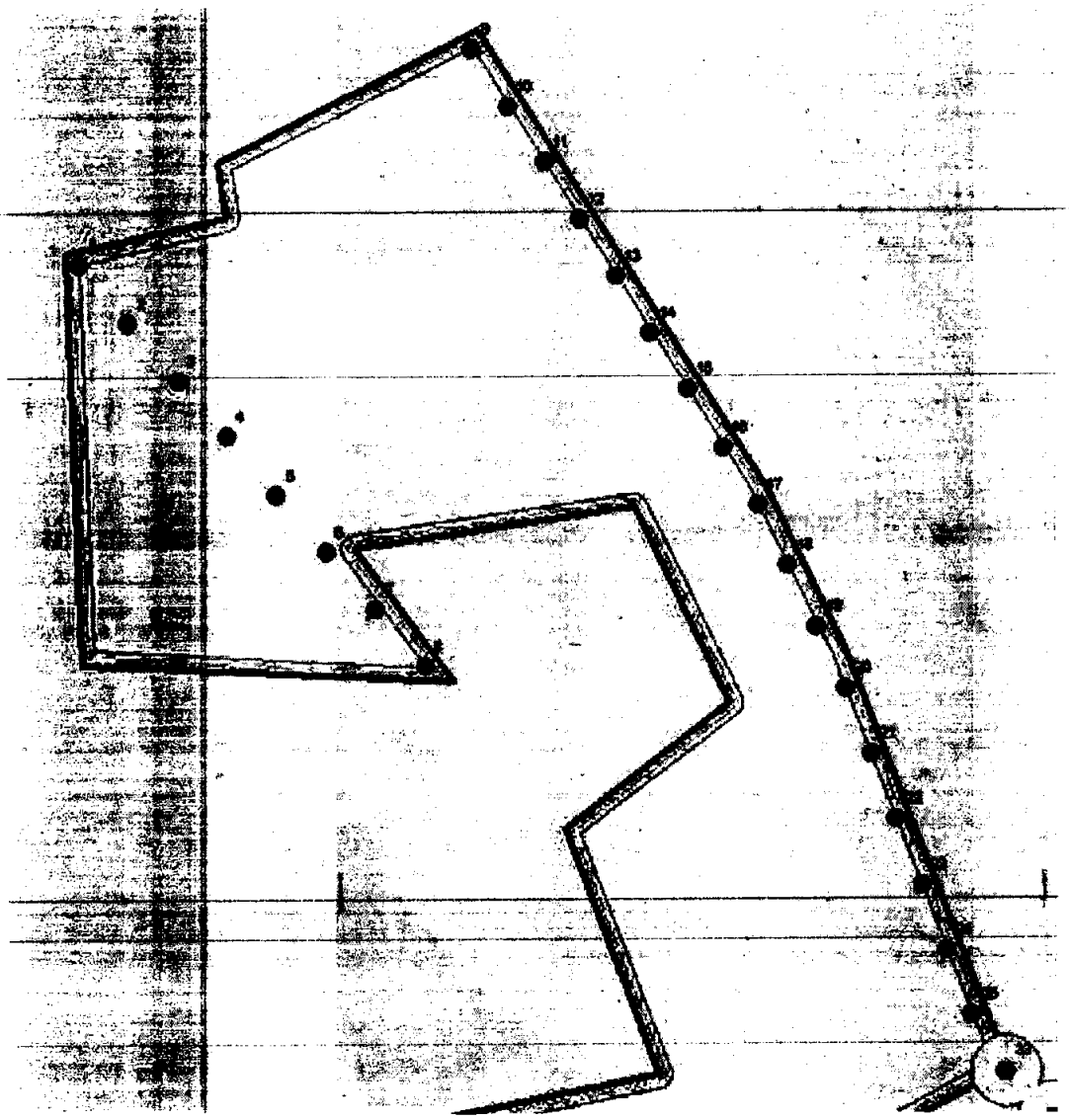
Micro-Sitting
of Generation Facility/Wind Power Plant



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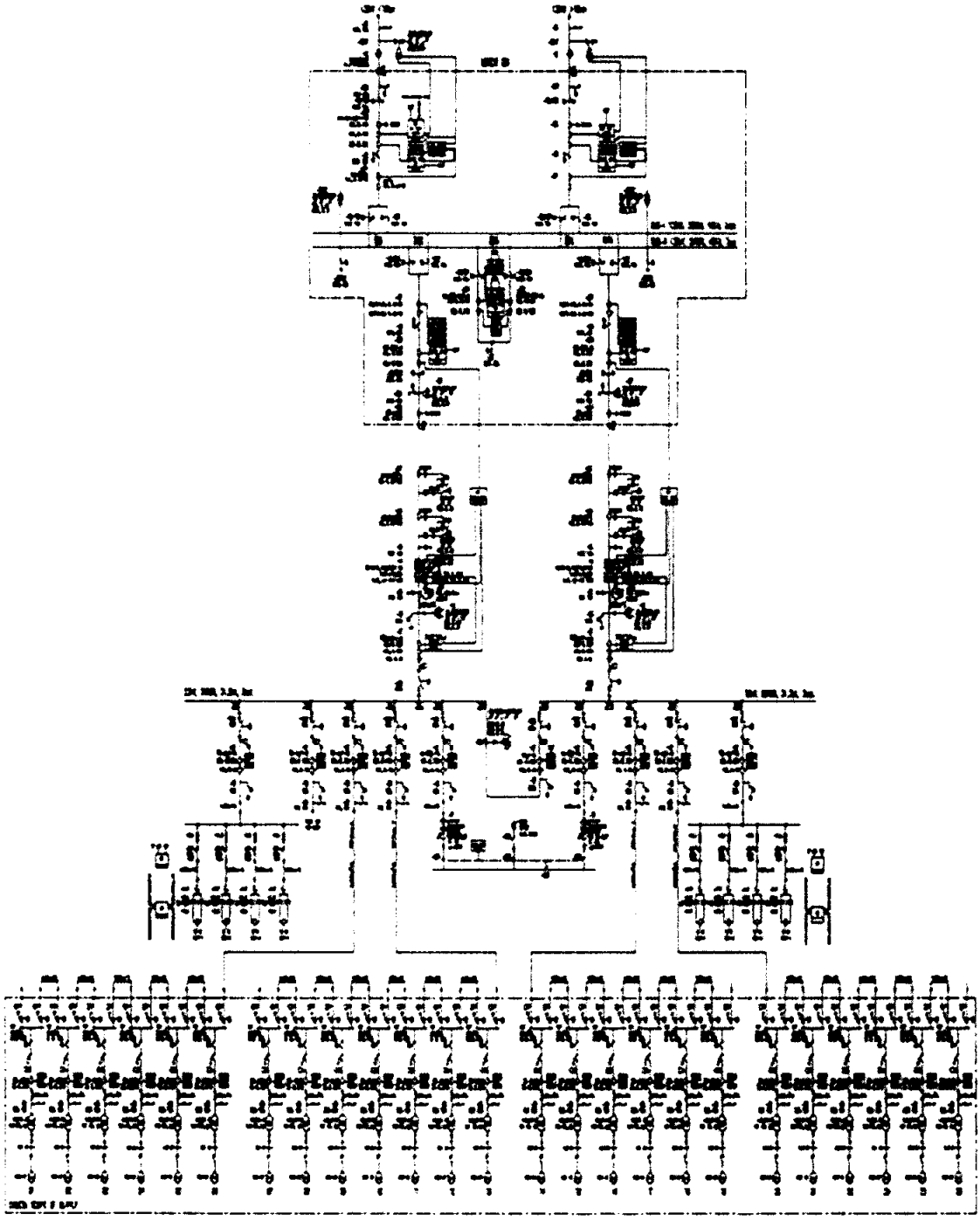
Single Line Diagram
of the Generation Facility/Wind Power Plant



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Interconnection Arrangement/Transmission Facilities for Dispersal of Power from the Generation Facility/Wind Power Plant of the Licensee

The power generated from the generation facility/wind power plant of Zephyr Power (Private) Limited (ZPPL) shall be dispersed to the national grid. The proposed interconnection arrangement/transmission facilities for dispersal of electric power will consist of the following:-

(a). The Interconnection/dispersal arrangement for the wind power plant of ZPPL will be consisting of a 132 KV D/C Transmission Line used for making IN-OUT of one Circuit of the 132 kV D/C Transmission Line connecting 220/132 KV Gharo Collector Grid Station and Thatta Grid Stations.

(2). Any change in the above mentioned Interconnection Arrangement/Transmission Facilities duly agreed by licensee, NTDC and HESCO, shall be communicated to the Authority in due course of time.

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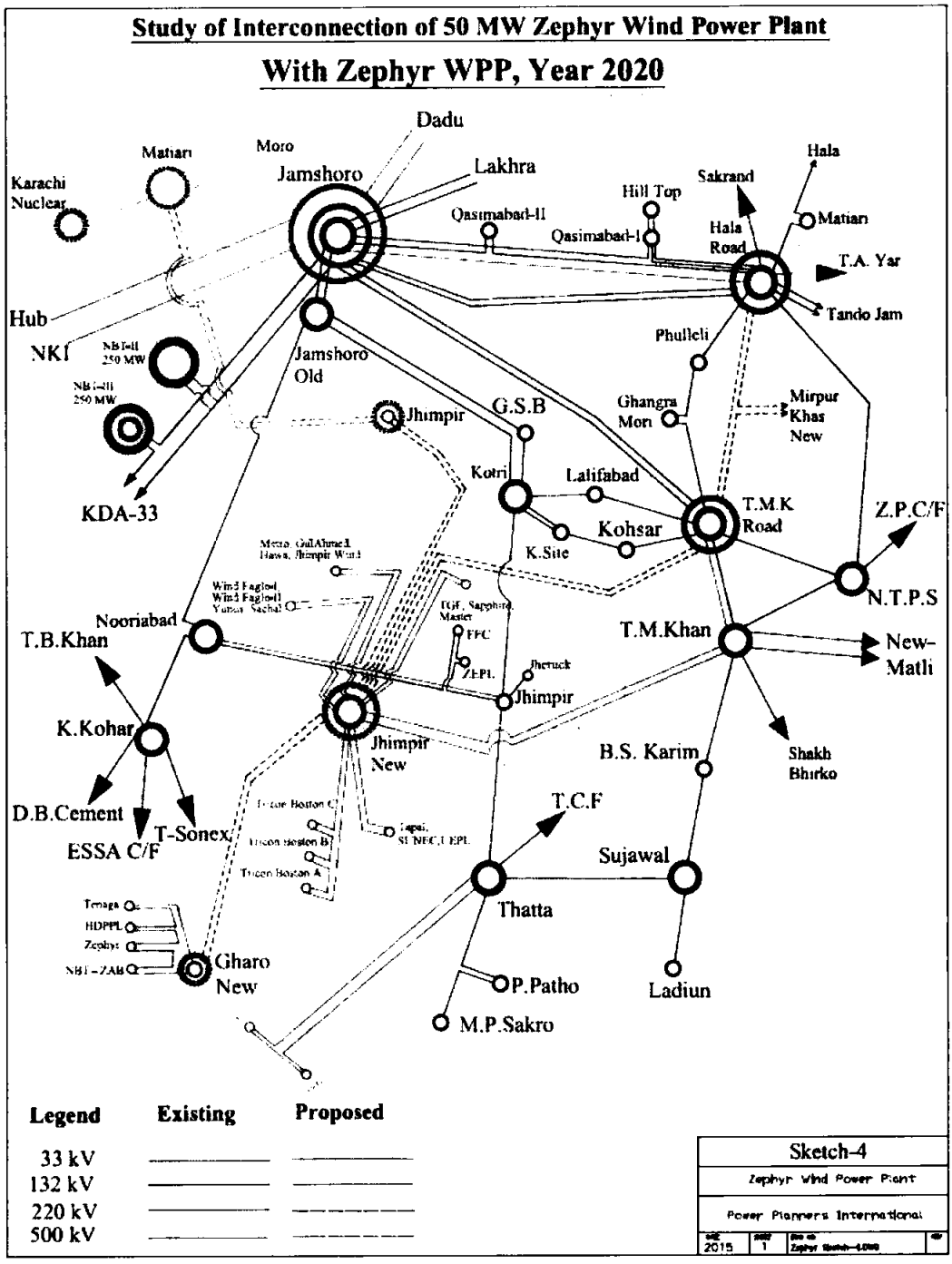
Schematic Diagram of Interconnection Arrangement/Transmission Facilities for Dispersal of Power from Generation Facility/Wind Power Plant



Details
of Generation Facility/Wind Power Plant
Wind Power Plant

(A). General Information

(i).	Name of the Company/Licensee	Zephyr Power (Pvt.) Limited
(ii).	Registered/Business Office	68 – B, Sindhi Muslim Cooperative Housing Society, Karachi – Pakistan
(iii).	Location of the Generation Facility/Wind Power Plant	Bhambore, Gharo, District Thatta, Sindh
(iv).	Type of Generation Facility	Wind Power Plant

(B). Wind Power Plant Capacity & Configuration

(i).	Wind Turbine Type, Make & Model	Gamesa (G114-2.0 IEC-IIIA) 2 MW
(ii).	Installed Capacity of the Generation Facility/Wind Power Plant (MW)	50 MW
(iii).	Number of Wind Turbine Units/Size of each Unit (KW)	25 x 2.0 MW

(C). Wind Turbine Details

(a).	Rotor	
(i).	Number of blades	3
(ii).	Rotor speed	7~14.7 rpm
(iii).	Rotor diameter	114 m
(iv).	Swept area	10207 m^2
(v).	Power regulation	Active Yaw System

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(vi).	Rated Power	2000 KW
(vii).	Cut-in wind speed	3 m/s
(viii).	Cut-out wind speed	25 m/s
(ix).	Survival wind speed	37.5 m/s
(x).	Pitch regulation	Hydraulic accumulator system
(b).	**Blades**	
(i).	Blade length	56 m
(ii).	Material	Fiber Glass enforced epoxy resin
(iii).	Weight	3 x 13 ton
(c).	**Gearbox**	
(i).	Type	One Step planetary gear and two steps parallel
(ii).	Gear ratio	1:128.5
(iii).	Oil quantity	Cone collar
(iv).	Main shaft bearing	One Step planetary gear and two steps parallel
(d).	**Generator**	
(i).	Power	2170 kW
(ii).	Voltage	690 V
(iii).	Type	Doubly-fed Induction Generator
(iv).	Speed	1680 rpm
(v).	Enclosure class	IP54
(vi).	Coupling	Flexible coupling
(vii).	Efficiency	98%
(viii).	Weight	9.15ton (Gen+Cooler)
(ix).	Power factor	-0.95 to +0.95 adjustable

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(e).	**Yaw System**	
(i).	Yaw bearing	Yaw ring with friction bearing
(ii).	Brake	Hydraulic brake consisting of 6 active clamps
(iii).	Yaw drive	Asynchronous motor
(iv).	Speed	0.42°/s (controlling speed)
(f).	**Control System**	
(i).	Type	PLC Based System
(ii).	Grid connection	IGBT converter
(iii).	Scope of monitoring	Remote monitoring parameters, e.g. environmental conditions, wind speed, ambient temperature, internal parameters such as oil levels, pressures, vibration, , Rotor state, grid situation etc.
(iv).	Recording	Production data, event list, long and short-term trends
(g).	**Brake**	
(i).	Design	Independent braker system
(ii).	Operational brake	Aerodynamic brake
(iii).	Secondary brake	High speed shaft disc break
(h).	**Tower**	
(i).	Type	Structure Carbon Steel
(ii).	Hub heights	Tubular tower 93 m

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(D). Other Details

(i).	Expected COD of the Generation Facility/Wind Power Plant (Anticipated)	November 12, 2018
(ii).	Expected Life of the Generation Facility/Wind Power Plant from its COD	20 Years

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Power Curve of Wind Turbine Generator of Gamesa (G114-2.0 IEC-IIIA) 2.00 MW (Graphical)

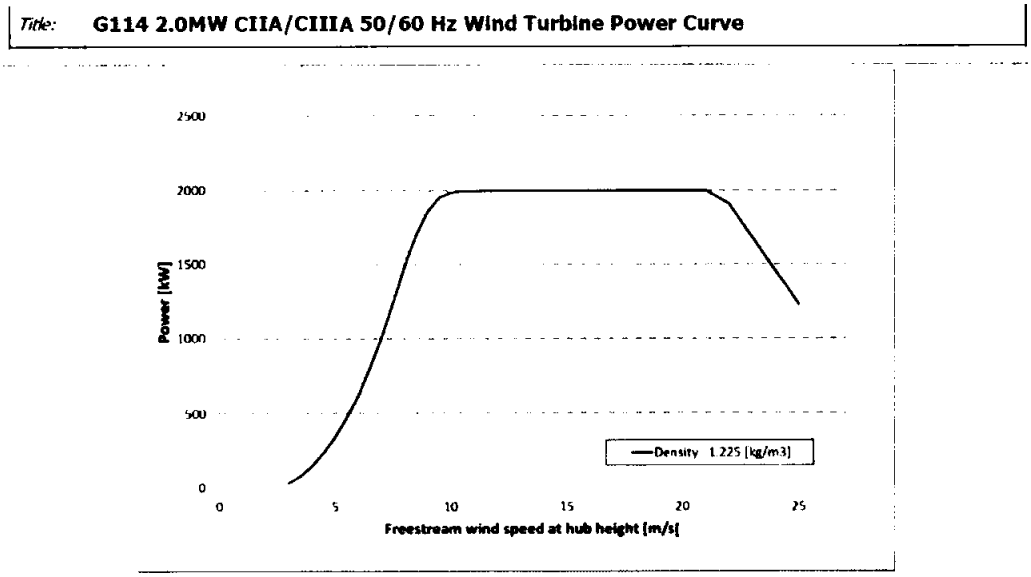

Figure 1 Power curve of the WT G114 2.0MW CIIA/CIIIA for an air density equal to 1.225 [kg/ m^3].

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Power Curve
of Wind Turbine Generator of
Gamesa (G114-2.0 IEC-IIIA) 2.00 MW
(Tabular)

Wind Speed (m/s)	Power Output (kW)
3	30
4	140
5	328
6	597
7	969
8	1440
9	1827
10	1981
11	1994
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

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Revised/Modified
SCHEDULE-II

The Total Installed/Gross ISO Capacity (MW), Total Annual Full Load Hours, Average Wind Turbine Generator 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 Farm of Licensee are given in this Schedule

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SCHEDULE-II

(1).	Total Installed Gross ISO Capacity of the Generation Facility /Wind Power Plant (MW)	50 MW
(2).	Total Annual Full Load Hours	3852 Hrs
(3).	Average Wind Turbine Generator Availability	96%
(4).	Total Gross Generation of the Generation Facility/Wind Farm (GWh)	221.937 GWh
(5).	Wake Losses (%)	3.93%
(6).	Availability Losses (%)	3.00%
(7).	Electrical Losses (%)	3.00%
(8).	Adaption Factor Losses (%)	4.00%
(9).	Annual Energy Generation (20 year equivalent Net AEP) (GWh) at P50	192.590 GWh
(10).	Net Capacity Factor (%)	43.94%

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 Energy Purchase Agreement.

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