National Electric Power Regulatory Authority
Islamic Republic of Pakistan

Registrar

NEPRA Tower, Attaturk Avenue (East), G-5/1, Islamabad
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Web: www.nepra.org.pk, E-mail: registrar@nepra.org.pk

No. NEPRA/R/DL/LAG-330/9762-67 July 01, 2016

Mr. Wang Shenliang
Chief Executive Officer
Three Gorges Third Wind Farm Pakistan (Pvt.) Limited
House No. 5, Street No. 72,
Sector F-8/3, Islamabad

Subject: **Generation Licence No. WPGL/32/2016**
Licence Application No. LAG-330
Three Gorges Third Wind Farm Pakistan (Pvt.) Limited

Reference: Your letter No. TGT/EX/OUT/2016-019, dated February 24, 2016.

Enclosed please find herewith Determination of the Authority in the matter of Generation Licence Application of Three Gorges Third Wind Farm Pakistan (Pvt.) Limited (TGTWFPPL) along with Generation Licence No. WPGL/32/2016 annexed to this determination granted by the National Electric Power Regulatory Authority to TGTWFPPL for its 49.50 MW Wind Power Plant located at Jhimpir, near Nooriabad, District Thatta, Sindh, pursuant to Section 15 of the Regulation of Generation, Transmission and Distribution of Electric Power Act (XL of 1997).

2. Please quote above mentioned Generation Licence No. for future correspondence.

Enclosure: **Generation Licence (WPGL/32/2016)**

1/7/16

(Syed Safeer Hussain)

Copy to:

6. Chief Executive Officer, Alternative Energy Development Board (AEDB), 2nd Floor, OPF Building, G-5/2, Islamabad.
7. Chief Executive Officer, NTDC, 414-WAPDA House, Lahore
8. Chief Operating Officer, CPPA-G, 6th Floor, Shaheed-e-Millat Secretariat, Blue Area, Islamabad
9. Chief Executive Officer, Hyderabad Electric Supply Company (HESCO), WAPDA Water Wing Complex, Hussainabad, Hyderabad
10. Director General, Sindh Environmental Protection Agency, Plot No. ST 2/1, Sector 23, Korangi Industrial Area, Karachi

National Electric Power Regulatory Authority (NEPRA)

Determination of the Authority in the Matter of Application of Three Gorges Third Wind Farm Pakistan (Private) Limited for the Grant of Generation Licence

June 30, 2016
Case No. LAG-330

(A). Background

(i). Government of Pakistan has set up Alternative Energy Development Board for harnessing Renewable Energy (RE) resources in the country. AEDB has issued Letter of Intent (LOI) to various RE developers for setting up projects in the country, under the Policy for Development of Renewable Energy for Power Generation 2006 ("the RE Policy").

(ii). AEDB issued LOI to Three Gorges Third Wind Farm Pakistan (Private) Limited-TGTWFPPL, (formerly Wind Eagle I Limited) for setting up an approximately fifty (50) MW wind based generation facility/wind power plant in the Jhimpir wind corridor, District Thatta, in the Province of Sindh. According to the terms and conditions of the LOI, TGTWFPPL carried out a feasibility study of the project including *inter alia*, wind power plant equipment details, micro-sitting details, power production estimates based on wind mast data of the project site, soil tests reports, technical details pertaining to selected wind turbine generator and other allied equipment to be used in the wind power plant, electrical studies, environmental study and project financing etc and AEDB accorded its approval for the same.

(B). Filing of Application

(i). In accordance with Section-15 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 ("the NEPRA Act") read with NEPRA Licensing (Application and Modification Procedure) Regulations, 1999 ("the Regulations"), TGTWFPPL submitted an application on February 25, 2016 requesting for the grant of generation licence.

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(ii). The Registrar examined the submitted application to confirm its compliance with the above mentioned Regulations and found the same compliant with the Regulations. Accordingly, the Registrar submitted the matter for the consideration of the Authority seeking admission of the application or otherwise.

(iii). The Authority considered the matter in its Regulatory Meeting held on April 12, 2016 and found the form and content of the application in compliance with Regulation-3 of the Regulations. The Authority admitted the application for consideration of the grant of the generation licence as stipulated in Regulation-7 of the Regulations. The Authority approved the advertisement containing (a). the prospectus; (b). a notice to the general public about the admission of the application of TGTWFPPL, to invite the general public for submitting their comments in the matter as stipulated in Regulation-8 of the Regulations. Further, the Authority also approved the list of the relevant stakeholders for informing about the admission of the application of TGTWFPPL and for providing their comments to assist the Authority in the matter, under Regulation-9 of the Regulations.

(iv). Accordingly, the advertisement was published in "the News" and "daily Express" on April 15, 2016. Apart from the above, separate letters were also sent to government ministries, their attached departments, representative organizations and individual experts etc. on April 18, 2016. The said stakeholders were requested for submitting their views/comments for assistance of the Authority.

(C). Comments of Stakeholders

(i). In reply to the above, the Authority received comments from five (05) stakeholders. These included Anwar Kamal Law Associates, Central Power Purchasing Agency (Guarantee) Limited (CPPA-G), Pakistan Council of Renewable Energy Technologies of Ministry of Science and Technology, Ministry of Water & Power and Board of Investment. The salient points of the comments offered by the said stakeholder are summarized hereunder: -

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(a). Anwar Kamal Law Associates in its comments has highlighted different issues of surplus capacity, underutilization of power plants and induction of new power plants on "take or pay basis" etc. Further, Anwar Kamal Law Associates has contended that RE power plants are not viable financially and economically due to higher upfront tariff and "must run condition". Anwar Kamal Law Associates also questioned the induction of RE projects in the current scenario (i.e. reduction in oil prices, RLNG contract with Qatar, upcoming coal power projects and introduction of competitive market etc.), affordability vs. availability of electric power and long term PPAs on "take or pay" basis etc. Anwar Kamal Law Associates requested the Authority to reject that the application of TGTWFPPL for the grant of generation licence;

(b). CPPA-G in its comments stated that TGTWFPPL has selected wind turbine generators of Goldwind (GW-82/1500) of 1.5 MW capacity, whereas, higher capacity wind turbine generators can also be installed at the same hub height. Further, TGTWFPPL 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 plant already enforced within the national grid and directions given by GM Planning Power NTDC vide letter dated February 23, 2016;

(c). Pakistan Council of Renewable Energy Technologies of Ministry of Science and Technology submitted that it has no objection on grant of generation licence to TGTWFPPL. However, it cannot comment on the financial or other TORs of the project;

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(d). Ministry of Water & Power, submitted that the Authority may process the generation licence application as per provisions of NEPRA Act and Government policy guidelines; and

(e). 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. In view of the said, grant of generation licence is supported subject to consumer friendly/competitive tariff and completion of all codal/technical formalities under rules & regulations.

(ii). The above comments of the stakeholders were examined and it was observed that Board of Investment, Pakistan Council of Renewable Energy Technologies of Ministry of Science &Technology and Ministry of Water & Power in their comments have supported the grant of generation licence to TGTWFPPL. Whereas, Anwar Kamal Law Associates and CPPA-G have raised certain observations to the grant of generation licence to TGTWFPPL. Accordingly, it was considered appropriate seeking perspective of TGTWFPPL on the observations of Anwar Kamal Law Associates and CPPA-G.

(iii). In response to the comments/observations of Anwar Kamal Law Associates, TGTWFPPL submitted that:

(a). Comments/observations of Anwar Kamal Law Associates are general in nature and not specifically related to application of TGTWFPPL for the grant of generation licence, rather they are related to working of NEPRA and Policies of Government of Pakistan for promotion of RE sector in Pakistan. TGTWFPPL

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appreciates the professional competence of Anwar Kamal Law Associates in the field of Law, however, the comments have been filed without fully understanding and appreciating the dynamics of the project, energy sector, financial and technical considerations relevant for determining project parameters. Therefore, the comments are liable to be dismissed outright being irrelevant and vague and having no nexus with the subject application for the grant of generation license.

(b). On the observation regarding induction of RE projects, TGTWFPPL has submitted that presently Pakistan has the lowest contribution of RE in the energy mix which needs to be improved to the level of other developing countries. Therefore, mainstreaming of RE and greater use of indigenous resources will be helpful in diversifying the energy mix, reducing the dependence on any single source (particularly imported fossil fuels), mitigating supply disruptions and price fluctuation risks. Further, additional costs and risks relating to fuel stocking, transportation, and temporary substitute arrangements are also irrelevant for RE projects.

(c). Regarding observation of Anwar Kamal Law Associates on the surplus installed capacity, TGTWFPPL has submitted that Anwar Kamal Law Associates is not fully aware about the operational capacity and installed capacity, for instance hydro projects are dependent on the hydrology and sizeable portion of installed capacity is inefficient and not economically viable to be operated.

(d). Regarding comments on the recent fall of RFO prices, TGTWFPPL has clarified that fuel prices are volatile and we cannot assume the fuel prices to remain on the existing low level. Regarding induction of RE projects in the current

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scenario (i.e. reduction in oil prices, RLNG contract with Qatar, upcoming coal power projects and introduction of competitive market etc.), TGTWFPPL has submitted that although there are projects under construction on coal and RLNG fuels, however, the ever increasing demand of electricity will continue to exist, therefore, RE must maintain a sizeable share in the overall energy mix of the country. It is pertinent to mention that indigenous RE contribution will result in savings of precious foreign exchange.

(e). Regarding the observation on upfront tariff, TGTWFPPL has informed that comparison of earlier upfront tariffs with the current upfront tariff reveals the improvement of technology/plant factor and reduction in cost, these benefits are reflected in the current upfront tariff offered by the Authority. About the concerns of Anwar Kamal Law Associates on "take or pay" feature of RE Policy, TGTWFPPL has submitted that replacing "take or pay" to "take and pay" would result in the end of IPP industry in Pakistan, which to date has been one of the most successful industry in Pakistan.

(iv). Regarding comments of CPPA-G, it was submitted that hub height and/or blade tip height do not establish a criteria to select the wind turbine generators for the project. The currently selected wind turbine generator has already been installed in the previous project of the company as well as in other three projects with accumulated installed capacity of 250.00 MW. GW-82/1500 is a certified and qualified wind turbine generator meeting all requirements of NTDC and national grid code of Pakistan and accordingly has been approved by AEDB for the current project. Gold Wind is one of the leading manufacturers of wind turbine generators over past few years in the world. TGTWFPPL will comply with the relevant provisions of the grid code. Further, TGTWFPPL agrees to the recommendations/directions of NTDC and the same can be discussed at the stage of Energy Purchase Agreement (EPA).

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(v). The Authority considered the above replies of the TGTWFPPL to the comments of the stakeholders and found the same plausible. In view of the said, the Authority decided to proceed further in the matter of application of TGTWFPPL for the consideration of the grant of generation licence as stipulated in the Regulations and NEPRA Licensing (Generation) Rules, 2000 ("the Rules").

(D). Grant of Generation Licence

(i). The sustainable and affordable energy/electricity is a key prerequisite for socio-economic development of any country. In fact, the economic growth of any country is directly linked with the availability of safe, secure, reliable and cheaper supply of energy/electricity. In view of the said reasons, the Authority is of the considered opinion that for sustainable development, all indigenous power generation resources including renewable energy must be developed on priority basis.

(ii). The existing energy mix of the country is heavily skewed towards the costlier thermal power plants, mainly operating on imported fuel. The continuous import of furnace oil not only creates pressure on the precious foreign exchange reserves of the country but is also an environmental concern. Therefore, in order to achieve sustainable development it is imperative that indigenous renewable energy resources are given priority for power generation and their development is encouraged. The Energy Security Action Plan 2005 approved by the Government of Pakistan, duly recognizes this very aspect of power generation through renewable energy and envisages that at least 5% of total national power generation capacity (i.e. 9700 MW) to be met through renewable energy resources by 2030. The Authority considers that the proposed project of TGTWFPPL is consistent with the provisions of Energy Security Action Plan 2005. The project will help in diversifying the energy portfolio of the country. Further, it will not only enhance the energy security of the country by reducing the dependence on imported furnace oil but will also help reduction in carbon emission by generating clean electricity, thus improving the environment.

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(iii). TGTWFPPL is setting up the proposed wind power plant in the Jhimpir wind corridor, at Jhimpir, District Thatta in the Province of Sindh. The proposed wind power plant will have a total installed capacity of 49.50 MW consisting 33 x 1.50 MW wind turbine generators. TGTWFPPL carried out an interconnection and system stability study for dispersal of electric power from the above mentioned wind power plant. According to the said study, the dispersal/interconnection arrangement will be consisting of 132 KV double circuit transmission line looping in-out between sub clusters of 50.00 MW wind power plants of Sachal Energy (Pvt.) Limited and Three Gorges Second Wind Farm Pakistan Limited to Jhimpir-New 220/132 KV collector substation. The study confirmed that proposed wind turbine generators will be in conformity with the required stability and reliability standards of NTDC as stipulated in the Grid Code. NTDC has approved the submitted interconnection and stability studies. Further, NTDC has also confirmed that necessary interconnection arrangement for dispersal of power from TGTWFPPL will be available well before the Commercial Operation Date (COD) of the proposed wind power plant of TGTWFPPL (i.e. September 30, 2017).

(iv). The term of a generation licence under Rules-5(1) of the Rules is to commensurate with the maximum expected useful life of the units comprised in a generating facility, except where an applicant for a generation licence consents to a shorter term. According to the information provided by TGTWFPPL, its wind power plant will achieve COD by September 30, 2017 and will have a useful life of more than twenty (20) years from its COD. In this regard, TGTWFPPL has requested that the term of the proposed generation licence may be fixed as twenty (20) years, consistent with the term of its proposed EPA. The Authority considers that the information provided by TGTWFPPL on useful life of its wind power plant is consistent with other similar cases. Forgoing in view, the Authority fixes the term of the proposed generation licence as twenty (20) years from COD of the project.

(v). Regarding the tariff, it is hereby 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 view of the said, the Authority through Artcile-6 of the proposed

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generation licence has directed TGTWFPPL to charge the power purchaser only such tariff which has been determined, approved or specified by the Authority. Further, the Authority through its determination No. NEPRA/TRF-349/TGTWFPL-2016/4197-4199, dated April 01, 2016, has granted upfront tariff to TGTWFPPL. The Authority directs TGTWFPPL to adhere to the Article-6 of the proposed generation licence and the terms and conditions of the said up-front tariff determination in letter and spirit without any exception.

(vi). Regarding land of the project, the Authority has observed that TGTWFPPL has acquired 702 acres of land at Jhimpir, District Thatta, in the Province of Sindh as shown in Schedule-I of the licence. In this regard, the Authority directs TGTWFPPL that the aforementioned land shall be exclusively used by TGTWFPPL for the proposed wind power project and TGTWFPPL cannot carry out any other generation activity on this land except with prior approval of the Authority.

(vii). The proposed wind power plant of TGTWFPPL for which generation licence has been sought, is based on wind which is a renewable energy source and does not cause any pollution however, the operation of the wind power plant may cause some other type of pollution including soil pollution, water pollution and noise pollution during construction and operation. In this regard, TGTWFPPL carried out an Initial Environment Examination study and obtained No Objection Certificate from Environmental Protection Agency, Govt. of Sindh. The Authority has considered these aspects and has made TGTWFPPL obligatory to comply with the required rules and regulation on environment as stipulated in Artcle-10 of the generation licence.

(viii). The proposed wind power plant of TGTWFPPL will be using renewable energy resource for generation of electric Power. Therefore, the project may qualify for the carbon credits under the Kyoto Protocol (for renewable energy projects coming into operation upto 2020). In view of the said, the Authority directs TGTWFPPL to initiate the process in this regard at the earliest so that proceeds for the carbon credits are materialized. TGTWFPPL shall be required to share the

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proceeds of the carbon credits with the power purchaser as stipulated in Article-14 of the generation licence.

(ix). In view of the above, the Authority hereby decides to approve the grant of generation licence to TGTWFPPL on the terms and conditions set out in the generation licence annexed to this determination. The grant of generation licence will be subject to the provisions contained in the NEPRA Act, relevant rules, regulations framed there under and other applicable documents.

Authority:

Maj. (R) Haroon Rashid
(Member)

Syed Masood-ul-Hassan Naqvi
(Member)

Himayat Ullah Khan
(Member)/Vice Chairman

Brig. (R) Tariq Saddozai
Chairman

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01.07.16

National Electric Power Regulatory Authority (NEPRA)
Islamabad – Pakistan

GENERATION LICENCE

No. WPGL/32/2016

In exercise of the Powers conferred upon the National Electric Power Regulatory Authority (NEPRA) under Section-15 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997, the Authority hereby grants a Generation Licence to:

THREE GORGES THIRD WIND FARM PAKISTAN (PRIVATE) LIMITED

Incorporated under the Companies Ordinance, 1984 Having Corporate Universal Identification No. 0095199, dated September 10, 2015

for its Generation Facility/Wind Power Plant/Wind Farm Located at Jhimpir, near Nooriabad, District Thatta, in the Province of Sindh

(Installed Capacity: 49.50 MW Gross ISO)

to engage in generation business subject to and in accordance with the Articles of this Licence.

Given under my hand on 01st day of July Two Thousand & Sixteen and expires on 29th day of September Two Thousand & Thirty Seven.

01.07.16

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 ";

(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 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;

(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 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 Farm, which are available or can be obtained in relation to the generation facility/Wind Farm after the COD;

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(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 (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 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 Farm, 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;

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

(o). "Licensee" means **Three Gorges Third Wind Farm Pakistan (Private) Limited** and its successors or permitted assigns;

(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 Farm" means "a cluster of Wind Turbines in the same location used for production of electric power";

(v). "Wind Turbine Generator" or "WTG" means the machines installed at the generation facility/Wind Farm 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.

Article-2
Applicability of Law

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

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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 Farm of the Licensee are set out in Schedule-I of this Licence.

3.2 The net capacity of the generation facility/Wind Farm 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 Farm 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 Farm.

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.

Article-6
Tariff

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

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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.

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.

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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 Farm

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 Farm 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 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.

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Article-15
Design & Manufacturing Standards

15.1 The Wind Turbine Generator or WTG and other associated equipments of the generation facility/Wind Farm 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 Farm shall be unused and brand new.

Article-16
Power Curve

The power curve for the individual Wind Turbine Generator or 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 Farm.

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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.

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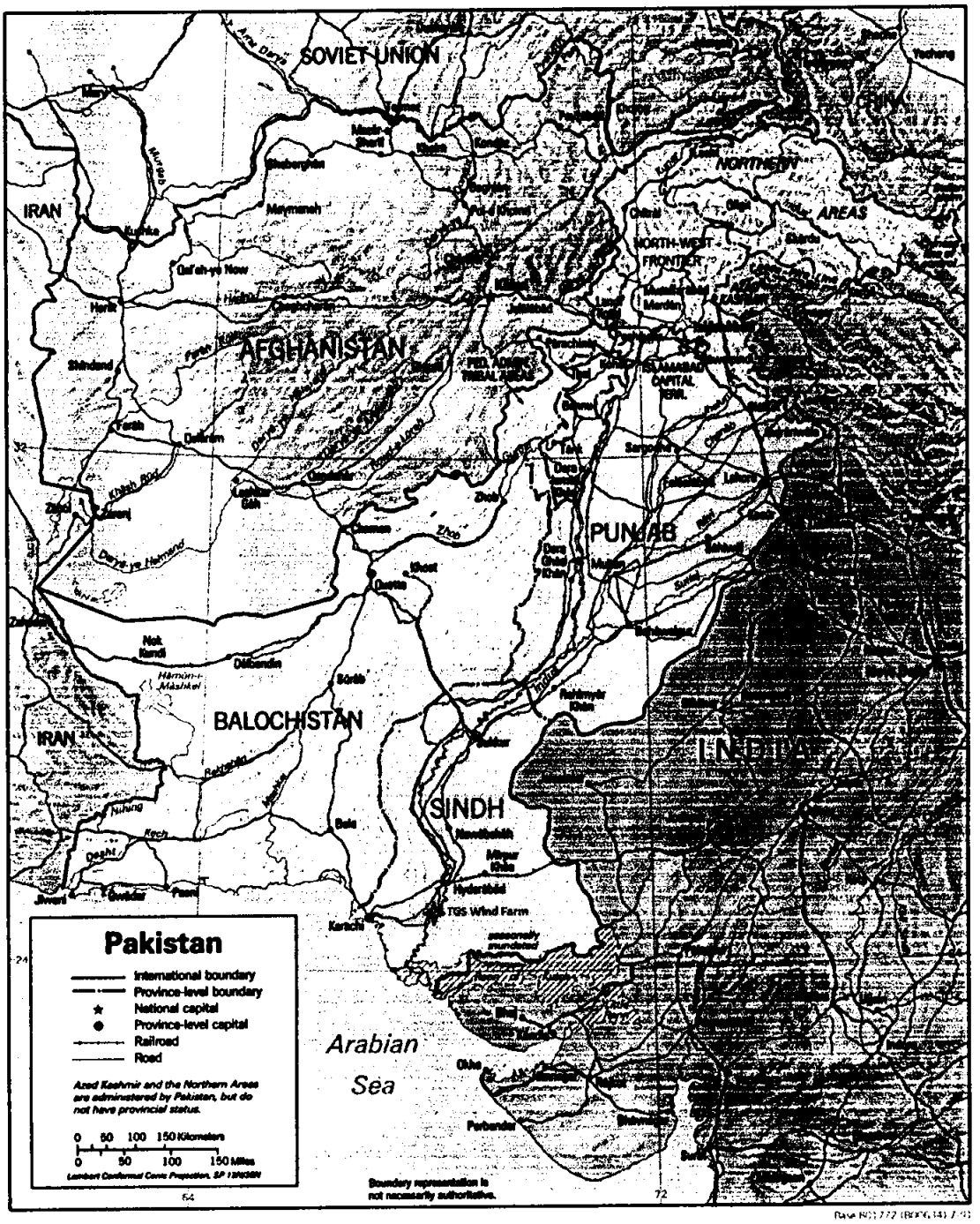
Location
of Generation Facility/Wind Power Plant/Wind Farm



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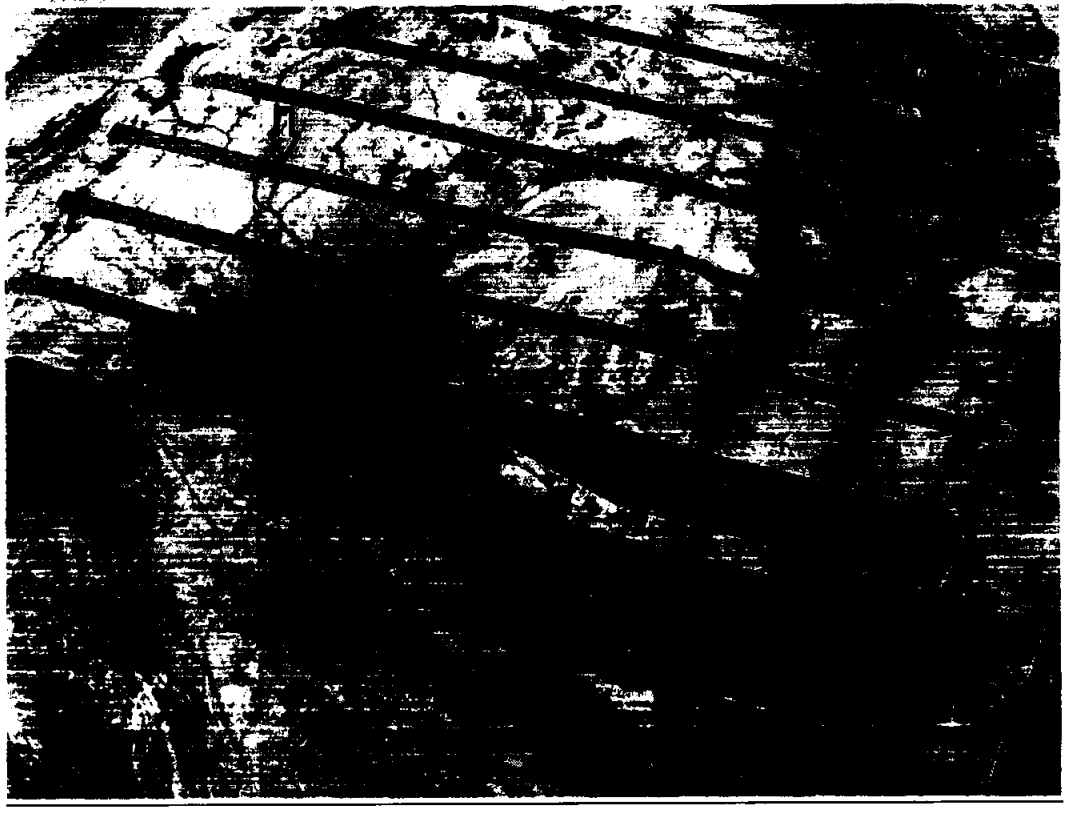
Land
of the Generation Facility/Wind Power Plant/Wind Farm

Total Land Area: 702 Acres

Geodetic Coordinates

Point No.	Latitude (N)	Longitude (E)
Boundary 1	25°08'37.32"	67°52'01.59"
Boundary 2	25°06'44.68"	67°52'03.85"
Boundary 3	25°06'45.81"	67°58'56.87"
Boundary 4	25°06'39.03"	67°58'52.64"



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

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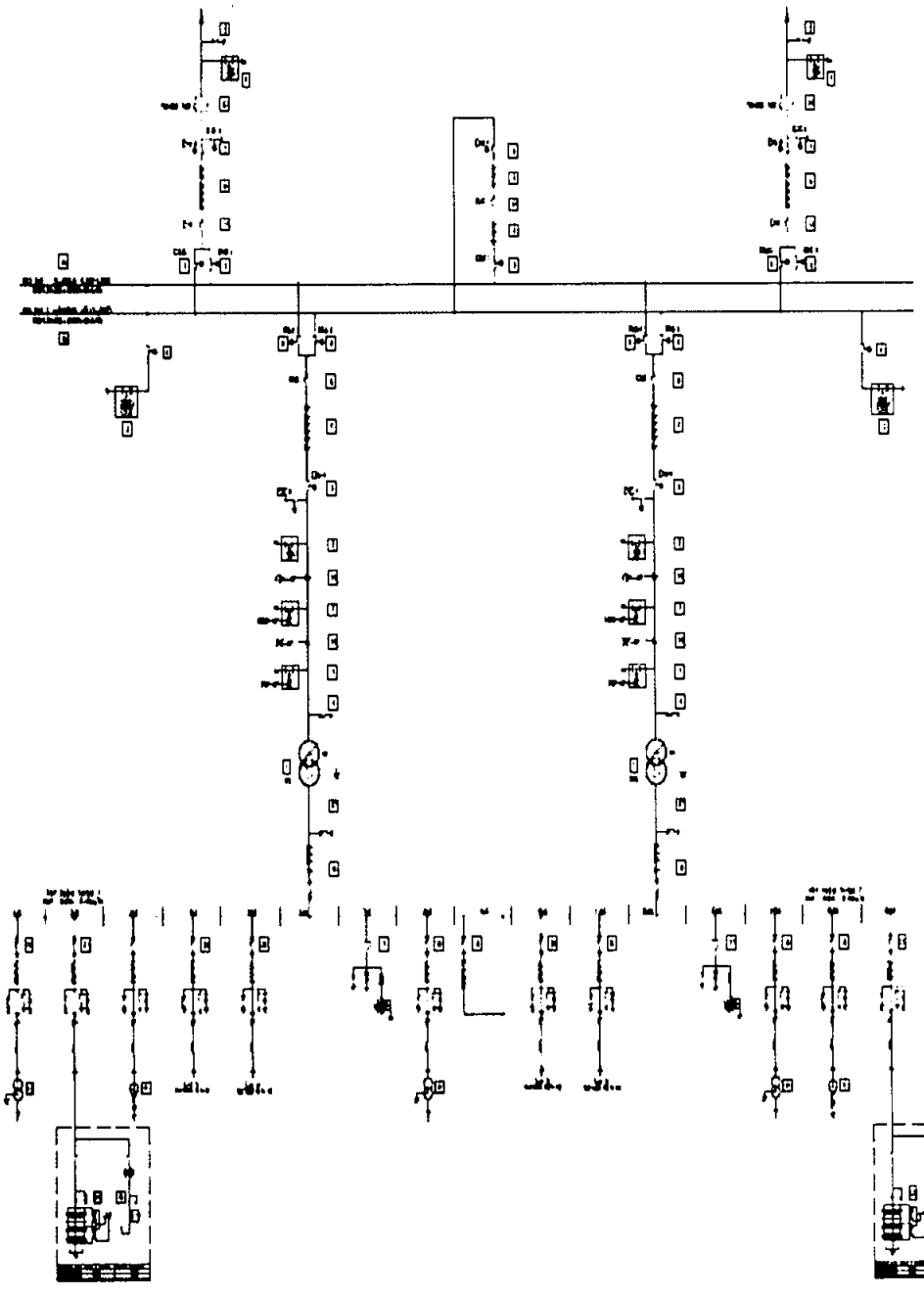
Single Line Diagram of the Generation Facility/Wind Power Plant/Wind Farm



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Interconnection Arrangement/Transmission Facilities for Dispersal of Power from Generation Facility/Wind Farm

The electric power generated from the Generation Facility/Wind Power Plant/Wind Farm of TGTWFPPL shall be dispersed to the National Grid through the load center of HESCO.

(2). The proposed Interconnection Arrangement/Transmission Facilities for dispersal of power will consist of the following:-

(a). The dispersal/interconnection arrangement of the Generation Facility/ Wind Power Plant/Wind Farm of TGTWFPPL will be consisting of 132 KV double circuit transmission line looping in-out between sub clusters of 50.00 MW WPPs/WFs of Sachal Energy (Pvt.) Limited and Three Gorges Second Wind Farm Pakistan Limited (TGSWFPL) to Jhimpir-New 220/132 KV collector substation.

(3). The scheme of interconnection of TGTWFPPL also proposes the following reinforcement already in place in Jhimpir cluster:-

(a). 220/132 KV Jhimpir-New Substation at suitable location in Jhimpir cluster;

(b). 70 KM long double circuit from Jhimpir-New 220 KV Substation to the existing T.M. Khan Road 220 KV Substation;

(c). A 132KV double circuit of 82 km using Greeley conductor would be constructed to connect Jhimpir-New 220/132 KV Substation with T.M. Khan in HESCO network;

(d). 220/132 KV Gharo-New substation at suitable location in Gharo cluster.

(e). 75 km long 220 KV double circuit from Gharo-New 220 KV Substation to Jhimpir-New 220 KV Substation;

(f). Five sub-collectors groups will be connected to Jhimpir 220/132 KV collector substation through 132 KV double circuits using Greeley Conductor;

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(g). Four WPPs/WFs in the collector system of Gharo 220/132 KV substation;

(h). Rehabilitation of the exiting 132 KV lines in the vicinity of WPP clusters, i.e. Jhimpir-Kotri, Jhimpir-Thatta, Thatta-Sujawal and Nooriabad-Jamshoro Old;

(i). 220/132 KV Gharo-New substation at suitable location in Gharo cluster;

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

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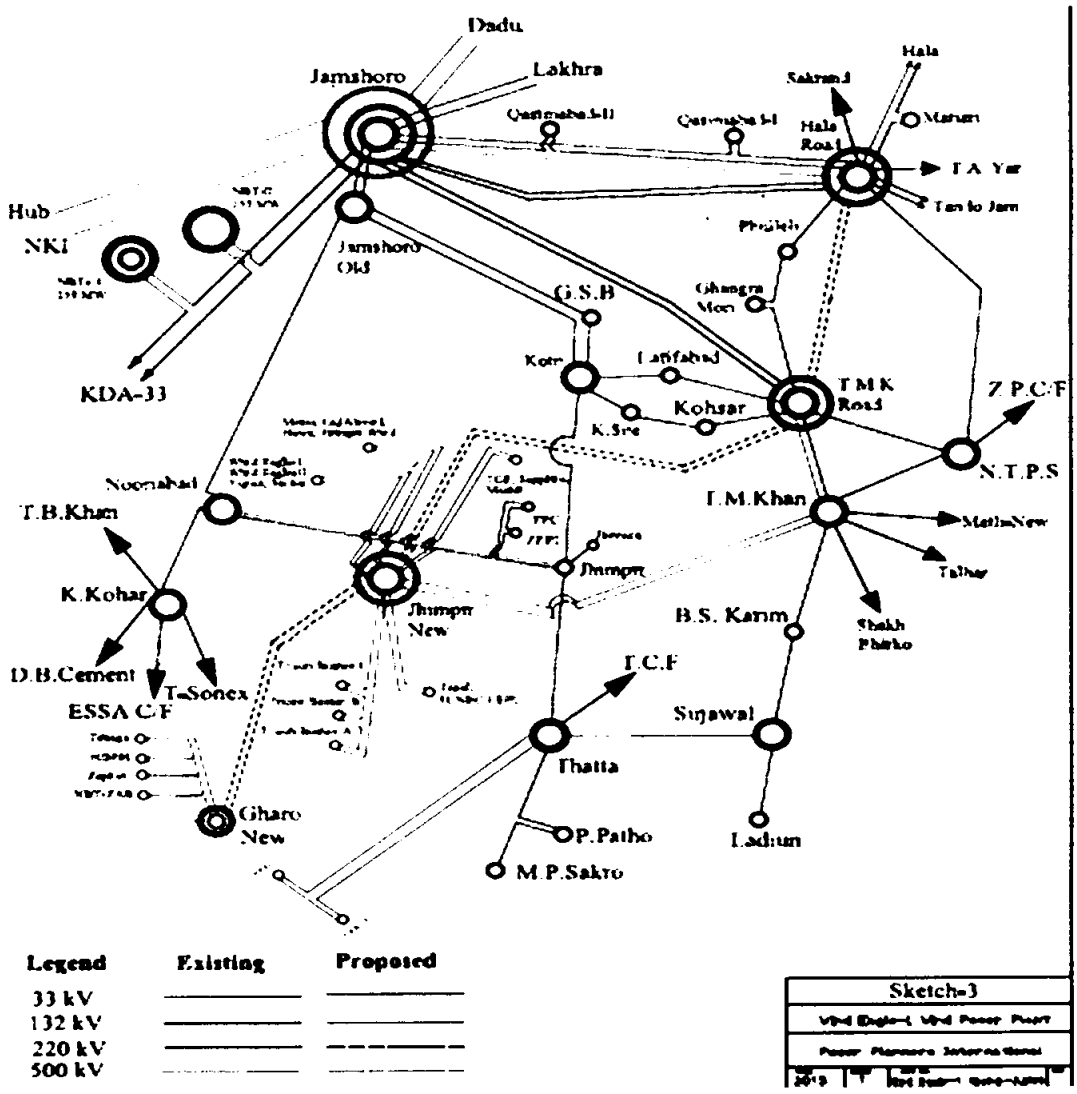
Schematic Diagram of Interconnection Arrangement/Transmission Facilities for Dispersal of Power from Generation Facility/Wind Power Plant/Wind Farm



Details of Generation Facility/Wind Power Plant/ Wind Farm

(A). General Information

(i).	Name of the Company/Licensee	Three Gorges Third Wind Farm Pakistan (Private) Limited
(ii).	Registered/Business Office	House No.5, Street No.72, F-8/3, Islamabad, Pakistan
(iii).	Plant Location	Jhimpir, near Nooriabad, District Thatta, in the Province of Sindh
(iv).	Type of Generation Facility	Wind Farm/Wind Power Plant

(B). Wind Farm Capacity & Configuration

(i).	Wind Turbine Type, Make & Model	Goldwind GW82/1500, Permanent Magnet Direct Drive (PMDD)
(ii).	Installed Capacity of Wind Farm (MW)	49.50 MW
(iii).	Number of Wind Turbine Units/Size of each Unit (KW)	33 x 1.50 MW

(C). Wind Turbine Details

(a).	**Rotor**	
(i).	Rated Power	1.5 MW
(ii).	Number of Blades	3 Each
(iii).	Rotor Speed	10 – 17.3 rpm
(iv).	Rotor Diameter	82 m
(v).	Swept Area	5325 m^2
(vi).	Power Regulation	Variable speed and variable pitch
(vii).	Rated power at	10.3 m/s (static, air density = 1.225 kg/m^3)

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(viii).	Cut-in Wind Speed	3.0 m/s (10 min avg.)
(ix).	Cut-out Wind Speed	22 m/s (10 min avg.)
(x).	Survival Wind Speed	52.5 m/s(3 second avg)
(xi).	Hub Height	85 m
(xii).	Pitch Regulation	Integrated PLC control
(b). Blades		
(i).	Number of Blades	3 Each
(ii).	Blade Length	40.3 m
(iii).	Material	Glass fiber reinforced resin
(iv).	Weight	5775 kg each
(c). Gear Box		
(i).	Type	Gearless
(ii).	Gear Ratio	N/A
(iii).	Weight	N/A
(iv).	Oil Quantity	N/A
(v).	Main Shaft Bearing	N/A
(d). Generator		
(i).	Power	1500 KW
(ii).	Voltage	620 V
(iii).	Type	PMDD Synchronous Generator
(iv).	Speed	Range: 10-17.3 rpm; Speed at rated power: 17.3 rpm
(v).	Enclosure Class	IP 23
(vi).	Coupling	Wye connection

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(vii).	Efficiency	≥95%
(viii).	Weight	44000 kg
(ix).	Power Factor	±0.95 (Leading to Lagging)
(e). Yaw System		
(i).	Yaw Bearing	Outer tooth ring 4 contact ball bearing
(ii).	Brake	7 pairs of braking pads
(iii).	Yaw Drive	4 induction drive motors
(iv).	Speed	0.43 degrees/Sec
(f). Control System		
(i).	Type	PLC
(ii).	Grid Connection	Full power converter automatically synchronization
(iii).	Scope of Monitoring	Central monitoring and remote monitoring system
(iv).	Recording	Normal operation, safety protection, fault inspection and handling, operation parameters setting and data recording
(g). Brake		
(i).	Design	3 Aerodynamic brakes for each blade
(ii).	Operational Brake	Aerodynamic brake
(iii).	Secondary Brake	Hydraulic brake (only for maintenance)
(h). Tower		
(i).	Type	Tubular Steel Tower
(ii).	Hub Heights	85m

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(D). Other Details

(i).	Project Commercial Operation Date-COD (Anticipated)	September 30, 2017
(ii).	Expected Life of the Generation Facility/WPP from COD	20 years

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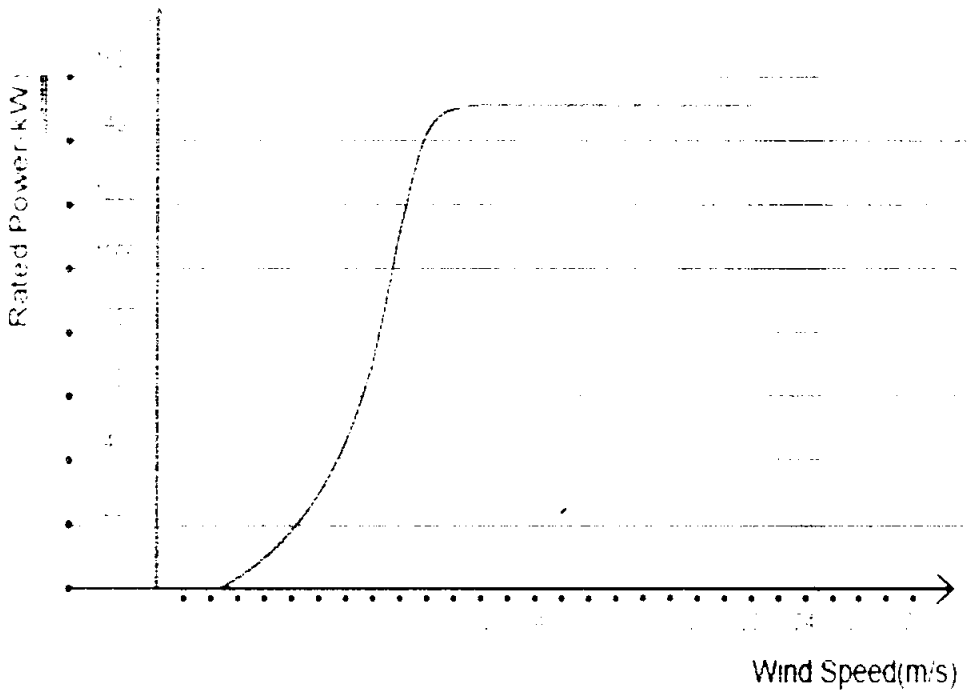
Power Curve of Wind Turbine Generator of Goldwind GW-82/1500 (Graphical)



1.225 kg/m³ air density

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Power Curve of Wind Turbine Generator of Goldwind GW-82/1500 (Tabular)

Wind Speed (m/s)	Power Output(kW)
3	28
3.5	55
4	89
4.5	130
5	181
5.5	244
6	319
6.5	408
7	512
7.5	632
8	767
8.5	913
9	1069
9.5	1224
10	1345
10.5	1419
11	1464
11.5	1486
12	1496
12.5	1499
13	1500
14	1500
15	1500
16	1500
17	1500
18	1500
19	1500
20	1500
21	1500
22	1500

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SCHEDULE-II

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 Farm of Licensee is given in this Schedule.

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SCHEDULE-II

(1).	Total Installed Gross ISO Capacity of the Generation Facility/Wind Farm (MW)	49.50 MW
(2).	Total Annual Full Load Hours	3066 Hrs
(3).	Average Wind Turbine Generator (WTG) Availability	97.0 %
(4).	Total Gross Generation of the Generation Facility/Wind Farm (GWh)	173.7 GWh
(5).	Array & Miscellaneous Losses (GWh)	13.52 GWh
(6).	Availability Losses (GWh)	5.07 GWh
(7).	Balance of Plant Losses (GWh)	3.38 GWh
(8).	Annual Energy Generation (20 years equivalent Net AEP) (GWh)	151.77 GWh
(9).	Net Capacity Factor (%)	35.00 %

Note

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

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