



National Electric Power Regulatory Authority

Islamic Republic of Pakistan

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Registrar

No. NEPRA/R/LAG-187/9583-85

October 12, 2011

Mr. Wang Shenliang
Director/CEO
Three Gorges First Wind Farm Pakistan (Private) Limited
House No. 87, Street No. 59,
Sector F-10/3, Islamabad

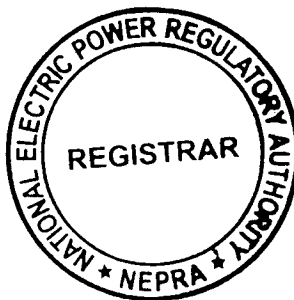
Subject: **Generation Licence No. WPGL/11/2011**
Licence Application No. LAG-187
Three Gorges First Wind Farm Pakistan (Private) Limited (TGF)

Reference: *Your letter No. TGF/EX/OUT/2011-004, dated June 08, 2011*

Enclosed please find herewith Generation Licence No. WPGL/11/2011 granted by National Electric Power Regulatory Authority (NEPRA) to Three Gorges First Wind Farm Pakistan (Private) Limited (TGF) for 49.50 MW Wind Farm located at Jhampir, near Nooriabad, District Thatta, Sindh pursuant to Section 15 of the Regulation of Generation, Transmission and Distribution of Electric Power Act (XL of 1997). Further, the determination of the Authority in the subject matter is also attached.

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

Enclosure: **Generation Licence**
[No. WPGL/11/2011]




(Syed Safeer Hussain)

Copy to:

1. Chief Executive Officer, Hyderabad Electric Supply Company (HESCO), WAPDA Water Wing Complex, Hussainabad, Hyderabad
2. Director General, Pakistan Environmental Protection Agency, House No. 311, Main Margalla Road, F-11/3, Islamabad.

**National Electric Power Regulatory Authority
(NEPRA)
Islamabad – Pakistan**

GENERATION LICENCE

No. WPGL/11/2011

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 FIRST WIND FARM PAKISTAN (PRIVATE)
LIMITED**

Incorporated under the Companies Ordinance, 1984
Under Corporate Universal Identification

No. 0075612, dated April 19, 2011

for its Wind Farm Located at Jhampir, near Nooriabad
District Thatta, 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 this 12th day of October Two
Thousand & Eleven and expires on day of 29th June
Two Thousand & Thirty Three.


Registrar

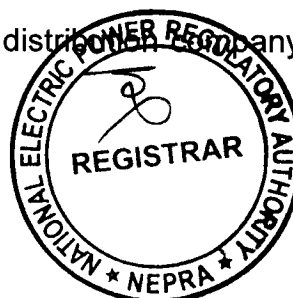




Article-1
Definitions

1.1 In this Licence

- (a) "Act" means the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (XL of 1997);
- (b) "Authority" means the National Electric Power Regulatory Authority constituted under section 3 of the Act;
- (c) "CPPA" means Central Power Purchasing Agency of NTDC or any other entity created for the like purpose;
- (d) "Licensee" means Three Gorges First Wind Farm Pakistan (Private) Limited;
- (e) "NTDC" means National Transmission and Despatch Company;
- (f) "Policy" means the Policy for Development of Renewable Energy for Power Generation, 2006 of Government of Pakistan as amended from time to time;
- (g) "Power Purchaser" means CPPA of NTDC purchasing power on behalf of XW-DISCOs;
- (h) "Rules" mean the National Electric Power Regulatory Authority Licensing (Generation) Rules, 2000;
- (i) "Wind Farm" means a cluster of wind turbines in the same location used for production of electric power;
- (j) "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 in the Rules.

Article-2
Application of Rules

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

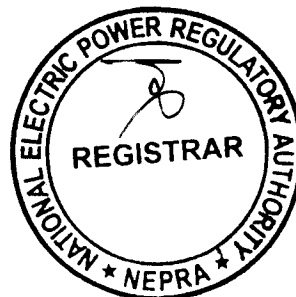
3.2 The net capacity of the Wind Farm of the Licensee is set out in Schedule-II hereto.

3.3 The Licensee shall provide the final arrangement, technical and financial specifications and other specific details pertaining to its Wind Farm before its commissioning.

Article-4
Term of Licence

4.1 The Licence is granted for a term of twenty (20) years after the Commercial Operation Date (COD).

4.2 Unless suspended or revoked earlier, the Licensee may within ninety (90) days prior to the expiry of the term of the Licence, apply for renewal of the Licence under the Licensing (Application and Modification Procedures) Regulation, 1999 as amended or replaced from time to time.



Article-5
Licence fee

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

Article-6
Tariff

The Licensee shall charge only such tariff which has been approved, determined, adjusted 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 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 NEPRA rules on Performance Standards as may be prescribed by the Authority 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.

Article-11
Power off take Point and Voltage

The Licensee shall deliver power at the outgoing bus of its 132 KV grid station. The up-gradation (step up) of generation voltage up to 132 KV 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 NTDC regarding Wind data specific to the Licensee's site and other related information on a regular basis and in a manner required by NTDC.



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 prevailing Policy issued by the Government on the subject.

Article-15
Design & Manufacturing Standards

Wind Turbine Generation system shall be designed, manufactured and tested according to the latest IEC standards or other equivalent standards. All plant and equipment shall be un-used and brand new.

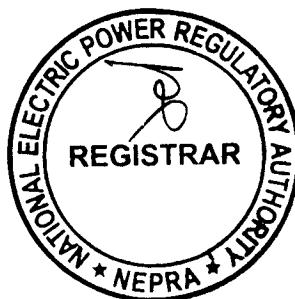
Article-16
Power Curve

The power curve for the individual Wind Turbine provided by the manufacturer and as mentioned in this Generation Licence shall form the basis in determining the cumulative Power Curve of Wind Farm/Complex.



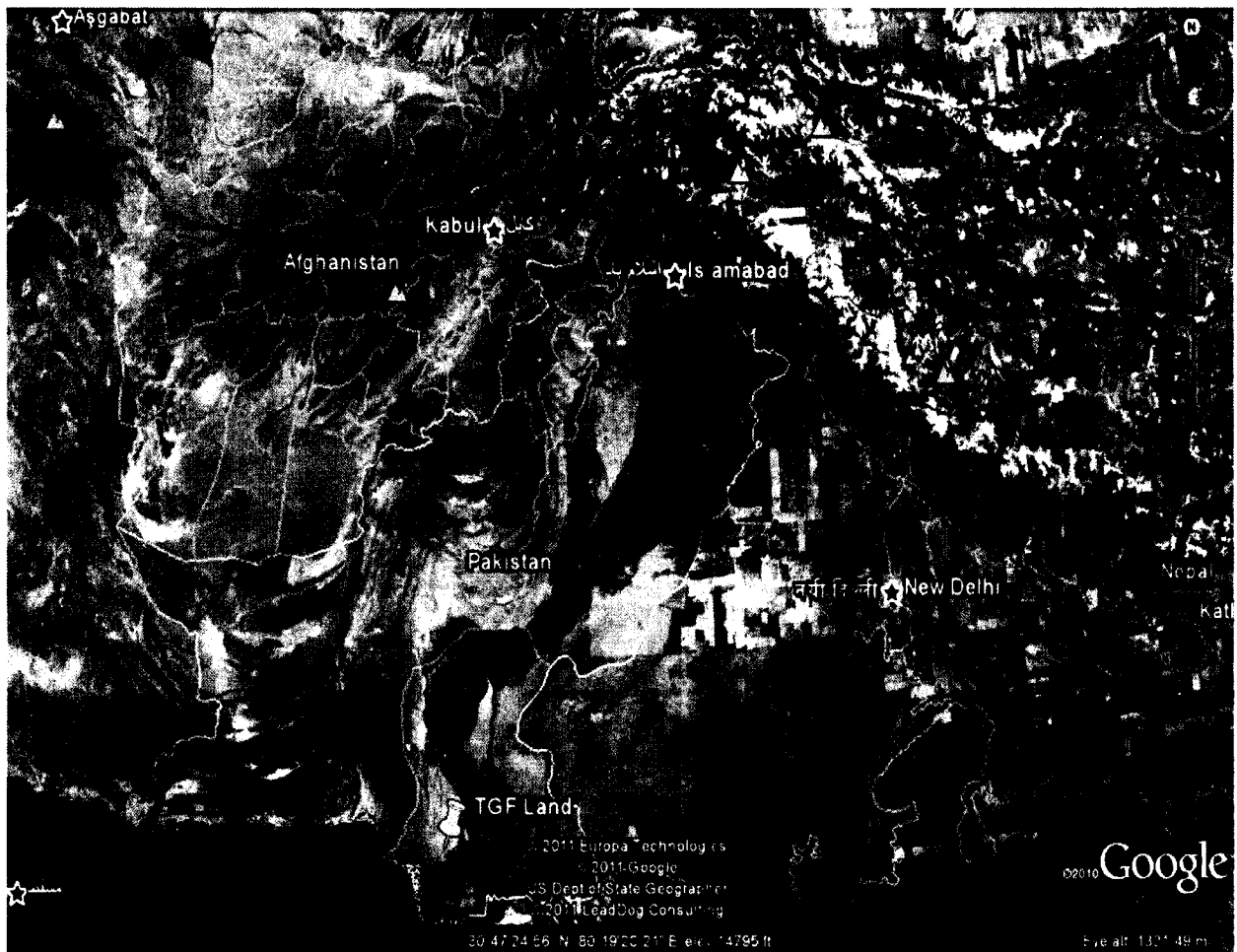
SCHEDULE-I

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 Facilities of the Licensee are described in this Schedule.

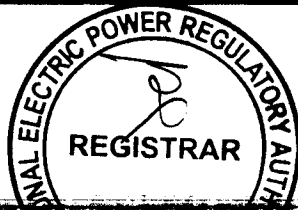


Wind Farm Location

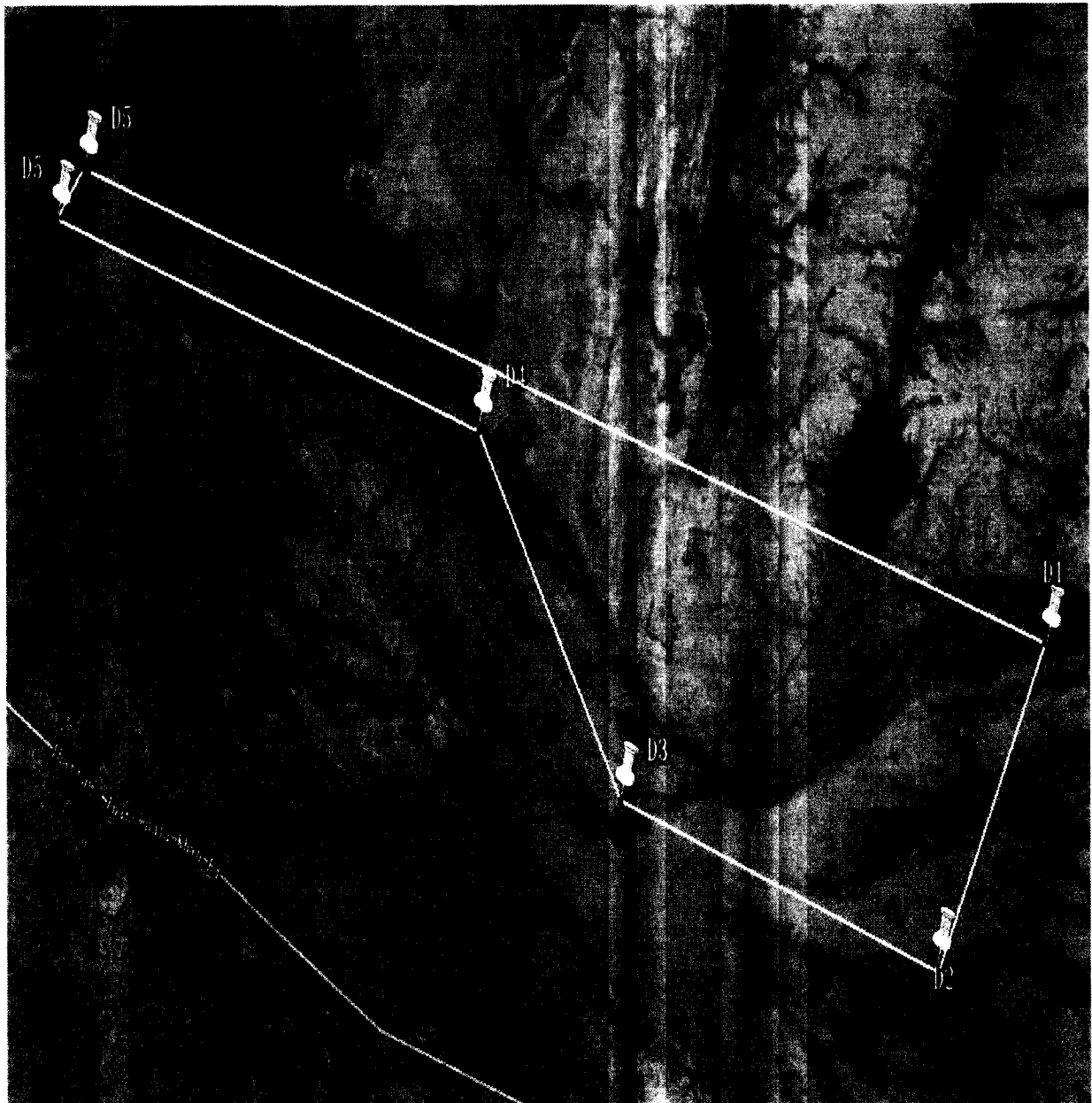
Border Point	Latitude	Longitude
D1	25°04'53.57"	67°57'46.81"
D2	25°04'13.75"	67°57'21.92"
D3	25°04'34.32"	67°56'10.62"
D4	25°05'20.29"	67°55'39.00"
D5	25°05'46.00"	67°54'04.57"
D6	25°05'52.08"	67°54'10.75"



Tug

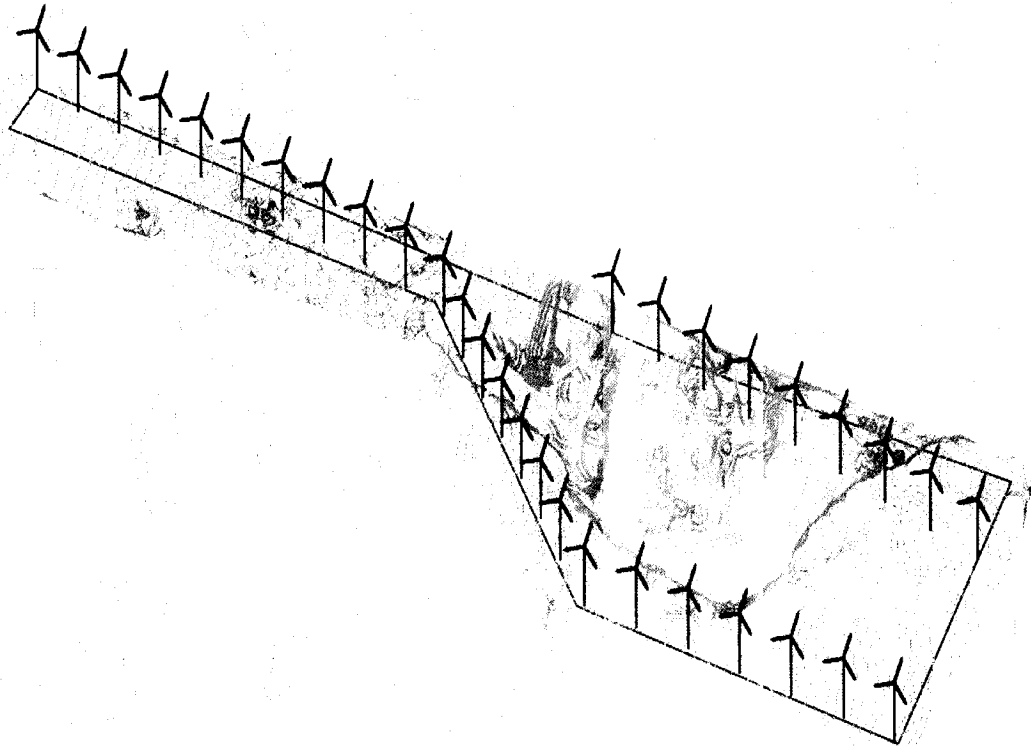


Wind Farm Lay Out



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Wind Farm Micro-Sitting

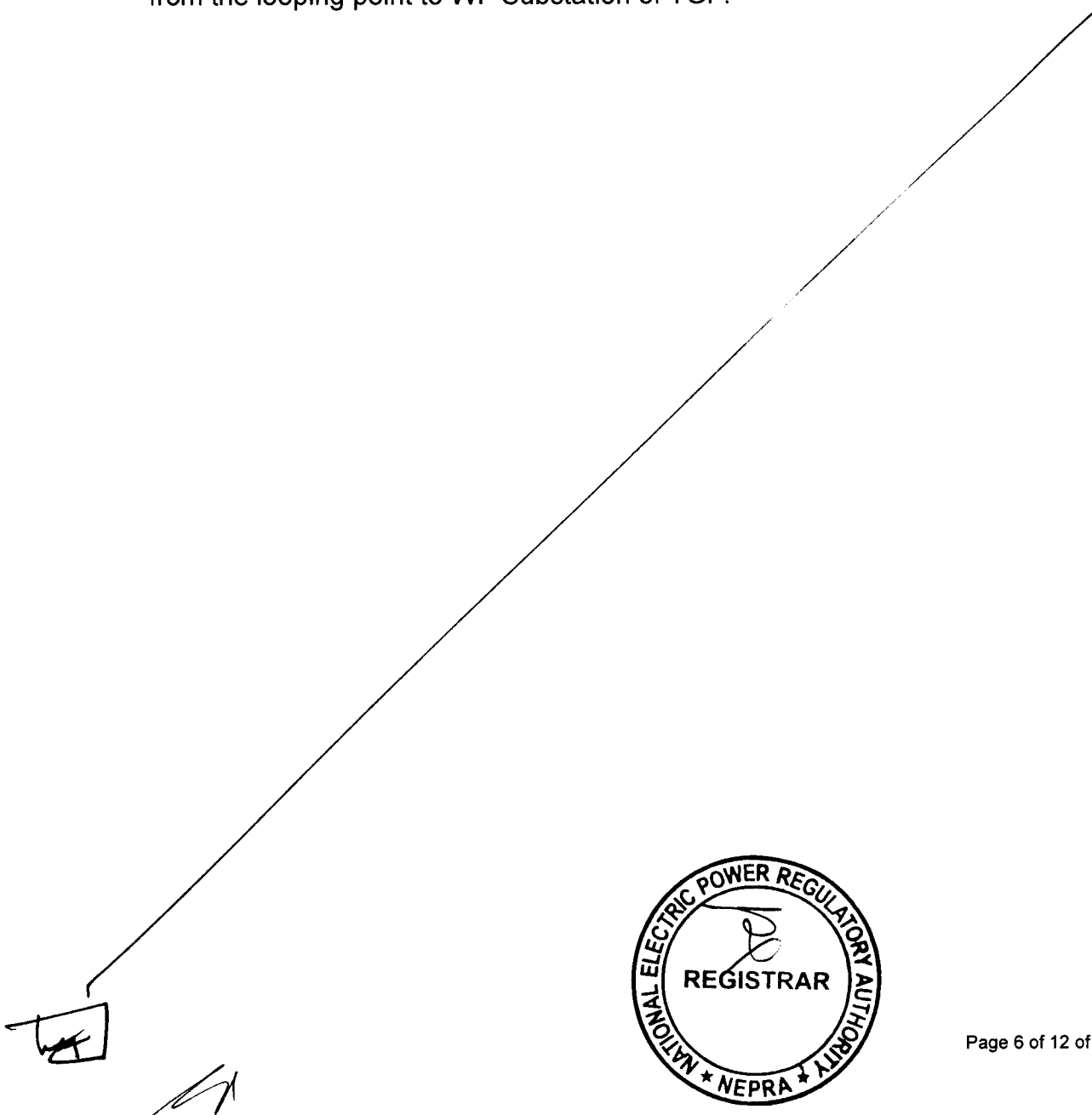


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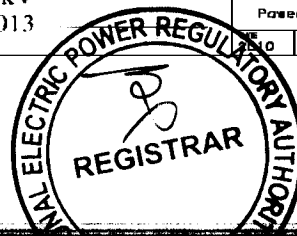
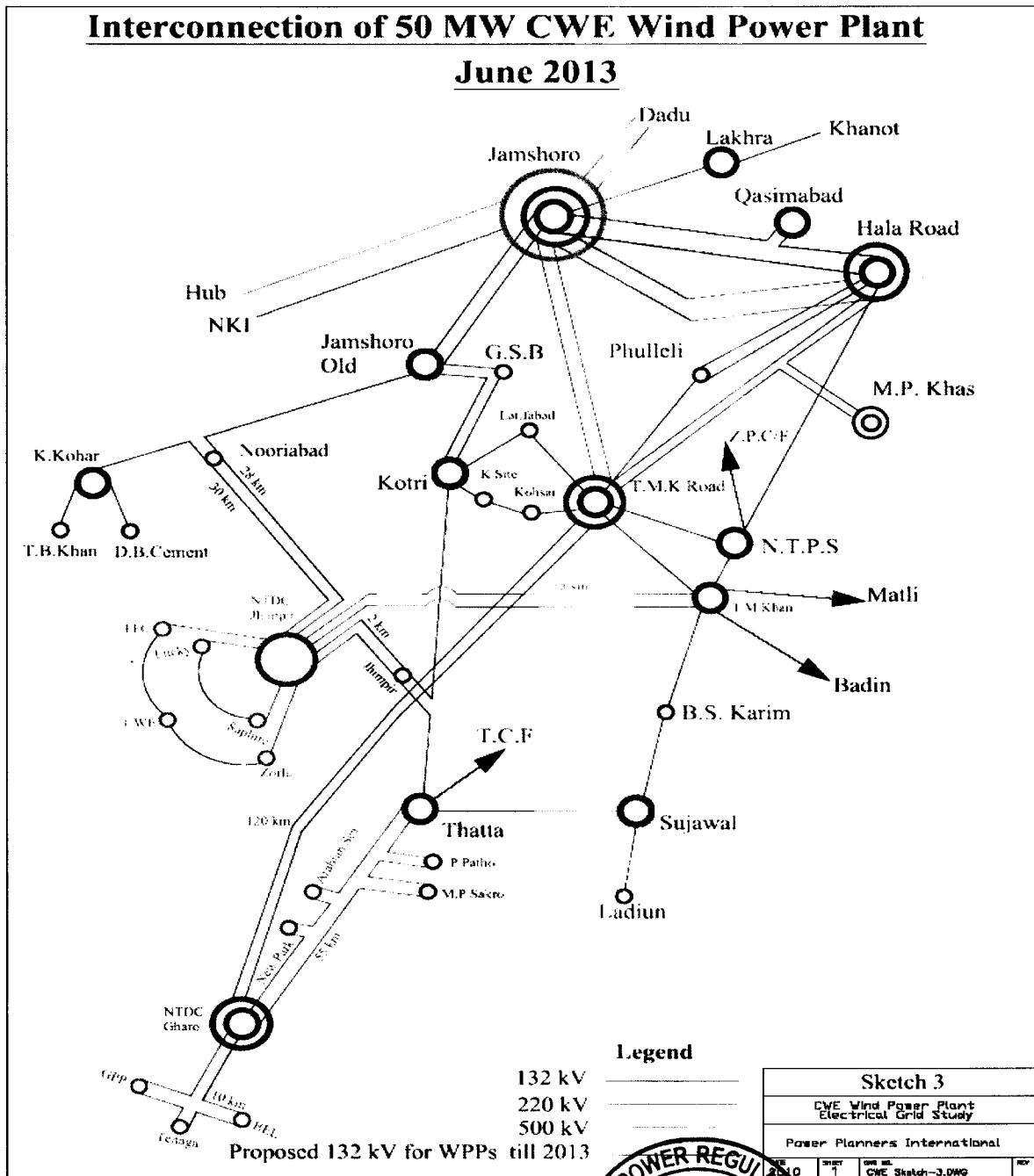


INTERCONNECTION **ARRANGEMENT FOR DISPERSAL OF POWER** **FROM THE WIND FARM**

The power generated by the Licensee from the Wind Farm shall be dispersed to the Load Center/Ring of HESCO, at 132 KV voltage level by Looping in-out of Jhampir-Nooriabad 132kV Single Circuit between ZORLU and FFC WPPs (which will be in place by the time WF of TFG becomes operational) Substation by laying a new double circuit of 132 KV Transmission Line measuring about 4-5 Kilometers from the looping point to WF Substation of TGF.



Schematic Diagram For Interconnection/Transmission Arrangement for Dispersal of Power from TGF Energy Limited



Wind Farm Details*

(A). General Information

(i).	Name of Applicant/Company	Three Gorges First Wind Farm Pakistan (Pvt) Ltd.
(ii).	Registered/Business Office	87, Street 59, F-10/3 Islamabad 44000 – Pakistan
(iii).	Plant Location	Jhampir, Near Nooriabad, District Thatta, Sindh.
(iv).	Type of Generation Facility	Wind Power

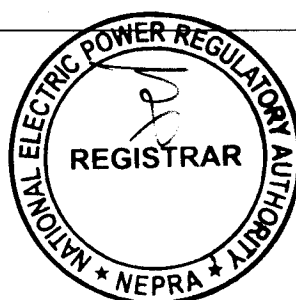
(B). Wind Farm Capacity & Configuration

(i).	Wind Turbine type, Make & Model	Goldwind Permanent Magnet Direct Drive GW77/1500
(ii).	Installed Capacity of Wind Farm (MW)	49.50 MW
(iii).	Number of Wind Turbine Units/Size of each Unit (MW)	33 x 1.50 MW

(C). Wind Turbine Details

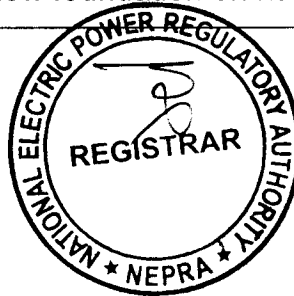
(a).	Wind Turbine	
(i).	Quantity	33 Each
(ii).	Rated Power	1.50 MW
(iii).	Number of Blades	3 Each
(iv).	Diameter of Blades	77 Meter
(v).	Rotor Swept Area	4657 Meter ²
(vi).	Cut-in Wind Speed	3 m/s

* As provided by Three Gorges First Wind Farm Pakistan (Private) Limited



(vii).	Rated Wind Speed	11 m/s
(viii).	Cut-out Wind Speed	22 m/s
(ix).	Survival Wind Speed	59.5 m/s (3s average)
(x).	Hub Height	85 Meter
(xi).	Rotational Speed	17 r.p.m.
(b).	Generator	
(i).	Generator Capacity	1500 kW
(ii).	Power Factor of Generators	-0.95~+0.95
(iii).	Rated Voltage	690 V
(c).	Compact Pre Fabricated Substation	
(i).	Quantity	33 Each
(ii).	Voltage Level	33±2×2.5%/0.69kV
(d).	132kV Substation	
(i).	Main Transformer	2 Each
(ii).	Type	132/33kV, 40/45 MVA ONAN/ONAF OLTC
(e).	WTGs Foundation	
(i).	Quantity	33 Each
(ii).	Type	Reinforced concrete foundation on natural ground
(iii).	Natural Foundation Features	Highly-weathered limestone, moderately-weathered limestone, highly weathered sandy shale bed
(f).	Compact Pre Fabricated Substation Foundation	
(i).	Quantity	33 Each
(2)	Type	Shallow foundation on natural ground

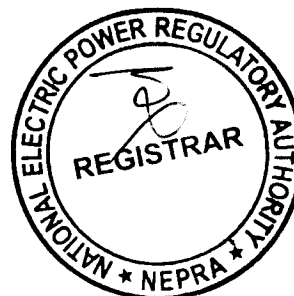


(3)	Natural Foundation Features	Highly-weathered limestone, moderately-weathered limestone, highly weathered sandy shale bed
(g).	Wind Resource	
(i).	Annual Average Wind Speed	7.4 m/s (85m height)
(ii).	Prevailing Winds	WSW
(iii).	Annual Benchmark Energy	138.7GWh

(D). Other Details

(i).	Project Commissioning date (Anticipated)	30 th June, 2013
(ii).	Expected Life of the Project from Commercial Operation date (COD)	20 Years

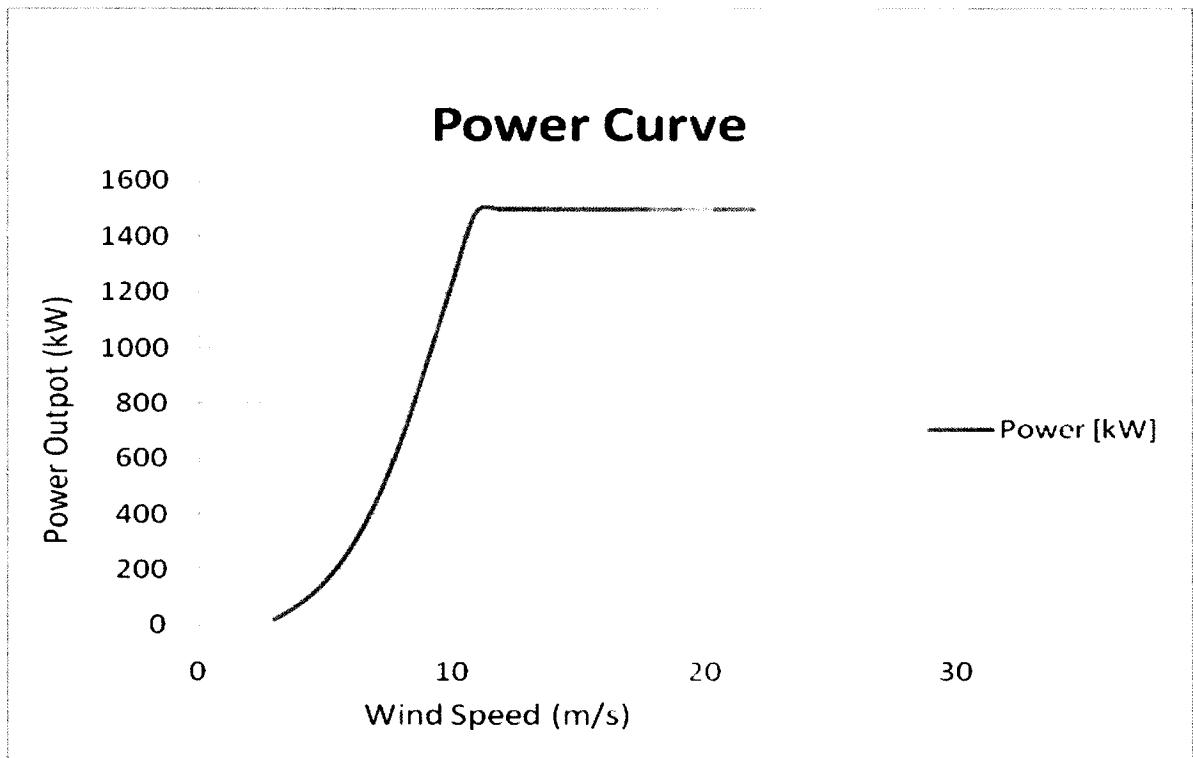


Power Curve
GW77/1500 @ 1.225 Kg/m³

Wind Speed [m/s]	Power [KW]
3	19.6
4	74.5
5	153.9
6	272.1
7	437.3
8	658.1
9	932.2
10	1220
11	1490
12	1500
13	1500
14	1500
15	1500
16	1500
17	1500
18	1500
19	1500
20	1500
21	1500
22	1500

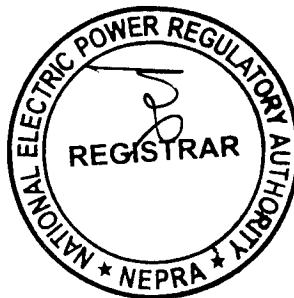


Power Curve (Graphic)
GW77/1500



SCHEDULE-II

The Installed/ISO Capacity (MW), De-Rated Capacity At Mean Site Conditions (MW), Auxiliary Consumption (MW) and the Net Capacity At Mean Site Conditions (MW) of the Generation Facilities of Licensee is given in this Schedule



SCHEDULE-II*

1.	Total Installed Capacity of the plant (Gross ISO)	49.50 MW
2.	De-rated Capacity at Mean Site Conditions (on account of Air density, humidity, temperature, Wake effect, wind direction, rain etc)	48.64 MW
3.	Auxiliary Consumption	0.80 MW
4.	Total Net Capacity of the Plant at Mean Site Conditions	47.84 MW

Note

All the above figures are indicative as provided by the Licensee. The Net Capacity available to NTDC for dispatch and provision to purchasers will be determined through procedures contained in the Agreements or Grid Code.

*As provided by three Gorges First Wind Farm Pakistan (Private) Limited

