



# National Electric Power Regulatory Authority

## Islamic Republic of Pakistan

2nd Floor, OPF Building, G-5/2, Islamabad.  
Tel : 9207200,9205225 Fax : 9210215  
E-mail: office@nepra.org.pk

No. NEPRA/R/LAG-75/5715-16

July 04, 2006

Chief Executive  
Green Power (Pvt.) Limited (GPPL)  
Amejee Chambers  
Campbell Street,  
Karachi 74200

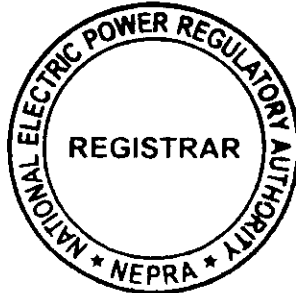
Subject: **Generation Licence No. WPGL/02/2006**  
**Licence Application No. LAG-75**  
**Green Power (Pvt.) Limited (GPPL)**


Please refer to your letter no. nil dated October 19, 2005 to NEPRA for a Generation Licence.

2. Enclosed here is Generation Licence No. WPGL/02/2006 granted by the Authority to Green Power (Pvt.) Limited (GPPL). The Licence is granted to you pursuant to Section 15 of the Regulation of Generation, Transmission and Distribution of Electric Power Act (XL of 1997).

3. Please quote above mentioned Generation Licence No. for your future correspondence with the Authority.

DA/as above



  
04.07.06  
(Mahjoob Ahmad Mirza)

Copy for information to 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/02/2006

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 (XL of 1997), the Authority hereby grants a Generation Licence to:

**Green Power (Private) Limited**  
(Installed Capacity: 49.5 MW ISO Gross)

**For its Plant at Khuti Khun, West of Mirpur Sakro, Distt. Thattha**

Incorporated under the Companies Ordinance, 1984  
Under Certificate of Incorporation

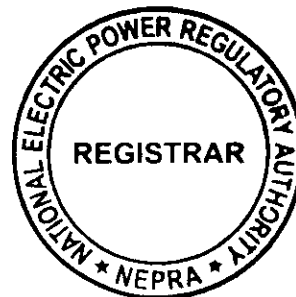
No. 00000010384/20041007 Dated October 8, 2004

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

Given under my hand this 27<sup>th</sup> day of JUNE, Two  
Thousand & Six, and expires on 30<sup>th</sup> day of OCTOBER, Two  
Thousand & TWENTY SEVEN

*[Handwritten signature]*

Registrar



*[Handwritten signature]*

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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 (XL of 1997);
- (b) "Authority" means the National Electric Power Regulatory Authority constituted under section 3 of the Act;
- (c) "Licensee" means Green Power (Pvt.) Limited
- (d) "Rules" mean the National Electric Power Regulatory Authority Licensing (Generation) Rules, 2000.
- (e) "Wind Power" means electricity produced by using wind turbines collectively in a wind farm.

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**

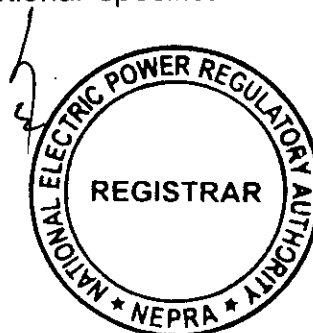
This Licence is issued subject to the provisions of the Rules, as amended from time to time.

## **Article 3 Generation Facilities**

3.1 The location, size (capacity in MW), technology, interconnection arrangements, technical limits, technical functional specifications and other details







specific to the wind power generation facilities of the Licensee are set out in Schedule-I to this Licence.

3.2 The net capacity of the Licensee's generation facilities is set out in Schedule-II hereto.

3.3 The Licensee shall provide the final arrangement, technical and financial specifications and other details specific to the wind generation facilities before commissioning of the generation facilities.

#### **Article 4 Term**

4.1 The Licence is granted for a term of twenty (20) years after the commercial Operation date.

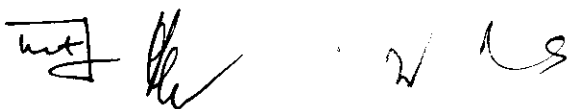
4.2 Unless revoked earlier, the Licensee may, ninety (90) days prior to the expiry of the term of the Licence, apply for renewal of the Licence under the Licensing (Application and Modification Procedures) Regulation, 1999.

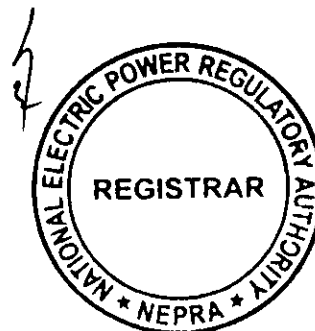
#### **Article 5 Licence fee**

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 consumers or purchasers only such tariff which has been approved by the Authority.





## **Article 7**

### **Competitive Trading Arrangement**

7.1 The Licensee shall participate in such measures 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 standards 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 conform to the relevant 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 conform to 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 or procurer (on behalf of purchaser(s)) at the outgoing bus of 132 KV grid station. Up-gradation (step up) of generation voltage up to 132 KV will be the responsibility of the Licensee.

**Article 12**  
**Wind Power Plant's Performance Data**

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 the wind farm and power purchaser's control room for transmission of wind speed and power output data to the Power Purchaser's or Procurer's control room for record of data.

**Article 13**  
**Provision of Information**


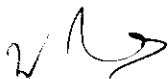
13.1 The obligation of the Licensee to provide information to the Authority shall be in accordance with Section 44 of the Act.

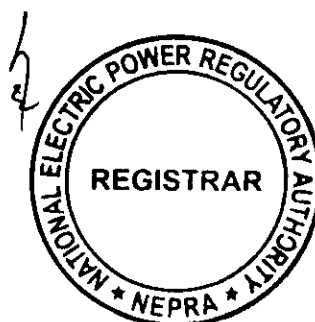
13.2 The Licensee shall in addition to 13.1 above, supply information to NTDC regarding Wind data specific to the Licensee's site and other related information on a regular basis and in a manner required by NTDC.

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 have been in the control or possession of the Licensee.

**Article 14**  
**Emissions Trading /Carbon Credits**

14.1 The Licensee will process and obtain emissions/Carbon Credits expeditiously and credit the proceeds to the Power Purchaser/Procurer on behalf of purchaser(s) on actual basis.



## **SCHEDULE-I**

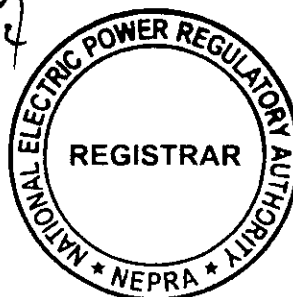
The location, size (capacity in MW) technology, interconnection arrangements, technical limits, technical functional specifications and other details specific to the Generation Facilities of the Licensee.

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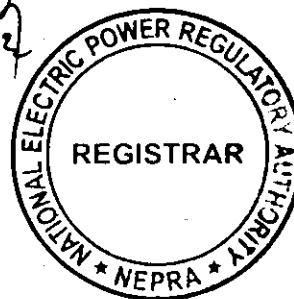
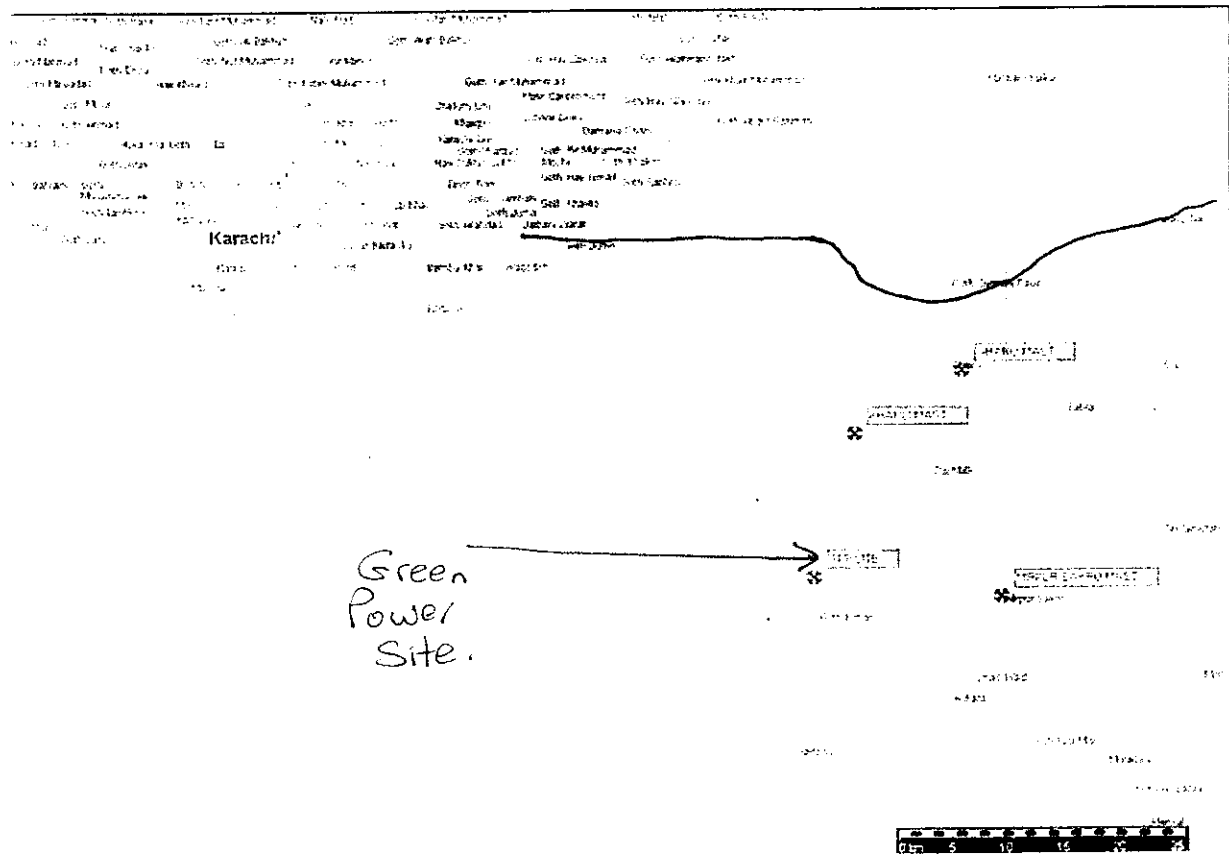
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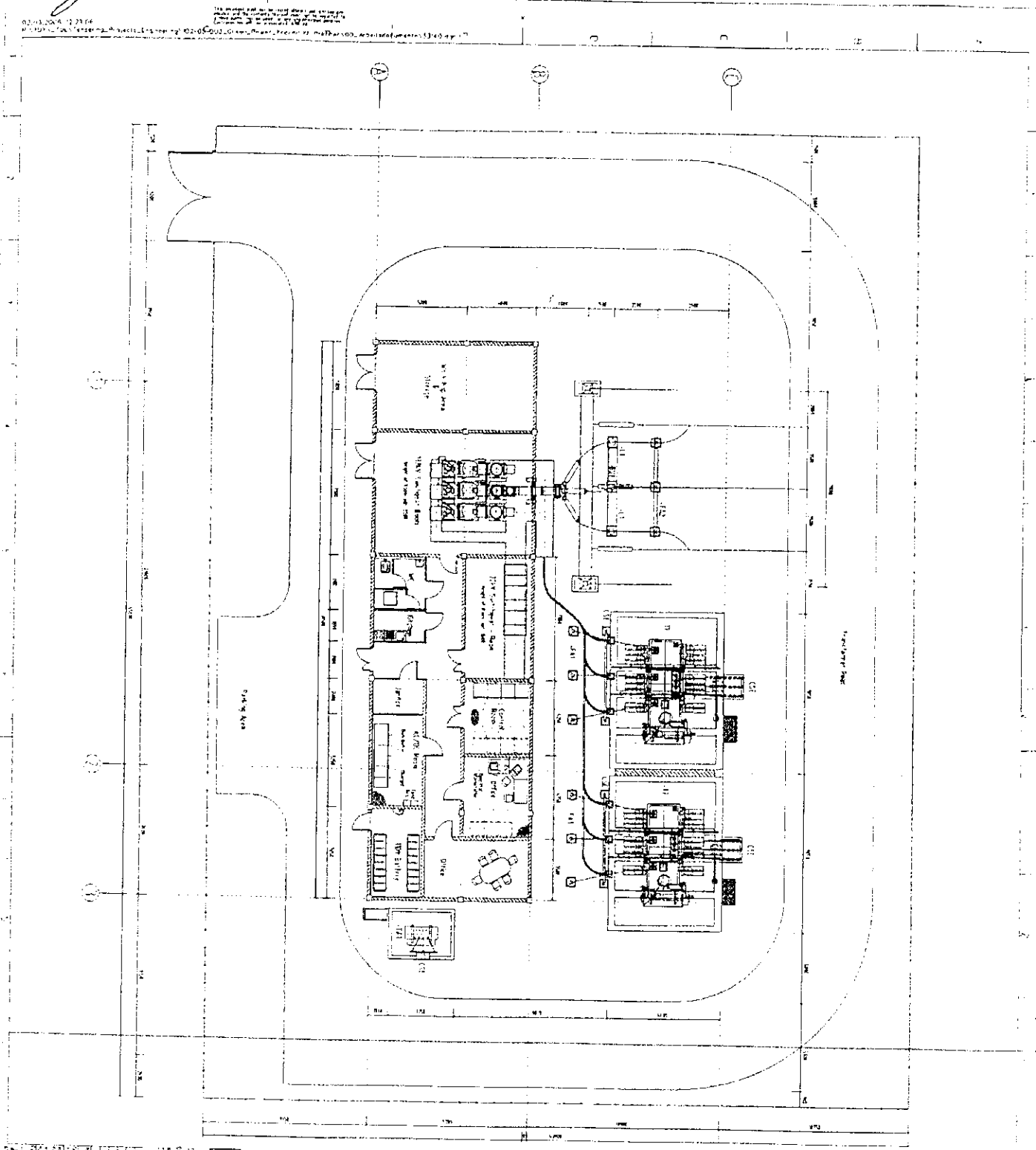
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## Project Site Location



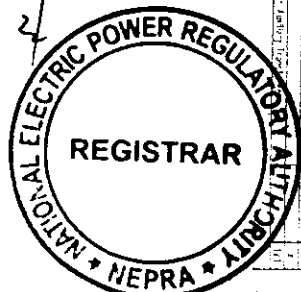




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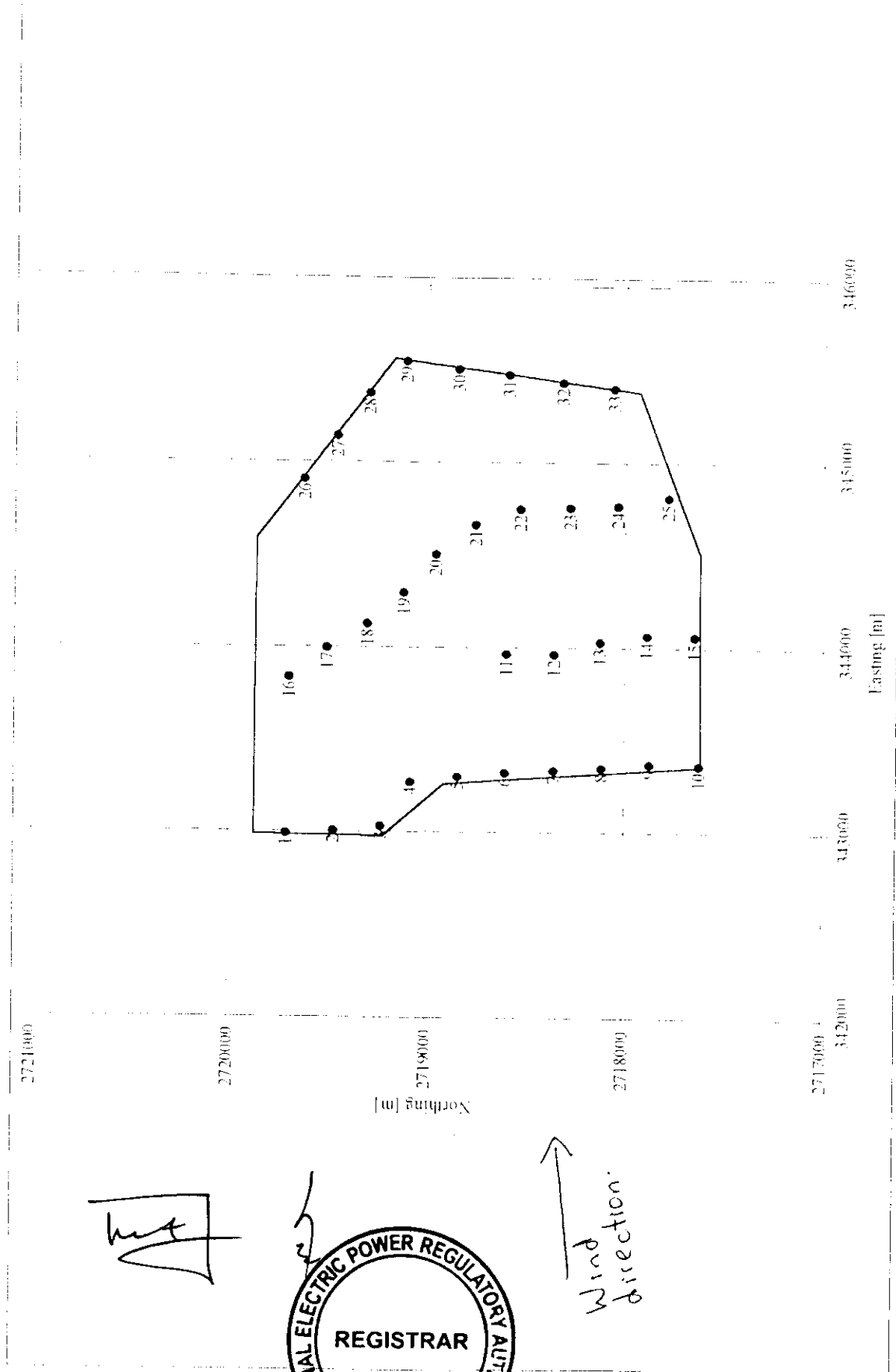
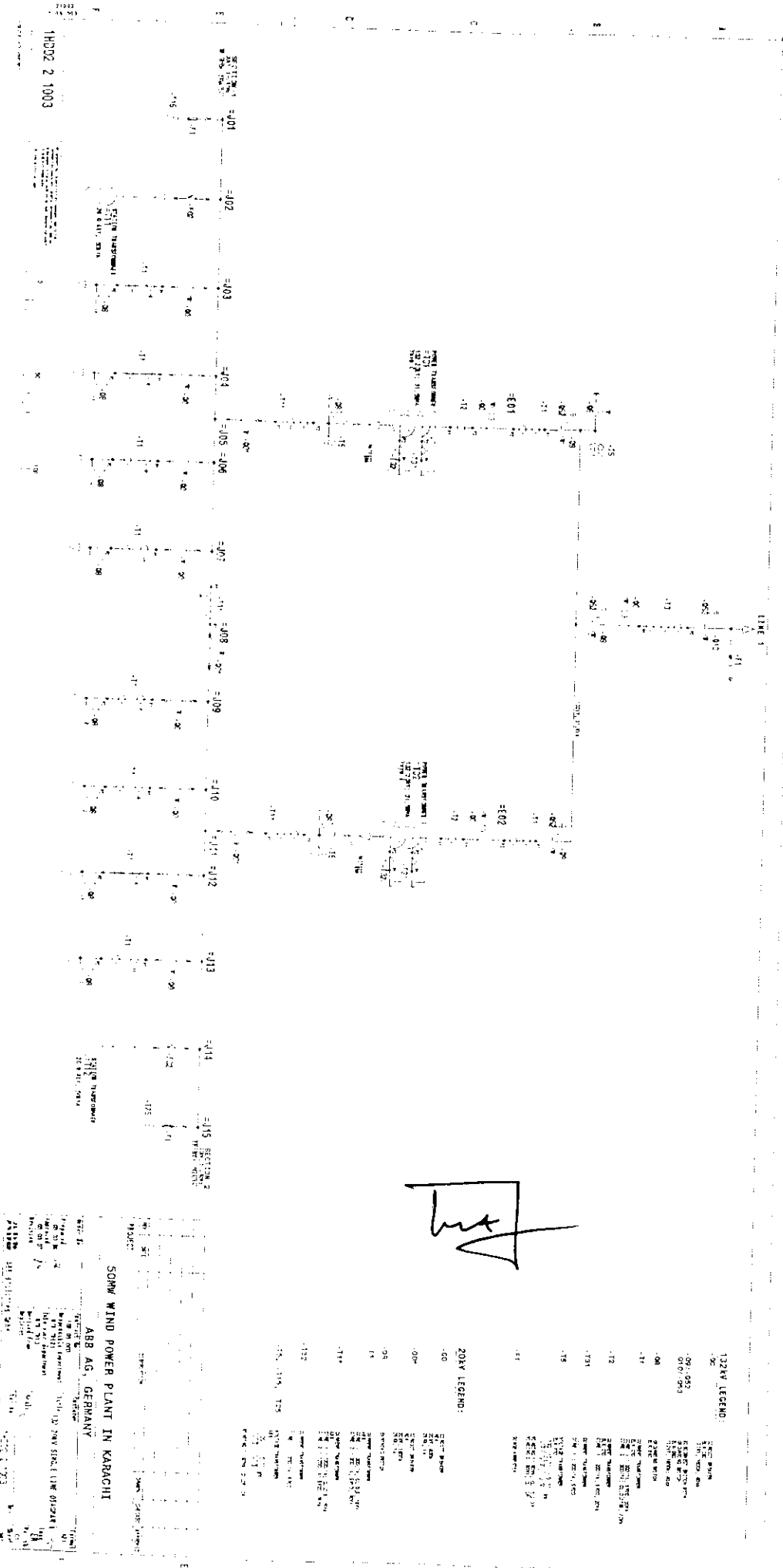
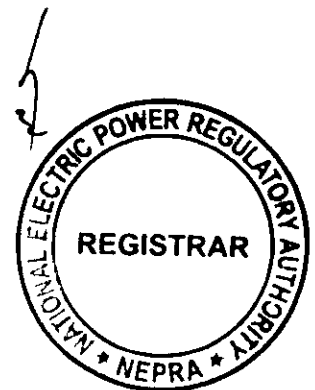


Figure 5.1 Proposed GE Wind 1.5slc turbine layout  
GREEN POWER (PVT) LTD.

SINGLE LINE DIAGRAM  
1 AKIN 18131



## **Plant Details\***

### **1. General Information**

- |      |                             |  |
|------|-----------------------------|--|
| i.   | Name of Applicant/Company   | Green Power (Pvt) Limited                        |
| ii.  | Registered Office           | Ameejee Chambers, Campbell Street, Karachi 74200 |
| iii. | Plant Location              | Khuti Khun, Mirpur Sakro, District Thatta        |
| iv.  | Type of Generation Facility | Wind Power                                       |




### **2. Plant System Description**

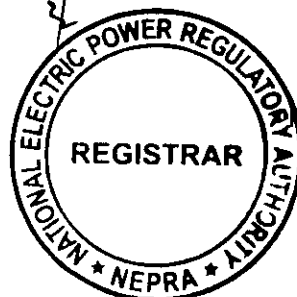
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|------|--------------|---------------|
| i.   | Unit Size    | 1.5 MW (Max)  |
| ii.  | No. of Units | 33 units      |
| iii. | Plant Size   | 49.5 MW (Max) |

### **3. Turbine Data**

- |      |                            |   |
|------|----------------------------|---|
| i.   | Make Model/ Type           | GE 1.5Sle Turbines                        |
|      |                            | Power (MW)    Velocity (m/s)              |
|      |                            | Max    1.5 MW    14m/s                    |
| ii.  | Wind Turbine Capacity (MW) | Min    0.039 MW    4m/s                   |
|      |                            | (Range attached as per manufacturer data) |
| iii. | No. of Blades              | Three                                     |
| iv.  | Hub Height                 | 64.7m                                     |

\* As Provided by the applicant



- v. Rotor Diameter 77m
- vi. Swept Area 4657m<sup>2</sup>
- Rated Turbine Speed
- vii.
  - Rotor Speed (rpm) 10.1 – 20.4 variable
  - cut in (m/s) 3.5m/s
  - cut out (m/s) 25m/s

**4. Generator Data**

- i. Generator Type Doubly Fed three-phase asynchronous generator
- ii. Generator Rating KVA 1500 KW - Power Factor 0.95
- iii. Rated Voltage 690V

**5. 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 new, un-used and of the latest model.

**6. Power Curve**

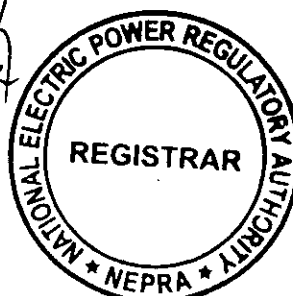
The collective power curve of the Wind Farm shall be verified as part of the Commissioning tests according to the latest IEC standards and shall be used to measure the performance of the wind turbines.

- 7. Project Commissioning date (Anticipated) October 2007

- 8. Expected Life of the Project from Commercial Operation date (COD) 20 Years

\* As Provided by the applicant



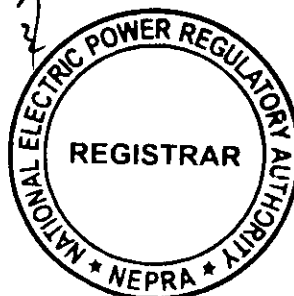


9. Plant Characteristics

- |      |                              |                           |
|------|------------------------------|---------------------------|
| i.   | Generation Voltage           | 132KV at outgoing bus bar |
| ii.  | Frequency                    | 50Hz                      |
| iii. | Power Factor                 | 0.95                      |
| iv.  | Automatic Generation Control | Yes.                      |





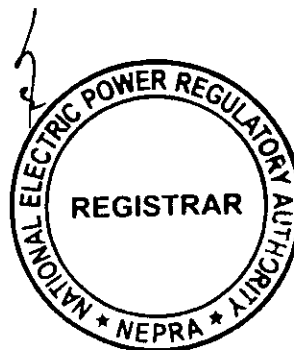


\* As Provided by the applicant

## Power Curve\*

Wind speed [m/s at hub height]	GE 1.5sle – Electrical Power [KW]
3	0
4	39
5	122
6	235
7	392
8	604
9	874
10	1137
11	1330
12	1428
13	1473
14	1494
15	1500
16	1500
17	1500
18	1500
19	1500
20	1500
21	1500
22	1500
23	1500
24	1500
25	1500

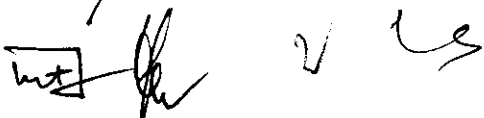


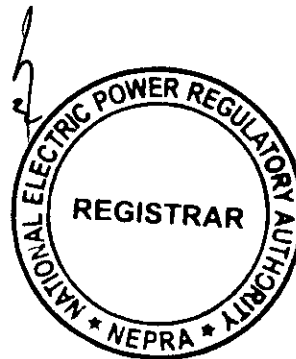


\* As provided by the applicant

## **SCHEDULE-II**

The net capacity of the Licensee's Generation Facilities

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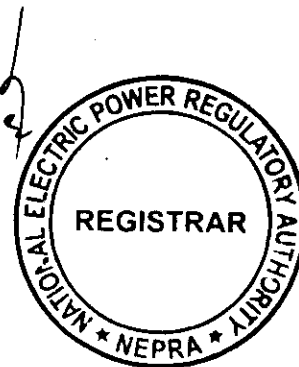
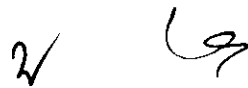


## **SCHEDULE-II** \*

1.	Installed Capacity Gross ISO (MW)	49.5 MW
2.	De-rated Capacity (MW) at Site Conditions (on account of Air density, humidity, tempt, wake, wind direction and rain etc)	46.8 MW
3.	Auxiliary Consumption (MW)	1.17 MW
4.	Net Capacity of the Plant at Site Conditions (MW)	45.63 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.

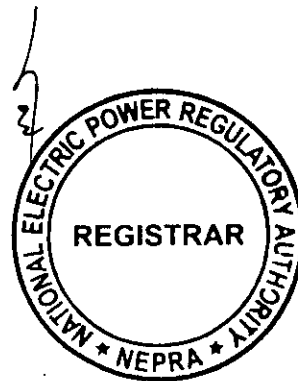


\* As provided by the applicant

## **INTERCONNECTION SCHEME FOR THE POWER DISPERSAL OF 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 constructing a new 132 KV Transmission Line from 132 KV Grid station at the wind farm to 132 KV Mirpur Sakro or Thatta Grid Stations.





June 27, 2006

Application/Case No.LAG-75

**Determination of the Authority in the Matter of**  
**Grant of Generation Licence to**  
**Green Power (Private) Limited**

**Background**

1. Green Power Private Limited (GPPL) is a Private Limited Company incorporated in Pakistan, under the Companies Ordinance, 1984 on October 8, 2004, with the objective to carry out the business of generation and distribution of electricity in Pakistan. As per information provided by GPPL:

- i. GPPL intends to setup a 49.5 MWe Wind Power based generation units collectively known as Wind Farm, in collaboration with M/s Metco Group. The proposed wind farm is located in the province of Sindh, approximately 50 KM South-East of Karachi at Khuti Khun, Mirpur Sakro, District Thatta. Alternative Energy Development Board (AEDB) has allocated 1000 Acres of land to GPPL acquired from Government of Sindh.
- ii. The proposed wind farm will comprise of 33 wind turbines of General Electric, each having a capacity of 1.5 MWe. The electricity generated by the wind farm will be supplied to National Transmission and Dispatch Company (NTDC).
- iii. For the dispersal of Power generated by the wind farm, new 132 KV interconnection transmission line from the project site to Mirpur Sakro and Thatta Grid Stations will be constructed, for which NTDC has submitted a PC-I to Ministry of Water and Power for necessary funding.



iv. It is anticipated that the project will be commissioned in October 2007.

2. In accordance with Section 15 of the NEPRA Generation, Transmission and Distribution Act, 1997 (Act), GPPL applied for grant of Generation Licence on October 19, 2005. The Authority admitted the application on December 5, 2005. Brief prospectus and Notices of Admission were published in daily newspapers of December 7, 2005. National Transmission and Dispatch Company (NTDC) filed a request for acquisition of power (50.0 MW) from GPPL as per Regulation 4(1) of NEPRA Interim Power Procurement (Procedures and Standards) Regulations 2005. The Authority admitted the application of NTDC on November 16, 2005 and granted permission to NTDC to procure power from GPPL to the tune of 50.0 MW.

3. A public hearing in the matter was held on January 16, 2006 which was attended by GPPL and representatives of NTDC, HESCO and AEDB. The major issues discussed during the hearing included the following:-

- I. Reliability of Wind Power and need of Alternative Power sources.
- II. Interconnection of power generation facility at 132 KV relative to need of local demand.
- III. Location of wind power and electrification of remote areas.
- IV. Compliance with Performance and Environment Standards.
- V. Financial viability compared to other options.

The applicant, interested persons and NTDC were heard and the issues were discussed during the hearing. The participants proffered their comments and submitted arguments supporting their stance.

4. Having considered the pleadings of the Applicant, the comments, point of view of NTDC, HESCO, AEDB and other experts and interested persons who assisted the Authority in arriving at an informed decision, the Policy of the Federal



Government to encourage harnessing of alternative energy modes of Generation, the Authority's determination is set out in the following paragraphs.

5. In view of the increasing trend in fossil fuel prices and our dependence on imports for meeting energy needs for sustainable development, it is imperative that alternative energy resources should be explored and its development encouraged. In the case under consideration this project will be among the first few commercial wind based electricity generation project serving an operational utility. Such projects can be considered as Model/Pilot projects for harnessing Wind Energy and if successful, can in the long run enhance energy security of the country by reducing dependence on Fossil Fuels.

6. Wind Power generation is expected to promote a cleaner environment and air quality by displacing Oil and Coal based electricity generation. No evidence has been provided to substantiate any adverse impact expected on the environment due to harm to birds or on account of noise pollution. The Project on the whole is therefore expected to be conducive to improving the environment and air quality.

7. Wind power generation technology differs from other traditional fuel based generation primarily because the generation capacity in the case of wind power is dependent upon the local wind speed and rotor-swept area. Optimization of annual energy out put and economic efficiency requires that the installed power be in conformity with the wind speed available at site. We have been provided data by the applicant and other sponsors of Wind Power, which is primarily based on data of Gharo mast having height of 30 meters and the data has been augmented by recent measurements from Khalili mast with height of 50 meters, the mast installed by Green Power in their wind farm and other specific cases, however data span in these cases is for a very limited recent period. The available data has been extrapolated for application to higher masts/ hub heights in specific proposals. The met data as well as specific case data has been supported/confirmed by AEDB and LOIs have been issued. However, uncertainty in the figures of assessment accrues on account of (a) short period of historical data available, (b) extrapolation of



available data to wind speed for higher masts and (c) application of data for one location to wind speed expectation for a wind farm located in another area.

8. We are therefore constrained to rely on the data provided to us and supported by AEDB for the purpose of allowing the installation of individual units as proposed by the applicant. The micro sitting of plants and optimization of energy output is primarily the responsibility of the sponsor/applicant. However in view of the wind risk allocation mentioned in the Federal Government Guidelines for determination of Tariff for Wind Power Generation issued by the Ministry of Water and Power (Guidelines), it is essential that the installed capacity/sitting should be such that optimum wind utilization is achieved and redundant higher capacity or sub-optimum concentration of units is not installed. The matter is to some extent addressed in the Guidelines in the shape of Benchmark wind speed/energy. The Licensee shall be responsible for correct assessment of bench mark energy and power purchaser or NTDC (on behalf of power purchaser) shall be responsible for verification and approval of the same according to actual site conditions/installation. Based on the wind availability in Keti Bander, Mirpur Sakro/Gharo coastal area of Sindh and contiguous inland area according to the data provided by various sponsors and AEDB, it is prudent to explore and allow installation of Wind Energy based electricity generation in the area.

9. As recommended in the Guidelines, it is appropriate to collectively generate and step up the generated voltage to 132 KV so that it can be procured by Distribution Companies or NTDC on their behalf at the 132 KV level and then Distributed according to requirement for most optimum utilization. NTDC has already requested for Procurement of Power from the applicant GPPL on behalf of Ex-WAPDA Discos which has been allowed by the Authority.

10. The issue of financial viability of the project is a mater of Tariff determination and is dealt with accordingly.



11. In view of the above, the Authority decides to grant a Licence for Generation of Electricity by means of Wind Power to Green Power (Private) Limited, in accordance with the Articles and Schedules as set out in the form attached herewith.

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**Authority**

Abdul Rahim Khan  
Member



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Zafar Ali Khan  
Member



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Lt Gen (R) Saeed-uz-Zafar  
Chairman



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**Determination of the Authority in the Matter of**  
**Grant of Generation Licence to**  
**Green Power (Private) Limited**

**Background**

1. Green Power Private Limited (GPPL) is a Private Limited Company incorporated in Pakistan, under the Companies Ordinance, 1984 on October 8, 2004, with the objective to carry out the business of generation and distribution of electricity in Pakistan. As per information provided by GPPL:

- i. GPPL intends to setup a 49.5 MWe Wind Power based generation units collectively known as Wind Farm, in collaboration with M/s Metco Group. The proposed wind farm is located in the province of Sindh, approximately 50 KM South-East of Karachi at Khuti Khun, Mirpur Sakro, District Thatta. Alternative Energy Development Board (AEDB) has allocated 1000 Acres of land to GPPL acquired from Government of Sindh.
- ii. The proposed wind farm will comprise of 33 wind turbines of General Electric, each having a capacity of 1.5 MWe. The electricity generated by the wind farm will be supplied to National Transmission and Dispatch Company (NTDC).
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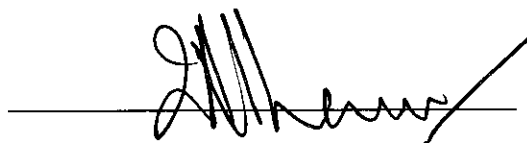
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**Authority**

Abdul Rahim Khan  
Member

A handwritten signature in black ink, appearing to read 'Abdul Rahim Khan', written over a horizontal line.

Zafar Ali Khan  
Member

A handwritten signature in black ink, appearing to read 'Zafar Ali Khan', written over a horizontal line.

Lt Gen (R) Saeed-uz-Zafar  
Chairman

A handwritten signature in black ink, appearing to read 'Saeed-uz-Zafar', written over a horizontal line.