National Electric Power Regulatory Authority
Islamic Republic of Pakistan

Registrar

NEPRA Tower, Ataturk Avenue(East), G-5/1, Islamabad
Ph: +92-51-9206500, Fax: +92-51-2600026
Web: www.nepra.org.pk, E-mail: registrar@nepra.org.pk

No. NEPRA/R/DL/LAG-82/ 480-85 January 15, 2015

Mr. Inam ur Rahman
Chief Executive Officer
Tenaga Generasi Limited
Dawood Centre, M.T. Khan Road,
Karachi-75530

Subject: **Modification-II in Generation Licence No. WPGL/04/2006 — Tenaga Generasi Limited (TGL)**

Reference: Your letter No. nil, dated August 28, 2014

It is intimated that the Authority has approved "Licensee Proposed Modification" in Generation Licence No. WPGL/04/2006 (issued on December 18, 2006) in respect of TGL pursuant to Regulation 10(11) of the NEPRA Licensing (Application & Modification Procedure) Regulations, 1999.

2. Enclosed please find herewith determination of Authority in the matter of Licensee Proposed Modification in the Generation Licence of TGL along with Modification-II in the Generation Licence No. WPGL/04/2006, as approved by the Authority.

Encl:/As above

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

(Syed Safeer Hussain) 15.01.15

Copy to:

1. Chief Executive Officer, Alternative Energy Development Board (AEDB), 2nd Floor, OPF Building, G-5/2, Islamabad.
2. Chief Executive Officer, NTDC, 414-WAPDA House, Lahore
3. Chief Operating Officer, CPPA, 107-WAPDA House, Lahore
4. Chief Executive Officer, Hyderabad Electric Supply Company (HESCO), WAPDA Water Wing Complex, Hussainabad, Hyderabad
5. 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 Authority in the Matter of Licensee Proposed Modification of Tenaga Generasi Limited

January 13, 2015
Case No. LAG-82

(A). Background

(i). The Authority granted a Generation Licence (No. WPGL/04/2006 dated December 18, 2006) to Tenaga Generasi Limited (TGL), in terms of Section-15 of Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (the NEPRA Act).

(ii). According to the above Generation Licence, the Generation Facility/Wind Power Plant/Wind Farm is to be located at Deh Khuttikun, Taluka Mirpur Sakro, District Thatta, in the Province of Sindh, based on thirty three (33) Wind Turbine Generator-WTG, each of 1.50 MW of General Electric-GE.

(B). Communication of Modification

(i). TGL in accordance with Regulation-10(2) of the National Electric Power Regulatory Authority Licensing (Application & Modification Procedure) Regulations, 1999 (the Regulations), communicated a Licensee Proposed Modification (LPM) in its existing Generation Licence on September 03, 2014.

(ii). In the "Text of the Proposed Modification", TGL submitted that its existing Generation Licence (which was modified through Modification-I, dated February 23, 2012) is based on WTG of 1.5 MW of GE. Whereas, TGL now intends to install latest 1.6 MW WTG of GE.

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(iii). Regarding the "Statement of Reasons in Support of the Modification", TGL submitted that the proposed WTG are the latest ones having better control system than the earlier ones which would produce more energy for National Grid. About the "Statement of the Impact on the Tariff, Quality of Service (QoS) and the Performance by the Licensee of its Obligations under the Licence", TGL submitted that the proposed change of WTG will not have any adverse impact on tariff, QoS 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 Regulations by TGL, the Registrar accepted the LPM for further processing as stipulated in the Regulations.

(ii). The Registrar published the communicated LPM on October 19, 2014 in one (01) English and one (01) Urdu News Paper, informing the general public, interested/affected parties and other stakeholders about the communicated LPM and for submitting their views in favor or against the same. Apart from the said, letters were also sent to Individual Experts, Government Ministries, different Departments and Various Representative Organization etc., conveying about the communicated LPM and publication of its notice in the press. Further, the said entities were invited to assist the Authority by submitting their views and comments in the matter.

(D). Comments of Stakeholders

(i). In reply to the above, the Authority received comments of one (01) stakeholder. This included Alternative Energy Development Board (AEDB). The salient points of the comments offered by AEDB are summarized in the following paragraphs: -

(a). AEDB submitted that TGL intended installing G.E. 1.60 MW (xle-82.50) WTGs' instead of G.E. 1.5 (xle-82.50). The proposed WTGs' are internationally certified as per IEC Standards.

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(ii). The Authority considered the above comments of the stakeholders on the communicated LPM of TGL and found the same supportive. In view of the said, the Authority decided to proceed further in the matter as stipulated in the Regulations and the NEPRA Licensing (Generation) Rules, 2000 (the Rules).

(E). Approval of LPM

(i). 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 the Act;

(c). is or is likely to be beneficial to the consumers;

(d). is reasonably necessary for the licensee to effectively and efficiently perform its obligations under the licence; and

(e). is reasonably necessary to ensure the continuous, safe and reliable supply of electric power to the consumers keeping in view the financial and technical viability of the licensee.

(ii). The Authority has observed that the existing Generation Licence (No. WPGL/04/2006 dated December 18, 2006 as amended through Modification-I, dated February 23, 2012) is based on G.E. 1.5 MW (xle-82.5 Meter). Whereas, TGL now intends installing WTG of 1.6 MW (xle-82.5 Meter) of G.E.

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(iii). In this regard, the Authority has examined the technical data provided by TGL and has observed that the 1.6 MW WTG is an upgraded version of GE1.5xle machines for improved performance and output. The Authority has noted that the output power of the proposed new WTG is more than the earlier one. Due to this, the number of WTG will be reduced for obtaining the same energy thus reducing the cost of civil and other allied work. Further, the Authority has found that the proposed GE1.6xle WTG contains an upgraded version of machine control software (Wind SCADA) that makes it more efficient and productive having Enhanced Controls Technology (ECT) with Advanced Load Control (ALC) utilizing physics-based models & Estimator-model design. The benefits of ALC Includes (a). Rotor imbalance compensation, tower damping, and drive train damping (b). Addressing higher-order rotor harmonics, gain scheduling, power/loads optimization, resulting up to 20% fatigue loads reduction.

(iv). In view of the above, the Authority is satisfied that the communicated LPM is reasonably necessary for TGL/the licensee to effectively and efficiently perform its obligations under its Generation Licence. The communicated LPM will not adversely affect the performance of TGL of its obligations under the existing Generation Licence. Further, the communicated LPM will be beneficial to the consumers. In fact, the communicated LPM will ensure the continuous, safe and reliable supply of electric power to the Power Purchaser and consumers keeping in view the financial and technical viability of the licensee. The Authority has also examined the Impact of Tariff that the communicated LPM may have. In this regard, the Authority has observed that TGL/Licensee was granted an Up-Front Tariff in terms of its determinations dated April 23, 2014 and May 02, 2014 which is equipment/technology neutral. Therefore, the Authority is satisfied that the communicated LPM of TGL/Licensee will not have any adverse impact on its existing Tariff. The Authority is convinced that TGL/Licensee has complied with all the requirements of the Regulations pertaining to the modification. Accordingly, the Authority in terms of Regulation 10(11)(a) of the Regulations approves the communicated LPM without any changes.

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(v). Accordingly, the already granted Generation Licence (No. WPGL/04/2006, dated December 18, 2006 and Modification-I dated February 23, 2012) in the name of TGL is hereby modified. The changes in "Face Sheet", "Articles of the Generation Licence", "Schedule-I" and "Schedule-II" of the Generation Licence are attached as annexure to this determination. The grant of the LPM will be subject to the provisions contained in the NEPRA Act, relevant rules framed there under, terms and conditions of the Generation Licence and other applicable documents.

Authority

Himayat Ullah Khan
Member

13.1.15

Maj. (R) Haroon Rashid
Member

14/1/15

Khawaja Muhammad Naeem
Member

14.01.15

Habibullah Khilji
Member/Vice Chairman

13/1/2015

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15.01.15

National Electric Power Regulatory Authority (NEPRA)
Islamabad – Pakistan

GENERATION LICENCE
No. WPGL/04/2006

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 **Tenaga Generasi LIMITED** (issued on December 18, 2006 and subsequent Modification-I dated February 23, 2012), to the extent of changes mentioned as here under:-

(i). the Installed Capacity of TGL modified through Modification-I will remain unchanged as 49.50 MW;

(ii). The validity date of the Generation Licence may be read as September 29, 2036 instead of September 29, 2028;

(iii). Changes in Articles of the Generation Licence attached as Revised/Modified Articles of 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-II** is given under my hand this 15th of **January Two Thousand** & **Fifteen.**

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). "Authority" means "the National Electric Power Regulatory Authority constituted under section 3 of the Act";

(c). "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;

(d). "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;

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

(f). "CPPA" means the Central Power Purchasing Agency of NTDC or any other entity created for the like purpose;

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(g). "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

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

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

(j). "IEC" means "the International Electrotechnical Commission and its successors or permitted assigns;

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

(l). "Licensee" means Tenaga Generasi Limited and its successors or permitted assigns;

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

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

(o). "Power Purchaser" means NTDC (through CPPA) on behalf of XW-DISCOs which purchases electricity from the Licensee, pursuant to an Energy Purchase Agreement for procurement of electricity;

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

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

(r). "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;

(s). "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 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.

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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 This Licence is valid from the date of its issue (i.e. December 18, 2006) and will remain valid for a term of twenty (20) years after the COD of the generation facility/Wind Farm.

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 National Electric Power Regulatory Authority Licensing (Application & Modification Procedure) Regulations, 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, 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 in terms of Rule-6 of the Rules.

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

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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.

Article-11
Power off take Point and Voltage

The Licensee shall deliver electric power to the Power Purchaser at the outgoing Bus Bar 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.

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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
Carbon Credits

The Licensee shall process and obtain 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 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.

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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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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.

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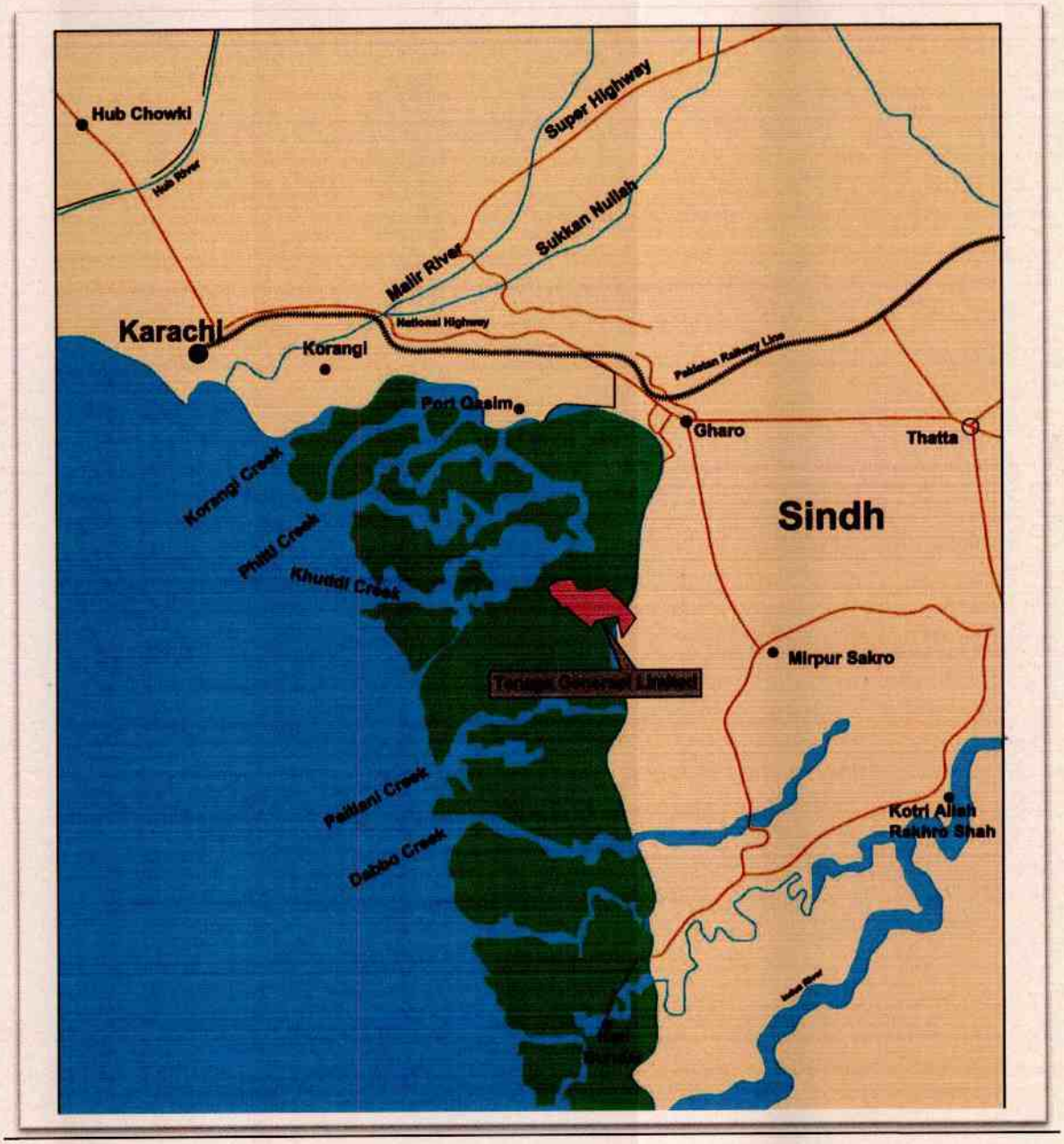
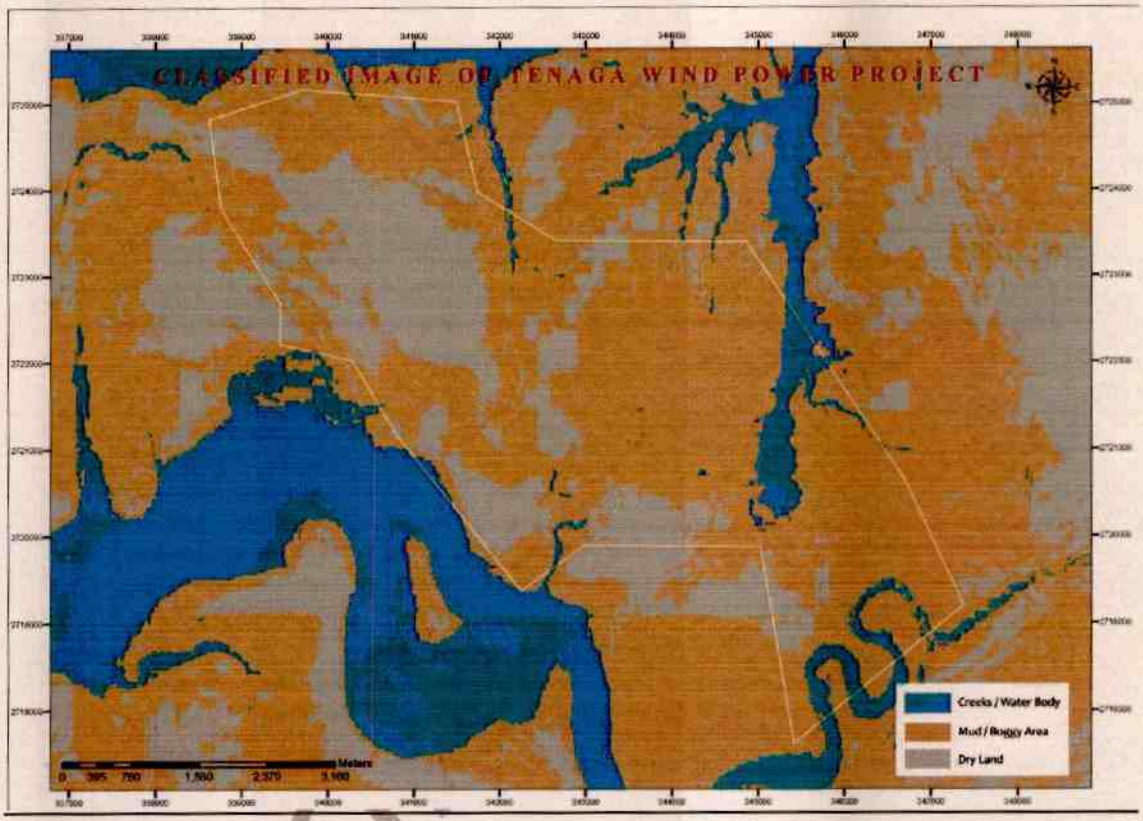
Site Location of the Generation Facility/Wind Farm /Wind Power Plant of Tenaga Generasi Limited (TGL)

Site Access of the Generation Facility/Wind Farm /Wind Power Plant of Tenaga Generasi Limited (TGL)



Land Coordinates of the Generation Facility/Wind Farm /Wind Power Plant of Tenaga Generasi Limited (TGL)



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Land Coordinates of the Generation Facility/Wind Farm /Wind Power Plant of Tenaga Generasi Limited (TGL)

S. No.	Longitude	Latitude
1	24° 36' 20.24" N	67° 24' 50.70" E
2	24° 36' 36.09" N	67° 24' 50.34" E
3	24° 37' 11.04" N	67° 24' 25.71" E
4	24° 37' 45.12" N	67° 24' 20.45" E
5	24° 37' 56.71" N	67° 24' 58.63" E
6	24° 37' 52.70" N	67° 26' 02.28" E
7	24° 37' 18.45" N	67° 26' 11.59" E
8	24° 35' 17.71" N	67° 26' 38.23" E
9	24° 35' 58.09" N	67° 26' 18.93" E
10	24° 37' 00.66" N	67° 26' 44.22" E
11	24° 37' 00.66" N	67° 28' 02.64" E
12	24° 35' 06.35" N	67° 28' 09.95" E
13	24° 35' 06.35" N	67° 26' 57.40" E
14	24° 35' 47.52" N	67° 26' 55.80" E
15	24° 35' 47.52" N	67° 26' 42.78" E
16	24° 36' 14.62" N	67° 25' 20.52" E
17	24° 35' 46.47" N	67° 25' 39.58" E
18	24° 34' 49.05" N	67° 26' 31.59" E
19	24° 34' 45.40" N	67° 29' 33.90" E
20	24° 35' 32.50" N	67° 29' 08.80" E
21	24° 35' 06.14" N	67° 28' 24.48" E
22	24° 33' 53.11" N	67° 28' 24.69" E

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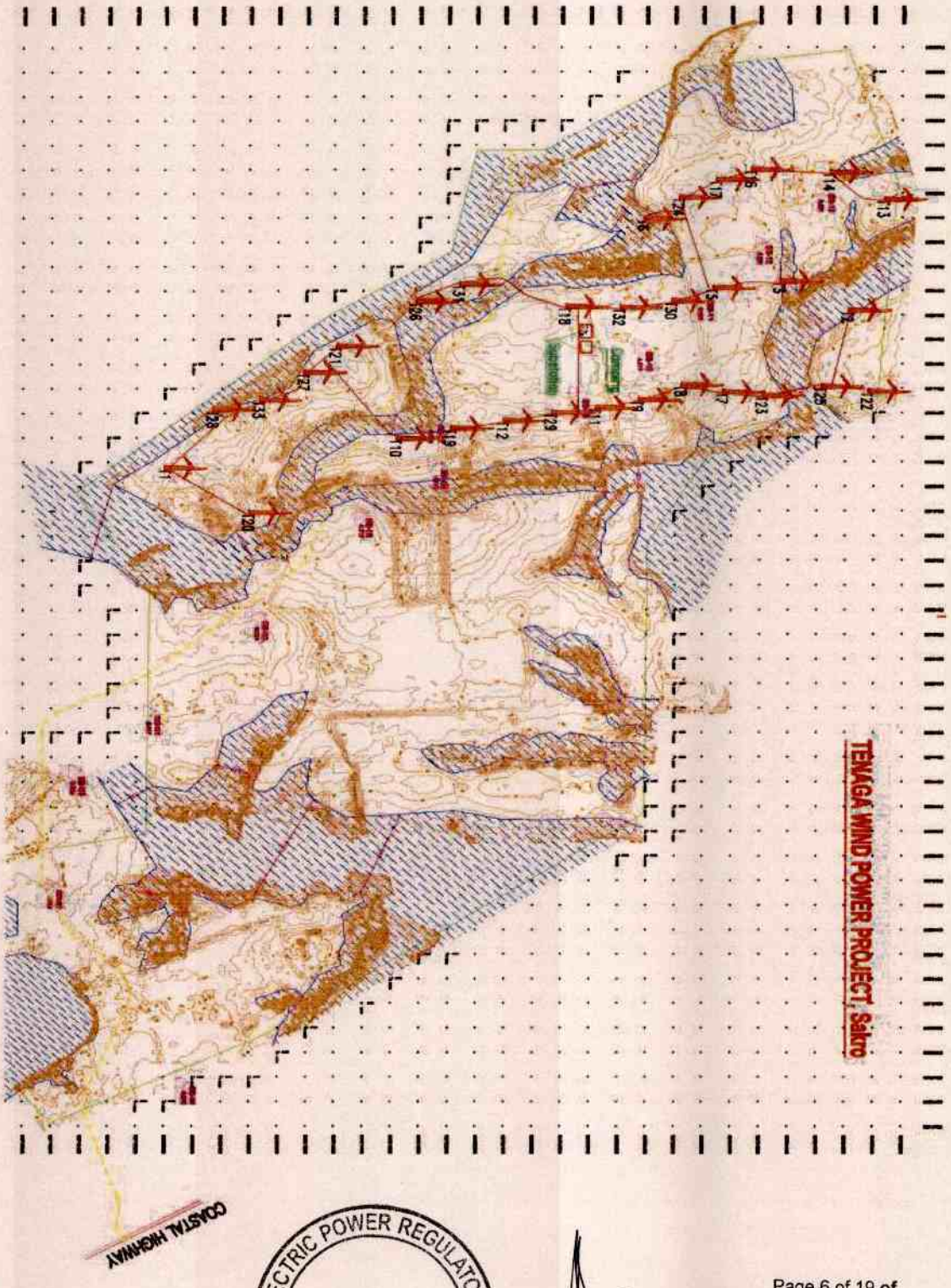
Micro-Sitting/Layout of the Generation Facility/Wind Farm/ Wind Power Plant of Tenaga Generasi Limited (TGL)



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Micro-Sitting/Layout of the Generation Facility/Wind Farm/ Wind Power Plant of Tenaga Generasi Limited (TGL)

WTG No.	Location (Coordinates)	
	E	N
1	342050	2720000
2	340764	2724827
3	340527	2724345
4	340580	2723874
5	340012	2723386
6	341374	2723652
7	341497	2723347
8	341810	2721641
9	341561	2723047
10	341665	2722394
11	339855	2725078
12	339628	2724697
13	339608	2724404
14	339601	2724146
15	339691	2723899
16	340730	2722834
17	341726	2722024
18	342415	2720599
19	341056	2721215
20	341429	2724965
21	341463	2724223
22	339837	2723637
23	341388	2724636
24	340691	2721779
25	341270	2720989
26	341753	2720344
27	341600	2722736
28	340686	2723583
29	340549	2722084
30	340739	2723216
31	341496	2720669

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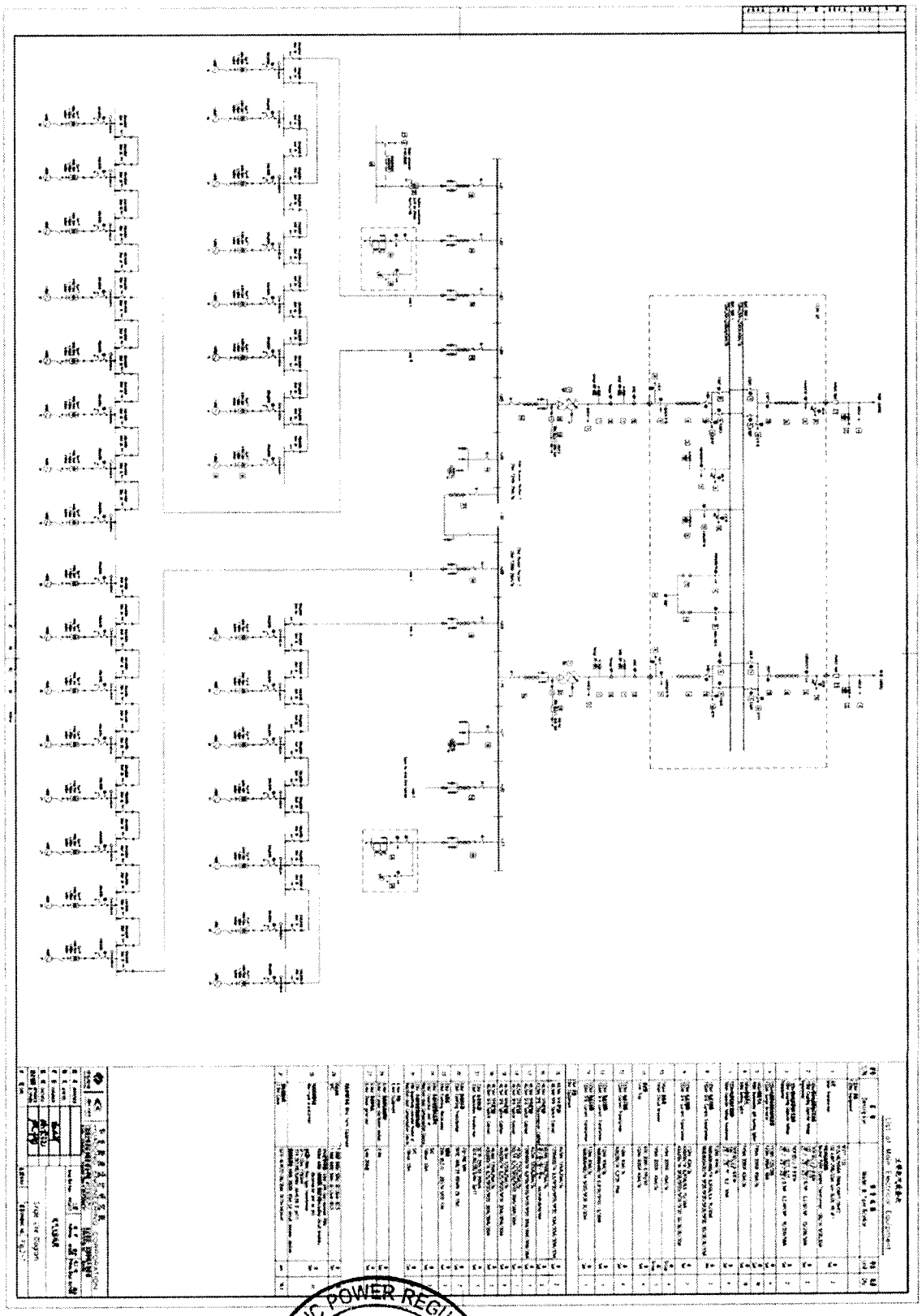
Single Line Diagram (Electrical) of the Generation Facility/Wind Farm/ Wind Power Plant of Tenaga Generasi Limited (TGL)



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Interconnection Arrangement/Transmission Facilities for Dispersal of Power from the Generation Facility/ Wind Farm/Wind Power Plant/of Tenaga Generasi Limited (TGL)

The power generated from the Generation Facility/Wind Power Plant/Wind Farm of TGL shall be dispersed to the load center of HESCO.

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

(a). A 132 KV D/C (Double Circuit) Transmission Line connecting the Generation Facility of Tenaga Generasi Limited with 220/132 KV New Gharo Grid Station.

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

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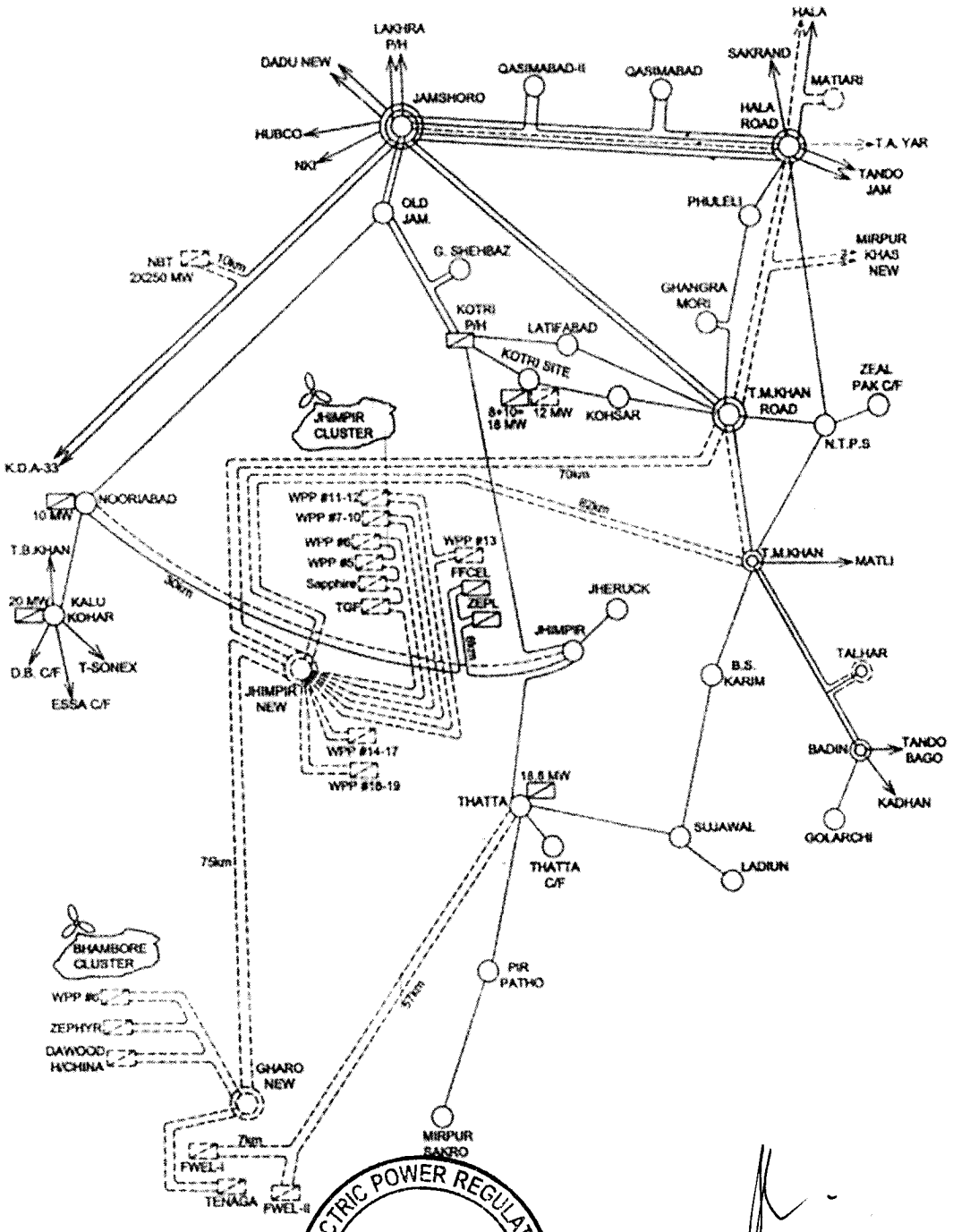
Schematic Diagram for Interconnection Arrangement/Transmission Facilities for Dispersal of Power from Tenaga Generasi Limited (TGL)

Interconnection Schemes For Power Evacuation of
19 No. WPPs at Jhimpir Cluster & 6 No. WPPs at Gharo/Bhambore Cluster
(With 220/132kV Jhimpir-New and 220/132kV Gharo-New Substations) and 2x250MW WPP by NBT



Detail of Generation Facility/Wind Farm/ Wind Power Plant

(A). General Information

(i).	Name of the Company/Licensee	Tenaga Generasi Limited (TGL)
(ii).	Registered/Business Office	3rd Floor, Dawood Centre, M.T. Khan Road, Karachi
(iii).	Plant Location	Deh Khuttikun, Taluka Mirpur Sakro, District Thatta, Sindh
(iv).	Type of Generation Facility	Wind Power

(B). Wind Farm Capacity & Configuration

(i).	Wind Turbine Type, Make & Model	General Electric (GE) 1.6xle -82.5m General Electric (GE) 1.5xle -82.5m
(ii).	Installed Capacity of Wind Farm (MW)	49.5 MW
(iii).	Number of Wind Turbine Units/Size of each Unit (KW)	30 x 1600 kW & 01x1500 kW

(C). Wind Turbine Details (GE 1.6xle -82.5m)

(a).	Rotor	
(i).	Number of blades	3
(ii).	Rotor speed	9.8 – 18.7 rpm
(iii).	Rotor diameter	82.5 m
(iv).	Swept area	5346 m2
(v).	Power regulation	Combination of blade pitch angle adjustment, and generator/ converter torque control.
(vi).	Cut-in wind speed	3 m/s
(vii).	Cut-out wind speed	25 m/s

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(viii)	Survival wind speed	40 m/s, 3s average
(ix)	Pitch regulation	Electric motor drives a ring gear mounted to the inner race of the blade pitch bearing.
(b).	**Blades**	
(i).	Blade length	40.3 m
(ii).	Material	Fiberglass polyester resin
(c).	**Gearbox**	
(i).	Type	Multi-stage planetary/helical gear design
(ii).	Gear ratio	1 : 107.1
(iii).	Main shaft bearing	Roller bearing mounted in a pillow-block housing arrangement.
(d).	**Generator**	
(i).	Power	1,600 kW
(ii).	Voltage	690 V
(iii).	Type	Doubly-fed induction type
(iv).	Enclosure class	IP 54
(v).	Coupling	Flexible coupling
(vi).	Power factor	+0.95 to -0.95
(e).	**Yaw System**	
(i).	Yaw bearing	Roller bearing
(ii).	Brake	Planetary yaw drives (with brakes that engage when the drive is disabled)
(iii).	Yaw drive	4 planetary yaw drives
(iv).	Speed	0.5 degree/s
(f).	**Control System**	
(i).	Type	Automatic or manually controlled
(ii).	Scope of monitoring	Remote monitoring of different parameters, e.g. temperature sensors, pitch parameters, speed, generator torque, wind speed and direction etc.

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(iii).	Recording	Production data, event list, long and short-term trends
(g).	**Brake**	
(i).	Design	Three independent systems, fail safe (individual pitch)
(ii).	Operational brake	Aerodynamic brake achieved by feathering blades.
(iii).	Secondary brake	Mechanical brake on (high speed) shaft of gearbox.
(h).	**Tower**	
(i).	Type	Tubular steel tower
(ii).	Hub heights	

(D). Wind Turbine Details (G.E. 1.5xle-82.5m)

(a).	**Rotor**	
(i).	Number of blades	3
(ii).	Rotor speed	9.8 – 18.7 rpm
(iii).	Rotor diameter	82.5 m
(iv).	Swept area	5346 m2
(v).	Power regulation	Combination of blade pitch angle adjustment, and generator/ converter torque control.
(vi).	Cut-in wind speed	3 m/s
(vii).	Cut-out wind speed	25 m/s
(viii)	Survival wind speed	40 m/s, 3s average
(ix)	Pitch regulation	Electric motor drives a ring gear mounted to the inner race of the blade pitch bearing.
(b).	**Blades**	
(i).	Blade length	40.3 m
(ii).	Material	Fiberglass polyester resin

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(c).	**Gearbox**	
(i).	Type	Multi-stage planetary/helical gear design
(ii).	Gear ratio	1 : 107.1
(iii).	Main shaft bearing	Roller bearing mounted in a pillow-block housing arrangement.
(d).	**Generator**	
(i).	Power	1,500 kW
(ii).	Voltage	690 V
(iii).	Type	Doubly-fed induction type
(iv).	Enclosure class	IP 54
(v).	Coupling	Flexible coupling
(vi).	Power factor	+0.95 to -0.95
(e).	**Yaw System**	
(i).	Yaw bearing	Roller bearing
(ii).	Brake	Planetary yaw drives (with brakes that engage when the drive is disabled)
(iii).	Yaw drive	4 planetary yaw drives
(iv).	Speed	0.5 degree/s
(f).	**Control System**	
(i).	Type	Automatic or manually controlled
(ii).	Scope of monitoring	Remote monitoring of different parameters, e.g. temperature sensors, pitch parameters, speed, generator torque, wind speed and direction etc.
(iii).	Recording	Production data, event list, long and short-term trends
(g).	**Brake**	
(i).	Design	Three independent systems, fail safe (individual pitch)
(ii).	Operational brake	Aerodynamic brake achieved by feathering blades.

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(iii).	Secondary brake	Mechanical brake on (high speed) shaft of gearbox.
(h).	**Tower**	
(i).	Type	Tubular steel tower
(ii).	Hub heights	80 m

(E). Other Details

(i).	Expected COD of the Generation Facility/Wind Farm/Wind Power Plant	September 30, 2016
(ii).	Expected Life of the Generation Facility/Wind Farm/Wind Power Plant from COD	20 Years

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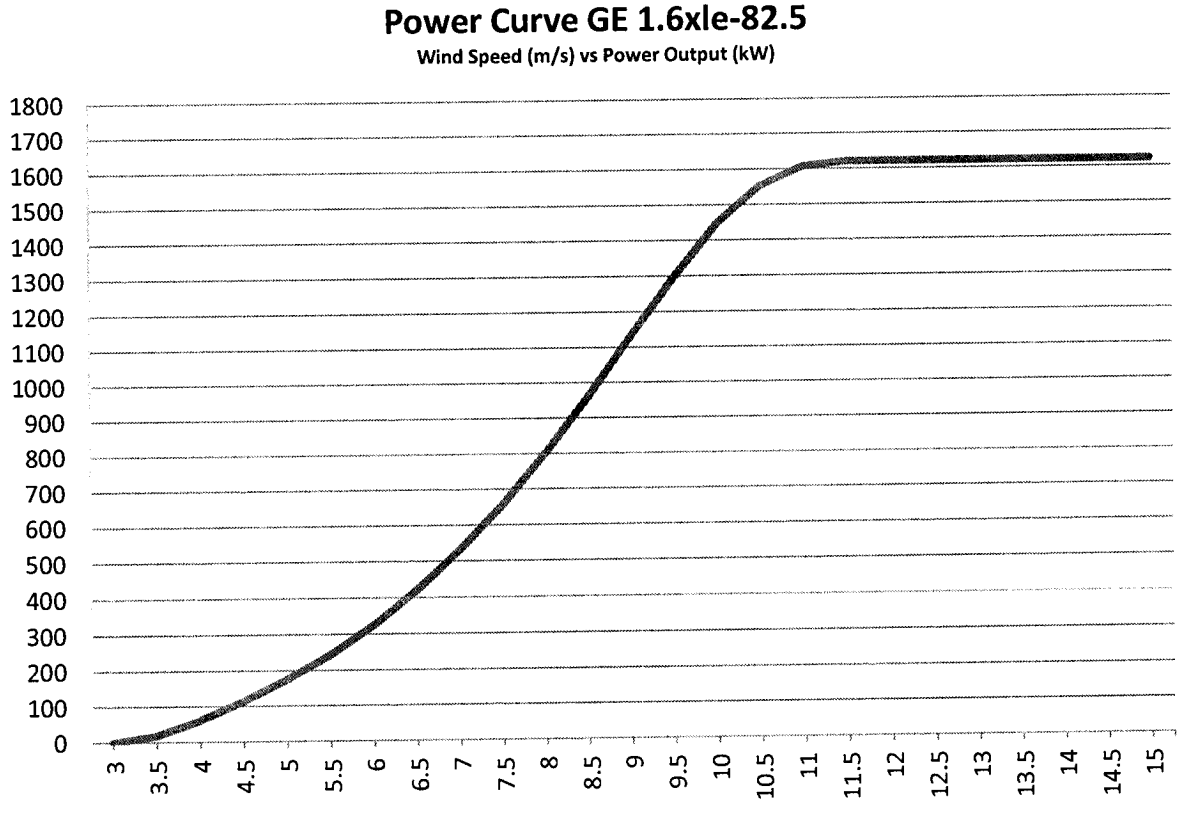
Power Curve of Wind Turbine Generator (GE 1.6xle-82.5) Graphic



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Power Curve of Wind Turbine Generator (GE 1.6-82.5) Tabular

Power Curve GE 1.6 MW xle		Power Curve GE 1.6 MW xle	
Wind Speed at Hub Height	Power Output [kW] Low Turbulence Intensities TI < 10%	Wind Speed at Hub Height [m/s]	Power Output [kW] Low Turbulence Intensities TI < 10%
[m/s]	[kW]	[m/s]	[kW]
3	0	9	1132
3.5	18	9.5	1296
4	61	10	1447
4.5	114	10.5	1553
5	175	11	1607
5.5	244	11.5	1620
6	326	12	1620
6.5	422	12.5	1620
7	532	13	1620
7.5	657	13.5	1620
8	801	14	1620
8.5	960	14.5	1620
9	1132	15	1620

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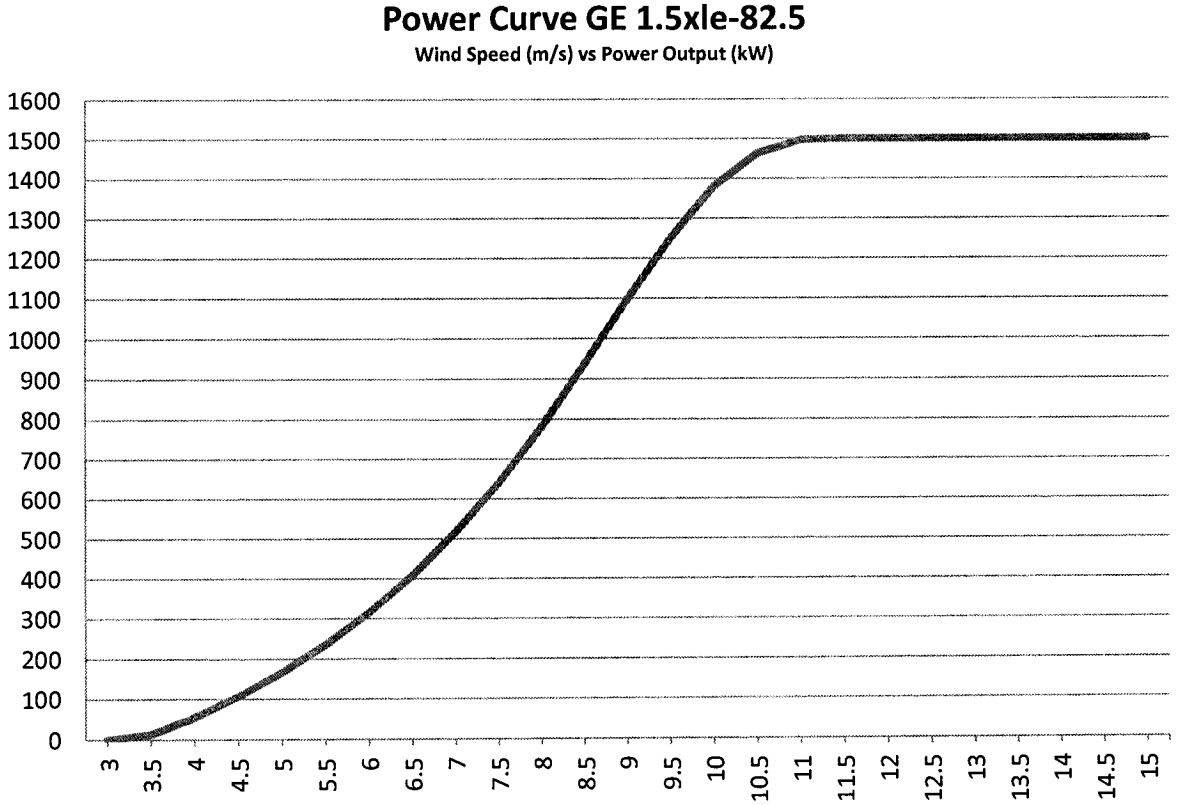
Power Curve of Wind Turbine Generator (GE 1.5xle-82.5) Graphic



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Power Curve of Wind Turbine Generator (GE 1.6-82.5) Tabular

Power Curve GE 1.5 MW xle		Power Curve GE 1.5 MW xle	
Wind Speed at Hub Height	Power Output [kW] Low Turbulence Intensities TI < 10%	Wind Speed at Hub Height [m/s]	Power Output [kW] Low Turbulence Intensities TI < 10%
[m/s]	[kW]	[m/s]	[kW]
3	0	9.5	1250
3.5	18	10	1380
4	61	10.5	1463
4.5	114	11	1497
5	175	11.5	1500
5.5	244	12	1500
6	326	12.5	1500
6.5	422	13	1500
7	532	13.5	1500
7.5	657	14	1500
8	801	14.5	1500
8.5	960	15	1500
9	1132	15.5	1500

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Revised/Modified
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/GWh)	49.5 MW
(2).	Total Annual Full Load Hours	2970 Hrs.
(3).	Average Wind Turbine Generator (WTG) Availability	95.9%
(4).	Total Gross Generation of the Generation Facility/Wind Farm (in GWh)	160.9819
(5).	Array & Miscellaneous Losses GWh	16.9031
(6).	Availability Losses GWh	5.6343
(7).	Balance of Plant Losses GWh	4.0245
(8).	Annual Energy Generation (20 year equivalent Net AEP) GWh	134.42
(9).	Net Capacity Factor	31%

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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