



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-86/1347

January 29, 2015

Mr. Jiang Li
Company Secretary
Hydrochina Dawood Power (Pvt.) Ltd.
18th Floor, B.R.R. Tower, Hassan Ali Street,
Off: I.I. Chundrigar Road,
Karachi-74000

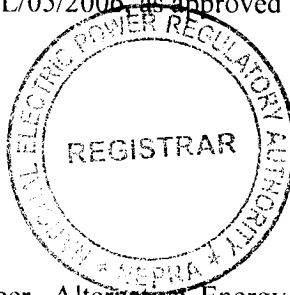
**Subject: Modification-III in Generation Licence No. WPGL/05/2006 —
Hydrochina Dawood Power (Pvt.) Limited (HCDPPL)**

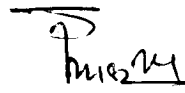
Reference: Your letter No. HDPPL-I(NEPRA-GL)/2014, dated December 05, 2014

It is intimated that the Authority has approved "Licensee Proposed Modification" in Generation Licence No. WPGL/05/2006 (issued on December 29, 2006) in respect of HCDPPL 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 HCDPPL along with Modification-III in the Generation Licence No. WPGL/05/2006, as approved by the Authority.

Encl:/As above




29.01.15
(Syed Safeer Hussain)

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
Hydrochina Dawood Power (Private) Limited

January 26, 2015
Case No. LAG-86

(A). Background

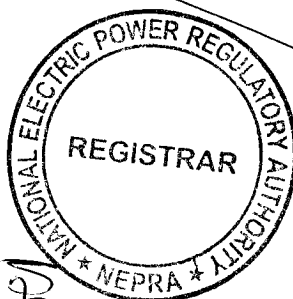
(i). The Authority granted a Generation Licence (No. WPGL/05/2006 dated December 29, 2006) to Hydrochina Dawood Power (Private) Limited (HCDPPL), in terms of Section-15 of Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (the NEPRA Act).

(ii). According to the above Generation Licence, the Generation Facility/Wind Power Plant/Wind Farm is to be located Near Port Qasim-Bhambore, Gharo Creek, District Thatta, in the Province of Sindh, based on thirty three (33) Wind Turbine Generator-WTG, each of 1.50 MW of GoldWind (GW).

(B). Communication of Modification

(i). HCDPPL 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 December 05, 2014.

(ii). In the "Text of the Proposed Modification", HCDPPL submitted that its existing Generation Licence is based on WTG of 1.5 MW of GW. Whereas, HCDPPL now intends to install latest 1.5 MW WTG of MingYang (MY).



(iii). Regarding the "Statement of Reasons in Support of the Modification", HCDPPL submitted that its project is located in the coastal area. In order to mitigate the risks associated with coastal belt, the company has decided to set up the project with WTGs of MY as the same are more suitable due to its high resistance to the corrosive conditions prevailing in the area of the project.

(iv). 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", HCDPPL 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

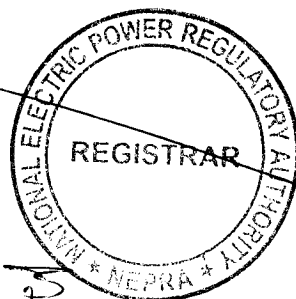
(i). After completion of all the required information as stipulated under the Regulation 10 (2) and 10 (3) of the Regulations by HCDPPL, the Registrar accepted the LPM for further processing as stipulated in the Regulations.

(ii). The Registrar published the communicated LPM on December 18, 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/comments in favor or against the same.

(iii). 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 three (03) stakeholders. These included Alternative Energy Development Board (AEDB), Pakistan Counsel of Renewable Energy Technologies (PCoRET), Ministry of



Science and Technology (MoST).

(ii). The salient points of the comments offered by the above mentioned stakeholders are summarized in the following paragraphs: -

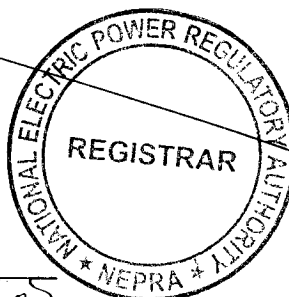
- (a). AEDB submitted that the documents provided reveal that HCDPPL intends to install WTGs of MY (1.5 MW) which is internationally certified as per IEC Standards;
- (b). PCoRET expressed its no reservation to the communicated LPM of HCDPPL; and
- (c). MoST endorsed the comments of PCoRET.

(iii). The Authority considered the above comments of the stakeholders on the communicated LPM of HCDPPL and found the in favor of the communicated LPM. 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 empowered 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

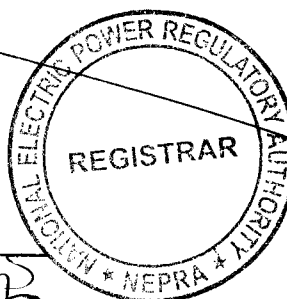


provisions of the NEPRA Act or the rules or regulations made pursuant to the Act;

- (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/05/2006 dated December 29, 2006 as amended through Modification-I, dated August 06, 2008 and Modification-II dated June 27, 2013) is based on GW 1.5 MW (GW82/1500). Whereas, HCDPPL now intends installing WTGs of 1.50 MW each of MY. In this regard, HCDPPL has submitted that the project is located on the coastal belt. The location of the project has intertidal environment and possible extreme wind conditions. Keeping in the view the severe conditions prevailing at site, HCDPPL hired the services of POWERCHINA Xibei Engineering Corporation Limited (hereafter "XIBEI") to conduct an analysis of the available WTGs in the Chinese market. After a three month in-depth research of the Chinese manufacturers of WTGs, the said consultant recommended that the project should be implemented with WTGs of MY instead of GW, to meet with the specific project site parameters and the network requirements of NTDC.

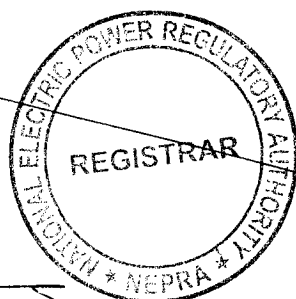
(iii). The Authority has examined the above mentioned study of XIBEI. In this regard, the Authority has observed that XIBEI has made its recommendations based on independent evaluation of WTG of MY (Model MY1.5MW-82), on the practical performance of several costal wind farms in China (including the wind farms in Dongfang Gancheng, Hainan), operation at high temperatures and in high salt mist conditions with emphasis also on the network compatibility and safety



requirements. The Authority has noted that XIBEI has concluded that the proposed WTG (MY1.5MW-82) has the required design characteristic to withstand high temperatures and corrosive coastal area environment. The WTG has proven performance capability in salt mist conditions similar to the site conditions of the Project of HCDPPL. Further, the proposed WTG (MY1.5MW-82) meets all the NTDC Grid Code requirements and IEC standards.

(iv). In view of the above, the Authority is satisfied that the communicated LPM is reasonably necessary for HCDPPL/the Licensee to effectively and efficiently perform its obligations under its Generation Licence. The communicated LPM will not adversely affect the performance of HCDPPL 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 HCDPPL/Licensee was granted an Up-Front Tariff in terms of its determinations dated April 23, 2014 and May 02, 2014 which is an energy based and equipment/technology neutral. Therefore, the Authority is satisfied that the communicated LPM of HCDPPL/the Licensee will not have any adverse impact on its existing Tariff. The Authority is convinced that HCDPPL/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.

(v). Accordingly, the already granted Generation Licence (No. WPGL/05/2006 dated December 29, 2006 as amended through Modification-I, dated August 06, 2008 and Modification-II dated June 27, 2013) in the name of HCDPPL 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

Maj. (R) Haroon Rashid
Member

Haroon Rashid
27/1/15

Khawaja Muhammad Naeem
Member

Khawaja Muhammad Naeem
28.01.15

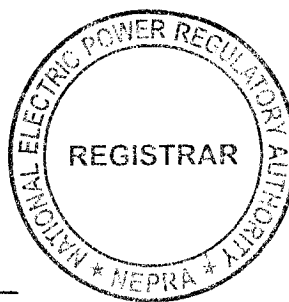
Habibullah Khilji
Member/Vice Chairman

Habibullah Khilji
26/1/2015

Brig. (R) Tariq Saddozai
Chairman

Tariq Saddozai
22.01.15

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29.01.15

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

GENERATION LICENCE

No. WPGL/05/2006

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 HYDROCHINA DAWOOD POWER (PRIVATE) LIMITED issued on December 29, 2006 and modified subsequently through Modification-I dated August 06, 2008 and Modification-II dated June 27, 2013 is modified again to the extent of changes mentioned as here under:-

- (i). the Installed Capacity of the Licensee/HYDROCHINA DAWOOD POWER (PRIVATE) LIMITED appearing on Face Sheet changed through Modification-II will remain unchanged as 49.50 MW;
- (ii). The Expiry Date of the Generation Licence may be read as June 29, 2036 instead of June 29, 2034;
- (iii). Changes in Articles of the Generation Licence are attached as Revised/Modified Articles of the Generation Licence;
- (iv). Changes in Schedule-I are attached as Revised/Modified Schedule-I; and
- (v). Changes in Schedule-II are attached as Revised/Modified Schedule-II.

This **Modification-III** is given under my hand this 29th of January Two Thousand & Fifteen.



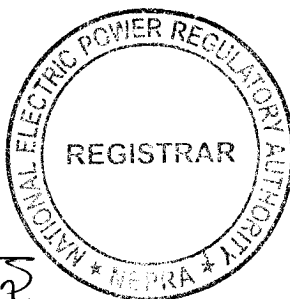
Registrar



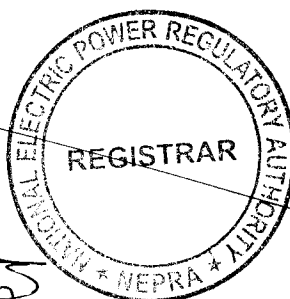
Article-1
Definitions

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 (CO₂) 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;



- (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 HYDROCHINA DAWOOD POWER (PRIVATE) 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;



- (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.

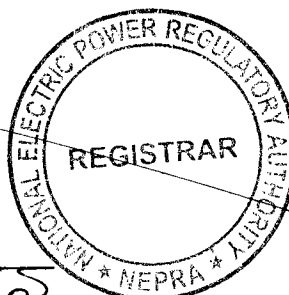
Article-2 **Application of Rules**

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.



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 29, 2006) and will remain valid 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 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

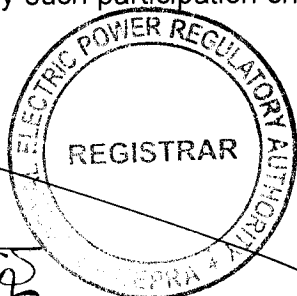
After the grant of the Generation Licence, the Licensee shall pay to the Authority the Licence fee, in the amount, manner and at the time set out in the National Electric Power Regulatory Authority (Fees) Rules, 2002.

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



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

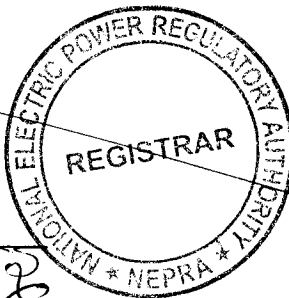
The Licensee shall comply with the relevant provisions of the National Electric Power Regulatory Authority Performance Standards (Generation) Rules 2009 as amended from time to time.

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.



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 In addition to 13.1 above, the Licensee shall 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.

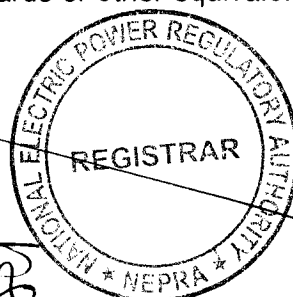
13.3 The Licensee shall be subject to such penalties as may be specified in the relevant rules made by the Authority for failure to furnish such information as may be required from time to time by the Authority and which is or ought to be or has been in the control or possession of the Licensee.

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.



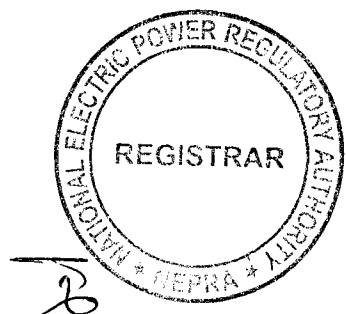
15.2 All the plant and equipment of the generation facility/Wind Farm shall be unused and brand new.

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.

HYDROCHINA Dawood Power (Private) Limited

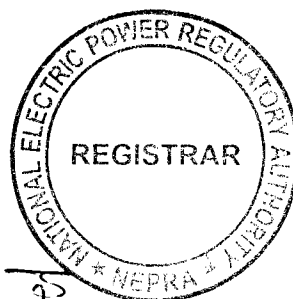
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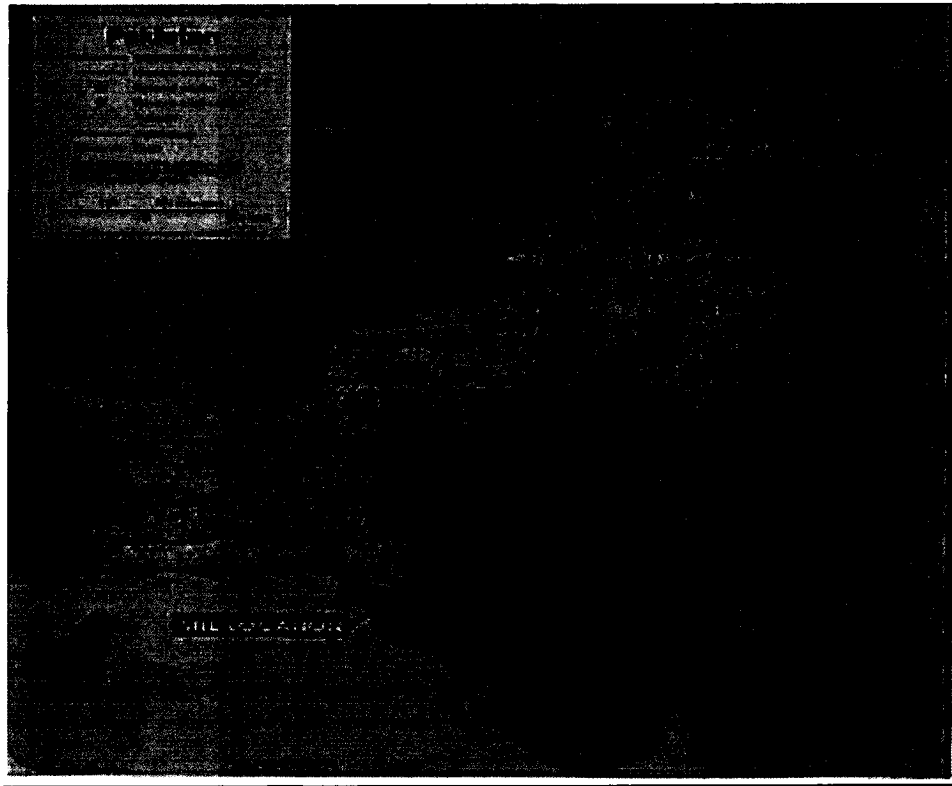
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Revised/Modified
SCHEDULE-I

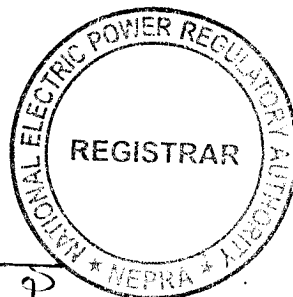
The Location, Size (i.e. Capacity in MW), Type of Technology, Interconnection Arrangements, Technical Limits, Technical/Functional Specifications and other details specific to the Generation Facility of the Licensee are described in this Schedule.



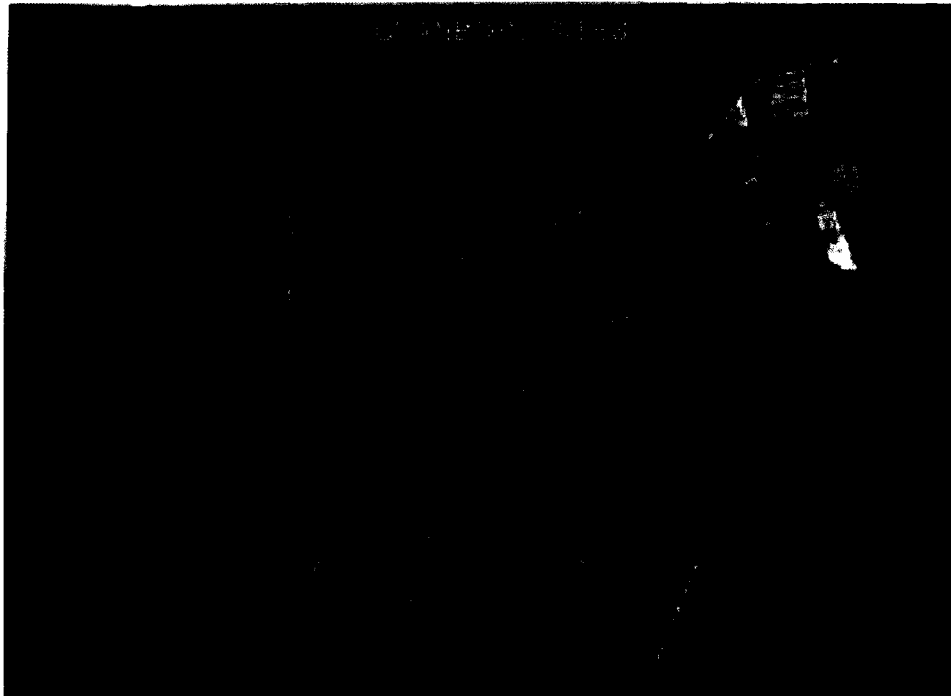
Site Location Map of the
Generation Facility/Wind Farm /Wind Power Plant of
HYDROCHINA Dawood Power (Pvt.) Limited
(HCDPPL)



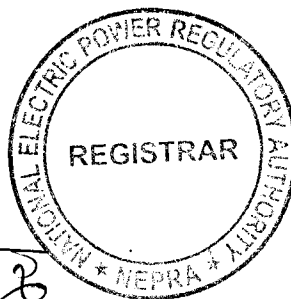
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Site Location of the
Generation Facility/Wind Farm /Wind Power Plant of
HYDROCHINA Dawood Power (Pvt.) Limited
(HCDPPL)

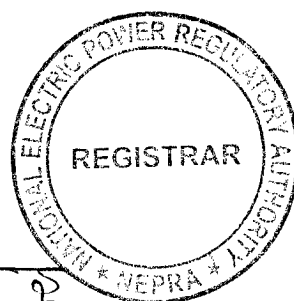


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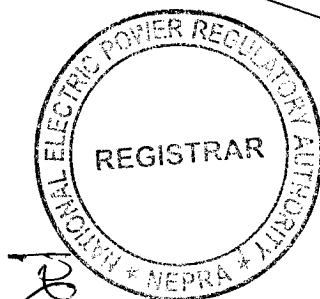
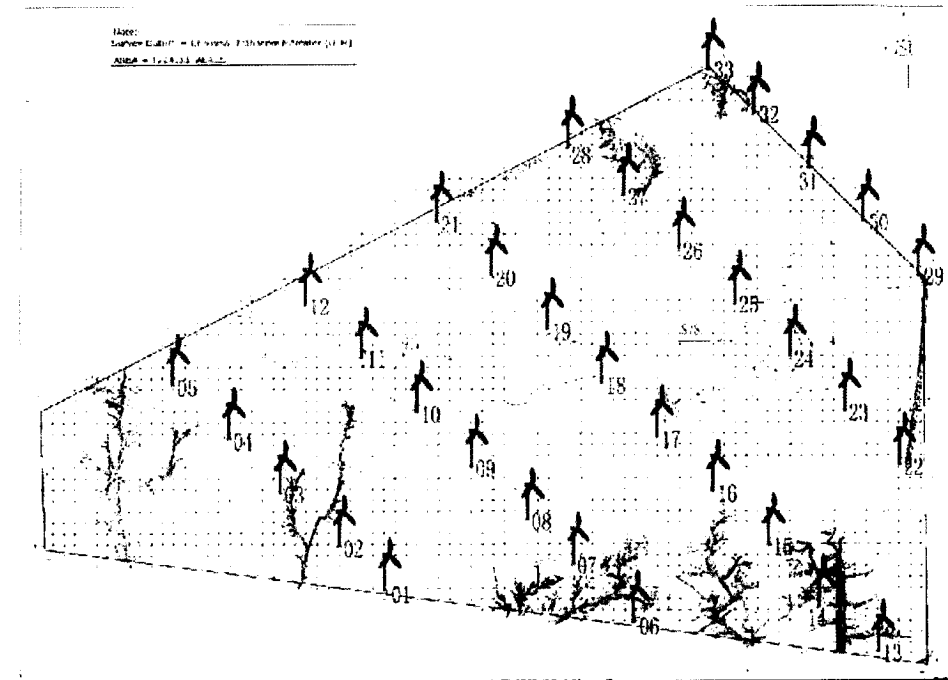


Land Coordinates of the
Generation Facility/Wind Farm /Wind Power Plant of
HYDROCHINA Dawood Power (Pvt.) Limited
(HCDPPL)

Border Point	North	East
1	N24°40'57.90"	E67°29'45.48"
2	N24°40'27.54"	E67°30'20.76"
3	N24°39'30.48"	E67°30'22.08"
4	N24°39'43.68"	E67°28'21.72"
5	N24°40'13.26"	E67°28'12.18"

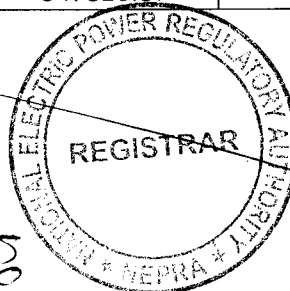


Micro-Sitting of the
Generation Facility/Wind Farm /Wind Power Plant of
HYDROCHINA Dawood Power (Pvt.) Limited
(HCDPPL)



**Wind Turbine Coordinates of the
Generation Facility/Wind Farm /Wind Power Plant of
HYDROCHINA Dawood Power (Pvt.) Limited
(HCDPPL)**

Layout Number 1 - 33 WTGs - 1.5MW		
UTM WGS84 (Zone 42)		
WTG ID	X	Y
WTG1	346353.82	2728292.82
WTG2	346149.941	2728489.56
WTG3	345883.279	2728736.63
WTG4	345646.403	2728975.82
WTG5	345394.634	2729218.95
WTG6	347486.58	2728144.22
WTG7	347213.531	2728409.81
WTG8	347003.552	2728610.68
WTG9	346751.783	2728853.81
WTG10	346500.014	2729096.94
WTG11	346248.246	2729340.07
WTG12	345996.477	2729583.2
WTG13	348605.29	2728009.21
WTG14	348331.581	2728210.48
WTG15	348101.752	2728495.47
WTG16	347849.983	2728738.6
WTG17	347598.214	2728981.73
WTG18	347346.446	2729224.86
WTG19	347094.677	2729467.99
WTG20	346842.908	2729711.12
WTG21	346591.139	2729954.25
WTG22	348703.600	2728859.59
WTG23	348451.831	2729102.72
WTG24	348200.062	3729345.85
WTG25	347948.293	2729588.98
WTG26	347696.524	2729832.11
WTG27	347444.756	2730075.24
WTG28	347185.501	2730287.26
WTG29	348787.29	2729710.04
WTG30	348535.52	2729953.17
WTG31	348283.75	2730196.3
WTG32	348030.92	2730438.33
WTG33	347826.87	2730635.37



**Interconnection Arrangement/Transmission Facilities for
Dispersal of Power from the Generation Facility/Wind
Power Plant/Wind Farm of HYDROCHINA Dawood Power
(Pvt.) Limited**

The power generated by the Licensee/HYDROCHINA Dawood Power (Pvt.) Limited (HCDPPL) from its generation facility/Wind Power Plant/Wind Farm shall be dispersed to the National Grid at 132 KV voltage level.

(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/Wind Power Plant/Wind Farm of HCDPPL with 220/132 KV New Gharo Grid Station.

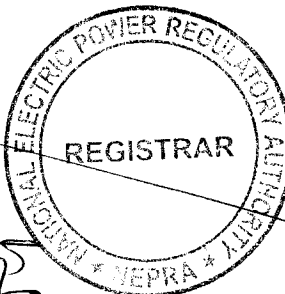
(3). The above dispersal arrangement assumes that infrastructure pertaining to strengthening of existing and laying of new transmission lines shall be in place as detailed below:-

(a). 220/132KV Gharo substation of NTDC at suitable location in Gharo cluster;

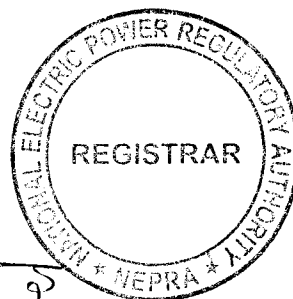
(b). 220/132KV Jhampir substation of NTDC at suitable location in Jhampir cluster;

(c). 220KV Double Circuit (D/C) (measuring about 145 KM in length) from Gharo (220 KV substation of NTDC) to 220 KV T. M. Khan Road substation (of NTDC) in Hyderabad for making an in-out at 220KV Jhampir substation of NTDC;

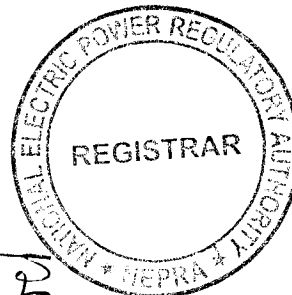
(2). The final Interconnection and Transmission Arrangement(s) including length of line, type of conductor etc. for the dispersal of power, if different from above,

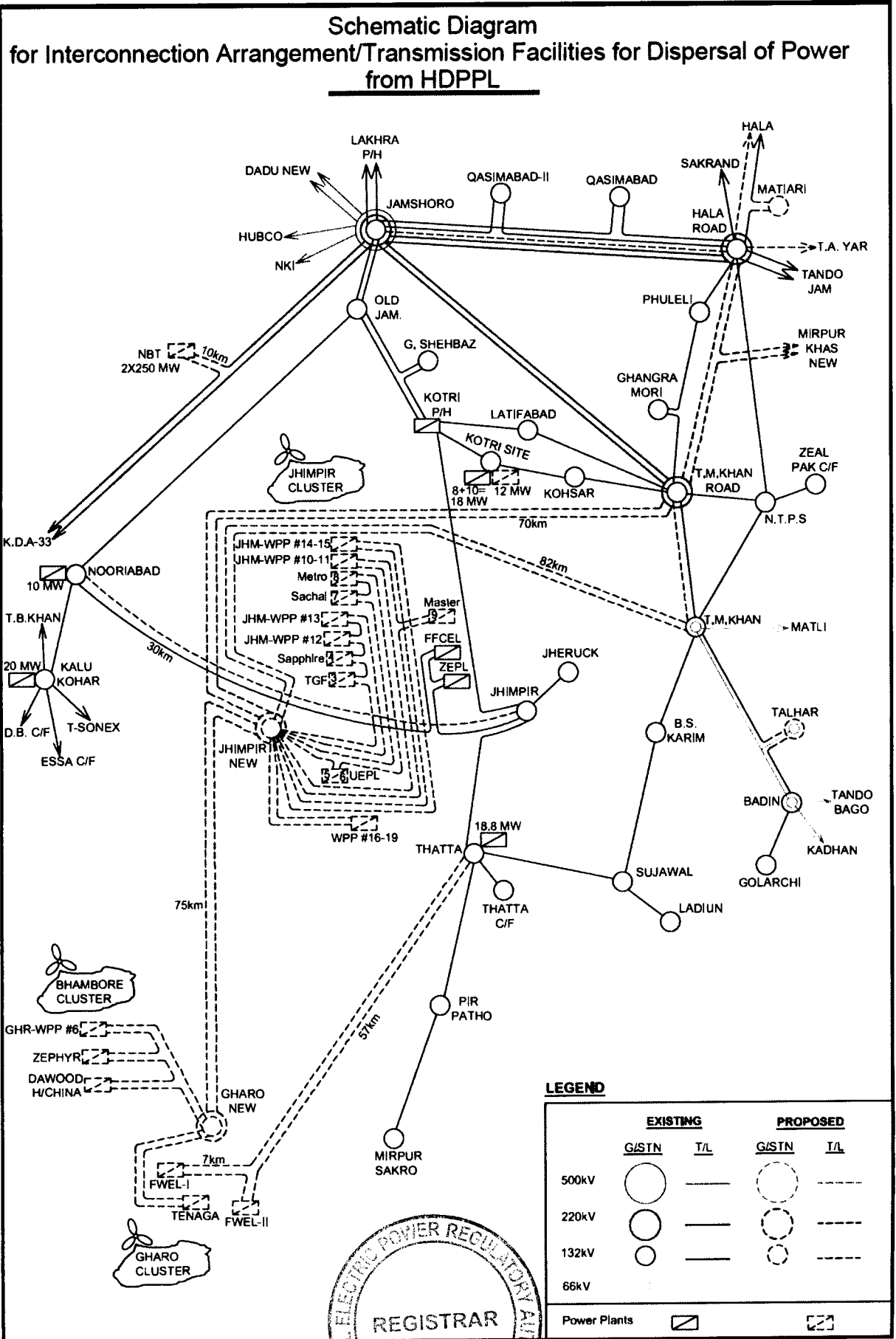


as agreed by HCDPPL, NTDC and HESCO shall be communicated to NEPRA in due course of time.



Schematic Diagram
for Interconnection/Transmission Arrangement for
Dispersal of Power from the Generation Facility/Wind
Power Plant/Wind Farm of HYDROCHINA Dawood Power
(Pvt.) Limited (HCDPPL)





Detail of
Generation Facility/Wind Power Plant/
Wind Farm

(A). General Information

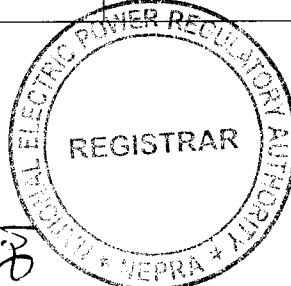
(i).	Name of the Company/Licensee	HYDROCHINA Dawood Power (Pvt.) Limited
(ii).	Registered/Business Office	18 th Floor, B.R.R. Tower, Hassan Ali Street, off: I.I. Chundrigar Road Karachi 74000
(iii).	Plant Location	Deh Kalar Sarkari (Bhanbore, Gharo), Taluka Mirpur Sakro, District Thatta, in the Province of Sindh
(iv).	Type of Generation Facility	Wind Power Plant/Wind Farm

(B). Wind Farm Capacity & Configuration

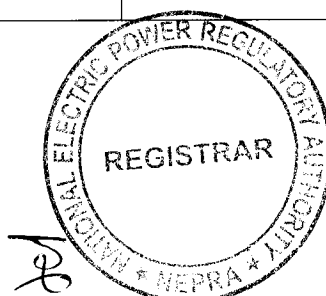
(i).	Wind Turbine Type, Make & Model	MY1.5MW-82 (Type-3 of Ming Yang)
(ii).	Installed Capacity of Wind Farm (MW)	49.50 MW
(iii).	Number of Wind Turbine Units/Size of each Unit (MW)	33 x 1.50 MW

(C). Wind Turbine Details

(a).	<u>Wind Turbine</u>	
(i).	Quantity	33
(ii).	Rated Power	1.50 MW
(iii).	Number of Blades	3
(iv).	Diameter of Blades	82 m
(v).	Rotor Swept Area	5390m ²
(vi).	Cut-in Wind Speed	3m/s
(vii).	Rated Wind Speed	10.8m/s



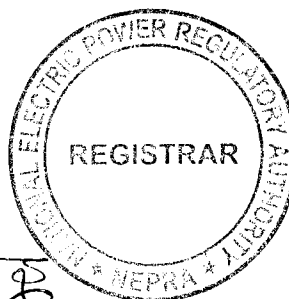
(viii)	Cut-out Wind Speed	25m/s
(ix)	Survival Wind Speed	59.5m/s
(x)	Hub Height	80m
(xi)	Rotational Speed	9~17.3 rad/s
(b).	<u>Generator</u>	
(i).	Generator Capacity	1500 kW
(ii).	Power Factor of Generators	0.982
(iii).	Rated Voltage	690V
(c).	<u>Compact Pre Fabricated Substation</u>	
(i).	Quantity	33
(ii).	Voltage Level	22 KV
(d).	<u>132kV Substation</u>	
(i).	Main Transformer	2
(ii).	Type	50MVA 132/22 KV ONAN WITH OLTC
(e).	<u>WTGs Foundation</u>	
(i).	Quantity	33
(ii).	Type	Borehole pile
(iii).	Natural Foundation Features	Offshore tidal flats with ground water at shallow depth from 0.43m to 1.03m consists of clay and fine grained sand.
(f).	<u>Compact Pre Fabricated Substation Foundation</u>	
(i).	Quantity	33 Each
(ii).	Type	Shallow foundation on natural ground
(iii).	Natural Foundation Features	Offshore tidal flats with ground water at shallow depth from 0.43m to 1.03m consists of clay and fine grained sand.
(g).	<u>Wind Resource</u>	
(i).	Annual Average Wind Speed	7.05 m/s (80m height)
(ii).	Prevailing Winds	SW



(iii).	Annual Benchmark Energy	130.33GWh
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(D). Other Details

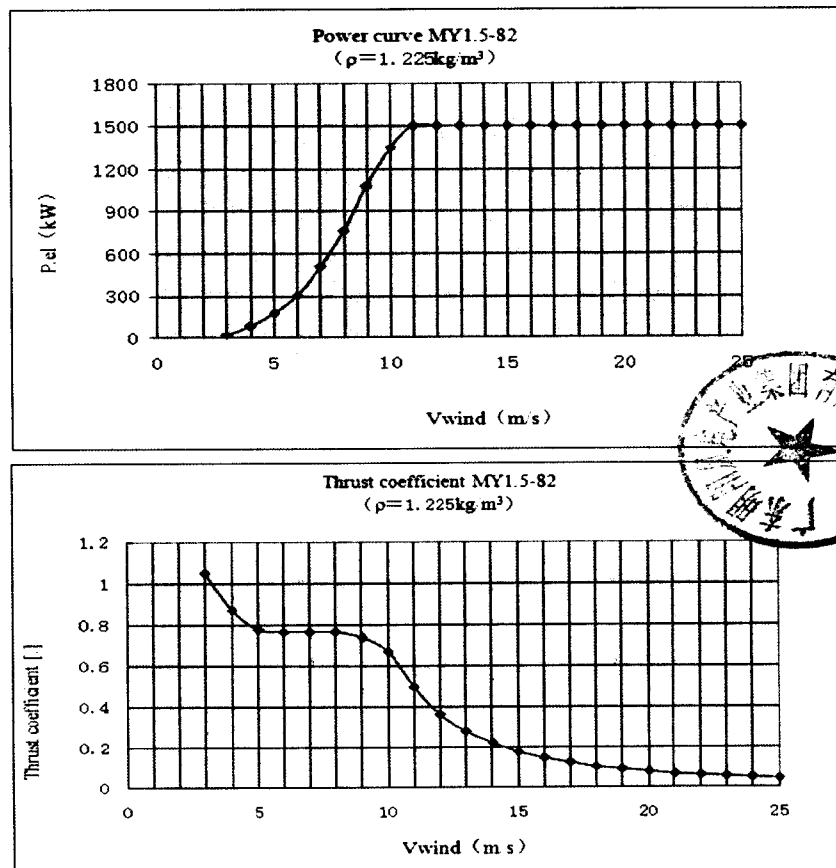
(i).	COD of the Generation Facility/Wind Power Plant/Wind Farm (Anticipated)	June 30, 2016
(ii).	Expected Life of the Generation Facility/Wind Power Plant/Wind Farm from COD	20 Years



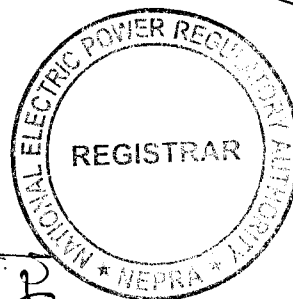
Power Curve of Wind Turbine Generator (MY1.5MW-82)



广东明阳风电产业集团有限公司
GUANG DONG MING YANG WIND POWER INDUSTRY GROUP CO.,LTD.

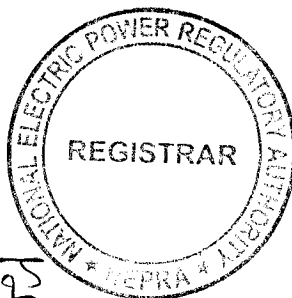


Company Address: Mingyang Industry Park, 22 Torch Road, Torch Development Zone, Zhongshan City, Guangdong Province, China
Website: www.mingyang.com.cn



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



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	2633 Hrs
(3).	Average Wind Turbine Generator (WTG) Availability	95%
(4).	Total Gross Generation of the Generation Facility/Wind Farm (in GWh)	175.86 GWh
(5).	Array & Miscellaneous Losses GWh	23.46 GWh
(6).	Availability Losses GWh	12.42 GWh
(7).	Balance of Plant Losses GWh	9.65 GWh
(8).	Annual Energy Generation (20 year equivalent Net AEP) GWh	130.33 GWh
(9).	Net Capacity Factor	30.06%

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.

