BEFORE
THE NATIONAL ELECTRIC
POWER REGULATORY AUTHORITY

APPLICATION FOR THE MODIFICATION OF A GENERATION LICENSE IN ACCORDANCE WITH REGULATION 10 OF THE NEPRA LICENSING (APPLICATION AND MODIFICATION PROCEDURE) REGULATIONS 1999, AND THE RULES & REGULATIONS SPECIFIED THEREUNDER

IN RESPECT OF
LIBERTY WIND POWER 1 (PVT.) LIMITED FORMERLY KNOWN AS "ZULAIKHA ENERGY (PVT.) LIMITED"
50 MW WIND POWER PROJECT AT JHIMPIR, DISTRICT THATTA, SINDH

Dated: [March, 11 2019]

Filed for:
Liberty wind Power 1 (Pvt.) Limited

LIBERTY WIND POWER 1 (PVT) LTD. LWP-1

LIBERTY WIND POWER 1 (PVT) LTD.
Formerly **Zulaikha Energy (Pvt) Ltd**

The Registrar
National Electric Power Regulatory Authority
2nd Floor, OPF Building,
Sector G-5/2,
Islamabad

Date: Mar, 11 20119

SUBJECT: Application for a Licensee Proposed Modification in the Generation License granted to Zulaikha Energy (Pvt.) Limited 50 MW Wind Power Project

I, Tanveer Ahmed, the Technical Director, being the duly authorized representative of Liberty Wind Power 1 (Pvt.) Limited by virtue of Board Resolution dated March 6, 2019, hereby apply to the National Electric Power Regulatory Authority for the licensee proposed modification of a Generation License granted to Zulaikha Energy (Pvt.) Limited pursuant to Regulation 10 of the NEPRA Licensing (Application And Modification Procedure) Regulations 1999.

I certify that the documents-in-support attached with this application are prepared and submitted in conformity with the provisions of the National Electric Power Regulatory Authority Licensing (Application and Modification Procedure) Regulations, 1999 (**"AMP Regulations"**), and undertake to abide by the terms and provisions of the above-said regulations. I further undertake and confirm that the information provided in the attached documents-in-support is true and correct to the best of my knowledge and belief.

A Bank Draft in the sum of Pakistani Rupees 329,920/- being the license modification fee calculated in accordance with Schedule II of the AMP Regulations, is also attached herewith. Further, additional documents/information, pursuant to the AMPR, are attached herewith.

Mr. Tanveer Ahmed
Technical Director
Liberty Wind Power 1 (Private) Limited
Formerly: Zulaikha Energy (Pvt.) Limited

APPLICATION FOR THE LICENSEE PROPOSED MODIFICATION OF A GENERATION LICENSE UNDER REGULATION 10 OF THE AMP REGULATIONS

1. Licensee's Responsibility in the Process

1.1. Sub-regulation 2 of Regulation 10 of the AMP Regulations provides, *inter alia,* that:

"A licensee may, at any time during the term of a license communicate to the Authority a licensee proposed modification setting out:

(a) the text of the proposed modification;

(b) a statement of reasons in support of the modification; and

(c) a statement of the impact on tariff, quality of service and the performance of the licensee of its obligations under the license."

1.2. Furthermore, Sub-regulation 5 of Regulation 10 of the AMP Regulations enumerates the conditions applicable to such proposed modification.

1.3. This Application for the licensee proposed modification of a generation license is made pursuant to Regulation 10 of the AMP Regulations (this "**Application**").

2. Introduction of the Applicant

2.1. As required under the Section 24 of Act Liberty Wind Power 1 (Pvt) Ltd formerly called 'Zulaikha Energy (Pvt.) Limited' (the "**Applicant**" or the "**Company**" or the "**Project Company**") is a private limited company incorporated under the Companies Ordinance, 1984 , to act as a special purpose vehicle (the "**SPV**") and develop a 50 MW wind power generation facility located at Jhimpir, District Thatta, Province of Sindh (the "**Project**"). The granted generation license to the Applicant (Generation License No. WPGL/39/2017), and other pertinent details

of the Applicant and description of the Project Company are annexed herewith as **Annex A** hereto.

3. The text of the proposed modification

3.1 Change in name of the Project Company in accordance with the Ordinance

3.1.1 The Project Company's name has been updated from Zulaikha Energy Private Limited to Liberty Wind Power 1 (Private) Limited. The original generation license application was filed under the former company name and it is requested from the Authority that the modified generation license be granted to the updated Company name. The underlying documents in pursuant to such modification are attached under **Annex A.**

3.2 Tower Hub Height

3.2.1 The originally filed generation license application elaborates that 'the proposed wind farm contains 25 Gamesa G114-2.0MWCIIA Wind Turbines at 80m hub height for the Company's Wind Power Project.' However, the hub height of the proposed Wind Turbine has been revised from eight meters (80m) to ninety-three (93m). The underlying technology specific documents in pursuant to such modification are attached under **Annex B.** It is proposed that the Generation License granted to Liberty Wind Power 1 (Pvt) Ltd may be modified in this respect.

3.2.2 Specifications of G114-2.0 MW CIIA Wind Turbine

(a).	**Rotor**	
(i).	Number of blades	3
(ii).	Rotor diameter	114 m
(iii).	Swept area	10207 m^2
(iv).	Power regulation	Combination of blade pitch angle adjustment, and generator / converter torque control.
(v).	Cut-in wind speed	3 m/s
(vi).	Cut-out wind speed	25 m/s

(vii)	Survival wind speed	59.5 m/s (Maximum 3 sec)
(viii)	Pitch regulation	Electric motor drives a ring gear mounted to the inner race of the blade pitch bearing.
(b).	**Blades**	
(i).	Blade length	56 m
(ii).	Material	Composite material reinforced with fiberglass through resin infusion technology.
(c).	**Gearbox**	
(i).	Type	3 combined stages: 1 stage planetary, 2 parallel shift gears.
(ii).	Gear ratio	1:128.5
(iii).	Main shaft	Cast shaft
(d).	**Generator**	
(i).	Nominal Power	2070 (kW)
(ii).	Voltage	690 V
(iii).	Type	Doubly fed with coil rotor and slip rings
(iv).	Degree of Protection	IP54 Turbine – IP21 Ring Body
(v).	Coupling	Main Shaft: Cone Collar, High Speed Shaft: Flexible coupling.
(vi).	Power factor	0.95
(e).	**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

(f).	**Brake**	
(i).	Design	Mechanical brakes
(ii).	Operational brake	Aerodynamic brake achieved by feathering blades.
(iii).	Secondary brake	Mechanical brake on (high speed) shaft of gearbox.
(g).	**Tower**	
(i).	Type	Conical barrel tube
(ii).	**Hub heights**	**93 m**

3.3 Lifespan of the Wind Farm

3.3.1 The originally filed generation license application elaborates that 'that the wind farm will be in operation for up to 20 years.' However, the envisaged wind farm will be in operation for a period of up to 25 years. The underlying documents in pursuant to such modification including modified/revised Schedule I and Schedule II are attached under **Annex C**.

4. Statement of reasons in support of the modification and a statement of the impact on tariff, quality of service and the performance of the licensee of its obligations under the license

4.1 Change in name of the Project Company in accordance with the Ordinance

4.1.1 The Project Company's name has been updated from Zulaikha Energy (Private) Limited to Liberty Wind Power 1 (Private) Limited. The change has no adverse impact on tariff, quality of service and the performance of the licensee of its obligations under the license.

4.2 Tower Hub Height

4.2.1 The hub height of the proposed Wind Turbine has been revised from eighty meters (80m) to ninety-three (93m). This change is to ensure more efficient and effective wind turbine with respect to site selection and the choice offers a

combination of scale and maximum performance. Furthermore, this is in-line with the tariff that was applied by the Company and determined by NEPRA. The 93m hub height is a standard product range and is backed by the Type Certificate, which was not available at the time when the Company had originally applied for the Generation License. However, it was offered to the market afterwards and was opted by the Company. Accordingly, the Company selected the WTG with 93m hub height was selected in the EPC Contract and the tariff was applied accordingly and contemplated in the Tariff Determination. The same hub height exists in various other licenses issued by NEPRA using the same WTG who had applied for a generation license after the Company. The change has no adverse impact on tariff, quality of service and the performance of the licensee of its obligations under the license.

4.3 Lifespan of the Wind Farm

4.3.1 The originally filed generation license application states that 'that the wind farm will be in operation for up to 20 years.' However, the envisaged wind farm will be in operation for a period of up to 25 years. The updated operation life is to ensure lower levelized cost of energy and is in congruence with the cost-plus tariff awarded to the Project Company by NEPRA. The same lifespan exists in various other licenses issued by NEPRA who had applied for a generation license after the Company. The change has no adverse impact on tariff, quality of service and the performance of the licensee of its obligations under the license

5. Evidence/relevant correspondence:

5.1. Copies of the pertinent correspondence are enclosed herewith for the learned Authority's assistance and consideration.

5.2. The Applicant would be pleased to provide any other assistance that the learned Authority may require in the matter of grant of Generation License.

6. **Additional Grounds**

6.1. The Applicant seeks to raise further additional grounds in support of this Application.

PRAYER

It is most humbly prayed to the esteemed Authority as follows:

A. That the Applicant be granted a modified Generation License for the development of the Project.

B. That the terms of the modified Generation License may kindly be made consistent with the terms of the GoP concession documents.

C. That the Authority may be pleased to treat the Applicant's request for the licensee proposed modification of Generation License on a non-discriminatory basis and any concession offered to comparable projects on the date of filing of this Application and at any stage subsequent to the grant of a modified license may kindly be granted to the Applicant as well.

D. Any further and better relief that the Authority may deem appropriate in the circumstances may kindly be granted to the Applicant.

We hope the information/explanation provided above meets your requirements, and remain available to assist you if you have any further queries.

Respectfully submitted for and on behalf of the Applicant:

Sincerely,
Liberty Wind Power 1 (Private) Limited
11-Mar-2019

ANNEX – A

APPLICANT COMPANY'S CONSTITUTIVE DOCUMENTS

ANNEX – B

TECHNOLOGY SPECIFIC DOCUMENTS AND SCHEDULE I AND SCHEDULE II FOR THE GRANT OF A MODIFIED GENERATION LICENSE

ANNEX – C

TARIFF DETERMINATION FOR PROJECT COMPANY

B 023887

SECURITIES AND EXCHANGE COMMISSION OF PAKISTAN

SECP

CERTIFICATE OF INCORPORATION ON CHANGE OF NAME

[Under Section 13 of the Companies Act, 2017 (XIX of 2017)]

Company Registration No. 0092877

I hereby certify that pursuant to the provisions of Section 12 of the Companies Act 2017 (XIX OF 2017), the name of ***ZULAIKHA ENERGY (PRIVATE) LIMITED*** *has been changed to* ***LIBERTY WIND POWER 1 (PRIVATE) LIMITED*** *and that the said company has been duly incorporated as a company limited by shares as a* ***private*** *company under the provisions of the said Act.*

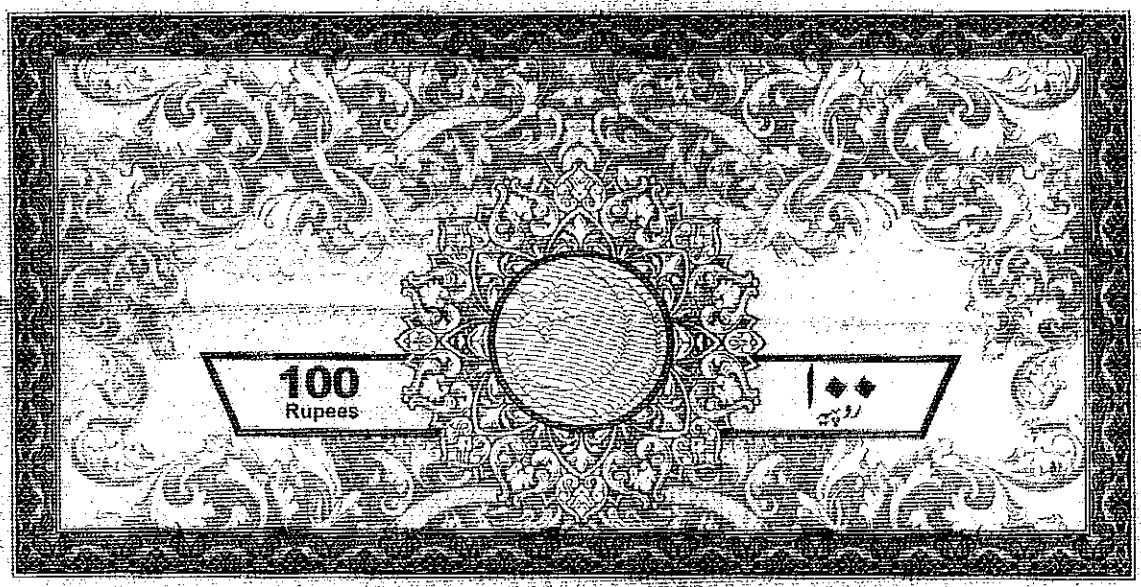
This change is subject to the condition that for period of 90 days from the date of issue of this certificate, the company shall continue to mention its former name along with its new name on the outside of every office or place in which its business is carried on and in every document or notice referred to in clauses ***(a) and (d) of Section 22.***

Given under my hand at Karachi this 3rd day of ***October Two Thousand and Seventeen.***

ZIA UL RASHEED ABBASI
JOINT REGISTRAR / ACTING INCHARGE
CRO, Karachi

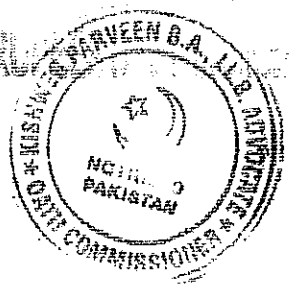
NO: 58970

N401411



MEHBOOB HASSAN KHAN STAMP VENDOR
Licence. No.57, Shop No. 69, B-39, K.No. 1430
Sec: 1-A/4, Zarina Colony Stop, 4-J North Karachi
M.H. KHAN
Advocate High Court
10659 H/C
PURPOSE ..... ATTESTED
VALUE RS..... ATTESTED
STAMP VENDOR'S SIGNATURE .....

27 OCT 2018



BEFORE

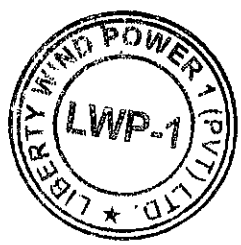
THE NATIONAL ELECTRIC POWER REGULATORY AUTHORITY

AFFIDAVIT

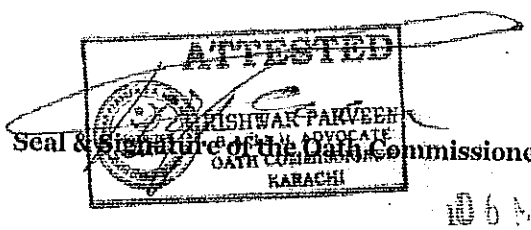
I, Tanveer Ahmed s/o Jan Mohammad bearing CNIC No 42201-9812741-7 the Technical Director of Liberty Wind Power 1 (Private) Limited do hereby solemnly affirm and declare on oath as under:

1. That the accompanying application for Modification in Generation License being filed before the National Electric Power Regulatory Authority (the "**NEPRA**") and the contents of the same may kindly be read as an integral part of this affidavit.

2. That the contents of the accompanying application for Modification in Generation License are true and correct to the best of my knowledge and belief and nothing has been concealed or misstated therein.



(Deponent)



Seal & Signature of the Oath Commissioner

06 Nov 2019

Extracts from
Resolution Passed by the Board of Directors of
Liberty Wind Power 1 (Private) Limited

On March 06, 2019

"**RESOLVED** that an application for modification in the Generation License (the "**GL Modification Application**") be filed by and on behalf of Liberty Wind Power 1 (Private) Limited (the "**Company**") with the National Electric Power Regulatory Authority ("**NEPRA**"), in connection with the GL Modification Application for the Company in respect of the Company's 50 MW wind energy power project at Jhimpir, Sindh (the "**Project**").

RESOLVED FURTHER that Mr. Tanveer Ahmed the Technical Director of the Company, be and is hereby authorized to sign the GL Modification Application, and any documentation ancillary thereto, pay all filing fees, and provide any information required by NEPRA in respect of the Project, and do all acts and things necessary for the processing, completion and finalization of the GL Modification Application.

Certified true copy

Company Secretary
Liberty Wind Power 1 (Private) Limited

CERTIFICATION

CERTIFIED, that, the above resolution by circulation was duly passed by the Board of Directors of Liberty Wind Power 1 (Private) Limited on March 06, 2019 for which the quorum of directors was present.

FURTHER CERTIFIED, that the said resolution has not been rescinded and is in operation and that this is a true copy thereof.

Company Secretary
Liberty Wind Power 1 (Private) Limited

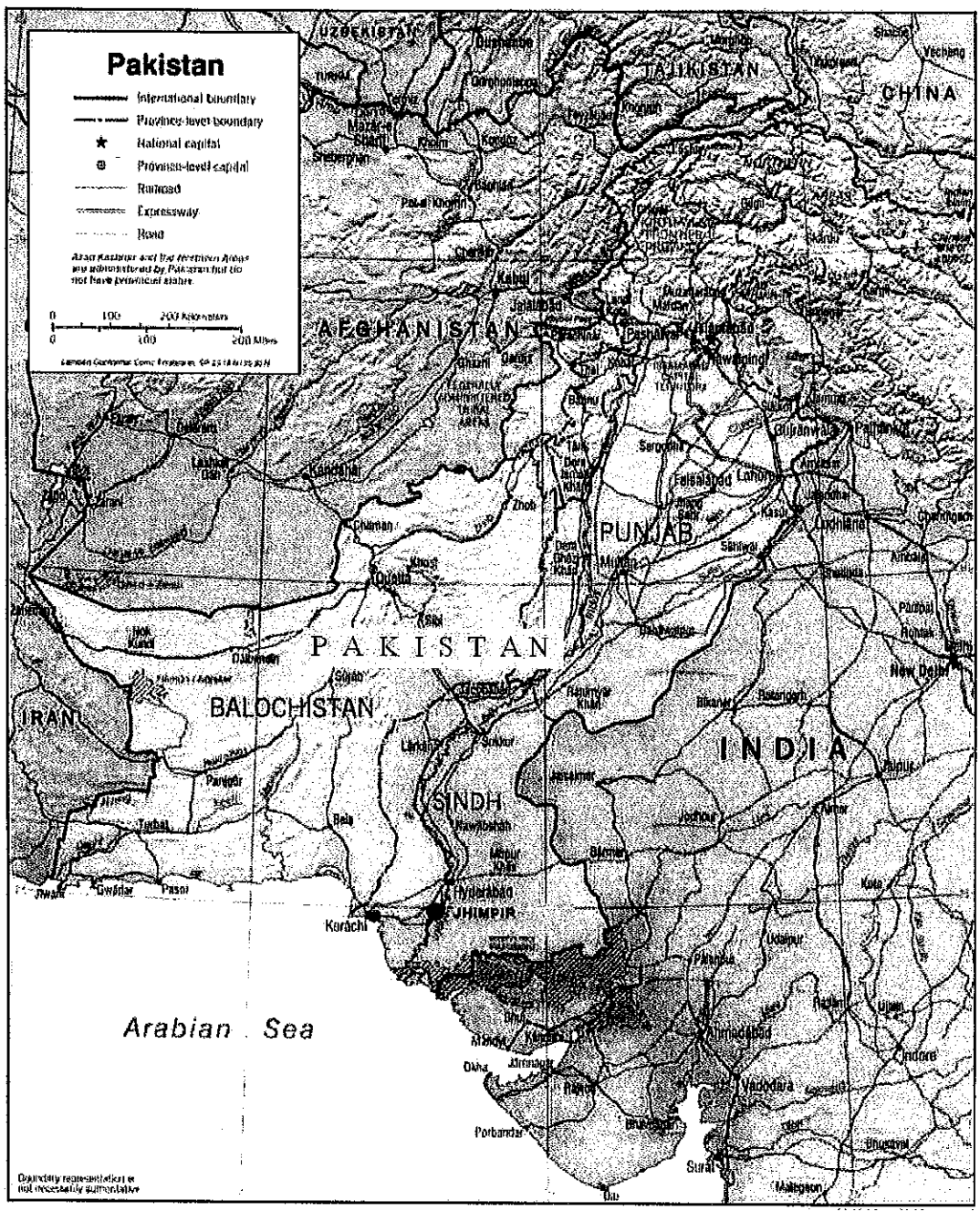
SCHEDULE-I

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

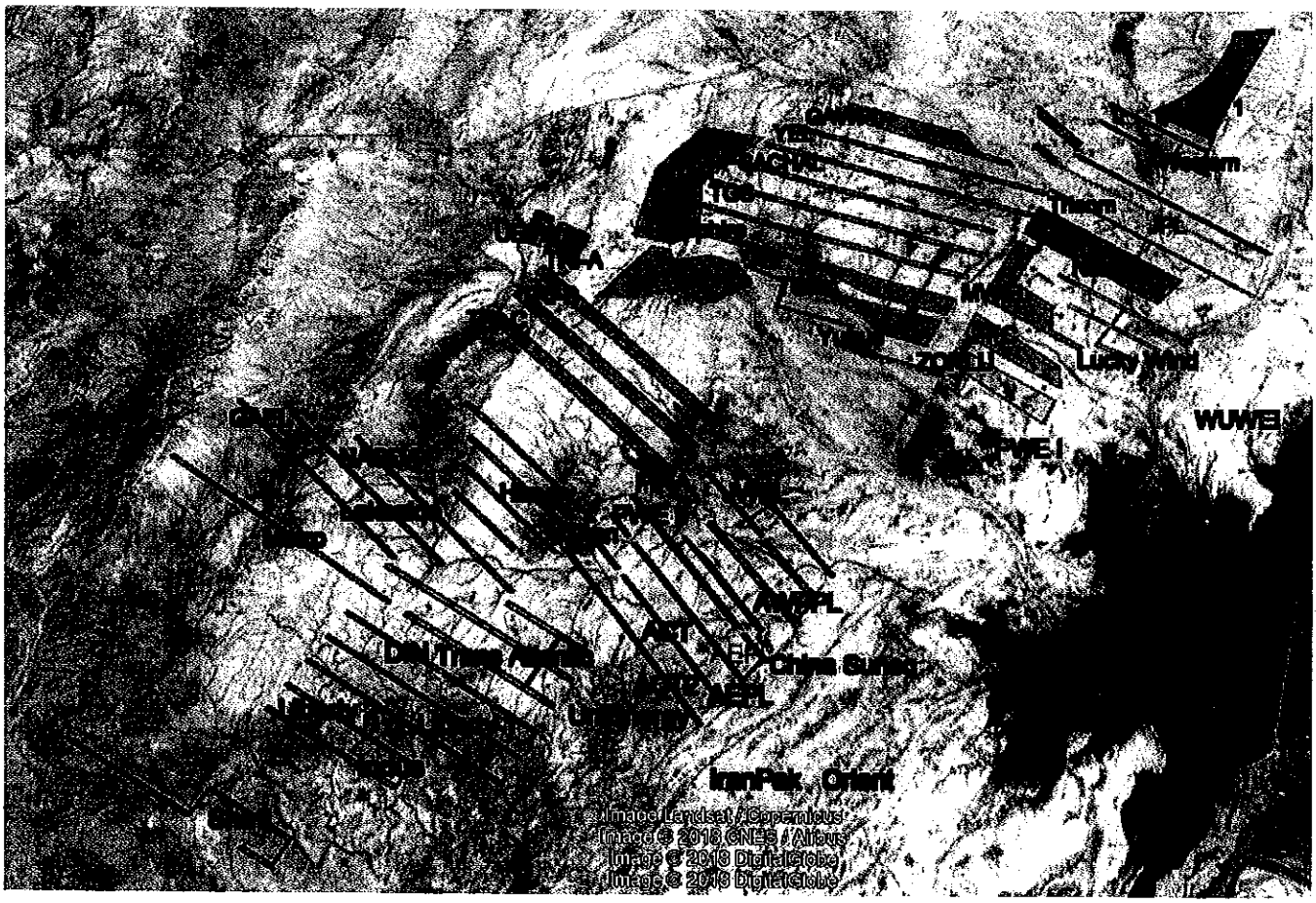
Actual drawings pertaining to Wind Farm Location Map, Wind Farm Lay Out, Wind Farm Micro-Sitting, Single Line Diagram (Electrical System of the Wind Farm),

Location of Generation Facility/ Wind Farm

The wind farm Project is located in Jhimpir, which is located approximately 120 km from Karachi, Pakistan's commercial hub and main coastal/port city. The Project site consists of 330 acres of land, which has been acquired by the project company. The Karachi-Hyderabad Motorway (Super Highway) and National Highway are the connecting roads to the Project site. The Jhimpir wind corridor is identified as potential area for the development of wind power projects. The geographical location of the project is shown in figure below.



The Project Site has flat terrain with sparse vegetation, consisting of small shrubby bushes. The map is given in Figure below:



Project Size

The Project shall have an installed capacity of approx. 50 MW rated power. The number of WTGs are 25 with capacity of 2.0 MW each.

Layout of Generation Facility/ Wind Farm

The general layout along with neighboring Wind Farms of 50 MW ZEPL is shown in figure below.

Land Coordinates of Generation Facility/Wind Farm

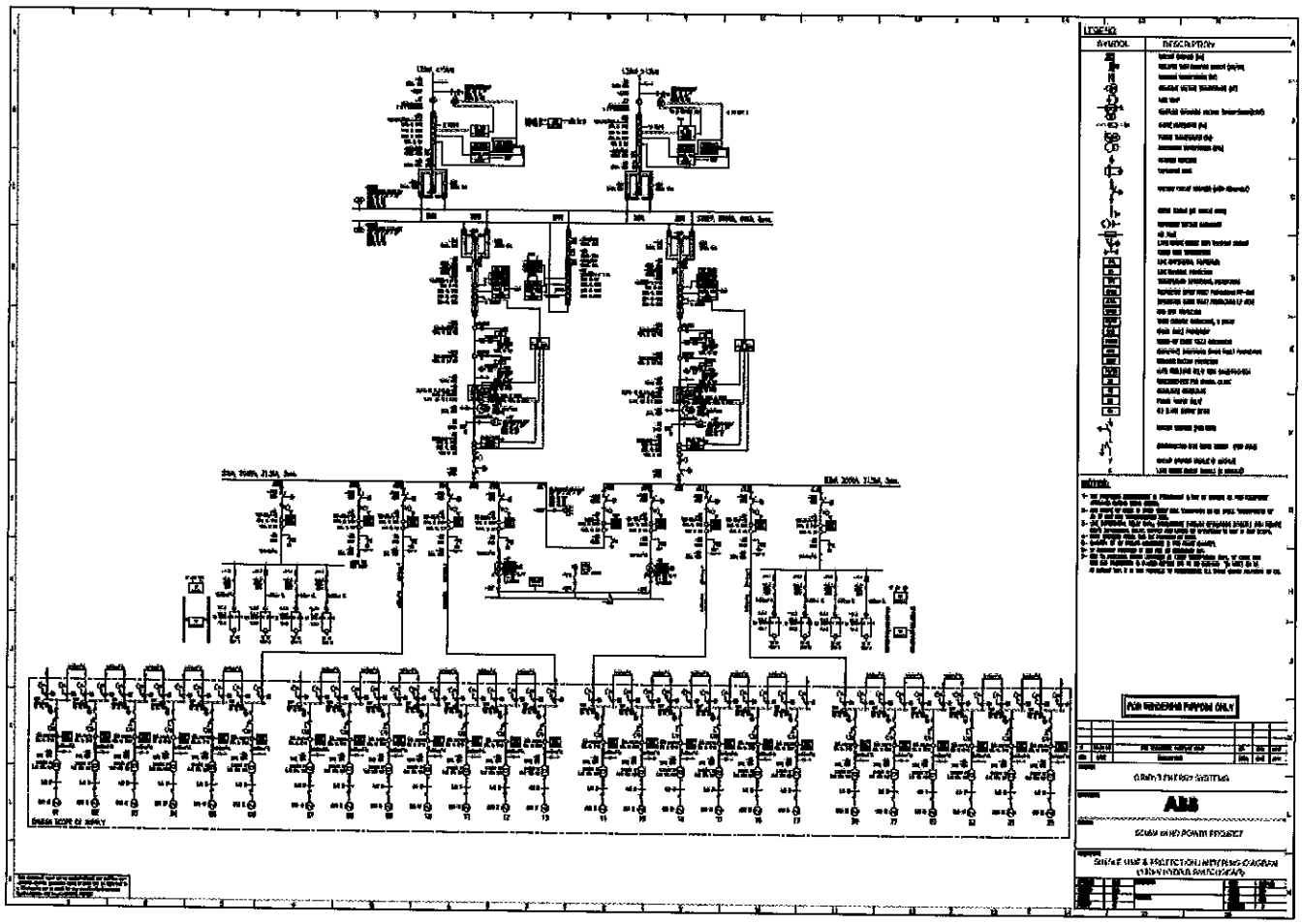
Location: Jhimpir – Sindh, Pakistan

The Site coordinates are given in Table below.

S. No.	Latitude	Longitude
1	24.909699	67.798994
2	24.910856	67.799731
3	24.951911	67.724835
4	24.952996	67.725601

Electrical System Single Line Diagram of Generation Facility/Wind Farm

The project will install 25 WTGs (Gamesa G114-2.0). There shall be four (04) WTG collector group.



Micro-Sitting of Generation Facility/Wind Farm

The micrositing of Wind Farm with 25 WTGs is given in figure below.

The coordinates are WTGs are given in table below.

G01	371683	2760051
G02	371972	2759867
G03	372260	2759684
G04	372549	2759500
G05	372837	2759316
G06	373126	2759133
G07	373414	2758949
G08	373703	2758765
G09	373991	2758582
G10	374280	2758398
G11	374569	2758215
G12	374857	2758031
G13	371339.5	2760257
G14	375434	2757664
G15	375777.4	2757426
G16	376047.4	2757253
G17	376327.2	2757087
G18	376588	2756929
G19	378182.9	2755888
G20	377165	2756562
G21	377409.9	2756402
G22	377669	2756230
G23	377928.9	2756062
G24	378457.2	2755710
G25	378727.2	2755553

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

Detail of Generation Facility/Power Plant/ Wind Farm

(A). General Information

(i).	Name of Applicant/Company	Liberty Wind Power 1 Private Limited
(ii).	Registered/Business Office	A/51-A,S.I.T.E, Karachi, Pakistan
(iii).	Plant Location	Jhampir, Nooriabad, District Thatta, Sindh
(iv).	Type of Generation Facility	Wind Power

(B). Wind Farm Capacity & Configuration

(i).	Wind Turbine Type, Make & Model	Gamesa G114-2.0 MW
(ii).	Installed Capacity of Wind Farm (MW)	50 MW
(iii).	Number of Wind Turbine Units/Size of each Unit (kW)	25 x 2000 kW

(C). Wind Turbine Details

(a).	Rotor	
(i).	Number of blades	3
(ii).	Rotor diameter	114 m
(iii).	Swept area	10207 m^2
(iv).	Power regulation	Combination of blade pitch angle adjustment, and generator / converter torque control.
(v).	Cut-in wind speed	3 m/s
(vi).	Cut-out wind speed	25 m/s

(vii)	Survival wind speed	59.5 m/s (Maximum 3 sec)
(viii)	Pitch regulation	Electric motor drives a ring gear mounted to the inner race of the blade pitch bearing.
(b).	**Blades**	
(i).	Blade length	56 m
(ii).	Material	Composite material reinforced with fiberglass through resin infusion technology.
(c).	**Gearbox**	
(i).	Type	3 combined stages: 1 stage planetary, 2 parallel shift gears.
(ii).	Gear ratio	1:128.5
(iii).	Main shaft	Cast shaft
(d).	**Generator**	
(i).	Nominal Power	2070 (kW)
(ii).	Voltage	690 V
(iii).	Type	Doubly fed with coil rotor and slip rings
(iv).	Degree of Protection	IP54 Turbine – IP21 Ring Body
(v).	Coupling	Main Shaft: Cone Collar, High Speed Shaft: Flexible coupling.
(vi).	Power factor	0.95
(e).	**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
(f).	**Brake**	
(i).	Design	Mechanical brakes

(ii).	Operational brake	Aerodynamic brake achieved by feathering blades.
(iii).	Secondary brake	Mechanical brake on (high speed) shaft of gearbox.
(g).	**Tower**	
(i).	Type	Conical barrel tube
(ii).	Hub heights	93 m
(h).	**Yaw System**	
(i).	Yaw bearing	PETP
(ii).	Brake	Active Yaw
(iii).	Yaw drive	Motor Drive
(iv).	Speed	0.42°/s Controlling speed

(D). Other Details

(i).	Project Commissioning Date (Anticipated)	2018-2019
(ii).	Expected Life of the Project from Commercial Operation Date (COD)	25 Years

Power Curve of Gamesa G114-2.0MW Wind Turbine Generator

The tabular and graphical values of Power curve are shown below:

3	29
4	135
5	319
6	581
7	943
8	1408
9	1804
10	1977
11	1993
12	1999
13	2000
14	2000
15	2000
16	2000
17	2000
18	2000
19	2000
20	2000
21	2000
22	1906
23	1681
24	1455
25	1230

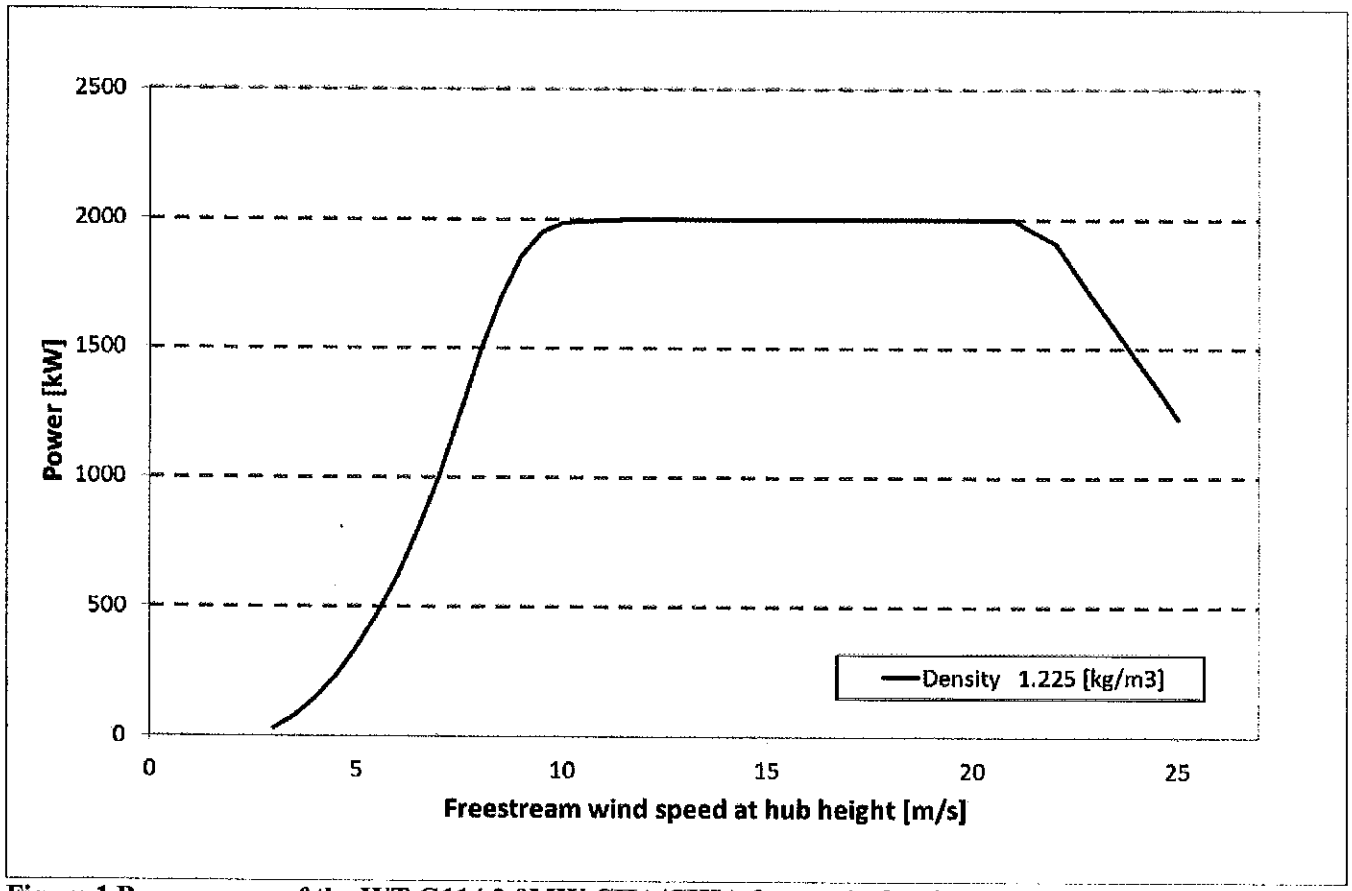


Figure 1 Power curve of the WT G114 2.0MW CIIA/CIIIA for an air density equal to 1.225 [kg/ m3]

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)	50 MW
(2).	Total Annual Full Load Hours	3328.80
(3).	Average Wind Turbine Generator (WTG) Availability	98%
(4).	Total Gross Generation of the Generation Facility/Wind Farm (in GWh)	185.518
(5).	Array & Miscellaneous Losses GWh	10.72969
(6).	Availability Losses GWh	3.71036
(7).	Balance of Plant Losses GWh	4.63795
(8).	Annual Energy Generation (25-year equivalent Net AEP) GWh	166.44
(9).	Net Capacity Factor	38 %

Note

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

DET NORSKE VERITAS

TYPE CERTIFICATE

G114-2.0MW IEC-IIA HH80, 93 & 125m 50/60Hz

TC-236603-A-2
Certificate number

2015-05-29
Date of issue

Manufacturer:

Gamesa Innovation and Technology, S.L.
Avda. Ciudad de la Innovación, 2 Parque Tecnológico
31621 Sarriguren (Navarra) - Spain

Valid until: 2019-12-12

Conformity evaluation has been carried out according to IEC 61400-22: 2010 "Wind Turbines - Part 22: Conformity Testing and Certification". This certificate attests compliance with IEC 61400-1 ed.3 incl. amd.1 and IEC 61400-22 concerning the design and manufacture .

Reference documents:

Final Evaluation Report:	PD-2366-18L080E-27 rev 2
Design Basis Conformity Statement:	DB-236603-A-0
Design Evaluation Conformity Statement:	DE-236603-A-2
Type Test Conformity Statement:	TT-236603-A-0
Manufacturing Conformity Statement:	MC-236603-A-1

Component Certificate 009.03.3.01.14.05 issued by TÜV SÜD for the LM 56.0 P Blade (DNV take no responsibility for the work covered by this Component Certificate)

Wind Turbine specification:

IEC WT class: IIA. For further information see Appendix 1 of this Certificate.

Date: 2015-05-29

J. Christer Eriksson

Management Representative
Det Norske Veritas, Danmark A/S

DANAK
PROD Reg. no. 7031

Date: 2015-05-29

Gema Parro

Project Manager
Det Norske Veritas, Danmark A/S

DET NORSKE VERITAS, DANMARK A/S

National Electric Power Regulatory Authority
Islamic Republic of Pakistan

Registrar

NEPRA Tower, Attaturk 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/TRF-425/LWPL-1-2017/18014-18016
November 19, 2018

Subject: **Determination of the National Electric Power Regulatory Authority in the matter of Tariff Petition filed by Liberty Wind Power 1 (Pvt.) Limited for Determination of Reference Generation Tariff in respect of 50 MW Wind Power Project** [Case # NEPRA/TRF-425/LWPL-1-2017]

Dear Sir,

Please find enclosed herewith the subject Determination of the Authority along with Annexure-I & II (27 pages) in Case No. NEPRA/TRF-425/LWPL-1-2017.

2. The Determination is being intimated to the Federal Government for the purpose of notification in the official gazette pursuant to Section 31(7) of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997.

3. The Order part along with Annexure-I & II of the Authority's Determination are to be notified in the official Gazette.

Enclosure: As above

19 11 18

(Syed Safeer Hussain)

Secretary
Ministry of Energy (Power Division)
'A' Block, Pak Secretariat
Islamabad

CC:

1. Secretary, Cabinet Division, Cabinet Secretariat, Islamabad.
2. Secretary, Ministry of Finance, 'Q' Block, Pak Secretariat, Islamabad.

LIBERTY WIND POWER 1 (PVT) LTD. LWP-1

DETERMINATION OF THE NATIONAL ELECTRIC POWER REGULATORY AUTHORITY IN THE MATTER OF TARIFF PETITION FILED BY LIBERTY WIND POWER 1 (PVT) LIMITED FOR DETERMINATION OF REFERENCE GENERATION TARIFF IN RESPECT OF 50 MW WIND POWER PROJECT

1. Liberty Wind Power 1 (Pvt.) Ltd. (formerly Zulaikha Energy (Pvt.) Ltd.) ("LWPL-1" or "the petitioner" or " the company/project company") vide its letter dated December 15, 2017 filed a tariff petition before National Electric Power Regulatory Authority ("NEPRA" or the Authority") under the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 ("NEPRA Act") and NEPRA (Tariff Standards & Procedure) Rules, 1998 for determination of generation tariff in respect of its 50 MW wind power project ("the project") envisaged to be set up at Jhimpir, District Thatta, Sindh. The petitioner requested for the approval of levelized tariff of US Cents 6.8231/kWh (Rs. 7.1643/kWh) over the tariff control period of 25 years.

SUBMISSIONS OF THE PETITIONER

2. The petitioner submitted that it is a company established under the laws of Pakistan. Letter of Intent ("LOI") was issued to the project company by Directorate of Alternative Energy, Government of Sindh ("GOS") on August 28, 2015 for establishing a 50 MW wind power generation project. On January 17, 2018, the validity of the said LOI was extended by GOS till May 13, 2019.

3. LWPL-1 also submitted the minutes of the meeting of Panel of Experts ("POE") of GOS dated October 31, 2017 which was conducted to review the feasibility study submitted by LWPL-1. In that meeting, the POE approved the feasibility study of the project and advised the project company for further perusal of tariff and generation license. The generation license was issued by NEPRA to LWPL-1 on February 1, 2017.

4. Summary of the key information provided by the petitioner is as follows:

Project company	:	Liberty Wind Power 1 (Private) Limited *(formerly Zulaikha Energy (Private) Limited*
Sponsors	:	Liberty Mills Limited
Capacity	:	50 MW

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Project location	:	Jhimpir, District Thatta, Sindh	
Land area	:	322 Acres	
Concession period	:	25 years from Commercial Operations Date	
Power purchaser	:	Central Power Purchasing Agency Guarantee Ltd.	
Wind turbine	:	Siemens Gamesa Renewable Energy	
Model	:	G114-2.0	
Plant capacity factor	:	38%	
Annual energy generation	:	166.440 GWh	
EPC contractor	:	HydroChina Corporation	
Project cost		**USD in millions**	
EPC cost	:	78.000	
Duties & taxes	:	1.030	
Non-EPC & Project Development Cost	:	4.140	
Insurance during construction	:	0.550	
Financial Charges	:	1.410	
Interest during construction	:	2.860	
Total project cost	:	**87.990**	
Financing structure	:	Debt: 80% : Equity: 20%	
Debt composition	:	50% local % 50% foreign loan	
Interest rate	:	SBP Facility - Fixed rate (2%) + 1.5%	
		3 month LIBOR (1.57%) + 4.25%	
Debt repayment period	:	Local loan 10 years and foreign loan13 years	
Return on equity	:	13.87% IRR based	
O&M cost	:	USD 1.90 million per annum	
Insurance cost	:	USD 0.39 million per annum	
		PKR/kWh	**US¢/kWh**
Levelized Tariff	:	7.1643	6.8231
Exchange rate	:	1 USD = PKR 105	

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PROCEEDINGS:

5. The Authority considered the tariff petition and admitted the same for further processing. Notice of Admission/Hearing containing salient features of the petition, hearing schedule and issues framed for hearing was published in two national daily newspapers on March 18, 2018. Through the said notice, NEPRA invited comments and intervention requests from the interested parties within fourteen (14) days of publication of notice. Tariff petition and Notice of Admission/Hearing were also published on NEPRA's website for information of general public. Individual Notices of hearing were also sent to the stakeholders, considered to be relevant, and the petitioner on March 20, 2018 for participation in the proceedings.

6. The hearing on the subject matter was held on April 5, 2018 (Thursday) at 11:00 A.M. at NEPRA Tower, Islamabad, which was attended by a large number of participants including the petitioner, representatives of National Transmission & Despatch Co. Ltd. ("NTDCL"), Punjab Power Development Board ("PPDB"), GOS etc.

7. In response to Notice of Admission/Hearing, comments were received from Central Power Purchasing Agency (Guarantee) Limited (CPPA-G) dated March 27, 2018 whereas no intervention request was received from any party. The comments of CPPA-G are discussed in the relevant paragraphs of this determination.

ISSUES FRAMED:

8. Following is the list of issues that were framed by the Authority for the hearing:

   i. Whether the details provided for EPC cost are sufficient and whether the claimed EPC cost is competitive and comparative and based on the firm and final agreement(s)? and
   ii. Whether the NEPRA (Selection of EPC Contractor by IPPs) Guidelines, 2017 have been fully complied with?
   iii. Whether the details provided for Non-EPC cost are sufficient and claimed Non-EPC cost is justified? Also provide justification for land requirement as claimed by the petitioner.
   iv. Whether the claimed annual energy generation and corresponding plant capacity factor are reasonable and justified? And

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v. Whether the petitioner's proposed wind turbine technology satisfies the international standards of quality and operation?

vi. Whether the claimed O&M costs are justified? Provide rationale of claiming foreign & local O&M cost.

vii. Whether the claimed insurance during operation cost is justified?

viii. Whether the claimed return on equity is justified?

ix. Whether the claimed financing/debt terms are justified?

x. Whether the claimed construction period is justified?

xi. Any other issue with the approval of the Authority.

9. The issue wise submissions of the petitioner and the Authority's findings and decision thereon are as under:

Whether the details provided for EPC cost are sufficient and whether the claimed EPC cost is competitive and comparative and based on the firm and final agreement(s)? and

Whether the NEPRA (Selection of EPC Contractor by IPPs) Guidelines, 2017 have been fully complied with?

10. The petitioner has claimed USD 78.000 million on account of Engineering, Procurement and Construction ("EPC") cost in its tariff petition. In this regard the petitioner has submitted copies of EPC contracts signed on October 15, 2017. The breakup of the EPC cost as provided by the petitioner is given hereunder:

EPC cost	(PKR in million)	(USD in million)	Total (USD in million)
Offshore contract		67.000	67.000
Onshore contract	577.500	5.500	11.000
Total	**577.500**	**72.500**	**78.000**

11. The petitioner has submitted that it has carried out a comprehensive competitive bidding process for the selection of EPC contractor for the project. NEPRA vide letter dated May 11, 2018 directed LWPL-1 to submit the complete documents related to bidding process followed by the project company for the selection of the EPC contractor. In response, the petitioner submitted all the documents with respect to the bidding process vide letter dated May 28, 2018. In the said

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letter the petitioner informed that Request for Proposal ("RFP") was issued to various EPC contractors on April 07, 2016 and the potential bidders were requested to submit their bids by or before May 06, 2016. In response, following EPC contractors submitted their bids:

a. Nordex Acciona Wind Power
b. Hydro China International
c. Sany Heavy Energy Machinery Limited
d. Shandong Swiss Electric Company Limited
e. Orient Energy System

12. The petitioner submitted that the bid evaluation process was conducted by its technical consultant along with project development team of the company. All the received bids were critically evaluated based on various, technical, commercial and financial parameters. According to the evaluation matrix, M/s Hydrochina International was selected as EPC contractor with overall price of USD 84.5 million. The petitioner further submitted that NEPRA announced benchmark tariff for wind power projects on January 27, 2017. For filing petition under cost plus mode, LWPL-1 submitted that it renegotiated the EPC price to the level of USD 78 million with the selected EPC contractor to bring that in line with the benchmark tariff. Further, the WTG having hub height of 93m was selected as opposed to previously offered 80m to increase the energy output. In its petition, LWPL-1 submitted that the Offshore Contract was signed with M/s Power Construction Corporation of China Limited on October 15, 2017 which includes procurement and supply of electrical and mechanical equipment outside Pakistan. The Onshore Contract was signed with M/s Hydrochina International Engineering Company Limited on October 15, 2017 which includes civils works, erection, testing, commissioning and all other works for completion of the project inside Pakistan. The EPC contractor will install 25 x G114-2.0 selected WTGs at 93 meter hub height for the project. During the hearing, the petitioner submitted that EPC bidding process for the project was completed before the issuance of NEPRA (Selection of Engineering, Procurement and Construction Contractor by Independent Power Producers) Guidelines, 2017, i.e. on May 19, 2017.

13. To evaluate the EPC cost claim of LWPL-1, the Authority has considered the latest available EPC cost data in different parts of the world. The information given in the reports published by International Renewable Energy Agency ("IRENA"), Bloomberg and other sources has been relied

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upon for this purpose. Furthermore, the tariff determinations approved by the regulators of countries in different regions have also been studied. The costs allowed by the Authority in previously determined wind power projects were also examined. After analysing all this information, the Authority is of the view that EPC cost of USD 78.000 million as claimed by LWPL-1 is on the higher side. The process of selection of contractors followed by the petitioner may have been transparent; however, the same has not yielded prices which can be considered competitive and comparative. The considerations of the Authority for the assessment of the EPC costs to be allowed to the petitioner are given in the following paragraph.

14. It was noted that the average wind turbine prices across most of the countries were below USD 1 million per MW in 2017. The most updated reports provide that average global cost of wind turbines for the contracts signed in 1st Half of 2018 have fallen to around USD 0.85 million per MW. Beside turbine cost, the absolute amount and proportion of other components that constitute the total EPC cost as given in the referred reports was also analysed. EPC costs in China and India were also checked and found lowest in the world due to their local manufacturing, low cost of land and labour etc. For instance, there are states in India where the total EPC cost of even less than USD 0.80 million per MW has been allowed recently by their respective regulators. However, the Authority is of the view that the cases of any particular country cannot be made exact reference for Pakistan owing to differences in market conditions, local manufacturing bases, tariff regimes, performance targets and other technological and economic factors. The trend of decrease in EPC prices over last couple of years and reasons thereof were also examined. The competition among WTG suppliers has been reported as the primary factor for the decline in turbine prices and corresponding EPC cost of wind power projects. The variations in the cost of turbine having different hub heights, rotor diameters, nameplate capacity, origin of manufacturing were also analysed. The differences in the civil cost part of the project due to variations in the number and size of the turbines were also considered. The Authority further noted that margins for EPC contractor, transportation costs, level of performance being approved in this determination etc. should also be taken into account to set the EPC cost. After detailed analysis of the available information and factoring in all the aforesaid factors, the Authority has decided to approve the EPC cost of LWPL-1 as USD 57.940 million.

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15. The allowed EPC cost is the maximum limit on overall basis. Applicable foreign portion of this cost, shall be allowed variations at Commercial Operations Date ("COD") due to change in PKR/USD parity during the allowed construction period, on production of authentic documentary evidence to the satisfaction of the Authority.

16. It has been noted that the hub height of the project in the approved license is 80 m whereas the petitioner during the hearing informed that turbines having hub height of 93 m shall be installed for the project. Further, it is noted that the license has been granted to the petitioner in the name of Zulaikha Energy (Pvt) Limited and the subject petition has been filed with the company name of LWPL-1. The petitioner is hereby directed to get the approval of the Authority for the aforementioned changes in its generation license at the earliest.

Whether the details provided for Non-EPC cost are sufficient and claimed Non-EPC cost is justified? Also provide justification for land requirement as claimed by the petitioner.

17. The petitioner has claimed USD 9.990 million on account of non-EPC cost. Detail of non-EPC cost provided by the petitioner is hereunder:

Non-EPC Cost	(USD million)
Project Development cost	4.140
Duties & taxes	1.030
Insurance during construction	0.550
Financial charges	1.410
Interest during construction	2.860
Total Non-EPC Cost	**9.990**

Project Development Cost

18. The petitioner has claimed Project Development Cost ("PDC") of USD 4.140 million. In its petition and during the hearing, the petitioner submitted that this claim includes the cost of feasibility and other studies, administrative costs, fixed assets and office setup cost, various regulatory fees, travelling expenses, cost of land and fees in relation to advisors of the project.

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19. The petitioner submitted that the land lease for 322 acres has been signed with GOS on June 05, 2017. The petitioner has submitted the agreement of lease as per which it has already paid an amount of Rs. 9.66 million for the first 10 years lease.

20. The Authority has noted that PDC of around USD 3.5 million had been allowed in the earlier tariff cases of wind power projects. The Authority also referred the recent tariff cases of solar power projects of comparable size where the maximum PDC to the tune of USD 1.782 million has been allowed. Considering these details while accounting for the difference in construction period between solar and wind power projects, the Authority has decided to allow USD 2.5 million on account of PDC to the petitioner. This cost shall be adjusted at actual, up to the maximum allowed cost, based on production of verifiable documents at the time of COD.

Duties and Taxes

21. The petitioner has claimed taxes & duties of USD 1.030 million. The petitioner submitted that Sindh Infrastructure Development Surcharge @ 1.15% (USD 0.834 million) of the imports for the project has been assumed. In addition, financing cost on Sindh Sales Tax to the tune of USD 0.2 million has been claimed. The petitioner further submitted that custom duty, special excise duty, sales tax, advance income tax and federal excise duty have not been assumed in the petition and requested to allow/adjust at actual at COD.

22. The Authority noted that it has been allowing only those duties and taxes which are imposed directly on the petitioner and not on the third party, being non-transferable and non-reimbursable nature up to commencement of operation at COD stage on actual upon production of verifiable documentary evidences to the satisfaction of the Authority. The same treatment is allowed for LWPL-1 also. Doing so, impact of such duties/taxes has not been taken into account in the reference tariff and the same shall be adjusted at the time of COD.

Insurance During Construction

23. The petitioner has claimed USD 0.550 million on account of insurance during construction cost based on 0.70% of claimed EPC cost plus custom duties. Following insurance coverage has been indicated by the petitioner as required by the lenders during the construction period:

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a. Construction all risk insurances (CAR)
b. CAR delay in start-up insurance
c. Terrorism insurance
d. Marine and inland transit insurance
e. Marine – delay-in start-up insurance
f. Comprehensive general liability

24. The Authority has analysed the available data with respect to during construction insurance incurred by a number of wind power projects that have achieved COD. It has also been noted that in the recent tariff cases of solar power projects, the Authority has allowed pre-COD insurance at the maximum rate of 0.50% of the approved EPC cost. Based on these considerations, the Authority has decided to allow insurance during construction to the maximum of 0.5% of the approved EPC cost for the project as well which works out to be around USD 0.290 million. Insurance during construction shall be adjusted at actual, subject to allowed amount as maximum limit, at the time of COD on production of authentic documentary evidence to the satisfaction of the Authority.

Financial Fee & Charges

25. The petitioner has claimed USD 1.410 million on account of financial charges and submitted that the claimed amount includes lenders up-front fee, lenders advisors & agents charges, commitment fee, management fee, charges related to various Letter of Credit ("LC")to be established in favour of various contracting parties, fees payable and stamp duty applicable on the financing documents, agency fee, security trustee fee, LC commitment fee/charges for EPC, commitment fee and other financing fees cost and charges. The petitioner submitted that keeping in view the deteriorating country risk profile of the country, long gestation period of the project and prevailing circular debt issue, higher financing cost is required to be incurred for obtaining financing for the project.

26. It was noted that in earlier tariff determinations for wind power projects, the Authority had allowed financial fee & charges at the rate of 3% of the debt portion of capital expenditures (EPC, PDC, pre-COD insurance). In recent cost plus tariff determinations of solar power projects, financial fee & charges at the rate of 2.5% of the debt portion of capital expenditures has been

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allowed. Considering the recent standards, the Authority has decided to approve financing fee and charges with the cap of 2.5% of the allowed debt portion of the approved capital cost to LWPL-1. Accordingly, the allowed amount under this head works out to be around USD 1.215 million. Financing charges shall be adjusted at actual, subject to allowed amount as maximum limit, at the time of COD on production of authentic documentary evidences to the satisfaction of the Authority.

Interest During Construction (IDC)

27. The petitioner has claimed interest during construction of USD 2.86 million for 15 month construction period on the terms offered by the lender which has been calculated at State Bank of Pakistan ("SBP") financing rate of 2% plus a spread of 1.50% for local financing and at 3-month LIBOR (1.57%) plus a spread of 4.25% for foreign loan. The petitioner submitted that actual IDC, however, shall be subject to change in base rate, funding requirement (drawdowns) of the project during the construction period, changes in project cost including changes due to taxes and duties, and variations in PKR / USD exchange rate. The loan repayment period of ten years for local loan and thirteen years for foreign loan has been claimed by the petitioner. The terms of financing as well as period for construction being approved in this determination are discussed in the ensuing relevant sections. Based on the approved financing terms, construction period, capital cost including financing fee and charges while considering notional drawdowns of 20% in each quarter, the IDC works out to be USD 1.961 million which is hereby approved.

28. Recapitulating the above, the approved project cost under various heads is given hereunder:

Project Cost	(USD million)
EPC Cost	57.940
Project Development Cost	2.500
Insurance during construction	0.290
Financing Fee & Charges	1.215
Interest During Construction	1.961
Total	**63.906**

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Whether the claimed annual energy generation and corresponding plant capacity factor are reasonable and justified? And whether the petitioner's proposed wind turbine technology satisfies the international standards of quality and operation?

29. The petitioner submitted the following technical parameters in this regard:

Project capacity	50 MW
Annual power generation	166,440 MWh
Net capacity factor	38%
Hub Height	93m
Rotor Diameter	114m
Name plate capacity (Each Turbine)	2 MW

30. The petitioner has claimed annual energy production of 166.440 GWh and corresponding net plant capacity factor of 38%. The petitioner submitted Wind Resource and Energy Yield Assessment Report ("Energy Report") conducted by the technical consultant hired by LWPL-1. The petitioner submitted that the project has collected wind climate data from a Ground Measuring Station installed at the project site according to international standards.

31. The petitioner submitted that GAMESA Corporation is a multi-national company, with head office in Spain, involved in Design, Manufacturing, Engineering, Erection & Commissioning, Operations and Maintenance of wind turbines and wind farms around the world. The petitioner also submitted that Gamesa has a wide product range with a power capacity from 660kW per WTG to 5MW per WTG. Out of the total 21.9 GW manufactured by Gamesa, 19.3 GW belongs to 2.0-2.5 MW platform with a proved availability number higher than 98% worldwide. Gamesa 2.0-2.5 MW platform has been selected by 10 out of 15 top wind farm developers around the globe in 2014. The petitioner during the hearing submitted that the selected turbine has been certified by Det Norske Veritas (DNV) laboratory.

32. To assess this parameter of tariff, the Authority has analysed the data of energy yields of currently operational wind power plants in the country. The data of energy yields in different regions of the world and their trend in last couple of years has also been reviewed. It has been noted that worldwide, the capacity factors have improved as new machines are yielding better energy

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output within a given wind resource regime. These improvements have also been noted while comparing the energy production of old and newly commissioned wind power projects in Jhimpir region. It is found that the primary reason of these better results has been the change in turbine design through improvement in hub height, nameplate capacity and especially the enhancement in rotor diameters. For LWPL-1 also, it has been found that the mentioned three parameters are better than the turbines installed by the earlier wind power projects which are under operation in the country. Keeping in view these considerations while comprehensively analysing the information with respect to wind resource, location, technology etc. the Authority understands that the net annual plant capacity factor as claimed by the petitioner is quite on the lower side. The Authority is of the view that the yield numbers provided in the Energy Report at each probability level are quite conservative. As per the analysis of the Authority, it is considered that there exists high likelihood that the project can comfortably achieve yield better than given in the Energy Report even when compared with energy numbers at P50 level.

33. The Authority also noted the recent tariffs of three wind power projects were approved based on capacity factor results as assessed by the Authority. However, those project companies filed review motions primarily objecting the capacity factor approved in those determinations. In addition, the financiers such as Asian Development Bank and International Finance Corporation approached the Authority stating that it may not be viable for them to finance wind power projects on the basis as adopted by NEPRA to assess capacity factor. They requested the Authority that tariff of wind power projects should be set on a good probability level, preferably as given in their Energy Reports. They further submitted that the tariffs of wind power projects throughout the world are set on energy yield having higher possibility, mainly for financing purpose.

34. In view of these considerations and primarily to ensure the bankability of the project, the Authority has decided to set the tariff of LWPL-1 at net annual plant capacity factor of 38%. However, keeping in view the assessed potential of higher generation, the Authority has decided to approve the following sharing mechanism:

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Net annual plant capacity factor	% of prevalent tariff allowed to power producer
Above 38% up to 40%	5%
Above 40% up to 42%	10%
Above 42% up to 44%	20%
Above 44% up to 46%	40%
Above 46% up to 48%	80%
Above 48%	100%

Whether the claimed O&M costs are justified? Provide rationale of claiming foreign & local O&M cost.

35. The petitioner has claimed O&M cost of USD 1.90 million per annum i.e. USD 38,000 per MW per annum. The petitioner submitted the O&M contract for the initial 2 years (i.e. warranty period) signed with Hydrochina International Engineering Company Ltd. on October 15, 2017. In its petition and during the hearing, LWPL-1 submitted that the claimed O&M includes cost of services rendered by the O&M operator, spare parts and related cost for routine maintenance. It also includes cost of administrative expense, security expenses, human resources, local general stores, utilities, land lease, corporate, audit & advisory fees etc. The O&M cost has been claimed in the ratio of 39:61 for local and foreign costs respectively.

36. To evaluate the O&M cost claim of LWPL-1, the Authority has considered the latest available O&M cost data in different parts of the world. The information given in the reports published by IRENA Bloomberg and other sources have been relied upon. Furthermore, the tariff determinations approved by the regulators of countries in different regions have also been studied. The costs allowed by the Authority in previously determined wind power projects were also examined. Analysing all this data and particularly the trend of decrease in this cost component, the Authority is of the view that O&M cost of USD 1.9 million as claimed by LWPL-1 is not reasonable. The considerations made by the Authority for the assessment of the O&M costs to be allowed to the petitioner are given in the following paragraph.

37. The referred reports provide that the O&M cost has decreased sharply over the last couple of years and forecast further decrease in the upcoming years. The O&M cost of as low as USD

15,000 per MW per annum has been found in the referred sources for the initial term contracts. However, these sources qualify that O&M cost increases reasonably with turbines age as component failure becomes more common and manufacturer warranties expire. It has also been found that wind power projects being setup with larger turbines and more sophisticated design will have relatively lower overall O&M cost. The reported impact of size of project and turbines on the annual cost of O&M and differentials with their varying sizes was also analysed. O&M cost in India and China have also been checked and found to be lowest across different countries. Particularly in India, the O&M cost has been found in range of USD 10,000 per MW to USD 14,000 per MW in different states. Nevertheless, the Authority is cognizant of the fact that the costs of India and China cannot be replicated in Pakistan due to advanced development stage of wind industry in those countries and consequent available expertise in terms of manpower and required equipment as well as due to difference in tariff regimes. In addition, the Authority also noted that the level of performance being approved in this determination is relatively higher as compared to what is allowed in India and China which shall require more robust warranties from the O&M contractor that shall also result in comparatively higher O&M cost. Considering all these factors, the Authority has decided to approve O&M cost of USD 23,000 per MW per annum for LWPL-1. In view of the claim of the petitioner and other project companies, the Authority has decided to share the approved O&M cost into local and foreign components in the ratio of 50:50.

Whether the claimed insurance during operation cost is justified?

38. The petitioner has claimed USD 0.39 million per annum on account of insurance during operation which is based on 0.5% of claimed EPC cost. The claimed insurance cost consists of operations all risk insurance for the project as well as business-interruption insurance. The petitioner submitted that these are standard insurances required by all lenders' and also set out under the Energy Purchase Agreement ("EPA"). The petitioner submitted that since the Pakistan Insurance/Reinsurance industry does not have sufficient capacity and expertise to manage such huge risks entirely, therefore this risk is required to be insured/reinsured internationally. The risks to be covered through insurance will include machinery breakdown, natural calamities (like earthquake, floods, etc.), sabotage and consequential business interruption, etc.

39. The Authority has allowed insurance during operation at the rate of 0.4% of the EPC cost in the most recent determination of solar energy projects. The data of actual insurance of operational wind power projects has also been analysed for this purpose which shows that insurance during operation has been secured at the rate of even less than 0.4%. In view thereof, the Authority has decided to allow insurance during operation at maximum limit of 0.4% of the approved EPC cost to LWPL-1. This cost shall be allowed adjustment on annual basis as per the mechanism given in the order part of this determination.

Whether the claimed return on equity is justified?

40. The petitioner claimed return on equity (ROE) and return on equity during construction (ROEDC) of 13.87% and submitted that ROE be adjusted at COD in order to ensure an IRR based return of 15% on equity. The petitioner further submitted that the withholding tax component has not been identified as a separate line item in the tariff as the same is assumed to be paid on all equity components i.e. ROE and ROEDC, at actual as a pass-through item under the tariff.

41. It was noted that over the passage of time, the Authority has revised the equity returns downward for a number of generation technologies keeping in view the developments in those sectors. The Authority has noted that nearly 1200 MWs of wind power projects are operational. Further, it has been learnt that wind power projects having capacity of more than 2,000 MWs to be setup in Sindh have obtained LOIs from different facilitating agencies. This makes it quite clear that risk profile for developing wind projects especially in Sindh province has reduced considerably. Moreover, the Authority noted that a number of under process wind power companies have claimed ROE of even less than 14%. In view thereof, the Authority has decided to approve the ROE for the petitioner at the rate of 14%. Regarding the petitioner's claim of withholding tax on dividend, the Authority noted that it has principally decided not to allow this tax as pass through in any of the tariff cases.

Whether the claimed financing/debt terms are justified?

42. The petitioner has submitted that 50% foreign loan and 50% local loan shall be secured for the project based on debt to equity ratio of 80:20. For foreign financing, the interest rate of LIBOR (1.57%) plus 4.25% with debt repayment period of 13 years has been claimed. For local financing, the petitioner submitted that debt under SBP financing scheme shall be availed with a fixed rate

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of 2% plus 1.50% with debt repayment period of ten years. The petitioner has submitted indicative term sheet signed with the lenders (CDC and Faisal Bank).

43. The Authority has considered the terms of financing being claimed by the petitioner. The Authority has noted that the SBP has issued concessionary financing scheme in June, 2016. Under the said scheme, renewable energy projects having capacity up to 50 MW can secure loan up to the limit of Rs. 6 billion at the fixed rate of maximum 6% for the minimum debt servicing tenor of ten years. The size of the project being setup by the petitioner is 50 MW which makes it eligible to avail 100% financing under SBP scheme. The Authority has therefore decided to approve the reference tariff of LWPL-1 while taking into account 100% loan under SBP scheme and hereby direct the petitioner to approach SBP for this purpose.

44. In case the petitioner is not able to secure financing under SBP scheme then the tariff of LWPL-1 shall be adjusted on conventional local/foreign financing, or a mix of both, at the time of its COD. However, the petitioner shall have to prove through documentary evidence issued by SBP/commercial bank that it exhausted the option of availing 100% financing under SBP scheme before availing part/full of conventional local/foreign loan. For conventional full/part of local loan, if any, the tariff of the petitioner shall be approved on applicable KIBOR plus spread of 2.25% and foreign loan on applicable LIBOR plus spread of 4.25%. For conventional loans, the term of debt servicing shall not be lesser than thirteen years. As the reference tariff has been computed using 100% loan under SBP scheme as against the claim of 50% of that loan, therefore, the rate of 6%, as given in the said scheme, has been taken into account. The savings in the cost of the financing (i.e. if the cost is less than 6%), if negotiated/availed by the company, shall be shared in accordance with the mechanism given in the Order part of this determination.

45. The Authority has decided to approve the tariff of LWPL-1 on the basis of debt to equity ratio of 80:20 as claimed by the petitioner which shall remain same regardless of any form of financing secured by the petitioner.

Whether the claimed construction period is justified?

46. The petitioner has claimed 15 months for the construction of the project. The Authority has found this claim reasonable and decided to allow the same.

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Any other issue with the approval of the Authority.

Comments of CPPA-G

47. CPPA-G submitted that NEPRA should review the proposal in the context of demand vs supply situation coupled with the quantum of renewable energy to be inducted in Grid according to the recommendations of Grid Code Review Panel ("GCRP") duly approved by NEPRA from time to time. CPPA-G also submitted that all the projects based on wind, solar, small hydel and bagasse energy will be awarded through competitive bidding as per Cabinet Committee on Energy ("CCE") decision.

48. Regarding the submission of CPPA-G with respect to demand and supply position, it has been noted that NTDCL vide its letter dated June 23, 2017 submitted tentative demand supply analysis with the report namely Power Balance up to 2025. In that document, NTDCL submitted that it plans to evacuate 600 MW additional power from wind power projects in 2019-20 and further 500MW collectively from wind and solar power projects in 2020-21.

49. Regarding quantum of renewable energy induction in the Grid, the Authority has noted that as per approved Grid Code Addendum No. I (Revision-I) for Grid Integration of Wind Power Plants, the upper limit equal to 5% of the total installed grid-connected power capacity has been set for the integration of wind power plants. The Authority also noted that NTDCL has issued certificate of approval of the system studies of the project company on December 1, 2016. NTDCL in its approval letter also certified that the power to be generated by the project company will be evacuated by July, 2019 and will not have any adverse effect on the national grid as required under the Grid Code. On the basis of that approval, the Authority has issued generation license to LWPL-1 on February 01, 2017.

50. Regarding award of tariff of renewable energy projects through competitive bidding, it was noted that vide its decision dated January 27, 2017 in the matter of Wind Power Generation Tariff, the Authority decided to allow induction of wind energy through competitive bidding and directed the relevant agencies to develop RFP for that purpose. Due to non-finalization of RFP by any agency after the lapse of considerable time period, the process of competitive bidding has not taken place. Further, the Authority through decision dated May 30, 2017 passed in the Review Motions of GOS clarified that submission of tariff petitions under the Tariff Rules, 1998

is permissible. Therefore, it may not be considered appropriate to stop entertaining applications under Tariff Rules, 1998 merely on the basis of the decision of CCE.

51. **ORDER**

In pursuance of section 7(3) (a) of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 read with NEPRA (Tariff Standards & Procedure) Rules, 1998, the Authority hereby determines and approves the following generation tariff along with terms and conditions for Liberty Wind Power 1 (Pvt) Limited for its 50 MW wind power project for delivery of electricity to the power purchaser:

Rs./kWh

Tariff Component	Year 1-10	Year 11-25
Operations and Maintenance Cost	0.8291	0.8291
Insurance during Operation	0.1671	0.1671
Return on Equity	1.4064	1.4064
Debt Servicing	4.9285	-
Total	**7.3311**	**2.4026**

- Levelized tariff works out to be US Cents 4.7824/kWh.
- EPC cost of USD 57.940 million has been considered.
- PDC cost of USD 2.500 million has been taken into account.
- Insurance during construction at the rate of 0.5% of the EPC cost has been approved.
- Financing charges at the rate of 2.5% of the debt portion of the capital cost has been approved.
- Net Annual Plant Capacity Factor of 38% has been approved.
- O&M Cost of USD 23,000 per MW per year has been approved.
- Debt to Equity of 80:20 has been used.
- Debt Repayment period of 10 years has been taken into account.
- The cost of financing of 6% for construction and operation has been used.
- Return on Equity of 14% has been allowed.

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- Construction period of fifteen (15) months has been used for the workings of ROEDC and IDC.
- Insurance during Operation has been calculated as 0.4% of the allowed EPC Cost.
- Reference Exchange Rates of 120 PKR/USD has been used.
- The aforementioned tariff is applicable for twenty five (25) years from COD
- Detailed component wise tariff is attached as **Annex-I** of this decision.
- Debt Servicing Schedule is attached as **Annex-II** of this decision.

A. <u>One Time Adjustments at COD</u>

- The EPC cost shall be adjusted at actual considering the approved amount as the maximum limit. Applicable foreign portion of the EPC cost will be adjusted at COD on account of variation in PKR/USD parity, on production of authentic documentary evidence to the satisfaction of the Authority. The adjustment in approved EPC cost shall be made only for the currency fluctuation against the reference parity values.
- The petitioner has submitted M/s DNV-GL certification No. TC-236603-A-2 date May 29, 2015 about the design, specification and country of origin of various component of the wind turbine to be installed for this project. At the time of COD stage tariff adjustments, the petitioner will have to provide a confirmation from the EPC contractor as to the fullest compliance of the equipment having same design and origin of manufacture as given in the type certificate. Where needed, the bill of lading and other support documents will also have to be submitted.
- PDC, Insurance during construction and Financing Fee and Charges shall be adjusted at actual at the time of COD considering the approved amount as the maximum limit. The amounts allowed on these accounts in USD will be converted in PKR using the reference PKR/USD rate of 120 to calculate the maximum limit of the amount to be allowed at COD.
- Duties and/or taxes, not being of refundable nature, relating to the construction period directly imposed on the company up to COD will be allowed at actual upon production of verifiable documentary evidence to the satisfaction of the Authority.

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- IDC will be recomputed at COD on the basis of actual timing of debt draw downs (for the overall debt allowed by the Authority at COD) for the project construction period of fifteen months allowed by the Authority.
- For full/part of conventional local or foreign loans or a mix of both, if availed by the company, the IDC shall also be allowed adjustment for change in applicable KIBOR/LIBOR.
- The tariff has been determined on debt: equity ratio of 80:20. The tariff shall be adjusted on actual debt: equity mix at the time of COD, subject to equity share of not more than 20%. For equity share of more than 20%, allowed IRR shall be neutralized for the additional cost of debt: equity ratio.
- The reference tariff has been worked out on the basis of cost of 6% offered under SBP financing scheme. In case cost negotiated by the company under SBP scheme is less than the said limit of 6%, the savings in that cost shall be shared between the power purchaser and the power producer in the ratio of 60:40 respectively.
- For full or part of local or foreign loan, if any, the savings in the approved spreads shall be shared between the power purchaser and power producer in the ratio of 60:40.
- ROEDC will be adjusted at COD on the basis of actual equity injections (within the overall equity allowed by the Authority at COD) for the project construction period of fifteen months allowed by the Authority.

B. <u>Indexations</u>

Adjustment of O&M, return on equity, return on equity during construction shall be made on quarterly basis for the quarters starting from 1st July, 1st October, 1st January and 1st April based on latest available information. Adjustment of Debt Servicing Component (if any) shall be made either quarterly or bi-annually depending upon the final terms approved by the Authority. For bi-annual adjustments, the periods shall start from 1st July and 1st January. Insurance component shall be adjusted on annual basis starting from either 1st January or 1st July. The indexation mechanisms are given hereunder:

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i) **Operation and Maintenance Costs**

O&M components of tariff shall be adjusted based on revised rates of local Inflation (CPI) as notified by Pakistan Bureau of Statistics, foreign inflation (US CPI) as notified by US Bureau of Labour Statistics and TT&OD selling rate of US Dollar as notified by National Bank of Pakistan according to the following formula;

F. $O\&M_{(REV)}$	=	F. $O\&M_{(REF)}$ * US $CPI_{(REV)}$ / US $CPI_{(REF)}$ *$ER_{(REV)}/ER_{(REF)}$
L. $O\&M_{(REV)}$	=	L. $O\&M_{(REF)}$ * $CPI_{(REV)}$ / $CPI_{(REF)}$
Where;		
F. $O\&M_{(REV)}$	=	The revised O&M Foreign Component of Tariff
L. $O\&M_{(REV)}$	=	The revised O&M Local Component of Tariff
F. $O\&M_{(REF)}$	=	The reference O&M Foreign Component of Tariff
L. $O\&M_{(REF)}$	=	The reference O&M Local Component of Tariff
US $CPI_{(REV)}$	=	The revised US CPI (All Urban Consumers)
US $CPI_{(REF)}$	=	The reference US CPI (All Urban Consumers) of 252.146 of August, 2018
$CPI_{(REV)}$	=	The revised CPI (General)
$CPI_{(REF)}$	=	The reference CPI (General) of 229.27 for the month of August, 2018
$ER_{(REV)}$	=	The revised TT & OD selling rate of US dollar
$ER_{(REF)}$	=	The reference TT & OD selling rate of RS. 120/USD

Note: The reference indexes shall be revised after making the required adjustments in tariff components at the time of COD.

ii) **Insurance during Operation**

The actual insurance cost for the minimum cover required under contractual obligations with the Power Purchaser, not exceeding 0.4% of the approved EPC cost, will be treated as pass through. Insurance component of reference tariff shall be adjusted annually as per actual upon production of authentic documentary evidence according to the following formula:

AIC	=	Ins $_{(Ref)}$ / P $_{(Ref)}$ * P $_{(Act)}$
Where;		

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AIC	=	Adjusted insurance component of tariff
$Ins_{(Ref)}$	=	Reference insurance component of tariff
$P_{(Ref)}$	=	Reference premium @ 0.4% of approved EPC Cost at Rs. 120
$P_{(Act)}$	=	Actual premium or 0.4% of the approved EPC Cost converted into Pak Rupees on exchange rate prevailing at the time of insurance premium payment of the insurance coverage period whichever is lower

iii) **Return on Equity**

The total ROE (ROE + ROEDC) component of the tariff will be adjusted on quarterly basis on account of change in USD/PKR parity. The variation relating to these components shall be worked out according to the following formula;

$ROE_{(Rev)}$	=	$ROE_{(Ref)} * ER_{(Rev)}/ ER_{(Ref)}$
Where;		
$ROE_{(Rev)}$	=	Revised ROE Component of Tariff
$ROE_{(Ref)}$	=	Reference ROE Component of Tariff
$ER_{(Rev)}$	=	The revised TT & OD selling rate of US dollar as notified by the National Bank of Pakistan
$ER_{(Ref)}$	=	The reference TT & OD selling rate of Rs. 120/USD

Note: The reference tariff component shall be revised after making the required adjustments at the time of COD.

iv) **Indexations applicable to debt**

For full or part of conventional foreign debt, if any, respective principle and interest components will be adjusted on quarterly/bi-annual basis, on account of revised TT & OD selling rate of US Dollar, as notified by the National Bank of Pakistan as at the last day of the preceding quarter, over the applicable reference exchange rate. The interest part of the foreign loan shall be allowed adjustment with respect to change in the applicable LIBOR. For full or part of conventional local loan, if any, the interest component shall be allowed adjustment with respect to change in applicable KIBOR.

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C. Terms and Conditions

The following terms and conditions shall apply to the determined tariff:

- All plant and equipment shall be new and of acceptable standards. The verification of the plant and equipment will be done by the independent engineer at the time of the commissioning of the plant duly appointed by the power purchaser.
- This tariff will be limited to the extent of net annual energy generation supplied to the power purchaser up to 38% net annual plant capacity factor. Net annual energy generation supplied to the power purchaser in a year, in excess of 38% net annual plant capacity factor will be charged at the following tariffs:

Net annual plant capacity factor	% of prevalent tariff allowed to power producer
Above 38% up to 40%	5%
Above 40% up to 42%	10%
Above 42% up to 44%	20%
Above 44% up to 46%	40%
Above 46% up to 48%	80%
Above 48%	100%

- The petitioner is required to ensure that all the equipment is installed as per the details/specifications provided in the determination. Any change in the power curve of the turbines as provided in studies along with the petition and the relevant assumptions contained therein shall not be allowed.
- The petitioner is required to maintain the availability levels as declared in the Tariff Petition and the studies provided therein. Necessary clauses shall be included in the EPA so that the power producer cannot intentionally suppress the capacity factors. NPCC shall conduct detailed monitoring/audit of the operational record/log of all the wind turbines on quarterly basis to verify output/capacity of the power plant.
- The risk of wind resource shall be borne by the power producer.
- In the tabulated above tariff no adjustment for certified emission reductions has been accounted for. However, upon actual realization of carbon credits, the same shall be distributed between the power purchaser and the power producer in accordance with the applicable GOP Policy, amended from time to time.

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- The savings in the cost under SBP scheme during the loan tenor shall be shared between the power purchaser and power producer in the ratio of 60:40.
- In case the company shall secure full or part of local conventional loan then the tariff of company shall be adjusted at the time of COD at applicable KIBOR + spread of 2.25%. The savings in the approved spreads during the loan tenor shall be shared between the power purchaser and power producer in the ratio of 60:40. The tenor of the debt servicing shall not be less than thirteen years for this loan.
- In case the company shall secure full or part of foreign conventional loan then the tariff of company shall be adjusted at the time of COD at applicable LIBOR + spread of 4.25%. The savings in the approved spreads during the loan tenor shall be shared between the power purchaser and power producer in the ratio of 60:40. The tenor of the debt servicing shall not be less than thirteen years for this loan.
- In case the company shall secure foreign loan under any credit insurance (Sinosure etc.) then the cost of that insurance shall be allowed to the maximum limit of 0.6% of the yearly outstanding principal and interest amounts. For that purpose, the spread over that full/part of loan shall be considered as 3.5% as the maximum limit. The savings in the spread during the loan tenor shall be shared between the power purchaser and power producer in the ratio of 60:40.
- The company will have to achieve financial close within one year from the date of issuance of this determination. The tariff granted to the company will no longer remain applicable/valid, if financial close is not achieved by the company in the abovementioned timeline or its generation license is declined/revoked by NEPRA.
- The targeted maximum construction period after financial close is fifteen months. No adjustment will be allowed in this tariff to account for financial impact of any delay in project construction. However, the failure of the company to complete construction within fifteen months will not invalidate the tariff granted to it.
- Pre COD sale of electricity is allowed to the project company, subject to the terms and conditions of Energy Purchase Agreement, at the applicable tariff excluding principal repayment of debt component and interest component. However, pre COD sale will not

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alter the required commercial operations date stipulated by the Energy Purchase Agreement in any manner.

- In case the company is obligated to pay any tax on its income from generation of electricity, or any duties and/or taxes, not being of refundable nature, are imposed on the company, the exact amount paid by the company on these accounts shall be reimbursed on production of original receipts. This payment shall be considered as a pass-through payment. However, withholding tax on dividend shall not be passed through.
- No provision for the payment of Workers Welfare Fund and Workers Profit Participation has been made in the tariff. In case, the company has to pay any such fund, that will be treated as pass through item in the EPA.
- The approved tariff along with terms & conditions shall be made part of the EPA. General assumptions, which are not covered in this determination, may be dealt with as per the standard terms of the EPA.

52. The Order part along with two Annexures is recommended for notification by the Federal Government in the official gazette in accordance with Section 31(7) of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997.

AUTHORITY

(Saif Ullah Chattha)
Member 31.10.2018

31/10/2018
(Rehmatullah Baloch)
Vice Chairman

(Brig (R) Tariq Saddozai)
Chairman

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Annex-I

LIBERTY WIND POWER 1 (PVT) LIMITED
REFERENCE TARIFF TABLE

Year	Foreign O&M	Local O&M	Insurance	Return on Equity	ROEDC	Loan Repayment	Interest Charges	Tariff
	Rs. / kWh	Rs. / kWh	Rs. / kWh	Rs. / kWh	Rs. / kWh	Rs. / kWh	Rs. / kWh	Rs. / kWh
1	0.4146	0.4146	0.1671	1.2901	0.1163	2.7786	2.1499	7.3311
2	0.4146	0.4146	0.1671	1.2901	0.1163	2.9491	1.9793	7.3311
3	0.4146	0.4146	0.1671	1.2901	0.1163	3.1301	1.7984	7.3311
4	0.4146	0.4146	0.1671	1.2901	0.1163	3.3222	1.6063	7.3311
5	0.4146	0.4146	0.1671	1.2901	0.1163	3.5260	1.4024	7.3311
6	0.4146	0.4146	0.1671	1.2901	0.1163	3.7424	1.1861	7.3311
7	0.4146	0.4146	0.1671	1.2901	0.1163	3.9721	0.9564	7.3311
8	0.4146	0.4146	0.1671	1.2901	0.1163	4.2158	0.7127	7.3311
9	0.4146	0.4146	0.1671	1.2901	0.1163	4.4745	0.4540	7.3311
10	0.4146	0.4146	0.1671	1.2901	0.1163	4.7491	0.1794	7.3311
11	0.4146	0.4146	0.1671	1.2901	0.1163	-	-	2.4026
12	0.4146	0.4146	0.1671	1.2901	0.1163	-	-	2.4026
13	0.4146	0.4146	0.1671	1.2901	0.1163	-	-	2.4026
14	0.4146	0.4146	0.1671	1.2901	0.1163	-	-	2.4026
15	0.4146	0.4146	0.1671	1.2901	0.1163	-	-	2.4026
16	0.4146	0.4146	0.1671	1.2901	0.1163	-	-	2.4026
17	0.4146	0.4146	0.1671	1.2901	0.1163	-	-	2.4026
18	0.4146	0.4146	0.1671	1.2901	0.1163	-	-	2.4026
19	0.4146	0.4146	0.1671	1.2901	0.1163	-	-	2.4026
20	0.4146	0.4146	0.1671	1.2901	0.1163	-	-	2.4026
21	0.4146	0.4146	0.1671	1.2901	0.1163	-	-	2.4026
22	0.4146	0.4146	0.1671	1.2901	0.1163	-	-	2.4026
23	0.4146	0.4146	0.1671	1.2901	0.1163	-	-	2.4026
24	0.4146	0.4146	0.1671	1.2901	0.1163	-	-	2.4026
25	0.4146	0.4146	0.1671	1.2901	0.1163	-	-	2.4026
Levelized Tariff	**0.4146**	**0.4146**	**0.1671**	**1.2901**	**0.1163**	**2.3818**	**0.9545**	**5.7388**

LIBERTY WIND POWER 1 (PVT) LIMITED
DEBT SERVCING SCHEDULE

Relevant Quarters	Base amount (USD)	Principal Repayment (USD)	Interest (USD)	Balance Principal (USD)	Total Debt Service (Million USD)	Annual Principal Repayment Rs./kWh	Annual Interest Rs./kWh
1	51,124,729	942,081	766,871	50,182,649	1,708,952	2.7786	2.1499
2	50,182,649	956,212	752,740	49,226,437	1,708,952		
3	49,226,437	970,555	738,397	48,255,882	1,708,952		
4	48,255,882	985,113	723,838	47,270,769	1,708,952		
5	47,270,769	999,890	709,062	46,270,879	1,708,952	2.9491	1.9793
6	46,270,879	1,014,888	694,063	45,255,990	1,708,952		
7	45,255,990	1,030,112	678,840	44,225,879	1,708,952		
8	44,225,879	1,045,563	663,388	43,180,315	1,708,952		
9	43,180,315	1,061,247	647,705	42,119,069	1,708,952	3.1301	1.7984
10	42,119,069	1,077,166	631,786	41,041,903	1,708,952		
11	41,041,903	1,093,323	615,629	39,948,580	1,708,952		
12	39,948,580	1,109,723	599,229	38,838,857	1,708,952		
13	38,838,857	1,126,369	582,583	37,712,489	1,708,952	3.3222	1.6063
14	37,712,489	1,143,264	565,687	36,569,224	1,708,952		
15	36,569,224	1,160,413	548,538	35,408,811	1,708,952		
16	35,408,811	1,177,819	531,132	34,230,992	1,708,952		
17	34,230,992	1,195,487	513,465	33,035,505	1,708,952	3.5260	1.4024
18	33,035,505	1,213,419	495,533	31,822,086	1,708,952		
19	31,822,086	1,231,620	477,331	30,590,466	1,708,952		
20	30,590,466	1,250,095	458,857	29,340,372	1,708,952		
21	29,340,372	1,268,846	440,106	28,071,526	1,708,952	3.7424	1.1861
22	28,071,526	1,287,879	421,073	26,783,647	1,708,952		
23	26,783,647	1,307,197	401,755	25,476,450	1,708,952		
24	25,476,450	1,326,805	382,147	24,149,645	1,708,952		
25	24,149,645	1,346,707	362,245	22,802,938	1,708,952	3.9721	0.9564
26	22,802,938	1,366,907	342,044	21,436,031	1,708,952		
27	21,436,031	1,387,411	321,540	20,048,620	1,708,952		
28	20,048,620	1,408,222	300,729	18,640,398	1,708,952		
29	18,640,398	1,429,346	279,606	17,211,052	1,708,952	4.2158	0.7127
30	17,211,052	1,450,786	258,166	15,760,266	1,708,952		
31	15,760,266	1,472,548	236,404	14,287,719	1,708,952		
32	14,287,719	1,494,636	214,316	12,793,083	1,708,952		
33	12,793,083	1,517,055	191,896	11,276,028	1,708,952	4.4745	0.4540
34	11,276,028	1,539,811	169,140	9,736,217	1,708,952		
35	9,736,217	1,562,908	146,043	8,173,308	1,708,952		
36	8,173,308	1,586,352	122,600	6,586,957	1,708,952		
37	6,586,957	1,610,147	98,804	4,976,809	1,708,952	4.7491	0.1794
38	4,976,809	1,634,299	74,652	3,342,510	1,708,952		
39	3,342,510	1,658,814	50,138	1,683,696	1,708,952		
40	1,683,696	1,683,696	25,255	(0)	1,708,952		

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA AUTHORITY

National Electric Power Regulatory Authority
Islamic Republic of Pakistan

Registrar

NEPRA Tower, Attaturk 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-347/1735-41 February 01, 2017

Mr. Tanveer Ahmed
Technical Director
Zulaikha Energy (Private) Limited
K/51-A, S.I.T.E. Karachi.

Subject: **Grant of Generation Licence No. WPGL/39/2017**
Licence Application No. LAG-347
Zulaikha Energy (Private) Limited (ZEPL)

Reference: *Your application vide letter No. Nil, dated Nil (received on May 24, 2016).*

Enclosed please find herewith Generation Licence No. WPGL/39/2017 granted by National Electric Power Regulatory Authority (NEPRA) to Zulaikha Energy (Private) Limited (ZEPL) for its 50.00 MW Wind Power Plant located at Deh Kohistan 7/3 & 7/4, Tapo Jungshahi, District Thatta in the province of Sindh, pursuant to Section 15 of the Regulation of Generation, Transmission and Distribution of Electric Power Act (XL of 1997). Further, the determination of the Authority in the subject matter is also attached.

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

Enclosure: Generation Licence (WPGL/39/2017)

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

01.02.17
(Syed Safeer Hussain)

Copy to:

1. Secretary, Ministry of Water and Power, A-Block, Pak Secretariat, Islamabad.
2. Chief Executive Officer, Alternative Energy Development Board (AEDB), 2nd Floor, OPF Building, G-5/2, Islamabad
3. Chief Executive Officer, NTDC, 414-WAPDA House, Lahore
4. Chief Executive Officer, CPPA-G, 6th Floor, Shaheed-r-Millat Secretariat, Jinnah Avenue, Blue Area, Islamabad
5. Chief Executive Officer, Hyderabad Electric Supply Company Limited (HESCO), WAPDA Offices Complex, Hussainabad, Hyderabad
6. Director General, Environment Protection Department, Government of Sindh, Complex Plot No. ST-2/1, Korangi Industrial Area, Karachi.

National Electric Power Regulatory Authority (NEPRA)

Determination of the Authority in the Matter of Application of Zulaikha Energy (Private) Limited for the Grant of Generation Licence

Case No. LAG-347
January 26, 2017

(A). Background

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

(ii). The provinces are also empowered to set up generation facilities of any size, location and fuel of their choice. In view thereof, Govt. of Sindh issued an LoI dated August 28, 2015 to Zulaikha Energy (Private) Limited (ZEPL) for establishing 50 MW wind based generation facility/wind power plant in the Jhimpir wind corridor, District Thatta, in the Province of Sindh. According to the terms and conditions of the LoI, ZEPL carried out a feasibility study of the project.

(B). Filing of the Application

(i). In accordance with Section-15 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (the NEPRA Act), ZEPL submitted an application on May 24, 2016 requesting for the grant of generation licence.

(ii). The Registrar examined the submitted application to confirm its compliance with the NEPRA Licensing (Application and Modification Procedure) Regulations, 1999 (the Licensing Regulations). The Registrar found the application compliant with the Licensing Regulations and submitted the matter for consideration of the Authority seeking admission of the application or otherwise.

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(iii). The Authority considered the matter in its Regulatory Meeting (RM-16-431), held on July 12, 2016 and found the form and content of the application in substantial compliance with Regulation-3 of the Licensing Regulations. The Authority admitted the application for consideration of the grant of the generation licence as stipulated in Regulation-7 of the Licensing Regulations. The Authority approved the advertisement containing (a). the prospectus; (b). a notice to the general public regarding admission of the application of ZEPL, for the purpose of inviting the general public to submit their comments in the matter as stipulated in Regulation-8 of the Licensing Regulations. Further, the Authority also approved the list of the relevant stakeholders to inform regarding the admission of the application of ZEPL and seek their comments to assist the Authority in the matter. Accordingly, the advertisement was published in the national newspapers on July 14, 2016.

(iv). Apart from the above, separate letters were also sent to government ministries, their attached departments and representative organizations etc. on July 15, 2016. The said stakeholders were requested to submit their views/comments for assistance of the Authority.

(C). Comments of Stakeholders

(i). In reply to the above, the Authority received comments from five (05) stakeholders. These included Board of Investment, Pakistan Council of Renewable Energy Technologies, Anwar Kamal Law Associates, Karachi Shipyard & Engineering Works Limited and Engineering Development Board. The salient points of the comments offered by the above mentioned stakeholders are summarized in the following paragraphs: -

(a). Board of Investment in its comments submitted that energy sector is the priority sector of the Government to cater the short fall in the country. Board of Investment being an investment promoting and facilitating agency has also been making its efforts to attract investment in energy sector and understands that affordable and smooth supply of energy is the backbone for industrial growth as well as attracting foreign direct investment in the country. In view thereof, Board of Investment supports the grant of generation licence, subject to consumer friendly and competitive tariff and completion of all

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codal/technical formalities under rules & regulations;

(b). Pakistan Council of Renewable Energy Technologies commented that contents of the application have been examined and it has no objection on the grant of Generation Licence. The Council further submitted that it cannot comment on the financial or other TOR's of the project;

(c). Anwar Kamal Law Associates in their comments raised different issues of power sector in general including surplus capacity, under utilization of power plants and induction of new power plants on "take or pay basis" etc. Further, Anwar Kamal Law Associates submitted their reservations regarding different power sector issues including financial and economic viability of the induction of renewable energy projects, higher upfront tariff of renewable energy projects, "must run condition" of renewable energy projects, suitability of upfront tariff regime for Pakistan, induction of renewable energy projects in the current scenario (i.e. reduction in oil prices, RLNG contract with Qatar, upcoming coal power projects and introduction of competitive market etc.), affordability vs. availability of electric power and long term power purchase agreements on "take or pay" basis etc. In view of the said, Anwar Kamal Law Associates requested to reject the generation licence application of ZEPL;

(d). Karachi Shipyard & Engineering Works Limited in its comments stated that it has no objection on the application for grant of generation licence in respect of 50.0 MW wind power project at Jhimpir, District Thatta. Karachi Shipyard & Engineering Works Limited further submitted that it is fully capable of manufacturing the towers for wind turbines and its fabrication facilities are available in the vicinity of Karachi much near to Jhimpir. The rates of fabrication and site installation are most competitive and at par with the market. Karachi Shipyard & Engineering Works Limited requested the Authority to advise ZEPL to consider their facilities for local fabrication, erection and installation of required wind power plant;

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(e). Engineering Development Board submitted that as per C.G.O-03/2015 power plants of capacity of 25 MW and above are exempted from payment of duties and taxes as defined under the relevant notifications, and no condition for the local manufacturing is applicable on the import of these power plants. While evaluating the list, it was observed that the list of importable items also contains items which otherwise could not be imported as part of plant, machinery and equipment etc., as the same do not fall in the criteria defined under CGO-3/2015. Therefore, while recommending the list of equipment, it may be ensured that irrelevant equipments are not permitted which are not directly used as power plant equipment.

(ii). The above comments of the stakeholders were examined and comments of Pakistan Council of Renewable Energy Technologies and Board of Investment were found in favour of the grant of Generation Licence to ZEPL, whereas Anwar Kamal Law Associates, Karachi Shipyard & Engineering Works Limited and Engineering Development Board have raised certain observations. Accordingly, it was considered appropriate to seek the perspective of ZEPL on the comments/observations of Anwar Kamal Law Associates, Karachi Shipyard & Engineering Works Limited and Engineering Development Board.

(iii). In response to the comments/observations of Anwar Kamal Law Associates, ZEPL submitted its reply stating that the comments of Anwar Kamal Law Associates are generic in nature regarding the overall power sector of Pakistan and issues relating to the viability of induction of renewable energy power plants. None of the comments highlighted by Anwar Kamal Law Associates are specific in nature which relates to the project of ZEPL and/or need to be specifically addressed by the ZEPL. Since the matters relating to Pakistan power sector and generation of electric power fall within the activities of NEPRA being the sole and exclusive regulator, it is the Authority which is best place to evaluate such issues and the applicant will elect not to comment on this matter at this stage, allowing NEPRA and other policy making institutions to respond to the issues relating to overall impact of the specific technology in the power sector of Pakistan.

(iv). Regarding the observations of Karachi Shipyard & Engineering Works Limited, ZEPL submitted that to achieve higher capacity factor and

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efficiency, ZEPL has already finalized commercial terms with Gamesa-a global leader in the design, manufacture, installation and maintenance of wind turbines.

(v). In reply to the comments of Engineering Development Board, ZEPL submitted that Engineering Development Board has acknowledged that pursuant to CGO-5/2015, the task of determining the bonafide requirement of power purchaser imported equipment has been assigned to the Ministry of Water and Power. Therefore, the comments of Engineering Development Board should be submitted to the Ministry of Water and Power, if any. ZEPL in this regard is not bound to give any view at this stage.

(vi). The replies submitted by ZEPL were examined and found satisfactory. Accordingly, it was considered appropriate to process the application of ZEPL for the grant of generation licence as stipulated in the Licensing Regulations and NEPRA Licensing (Generation) Rules, 2000 (the Generation Rules).

(D). Analysis of the Authority

(i). The Authority has examined the generation licence application of ZEPL along with information provided with the application including feasibility study of the project, environment impact assessment study, interconnection and dispersal arrangement studies, comments of stakeholders, NEPRA Act, relevant rules & regulations framed under the NEPRA Act and the provisions of the RE Policy.

(ii). Regarding the observations raised by Anwar Kamal Law Associates, the Authority has observed that the same are not specific to the grant of generation licence to ZEPL and are related to regulatory and policy decisions and reiteration of their earlier comments which have already been deliberated upon by the Authority in the cases of upfront tariff in detail. Further, a comprehensive reply in this regard has also been sent to Anwar Kamal Law Associates through NEPRA's letter No. NEPRA/SAT-I/TRF-100/1706 dated December 27, 2016.

(iii). The main features of the application under consideration are that the applicant company i.e. ZEPL was incorporated as a company limited by shares under Section-32 of the Companies Ordinance 1984 (XLVII of 1984), having Corporate Universal Identification No. 0092877 dated August 08, 2015. The

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registered/business office of ZEPL is A/51-A, S.I.T.E. Karachi. The memorandum of association of ZEPL includes the business of power generation and sale as one of its objectives.

(iv). After the issuance of LoI by Energy Department, Govt. of Sindh, the sponsors carried out various studies to assess the feasibility of the project. These studies included the wind resource assessment, geo technical investigation, digital topographic map, initial environmental examination and grid interconnection study. The complete feasibility study was submitted to Energy Department, Govt. of Sindh which has recommended the project for the award of upfront tariff and grant of generation licence.

(v). ZEPL has selected Gamesa (G114/2.0 MW) IEC wind class IIIA wind turbine generators for the project and has proposed to install twenty five (25) wind turbine generators, making the total installed capacity of the generation facility to 50.00 MW. The cut-in, rated and cut-out wind speed for (G114/2.0 MW) wind turbine generators are 3m/s, 10.3m/s and 25m/s respectively, whereas the survival wind speed is 59.5 m/s (maximum 3 seconds).

(vi). Regarding grid interconnection of the project, the Authority observes that ZEPL has carried out an interconnection and system stability study for dispersal of electric power from the above mentioned wind power plant through NTDC. According to the said study, the power generated by ZEPL shall be dispersed at 132-kV level. The dispersal/interconnection arrangement will be consisting of 132-kV double circuit transmission line for looping in-out from ZEPL on the 132-kV single circuit from the wind power plant of Din Energy Limited to Jhimpir-2. NTDC through its letter No. 8806/GM/SGC/NTDC dated December 01, 2016 has approved the interconnection study of ZEPL and has issued power evacuation certificate to ZEPL. NTDC has further clarified that the power to be generated by ZEPL will be evacuated by July 2019 and the power injected through the project of ZEPL will not have any adverse effect on the national grid as required under the grid code.

(vii). Regarding impact of the project on environment, the Authority is of the view that the proposed wind power plant of ZEPL is based on a renewable energy source and does not cause any pollution, however, the operation of the wind power plant may cause some other type of pollution including soil pollution,

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water pollution and noise pollution during construction and operation. In this regard, ZEPL has carried out an Initial Environment Examination Study and Environmental Protection Agency, Govt. of Sindh has accorded its approval for the same.

(viii). Regarding land of the project, the Authority has observed that Land Utilization Department, Govt. of Sindh has allotted 322 acres of land (on 30 years lease basis), to the sponsors of the project in Deh Kohistan 7/3 & 7/4, Tapo Jungshahi, District Thatta, in the Province of Sindh for 50 MW wind power plant.

(ix). Foregoing in view, the Authority is of the considered opinion that the project of ZEPL fulfills the eligibility criteria for grant of generation licence as given under the NEPRA Act and rules & regulations framed there under.

(E). Grant of Generation Licence

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

(ii). The existing energy mix of the country is heavily skewed towards the costlier thermal power plants, mainly operating on imported furnace oil. The import of furnace oil for electric power generation not only causes depletion of precious foreign exchange reserves of the country but is also an environmental concern. Therefore, in order to achieve sustainable development it is imperative that indigenous RE resources are given priority for power generation and their development be encouraged. The Energy Security Action Plan 2005 (ESAP) of GoP, also recognizes this very aspect of power generation through RE and envisages that at least 5% of total national power generation capacity to be met through RE resources by 2030. The Authority considers that the proposed project of ZEPL is consistent with the provisions of ESAP. The project will help in diversifying the energy portfolio of the country. Further, it will not only enhance the energy security of the country by reducing the dependence on imported furnace oil

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but will also help reduction in carbon emission by generating clean electricity, thus improving the environment.

(iii). The term of a generation licence under Rules-5(1) of the Generation Rules is to commensurate with the maximum expected useful life of the units comprised in a generation facility, except where an applicant for a generation licence consents to a shorter term. As per international benchmark, the useful life of wind turbine generators is considered as 20 to 25 years. In this regard, it is observed that the anticipated Commercial Operation Date (COD) of the wind power plant of ZEPL is October 31, 2019 and it will have a useful life of more than twenty (20) years from its COD. Foregoing in view, the Authority fixes the term of the generation licence as twenty (20) years from COD of the project.

(iv). Regarding the tariff that ZEPL will charge from its power purchaser/CPPA-G, it is hereby clarified that under Section-7(3)(a) of the NEPRA Act, determining tariff, rate and charges etc. is the sole prerogative of the Authority. In view thereof, the Authority directs ZEPL to charge the power purchaser only such tariff which has been determined, approved or specified by the Authority.

(v). Regarding land of the project, it is clarified that Land Utilization Department, Govt. of Sindh has allotted 322 acres of land to ZEPL for development of 50.00 MW wind power plant. In this regard, the Authority directs ZEPL that the aforementioned land shown in Schedule-I of the generation licence, shall exclusively be used by ZEPL for the proposed wind power project and ZEPL cannot carry out any other activity on this land except with prior approval of the Authority.

(vi). Regarding compliance with the environmental standards, the Authority directs ZEPL to ensure that the project will comply with the environmental standards during the term of the generation licence. In view of the said, the Authority has included a separate article (i.e. Article-10) in the generation licence along with other terms and conditions that the licensee will comply with relevant environmental standards. Further, the Authority directs ZEPL to submit a report on a bi-annual basis, confirming that operation of its project is compliant with required environmental standards as prescribed by the concerned environmental protection agency.

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(vii). The proposed wind power plant of ZEPL will be using renewable energy resource for generation of electric power. Therefore, the project may qualify for carbon credits under the Kyoto Protocol. Under the said protocol, projects coming into operation up to the year 2020 can qualify for carbon credits. ZEPL has informed that the project will achieve COD by October 31, 2019 which is within the deadline of the Kyoto Protocol. In view thereof, an article (i.e. Article-14) for carbon credits and its sharing with the power purchaser has been included in the generation licence. Accordingly, the Authority directs ZEPL to initiate the process in this regard at the earliest so that proceeds for carbon credits are materialized. ZEPL shall be required to share the proceeds of carbon credits with the power purchaser as stipulated in Article-14 of the generation licence.

In view of the above, the Authority hereby approves the grant of generation licence to ZEPL on the terms and conditions set out in the generation licence annexed to this determination. The grant of generation licence shall be subject to the provisions contained in the NEPRA Act, relevant rules, regulations framed there under and other applicable documents.

Authority:

Maj. (R) Haroon Rashid
(Member)

27/1/17

Syed Masood-ul-Hassan Naqvi
(Member)

27/1

Himayat Ullah Khan
(Member/Vice Chairman)

30.1.17

Tariq Saddozai
(Chairman)

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31.02.17

National Electric Power Regulatory Authority
(NEPRA)
Islamabad – Pakistan

GENERATION LICENCE

No. WPGL/39/2017

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

ZULAIKHA ENERGY (PVT.) LIMITED

Incorporated under the Companies Ordinance, 1984
Corporate Universal Identification No. 0092877, dated April 08, 2015,

for its Generation Facility/Wind Power Plant Located at Deh Kohistan 7/3 &7/4, Tapo Jungshahi, District Thatta, In the Province of Sindh

(Installed Capacity: 50.00 MW Gross ISO)

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

Given under my hand on 01st day of ~~January~~ February Two Thousand & Seventeen and expires on 30th day of October Two Thousand & Thirty Nine.

01.02.17

Registrar

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Article-1
Definitions

1.1 In this Licence

(a). "Act" means the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997";

(b). "Applicable Documents" mean the Act, the NEPRA rules and regulations, any documents or instruments issued or determinations made by the Authority under any of the foregoing or pursuant to the exercise of its powers under the Act, the grid code, the applicable distribution code, if any, or the documents or instruments made by the licensee pursuant to its generation licence, in each case of a binding nature applicable to the licensee or, where applicable, to its affiliates and to which the licensee or any of its affiliates may be subject;

(c). "Authority" means the National Electric Power Regulatory Authority constituted under Section-3 of the Act;

(d). "Bus Bar" means a system of conductors in the generation facility/wind power plant of the Licensee on which the electric power of all the wind turbine generators or WTGs is collected for supplying to the Power Purchaser;

(e). "Carbon Credits" mean the amount of Carbon Dioxide (CO_2) and other greenhouse gases not produced as a result of generation of energy by the generation facility/ wind power plant, 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 power plant, which are available or can be obtained in relation to the generation facility/ wind power plant after the COD;

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

(g). "CPPA-G" means Central Power Purchasing Agency (Guarantee) Limited or any other entity created for the like purpose;

(h). "Distribution Code" means the distribution code prepared by XW-DISCO(s) and approved by the Authority, as it may be revised from time to time with necessary approval of the Authority;

(i). "Energy Purchase Agreement" means the energy purchase agreement, entered or to be entered into by and between the Power Purchaser and the Licensee, for the purchase and sale of electric energy generated by the generation facility/ wind power plant, as may be amended by the parties thereto from time to time;

(j). "Financing Documents" will have the same meaning as defined in the respective Implementation Agreements to be signed by the Licensee for its generation facility/ wind power plant;

(k). "Grid Code" means the grid code prepared by NTDC and approved by the Authority, as it may be revised from time to time by NTDC with the approval by the Authority;

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

(m). "IEC" means the International Electro-technical Commission and its successors or permitted assigns;

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

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

(p). "Licensee" means **Zulaikha Energy (Pvt.) Limited** and its successors or permitted assigns;

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

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

(s). "Power Purchaser" means the CPPA-G purchasing electric power on behalf of XW-DISCO(s) from the Licensee, pursuant to an Energy Purchase Agreement for procurement of electricity;

(t). "Regulations" mean the National Electric Power Regulatory Authority Licensing (Application & Modification Procedure) Regulations, 1999 as amended or replaced from time to time;

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

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

(w). "Wind Turbine Generator" or "WTG" means the machines installed at the generation facility/ wind power plant with generators for conversion of wind energy into electric power/energy;

(x). "XW DISCO" means an Ex-WAPDA distribution company engaged in the distribution of electric power.

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1.2 Words and expressions used but not defined herein bear the meaning given thereto in the Act or rules and regulations issued under the Act.

Article-2
Applicability of Law

This Licence is issued subject to the provisions of the Applicable Law, 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 power plant of the Licensee are set out in Schedule-I of this Licence.

3.2 The net capacity of the generation facility/ wind power plant 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 power plant before its COD.

Article-4
Term of Licence

4.1 The Licence is granted for a term of twenty (20) years from the COD of the generation facility/wind power plant.

4.2 Unless suspended or revoked earlier, the Licensee may apply for renewal of this licence ninety (90) days prior to the expiry of the above term, as stipulated in the Regulations.

Article-5
Licence fee

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

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Article-6
Tariff

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

Article-7
Competitive Trading Arrangement

7.1 The Licensee shall participate in such manner as may be directed by the Authority from time to time for development of a Competitive Trading Arrangement. The Licensee shall in good faith work towards implementation and operation of the aforesaid Competitive Trading Arrangement in the manner and time period specified by the Authority. Provided that any such participation shall be subject to any contract entered 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.

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Article-10
Compliance with Environmental Standards

10.1 The Licensee shall comply with the environmental standards as may be prescribed by the relevant competent authority from time to time.

10.2 The Licensee shall provide a certificate on a bi-annual basis, confirming that the operation of its generation facility is in line with environmental standards as prescribed by the relevant competent authority.

Article-11
Power off take Point and Voltage

The Licensee shall deliver power to the Power Purchaser at the outgoing bus bar of its grid station. The up-gradation (step up) of generation voltage up to the required dispersal voltage level will be the responsibility of the Licensee.

Article-12
Performance Data of Wind Power Plant

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 power plant 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

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required from time to time by the Authority and which is or ought to be or has been in the control or possession of the Licensee.

Article-14
Emissions Trading /Carbon Credits

The Licensee shall process and obtain emissions/carbon credits expeditiously and credit the proceeds to the Power Purchaser as per the Policy.

Article-15
Design & Manufacturing Standards

15.1 The Wind Turbine Generator or WTG and other associated equipments of the generation facility/ wind power plant 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 power plant 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 power plant.

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SCHEDULE-I

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

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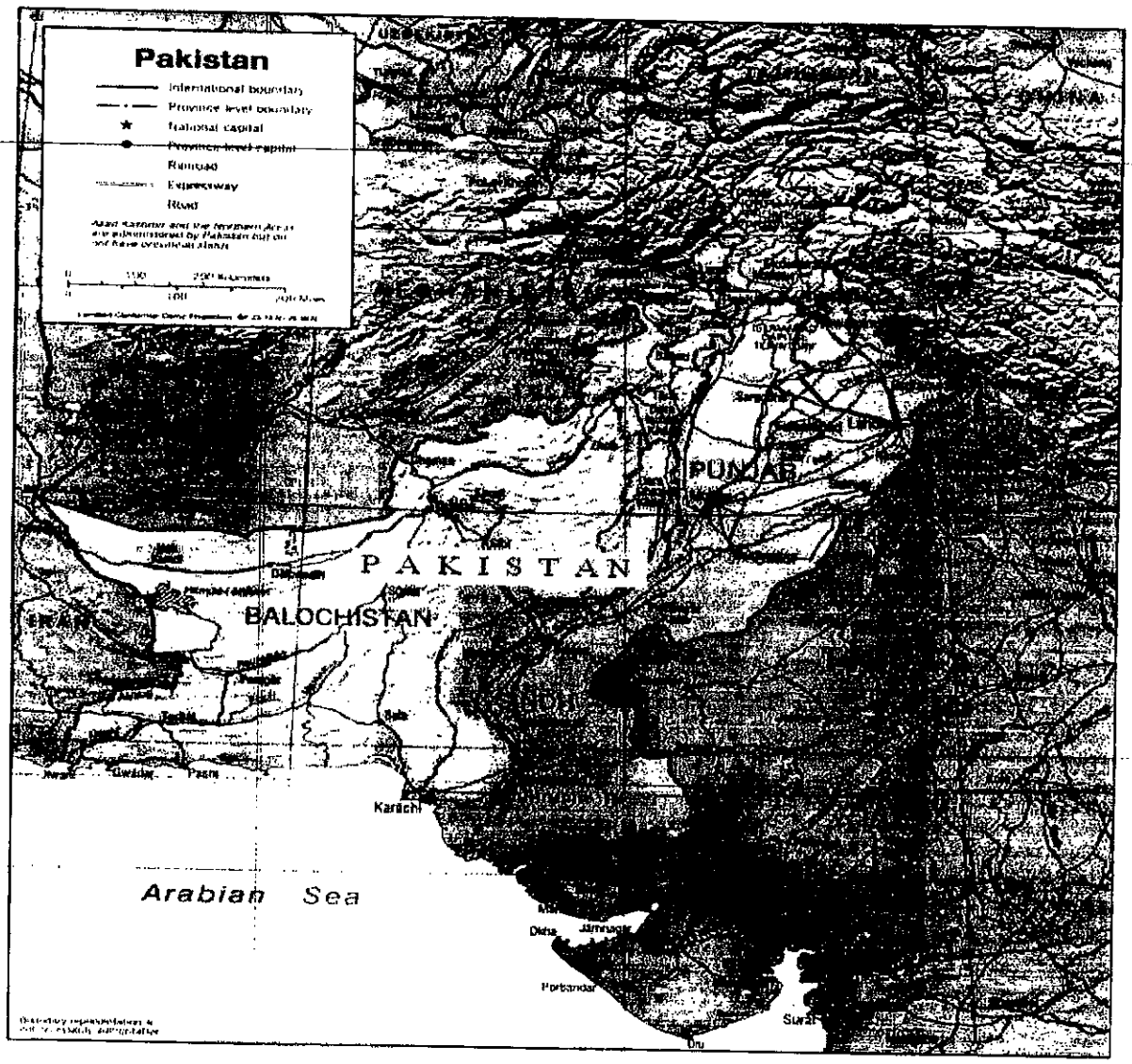
Site Location of the Generation Facility/Wind Power Plant of Zulaikha Energy (Pvt.) Limited (ZEPL)



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Layout of the Generation Facility/ Wind Power Plant of ZEPL

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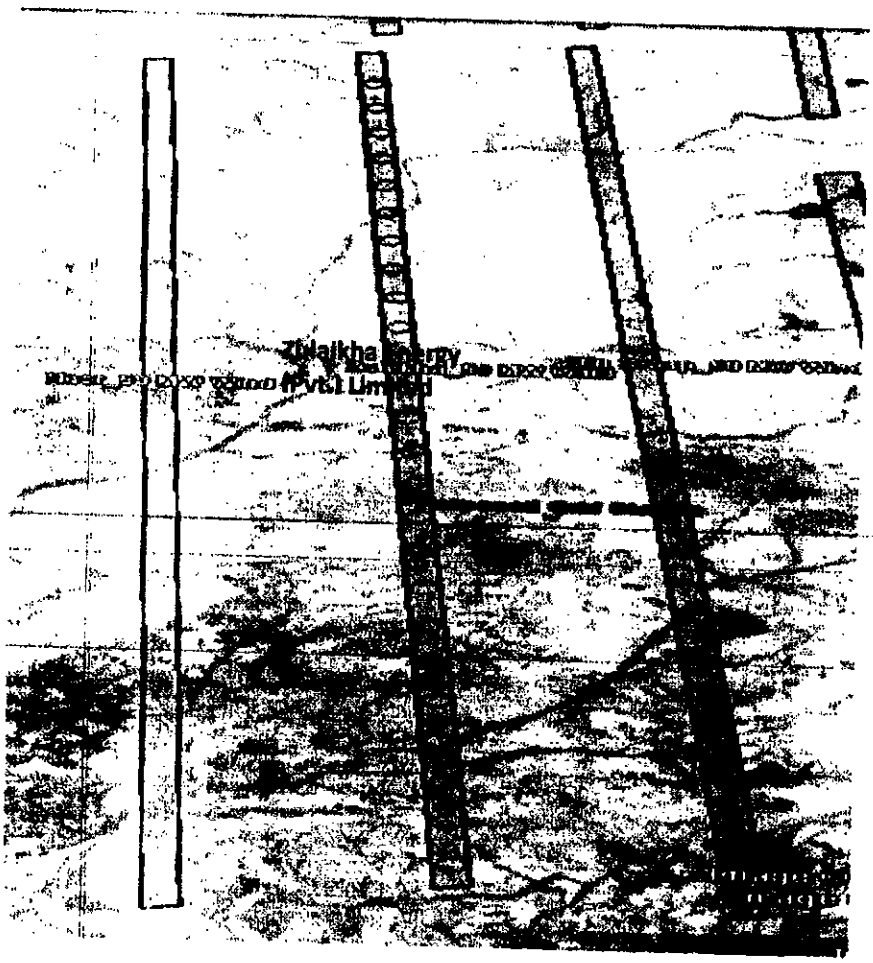
Land Coordinates and Micro-Sitting of the Generation Facility/Wind Power Plant of ZEPL

Total Land: 322 Acres		
Sr. No.	Latitude	Longitude
1	24°54' 34.92"N	67° 47' 56.38"E
2	24°54' 39.08"N	67° 47' 59.00"E
3	24°57' 06.88"N	67° 43' 29.41"E
4	24°57'10.76"N	67° 43' 32.81"E



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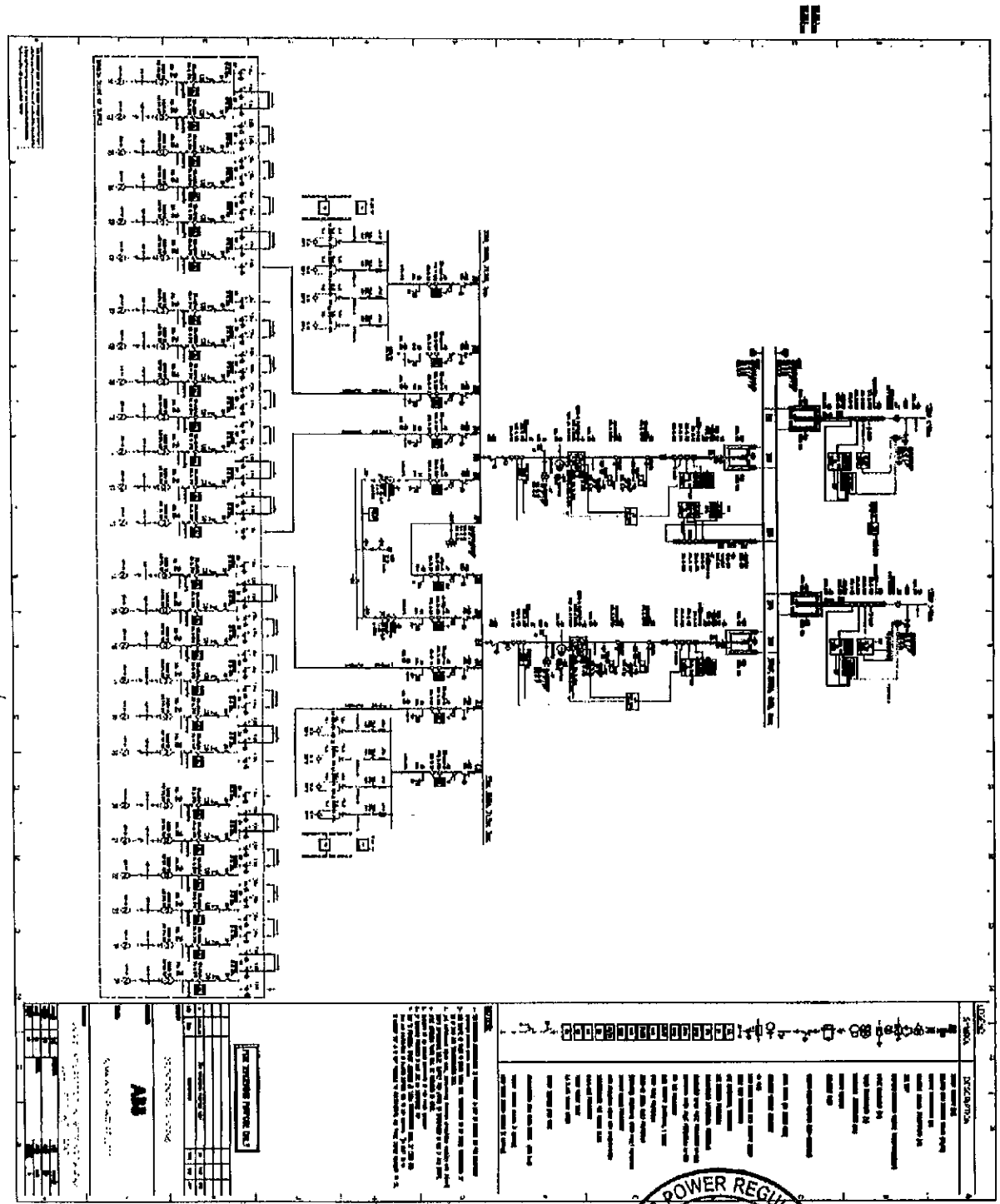
Single Line Diagram (Electrical) of the Generation Facility/Wind Power Plant of ZEPL



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Interconnection Arrangement for Dispersal of Power from the Generation Facility/Wind Power Plant of ZEPL

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

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

(a). A new 220/132 kV Jhimpir-2 substation 3x250 MVA, 220/132 kV transformers.

(b). 220 kV double circuit (D/C) transmission line, approx. 18 km long, on twin-bundled Greeley conductor for looping in/out of one circuit of the existing Jamshoro- KDA-33 D/C transmission line at Jhimpir-2.

(c). 220 kV D/C transmission line, approx. 7 km long, on twin-bundled Greeley conductor for looping In/Out of one of the planned Jhimpir New (Jhimpir-1)- Gharo New D/C transmission line at Jhimpir-2.

(d). 132 kV D/C transmission line, approx. 50 km long on twin bundled Greeley conductor for connecting 7 wind power plants including ZEPL with Jhimpir-2. In this scheme, the interconnection of ZEPL includes 132 kV D/C transmission line, approx. 2 km long, on twin-bundled Greeley conductor for looping in/out from ZEPL on the 132kV single circuit from Din Energy Limited to Jhimpir-2.

(3). Any change in the above mentioned interconnection arrangement /transmission facilities duly agreed by ZEPL, NTDC and HESCO shall be communicated to the Authority in due course of time.

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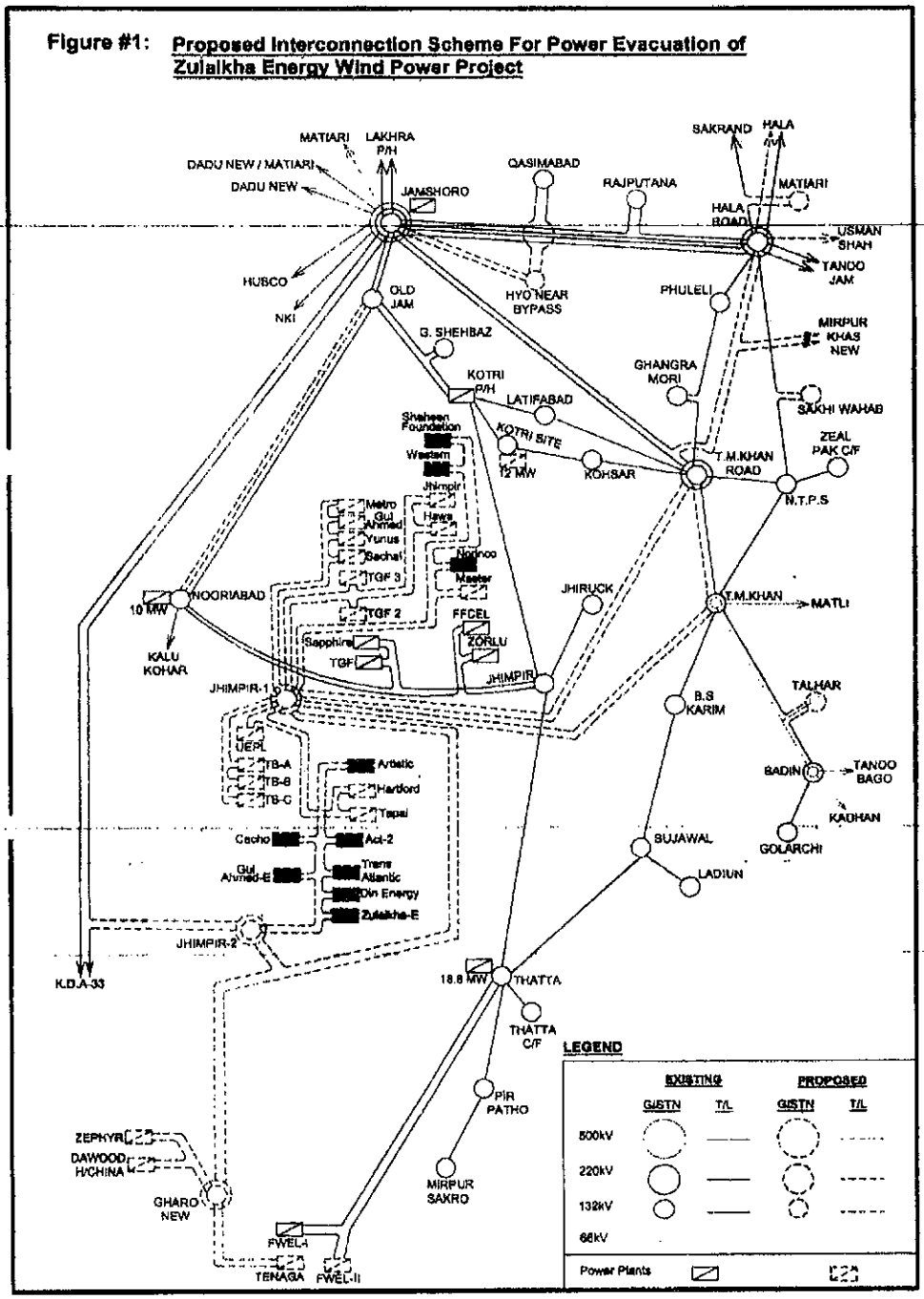
Schematic Diagram for Interconnection Arrangement for Dispersal of Power from the Generation Facility/Wind Power of ZEPL

Figure #1: Proposed Interconnection Scheme For Power Evacuation of Zulaikha Energy Wind Power Project



Detail of Generation Facility/Wind Power Plant/ Wind Farm of ZEPL

(A). General Information

(i).	Name of the Company/Licensee	Zulaikha Energy (Pvt.) Limited
(ii).	Registered/Business Office	A/51-A, S.I.T.E, Karachi
(iii).	Plant Location	Deh Kohistan 7/3 & 7/4 Tapo Jungshahi, District Thatta, in the Province of Sindh
(iv).	Type of Generation Facility	Wind Farm/Wind Power Plant

(B). Wind Farm Capacity & Configuration

(i).	Wind Turbine Type, Make & Model	Gamesa G114-2.0 MW
(ii).	Installed Capacity of Wind Farm (MW)	50.00 MW
(iii).	Number of Wind Turbine Units/Size of each Unit (KW)	25x2.00 MW

(C). Wind Turbine Details

(a).	**Rotor**	
(i).	Number of blades	3
(ii).	Rotor diameter	114 m
(iii).	Swept area	10207 m^2
(iv).	Power regulation	Combinations of blade pitches angle adjustment, and generator/converter torque control.
(v).	Cut-in wind speed	3 m/s
(vi).	Cut-out wind speed	25 m/s
(vii).	Rated wind speed	13.07 m/s
(viii).	Survival wind speed	59.5 m/s (Maximum 3 sec)

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(ix).	Pitch regulation	Electric motor drives a ring gear mounted to the inner race of the blade pitch bearing.
(b).	**Gearbox**	
(i).	Type	3 combined stages: 1 stage planetary, 2 parallel shift gears
(ii).	Gear ratio	1:128.5
(iii).	Main shaft	Cast Shaft
(c).	**Blades**	
(i).	Blade length	56 m
(ii).	Material	Composite material reinforced with fiberglass through resin infusion technology.
(d).	**Generator**	
(i).	Nominal Power	2040 kVA
(ii).	Voltage	690 V
(iii).	Type	Doubly fed with coil rotor and slip rings
(iv).	Degree of Protection	IP54 Turbine-IP21 Ring Body
(v).	Coupling	Main Shaft: Cone Collar High Speed Shaft: Flexible Coupling
(vi).	Power factor	0.95
(e).	**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
(f).	**Brake**	
(i).	Design	Mechanical brakes
	Operational brake	Aerodynamic brake achieved by feathering blades

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(iii).	Secondary brake	Mechanical brakes on high speed shaft of gearbox
(g).	**Tower**	
(i).	Type	Conical barrel tube
(ii).	Hub height	80 m
(h).	**Yaw System**	
(i).	Yaw bearing	PETP
(ii).	Brake	Active Yaw
(iii).	Yaw drive	Motor Drive
(iv).	Speed	0.42/s controlling speed
(i).	**Other Details**	
(i).	Project Commissioning Date (Anticipated)	October 31, 2019
(ii).	Expected Life of the Project from Commercial Operation Date (COD)	20 Years

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Power Curve of Wind Turbine Generator of Gamesa G114/2.0 (Tabular)

[illegible]	[illegible]
4	135
[illegible]	[illegible]
6	581
[illegible]	[illegible]
8	1408
[illegible]	[illegible]
10	1977
[illegible]	[illegible]
12	1999
[illegible]	[illegible]
14	2000
[illegible]	[illegible]
16	2000
[illegible]	[illegible]
18	2000
[illegible]	[illegible]
20	2000
[illegible]	[illegible]
22	1906
[illegible]	[illegible]
24	1455
[illegible]	[illegible]

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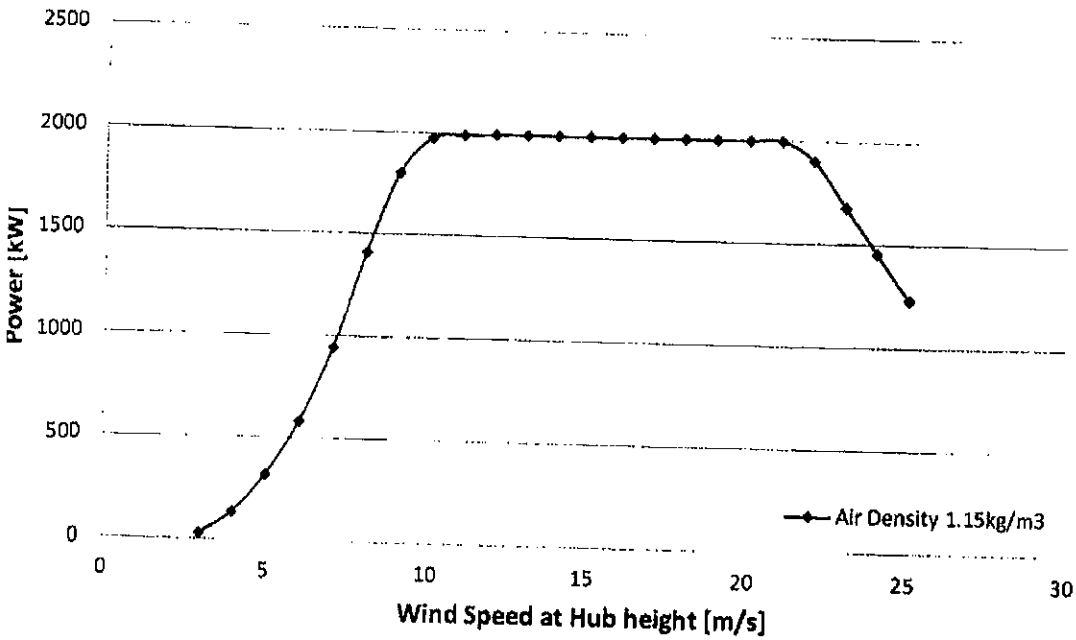
Power Curve of Wind Turbine Generator of Gamesa G114/2.0 (Graphical)



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SCHEDULE-II

The Total Installed/Gross ISO Capacity (MW), Total Annual Full Load Hours, Average Wind Turbine Generator (WTG) Availability, Total Gross Generation of the Generation Facility/Wind Farm (in GWh), Array & Miscellaneous Losses (GWh), Availability Losses (GWh), Balance of Plant Losses (GWh) Annual Energy Generation (GWh) and Net Capacity Factor of the Generation Facility /Wind Farm of Licensee are given in this Schedule

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SCHEDULE-II

(1).	Total Installed Gross ISO Capacity of the Generation Facility /Wind Farm (MW/GWh)	50.00 MW
(2).	Total Annual Full Load Hours	3066 Hrs
(3).	Average Wind Turbine Generator (WTG) Availability	97.0 %
(4).	Total Gross Generation of the Generation Facility/Wind Farm (in GWh)	173.7 GWh
(5).	Array & Miscellaneous Losses GWh	12.58 GWh
(6).	Availability Losses GWh	4.72 GWh
(7).	Balance of Plant Losses GWh	3.14 GWh
(8).	Annual Energy Generation (20 years equivalent Net AEP) GWh	153.3 GWh
(9).	Net Capacity Factor	35.00 %

Note

All the above figures are indicative as provided by the Licensee/ZEPL. The net energy available to power purchaser for dispatch will be determined through procedures contained in the energy purchase agreement.

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