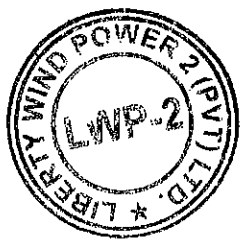
BEFORE
THE NATIONAL ELECTRIC
POWER REGULATORY AUTHORITY

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 2 (PVT.) LIMITED FORMERLY KNOWN AS "NOOR SOLAR ENERGY (PVT.) LIMITED"
50 MW WIND POWER PROJECT AT JHIMPIR, DISTRICT THATTA, SINDH

Dated: [March 11, 2019]

Filed for:
Liberty wind Power 2 (Pvt.) Limited



LIBERTY WIND POWER 2 (PVT) LTD.
Formerly **Noor Solar Energy (Pvt) Ltd**

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

Date: Mar, 11 2019

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

I, Tanveer Ahmed, the Technical Director, being the duly authorized representative of Liberty Wind Power 2 (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 Noor Solar Energy (Private) 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.

Tanveer Ahmed
Technical Director
Liberty Wind Power 2 (Private) Limited
Formerly: Noor Solar 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 2 (Private) Ltd formerly called 'Noor Solar 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/46/2017), 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 Noor Solar Energy (Private) Limited to Liberty Wind Power 2 (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 2 (Private) 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**

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 Noor Solar Energy (Private) Limited to Liberty Wind Power 2 (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.

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 2 Private Limited
Formerly: Noor Solar Energy (Private) Limited
11-March 2019

LIBERTY WIND POWER 2 (PVT) LTD. LWP-2

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

B 025324

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. 0092876

I hereby certify that pursuant to the provisions of Section 12 of the Companies Act 2017 (XIX OF 2017), the name of ***NOOR SOLAR ENERGY (PRIVATE) LIMITED*** *has been changed to* ***LIBERTY WIND POWER 2 (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 ***13th*** *day of* ***October Two Thousand and Seventeen.***

Rs.2,500/-

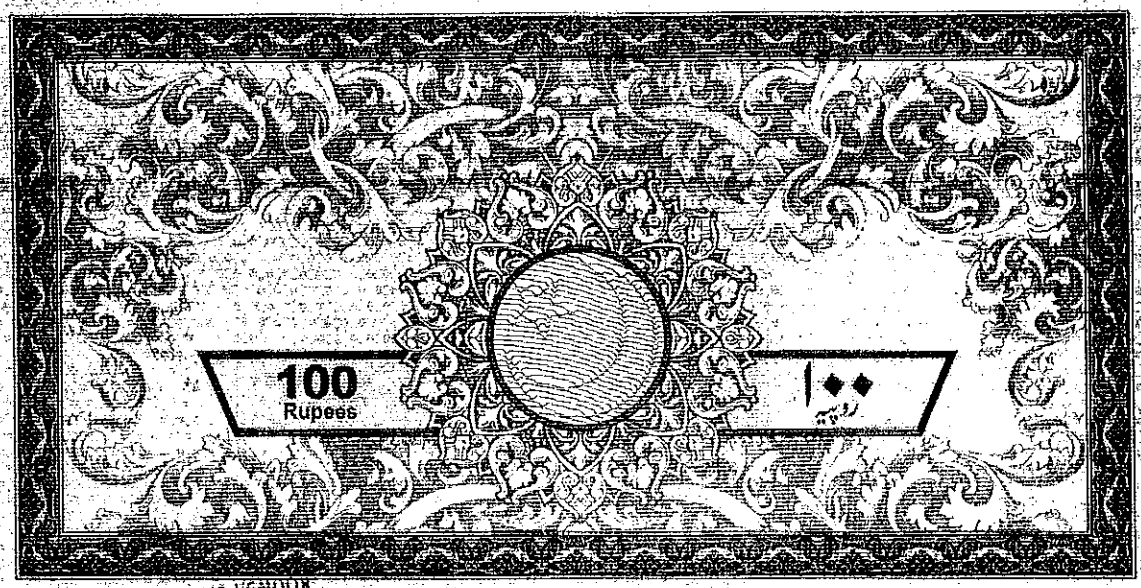
MUHAMMAD NAEEM KHAN
ADDITIONAL REGISTRAR / INCHARGE
CRO, Karachi

Company Registration Office Karachi
Securities and Exchange Commission of Pakistan

D.NO 59272

Date 18/10/2017

N401410



HBOOB HASSAN KHAN STAMP VENDOR
Licence. No.57, Shop No. 68, S-30, K No. 1430
Sec. 1-A14, Zaitun Colony Stop, A-1 North Karachi
M.H. KHAN
Advocate High Court
10659-H/C
ATTACHED
VALUE RS.
STAMP VENDOR'S SIGNATURE

27 OCT 2016

KISHWER PARVEEN B.A., LL.B. ADVOCATE
NOTARIED
PAKISTAN
OATH COMMISSIONER

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 2 (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.

LIBERTY WIND POWER 2 (PVT) LTD. LWP-2

(Deponent)

ATTESTED
KISHWAR PARVEEN
OATH COMMISSIONER
KARACHI

Seal & Signature of the Oath Commissioner

06 MAR 2019

Extracts from
Resolution Passed by the Board of Directors of
Liberty Wind Power 2 (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 2 (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 2 (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 2 (Private) Limited

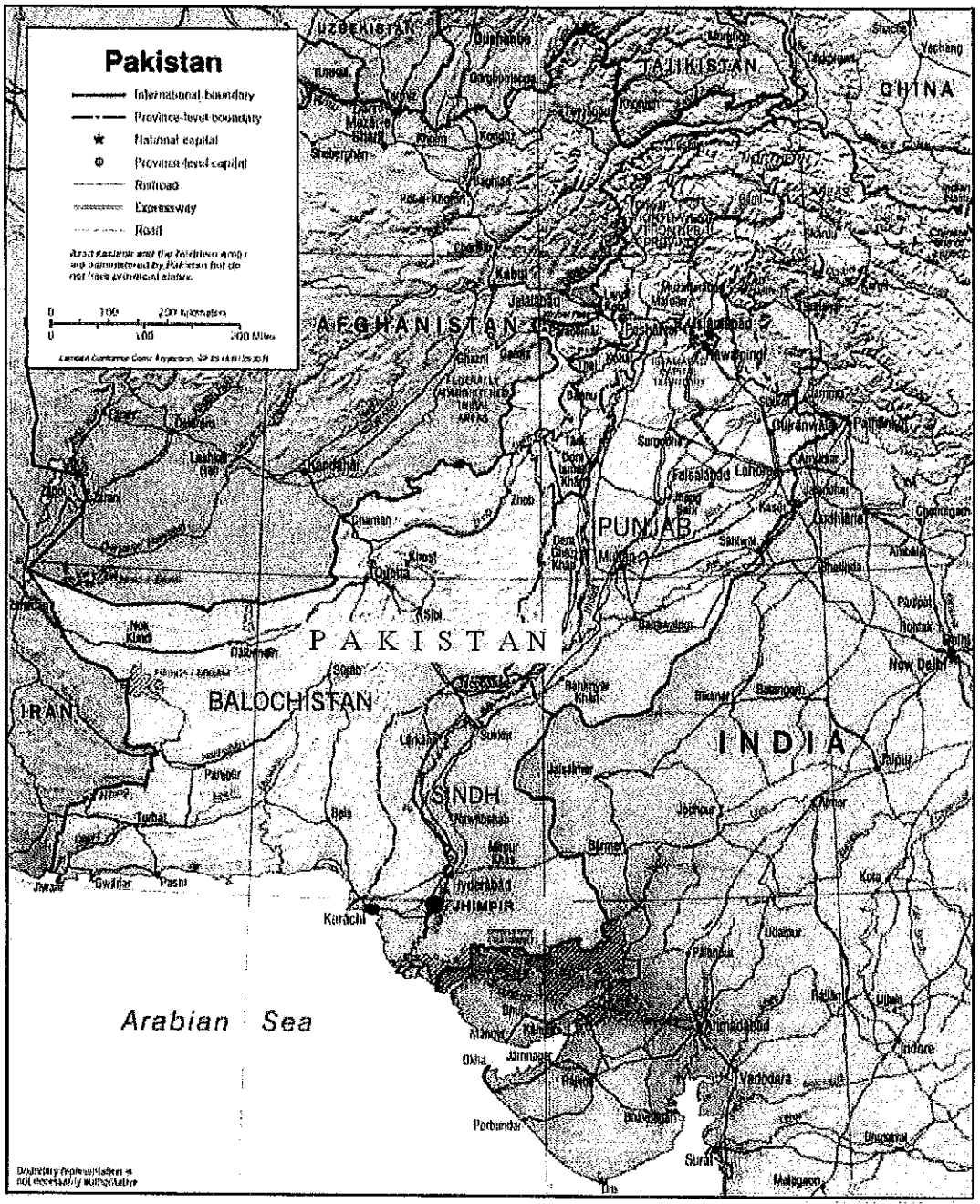
SCHEDULE-I

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.

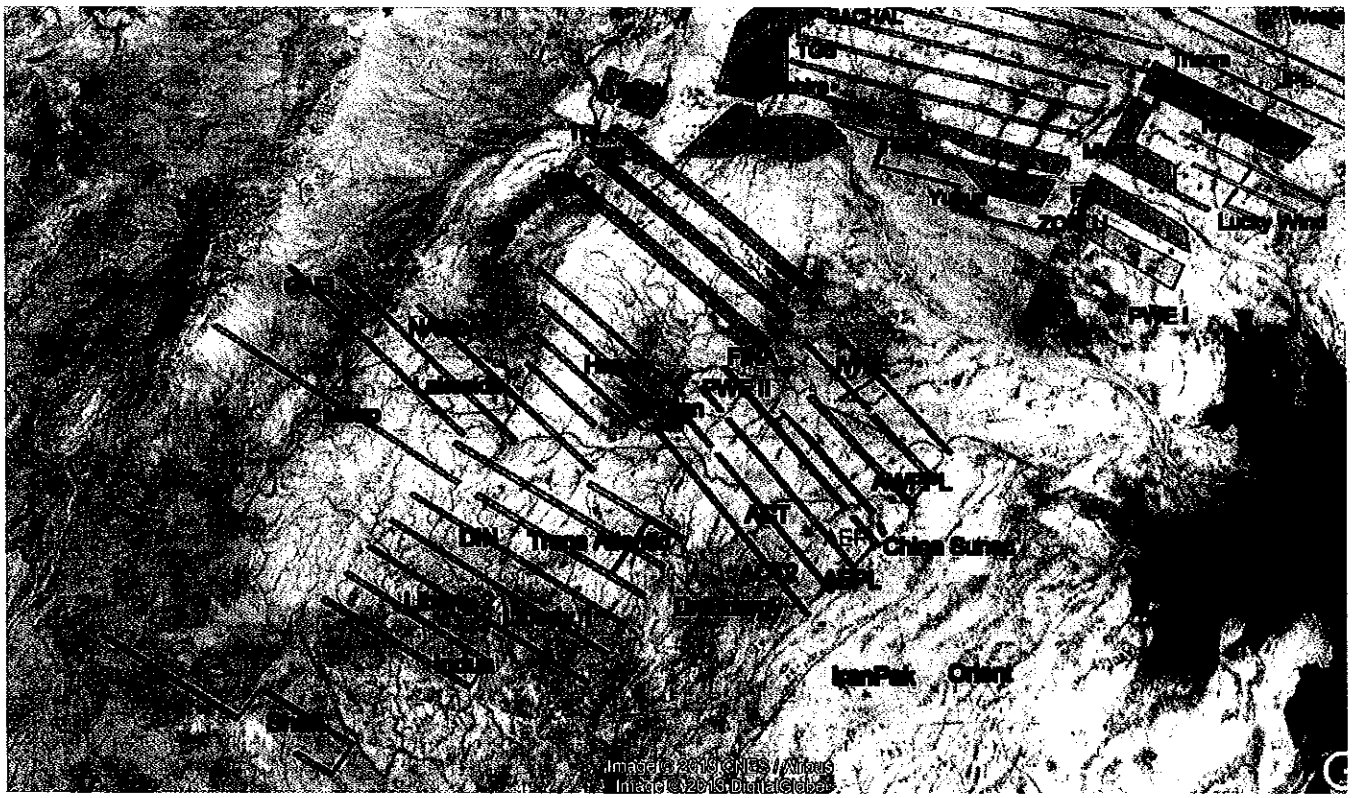
Actual drawings pertaining to Wind Farm Location Map, Wind Farm Lay Out, Wind Farm Micro-Sitting, Single Line Diagram (Electrical System of the Wind Farm).

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

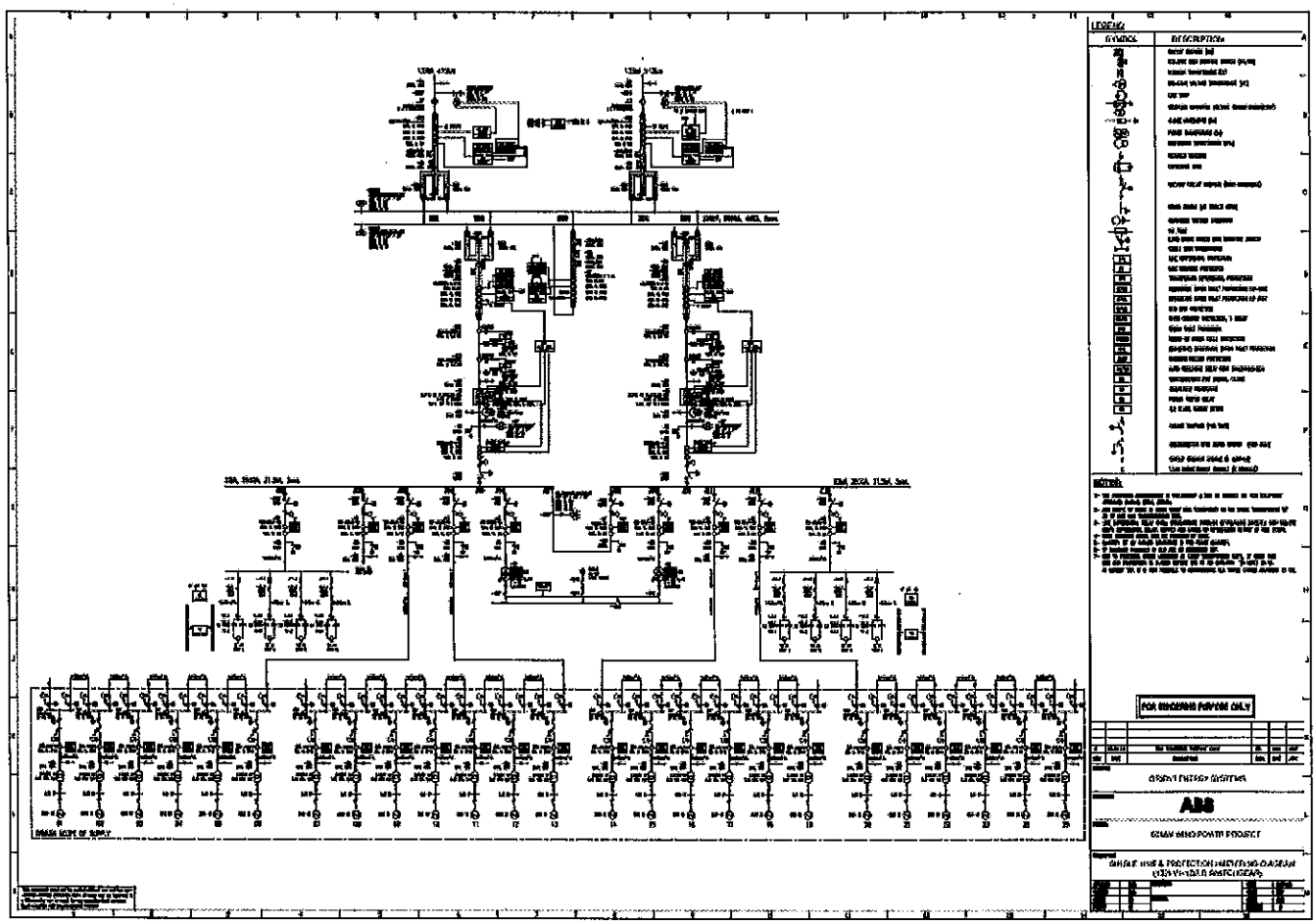
Location: Jhimpir – Sindh, Pakistan

The Site coordinates are given in Table below.

S. No.	Latitude	Longitude
1	24.900817	67.793202
2	24.901968	67.793978
3	24.943312	67.718515
4	24.94443	67.719293

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	370725	2759301
G02	371013	2759117
G03	371301	2758934
G04	371590	2758750
G05	371878	2758566
G06	372167	2758383
G07	372455	2758199
G08	372744	2758015
G09	373032	2757832
G10	373321	2757648
G11	373609	2757464
G12	373898	2757281
G13	374186	2757097
G14	374475	2756913
G15	374763	2756730
G16	375052	2756546
G17	375340	2756362
G18	375629	2756179
G19	376206	2755811
G20	376494	2755628
G21	376783	2755444
G22	377071	2755260
G23	377360	2755077
G24	377648	2754893
G25	377937	2754709

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 2 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

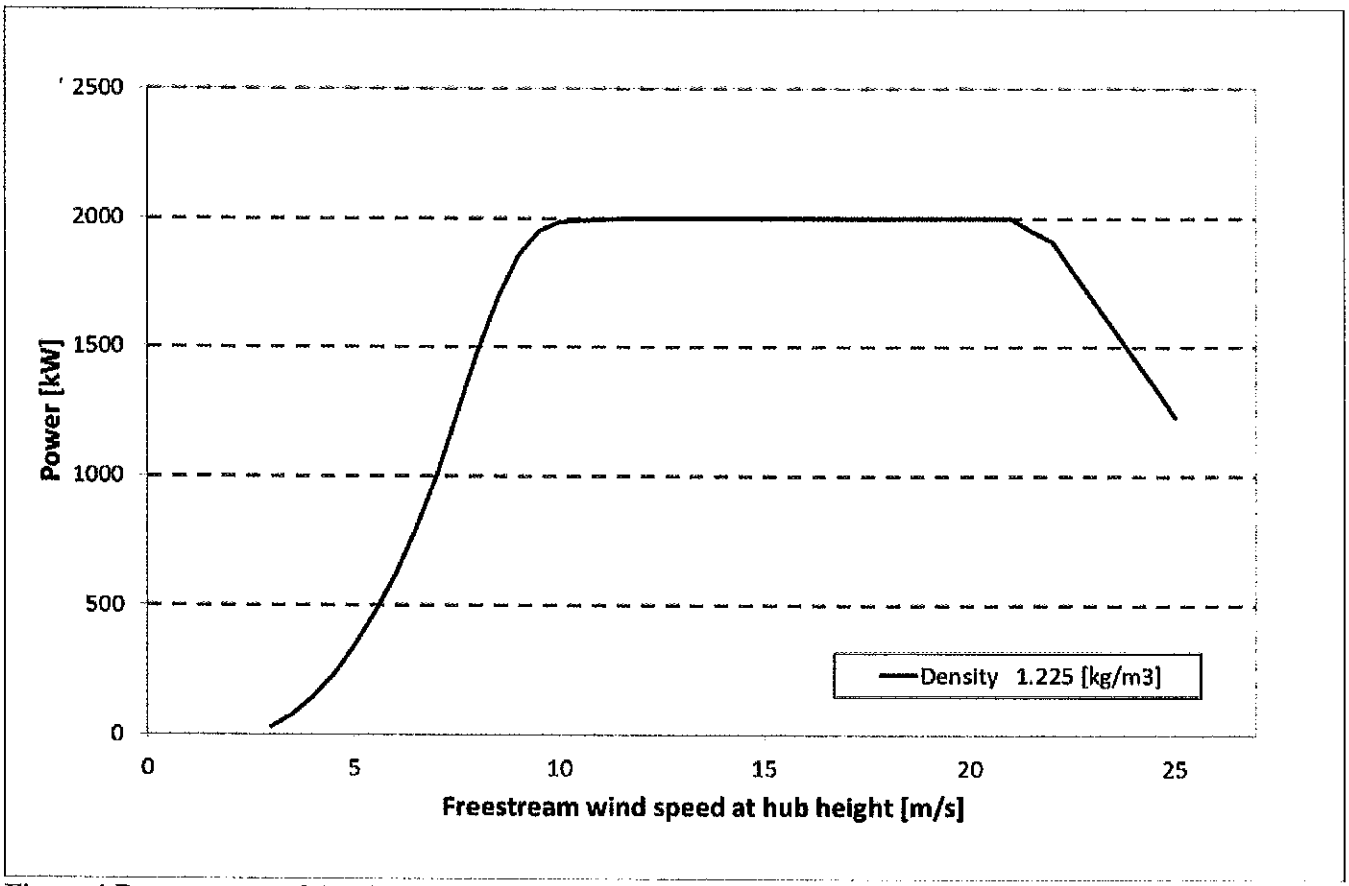


Figure 1 Power curve of the WT G114 2.0MW CIIA/CIIIA for an air density equal to 1.225 [kg/ m3]

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

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

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-431/LWPL-2-2017/18021-18023
November 19, 2018

Subject: **Determination of the National Electric Power Regulatory Authority in the matter of Tariff Petition filed by Liberty Wind Power 2 (Pvt.) Limited for Determination of Reference Generation Tariff in respect of 50 MW Wind Power Project** [Case # NEPRA/TRF-431/LWPL-2-2017]

Dear Sir,

Please find enclosed herewith the subject Determination of the Authority along with Annexure-I & II (28 pages) in Case No. NEPRA/TRF-431/LWPL-2-2017.

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 2 (PVT) LTD. LWP-2

DETERMINATION OF THE NATIONAL ELECTRIC POWER REGULATORY AUTHORITY IN THE MATTER OF TARIFF PETITION FILED BY LIBERTY WIND POWER 2 (PVT) LIMITED FOR DETERMINATION OF REFERENCE GENERATION TARIFF IN RESPECT OF 50 MW WIND POWER PROJECT

1. Liberty Wind Power 2 (Pvt.) Ltd. (formerly Noor Solar Energy (Pvt.) Ltd.) ("LWPL-2" or "the petitioner" or " the company/project company") vide its letter dated December 29, 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 reference 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 6.8684/kWh (Rs. 7.2118/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 March 7, 2018, the validity of the said LOI was extended by GOS up to March 24, 2019.

3. The petitioner also submitted the minutes of the meeting of Panel of Experts ("POE") of GOS dated November 7, 2017 which was conducted to review the feasibility study submitted by LWPL-2. 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-2 on August 1, 2017.

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

Project company	:	Liberty Wind Power 2 (Pvt.) Limited *(formerly Noor Solar Energy (Pvt.) Ltd.)*
Sponsors	:	Liberty Group / Liberty Mills Limited

Capacity	:	50 MW
Project location	:	Jhimpir, District Thatta, Sindh
Land area	:	330 acres
Concession period	:	25 years from Commercial Operations Date
Power purchaser	:	Central Power Purchasing Agency Guarantee Ltd.
Wind turbine	:	Siemens Gamesa
Model	:	G 114-2.0
Plant capacity factor	:	38%
Annual energy generation	:	166.440 GWh
Construction period	:	15 months
EPC contractor	:	Hydrochina Corporation
Project cost		**USD in millions**
EPC cost	:	78.000
Land	:	0.520
Non-EPC	:	0.790
Project Development Cost	:	2.830
Duties and taxes	:	1.030
Insurance during construction	:	0.550
Financial fee and charges	:	1.410
Interest during construction	:	3.080
Total project cost	:	**88.210**
Financing structure	:	Debt: 80% : Equity: 20%
Debt composition	:	50% local & 50% foreign loan
Interest rate	:	SBP Facility-Fixed rate (2%) + 1.75%
	:	3 month LIBOR (1.57%) + 4.25%
Debt repayment period	:	Local 10 years and foreign 13 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

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		PKR/kWh	US¢/kWh
Levelized Tariff	:	7.2118	6.8684
Exchange rate	:	1 USD= PKR 105	

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 19, 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 10, 2018 (Tuesday) at 11:30 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"), 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.

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iv. Whether the claimed annual energy generation and corresponding plant capacity factor are reasonable and justified? And

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 in the tariff petition is given hereunder:

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

11. In its petition, LWPL-2 submitted that it has carried out an international competitive bidding process by circulation Request for Proposals ("RFP") to the EPC contractors for the development

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of the project. The petitioner submitted that based on thorough due diligence and following an intense negotiations process with the various suppliers and contractors, the project company shortlisted Hydrochina Corporation with Gamesa as the technology for the project. NEPRA vide letter dated May 11, 2018 directed LWPL-2 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 the required documents with respect to the bidding process vide letter dated May 28, 2018. In the said letter the petitioner informed that RFP was issued to various EPC contractors on April 7, 2016 and the potential bidders were requested to submit their bids by or before May 6, 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 84.50 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-2 submitted that it renegotiated the EPC price to the level of USD 78.00 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-2 submitted that the Offshore Contract was signed with M/s Power Construction Corporation of China Limited on October 15, 2017 which includes procurement and supplying imported equipment and materials, 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 design, engineering, construction 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

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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-2, 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 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-2 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-2 as USD 57.940 million.

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 Noor Solar Energy (Pvt) Limited and the subject petition has been filed with the company name of LWPL-2. 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 10.210 million on account of non-EPC cost. Detail of non-EPC cost as provided by the petitioner is hereunder:

Non-EPC Cost	(USD million)
Project Development cost, Non EPC and Land cost	4.140
Duties & taxes	1.030
Insurance during construction	0.550
Financial charges	1.410
Interest during construction	3.080
Total Non-EPC Cost	**10.210**

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Project Development Cost, Non-EPC & Land Cost

18. The petitioner has claimed Project Development Cost ("PDC") of USD 2.83 million. In its petition and during the hearing, the petitioner submitted that this claim includes the cost of feasibility and other studies, cost of met mast, administrative costs, fixed assets power purchaser letter of credit cost, office setup cost, various regulatory fees, travelling expenses and fees in relation to advisors of the project. Non-EPC cost of USD 0.79 million and land lease cost of USD 0.52 million has been claimed for 330 acres of land.

19. The petitioner submitted that the land lease for 330 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. 9.9 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 (inclusive of Non EPC and land cost) 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

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production of verifiable documentary evidences to the satisfaction of the Authority. The same treatment is allowed for LWPL-2 also. Doing so, impact of such duties/taxes has not be 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 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:

    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,

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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 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-2. 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 3.080 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 1.75% 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 depending on the fluctuations 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:

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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**

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-2. 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

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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 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-2 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.

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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-2 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:

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-2 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-2, 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-

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2 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-2. 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 per annum 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

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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-2. 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.

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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 of 2% plus 1.75% 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-2 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-2 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.

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45. The Authority has decided to approve the tariff of LWPL-2 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' time for the construction of the project. The Authority has found this claim reasonable and decided to allow the same.

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 May 31, 2017. NTDCL in its approval letter also certified that the power to be generated by the project company will be evacuated provided the study assumptions and results given in the approved grid interconnection study report and power injection through this project will not have any adverse

effect on the national grid as required under the prevailing grid code. On the basis of that approval, the Authority has issued generation license to LWPL-2 on August 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 2 (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.

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- 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.
- 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

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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.

- 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.

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- 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. Indexations

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 starting from either 1st January or 1st July. Insurance component shall be adjusted on annual basis starting from either 1st January or 1st July. The indexation mechanisms are given hereunder:

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)

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$US\ CPI_{(REF)}$	=	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;		
AIC	=	Adjusted insurance component of tariff
$Ins_{(Ref)}$	=	Reference insurance component of tariff
$P_{(Ref)}$	=	Reference premium @ 0.4% of the 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;

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$ROE_{(Rev)}$	=	$ROE_{(Ref)} * ER_{(Rev)} / ER_{(Ref)}$
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.

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:

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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%

- 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.

- 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

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

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- 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

(Rehmatullah Baloch)
Vice Chairman

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
NEPRA AUTHORITY

(Brig (R) Tariq Saddozai)
Chairman

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LIBERTY WIND POWER 2 (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**

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LIBERTY WIND POWER 2 (PVT.) LIMITED
DEBT SERVCING SCHEDU

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		

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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-385/13449-55

August 1, 2017

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

Subject: **Grant of Generation Licence No. WPGL/46/2017**
Licence Application No. LAG-385
Noor Solar Energy (Private) Limited (NSEPL)

Reference: *NSEPL's application vide letter dated nil, received on February 21, 2017.*

Enclosed please find herewith Generation Licence No. WPGL/46/2017 granted by National Electric Power Regulatory Authority (NEPRA) to Noor Solar Energy (Private) Limited (NSEPL) for its 50.0 MW Wind Power Plant located at Deh Kohistan 7/3 and 7/4 Tapo Jungshahi, Taluka and 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/46/2017)

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(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, ENERCON Building, Sector G-5/2, 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 Noor Solar Energy (Pvt.) Limited
for the Grant of Generation Licence

August ,2017
Case No. LAG-385

(A). Background

(i). In order to harness the potential of Renewable Energy (RE) resources in the country, the Government of Pakistan (GoP) has formulated a policy titled "Policy for Development of Renewable Energy for Power Generation 2006 (the "RE Policy"). The said policy is in field since 2006 under which both Federal Government and the Provincial Governments are supporting the implementation of RE projects in the country.

(ii). In consideration of the above, the Federal and Provincial Governments have been issuing Letter of Intent (LoI) to various developers for setting up different type of RE projects across the country. In this regard, Energy Department of Government of Sindh (EDGoS) issued LoI to Noor Solar Energy (Pvt.) Limited (NSEPL) for setting up a 50.00 MW wind based generation facility/Wind Power Plant/Wind Farm in the wind corridor of Jhimpir, district Thatta in the province of Sindh.

(iii). In order to implement the project, the services of various consultants were hired and a feasibility study of the project was carried out. The feasibility study *inter alia* included technical details of the project, micro-siting, power production estimates, soil test reports, electrical and environmental studies etc. After the said, NSEPL decided to approach the Authority for the grant of generation licence.

(B). Filing of Application

(i). NSEPL submitted an application on February 21, 2017 for the grant of generation licence in terms of Section-15 of Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (the "NEPRA Act") read

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with the relevant provisions of the NEPRA Licensing (Application and Modification Procedure) Regulations, 1999 (the "Licensing Regulations").

(ii). The Registrar examined the submitted application to confirm its compliance with the Licensing Regulations and observed that the application lacked some of the required information/documentation. Accordingly, NSEPL was directed for submitting the missing information/documentation and the same was received on March 02, 2017. The Authority considered the matter and found the form and content of the application in substantial compliance with Regulation-3 of the Licensing Regulations. Accordingly, the Authority admitted the application on March 22, 2017 for consideration of the grant of the generation licence as stipulated in Regulation-7 of the Licensing Regulations. The Authority approved an advertisement to invite comments of general public, interested and affected persons in the matter as stipulated in Regulation-8 of the Licensing Regulations. Accordingly, notices were published in one (01) Urdu and one (01) English newspapers on March 25 & 28, 2017.

(iii). In addition to the above, the Authority also approved a list of stakeholders for seeking their comments for assistance of the Authority in the matter in terms of Regulation-9(2) of the Licensing Regulations. Accordingly, letters were sent to said stakeholders on March 28, 2017 soliciting their comments for assistance of the Authority.

(C). Comments of Stakeholders

(i). In reply to the above, the Authority received comments from four (04) stakeholders. These included Central Power Purchasing Agency (Guarantee) Limited (CPPA-G), Engineering Development Board (EDB), Anwar Kamal Law Associates (AKLA) and Energy Department Govt. of Sindh (EDGoS). The salient points of the comments offered by the said stakeholders are summarized below:-

(a). CPPA-G submitted that NSEPL has selected Gamesa-G114 Wind Turbine Generators (WTGs) each having capacity of 2.00 MW which seem to be appropriate choice but higher capacity turbine are available in the market for getting higher generation. NSEPL should ensure that the proposed generation facility with

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latest provisions of the Grid Code approved by the Authority and IEC standards. The interconnection study for evacuation of electric power from the proposed generation facility has not been vetted by National Transmission and Despatch Company Limited (NTDC). Presently, AEDB is in the process of formulating the request for proposal (RFP) documents to carry out competitive bidding for procurement of electric power from wind projects pursuant to terms and conditions of Determination of the Authority dated January 27, 2017 and NEPRA Competitive Bidding (Approval Procedure) Regulations 2014. Only successful bidders as determined through competitive bidding will be considered for issuance of PAR by CPPA-G;

(b). EDB did not express any reservation to the grant of generation licence to NSEPL. However, EDB suggested that efforts should be made to utilize indigenous potential available for the proposed project;

(c). AKLA raised various issues being faced by the electric power sector of the country. It was highlighted that there is under-utilization of various existing generation facilities and resultantly there is surplus capacity. Therefore, induction of new power plants on "Take or Pay" basis etc. is not justifiable. AKLA contested that RE based generation facilities have higher upfront tariff and also enjoy the status of "must run" making such facilities not viable financially and economically. AKLA questioned the induction of RE projects in the scenario of reducing oil prices, proposed long term contracts of R-LNG and under construction coal power projects. AKLA opined that instead of setting up new power plants having higher cost, efforts should be made to utilize the available generation capacity first to its full. Further, efforts should be made to encourage investors to setup new generation facilities under "Take and Pay" regime in a competitive power market. AKLA opposed the grant of generation licence to NSEPL; and

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(d). EDGoS explained the huge potential of the RE in the country especially in the province of Sindh and the benefits that can be achieved through the use of the same in generation of electric power. EDGoS supported the grant of generation licence to NSEPL.

(ii). The Authority reviewed the above comments of the stakeholders and decided to seek the perspective of the NSEPL on the observations of on the observations of CPPA-G, EDB and AKLA. On the comments of CPPA-G, it was submitted that it will comply with the provisions of the Grid Code without any exception. It was also confirmed that NTDC has already approved the interconnection study for the project and issued necessary certificate confirming that necessary infrastructure will be available for dispersal of electric power from the proposed generation facility. NSEPL also informed that in view of the approval of NTDC, it has also filed a request with CPPA-G for PAR. Regarding, the comments of EDB, it was confirmed that the project company shall make all possible efforts to utilize the indigenous potential available for development of the project, while remaining within the domain of RE Policy and other relevant rules and regulations.

(iii). About the observations of AKLA, it was submitted that the comments offered by AKLA were general in nature and not specifically relate to the application of the Company for issuance of generation licence. NSEPL stated that the points raised by AKLA relate to the policy of GoP for promotion of RE sector in country. NSEPL expressed that it appreciates the professional competence of AKLA in field of law however, the comments have been filed without fully appreciating the dynamics of the project, energy sector, financial and technical considerations relevant for determining project parameters. Therefore, the comments are liable to be dismissed outright being irrelevant and vague and having no nexus with the subject application for grant of generation licence. It was stated that mainstreaming of RE and greater use of indigenous resources can help to diversify energy mix of the country and reduce dependence on any single source, particularly imported fossil fuels, thereby mitigating against supply disruptions and price fluctuation risks. Additional costs and risks relating to fuel

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stocking, transportation, and temporary substitute arrangements are also irrelevant for RE systems, except for backup purposes.

(iv). Further, NSEPL stated that AKLA in its comments claimed that generation capacity of country is surplus. It appears that the commentator is not fully aware about the operational capacity and installed capacity, for instance the installed capacity of the hydro projects cannot operate at full load throughout the year as it dependent on the hydrology. Furthermore, a sizeable portion of installed capacity is inefficient and not economically viable to be operated. NSEPL stated that fuel prices are volatile and cannot be assumed to remain on the existing low level. Further, NSEPL stated that the availability of a generation facility varies from 80%-90% due to schedule maintenances and tripping of plant and the same is to be take into consideration for utilization factor. NSEPL commented that though there are projects under construction on coal and RLNG fuels, however, the ever increasing demand of electricity will continue to exist therefore, RE has to maintain a sizeable share in the overall energy mix. It is pertinent to mention that indigenous RE sector will result in savings of precious foreign exchange. It was sated that presently country has the lowest contribution of RE in the energy mix which needs to be improved to the level of other developing countries. NSEPL remarked that comparison of earlier upfront tariffs with the current upfront tariff reveals the improvement of technology/plant factor and reduction in cost, these benefits are reflected in the current upfront tariff offered by the Authority.

(v). NSEPL expressed that though the comments of AKLA may be well intentioned however, it betrays a fundamental lack of understanding of the dynamics of what is involved in a viable power policy. Most of the comments are directed at the Authority and the RE Policy with the biggest concern over "Take or Pay" feature which AKLA would like to be changed to "Take and Pay". It appears that AKLA does not seem to understand that replacing "Take or Pay" to "Take and Pay" would result in the end of IPP industry in the country, which to date has been one of the most successful.

(vi). The Authority has considered the comments of the stakeholders, the replies of NSEPL and observed that AKLA while submitting its comments has

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referred to its various previous correspondences in different licensing and tariff matters wherein it raised different issues including (a) surplus capacity; (b) capacity payment without supplying electricity (c); addition of high cost renewable plants (d); underutilization of power plants; and (e) induction of new power plants on "Take or Pay" basis and others etc. In this regard, the Authority has observed that it had duly addressed the aforementioned objections/comments and sent a comprehensive reply to AKLA through letter no. NEPRA/SAT-I/TRF-100/17060, dated December 27, 2016. The Authority reiterates its earlier findings and observations given in the aforementioned letter and is of the considered opinion that in fact there is considerable supply demand gap resulting in load-shedding and load management. The aforementioned is strengthened from the fact that the proposed generation facility/Wind Power Plant/Wind Farm of NSEPL is included in the future expansion plan of National Transmission and Despatch Company Limited (NTDC). Regarding the observations of AKLA that RE Projects should have "Take and Pay" tariff, the Authority hereby clarifies that through its determination No. NEPRA/TRF-WPT/2017/1542-1544 January 27, 2017, it has already determined a benchmark tariff for future wind power projects which is on unit delivered basis meaning thereby that a power producer/generation company is paid only for the energy it delivers. In view of foregoing, the Authority considers that the observations of AKLA stand addressed.

(vii). In consideration of the above and having addressed the comments/objections of the stakeholders, the Authority considered it appropriate to proceed further in the matter of application of NSEPL for the consideration of grant of generation licence as stipulated in the Licensing Regulations and NEPRA Licensing (Generation) Rules 2000 (the "Generation Rules").

(D). Evaluation/Findings

(i). The Authority has examined the submissions of NSEPL including the information provided in its application for the grant of generation licence. The Authority has also considered the feasibility study of the project, Grid Interconnection Study (GIS), provisions of the RE Policy and the relevant rules & regulations.

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(ii). The Authority has observed the main sponsors of the project is Mukaty family. The family is involved in various business venture including import of chemicals and dyes, Textile machineries, Investments in the capital markets and real estate, Textile Products and General Merchant. Lately, the family through its textile entity in the name of Liberty Mills Limited (LML) entered into the electric power generation venture and set up a 200.00 MW furnace oil based generation facility at Faisalabad in the province of Punjab which is in operation since January 2011. Now, the Mukaty family is further diversifying its portfolio by venturing into RE sector and is setting up two (02) wind based projects in the name of Zulaikha Energy (Private) Limited (ZEPL) and NSEPL. It is pertinent to mention that the Authority has already granted a generation licence No. WPGL/39/2017, dated February 01, 2017 to ZEPL.

(iii). In order to implement the project, the Mukaty family incorporated a new company in the name of NSEPL under company under Section-32 of the Companies Ordinance, 1984 (Corporate Universal Identification No. 0092876, dated April 08, 2015). The registered office of the company is located at A/51-A, SITE Karachi. According to the Memorandum of Association, the objects of the company, inter *alia*, include business of power generation and its sale thereof.

(iv). The Govt. of Sindh (GoS) has allocated 330 acres of land in the Jhimpir wind corridor at deh Kohistan 7/3 & 7/4 tapo Jungshahi, taluka and district Thatta, in the province of Sindh for setting up a 50.00 MW generation facility/ Wind Power Plant/Wind Farm. According to the latest balance sheet, LML has a total assets of around Rs. 26.00 billion. It is pertinent to mention that based on the financial strength and other evaluation parameters, EDGoS issued LoI to NSEPL for development of the project.

(v). In view of the explanation given above, the Authority considers that the sponsors have strong financial and technical background to carry out the project. It is pertinent to mention that sponsors are in negotiation with different lending institutions for the financing of the project. In this regard, the company has provided expression of interest from Meezan Bank Limited confirming financing for the project to the tune of Pak Rs. 7600.00 million. According to the submitted

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information, the total outlay of the project will be U.S. $ 110.25 million which will be financed through a combination of debt (U.S. $ 82.688 million) and equity (U.S. $ 27.563 million) in a ratio of 75:25 which is in line the benchmark set out in the RE Policy and the determinations of the Authority.

(vi). As explained in the preceding paragraphs, NSEPL had carried out a feasibility study of the project. The review of the feasibility study reveals that the company has considered various world class manufactures of Wind Turbine Generator (WTG) including General Electric-GE, VESTAS, Gamesa, Nordex, Suzlon, Ming Yang and Goldwind etc. The selection procedure for WTG duly considered various parameters including (a). wind resource position of the corridor of Jhimipir (b). capital cost of equipment/WTG; (c). lead time for supply of equipment/WTG; (d). expected energy yield of WTG; (e). reliability and compliance with Grid Code; (f). availability of suitable operation and maintenance teams (including easiness/availability spare parts for WTG etc.

(vii). After considering the above mentioned factors NSEPL decided to select WTG of G114-2.0 MW of Gamesa Corporation, Spain. It is pertinent to mention that Gamesa is one of the world leader in the wind industry and has significant share worldwide. The feasibility study also optimized the size of the proposed generation facility/Wind Power Plant/Wind Farm to 50.00 MW having 25 x 2.00 MW of WTG. In consideration of the above, it is clarified that the proposed WTG is third generation (Type-III) having induction generator with gearbox. The said WTG inherits many of the technologies developed over the last 15 years for the Gamesa 2.0 MW platform. Now, with a rotor diameter of 114 m, the G114-2.0 MW has a 38% larger swept area than the G97-2.0 MW and produces over 20% more energy annually. The new blade having length of 56 m and with state of the art airfoil design ensures maximum energy production, reduced noise levels and a significantly lower cost of energy for Class II/III sites. The proposed WTG has better feedback and control system with good characteristics for grid reliability and stability for grid as required in the Grid Code.

(viii). The Authority has noted that sponsors of the project carried out the required GIS for dispersal of electric power from the proposed generation

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facility/Wind Power Plant/Wind Farm. According to the said, the dispersal of electric power will be made at voltage level of 132kV. The dispersal/interconnection arrangement will be consisting of 132kV D/C transmission line (approximately 0.8 km long, on twin-bundled AASC Greeley conductor) for making In/Out of 132kV Single Circuit (S/C) transmission line connecting the projects of Indus Wind Energy Limited and Din Energy Limited to the grid station of Jhimpir-2. In this regard, NTDC has confirmed that the electric power from the proposed generation facility/Wind Power Plant/Wind Farm will not have any adverse effect on the National Grid. Further, the necessary arrangements for evacuation of electric power will be made available well before the Commercial Operation Date (COD) of the generation facility/Wind Power Plant/Wind Farm.

(ix). The Authority considers that the proposed project, for which generation licence is being sought, is based on RE source and does not cause pollution as in the case of conventional power plants. However, the Authority considers that the construction and operation of the generation facility/Wind Power Plant/Wind Farm may cause soil pollution and noise pollution. In this regard, the Authority has observed that NSEPL also carried out the Initial Environment Examination and submitted the same for the consideration and approval of Sindh Environmental Protection Agency, Government of Sindh (EPAGoS). The Authority is satisfied that EPAGoS has issued a No Objection Certificate (NOC) for the construction of the project.

(x). In terms of Rule-3 of the Generation Rules, the Authority may grant a generation licence to any person to engage in the generation business. The said rule stipulates various conditions pertaining to the grant of generation licence as explained in Rule-3(2), Rule-3(3), Rule-3(4) and Rule-3(5) of the Generation Rules. In this particular case, the Authority has observed that conditions of Rule-3(2) and Rule-3(3) stands satisfied as NSEPL has provided details of location, technology, size, net capacity/energy yield, interconnection arrangements, technical limits, technical functional specifications and other details specific to the generation facilities. The provision of Rule-3(4) of the Generation Rules regarding holding a public hearing is not applicable as there is no issue which require this exercise.

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(xi). Further, Rule-3(5) of the Generation Rules stipulates that the Authority may refuse to issue a generation licence where the site, technology, design, fuel, tariff or other relevant matters pertaining to the generation facility proposed in an application for a generation licence are either not suitable on environmental grounds or do not satisfy the least cost option criteria. In this regard, Rule-3(5) of the Generation Rules also stipulates the conditions pertaining to least cost option criteria which include (a). sustainable development or optimum utilization of the renewable or non-renewable energy resources proposed for generation of electric power; (b). the availability of indigenous fuel and other resources; (c). the comparative costs of the construction, operation and maintenance of the proposed generation facility against the preferences indicated by the Authority; (d). the costs and right-of-way considerations related to the provision of transmission and interconnection facilities; (e). the constraints on the transmission system likely to result from the proposed generation facility and the costs of the transmission system expansion required to remove such constraints; (f). the short-term and the long-term forecasts for additional capacity requirements; (g). the tariff resulting or likely to result from the construction or operation of the proposed generation facility; and (h) the optimum utilization of various sites in the context of both the short-term and the long-term requirements of the electric power industry as a whole.

(xii). In consideration of the above, the Authority clarifies that AEDB/GoP has identified two wind corridors (of Jhimpir and Gharo) in the province of Sindh. The estimated potential for these two corridors is more than 50,000 MW. At the moment, around fourteen (14) projects with a cumulative installed capacity of around 750.00 MW have been installed and commissioned whereas another twenty four (24) projects including that of NSEPL with cumulative capacity of around 1300.00 MW are in various stages of implementation.

(xiii). The proposed project will result in optimum utilization of the RE resources which was earlier untapped, resulting in pollution free electric power. It is relevant to mention that wind is an indigenous fuel and such fuels have a preference for the energy security. It is pertinent to state that the Authority has

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determined a benchmark levelized tariff for the future wind projects which works out to be U.S. Cents 7.7342/kWh & 6.7467/kWh for local & foreign financing respectively. The said determination envisages conducting bidding among companies/sponsors of the project(s) as stipulated in NEPRA Competitive Bidding (Approval Procedure) Regulations, 2014. The said regulation envisages that companies/sponsors of the project(s) will be offering a discount on the announced benchmark tariff meaning thereby that tariff for future wind projects will be less than U.S Cents 7.7342/kWh & 6.7467/KWh for local & foreign financing respectively, which will be very competitive.

(xiv). As explained in the preceding paragraphs, the sponsors of the project carried out the GIS which concludes that the project will not face any constraints in transmission system. Further, being located in close proximity to the transmission system, the project will not result in cost and right-of-way issues for the provision of transmission and interconnection facilities. It is pertinent to mention that NTDC has included the project in its long-term forecasts for additional capacity requirements.

(xv). In view of the above, the Authority is of the considered view that the project of NSEPL fulfills the eligibility criteria for grant of generation licence as stipulated in the NEPRA Act, rules and regulations and other applicable documents.

(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 RE must be developed on priority basis.

(ii). The existing energy mix of the country is heavily skewed towards thermal power plants, mainly operating on imported fossil fuel. The continuous import of fossil fuel not only creates pressure on the precious foreign exchange

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reserves of the country but is also an environmental c[illegible]n. Therefore, in order to achieve sustainable development it is imperative th[illegible]genous RE resources are given priority for power generation and their deve[illegible]t is encouraged. The Energy Security Action Plan 2005 approved by GoP, [illegible] recognizes this very aspect of power generation through renewable energy e[illegible]nvisages that at least 5% of total national power generation capacity (i.e. 9[illegible]W) to be met through RE resources by 2030.

(iii). The Authority considers that the prop[illegible]roject of NSEPL is consistent with the provisions of Energy Security Acti[illegible]an 2005. The project will help in diversifying the energy portfolio of the co[illegible]urther, it will not only enhance the energy security of the country by re[illegible] the dependence on imported fuel but will also help in reducing in carbon e[illegible]n by generating clean electricity, thus improving the environment.

(iv). As explained in the preceding paragraph[illegible], [illegible]PL has provided the details of location, technology, size, net capacity/e[illegible]ield, interconnection arrangements, technical details and other related in[illegible]on for the proposed generation facility/Wind Power Plant/Wind Farm. In th[illegible]ard, the Authority has observed that Govt. of Sindh has allocated land t[illegible]PL for setting up a generation facility/Wind Power Plant/Wind Farm. Th[illegible]d details have been incorporated in Schedule-I of the proposed gener[illegible]ence. The Authority directs NSEPL to utilize the allocated land exclusively for proposed generation facility/Wind Power Plant/Wind Farm and not to carry [illegible]ny other generation activity on the said land except with its prior approval.

(v). The term of a generation licence under Pa[illegible]'1) of the Generation Rules is required to match with the maximum expect[illegible]f the units comprised in a generating facility, except where an applicant f[illegible] generation licence consents to a shorter term. According to the information[illegible]ovided by NSEPL, its generation facility/Wind Power Plant/Wind Farm will a[illegible]ve COD by July 31, 2019 and will have a useful life of more than twenty five [illegible]) years from its COD. In this regard, NSEPL has requested that the term[illegible]roposed generation licence may be fixed as twenty five (25) years. The Auth[illegible]y considers that said submission of NSEPL about the useful life of the gener[illegible] facility/Wind Power

Plant/Wind Farm and the subsequent request of to fix the term of the generation licence is consistent with international benchmarks therefore, the Authority fixes the term of the generation licence to twenty five (25) years from COD of the project.

(vi). Regarding the tariff, 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 of the said, the Authority through Article-6 of the generation licence directs NSEPL to charge the power purchaser only such tariff which has been determined, approved or specified by the Authority. The Authority directs NSEPL to adhere to the Article-6 of the generation licence in letter and spirit without any exception.

(vii). About the compliance with the environmental standards, as discussed in the preceding paragraphs, NSEPL has provided the NOC from EPAGoS and has confirmed that the project will comply with the required standards during the term of the generation licence. In view of the importance of the issue, the Authority has decided to include a separate article (i.e. Article-10) in the generation licence along with other terms and conditions making it obligatory for NSEPL to comply with relevant environmental standards at all times. Further, the Authority directs NSEPL to submit a report on a bi-annual basis, confirming that operation of its generation facility/Wind Power Plant/Wind Farm is in compliance with the required environmental standards as prescribed by the concerned environmental protection agency.

(viii). The proposed generation facility/Wind Power Plant/Wind Farm of NSEPL will be using RE resource for generation of electric power. Therefore, the project may qualify for the carbon credits under the Kyoto Protocol. Under the said protocol, projects coming into operation up to the year 2020 can qualify for the carbon credits. NSEPL has informed that the project will achieve COD by July 31, 2019 which is within the deadline of the Kyoto Protocol. In view of the said, 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 NSEPL to initiate the process in this regard at the earliest so that proceeds for the

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carbon credits are materialized. NSEPL shall be required to share the proceeds of the carbon credits with the power purchaser as stipulated in Article-14 of the generation licence.

(ix). In view of the above, the Authority hereby approves the grant of generation licence to NSEPL on the terms and conditions set out in the generation licence annexed to this determination. The grant of generation licence will 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)

Syed Masood-ul-Hassan Naqvi
(Member)

Himayat Ullah Khan
(Member)

Saif Ullah Chattha
(Member/Vice Chairman)

Tariq Saddozai
(Chairman)

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National Electric Power Regulatory Authority
(NEPRA)
Islamabad – Pakistan

GENERATION LICENCE

No. WPGL/46/2017

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

NOOR SOLAR ENERGY (PVT.) LIMITED

Incorporated Under Section-32 of the Companies Ordinance 1984 (XLVII of 1984) Having Corporate Universal Identification No. 0092876, dated April 08, 2015

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

(Total 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 this on 1st day of August Two Thousand & Seventeen and expires on 30th day of July Two Thousand & Forty Four.

01.08.17

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 as amended or replaced from time to time;

(b). "AEDB" means the Alternative Energy Development Board or any other entity created for the like purpose established by the GoP to facilitate, promote and encourage development of renewable energy in the country;

(c). "Applicable Documents" mean the Act, the rules and regulations framed by the Authority under the Act, 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;

(d). "Applicable Law" means all the Applicable Documents;

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

(f). "Bus Bar" means a system of conductors in the generation facility/Wind Power Plant/Wind Farm of the Licensee on which the electric power from all the WTGs is collected for supplying to the Power Purchaser;

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(g). "Carbon Credits" mean the amount of Carbon Dioxide (CO_2) and other greenhouse gases not produced as a result of generation of electric energy by the generation facility/Wind Power Plant/Wind Farm and other environmental air quality credits and related emissions reduction credits or benefits (economic or otherwise) related to the generation of electric energy by the generation facility/Wind Power Plant/Wind Farm, which are available or can be obtained in relation to the generation facility/Wind Power Plant/Wind Farm after the COD;

(h). "Commercial Operations Date (COD)" means the day immediately following the date on which the generation facility/Wind Power Plant/Wind Farm of the Licensee is commissioned;

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

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

(k). "Energy Purchase Agreement (EPA)" 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/Wind Farm, as may be amended by the parties thereto from time to time;

(l). "Generation Rules" mean the National Electric Power Regulatory Authority Licensing (Generation) Rules, 2000 as amended or replaced from time to time;

(m). "Grid Code" means the grid code prepared and revised from time to time by NTDC with necessary approval of the Authority;

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(n). "GoP" means the Government of Pakistan acting through the AEDB which has issued or will be issuing to the Licensee a LoS for the design, engineering, construction, insuring, commissioning, operation and maintenance of the generation facility/Wind Power Plant/Wind Farm;

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

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

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

(r). "Implementation Agreement (IA)" means the implementation agreement signed or to be signed between the GoP and the Licensee in relation to this particular generation facility/Wind Power Plant/Wind Farm, as may be amended from time to time;

(s). "Letter of Support (LoS)" means the letter of support issued or to be issued by the GoP through the AEDB to the Licensee;

(t). "Licensee" means **Noor Solar Energy (Pvt.) Limited** or its successors or permitted assigns;

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

(v). "Net Delivered Energy" means the net electric energy expressed in kWh generated by the generation facility/Wind Power Plant/Wind Farm of the Licensee at its outgoing Bus Bar and delivered to the Power Purchaser;

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

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

(y). "Power Purchaser" means CPPA-G which will be purchasing electric energy from the Licensee either on behalf of all XW-DISCOs or any single XW-DISCO, pursuant to an EPA for procurement of electric energy;

(z). "SCADA System" means the supervisory control and data acquisition system for gathering of data in real time from remote locations to control equipment and conditions;

(aa). "Wind Power Plant/Wind Farm" means a cluster of WTGs situated in the same location of a generation facility used for production of electric energy;

(bb). "Wind Turbine Generator (WTG)" means the machines installed at the generation facility/Wind Power Plant/Wind Farm with generators for conversion of wind energy into electric energy;

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

1.2 The words and expressions used but not defined herein bear the meaning given thereto in the Act or Generation Rules and Licensing 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.

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Article-3
Generation Facilities

3.1 The location, size (capacity in MW), technology, interconnection arrangements, technical limits, technical functional specifications and other details specific to the generation facility/Wind Power Plant/Wind Farm of the Licensee are set out in Schedule-I of this licence.

3.2 The net capacity/Net Delivered Energy of the generation facility/Wind Power Plant/Wind Farm of the Licensee is set out in Schedule-II of this licence. The Licensee shall provide the final arrangement, technical and financial specifications and other specific details pertaining to its generation facility/Wind Power Plant/Wind Farm before its COD.

Article-4
Term of Licence

4.1 This licence shall become effective from the date of its issuance and will have a term of twenty five (25) years from the COD of the generation facility/Wind Power Plant/Wind Farm of the Licensee.

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 Licensing Regulations.

Article-5
Licence fee

The Licensee shall pay to the Authority the licence fee as stipulated in the National Electric Power Regulatory Authority (Fees) Rules, 2002 as amended or replaced from time to time.

Article-6
Tariff

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

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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 Generation 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 or replaced from time to time.

Article-10
Compliance with Environmental & Safety Standards

10.1 The generation facility/Wind Power Plant/Wind Farm of the Licensee shall comply with the environmental and safety standards as may be prescribed by the relevant competent authority from time to time.

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

Article-11
Power off take Point and Voltage

The Licensee shall deliver the electric energy to the Power Purchaser at the outgoing Bus Bar of its generation facility/Wind Power Plant/Wind Farm. The Licensee shall be responsible for the up-gradation (step up) of generation voltage up to the required dispersal voltage level.

Article-12
Performance Data

12.1 The Licensee shall install monitoring mast with properly calibrated automatic computerized wind speed recording meters at the same height as that of the WTG.

12.2 The Licensee shall install SCADA System or compatible communication system at its generation facility/Wind Power Plant/Wind Farm as well as at the side of the Power Purchaser.

12.3 The Licensee shall transmit the wind speed and power output data of its generation facility/Wind Power Plant/Wind Farm to the control room of the Power Purchaser.

Article-13
Provision of Information

In accordance with provisions of Section-44 of the Act, the Licensee shall be obligated to provide the required information in any form as desired by the Authority without any exception.

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Article-14
Emissions Trading /Carbon Credits

The Licensee shall process and obtain expeditiously the Carbon Credits admissible to the generation facility/Wind Power Plant/Wind Farm. The Licensee shall share the said proceeds with the Power Purchaser as per the Policy.

Article-15
Design & Manufacturing Standards

The WTGs and other associated equipment of the generation facility/Wind Power Plant/Wind Farm shall be designed, manufactured and tested according to the latest IEC, IEEE standards or any other equivalent standard in the matter. All the plant and equipment of the generation facility/Wind Power Plant/Wind Farm shall be unused and brand new.

Article-16
Power Curve

The power curve for the 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/Wind Farm.

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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 Facilities of the Licensee are described in this Schedule.

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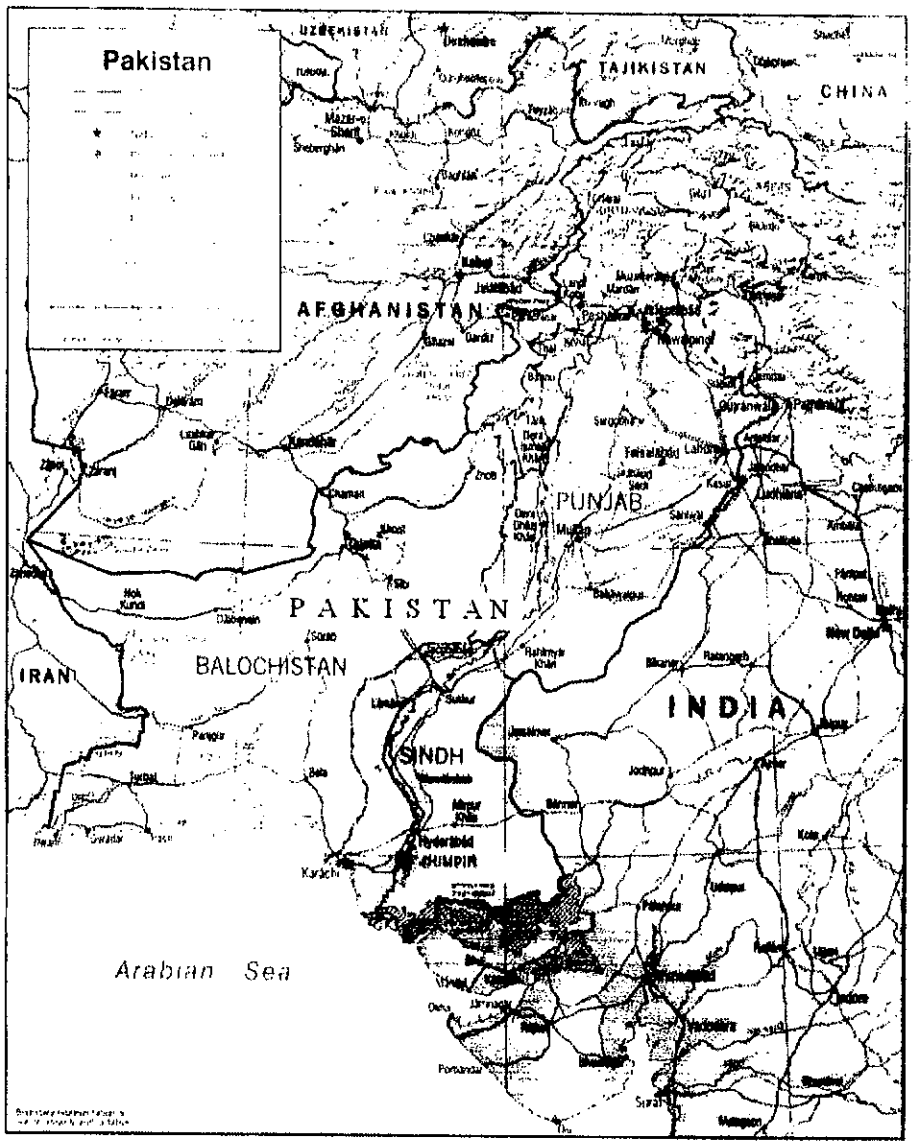
Location of the Generation Facility/Wind Power Plant/Wind Farm of the Licensee



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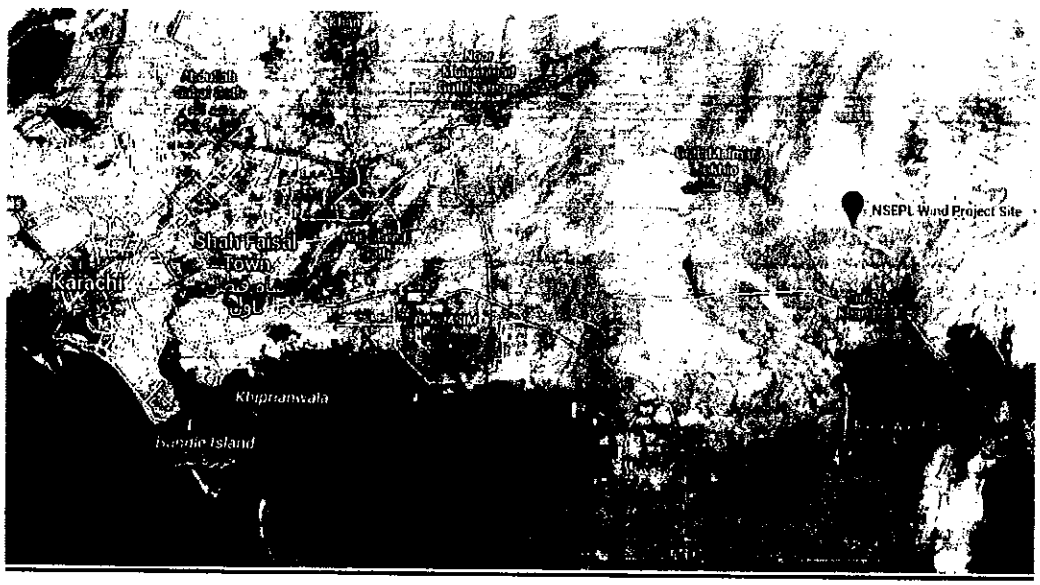
Location of the Generation Facility/Wind Power Plant/Wind Farm of the Licensee



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Land Coordinates of the Generation Facility/Wind Power Plant/Wind Farm of the Licensee

Allocated land of 330 acres at Deh Kohistan 7/3 & 7/4 Tapo Jungshahi

Sr. No.	Latitude	Longitude
1	24.900817	67.793202
2	24.901968	67.793978
3	24.943312	67.718515
4	24.94443	67.719293

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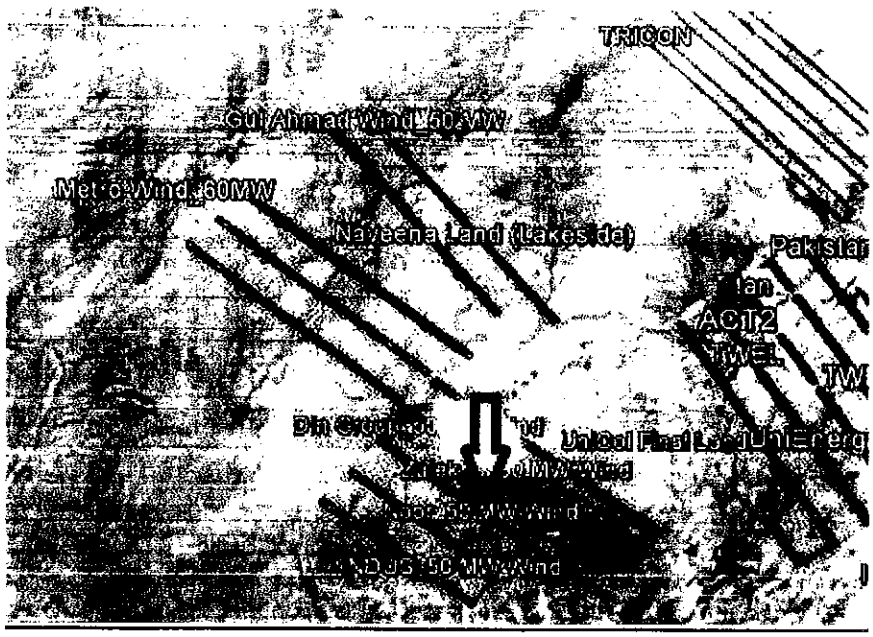
Layout of the Generation Facility/Wind Power Plant/Wind Farm of the Licensee



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Micro-Sitting of the Generation Facility/Wind Power Plant/Wind Farm of the Licensee

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Micro-Sitting of the Generation Facility/Wind Power Plant/Wind Farm of the Licensee

[illegible]	Coordinates UTM z42 W[illegible]	
[illegible]	[illegible](E)	[illegible](N)
NOOR_G01	378108	2754601
NOOR_G02	377800	2754797
NOOR_G03	377492	2754994
NOOR_G04	377184	2755190
NOOR_G05	376875	2755386
NOOR_G06	376567	2755582
NOOR_G07	376259	2755779
NOOR_G08	375950	2755975
NOOR_G09	375642	2756171
NOOR_G10	375334	2756367
NOOR_G11	375026	2756564
NOOR_G12	374717	2756760
NOOR_G13	374409	2756956
NOOR_G14	374101	2757152
NOOR_G15	373792	2757348
NOOR_G16	373484	2757545
NOOR_G17	373176	2757741
NOOR_G18	372868	2757937
NOOR_G19	372559	2758133
NOOR_G20	372251	2758330
NOOR_G21	371943	2758526
NOOR_G22	371634	2758722
NOOR_G23	371326	2758918
NOOR_G24	371018	2759115
NOOR_G25	370710	2759311

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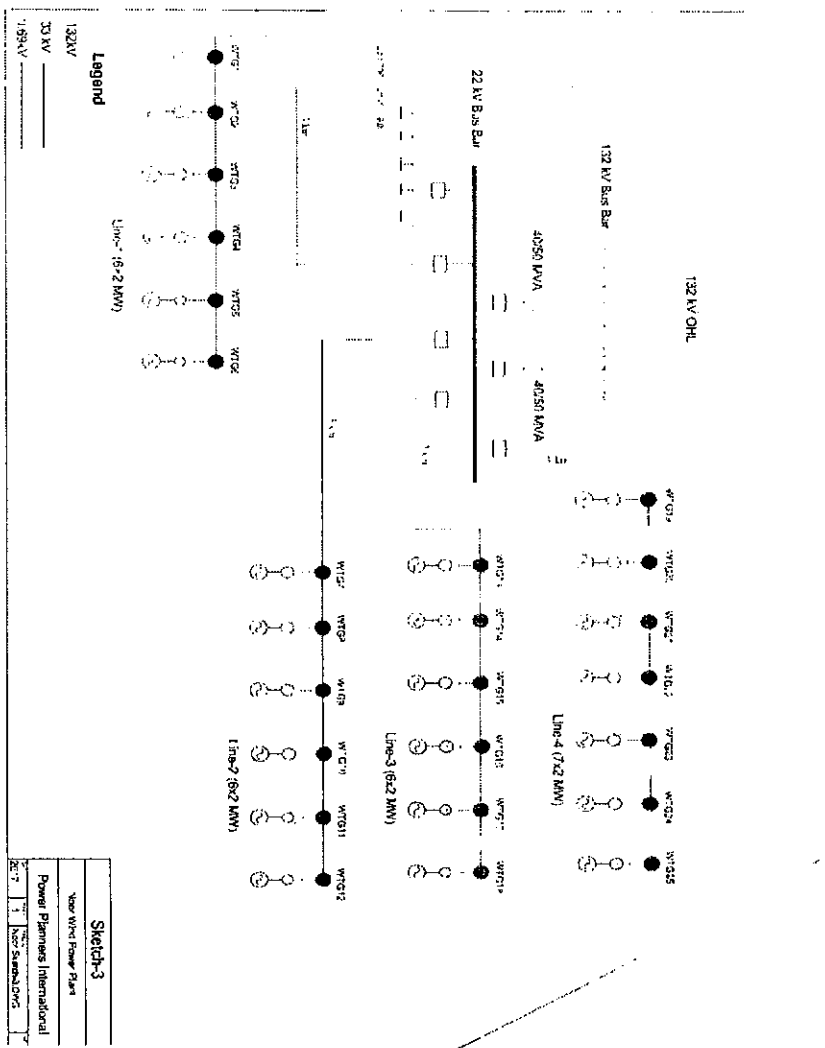
Single Line Diagram (Electrical System) of the Generation Facility/Wind Power Plant/Wind Farm of the Licensee



Interconnection Facilities/ Transmission Arrangements for Dispersal of Electric Power from the Generation Facility/Wind Power Plant/Wind Farm

The electric power generated from the Generation Facility/Wind Power Plant/Wind Farm of the Licensee i.e. Noor Solar Energy (Pvt.) Limited (NSEPL) shall be dispersed to the National Grid through the load center of HESCO.

(2). The proposed Interconnection Arrangement/Transmission Facilities for dispersal of power from Generation Facility/Wind Power Plant/Wind Farm of NSEPL will consist of the following:-

(i). A total of two 220 kV D/C transmission lines (measuring approx. 5km long each on twin bundled AASC Greeley conductor) for making double In/out of existing 220 kV Double Circuit (D/C) Jamshoro–KDA-33 transmission lines at the proposed 220/132kV Jhimpir-2 grid station/ substation;

(ii). Addition of 4th power transformer (of 250 MVA) at the newly proposed 220/132kV Jhimpir-2 grid station/substation;

(iii). A 132kV D/C transmission line (approx. 135 km long on twin bundled AASC Greeley conductor) for connecting eight (08) Wind Power Plants (WPPs) in the first loop[1] to newly proposed 220/132kV Jhimpir-2 grid station/ substation;

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[1] Lakeside, Nasda, Trans-Atlantic, Uni-Energy, Iran Pak, Artistic, Act-2 and Cacho WPPs

(iv). 132kV D/C transmission line (approx. 168 km long on twin bundled AASC Greeley conductor) for connecting eight (08) WPPs in the second loop[2] to newly proposed 220/132 kV Jhimpir-2 grid station/substation.

(3). In the above scheme the interconnection of NSEPL (which is placed in second loop) includes a 132 kV D/C transmission line (measuring approx. 0.8 km in length, on twin bundled AASC Greeley conductor) for making in/out of 132kV single circuit transmission line from WPP of Indus Energy Limited to the WPP of Din Energy Limited connecting the generation facility/Wind Power Plant/Wind Farm to the newly proposed 220/132 kV Jhimpir-2 grid station/substation.

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

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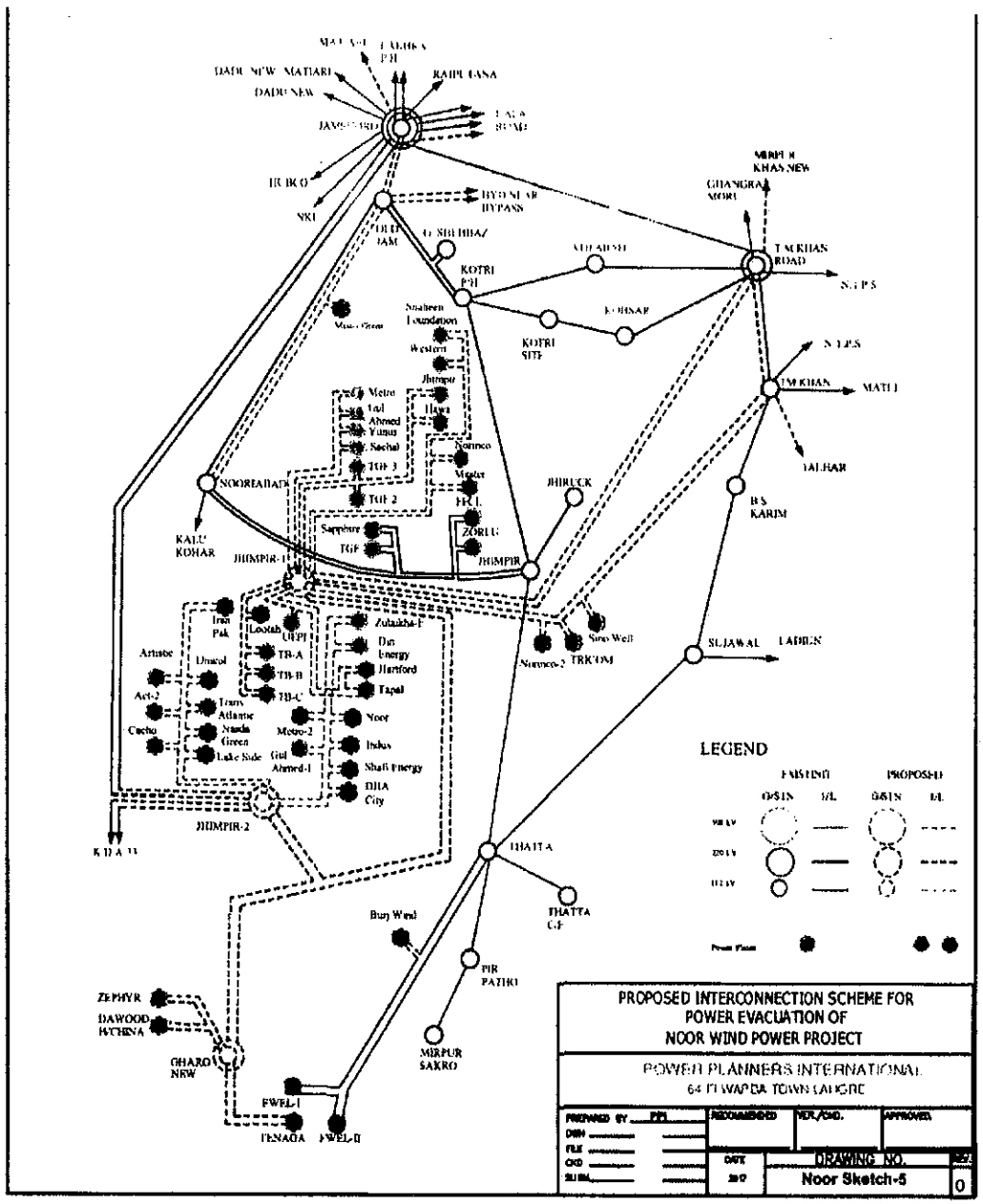
[2] Noor, Gul Ahmed, Metro-2, Zulaikha, Din Energy, Indus, Shafi Energy and DHA-City WPPs

Schematic Diagram
for Interconnection Arrangement/Transmission Facilities for Dispersal of Electric Power from the Licensee



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Detail of Generation Facility/Wind Power Plant/ Wind Farm

(A). General Information

(i).	Name of Company/Licensee	Noor Solar Energy (Pvt.) limited
(ii).	Registered Office of Company/Licensee	A/51-A,S.I.T.E, Karachi.
(iii).	Business Office of Company/Licensee	-Do-
(iv).	Location of the generation facility/Wind Power Plant/Wind Farm	at Deh Kohistan 7/3 & 7/4 Tapo Jungshahi, Taluka & District Thatta in the Province of Sindh
(v).	Type of the generation facility/Wind Power Plant/Wind Farm	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)	50.00 MW
(iii).	Number of Wind Turbine Units/Size of each Unit (MW)	25 x 2.0 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	Combination of blade pitch angle adjustment, and generator / converter torque control.

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(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	2040 (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.

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(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	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

(D). Other Details

(i).	COD of the generation facility/Wind Power Plant/Wind Farm	July 31, 2019 (anticipated)
(ii).	Minimum Expected Useful Life of the generation facility/Wind Power Plant/Wind Farm from COD	25 Years

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Power Curve
of Wind Turbine Generator (WTG) of Gamesa G114-2.0 MW
(in Tabular Form)

Speed (m/s)	Power (kW)
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

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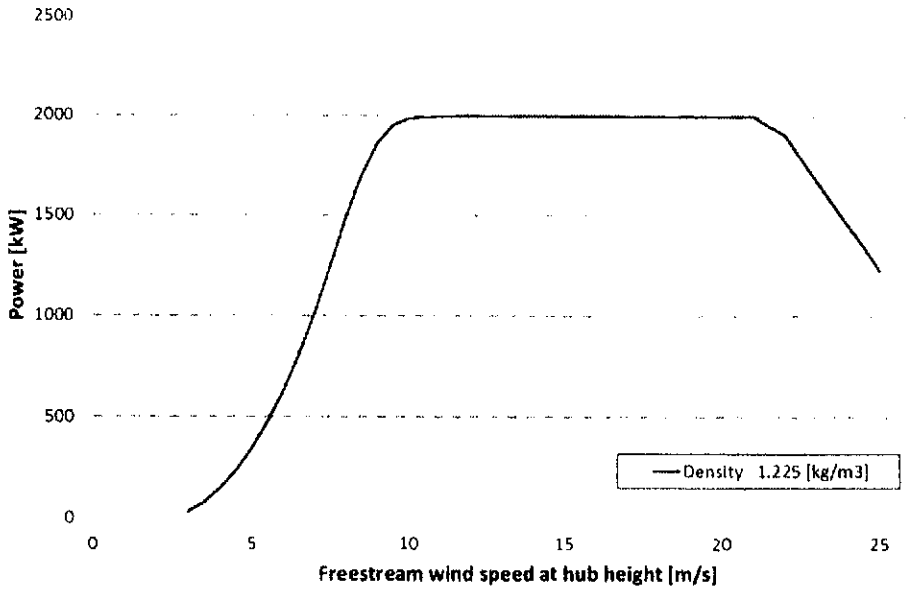
Power Curve
of Wind Turbine Generator (WTG) of Gamesa G114-2.0 MW
(in Graphical Form)



SCHEDULE-II

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

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SCHEDULE-II

(1).	Total Installed Gross ISO Capacity of the Generation Facility /Wind Power Plant/Wind Farm (MW/GWh)	50.00 MW
(2).	Total Annual Full Load Hours	3066
(3).	Average Wind Turbine Generator (WTG) Availability	97.00%
(4).	Total Gross Generation of the Generation Facility/Wind Farm (in GWh)	173.74
(5).	Array & Miscellaneous Losses GWh	12.58
(6).	Availability Losses GWh	4.72
(7).	Balance of Plant Losses GWh	3.14
(8)	Annual Energy Generation (25 year equivalent Net AEP) GWh	153.3
(9).	Net Capacity Factor	35.00 %

Note

All the above figures are indicative as provided by the Licensee. The Net Delivered Energy available to Power Purchaser for dispatch will be determined through procedures contained in the Energy Purchase Agreement (EPA) or the Applicable Document(s).

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