振发新能源
ZHENFA NEW ENERGY

振发巴基斯坦新能源有限公司
Zhenfa Pakistan New Energy Company (Private) Limited

July 24, 2020

The Registrar
National Electric Power Regulatory Authority
NEPRA Tower Attaturk Avenue (East),
Sector G-5/1, Islamabad, Pakistan

Subject: Licensee Proposed Modification (LPM) in Generation License of 100 MWp Zhenfa Solar Power Project issued to Zhenfa Pakistan New Energy Company (Pvt.) Limited (ZPNECPL)

We herewith submit the company's Generation License Modification application along with the fee as determined by the National Electric Power Regulatory Authority ("NEPRA" or the "Authority") for kind consideration and favorable approval by the Authority in accordance, inter alia, under NEPRA's Licensing (Application and Modification Procedure) Regulation 1999, section 10(2) read with the Section 47 of Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 and other applicable provisions of NEPRA Act.

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, 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 documents-in-support is true and correct to the best of my knowledge and belief.

The LPM Application (including its Annexures) is being submitted in triplicate herewith:

a. ICBC Draft No. CO000024827 dated July 23, 2020 amounting to PKR 467,360 (Pakistan Rupees Four Hundred Sixty-Seven Thousand Three Hundred Sixty only) as requisite fee for LPM.
b. Board Resolution of Zhenfa Pakistan New Energy Company (Pvt.) Limited.
c. Affidavit of Mr. Maqsood Ahmad.
d. Other data required for modification under above section.

Yours sincerely,

Zhenfa Pakistan New Energy Company (Pvt) Ltd.

Maqsood Ahmad
Chief Executive Officer
Zhenfa Pakistan New Energy Company (Pvt.) Limited

We hereunder reply to the three queries mentioned in Sub-regulation 2 of Regulation 10 of the Application and Modification Procedure:

1. TEXT OF THE PROPOSED MODIFICATION

1.1. Following modifications in Generation License are requested as per Tariff determination of the Project dated February 21, 2020:

Description	Old	Proposed
Modules	Si-poly model P6- 60 260 Wp & 265Wp	435 Wp with Half-cut having more shade tolerance and conversion efficiency of 19.6% at STC
Inverters	SG630 MX	3125HV-MV-20
Tracking configuration	30 % Single Axis Tracking & 70% Fixed Tilt	100% Single Axis Tracking
Capacity Factor	19.25%	21.51%

Generation License and its schedules are attached accordingly.

2. STATEMENTS OF REASONS IN SUPPORT OF MODIFICATIONS:

2.1. The Project Company (the Company) was granted Generation License bearing No. SPGL/19/2017 by NEPRA on 10 July 2017 for its 100 MW solar power project at Rukh Chaubara District Layyah in the Province of Punjab. This license was based on solar equipment specification approved in Feasibility Study (Dec 1, 2015).

2.2. NEPRA awarded tariff to the Company vide its order dated 21 February 2020 based on the latest technology and technology related factors as per the CCoE decision dated April 4, 2019.

2.3. The Authority in its above determination (para 14.6) instructed to the company to submit the request for LPM according to its determination.

3. STATEMENT OF IMPACT ON TARIFF

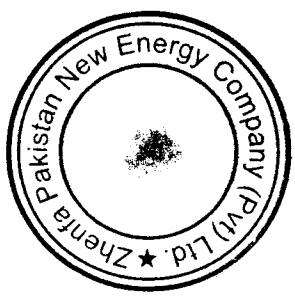
3.1. There is no impact on the tariff determined vide Authority's above referred decision.

3.2. Further, the company will achieve the quality of service and the performance of the licensee of its obligations under the license and determination.

4. PRAYER

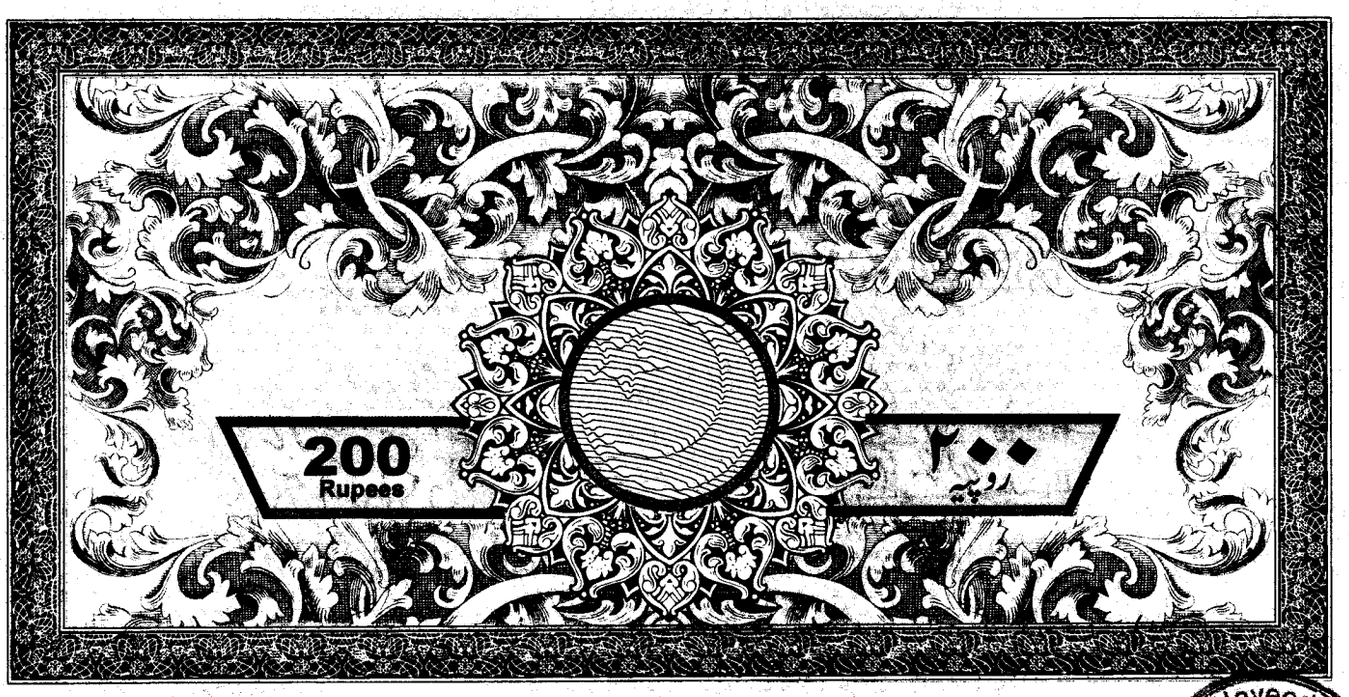
It is, humbly prayed, to grant modified Generation License to the Company at the earliest to achieve Financial Close for the Project as per awarded timelines.

Respectfully submitted for and on behalf of the Applicant.



Maqsood Ahmad
Chief Executive Officer
Zhenfa Pakistan New Energy Company (Pvt.) Limited

ANNEXURE-A PayOrder



BEFORE
THE NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
100 MWp ZHENFA SOLAR POWER PROJECT BY ZHENFA PAKISTAN NEW ENERGY COMPANY (PRIVATE) LIMITED AT RAKH CHOBARA, LAYYAH, PUNJAB

AFFIDAVIT

I, **MAQSOOD AHMAD**, **Chief Executive Officer** of **M/s ZHENFA PAKISTAN NEW ENERGY COMPANY (PRIVATE) LIMITED**, 64/XX, Khayaban-e-Iqbal, DHA Phase-3, Lahore, Pakistan, do hereby declare and affirm on oath as under:

1. That I am the authorized representative of **M/s ZHENFA PAKISTAN NEW ENERGY COMPANY (PRIVATE) LIMITED.**

2. That the contents of the accompanying application of Zhenfa Pakistan New Energy Company (Pvt.) Limited for the modification of its Generation License No. SPGL/19/2017 dated 10-07-2017, including all attached documents-in-support are true and correct to the best of my knowledge and belief and that nothing has been concealed.

3. I also affirm that all further documentation and information provided by me in connection with the said application shall be true and correct to best of my knowledge and belief.

Zhenfa Pakistan New Energy Company (Pvt) Ltd.

Deponent

Verification

Verified on oath at Lahore on this July 24, 2020 that the contents of the above affidavit are true and correct to the best of thy knowledge and belief.

Zhenfa Pakistan New Energy Company (Pvt) Ltd.

Deponent

振发新能源
ZHENFA NEW ENERGY

振发巴基斯坦新能源有限公司
Zhenfa Pakistan New Energy Company (Private) Limited

Certified True Copy of resolutions of the Board of Directors passed by circulation on July 22, 2020

Resolved:

"That Mr. Maqsood Ahmed, Chief Executive Officer of the Company, be and is hereby authorised to file; (i) an application for Licensee Proposed Modification in Generation License No. SPGL/19/2017 dated 10 July 2017; (ii) any other clarification, submission of application petition, heading hearing or document in support thereof; (iii) to make any oral or written representations on behalf of the Company before the National Electric Power Regulatory Authority and any other body, organization, department judicial and quasi-judicial body in relation to the aforesaid filings and to do all other acts deeds, things and matters as may be deemed expedient in giving effect to the aforesaid resolution.

Further Resolved:

"that these resolutions duly certified by one of the Directors of the Company or the Company Secretary be communicated to the concerned parties which shall constitute the Company's mandate to the concerned parties and shall remain in force until revoked/changed by notice in writing to the concerned parties."

Certified True Copy

Khalid Mahmood
Company Secretary

Zhenfa Pakistan New Energy Company (Pvt) Ltd.

Address: 64/XX, Khayaban-e-Iqbal, DHA Phase 3, Lahore.
Tel : +92-42-37132637-38 Fax: +92-42-37132634, Email: zhenfaproject@outlook.com, maqbas@atlas.com.pk

ANNEXURE-D

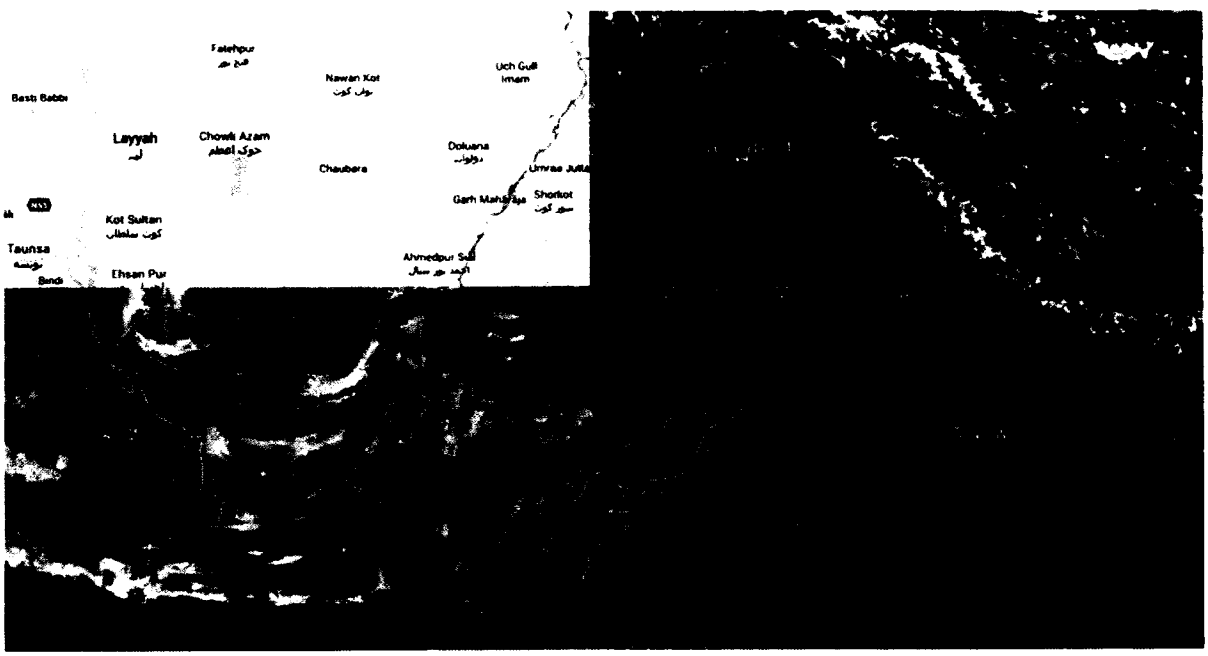
Modified Schedule-I

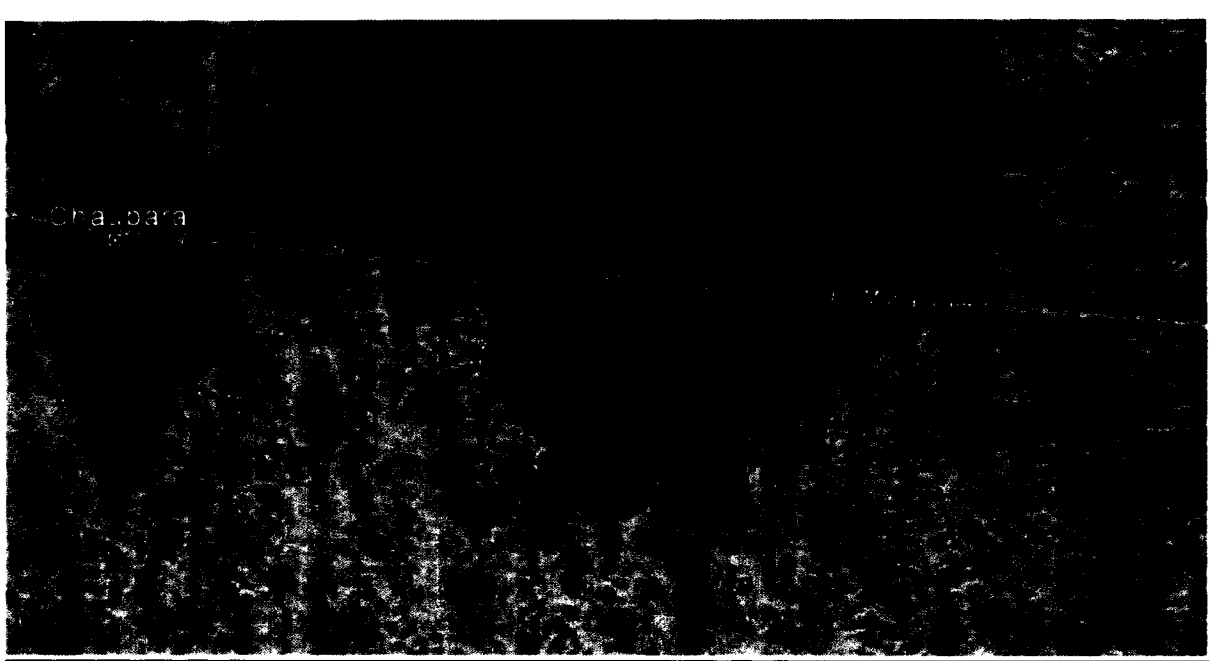
SCHEDULE-I

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.

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

The Project site is located at Rakh Chaubara, District Layyah, Punjab.



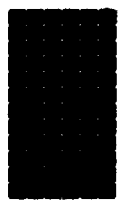


Location of the Generation Facility/Solar Power Plant/Solar Farm of the Licensee

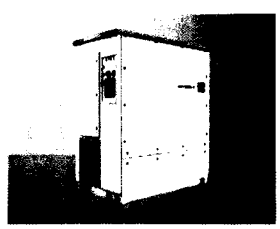
Boundary Point	Geodetic	
	Latitude	Longitude
1.	30°54'11.86"N	71°33'36.21"E
2.	30°53'55.07"N	71°33'35.19"E
3.	30°53'54.59"N	71°33'13.89"E
4.	30°53'5.81"N	71°33'11.43"E
5.	30°53'5.98"N	71°33'42.08"E
6.	30°53'14.86"N	71°33'42.96"E
7.	30°53'15.18"N	71°33'58.07"E
8.	30°53'18.98"N	71°33'58.82"E
9.	30°53'19.16"N	71°34'6.43"E
10.	30°53'24.73"N	71°34'8.65"E
11.	30°53'24.82"N	71°34'11.15"E
12.	30°53'50.08"N	71°34'12.40"E
13.	30°53'50.04"N	71°34'17.54"E
14.	30°53'53.91"N	71°34'18.24"E
15.	30°53'53.93"N	71°34'20.81"E
16.	30°54'8.61"N	71°34'24.10"E

Process Flow Diagram of the Generation Facility/Solar Power Plant/Solar Farm of the Licensee

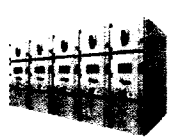
Sun



Solar Panel



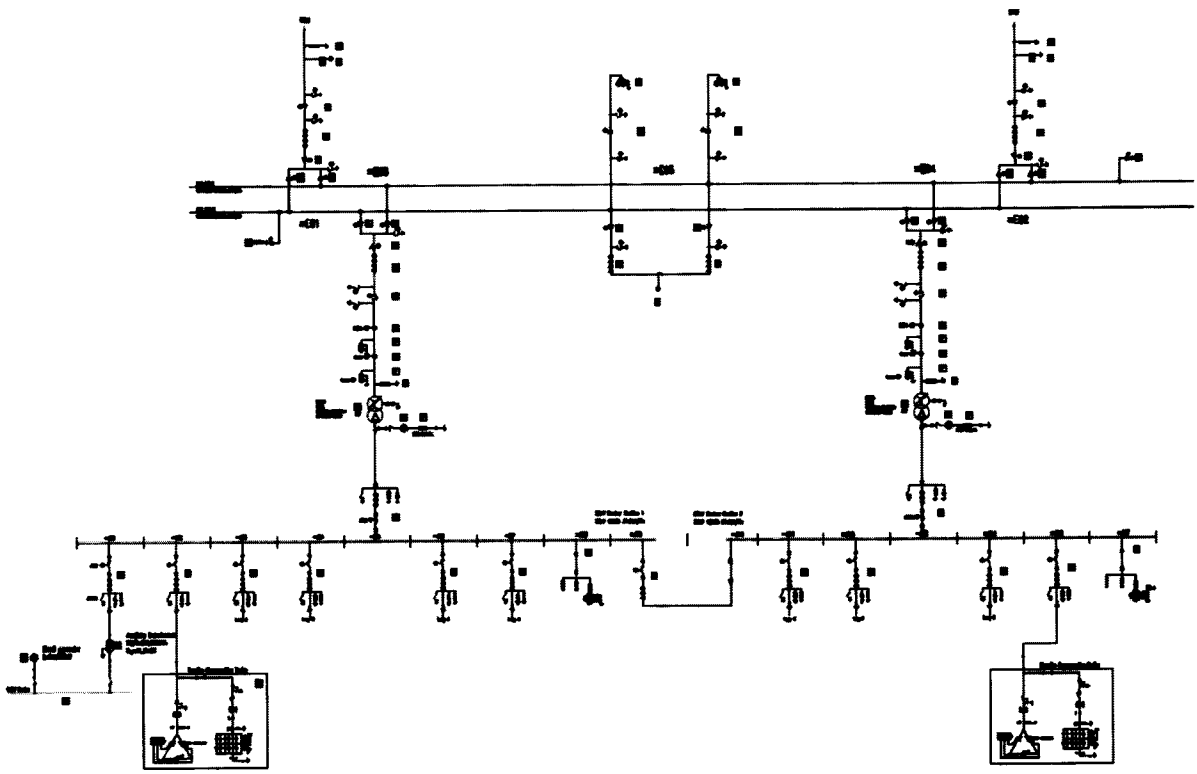
Inverter



Switchgear

Transformer

Single Line Diagram of the Generation Facility/Solar Power Plant/Solar Farm of the Licensee

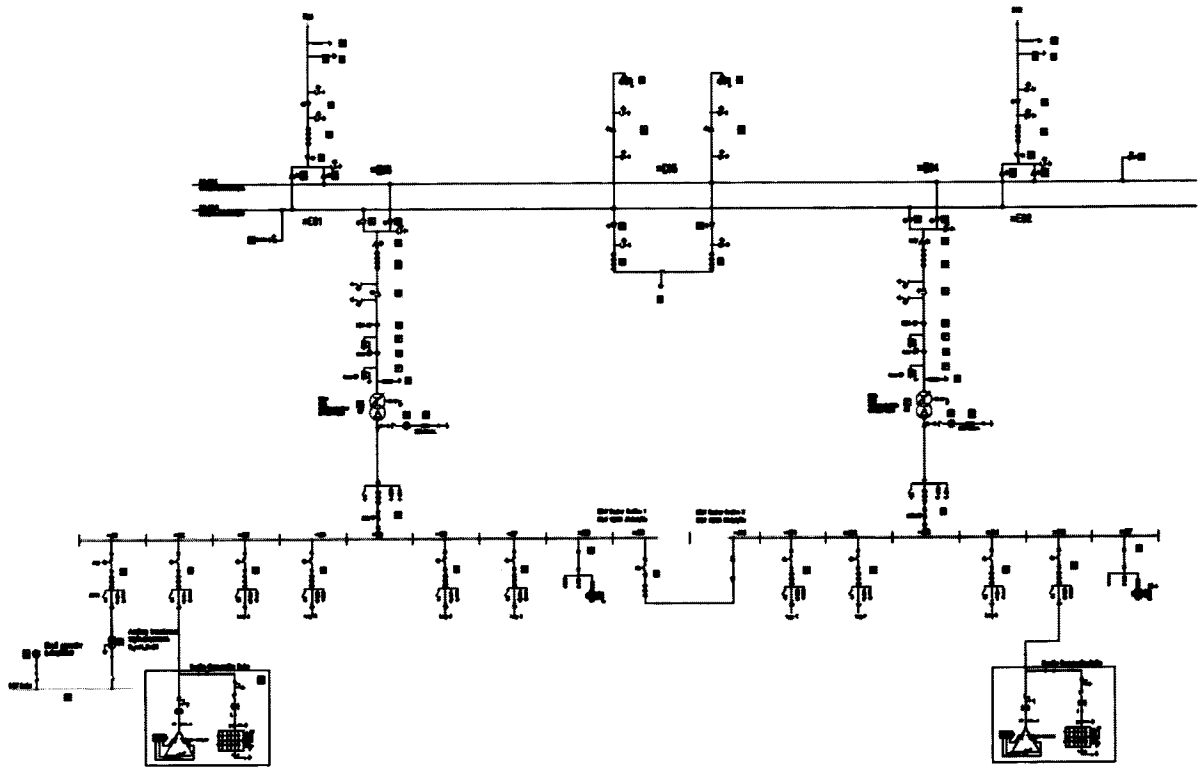


Interconnection Arrangement/Transmission Facilities for Dispersal of Power from the Generation Facility/Solar Power Plant/Solar Farm of the Licensee

The electric power generated from the Generation Facility/Power Plant/Solar Farm of ZPNECL shall be sold to CPPA-G and dispersed to the load center of MEPCO (DISCO).

The proposed Interconnection Arrangement/Transmission Facility for dispersal of electric power for the Generation Facility/Solar Power Plant/Solar Farm comprises the following: - 132 kV double circuit (400 sq mm, Cu conductor) of about 6.5 km length to be constructed by MEPCO from Chubara Grid.

Schematic Diagram for Dispersal of Electric Energy/Power from the Generation Facility/Solar Power Plant



Details of
Generation Facility/Solar Power Plant/ Solar Farm

(A). General Information

(i).	Name of the Company/Licensee	Zhenfa Pakistan New Energy Company (Pvt.) Limited (ZPNECL)
(ii).	Registered/ Business office of the Company/Licensee	64/XX, Khayaban-e-Iqbal, DHA Phase-3, Lahore, Pakistan.
(iii).	Type of the generation facility/Solar Power Plant/Solar Farm	Solar Photovoltaic (PV)
(iv).	Location(s) of the generation facility Solar Power Plant/ Solar Farm	Rakh Chaubara, District Layyah, in the Province of Punjab

(B). Solar Power Generation Technology & Capacity

(i).	Type of Technology	Photovoltaic (PV) with single-axis tracking	
(ii).	System Type	Grid Connected	
(iii).	Installed Capacity of the generation facility Solar Power Plant/ Solar Farm (MW/KW)	100.00 MWp	
(iv).	No. of Panel/Modules	229,908	
(v).	PV Array	Nos. of Strings	8211
		Modules in a string	28
(vi).	Invertor(s)	Quantity	26
		Capacity of each unit	3125 kW

(C). Technical Details of Equipment (at Each of above Location)

(a).	**Solar Panels – (PV Modules)**	
(i).	Type of Module	Monocrystalline 435 W
(ii).	Type of Cell	Half-cut Monocrystalline PV Cells
(iii).	Dimension of each Module	2115mm x 1052mm
(iv).	No. of Panel /Modules	229,908
(v).	Module Area	2.22 m^2
(vi).	Panel's Frame	Anodized aluminum alloy
(vii).	Weight of one Module	24.0
(viii).	No of Solar Cells in each module	144
(ix).	Efficiency of module	19.6%
(x).	Maximum Power (P_{max})	435 W
(xi).	Voltage @ (Pmax)	40.8 V
(xii).	Current @ Pmax	10.67 A
(xiii).	Open circuit voltage (Voc)	49.4 V
(xiv).	Short circuit current (Isc)	11.26 A
(xv).	Junction box IP rating	IP 68
(b).	**Trackers – Horizontal Axis Tracking**	
(i).	No. of Trackers	8480
(ii).	Phi angle	-60° to +60°

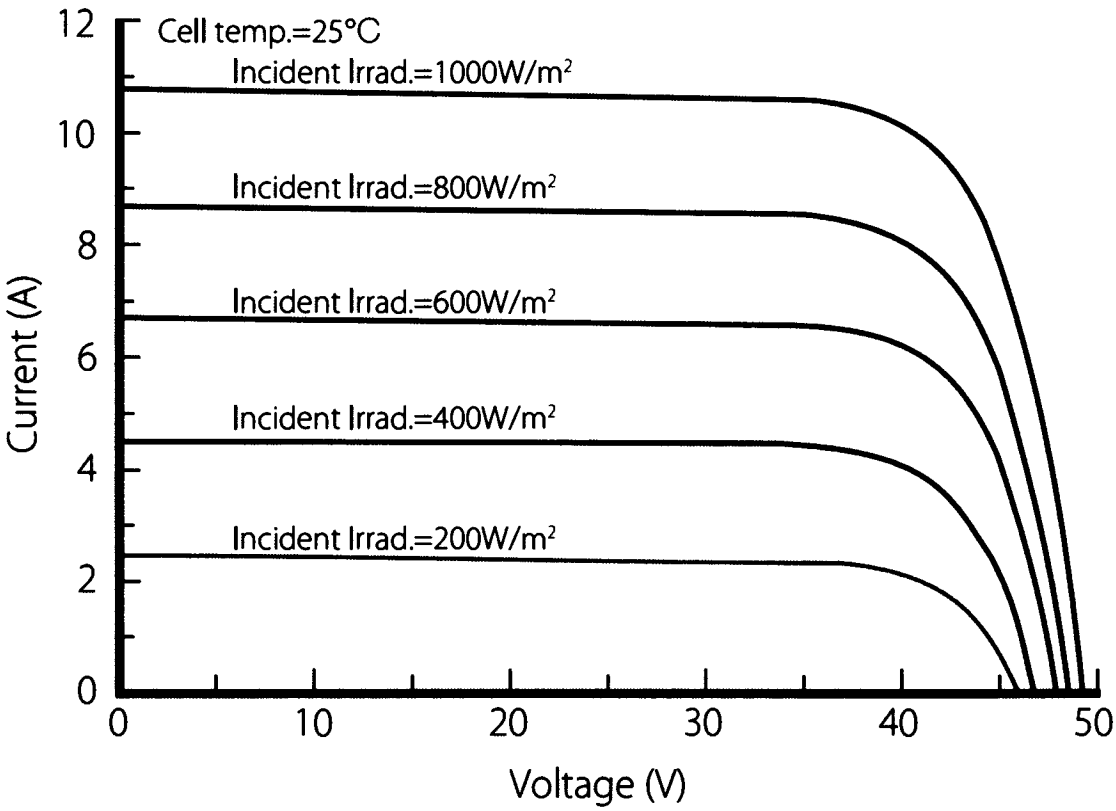
(c).	**Inverters**		
(i).	Capacity of each unit	3125 kW	
(ii).	Input Operating Voltage Range	875 to 915 V DC	
(iii).	Number of Inverters	26	
(iv).	Total Power (AC)	81250 kW	
(v).	Efficiency of inverter	98.7 %	
(vi).	Max. Allowable Input voltage	1500 V DC	
(vii).	Max. Current	4178 A	
(viii).	MPPT voltage range	875 – 1300 V	
(ix).	Output electrical system	3 phase, 3 wire	
(x).	AC voltage range	10 – 35 kV	
(xi).	Power Factor (adjustable)	0.8 leading ~ 0.8 lagging	
(xii).	Power control	MPP tracker	
(xiii).	Rated Frequency	50/60 Hz	
(xiv).	Environmental Enclosures	Relative Humidity	0 – 95 %
		Degree of protection	IP 55
		Operating Elevation	Up to 4000 m
(xv).	Operating temperature	-35°C ~ +60°C	
(xvi).	Grid Operating protection	A	DC circuit breaker
		B	AC circuit breaker

		C	DC overload protection
		D	Lighting protection
		E	Grid monitoring
		F	Insulation monitoring
		G	Anti-Islanding
(d).	**Data Collecting System**		
(i).	System Data	Continuous online logging with data logging software to portal.	
(e).	**Power Transformer**		
(i).	Ratings	2 x 90 MVA	
(ii).	Type of transformer	ONAN	
(iii).	Transformer Purpose	Step-up (33 kV/132 kV)	
(iv).	Output Voltage	132 kV	

(D). Other Details

(i).	Expected COD of the generation facility Solar Power Plant/ Solar Farm	21st Dec, 2021
(ii).	Expected useful Life of the generation facility Solar Power Plant/ Solar Farm from the COD	25 years

V.I Curve of Solar Cell



ANNEXURE-E

Modified Schedule II

SCHEDULE-II

The Total Installed Gross ISO Capacity of the Generation Facility/Power Plant/Solar Plant (MW), Total Annual Full Load (Hours), Average Sun Availability, Total Gross Generation of the Generation Facility/Solar Farm (in kWh), Annual Energy Generation (25 years Equivalent Net Annual Production-AEP) KWh and Net Capacity Factor of the Generation Facility/Solar Farm of Licensee are given in this Schedule.

SCHEDULE-II

(1).	Total PV Installed Capacity of the Generation Facility/Solar Farm	100 MWp
(2).	Average Sun Hour Availability/Day (Irradiation on Inclined Surface)	5-7 Hours
(3).	PV Plant Generating Capacity Annually (As Per Simulation)	188,427 MWh
(4).	Net Capacity Factor	21.51%

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).

ANNEXURE-F

Data Sheets

Solar Panels – (PV Modules)		
(i).	Type of Module	Monocrystalline 435 W or equivalent
(ii).	Type of Cell	Monocrystalline PV Cells
(iii).	Dimension of each Module	2115mm x 1052mm
(iv).	No. of Panel /Modules	229,908
(v).	Module Area	2.22 m^2
(vi).	Panel's Frame	Anodized aluminum alloy
(vii).	Weight of one Module	24.0
(viii).	No of Solar Cells in each module	144
(ix).	Efficiency of module	19.6%
(x).	Maximum Power (P_{max})	435 W
(xi).	Voltage @ (Pmax)	40.8 V
(xii).	Current @ Pmax	10.67 A
(xiii).	Open circuit voltage (Voc)	49.4 V
(xiv).	Short circuit current (Isc)	11.26 A
(xv).	Junction box IP rating	IP 68
Inverters		
(xvii).	Capacity of each unit	3125 kW
(xviii).	Input Operating Voltage Range	875 to 915 V DC
(xix).	Number of Inverters	26
(xx).	Total Power (AC)	81250 kW

(xxi).	Efficiency of inverter	98.7 %	
(xxii).	Max. Allowable Input voltage	1500 V DC	
(xxiii).	Max. Current	4178 A	
(xxiv).	MPPT voltage range	875 – 1300 V	
(xxv).	Output electrical system	3 phase, 3 wire	
(xxvi).	AC voltage range	10 – 35 kV	
(xxvii).	Power Factor (adjustable)	0.8 leading ~ 0.8 lagging	
(xxviii).	Power control	MPP tracker	
(xxix).	Rated Frequency	50/60 Hz	
(xxx).	Environmental Enclosures	Relative Humidity	0 – 95 %
		Degree of protection	IP 55
		Operating Elevation	Up to 4000 m
(xxxi).	Operating temperature	-35°C ~ +60°C	
(xxxii).	Grid Operating protection	A	DC circuit breaker
		B	AC circuit breaker
		C	DC overload protection
		D	Lighting protection
		E	Grid monitoring
		F	Insulation monitoring
		G	Anti-Islanding