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/LAG-391/222-28

January 07, 2022

Syed Mumtaz Hassan
Country Manager
Zorlu Solar Pakistan (Pvt.) Limited
C-117, Clifton, Block 2, Karachi

Subject: **Modification Generation Licence No. SPGL/23/2017 (Modification-II)**
Licence Application No. LAG-283
Zorlu Solar Pakistan (Private) Limited, (ZSPPL)

Reference: ZSPPL's LPM submitted vide letter No. ZSPL/NEPRA-GL/0720-01 dated 13.07.2021

It is intimated that the Authority has approved Modification - II in Generation Licence No. SPGL/23/2017 dated August 18, 2017 in respect of Zorlu Solar Pakistan (Private) Limited (ZSPPL) pursuant to Section 26 of the NEPRA Act read with Regulation 10(11) of the NEPRA Licensing Regulations.

2. Enclosed please find herewith determination of the Authority in the matter of Licensee Proposed Modification of ZSPPL alongwith Modification-II in the Generation Licence No. SPGL/23/2017, approved by the Authority.

Enclosure: As Above

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

07 01 22

(Syed Safeer Hussain)

Copy to:

1. Secretary, Power Division, Ministry of Energy, 'A' Block, Pak Secretariat, Islamabad
2. C.E.O Alternative Energy Development Board (AEDB), 2nd Floor, OPF Building, G-5/2, Islamabad
3. Managing Director, NTDC, 414 WAPDA House, Lahore
4. Chief Executive Officer, CPPA(G), 73 East, A.K. Fazl-ul-Haq Road, Blue Area, Islamabad
5. Chief Executive Officer, Multan Electric Power Company, MEPCO Headquarters, Khanewal Road, Multan
6. Director General, Environmental Protection Department, National Hockey Stadium, Ferozpur Road, Lahore

National Electric Power Regulatory Authority (NEPRA)

Determination of the Authority in the Matter of Licensee Proposed Modification in the Generation Licence of Zorlu Solar Pakistan (Private) Limited

January 7th, 2022
Case No. LAG-391

(A). Background

(i). Zorlu Solar Pakistan (Private) Limited (ZSPPL) holds a generation licence (No. SPGL/ 23/2017, dated August 18, 2017 and Modification-I dated March 14, 2018) in terms of the then Section-15 (now, Section-14B) of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 ("the NEPRA Act").

(ii). The Authority granted the above mentioned generation licence to ZSPPL for its 100.00 MW_P Photo Voltaic (PV) Cell based generation facility to be set up at Quaid-e-Azam Solar Park (Extension) Lal Sohanra in Cholistan tehsil Hasilpur, district Bahawalpur in the province of Punjab, for supplying to National Grid.

(B). Communication of Modification

(i). ZSPPL in accordance with Regulation-10 of the NEPRA Licensing (Application & Modification Procedure) Regulations, 1999 ("the Licensing Regulations") communicated a Licensee Proposed Modification (LPM) in its above mentioned Generation Licence on July 29, 2020.

(ii). In the "text of the proposed modification", ZSPPL stated that it plans to change the type of the PV technology from existing Thin Film to Mono-Crystalline. In view of the said, there will be changes in Number of Panels/ Modules, Maximum Power (P_{max}), Installed Capacity, Expected Commercial Operation Date (COD) and the Capacity Factor (CF) of the project.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(iii). Regarding the "statement of the reasons in support of the modification", ZSPPL, *inter alia*, submitted that the Authority granted it a tariff vide its determination dated November 19, 2018 requiring it to achieve Financial Close (FC) within one (01) year. The company could not achieve the FC of the project for various reasons beyond its control and has now filed a new petition for determination of tariff based on a superior technology. In order to incorporate the changes in technology in the Generation Licence, a modification is necessary.

(iv). About the statement of "the impact on tariff", "Quality of Service (QoS)" and "the performance by the licensee of its obligations under the licence", ZSPPL submitted that the proposed changes will have a positive impact on tariff as the new technology of PV will result in higher energy yield resulting less per kwh of rate. Further, ZSPPL confirmed that the proposed modification will not have any effect on the QoS and the performance by the Licensee of its obligations under its existing Generation Licence.

(C). Processing of Modification

(i). After completion of all the required information as stipulated under the Regulation-10(2) and 10(3) of the Licensing Regulations, the Registrar published the communicated LPM in one (01) English and one (01) Urdu daily newspaper on August 15 & 17, 2020, informing the general public, interested/affected parties and other stakeholders about the said LPM as required under the Regulation-10(4) of the Licensing Regulations.

(ii). The Registrar also invited comments of the relevant Govt. Ministries, their attached Departments, representative organizations and individual experts etc. for the assistance of the Authority, by sending separate letters to the said stakeholders on August 18, 2020, in favour or against the communicated LPM as stipulated in Regulation-10(9) of the Licensing Regulations.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(D). Comments of Stakeholders

(i). In response to the above, the Authority received comments from four (04) stakeholders which included Board of Investment (BOI), Punjab Power Development Board (PPDB), Multan Electric Power Company Limited (MEPCO) and Central Power Purchasing Agency (Guarantee) Limited (CPPAGL). The salient points of the comments offered by the above mentioned stakeholders are summarized in the following paragraphs: -

(a). BOI submitted that proposed modification of ZSPPL does not involve any investment related matter therefore, its comments in the matter may be treated as "NIL";

(b). PPDB stated that according to the decision of the Cabinet Committee on Energy (CCoE) dated April 04, 2019, allowed the project to proceed further in terms of the provisions of the Renewable Energy (RE) Policy 2006. The Authority through its determination January 15, 2020 awarded ZSPPL a tariff of U.S. ¢ 3.7738/kwh. National Transmission and Despatch Company Limited (NTDC) has also confirmed the grid availability for the project vide its letter dated March 02, 2020. Ministry of Energy (MoE) has notified the determined tariff in the official Gazette vide notification dated March 09, 2020. Further, CPPAGL through its correspondence May 04, 2020, has reassured consent to purchase power from project. ZSPPL has submitted all the requisite documents to Alternative Energy Development Board (AEDB) including the Performance Guarantee for issuance of Tri-partite Letter of Support (LOS). In view of the said, the LPM of ZSPPL for modification in the Generation Licence is supported;

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(c). MEPCO submitted that the company through the LPM has proposed to change the PV Technology which is advanced and will result in better Capacity Factor. The Authority may impose a condition on the power producer that latest technology should be used to reduce the cost of production; and

(d). CPPAGL remarked that the company is using the Monocrystalline PV technology whereas more advanced/state of art technologies are available internationally including (a). Using Concentrated Photovoltaic (CPV) and (b). Using double Axis Tracking Technology, which will improve the capacity factor which will result in reduction in tariff.

(ii). The Authority considered the above comments of the stakeholders and in view of the observations of MEPCO and CPPAGL, considered it appropriate seeking perspective of ZSPPL. On the said, ZSPPL submitted that that the said stakeholders have raised the issues that (a). a condition be imposed on the company to utilize latest technology; (b). company should use CPV; and (b). double axis technology for better CF to reduce the tariff.

(iii). In this regard, ZSPPL submitted the project was envisaged in the year 2017 under the Letter of Intent (LoI) of PPDB and completed all the required milestones as envisaged in the said LoI including the preparation of the feasibility study and its approval by the Panel of Experts (PoE). The feasibility study of the project duly locked the technology for the project i.e. PV cells. It is pertinent to mention that the CCoE in its decision dated April 04, 2019 placed the project under Category-II which required that projects having tariff granted more than one year before, to file a petition to determine a new tariff as per the prevailing market conditions. Accordingly, the company filed a petition with the regulator and the Authority gave its determination dated January 15, 2020 fixing the parameters of

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

the project having Mono-crystalline PV cells of 365 watt, with fixed tilt arrangement.

(iv). It was submitted that company has communicated the LPM to change the type of PV Cells as the commercial manufacturing of the earlier proposed ones is no longer being carried out. The above suggestions of CPPAGL are somewhat belated considering the fact that the iteration of tariff has already been done thus complying with the decision of CCoE. Any further changes in technology as suggested will delay the implementation of the project and may not result in lowering of tariff as envisaged by CPPAGL due to higher cost of the proposed equipment.

(E). Hearing of Parties

(i). The Authority considered the above submissions of ZSPPL in reply to the observations of different stakeholders and decided to hold a hearing. In consideration of the said, the hearing was held on February 24, 2021 wherein relevant stakeholders participated through ZOOM.

(ii). The representatives of ZSPPL explained that project was envisaged in terms of the LoI dated January 17, 2017 of PPDB which had envisaged setting a 100 MW_P generation facility at Quaid-e-Azam Solar Park located at Lal Sohanra at tehsile Hasilpur, district Bahawalpur in the province of Punjab using fixed tilt PV modules. In this regard, ZSPPL carried out a detailed bankable feasibility study of the project duly considering all the relevant factors envisaged under the LoI and optimized the design of the project using fixed tilt arrangement.

(iii). The representative of the ZSPPL acknowledged that considerable time has lapsed and significant improvement in technology have occurred as compared to the time when the project was earlier envisaged. The use of latest technology of tracking etc. can be considered but there are certain limitation as civil work pertaining to foundations of the structures for housing the PV strings which needs to be evaluated to arrive a decision to justify the change in

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY REGISTRAR NEPRA

technology.

(iv). The Authority considered the above submissions of ZSPPL and directed to provide a detailed working of the various options that may be possible duly considering the limitations at site due to already carried out civil work.

(F). Submissions of Company

(i). In consideration of the above, ZSPPL submitted a detailed report with various possible option benchmarking the same against the existing fix tilt arrangement. While explaining the base case of fixed tilt arrangement it was submitted that piles for the project had already been constructed on the existing fixed tilt arrangement therefore, there will be requirement of demolishing a major quantity of the same and construction of additional ones. Further, there will be additional cost of capital involved which are explained in the following paragraphs.

(ii). ZSPPL submitted the above mentioned study/analysis considering various scenarios based on limiting factor of the pitch distance between the piles of the structure on which the panels are to be placed. The company considered three (03) additional scenarios with pitch distance of 6.1 meter, 7.00 meter and 9.00 meter. In this regard, the company also submitted a detailed analysis pertaining to additional cost associated with the said scenarios including: - (a). Bi-Facial modules; (b). deployment of trackers; (c). construction of extra piles; (d). requirement of extra land; (e). cleaning and levelling of land; (f). additional equipment including cabling; and (g). additional transportation charges, that will be required to implement the project with advanced modules consider the tracking system. Further, ZSPPL also submitted the likely CF and resultant expected tariff for each of the above options.

(iii). In consideration of the above, ZSPPL explained that in the fix tilt arrangement the orientation of the PV cells is East to West as per the standard practice and uptill now about 80,000 piles have already be constructed. In order to install tracking system, the orientation of the PV cells will be made from North-

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY REGISTRAR NEPRA

South and if the pitch distance of 6.10 meter is used, a total of around 15,670 existing mini piles will be used whereas 12,614 additional mini piles will be required to be constructed and the arrangement will result in a CF of about 22.66% using the already available/allocated land. It was submitted that if the pitch distance of 7.00 meter is used, none of the existing mini piles will be used whereas 28,284 new mini piles will be required to be constructed and the arrangement will result in a CF of around 22.97%. Further to the above, ZSPPL stated that if the pitch distance of 9.00 meter is considered, none of the existing mini piles will be used whereas 28,284 new mini piles will be required to be constructed and the arrangement will result in a CF of approximately 23.40% however, the same will also be requiring additional piece of land to the tune of 150.00 acres which may be an issue considering the fact other projects have also been envisaged in the adjoining area.

(G). Evaluation/Findings

(i). The Authority examined the entire case in detail including the already granted licence, the communicated LPM, comments of the stakeholder and rejoinder from the Licensee. In this regard, the Authority observed that a Generation Licence (No. SPGL/23/2017, dated August 18, 2017 and Modification-I, dated March 14, 2018) was granted to ZSPPL with an installed capacity 100.00 MW_P. The said licence was granted to ZSPPL for its PV based generation facility to be located at Quaid-e-Azam Solar Park located, Lal Sohanra, tehsile Hasilpur and district Bahawalpur in the province of Punjab. Now, in terms of the communicated LPM now, ZSPPL plans changing the type and specifications of the PV technology, the related associated equipment and other milestones of the project specially the Commercial Operation Date (COD) of the project.

(ii). In this regard, the Authority has observed that in terms of Section-26 of the NEPRA Act read with Regulation-10(5) of the Licensing Regulations, it is empowered to modify an existing licence of a licensee subject to and in accordance with such further changes as it may deem fit if, in the opinion of the

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

Authority such modification (a). does not adversely affect the performance by the licensee of its obligations; (b). does not cause the Authority to act or acquiesce in any act or omission of the licensee in a manner contrary to the provisions of the NEPRA Act or the rules or regulations made pursuant to it; (c). is or is likely to be beneficial to the consumers; (d). is reasonably necessary for the licensee to effectively and efficiently perform its obligations under the licence; and (e).is reasonably necessary to ensure the continuous, safe and reliable supply of electric power to the consumers keeping in view the financial and technical viability of the licensee.

(iii). In this regard, the Authority has considered the submissions of the stakeholders and in view of the above observations made, the Authority directed ZSPPL to change the technology with double faced PV cells and single axis tracking to adopt the improvement in technology thus resulting in better CF. As explained in the preceding paragraphs, ZSPPL has given its consent to adopt the changes in technology etc. making the project more efficient and addressing the observations of the stakeholders. As explained above, ZSPPL has submitted three scenarios based on pitch distance of 6.10 meter, 7.00 meter and 9.00 meter with Bi-facial Mono Crystalline PV Modules. Although, ZSPPL has submitted its preliminary submission relating to the cost impact of each of the said proposal. The Authority has considered the same but is of the considered view that the same will be deliberated in detail at the time of determination of tariff for the project for which the company will be filing a petition subsequently.

(iv). The Authority has observed that in its submissions for the LPM, the company has indicated using PV cell of 470 Watt but during the processing, ZSPPL submitted that the said type of cells are not available now. In lieu of the said, ZSPPL proposed that it will be using bifacial modules each of 640-645 Watt. The Authority has considered the submissions of the ZSPPL and observes that the proposed change will not have any detrimental effect and in fact will result in better CF when used in single axis tracking. In this regard, the Authority has observed that the above mentioned change can be considered in terms of the

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR

relevant provisions of Licensing Regulations.

(v). In consideration of the above, the Authority observes that (a). the proposed LPM will not adversely affect the performance of the licensee of its obligations under its Generation Licence considering the fact that the proposed PV modules are of latest make/model and will result in better performance; (b). the LPM has not caused it to act or acquiesce in any act or omission of the licensee in a manner contrary to the provisions of the NEPRA Act or the rules or regulations made pursuant to it; (c). the LPM will be beneficial to the consumer considering the fact the proposed changes will result in better energy yield and increase in CF; (d). the LPM is reasonably necessary for the licensee to effectively and efficiently perform its obligations under the licence; and (e).is reasonably necessary to ensure the continuous, safe and reliable supply of electric power, keeping in view the financial and technical viability of the licensee.

(H). Approval of LPM

(i). In view of the above, the Authority is satisfied that the Licensee has complied with all the requirements of the Licensing Regulations pertaining to the modification. Therefore, the Authority in terms Section-26 of the NEPRA Act read with Regulation-10(11) of the Licensing Regulations approves the communicated LPM with changes to the extent *inter alia* the technology of PV to Bi-Facial modules with single axis tracking. In consideration of the above, the Generation Licence (No. No. SPGL/23/2017, dated August 18, 2017 and Modification-I, dated March 14, 2018) granted to ZSPPL is hereby modified.

(ii). The changes made in the above mentioned Generation Licence of ZSPPL are attached as annexure to this determination of the Authority. The approval of the LPM of ZSPPL is subject to the provisions contained in the NEPRA Act (as amended from time to time), relevant rules and regulations framed there under, the terms & conditions of the Generation Licence and other applicable documents. In consideration of the above, the Authority directs the company/Licensee to file a fresh petition in terms of the provisions of the relevant

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR

rules for determination of tariff duly considering the various scenarios as explained in the preceding paragraphs.

Authority

Engr. Maqsood Anwar Khan
(Member)

Engr. Rehmatullah Baloch
(Member)

Engr. Rafique Ahmed Shaikh
(Member)

Engr. Tauseef H. Farooqi
(Chairman)

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

07 01 22

National Electric Power Regulatory Authority
(NEPRA)
Islamabad – Pakistan

GENERATION LICENCE
No. SPGL/23/2017

In exercise of the Powers conferred under Section-26 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (as amended from time to time), the Authority hereby modifies the Generation Licence (No. SPGL/23/2017, dated August 18, 2017 and Modification-I dated March 14, 2018) granted to Zorlu Solar Power (Private) Limited to the extent of changes mentioned hereunder: -

(a). The expiry date of the Licence mentioned on the face sheet of the original licence may be read as **14th day of December 2048**;

(b). The Changes made in Articles of the Generation Licence are attached as **Revised/Modified Articles of Generation Licence**;

(c). The Changes made in Schedule-I of the Generation Licence are attached as **Revised/Modified Schedule-I**; and

(d). The Changes made in Schedule-II of the Generation Licence are attached as **Revised/Modified Schedule-II**;

This **Modification-II** is given under my hand on this 7th **day** of **January Two Thousand & Twenty-Two.**

07 01 22

Registrar

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

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, the Commercial Code if any, or the documents or instruments made by the Licensee pursuant to its 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;

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(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/Solar Power Plant/Solar Farm of the Licensee on which the electric power from all the photovoltaic cells is collected for supplying to the Power Purchaser;

(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/Solar Power Plant/Solar 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/Solar Power Plant/Solar Farm, which are available or can be obtained in relation to the generation facility/Solar Power Plant/Solar Farm after the COD;

(h). "Commercial Code" means the commercial code under the National Electric Power Regulatory Authority (Market Operator, Registration, Standards and Procedure) Rules, 2015 as amended or replaced from time to time;

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

(j). "Commissioning" means the undertaking of the Commissioning Tests of the generation facility/Solar Power Plant/Solar Farm as stipulated in the EPA;

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

(k). "Commissioning Tests" means the tests to be carried out pursuant to provisions of EPA;

(l). "CPPAGL" means Central Power Purchasing Agency (Guarantee) Limited or any other entity created for the like purpose;

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

(n). "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/Solar Power Plant/Solar Farm, as may be amended by the parties thereto from time to time;

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

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

(q). "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/Solar Power Plant/Solar Farm;

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

(r). "GoPb" means the Government of the province of Punjab acting through the PPDB which has issued letter of intent to the Licensee for the design, engineering, construction, insuring, commissioning, operation and maintenance of the generation facility/Solar Power Plant/Solar Farm;

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

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

(u). "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/Solar Power Plant/Solar Farm, as may be amended from time to time;

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

(w). "Licensee" means **Zorlu Solar Pakistan (Pvt.) Limited** or its successors or permitted assigns;

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

(y). "MEPCO" means Multan Electric Power Company Limited or its successors or permitted assigns;

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

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

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

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

(cc). "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;

(dd). "PPDB" means Punjab Power Development Board or any other entity created for the like purpose established by the GoPb to facilitate, promote and encourage development of private sector participation for development of projects for electric power in the province of Punjab;

(ee). "Punjab Power Policy" means the "Punjab Power Generation Policy 2006" of GoPb as amended from time to time;

(ff). "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;

(gg). "Solar Power Plant/Solar Farm" means a cluster of photovoltaic cells in the same location used for production of electric power;

(hh). "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 rules and regulations issued under the Act.

Article-2
Applicability of Law

This Licence is issued subject to the provisions of the Applicable Law, as amended or replaced from time to time.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

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/Solar Power Plant/Solar 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/Solar Power Plant/Solar 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/Solar Power Plant/Solar Farm before its COD.

Article-4
Term of Licence

4.1 This Licence is effective from the date of the issuance of the original licence i.e. August 18, 2017 and will have a term of twenty-five (25) years from the COD of the generation facility/Solar Power Plant/Solar Farm, subject to the provisions of Section-14(B) of the Act.

4.2 Unless suspended or revoked earlier or Licence ceases to have effect, 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) Regulation, 2021 as amended or replaced from time to time.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Article-6
Tariff

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

Article-7
Competitive Trading Arrangement

7.1 The Licensee shall participate in such manner as may be directed by the Authority from time to time for development of a Competitive Trading Arrangement.

7.2 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.

7.3 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.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

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/Solar Power Plant/Solar 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.

10.2 The Licensee shall provide a certificate on a bi-annual basis, confirming that the operation of its generation facility/Solar Power Plant/Solar 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/Solar Power Plant/Solar 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 properly calibrated automatic computerized solar radiation recording device(s) at its generation facility/Solar Power Plant/Solar Farm for recording of data.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

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

12.3 The Licensee shall transmit the solar radiation data and power output data of its generation facility/Solar Power Plant/Solar 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.

Article-14
Emissions Trading /Carbon Credits

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

Article-15
Design & Manufacturing Standards

The photovoltaic cells and other associated equipment of the generation facility/Solar Power Plant/Solar 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 generation facility/Solar Power Plant/Solar Farm shall be unused and brand new.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Article-16
Power Curve

The power curve for the individual photovoltaic cell 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/Solar Power Plant/Solar Farm.

Article-17
Compliance with Applicable Law

The Licensee shall comply with the provisions of the Applicable Law, guidelines, directions and prohibitory orders of the Authority as issued from time to time.

Article-18
Corporate Social Responsibility

The Licensee shall provide the descriptive as well as monetary disclosure of its activities pertaining to corporate social responsibility (CSR) on an annual basis.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

SCHEDULE-I

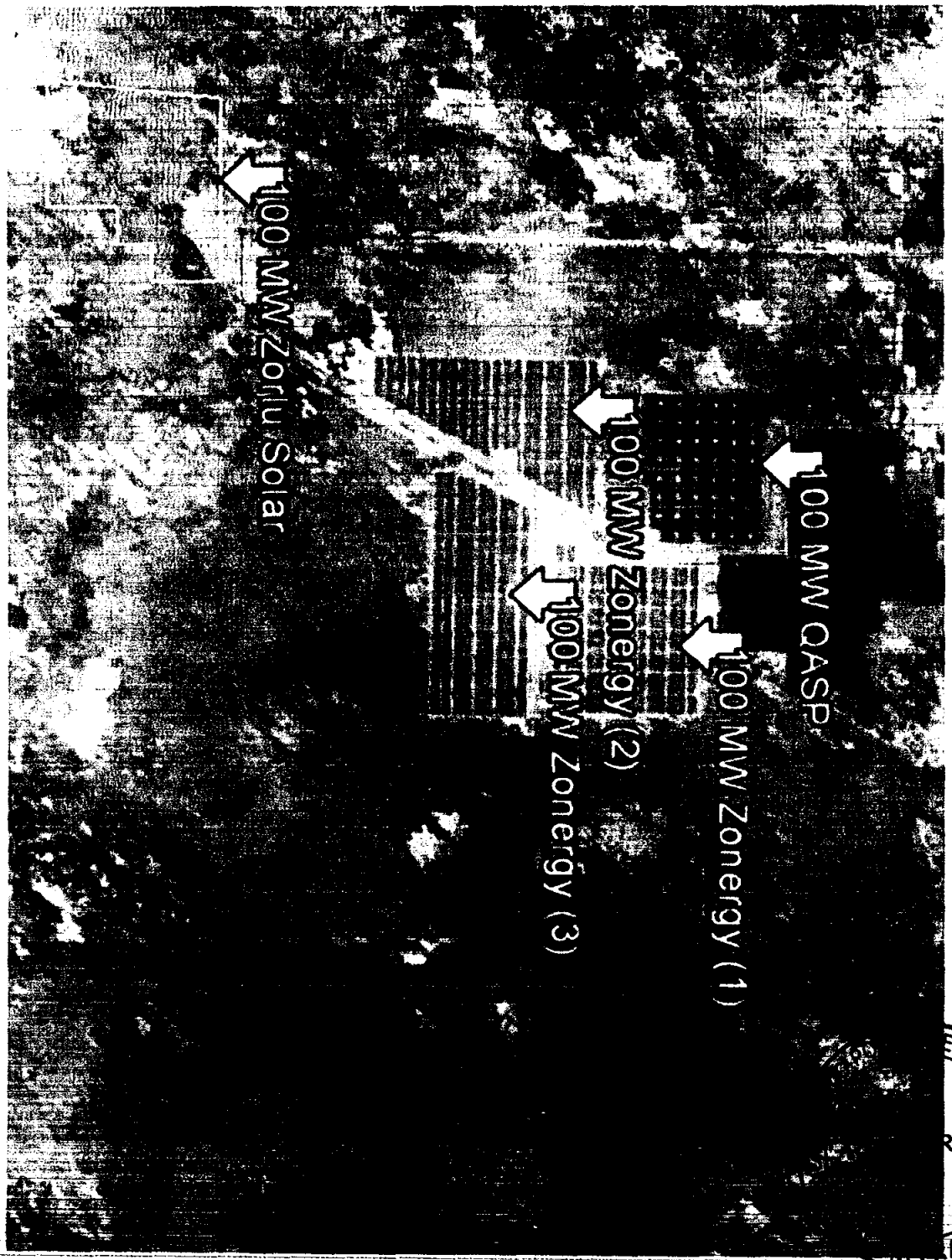
The Location, Size (i.e. Capacity in MW), Type of Technology, Interconnection Arrangements, Technical Limits, Technical/Functional Specifications and other details specific to the Generation Facilities of the Licensee are described in this Schedule.

NATIONAL ELECTRIC POWER REGULATORY
REGISTRAR
NEPRA

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

REGULATORY AUTHORITY
REGISTRAR
NEPRA

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



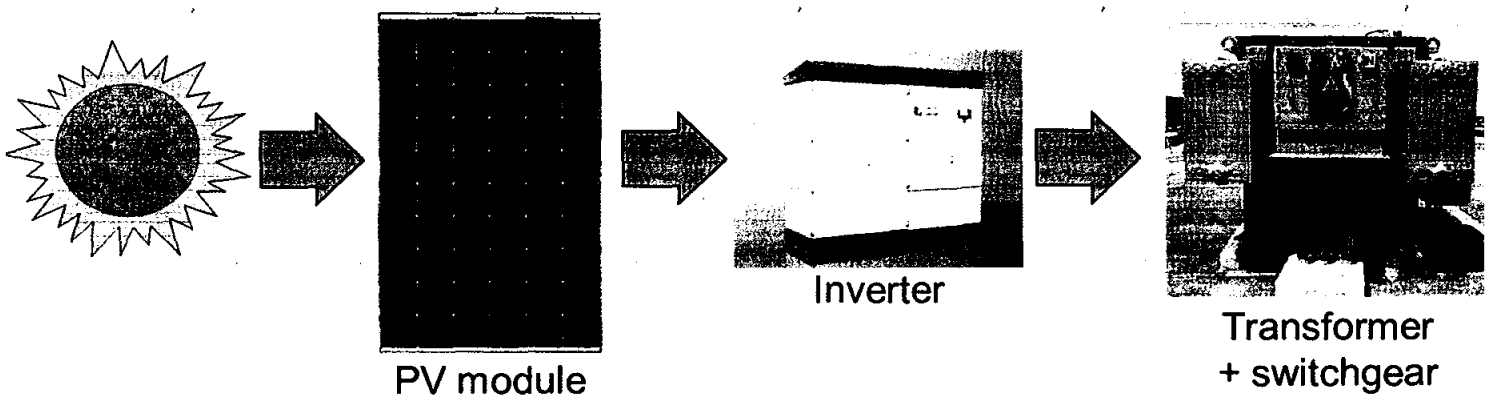
Land Coordinates of the Generation Facility/Solar Power Plant/Solar Farm of the Licensee

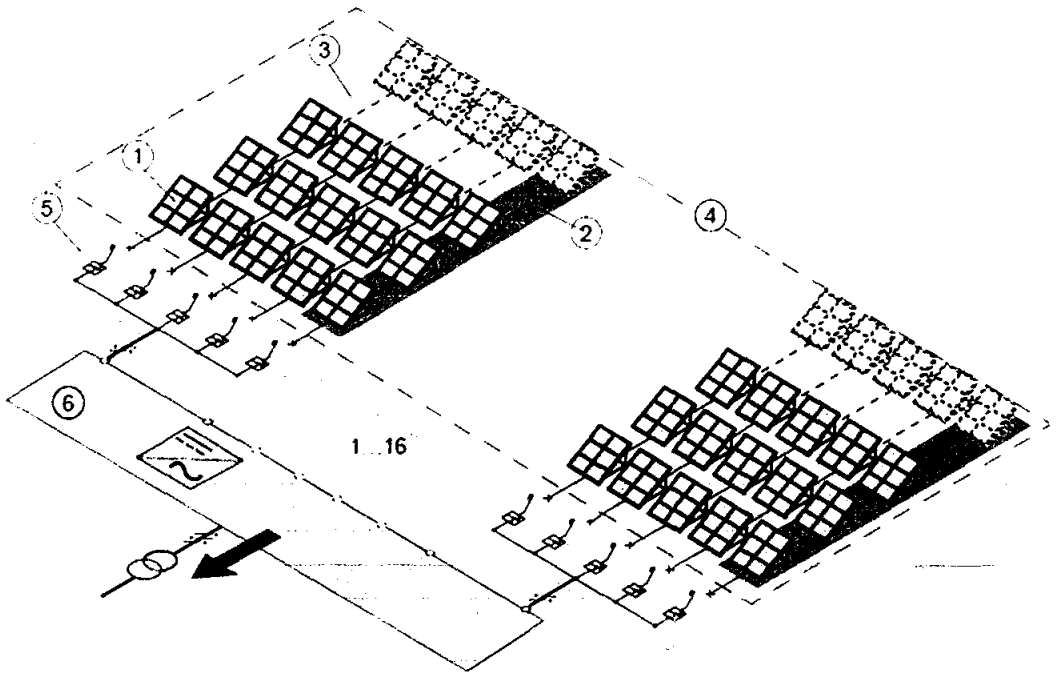
Sr. No.	Latitude	Longitude
Boundary 1	29°16'50.10"N	71°47'19.98"E
Boundary 2	29°16'50.10"N	71°48'22.08"E
Boundary 3	29°16'30.54"N	71°48'22.08"E
Boundary 4	29°16'30.54"N	71°48'9.66"E
Boundary 5	29°16'20.76"N	71°48'9.66"E
Boundary 6	29°16'20.76"N	71°47'57.24"E
Boundary 7	29°16'1.20"N	71°47'57.24"E
Boundary 8	29°16'1.20"N	71°47'13.98"E

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

The allocated land may vary due to various options of pitch distance of 6.1 meter, 7.00 meter and 9.00 meter as explained below in another footnote given at page-10 of this Schedule-I.

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

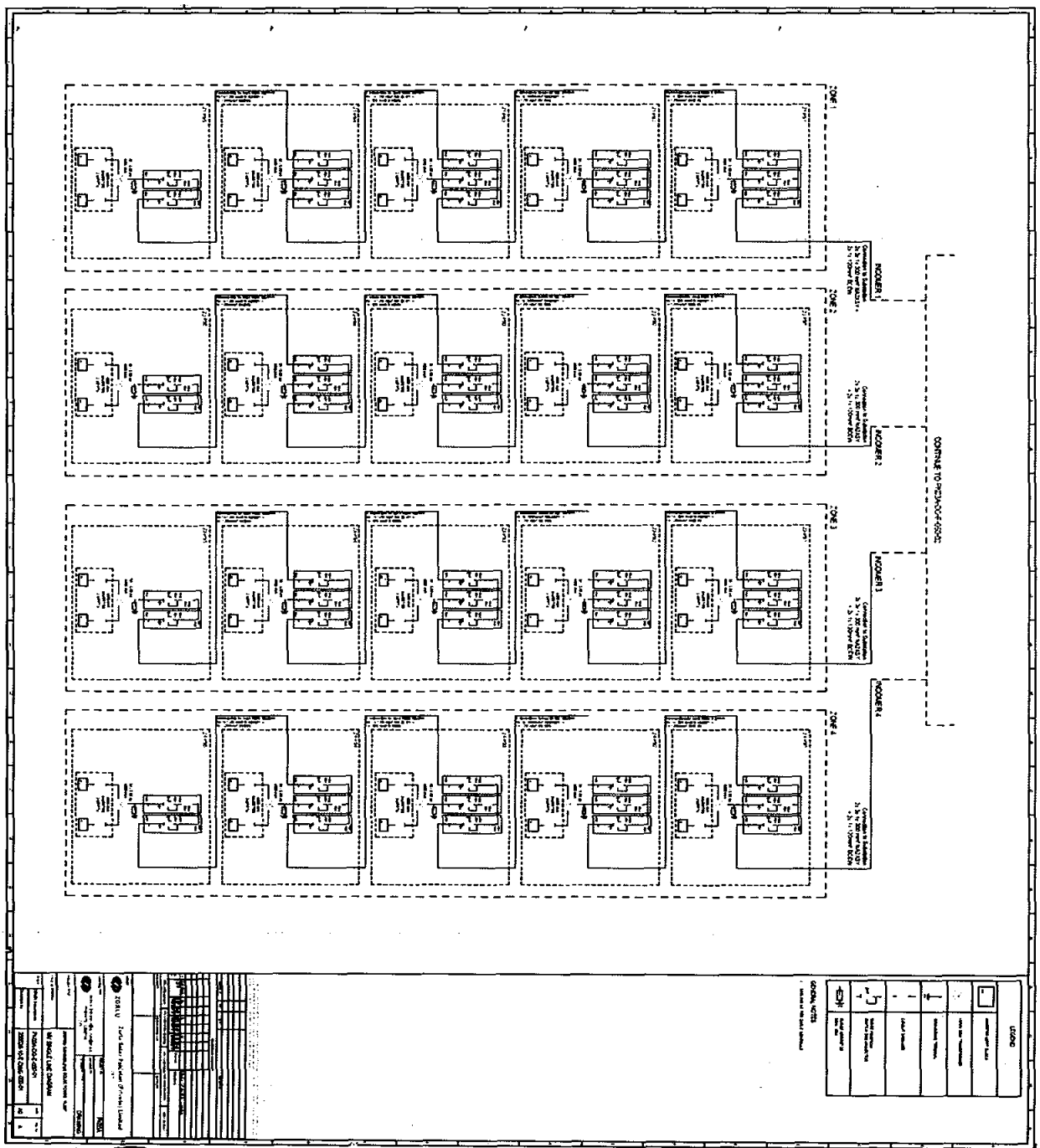




1	Solar module (photovoltaic module)	3	Solar array	5	Solar array junction box
2	Solar string	4	Solar generator	6	Inverter

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

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



NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

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

The electric power generated from the generation facility/Solar Power Plant/Solar Farm of the Licensee/Zorlu Solar Pakistan (Pvt.) Limited shall be dispersed to the National Grid through the load center of MEPCO.

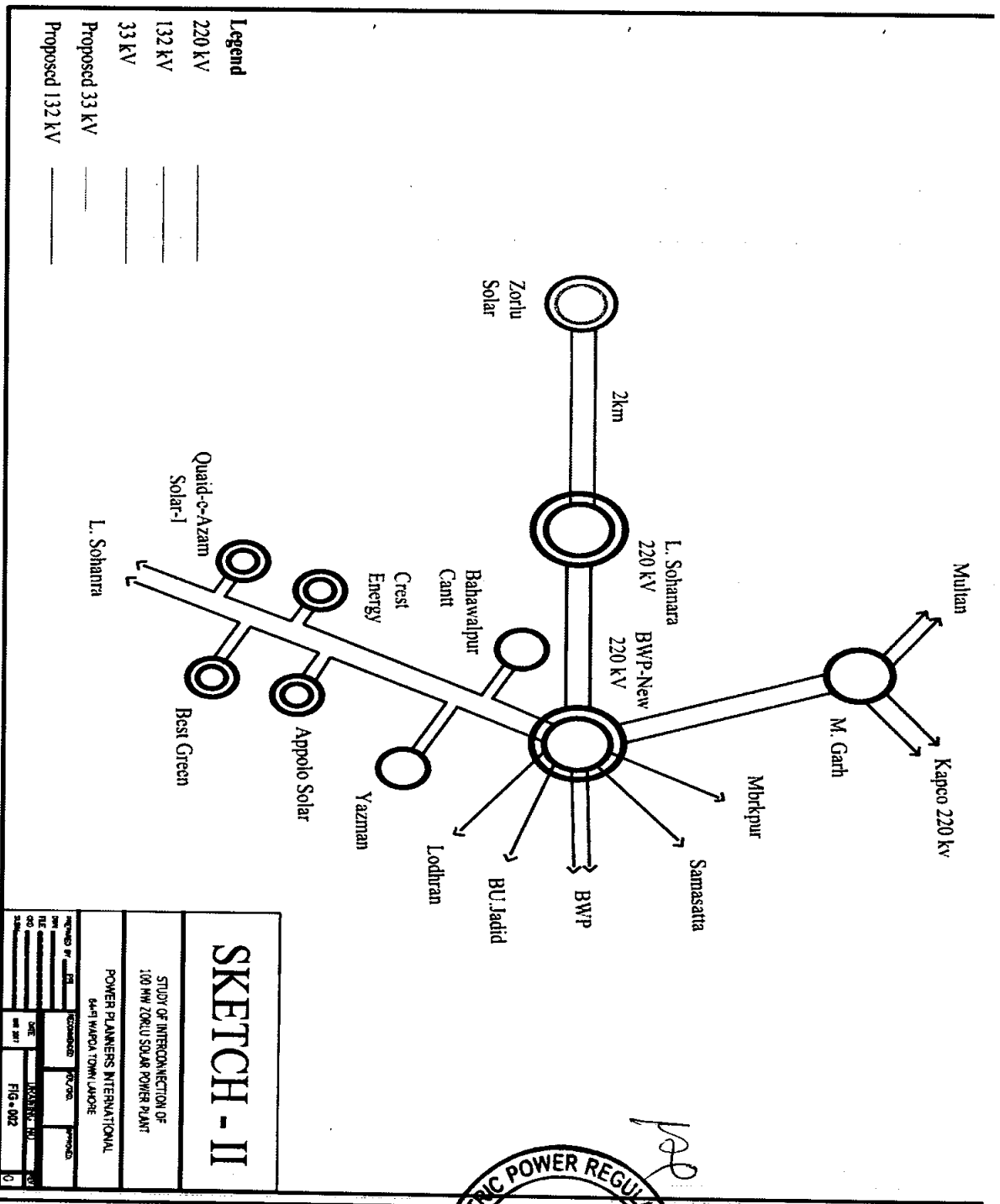
(2). The proposed Interconnection Arrangement/Transmission Facilities for dispersal of power from generation facility/Solar Power Plant/Solar Farm of the Licensee/ZSPPL will consist of the following: -

(a). A 132 kV D/C transmission line (measuring approx. 2km long on ACSR Rail conductor) connecting directly with 220/132kV Lal-Sohanra grid station/substation;

(3). Any change in the above Interconnection Arrangement/Transmission Facility duly agreed by Licensee/ZSPPL, NTDC and MEPCO, shall be communicated to the Authority in due course of time.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Single line Diagram of the Interconnection Arrangement/Transmission Facilities for Dispersal of Electric Power



NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

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

(A). General Information

(i).	Name of the Company/ Licensee	Zorlu Solar Pakistan (Pvt.) Limited
(ii).	Registered Office/ Business Address of the Company/Licensee	C-117, Clifton Block-2, Karachi, in the province of Sindh, Pakistan.
(iii).	Location of the Generation Facility/ Solar Power Plant/Solar Farm	Quaid-e-Azam Solar Park (Extension), Lal Sohanra in Cholistan, Tehsil Hasilpur, District Bahawalpur in the Province of Punjab
(iv).	Type of generation facility	Photovoltaic (PV) Cell/Modules based generation facility Solar Power Plant/Solar Farm

(B). Technology & Capacity

(i).	Type of Technology	Photovoltaic (PV) Cell with Single Axis Tracking
(ii).	Type of System	Grid Connected
(iii).	Installed Capacity of Generation facility Solar Power Plant/Solar Farm	≈100 MW_P

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(C). Details of Equipment†

(a).	**Solar Panels – PV Modules**	
(i).	Type of Module	Tier 1-Bifacial Mono-Crystalline PV module type 640-645 Wp on Single Axis tracker
(ii).	Type of Cell	Mono-Crystalline Silicone
(iii).	Dimension of each Module	2384×1303×35
(iv).	No. of Panel /Modules	155, 792
(v).	Module Area	3.1 m^2
(vi).	Panel's Frame	Anodized Aluminium Alloy
(vii).	Weight of one Module	38.7 kg
(viii).	No of Solar Cells in each module	132
(ix).	Efficiency of module	20.6% -20.9%
(x).	Maximum Power (P_{max})	640 - 645W
(xi).	Voltage @ P_{max}	37V – 38.3V
(xii).	Current @ P_{max}	18 A – 19.3A
(xiii).	Open circuit voltage (V_{oc})	45.1V – 46.1V
(xiv).	Short circuit current (I_{sc})	19.1A - 20.1A
(xv).	Maximum system open Circuit Voltage	1000/1500VDC (IEC)
(b).	**Inverters**	
(i).	Capacity of each unit	4000kW
(ii).	Manufacturer	SIEMENS - WSTECH
(iii).	Input Operating Voltage Range	836V-1500V

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

† The Authority has approved the Licensee Proposed Modification-LPM of the Licensee/ZSPPL with Bi-facial Mono Crystalline Modules and single Axis Tracking. In this regard, the Licensee/ZSPPL has considered three options with pitch distances of 6.1 meter, 7.00 meter and 9.00 meter which will be firmed up based on the Least Cost of Energy/Tariff to be decided through the Determination of the Authority for tariff.

(iv).	Number of Inverters	20	
(v).	Efficiency of inverter (EU)	98.5 %	
(vi).	Max. Allowable Input voltage	1500 V DC	
(vii).	Max. Current	4 x 1220 A	
(viii).	Max. Power Point Tracking Range	836 ~ 1500V	
(ix).	Output electrical system	3 phase, 3 wire	
(x).	Rated Output Voltage	550V	
(xi).	Power Factor (adjustable)	0 ~ 1 (leading & lagging)	
(xii).	Power control	MPP tracker	
(xiii).	Rated Frequency	50 Hz	
(xiv).	Environmental Enclosures	Relative Humidity	0~95%, non-condensing
		Audible Noise	< 55 dB(A)
		Operating Elevation	4500m (>3000m derating)
		Operating ambient temperature	-25℃~+60℃
(xv).	Grid Operating protection	A	DC circuit breaker
		B	AC circuit breaker
		C	DC overload protection (Type 2)
		D	Overheat protection
		E	Grid monitoring
		F	Insulation monitoring
		G	Ground fault monitoring

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(c).	**Junction Boxes**	
(i).	Number of J/Box units	636
(ii).	Input circuits in each box	8 circuits (204of 636), 10 circuits (412 of 636), 12 circuits (20 of 636)
(iii).	Max. input current for each circuit	Impp = 13,04 A Isc = 13,93 A
(iv).	Protection Level	IP65
(v).	Over current protection	20 A fuse per circuit (on both polarities)
(vi).	Surge protection	Type II
(d).	**Data Collecting System**	
(i).	System Data	Hardwire connection via RS485, Ethernet and/or F/O.
(e).	**Power Transformer**	
(i).	Rating	2x80/100 MVA
(ii),	Type of transformer	ONAN/ONAF
(iii),	Purpose of transformer	Step-up (33 kV/132 kV)
(iv).	Output Voltage	132 kV
(f).	**Mounting Structure**	
(i).	Structure	Tracker System
(ii).	Tilt of Array frame	+/- 55°
(iii).	Array specifications	Landscape oriented, 26 modules in series, 1x52 in a structure (tracker table)
(g).	**Unit Transformer**	
(i)	Rating	20×4000 kVA
(ii).	Type of transformer	33kV Oil Typed Transformer
(iii).	Purpose of transformer	Step-up (2x0.55kV/33kV)
(iv).	Output Voltage	33 KV

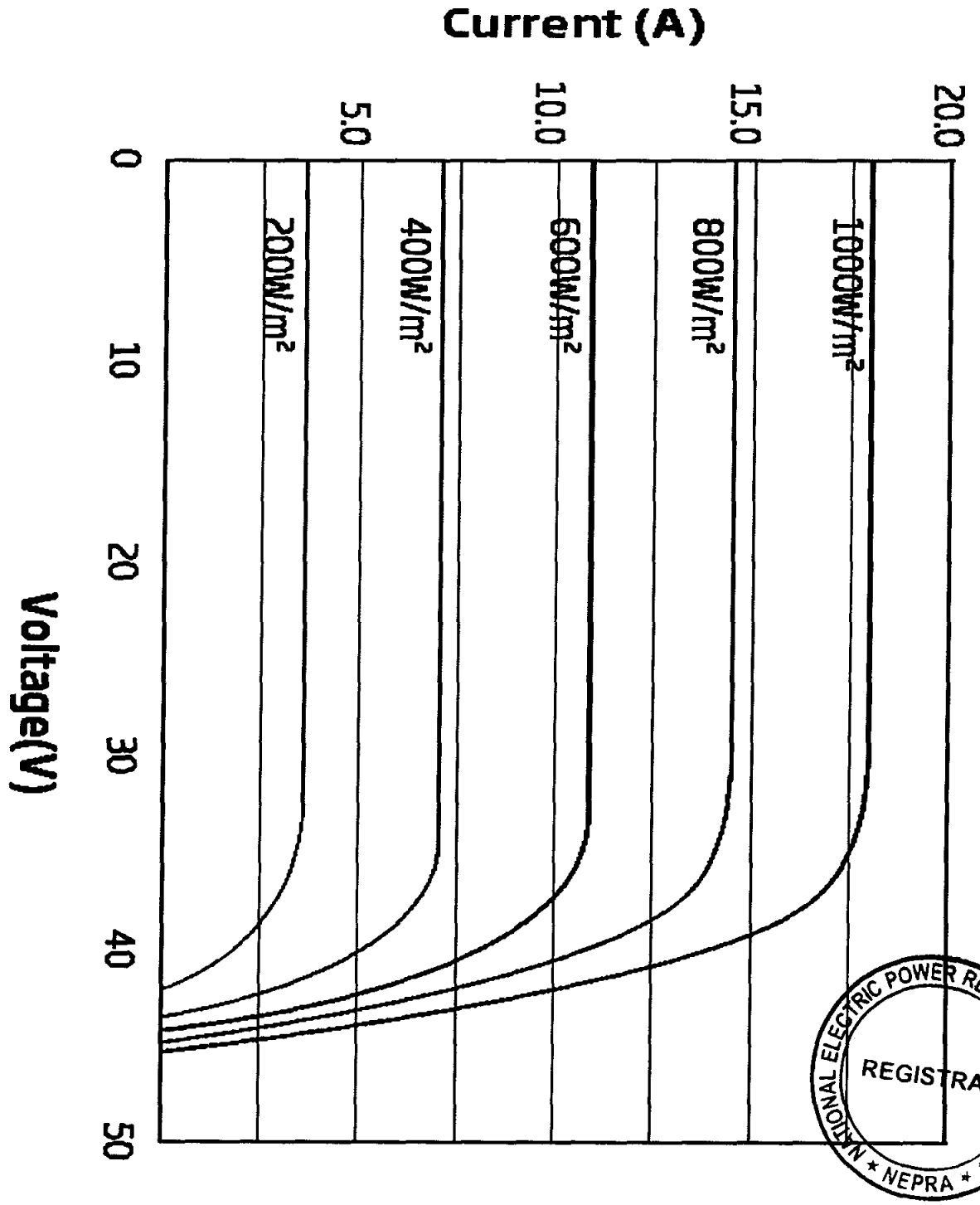
NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(D). Other Details

(i).	Expected COD of Generation Facility/Solar Power Plant/ Solar Farm	December 15, 2023
(ii).	Expected useful life Generation Facility/Solar Power Plant/ Solar Farm from COD	25 years

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

V-I Curve (Normalized) for Tier-1 Bifacial Mono-Crystalline Modules



NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

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.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

SCHEDULE-II

Sr. No.	Description	Option-I (Pitch Distance of 6.10 meter)	Option-II (Pitch Distance 7.00 meter)	Option-III (Pitch Distance 9.00 meter)
(1).	Total Installed Capacity of the Generation Facility/Solar Power Plant/Solar Farm	100 MW	100 MW	100 MW
(2).	Average Sun Hour Availability/Day (Irradiation on Inclined Surface)	8 to 8.5 Hours	8 to 8.5 Hours	8 to 8.5 Hours
(3).	No. of days per year	365	365	365
(4).	Annual generating capacity of Generation Facility/Solar Power Plant/Solar Farm (As Per Simulation)	198,488 MWh	201,218 MWh	205,065 MWh
(5).	Total expected generation of the Generation Facility/Solar Power Plant/Solar Farm during the twenty five (25) years term of this licence	4,658,392 MWh	4,661,122 MWh	4,664,969 MWh
(6).	Annual generation of Generation Facility/Solar Power Plant/Solar Farm based on 24 hours working	876,000 MWh	876,000 MWh	876,000 MWh
(7).	Net Capacity Factor of Generation Facility/Solar Power Plant/Solar Farm	22.66%	22.97%	23.40 %

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).

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA