



National Electric Power Regulatory Authority
Islamic Republic of Pakistan

Registrar

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No. NEPRA/R/DL/LAG-391/14274-80

August 18, 2017

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

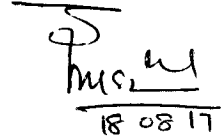
Subject: Grant of Generation Licence No. SPGL/23/2017
Licence Application No. LAG-391
Zorlu Solar Pakistan (Private) Limited (ZSPPL)

Reference: ZSPPL's application vide letter dated March 30, 2017 (received on March 31, 2017)

Enclosed please find herewith Generation Licence No. SPGL/23/2017 granted by National Electric Power Regulatory Authority (NEPRA) to Zorlu Solar Pakistan (Private) Limited (ZSPPL) for its 100.00 MW Solar Power Plant located at Quaid-e-Azam Solar Park (Extension), Lal Sohanra, Cholistan, Tehsil Hasilpur, District Bahawalpur in the province of Punjab, 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
(SPGL/23/2017)


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(Syed Safer 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, Multan Electric Power Company (MEPCO), NTDC Colony, Khanewal Road, Multan.
6. Director General, Environment Protection Department, Government of Punjab, National Hockey Stadium, Ferozepur Road, Lahore.

National Electric Power Regulatory Authority
(NEPRA)

Determination of the Authority
in the Matter of Application of Zorlu Solar Pakistan (Pvt.)
Limited for the Grant of Generation Licence

August 18, 2017
Case No. LAG-391

(A). Background

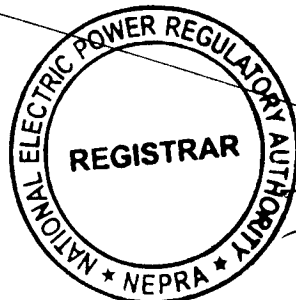
(i). Punjab is the largest province of the country in terms of population. In order to tap the indigenous potential of the province for generation of electric power, the Government of Punjab (GoPb) formulated a policy titled Punjab Power Generation Policy 2006 (the "Punjab Power Policy").

(ii). In this regard, GoPb has issued Letter of Intent (LoI) to different project developers/entrepreneurs for setting up hydel, solar and wind hydro power projects. One such LoI has been issued to Zorlu Enerji Elektrik Uretim A.S Turkey under the Punjab Power Policy. The LoI envisaged setting up a 100.00 MW solar based generation facility/Solar Power Plant/Solar Farm at Quaid-e-Azam Solar Park located at Lal Sohanra at tehsile Hasilpur, district Bahawalpur in the province of Punjab.

(iii). According to the terms and conditions of LoI, the sponsors of the project incorporated Special Purpose Vehicle (SPV) in the name of Zorlu Solar Pakistan (Pvt.) Limited (ZSPPL) and carried out the feasibility study. Thereafter, the SPV decided to approach the Authority for the grant of generation licence.

(B). Filing of Application

(i). ZSPPL submitted an application on March 31, 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 with the relevant provisions of the NEPRA Licensing (Application and Modification Procedure) Regulations, 1999 (the "Licensing Regulations").



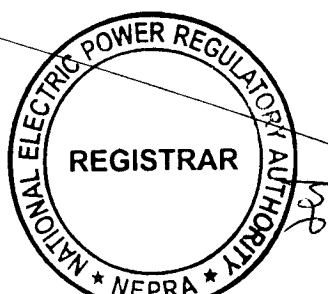
(ii). The Registrar examined the submitted application to confirm its compliance with the Licensing Regulations and observed that the application lacked some of the required information/documentation. Accordingly, ZSPPL was directed for submitting the missing information/documentation and the same was received on April 20, 2016. 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 May 16, 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 May 19, 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 terms of Regulation-9(2) of the Licensing Regulations. Accordingly, letters were sent to the said stakeholders on May 22, 2017, soliciting their comments for assistance of the Authority.

(C). Comments of Stakeholders

(i). In reply to the above, the Authority received comments from three (03) stakeholders. These included Anwar Kamal Law Associates (AKLA), Pakistan Council of Renewable Energy Technologies (PCoRET) and Ministry of Science and Technology (MoST). The salient points of the comments offered by the said stakeholders are summarized below:-

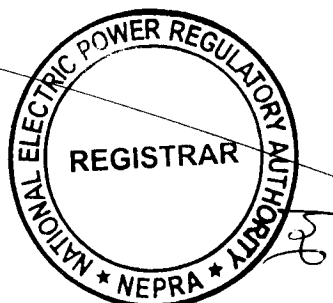
- (a). AKLA raised various issues being faced by the electric power sector of the country. It was highlighted that there is under-utilization of various existing generation facilities and resultantly there is surplus capacity. Therefore, induction of new power plants on "Take or Pay" basis etc. is not 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 ZSPPL;

- (b). PCoRET stated that it cannot comments on the financial aspects of the project but as per the supplied/available information it has no objection to the grant of generation licence to ZSPPL; and
- (c). MoST endorsed the above comments of PCoRET and expressed its no objection for the grant of generation licence to ZSPPL.

(ii). The Authority considered the above comments of the stakeholders and decided to seek the perspective of ZSPPL on the observations of AKLA. On the said, it was submitted that comments offered by AKLA are general in nature and don't specifically relate to its application for the grant of generation licence. The points raised relate to policies of the Govt. of Pakistan (GoP) for promotion of RE in the country. Although the professional competence of AKLA in field of law are appreciable however, it is considered that the comments have been filed without fully appreciating the dynamics of the project, energy sector, financial and technical considerations relevant for determining project parameters. ZSPPL stated that mainstreaming of RE and greater use of indigenous resources can help diversify the energy mix of the country thereby reducing the dependence of the country on any single source, particularly imported fossil

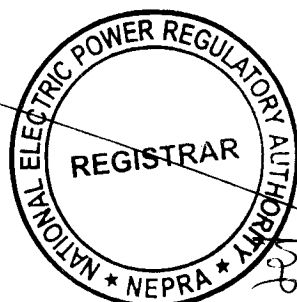


fuels, thereby mitigating against supply disruptions and price fluctuation risks. Further, additional costs and risks relating to fuel stocking, transportation, and temporary substitute arrangements are also avoided in the case of RE.

(iii). ZSPPL stated that the claim of AKLA that country has surplus generation capacity is based upon a failure to appreciate the distinction between operational capacity and installed capacity. In consideration of the said, ZSPPL stated that although the installed capacity of generation facilities of hydro power projects can be much higher but such facilities cannot operate at full load throughout the year due to dependence on the hydrology. ZSPPL stated that a size-able portion of installed capacity of the country is inefficient and not economically viable to be operated therefore, stating that country has surplus capacity is not correct.

(iv). ZSPPL rebutted the claim of AKLA that fuel prices in the international market are low and are likely to remain so for the next several years and termed it as a pure speculation. ZSPPL stated that the fuel prices are highly volatile and cannot be assumed to remain on the existing low level. ZSPPL expressed that the cost of importing expensive fuel contributes not only to the balance of payments but is also a cause of the circular debt which is adversely affecting the power sector. ZSPPL stated that RE is a means of reducing reliance on purely imported fuel, the price of which fluctuates wildly. ZSPPL also rebutted the claim of AKLA that generation of RE is expensive and confirmed that the company has offered a reference tariff of U.S. ¢ 6.00/kWh which is significantly lower than the average generation basket price.

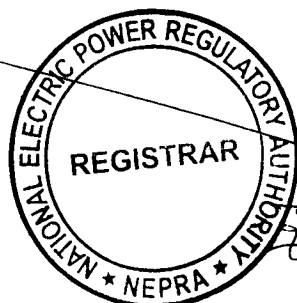
(v). ZSPPL acknowledged that new projects on imported/local coal and Re-Gasified Liquefied Natural Gas (RLNG) are being constructed however, the demand for electricity will continue to increase therefore, the country has to maintain a size-able share of RE in the overall energy mix. ZSPPL stated that indigenous RE will result in savings of precious foreign exchange. ZSPPL stated that currently the country has the lowest contribution of RE in the energy mix when compared to other developing countries therefore, this trend needs to be improved.



(vi). ZSPPL stated that although the submissions of AKLA are well intentioned but the submissions are premised on a fundamental lack of understanding of the dynamics involved in a viable power policy. The biggest concern expressed by AKLA is the "Take or Pay" which has been suggested 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 the projects non-bankable. ZSPPL submitted that the objections of AKLA may be rejected being irrelevant and vague.

(vii). In consideration of the above, the Authority observed that AKLA while submitting its comments has referred to its previous correspondences to NEPRA in different licence 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. 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.

(viii). The aforementioned stance is strengthened from the fact that the proposed generation facility/Solar Power Plant/Solar Farm of ZSPPL 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, it is hereby clarified that through its determination No. NEPRA/SPVPGT-2017/2915-2917 dated March 03, 2017, the Authority has decided to capture the falling prices of solar technology by having a market based competitive tariff instead of upfront tariff. In this regard, it is pertinent to mention that bidding based tariffs are tailored on unit delivered basis meaning thereby that a power producer/generation company is paid only for its delivered



energy. In view of the foregoing, the Authority considers that the observations of AKLA stand addressed.

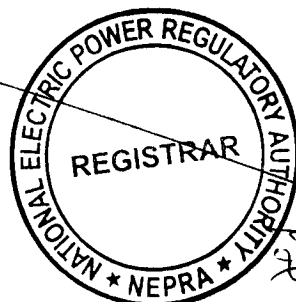
(ix). In consideration of the above and having addressed the comments/objections, the Authority considered it appropriate to proceed further in the matter of application of ZSPPL for the consideration of grant of generation licence as stipulated in the Licensing Regulations and NEPRA Licensing (Generation)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

(D). Evaluation/Findings

(i). The Authority has examined the submissions of ZSPPL 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.

(ii). The Authority has observed that the main sponsor of the project is Zorlu group which is one of the biggest corporate groups in Turkey involved in the areas of textiles, white goods and electronics manufacturing, energy and financial services. The said group set up one of the first wind farm in Pakistan and is operational since 2013 and contributes approximately 159.00 million kWh of electricity per year to the National Grid. According to the latest balance sheet, the sponsor has a total assets of around U.S. \$ 6.00 billion. Based on the financial strength and other evaluation parameters, PPDB issued Lol for development of the project. In this regard, GoPb has allocated 500 acres of land in extension of the Quaid-e-Azam Solar Park located at Lal Sohanra, district Bahawalpur, in the province of Punjab

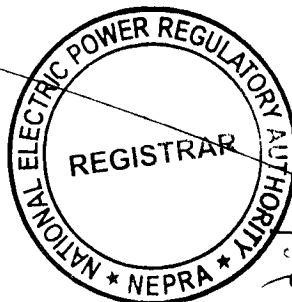
(iii). In order to implement the project, the sponsors incorporated a new company in the name of ZSPPL under Section-32 of the Companies Ordinance, 1984 (having Corporate Universal Identification No. 0103650, dated November 18, 2016). The registered office of the company is located at C-117, Clifton, Block 2, Karachi in the province of Sindh. According to the Memorandum of



Association, the objects of the company, inter alia, include business of power generation and its sale thereof.

(iv). In view of the explanation given above, the Authority considers that the sponsors have strong financial and technical background to carry out the project. According to the submitted information, the total outlay of the project will be U.S. \$ 103.00 million which will be financed through a combination of debt (U.S. \$ 77.25 million) and equity (U.S. \$ 25.75 million) in a ratio of 75:25 which is in line with the benchmark set out in the RE Policy and the determinations of the Authority. It is pertinent to mention that the sponsors are in negotiation with Asian Development Bank (ADB) for financing the debt portion of the project.

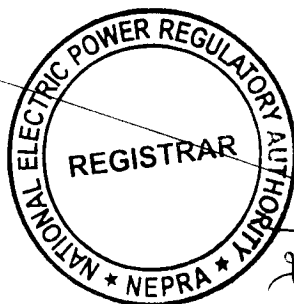
(v). As explained in the preceding paragraphs, ZSPPL had carried out a feasibility study of the project. The review of the feasibility study reveals that the company has considered various world class manufactures of PV cells including General BP Solar, Canadian Solar, China Sunergy, First Solar and BYD Company Limited etc. After duly considering the various factors including (a). Solar resource position of the locality (b). Capital cost of equipment/PV cells; (c). Lead time for supply of equipment/PV cells; (d). Expected energy yield of PV cells; (e). Reliability and compliance with Grid Code; (f). Availability of suitable operation and maintenance teams (including easiness/availability spare parts for PV cells etc., the company decided to select First Solar, Inc. It is pertinent to mention that First Solar USA is one of the world leader in the solar industry and has significant share worldwide. The feasibility study also optimized the size of the proposed generation facility/Solar Power Plant/Solar Farm to 100.00 MW_P, having 434,784 x 115.00 W_P and 425,530 x 117.50 W_P Cadmium Telluride (CD-TE) thin films. In consideration of the above, the Authority observes that the proposed PV Cells is the latest innovation of its type. The selected technology has distinctive features including versatility, flexibility, good performance in indirect light, good performance in high heat and good performance in niche markets. The proposed PV Cells have better feedback and control system with good characteristics for grid reliability and stability for grid as required in the Grid Code.



(vi). The Authority has noted that the sponsors of the project carried out the required interconnection and system stability study for dispersal of electric power from the proposed generation facility/Solar Power Plant/Solar Farm. According to the said study, the dispersal of electric power will be made on 132 KV Voltage. The dispersal/interconnection arrangement will be consisting of a 132kV D/C transmission line on ACSR Rail measuring around 2.00 KM approximately connecting the generation facility/Solar Power Plant/Solar Farm with 220/132 KV Lal Sohanra 220/132kV substation. In this regard, NTDC has confirmed that the electric power from the proposed generation facility/Solar Power Plant/Solar 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/Solar Power Plant/Solar Farm.

(vii). 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/Solar Power Plant/Solar Farm may cause soil pollution and noise pollution. In this regard, the Authority has observed that ZSPPL also carried out the Initial Environment Examination and submitted the same for the consideration and approval of Punjab Environmental Protection Agency, Government of Punjab (EPAGoPb). The Authority is satisfied that EPAGoPb has issued a No Objection Certificate (NOC) for the construction of the project.

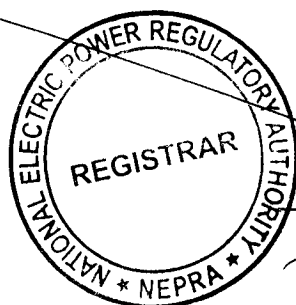
(viii). In terms of Rule-3 of the Generation Rules, the Authority may grant a generation licence to any person to engage in the generation business. The said rule stipulates various conditions pertaining to the grant of generation licence as explained in Rule-3(2), Rule-3(3), Rule-3(4) and Rule-3(5) 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 ZSPPL 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.

(ix). 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.

(x). The Authority considers that 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 solar is an indigenous resource and such resources have a preference for the energy security. As explained in the preceding paragraphs, the Authority through its determination No. NEPRA/SPVPGT-2017/2915-2917 dated March 3, 2017 has decided to capture the falling prices of solar technology by having a market based tariff for solar power projects which is expected to result in a very competitive tariff due to falling prices of the PV cells and related allied equipment.



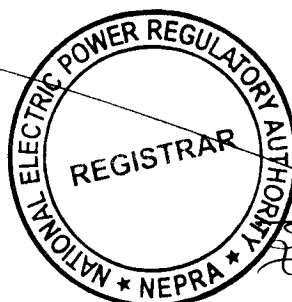
(xi). As explained in the preceding paragraphs, the sponsors of the project carried out the GIS which concludes that the project will not face any constraints in transmission system. Further, being located in close proximity to the transmission system, the project will not result in cost and right-of-way 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.

(xii). In view of the above, the Authority is of the considered view that the project of ZSPPL 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.

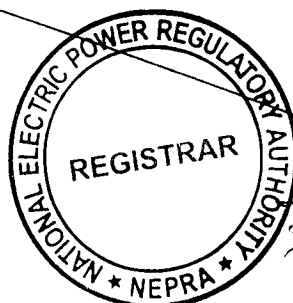
(ii). The existing energy mix of the country is heavily skewed towards thermal power plants, mainly operating on imported fossil fuel. The continuous import of fossil fuel not only creates pressure on the precious foreign exchange reserves of the country but is also an environmental concern. Therefore, in order to achieve sustainable development it is imperative that indigenous RE resources are given priority for power generation and their development is encouraged. The Energy Security Action Plan 2005 approved by GoP, duly recognizes this very aspect of power generation through renewable energy and envisages that at least 5% of total national power generation capacity (i.e. 9700 MW) to be met through RE resources by 2030.



(iii). The Authority considers that the proposed project of ZSPPL is consistent with the provisions of Energy Security Action Plan 2005. The project will help in diversifying the energy portfolio of the country. Further, it will not only enhance the energy security of the country by reducing the dependence on imported fuel but will also help in reducing the carbon emission by generating clean electricity, thus improving the environment.

(iv). As explained in the preceding paragraphs, ZSPPL has provided the details of location, technology, size, net capacity/energy yield, interconnection arrangements, technical details and other related information for the proposed generation facility/Solar Power Plant/Solar Farm. In this regard, the Authority has observed that Government of Sindh has allocated land to ZSPPL for setting up a generation facility/Solar Power Plant/Solar Farm. The said details have been incorporated in Schedule-I of the proposed generation licence. The Authority directs ZSPPL to utilize the allocated land exclusively for the proposed generation facility/Solar Power Plant/Solar Farm and not to carry out any other generation activity on the said land except with its prior approval.

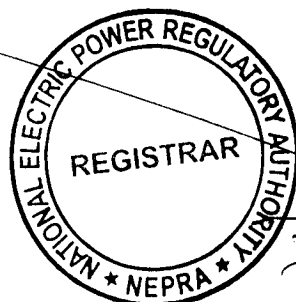
(v). The term of a generation licence under Rule-5(1) of the Generation Rules is required to commensurate with the maximum expected life of the units comprised in a generating facility, except where an applicant for a generation licence consents to a shorter term. According to the information provided by ZSPPL, its generation facility/Solar Power Plant/Solar Farm will achieve COD by December 31, 2017 and will have a useful life of more than twenty five (25) years from its COD. In this regard, ZSPPL has requested that the term of the proposed generation licence may be fixed as twenty five (25) years. The Authority considers that said submission of ZSPPL about the useful life of the generation facility/Solar Power Plant/Solar Farm and the subsequent request to fix the term of the generation licence is consistent with international benchmarks therefore the Authority fixes the term of the generation licence as 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 ZSPPL to charge the power purchaser only such tariff which has been determined, approved or specified by the Authority. The Authority directs ZSPPL 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, ZSPPL has provided the NOC from EPAGoPb 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 ZSPPL to comply with relevant environmental standards at all times. Further, the Authority directs ZSPPL to submit a report on a bi-annual basis, confirming that operation of its generation facility/Solar Power Plant/Solar Farm is in compliance with the required environmental standards as prescribed by the concerned environmental protection agency.

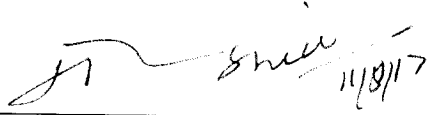
(viii). The proposed generation facility/Solar Power Plant/Solar Farm of ZSPPL will be using RE resource for generation of electric power. Therefore, the project may qualify for the carbon credits under the Kyoto Protocol. Under the said protocol, projects coming into operation up to the year 2020 can qualify for the carbon credits. ZSPPL has informed that the project will achieve COD by December 31, 2017, 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 ZSPPL to initiate the process in this regard at the earliest so that proceeds for the carbon credits are materialized. ZSPPL shall be required to share the proceeds of the carbon credits with the power purchaser as stipulated in Article-14 of the generation licence.



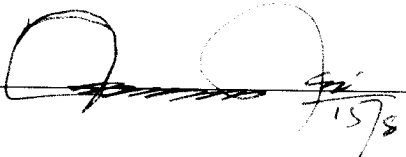
(ix). In view of the above, the Authority hereby approves the grant of generation licence to ZSPPL on the terms and conditions set out in the generation licence annexed to this determination. The grant of generation licence will be subject to the provisions contained in the NEPRA Act, relevant rules, regulations framed thereunder and other applicable documents.

Authority:

Maj. (R) Haroon Rashid
(Member)




Syed Masood-ul-Hassan Naqvi
(Member)



Himayat Ullah Khan
(Member)

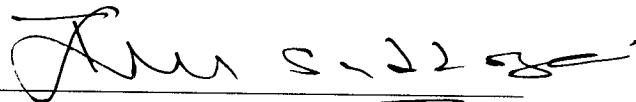


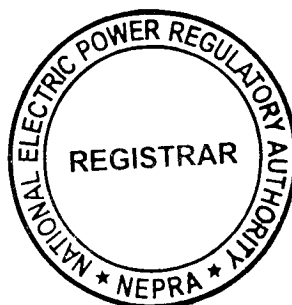
Saif Ullah Chattha
(Member/Vice Chairman)



16.8.2017

Tariq Saddozai
(Chairman)







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

GENERATION LICENCE

No. SPGL/23/2017

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

ZORLU SOLAR PAKISTAN (PVT.) LIMITED

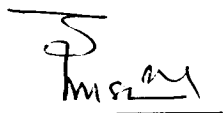
Incorporated Under Section-16 (5) of the Companies Ordinance 2016 (VI of 2016) Having Corporate Universal Identification No. 0103650, dated November 18, 2016

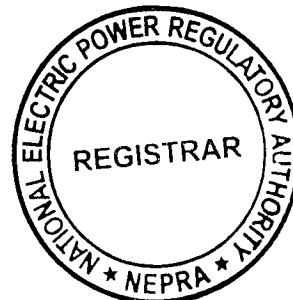
**for its Generation Facility/Solar Power Plant/Solar Farm
Located at Quaid-e-Azam Solar Park (Extension) Lal
Sohanra in Cholistan, Tehsil Hasilpur and District
Bahawalpur in the Province of Punjab**

(Total Installed Capacity: 100.00 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 18th day of August Two
Thousand & Seventeen and expires on 30th day of
December Two Thousand & Forty Two.

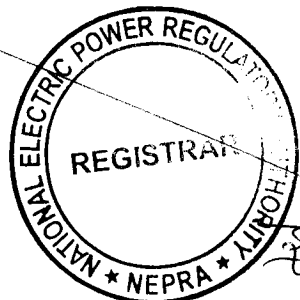

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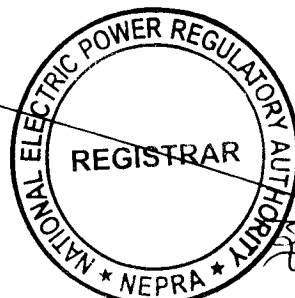
Article-1
Definitions

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/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;

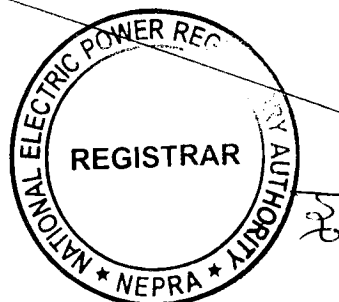


- (g). "Carbon Credits" mean the amount of Carbon Dioxide (CO₂) and other greenhouse gases not produced as a result of generation of electric energy by the generation facility/Solar Power Plant/Solar Farm and other environmental air quality credits and related emissions reduction credits or benefits (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 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;
- (i). "Commissioning" means the undertaking of the Commissioning Tests of the generation facility/Solar Power Plant/Solar Farm as stipulated in the EPA;
- (j). "Commissioning Tests" means the tests to be carried out pursuant to provisions of EPA;
- (k). "CPPA-G" means Central Power Purchasing Agency (Guarantee) Limited or any other entity created for the like purpose;
- (l). "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;
- (m). "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

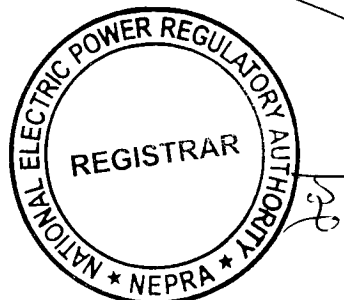


Farm, as may be amended by the parties thereto from time to time;

- (n). "Generation Rules" mean the National Electric Power Regulatory Authority Licensing (Generation) Rules, 2000 as amended or replaced from time to time;
- (o). "Grid Code" means the grid code prepared and revised from time to time by NTDC with necessary approval of the Authority;
- (p). "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;
- (q). "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;
- (r). "IEC" means "the International Electrotechnical Commission or its successors or permitted assigns;
- (s). "IEEE" means the Institute of Electrical and Electronics Engineers or its successors or permitted assigns;
- (t). "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;



- (u). "Letter of Support (LoS)" means the letter of support issued or to be issued by the GoP through the AEDB to the Licensee;
- (v). "Licensee" means Zorlu Solar Pakistan (Pvt.) Limited or its successors or permitted assigns;
- (w). "Licensing Regulations" mean the National Electric Power Regulatory Authority Licensing (Application & Modification Procedure) Regulations, 1999 as amended or replaced from time to time;
- (x). "MEPCO" means Multan Electric Power Company Limited or its successors or permitted assigns;
- (y). "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;
- (z). "NTDC" means National Transmission and Despatch Company Limited or its successors or permitted assigns;
- (aa). "Policy" means the "Policy for Development of Renewable Energy for Power Generation, 2006" of GoP as amended from time to time;
- (bb). "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;

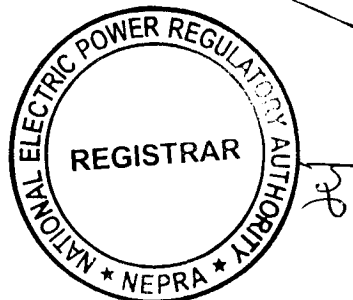


- (cc). "PPDB" means Punjab Power Development Board or any other entity created for the like purpose established by the GoPb to facilitate, promote and encourage development of private sector participation for development of projects for electric power in the province of Punjab;
- (dd). "Punjab Power Policy" means the "Punjab Power Generation Policy 2006" of GoPb as amended from time to time;
- (ee). "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;
- (ff). "Solar Farm" means "a cluster of photovoltaic cells in the same location used for production of electric power";
- (gg). "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.



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 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/Solar Power Plant/Solar Farm of the Licensee.

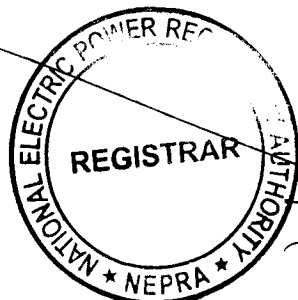
4.2 Unless suspended or revoked earlier, the Licensee may apply for renewal of this Licence ninety (90) days prior to the expiry of the above term, as stipulated in the Licensing Regulations.

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.



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

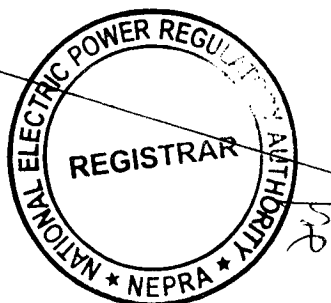
For the purpose of sub-rule(1) of Rule-19 of the Generation Rules, copies of records and data shall be retained in standard and electronic form and all such records and data shall, subject to just claims of confidentiality, be accessible by authorized officers of the Authority.

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/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

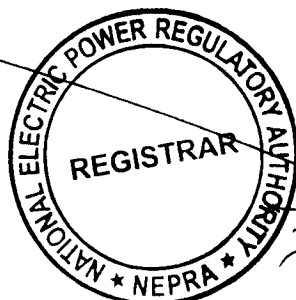
12.1 The Licensee shall install properly calibrated automatic computerized solar radiation recording device(s) at its generation facility/Solar Power Plant or Solar Farm for recording of the solar radiation data.

12.2 The Licensee shall install SCADA System or compatible communication system at its generation facility/Solar Power Plant or 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 or 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

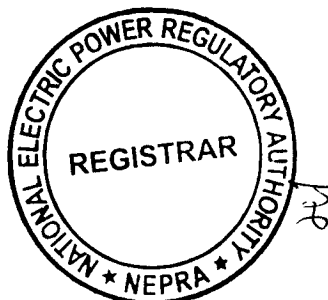
The Licensee shall process and obtain expeditiously the Carbon Credits admissible to the generation facility/Solar Power Plant/Solar Farm. The Licensee shall share the said proceeds with the Power Purchaser as per the Policy.

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 the generation facility/Solar Power Plant/Solar Farm shall be unused and brand new.

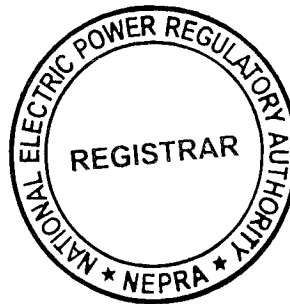
Article-16
Power Curve

The power curve for the individual solar photovoltaic cells 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.



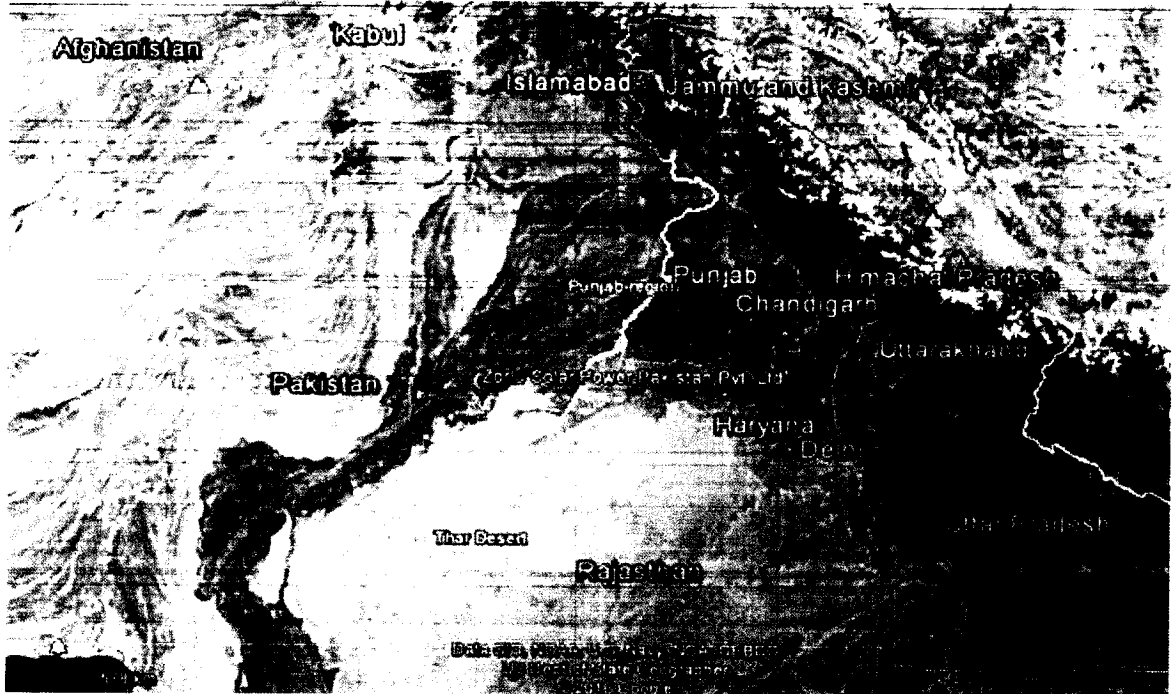
SCHEDULE-I

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.

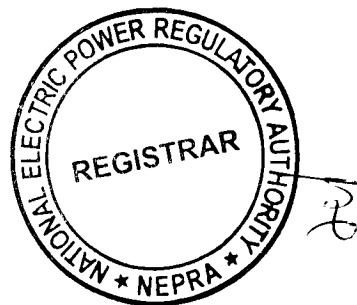
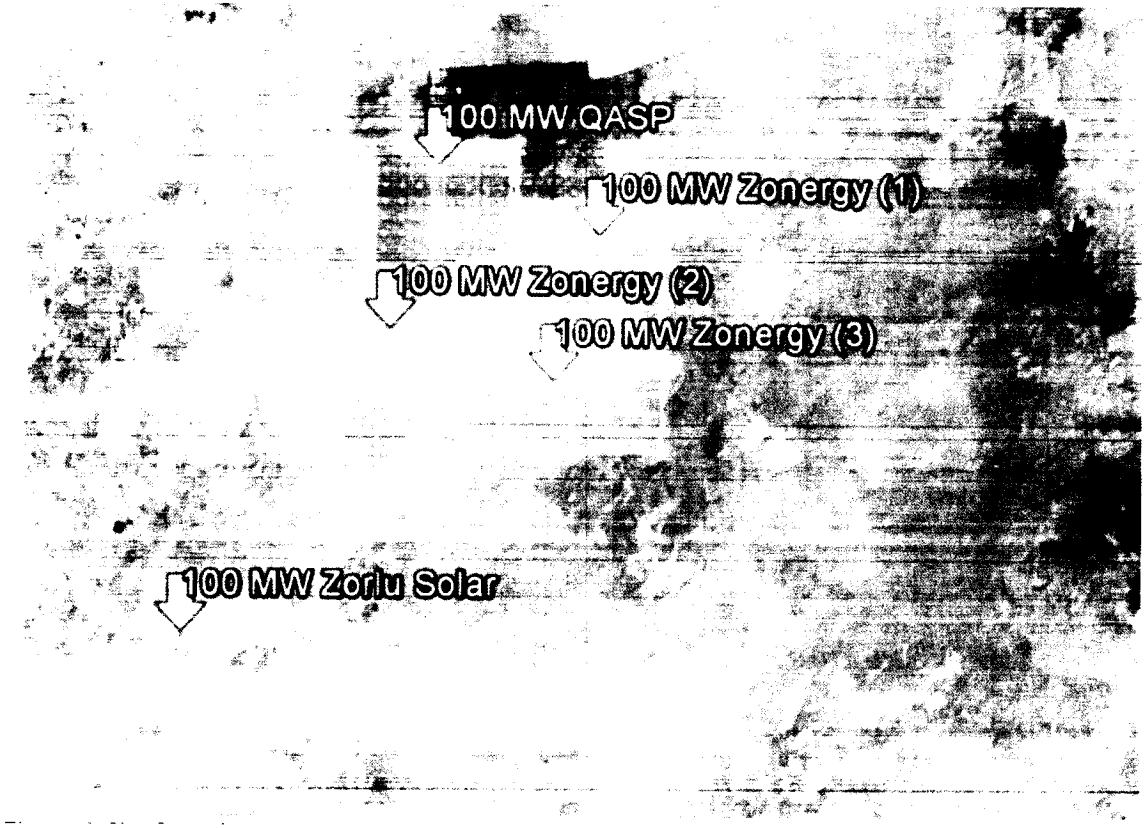


Generation Licence
Zorlu Solar Pakistan (Pvt.) Limited
Quaid-e-Azam Solar Park (Extension)
Lal Sohanra in Cholistan
Tehsil Hasilpur, District Bahawalpur
in the Province of Punjab

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



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



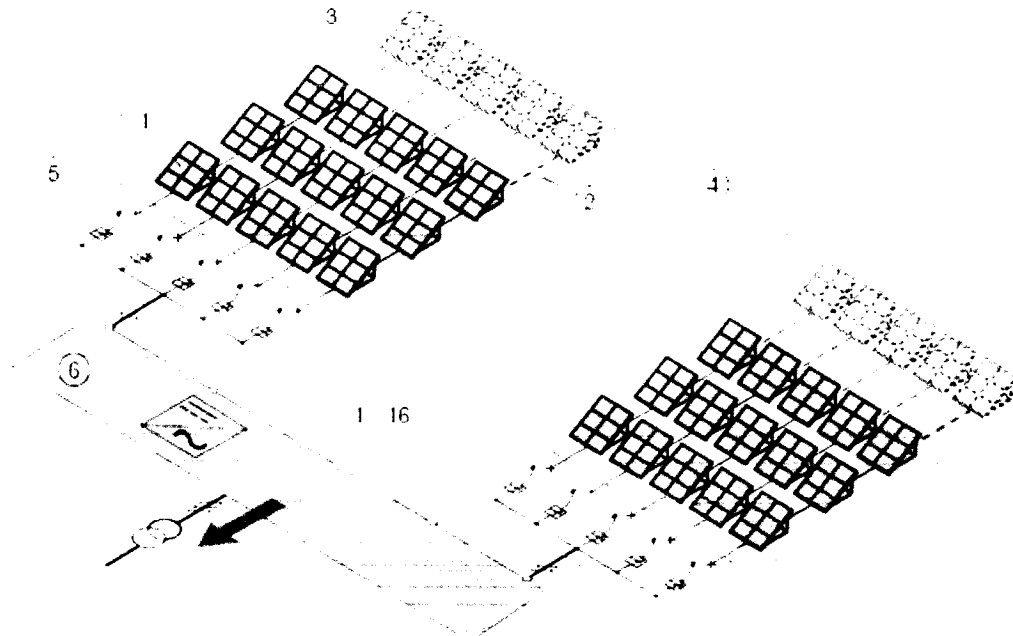
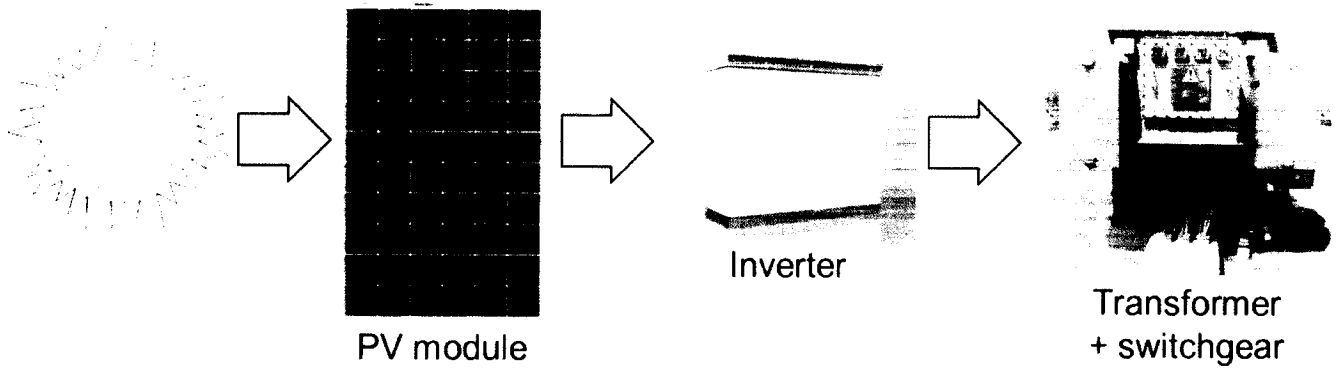
**Land Coordinates of the
Generation Facility/Solar Power Plant/Solar Farm
of the Licensee**

Total Project Land is 600 Acres

<u>Sr. No.</u>	<u>Latitude</u>	<u>Longitude</u>
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

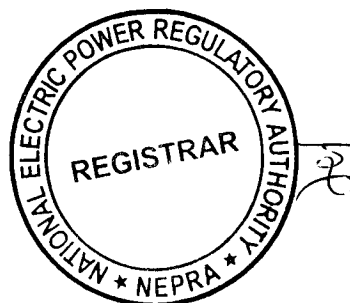


Process Flow Diagram
of the Generation Facility/Solar Power Plant/Solar Farm
of the Licensee

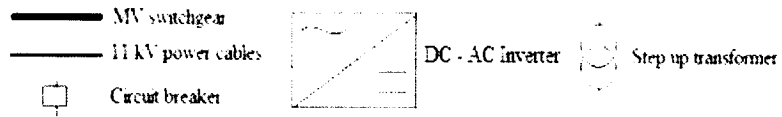
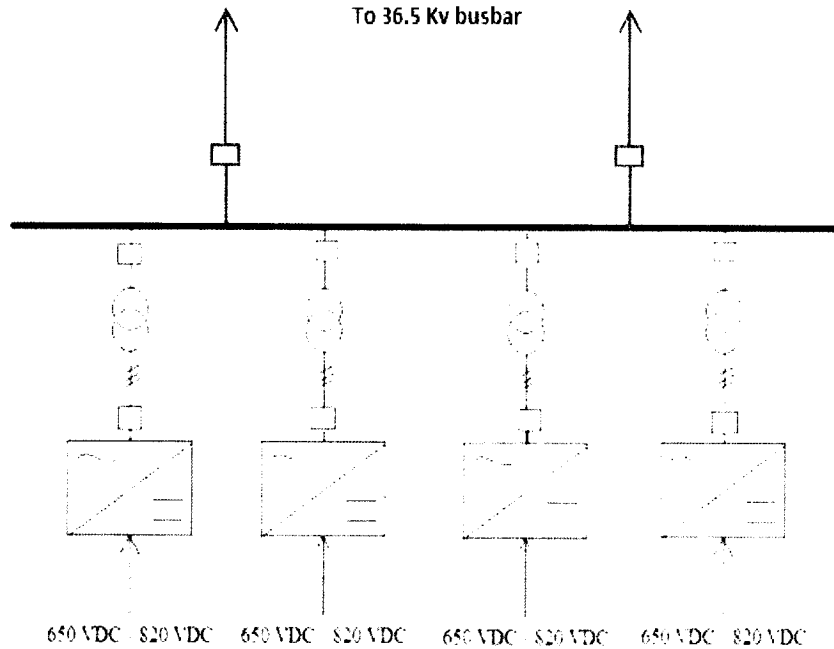


- | | | | | | |
|---|------------------------------------|---|-----------------|---|--------------------------|
| 1 | Solar module (photovoltaic module) | 3 | Solar array | 5 | Solar array junction box |
| 2 | Solar string | 4 | Solar generator | 6 | Inverter |

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



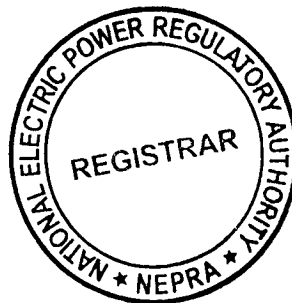
**Interconnection Arrangement/Transmission Facilities
for Dispersal of Power from the Generation Facility/Solar Power
Plant/Solar Farm of the Licensee**

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

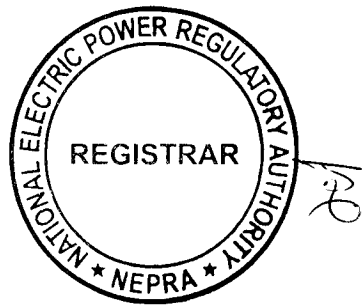
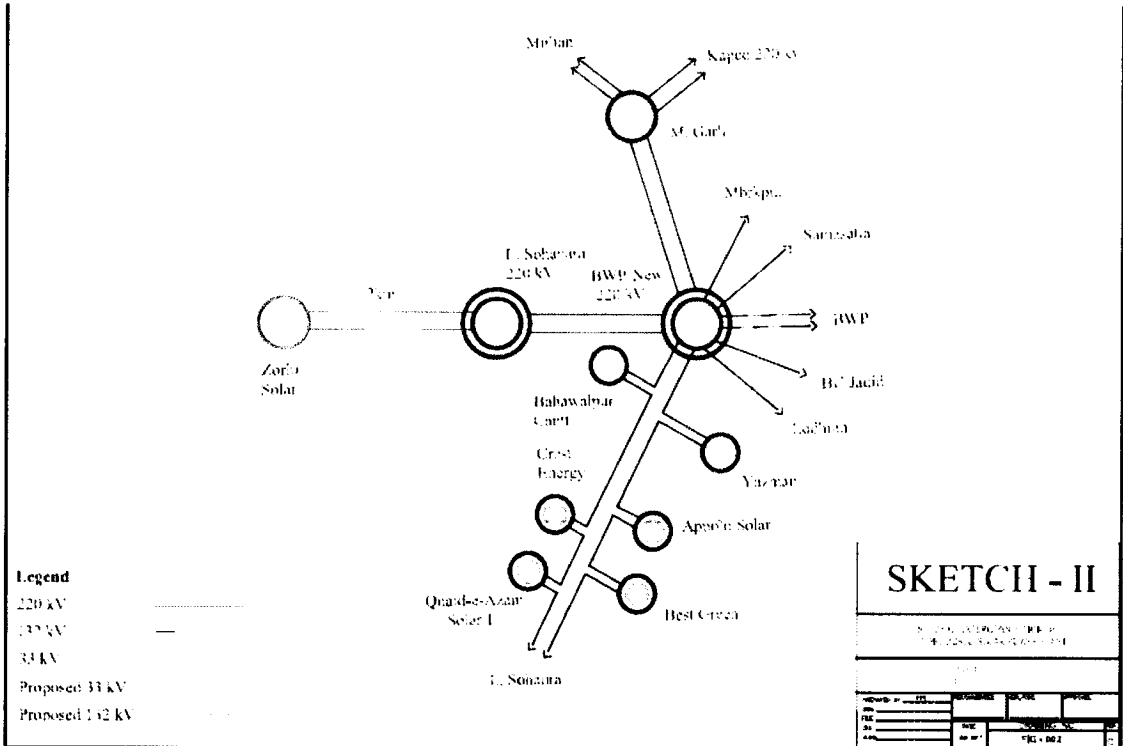
(2). The proposed Interconnection Arrangement/Transmission Facilities for dispersal of power from generation facility/Solar Power Plant/Solar Farm of the Licensee/ZSPPL will consist of the following:-

- (i). 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.



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



**Detail of
 Generation Facility/Solar Power Plant/
 Solar Farm**

(A). General Information

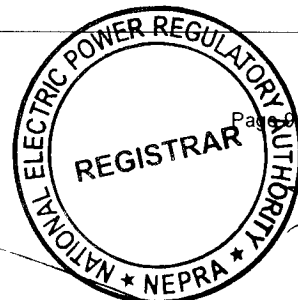
(i).	Name of the Company/Licensee	Zorlu Solar Pakistan (Pvt.) Limited
(ii).	Registered/ Business office of the Company/Licensee	C-117, Clifton Block-2, Karachi Pakistan.
(iii).	Location of the generation facility Solar Power Plant/ Solar Farm	Extension of Quaid-e-Azam Solar Park, in the Province of Punjab
(iv).	Type of the generation facility/ Solar Power Plant/ Solar Farm	Solar Photovoltaic (PV)

(B). Solar Power Generation Technology & Capacity

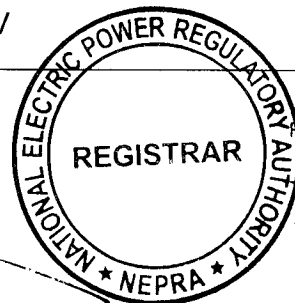
(i).	Type of Technology	Photovoltaic (PV) Cell
(ii).	System Type	Grid Connected
(iii).	Installed Capacity of the generation facility Solar Power Plant/ Solar Farm (MW)	100 MW

(C). Technical Details of Equipment

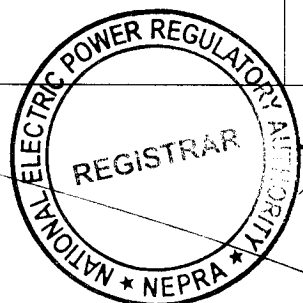
(a).	Solar Panels – PV Modules	
(i).	Type of Module	FS4115-3 (50 MW) & FS4118-3 (50 MW)
(ii).	Type of Cell	CdTe Thin Film
(iii).	Dimension of each Module	2991*2591*2438 mm



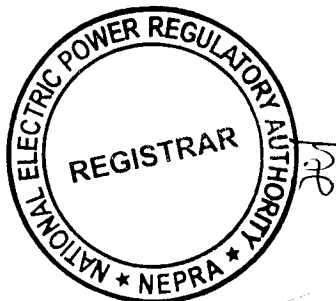
(iv).	No. of Panel /Modules	860,314
(v).	Module Area	0.72m ²
(vi).	Frame of Panel	None
(vii).	Weight of one Module	12kg
(viii).	No of Solar Cells in each module	up to 216 cells
(ix).	Efficiency of module	FS4115-3 115W(16.0 %) FS4118-3 117.5W (16.3 %)
(x).	Maximum Power (P _{max})	115 Wp & 117.5 Wp
(xi).	Voltage @ P _{max}	FS4115-3 = 69.3V and FS4118-3 = 70.1V
(xii).	Current @ P _{max}	FS4115-3 = 1.66A and FS4118-3 = 1.68A
(xiii).	Open circuit voltage (V _{oc})	FS4115-3 = 87.6V and FS4118-3 = 88.1V
(xiv).	Short circuit current (I _{sc})	FS4115-3 = 1.83A and FS4118-3 = 1.83A
(xv).	Maximum system open Circuit Voltage	1500 V
(b).	PV Array	
(i).	Nos. of Strings	61.451
(ii).	Modules in a string	14 each
(c).	Inverters	
(i).	Capacity of each unit	2500KW
(ii).	Manufacturer	Sungrow SG 2500HV
(iii).	Input Operating Voltage Range	900 ~ 1300V



(iv).	Number of Inverters	34	
(v).	Efficiency of inverter	98.7 %	
(vi).	Max. Allowable Input voltage	1500 V DC	
(vii).	Max. Current	3508 A	
(viii).	Max. Power Point Tracking Range	900 ~ 1300V	
(ix).	Output electrical system	3 phase, 3 wire	
(x).	Rated Output Voltage	550V	
(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%, non-condensing
		Audible Noise	< 55 dB(A)
		Operating Elevation	4500m(>3000m derating)
(xv).		Operating temperature	--35°C~+60°C
(xvi).	Grid Operating protection	A	DC circuit breaker
		B	AC circuit breaker
		C	DC overload protection (Type 2)
		D	Overheat protection
		E	Grid monitoring



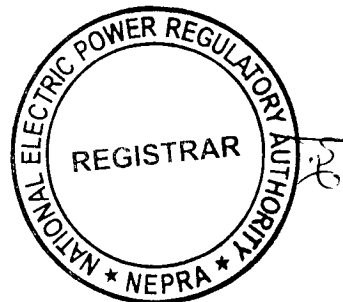
		F	Insulation monitoring
		G	Ground fault monitoring
(d).	Junction Boxes Installed and fixed on main steel structure in Array yard.		
(i).	Number of J/Box units	480	
(ii).	Input circuits in each box	20	
(iii).	Max. input current for each circuit	15A	
(iv).	Protection Level	IP 65	
(v).	Over current protection	Fuse	
(vi).	Surge protection	Yes	
(e).	Data Collecting System		
(i).	System Data	Continuous online logging with data logging software to portal.	
(f).	Power Transformer		
(i).	Rating	2x100 MVA	
(ii).	Type of transformer	ONAN/ONAF	
(iii).	Purpose of transformer	Step-up (33 kV/132 kV)	
(iv).	Output Voltage	132 KV	



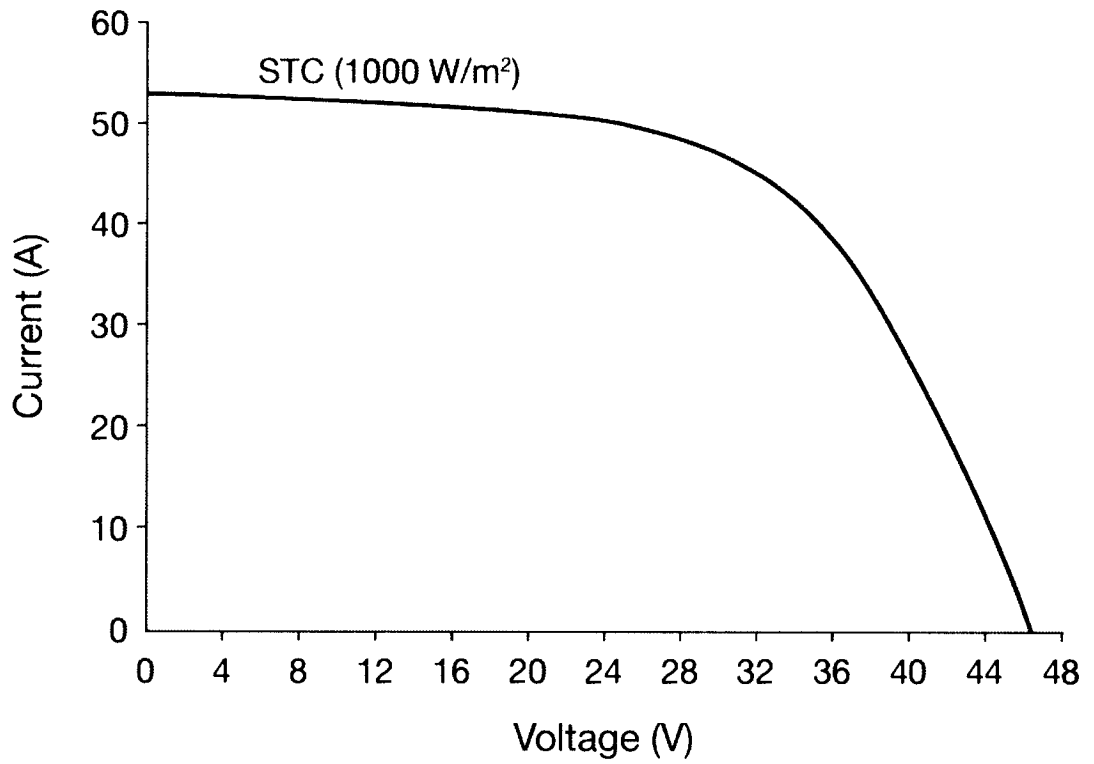
(g).	Unit Transformer	
(i).	Rating	17 × 5000 kVA
(ii).	Type of transformer	33KV Box-type transformer
(iii).	Purpose of transformer	Step-up (0.55KV/33KV)
(iv).	Output Voltage	33 KV

(D). Other Details

(i).	Expected COD of the generation facility Solar Power Plant/ Solar Farm	December 31, 2017
(ii).	Expected useful Life of the generation facility Solar Power Plant/ Solar Farm from the COD	25 years

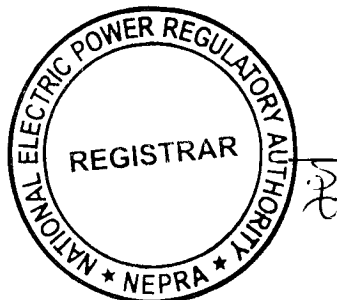


V-I Curve of Solar Cell



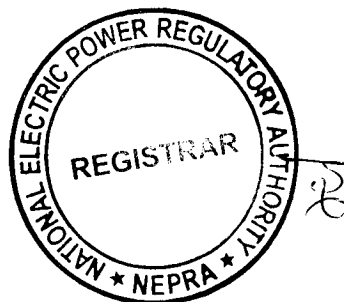
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SCHEDULE-II

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 Installed Capacity of the Generation Facility/Solar Power Plant/Solar Farm	100 MW
(2).	Average Sun Hour Availability/Day (Irradiation on Inclined Surface)	8 to 8.5 Hours
(3).	No. of days per year	365
(4).	Annual generating capacity of Generation Facility/Solar Power Plant/Solar Farm (As Per Simulation)	179,580 MWh
(5).	Total expected generation of the Generation Facility/Solar Power Plant/Solar Farm during the twenty five (25) years term of this licence	4,009,691 MWh
(6).	Annual generation of Generation Facility/Solar Power Plant/Solar Farm based on 24 hours working	876,000 MWh
(7).	Net Capacity Factor of Generation Facility/Solar Power Plant/Solar Farm	20.50%

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).

