National Electric Power Regulatory Authority
Islamic Republic of Pakistan

Registrar

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No. NEPRA/R/DL/LAG-460/10776-82 April 21, 2020

Mr. Muhammad Rafique,
Chief Financial Officer,
Artistic Solar Energy (Private) Limited,
Plot No. 3A, M.A.C.H.S,
Main Shahrah-e-Faisal, Karachi

Subject: **Grant of Generation Licence No. SPGL/37/2020**
Licence Application No. LAG-460
Artistic Solar Energy (Private) Limited (ASEPL)

Reference: ASEPL's application vide letter dated June 24, 2019.

Enclosed please find herewith Generation Licence No. SPGL/37/2020 granted by National Electric Power Regulatory Authority (NEPRA) to Artistic Solar Energy (Private) Limited (ASEPL) for its 50.0 MW Solar Power Plant located at Deh Looli, Taluka Salehpat, District Sukkur in the province of Sindh, pursuant to Section 14B of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997/Amendment Act, 2018. 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/37/2020)

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY REGISTRAR NEPRA

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(Syed Safeer Hussain)

Copy to:

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

National Electric Power Regulatory Authority (NEPRA)

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

April 21, 2020
Case No. LAG-460

(A). Background

(i). In order to harness the potential of Renewable Energy (RE) resources in the country, the Government of Pakistan (GoP) formulated a policy titled "Policy for Development of Renewable Energy for Power Generation 2006" (the "RE Policy"). Under the said RE Policy, both the Federal Government and the Provincial Governments had been supporting the implementation of RE projects in the country.

(ii). In consideration of the above, the Directorate of Alternative Energy, Energy Department of the province of Sindh issued Letter of Intent (LoI) to Artistic Milliners (Pvt.) Limited [hereafter called the "Sponsor(s)"] for setting up a Photo Voltaic (PV) based solar generation facility/Solar Power Plant/Solar Farm of 50.00 MW_P in the province at Deh Looli, taluka Salehpat, district Sukkur. According to the terms and conditions of the said LoI, the Sponsor(s) were required to carry out a detailed feasibility study of the project at internationally acceptable standards.

(iii). In order to implement the project, the Sponsors got incorporated under the company law, a Special Purpose Vehicle (SPV) in the name of Artistic Solar Energy (Private) Limited (ASEPL). Further, the Sponsors engaged the services of different consultants and completed the feasibility study of the project. After the said, ASEPL decided to approach the Authority for the grant of generation licence.

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(B). Filing of Application

(i). ASEPL submitted an application on June 26, 2019 for the grant of generation licence in terms of Section-14B 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. In view of the said, the Registrar directed ASEPL for submitting the missing information/documentation and the same was received on July 15, 2019. Accordingly, the Registrar submitted the application for the consideration of the Authority to decide the admission of the same or otherwise. The Authority considered the matter and found the form and content of the application in substantial compliance with Regulation-3 of the Licensing Regulations.

(iii). In view of the above, the Authority admitted the application on August 27, 2019 for consideration of the grant of the generation licence as stipulated in Regulation-7 of the Licensing Regulations. The Authority also approved a notice of admission to be published in the press for inviting comments of general public, interested and affected persons in the matter as stipulated in Regulation-8 of the Licensing Regulations. Accordingly, the said notices were published in one (01) Urdu and one (01) English newspapers on August 30, 2019.

(iv). In addition to the above, the Authority also approved a list of stakeholders for seeking their comments for assistance of the Authority in the matter in terms of Regulation-9(2) of the Licensing Regulations. Accordingly, letters were sent to different stakeholders as per the approved list on September 02, 2019, soliciting their comments for assistance of the Authority.

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(C). Comments of Stakeholders

(i). In reply to the above, the Authority received comments from four (04) stakeholders. These included National Transmission & Despatch Company Limited (NTDC), Energy Wing, Ministry of Planning, Development & Reform (P&D), Ministry of Science & Technology (MoST) and Central Power Purchasing Agency (Guarantee) Limited (CPPAGL). The salient points of the comments offered by the said stakeholders are summarized below:-

(a). NTDCL submitted that Cabinet Committee on Energy (CCoE) had categorized the upcoming projects of RE projects in three (03) different categories. Under the said decision, the projects under category-I & II have specific procedures, for their implementation depending on their status of progress already achieved. Regarding, category-III CCoE decided that Alternative Energy Development Board (AEDB) to carry out Competitive Bidding (CB). In this regard, ASEPL falls in category-III and can be considered for CB. Further to the said, the procurement of all future projects of RE shall be subject to the quantum ascertained under Indicative Generation Capacity Expansion Plan (IGCEP) along with the confirmation of the availability of transmission infrastructure for evacuation as approved by the regulator. In addition to the above, under proposed policy for RE 2019, new targets will be set for enhancement of contribution of RE enhancement therefore, the generation licence to any RE project may be associated with such terms and conditions as mentioned above;

(b). P&D stated that the proposed plant will generate electric power for providing to CPPAGL using indigenous source of RE. In view of the said, P&D supported the grant of

generation licence to ASEPL subject to fulfillment of all codal formalities;

(c). MoST remarked that installation of 50.00 MW_P solar power project will help to prevent/overcome the electricity shortfall in the country up to some extent. In consideration of the location of the project, MoST recommended the deployment of Monocrystalline PV panels from Tier-I manufacturers instead of Polycrystalline. Further, MoST stated that make and model of PV panels/modules have not mentioned in the notice that appeared in the press however, it may be ensured that the panels are IEC and UL certified; and

(d). CPPAGL remarked that the proposed project of ASEPL is listed under category-III of the CCoE decision March 29, 2019. According to the said decision the projects under category-III are to be processed through a CB process to be carried out by AEDB based on the quantum ascertained through IGCEP along with the dispersal arrangement including the completion of pre requisites for the issuance of Power Acquisition Request (PAR). In view of the said, CPPAGL suggested that that process of approval of IGCEP already submitted may be initiated. CPPAGL stated that it has not issued any PAR to the project therefore, it may not be considered as a Power Purchaser.

(ii). The Authority reviewed the above mentioned comments of the stakeholders and considered it appropriate to seek the perspective of ASEPL on the observations of NTDC, MoST and CPPAGL. On the comments of NTDC and CPPAGL, it was submitted that about the short and long-term forecast for additional capacity requirements, reference may be report titled "circular debt

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issues and solutions" reports submitted in August 2018 to the Senate of Pakistan. The demand supply analysis conducted by the Ministry of Energy (MoE) referred in the said report, indicates a shortfall of electricity till the end of FY2020. Further, Para 3.2 of the above referred report also indicates that for meeting the shortfall MoE plans to add 1,200 MW (600 MW for FY2018-19 and 600 MW for FY 2019-20) of Solar Power capacity. Therefore, it can be considered that there is a requirement and substantial room available in the system for addition of a 50.00 MW solar power project.

(iii). About the observations of CPPAGL to hold competitive bidding, ASEPL submitted that it understands that the Authority vide its determination/decision issued vide letter No. NEPRA/SPVPGT-2017/2915, dated March 03, 2017, approved and directed the relevant agencies to carry out CB for award of tariff to new solar PV power projects in the country under NEPRA Competitive Bidding (Approval and Procedure) Regulations, 2014 and directed the relevant agencies to prepare bidding documents and call bidding for the new solar PV power projects. Due to non-finalization of RFP by any agency after the lapse of considerable time period, the process of CB could not take place till date. Furthermore, the Authority through its decisions dated May 30, 2017 passed in the Review Motion of Govt. of Sindh and in the matter of Motion for Leave for Review tiled against Decision of the Authority dated March 03, 2017 in the matter of Solar PV Power Generation Tariff dated September 20, 2017, clarified that submission of tariff petitions under the NEPRA (Tariff Standards and Procedure) Rules, 1998 is permissible. Therefore, the decision of CCoE in this regard does not have valid grounds in light of previous decisions/determinations of the Authority.

(iv). On the comments of MoST, it was confirmed that the required feasibility study of the project has been carried out to arrive at informed decision for the selection of technology of the project and after going through an extensive iterative process, it has been concluded to deploy Polycrystalline technology which will result in a very cost effective tariff for the project. It was confirmed that the company through its EPC Contractor plans to procure/install PV solar panels

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from any of the top manufacturing company in the world including JinkoSolar, JA Solar, Trina Solar, LONGi Solar or Canadian Solar, all of which are IEC-61215 Certified.

(v). The Authority considered the above submissions of ASEPL and considered it appropriate to proceed further in the matter as stipulated in the Licensing Regulations and the NEPRA Licensing (Generation) Rules 2000 (the "Generation Rules").

(D). Evaluation/Findings

(i). The Authority reviewed the submissions of ASEPL including the information provided in its application for the grant of generation licence, comments of the stakeholders and the rejoinder in the matter. The Authority has also considered the feasibility study of the project, report of GIS etc., provisions of the RE Policy and the relevant rules & regulations.

(ii). The Authority has observed that the Sponsor(s) of the project includes Artistic Milliners (Pvt.) Ltd which was established in 1949, and is one of the leading and the largest premium quality denim cloth and finished products business house in the country. The company is engaged in the manufacturing and trading of denim, garments and fabrics and has the distinct privilege of being one of the few mills that are completely export oriented. The financial strength of the sponsor may be gauged from the fact that it has a total assets of around Rs. 52.00 billion.

(iii). The Sponsor(s) has already set up an approximately 50.00 MW Wind Power Plant located in Jhimpir, Sindh which is in production since 2018. Further, Govt. of Pakistan has recently issued a Letter of Support (LoS) for setting another wind project of about 50.00 MW in the province of Sindh. Further, the Sponsor(s) has won rights to develop different hydel projects (i.e. a 63.00 MW hydro power project located at Panjkora River, Upper Dir and a 55 MW hydro project at Ushu River, Swat, in the province of Khyber Pakhtunkhwa). In view of

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the said, the Authority considers that the Sponsor(s) has strong financial position as well as relevant experience in the electric power sector to develop the project.

(iv). As explained above, based on the financial strength and other evaluation parameters, Govt. of Sindh (GoS) issued LoI to the Sponsor(s) for the development of the project. In this regard, GoS has allocated land to the tune of 250.00 acres located at Deh Looli, taluka Salehpat, district Sukkur in the Province of Sindh. As explained above, for the implementation of the project, the Sponsor(s) has incorporated the SPV in the name of ASEPL under Section-32 of the Companies Ordinance, 1984 (XLVII of 1984), having Corporate Universal Identification No. 0094806, dated August 18, 2015. The Registered/Business Office address of the company/SPV is Plot 4 & 8, Sector-25, Korangi Industrial Area, Karachi in the province of Sindh. According to the Memorandum of Association, the principal objects of the company, *inter alia*, includes the business of electric power generation, operation and management in the country as well as abroad.

(v). According to the submitted information, the total outlay of the project will be approximately U.S. $ 45.00 million which will be financed through a combination of debt (U.S. $ 36.00 million) and equity (U.S. $ 09.00 million) in a ratio of 80:20 which is in line with the benchmark set out in different determinations of the Authority in similar cases. The Authority has observed that in view of the strength of the Sponsor(s), a number of multilateral institutions as well local banks have expressed their interests to finance the project on standard terms and conditions. In consideration of the above, the Authority considers that the sponsors have strong financial and technical resources to carry out the project.

(vi). As explained above, the sponsors carried out a detailed feasibility study of the project as stipulated in the term and conditions of the LoI. The said study, included, *inter alia*, data collection, detail of equipment of the solar based generation facility/solar power plant, optimization of the selected layout of the details, power production estimates based on solar irradiation data of the project

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site, technical details pertaining to selected PV cells and other allied equipment to be used in the solar power plant, electrical studies, environmental study, geo technical investigation including soil testing, unit rate analysis, costing, economic & financial analysis and project financing, etc.

(vii). The Authority has reviewed the feasibility study of the project and same reveals that the company has considered various world class manufacturers of PV cells including Hanwha Q Cells Co. Limited, JA Solar Holdings Co., Limited, Trina Solar Limited, First Solar, Inc., Jinko Solar Limited, Motech Industries Inc., Tongwei Solar Company Limited, Yingli Solar Limited, Canadian Solar Inc. and Shunfeng International Clean Energy Limited. After duly considering various factors including (a). Solar resource position of the proposed location; (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 of spare/replacement parts for PV Cells etc.), the company decided to select JA Solar.

(viii). The feasibility study also optimized the size of the proposed generation facility/Solar Power Plant/Solar Farm to ≈ 50.00 MW, having 147059 x 340 W_P Poly Crystalline PV Modules of JA Solar (JAP72S10-340 or any equivalent). It is relevant to mention that JA Solar was founded in 2005 and is a manufacturer of high-performance PV products. It has twelve (12) manufacturing bases and more than twenty (20) branches around the world, the business of the company covers silicon wafers, cells, modules and photovoltaic power stations. JA Solar products are available in over 120 countries and regions and are used extensively in ground-mounted power plants, commercial & industrial rooftop PV systems and residential rooftop PV systems. With its advantages of continuous technological innovation, sound financial performance, and well-established global sales and service networks, JA Solar has been well received and highly recognized by clients from home and abroad. The company has been listed on Fortune China 500 and Global Top 500 New Energy Enterprises for several consecutive years. It has annual sale revenue of ¥19.60 billion in the year 2018.

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The company has shipped more than 35 GW of PV panels across the globe and has more than 33000 clients worldwide. Accordingly, it can be safely said that the selected technology for PV cells is mature, cost effective and time tested. Accordingly, it can be safely said that the selected technology for PV cells is mature, cost effective and time tested. In view of the above, the Authority considers that the sponsors of the project have selected top of the line Tier-I company for supply of the PV panels. Further to said, the technology selected for PV cells for the project is polycrystalline which is a mature technology and is widely used due to its better energy yield to cost ratio. Accordingly, the Authority is of the considered opinion that the selected technology for PV cells is mature, cost effective and time tested. In view of the said, it is considered that the selected technology has distinctive features including versatility, flexibility and good performance.

(ix). The Authority has observed that the sponsors of the project carried out the required GIS to determine the arrangement for dispersal of electric power from the proposed generation facility/Solar Power Plant/Solar Farm. According to the said study, the interconnection arrangement for dispersal of electric power will be on 132kV voltage and will be consisting of a Double Circuit (D/C) transmission line (on ACSR Lynx conductor measuring around 08.00 km) for connecting the generation facility/Solar Power Plant/Solar Farm to 132 kV Nara C-1 Grid Station of Sukkur Electric Supply Company Limited (SEPCO). In this regard, SEPCO has already approved the above mentioned GIS, confirming that all the relevant parameters are within permissible limits of the Grid Code.

(x). The Authority observes that the proposed project, for which generation licence is being sought, is based on RE source and does not cause the types and level of pollution as in the case of conventional power plants. However, the proposed generation facility/Solar Power Plant/Solar Farm may cause soil pollution, water pollution and noise pollution during construction and operation. In this regard, the Authority has observed that ASEPL carried out the Initial Environment Examination (IEE) study for the project and submitted the same for the consideration and approval of Environmental Protection Agency,

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Government of Sindh (EPAGoS). In this regard, EPAGoS has already issued a No Objection Certificate (NOC) to the company for the construction of the project.

(xi). 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 the particular case under consideration, the Authority considers that conditions of Rule-3(2) and Rule-3(3) stand satisfied as ASEPL 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 facility/Solar Power Plant/Solar Farm. The provision of Rule-3(4) of the Generation Rules regarding holding a public hearing is not applicable as there was no issue which required this exercise.

(xii). The 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, the 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 cost 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

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various sites in the context of both the short-term and the long-term requirements of the electric power industry as a whole.

(xiii). The Authority considers that the proposed project will result in optimum utilization of the untapped RE resources of the province of Sindh, resulting in pollution free electric power. It is pertinent to mention that solar is an indigenous RE resource and such resources should have a preference for the energy security. There is a global trend of reduction in the prices of PV Cells which results in lower tariffs as is evident from various determinations of the Authority. These lower tariffs will result in reduction of the overall basket price which will be beneficial to the public at large.

(xiv). As explained in the preceding paragraphs, the sponsor of the project carried out the GIS which concludes that the project will not face any constraints in transmission system. Further, being located at reasonable distance from the thin population of the area, the project will not result in cost and right-of-way issues for the provision of transmission and interconnection facilities. In view of the said, the Authority considers that the project of ASEPL fulfills the eligibility criteria for grant of generation licence as stipulated in the NEPRA Act, rules, regulations and other applicable documents.

(E). Grant of Generation Licence

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

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

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reserves of the country but is also an environmental concern. Therefore, in order to achieve sustainable development, it is imperative that indigenous RE resources are given priority for electric power generation and their development is encouraged. Recently, the world market for RE technologies have seen a sharp declining trend in terms of prices, making these technologies very attractive and cost effective for generation of electric power. Further, there are developments in the sector which are paving the way to address the intermittency issues of these technologies. In view of the said, the Authority is of the considered opinion that there is a worldwide trend to increase the share of RE in the energy mix of any country and it is very likely that the Govt. of Pakistan will also be considering to increase the share of RE substantially in the coming years.

(iii). The current case under consideration of the Authority is that ASEPL which plans setting up a PV based solar generation facility/Solar Power Plant/Solar Farm Deh Looli, taluka Salehpat, district Sukkur in the province of Sindh of an approximate total installed capacity of 50.00 MW_P. As explained in the preceding paragraphs the proposed project not only fulfils the eligibility criteria for grant of generation licence as envisaged in the existing regulatory regime but also majority of the stakeholders are in support of the project except NTDC and CPPAGL which have raised certain concerns which the Authority considers appropriate to address through this determination.

(iv). As explained in the preceding paragraphs, NTDC and CPPAGL had submitted that CCoE under its decision dated March 29, 2019 has placed the project of ASEPL under category-III for which CB is to be carried against the quantum determined under IGCEP with confirmation of the availability of transmission infrastructure. Further, under proposed RE Policy 2019, new targets are being set will be set for enhancement of contribution of RE enhancement therefore, the generation licence to any project may be associated with such terms and conditions. In addition to the said, CPPAGL submitted that the process of approval of IGCEP already submitted may be initiated. Also, CPPAGL clarified that it has not issued any PAR to the project therefore, it may not be considered as a Power Purchaser.

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(v). In consideration of the above, the Authority hereby clarifies it performs its functions under the provisions of the NEPRA Act, rules and regulations framed thereunder. It is pertinent to mention that under the NEPRA Act, the Authority is only bound by the directions/decisions of the Counsel of Common Interest (CCI) and not any other forum. The Authority considers induction through CB as one of the most effective tool but despite the strict directions given in this regard, no tangible work has been carried out by the relevant agencies in preparation of the RFP and other related documentation including the security package. Due to the said, it is not clear when the ground work will be complete and when will the relevant agencies be able to carry out the CB.

(vi). Further to the above, the Authority has been directing NTDC for finalization and submission of IGCEP so that the future procurement can be made in a more scientific way however, the said plan is still under preparation and has not been submitted for approval of the regulator. It is pertinent to mention that in the year 2018 NTDC submitted IGCEP but the same was not found upto the mark and the Authority after reviewing the same returned it back to NTDC for incorporation of a list of observations made which is still awaited. In the absence of the IGCEP, the Authority cannot stop performing its regulatory functions and considers it appropriate to process and grant generation licence and tariff to a company which has fulfilled the required requirements of the NEPRA Act, rules and regulations framed thereunder.

(vii). In consideration of the above, one of the observation of CPPAGL was that it has not issued PAR to the project therefore, it may not be considered as a Power Purchaser. In this regard, the Authority hereby clarifies for the grant of the generation licence there is no such requirement envisaged in the NEPRA Act, relevant rules and regulation framed thereunder, to have a PAR before the issuance of the generation licence. Regarding the observation of CPPAGL that in the absence of PAR it should not be considered Power Purchaser, the Authority hereby clarifies that under the current status of the market in the country, whether

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explicitly stated or otherwise, all the procurement is made by CPPAGL on behalf of XW-DISCO(s) which act as Power Purchaser therefore, the observation of CPPAGL is not acceptable.

(viii). In view of the above, the Authority considers that the proposed project of ASEPL will help in diversifying the energy portfolio as well as increasing the share of RE in the energy mix 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 carbon emissions by generating clean electricity, thus improving the environment.

(ix). As explained in the preceding paragraphs, ASEPL 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 Sponsors/ASEPL has acquired private land to the tune of 250.00 acres for setting up the generation facility/Solar Power Plant/Solar Farm. The said details are being incorporated in the generation licence. The Authority directs ASEPL to utilize the allocated land exclusively for the proposed generation facility/Solar Power Plant/Solar Farm and not to carry out any other activity on the said allocated land except with the prior approval of the competent authority.

(x). 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 ASEPL, its generation facility/Solar Power Plant/Solar Farm will achieve COD by June 30, 2021 and will have a useful life of more than twenty five (25) years from its COD. In this regard, ASEPL 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 ASEPL 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

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Authority fixes the term of the generation licence as twenty five (25) years from COD of the project.

(xi). 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 considers appropriate to direct ASEPL to charge the power purchaser only such tariff which has been determined, approved or specified by it. Accordingly, the Authority decides to include a specific article in the generation licence. Further, the Authority directs ASEPL to adhere to the said in letter and spirit without any exception.

(xii). About the compliance with the environmental standards, as discussed in the preceding paragraphs, ASEPL has provided the NOC from EPAGoS and has confirmed that the project will comply with the required standards during the term of the generation licence. In view of the importance of the issue, the Authority has decided to include a specific article in the generation licence along with other terms and conditions making it obligatory for ASEPL to comply with relevant environmental standards at all times. Further, the Authority directs ASEPL to submit a report on 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.

(xiii). The proposed generation facility/Solar Power Plant/Solar Farm of ASEPL 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. ASEPL has informed that the project will achieve COD by June 30, 2021, which is beyond the deadline of the Kyoto Protocol. However, it is very likely that either the existing Kyoto Protocol is extended or some alternate Protocol will be in place in this regard. In view of the said, an article for carbon credits and its sharing with the power purchaser has been included in the generation licence. Accordingly, the Authority directs ASEPL to initiate the

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process in this regard at the earliest so that proceeds for the carbon credits are materialized. ASEPL shall be required to share the proceeds of the carbon credits with the power purchaser as stipulated in the generation licence.

(xiv). In view of the above, the Authority hereby approves the grant of generation licence to ASEPL 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:

Engr. Rafique Ahmed Shaikh
(Member)

14/4/20

Engr. Rehmatullah Baloch
(Member)

Did Not Attend

Saif Ullah Chattha
(Member)

15.4.2020

Engr. Bahadur Shah
(Member/Vice Chairman)

Engr. Tauseef H. Farooqi
(Chairman)

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
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21.04.20

National Electric Power Regulatory Authority (NEPRA)
Islamabad – Pakistan

GENERATION LICENCE

No. SPGL/37/2020

In exercise of the powers conferred upon the National Electric Power Regulatory Authority (NEPRA) under Section 14B of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997/Amendment Act, 2018, the Authority hereby grants a Generation Licence to:

ARTISTIC SOLAR ENERGY (PRIVATE) LIMITED

Incorporated Under Section-32
of the Companies Ordinance 1984 (XLVII of 1984) Having Corporate
Universal Identification No. 0094806, dated August 18, 2015

**for its Generation Facility/Solar Farm/
Solar Power Plant Located at Deh Looli, Taluka Salehpat, District Sukkur in the Province of Sindh**

(Total Installed Capacity: ≈ 50.00 MW_P Gross)

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

Given under my hand this on 21st day of April Two Thousand & Twenty and expires on 29th day of June Two Thousand & Forty-Six.

21/04/20

Registrar

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
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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, the Commercial 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;

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(g). "Carbon Credits" mean the amount of Carbon Dioxide (CO_2) and other greenhouse gases not produced as a result of generation of electric energy by the generation facility/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 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;

(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 may be revised from time to time with necessary approval of the Authority;

(m). "EDGoS" means department of energy or any other entity created for the like purpose established by the GoS to facilitate, promote and encourage development of private sector participation for development of projects for electric power in the province of Sindh;

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(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). "GoS" means the Government of the province of Sindh acting through its Department of Energy 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). "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;

(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;

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(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 Artistic Solar Energy (Private) 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). "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 or replaced 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;

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(cc). "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;

(dd). "SEPCO" means Sukkur Electric Power Company Limited or its successors or permitted assigns;

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

(ff). "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.

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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 subject to 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) 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

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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.

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.

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10.2 The Licensee shall provide a certificate on a bi-annual basis, confirming that the operation of its generation facility/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.

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.

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Article-14
Emissions Trading /Carbon Credits

The Licensee shall process and obtain expeditiously the Carbon Credits admissible to the generation facility/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.

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.

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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.

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SCHEDULE-I

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

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

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

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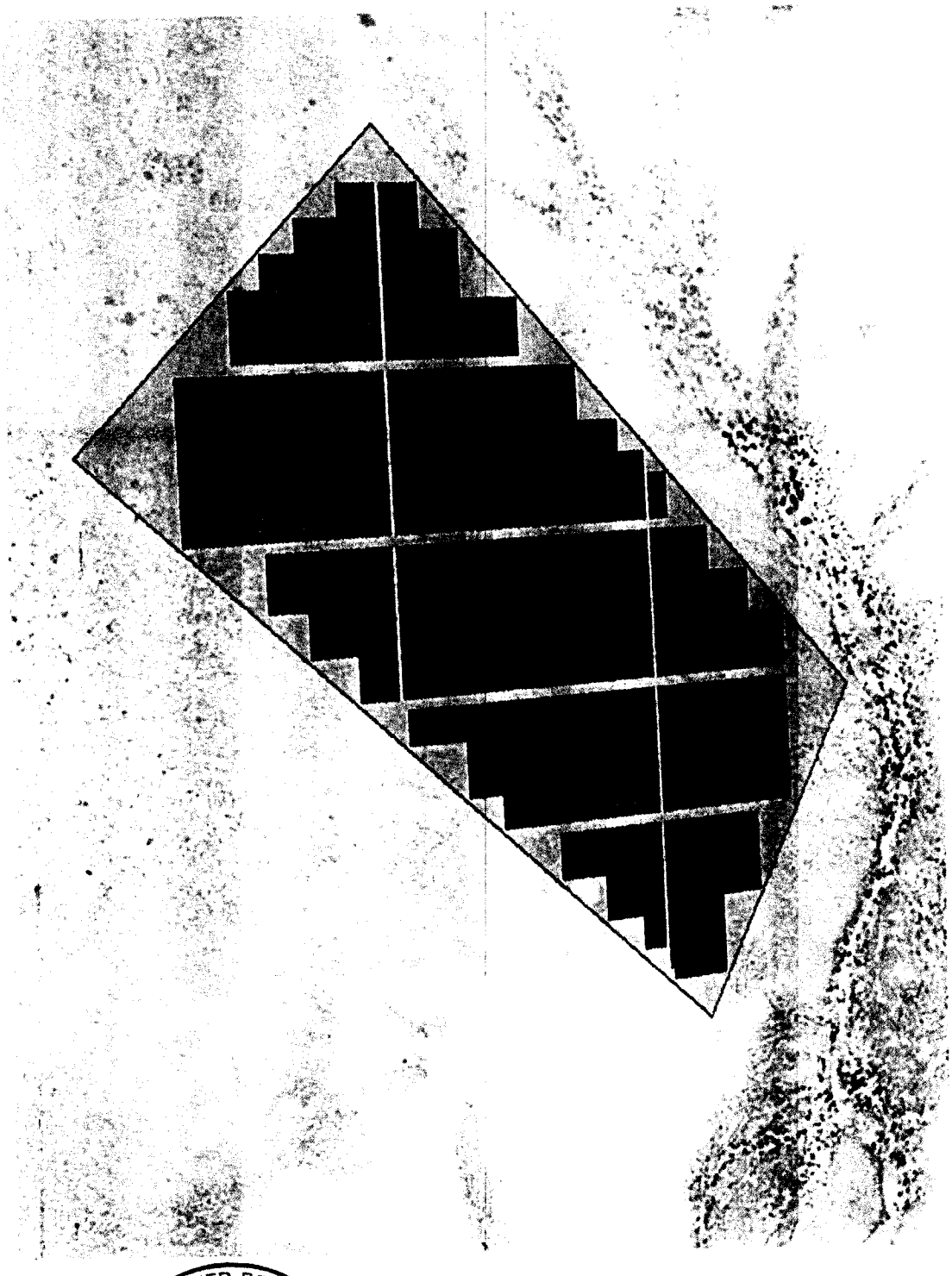
Layout of the Generation Facility/Solar Power Plant/Solar Farm of the Licensee



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

Sr. No.	Latitude (°N)	Longitude (°E)
(1).	27.391769	68.963281
(2).	27.381827	68.952427
(3).	27.386644	68.946786
(4).	27.394571	68.957380

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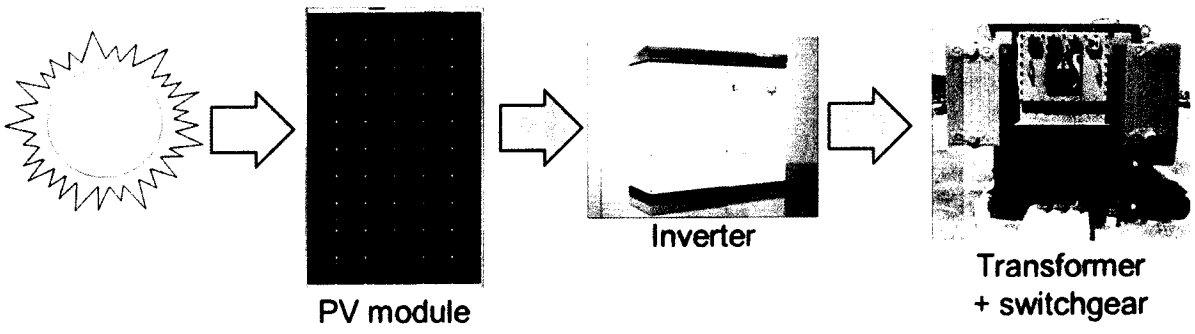
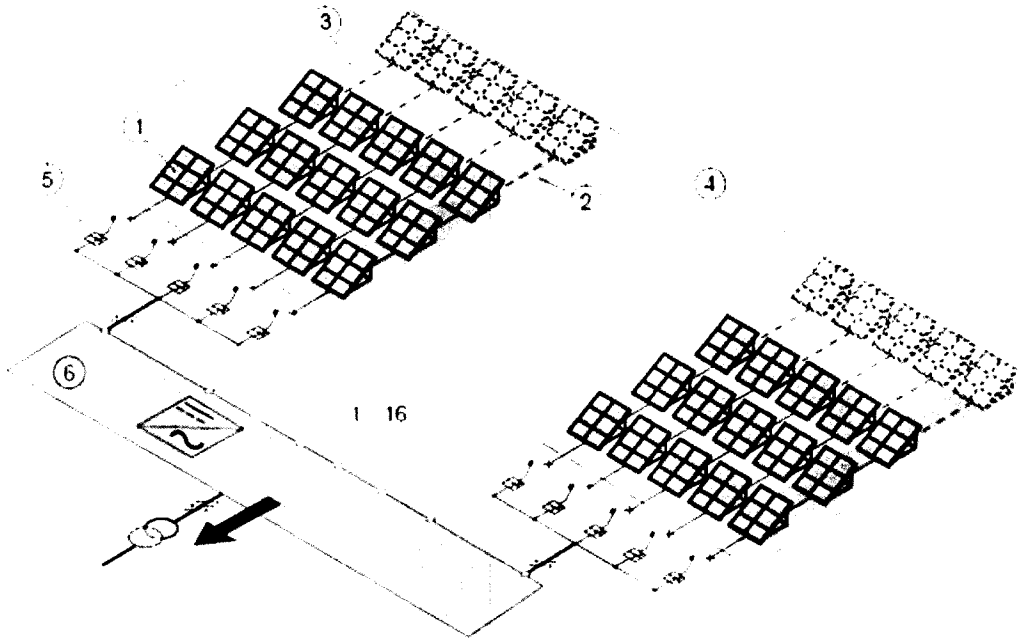
Process Flow Diagram of the Generation Facility/Solar Power Plant/Solar Farm of the Licensee





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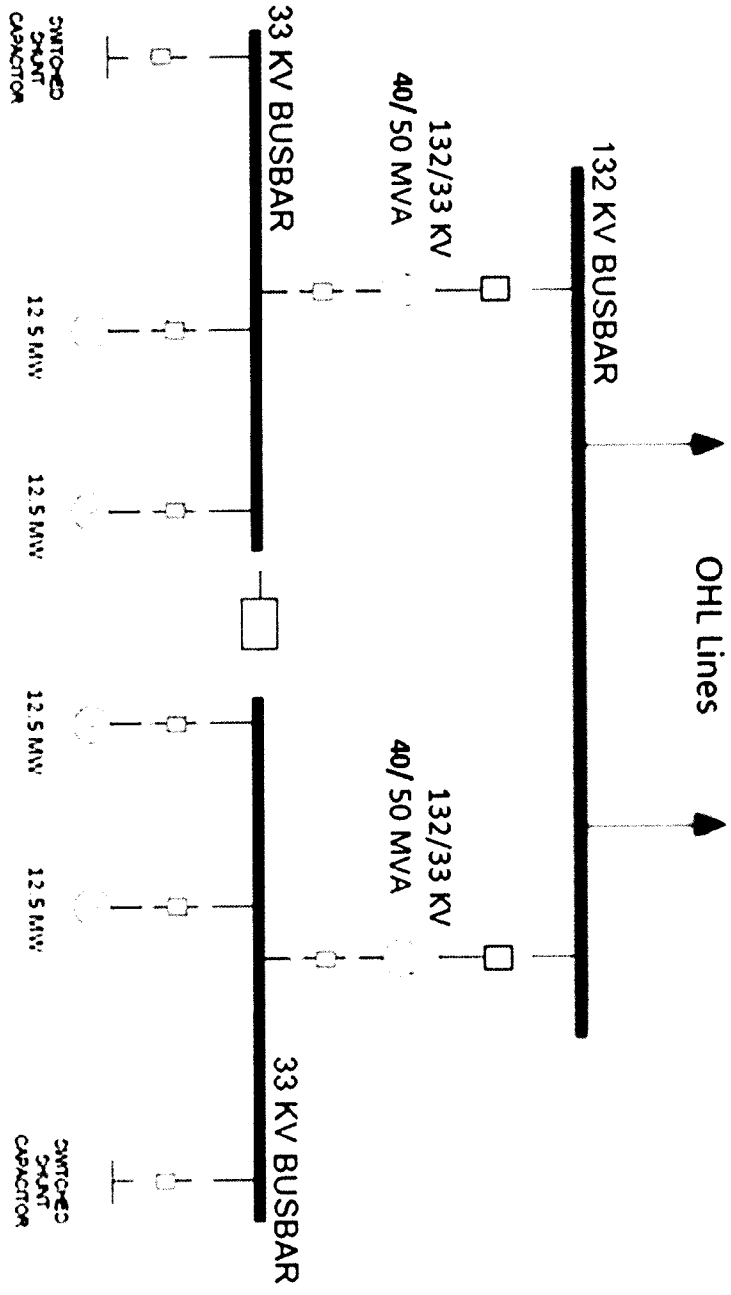
Single Line Diagram
of the Generation Facility/Solar Power Plant/Solar Farm
of the Licensee



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Interconnection Arrangement for Dispersal of Electric Energy/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/Artistic Solar Energy (Private) Limited/ASEPL shall be dispersed to the load centre of SEPCO.

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

(a). A 132 kV D/C transmission line (measuring approx. 8.00 km long on ACSR LYNX Conductor) connecting the proposed generation facility/Solar Power Plant/Solar Farm with 132 kV Nara C-I Grid Station of SEPCO;

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

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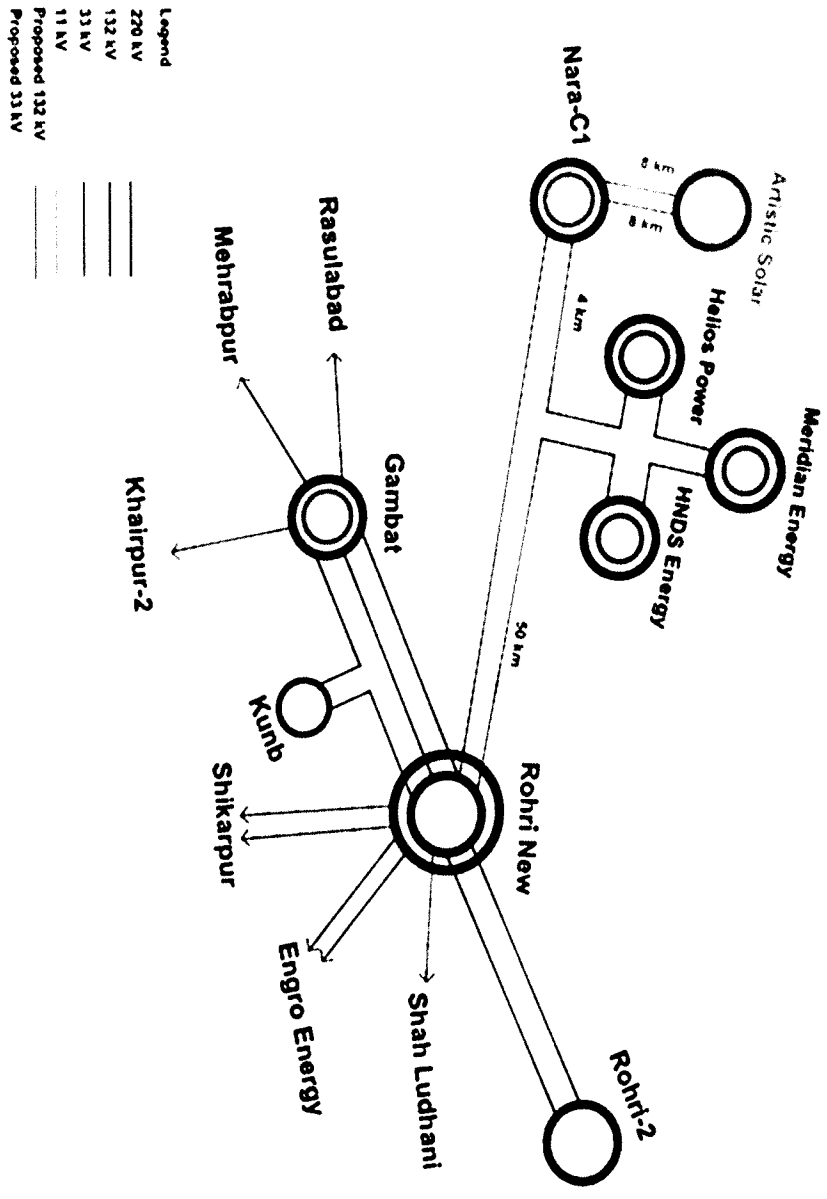
Schematic Diagram of the Interconnection Arrangement/Transmission Facility for Dispersal of Power from the Generation Facility/Solar Power Plant /Solar Farm



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Detail of Generation Facility/Solar Power Plant/ Solar Farm

(A). General Information

(i).	Name of the Company/ Licensee	Artistic Solar Energy (Private) Limited
(ii).	Registered/Business Office of the Company	Plot 4 & 8, Sector-25, Korangi Industrial Area, Karachi in the province of Sindh
(iii).	Location of the Generation Facility/Solar Power Plant/Solar Farm	Deh Looli, Taluka Salepat, District Sukkur in the Province of Sindh
(iv).	Type of Generation Facility Solar Power Plant/Solar Farm	Solar Photovoltaic (PV)

(B). Solar Power Generation Technology & Capacity

(i).	Type of Technology	Poly Crystalline PV Cell
(ii).	System Type	Grid Connected
(iii).	Installed Capacity of Solar (MW)	≈ 50.00 MW_P

(C). Technical Details of Equipment

(a).	**Solar Panels – PV Modules**	
(i).	Model of Modules	JA Solar- JAP72S10-340 or any equivalent
(ii).	Type of Cell	Polycrystalline
(iii).	Dimensions of each module	2015x996x40 mm
(iv).	No. of Modules	147059
(v).	Module Area	2.007 m2
(vi).	Panel's Frame	Aluminium Alloy
(vii).	Weight of one module	22.7 kg

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(viii).	No. of cells in each module	144
(ix).	Efficiency of Module	16.9 %
(x).	Maximum Power of each module (Pmax)	340 W
(xi).	Voltage @ (Pmax)	38.08 V
(xii).	Current @ (Pmax)	8.93 A
(xiii).	Open circuit voltage (Voc)	45.89 V
(xiv).	Short circuit current (Isc)	9.43 A
(xv).	Mounting Structure Type	Single Axis Tracking
(b).	**PV Array**	
(i).	No. of Strings	5071
(ii).	Modules in a string	29
(c).	**Inverters**	
(i).	Capacity of each unit	2550 kWac
(ii).	Manufacturer	TMIEC or any equivalent
(iii).	Input operating voltage range	915-1300 V
(iv).	No. of inverters	17
(v).	Total Power	43350 kWac
(vi).	Efficiency of Inverter	99.04%
(vii).	Max. Allowable input voltage	1500 V
(viii).	Max. Current	2337 A
(ix).	Max. Power Point Tracking range	2337 A
(x).	Output Electrical system	3 phase 3 wire
(xi).	Rated Output Voltage	630 V
(xii).	Power Factor	0.85 lead - 0.85 lag
(xiii).	Power Control	Mpp tracker

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(xiv).	Rated Frequency	50/60 Hz	
(xv).	Environmental	Relative Humidity	5% to 95 %
		Operating Elevation	Up to 1000m above sea level. 2000m as an option
		Operating Temperature	-20°C to +50°C
(xvi).	Grid Operating Protection	A	DC circuit breaker
		B	AC circuit breaker
		C	DC overload protection
		D	Lighting protection
		E	Grid monitoring
		F	Insulation monitoring
		G	Anti-Islanding
(d).	**Junction Boxes Installed and fixed on main steel structure in Array yard**		
(i).	No. of J/Box Units	317	
(ii).	Input circuits in each box	16	
(iii).	Max input current for each circuit	250 A	
(iv).	Protection level	IP 65	
(v).	Over current protection	Fuse	
(vi).	Surge protection	Yes	

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(e).	**Data collecting system**	
(i).	System Data	Continuous online logging with data logging software to portal.
(f).	**Power Transformer**	
(i).	Rating	2*40/50 MVA
(ii).	Type of Transformer	ONAF
(iii).	Purpose of Transformer	Step-up (33kV to 132kV)
(iv).	Output Voltage	132kV
(g).	**Unit Transformer**	
(i).	Rating	5100/2550kVA
(ii).	Type of Transformer	33KV Box-type transformer
(iii).	Purpose of Transformer	Step-up (630V to 33kV)
(iv).	Output Voltage	33kV

(D). Other Details

(i).	COD of the Generation Facility/Solar Power Plant/Solar Farm (Anticipated)	June 30, 2021
(ii).	Expected Useful Life of the Generation Facility/ Solar Power Plant/Solar Farm from the COD	25 Years

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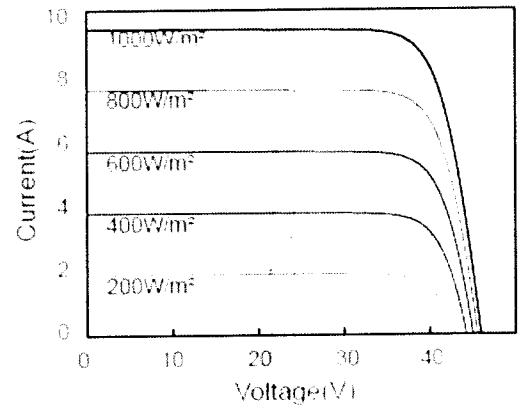
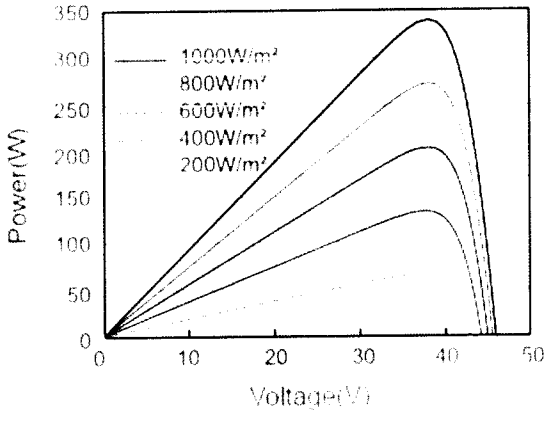
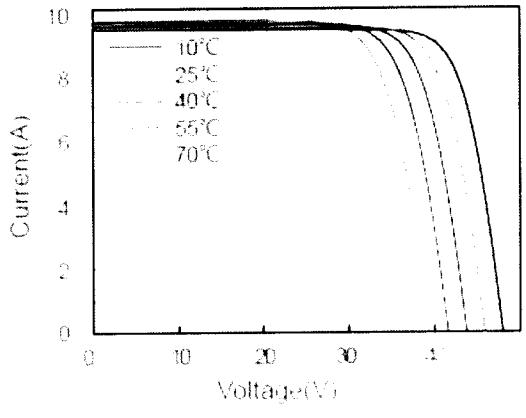
V-I Curve of PV Solar Cell of the Generation Facility/Solar Power Plant/ Solar Farm







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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/Power Plant/Solar Farm of Licensee is given in this Schedule.

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SCHEDULE-II

(1).	Total PV Installed Capacity of Generation Facility	50.00 MW_P
(2).	Average Sun Hour Availability/Day (Irradiation on Inclined Surface)	8.00-8.50 Hours
(3).	Days per Year	365
(4).	PV Plant Generating Capacity Annually (As Per Simulation)	93,199 MWh
(5).	Expected Total Generation in 25 years Life Span	2,129,242.00 MWh
(6).	Generation per Year from plant keeping 24 Hours Working	50 x 24 x 365 = 438,000MWh
(7).	Net Capacity Factor (4/6)	21.30%

Note

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

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