National Electric Power Regulatory Authority
Islamic Republic of Pakistan

Registrar

NEPRA Tower, Attaturk Avenue (East), G-5/1, Islamabad
Ph: +92-51-9206500, Fax: +92-51-2600026
Web: www.nepra.org.pk, E-mail: registrar@nepra.org.pk

No. NEPRA/R/DL/LAG-339/ 16524-30

December 09, 2016

Mr. Syed Saad Zafar Ullah Shah
Chief Executive Officer
Ourson Pakistan Limited,
10 Ali Block, New Garden Town,
Lahore.
Tel # +92 42 35911050-1

Subject: **Grant of Generation Licence No. SPGL/17/2016**
Licence Application No. LAG-339
Ourson Pakistan Limited (OSPL)

Reference: *Your application vide letter No. OSPL-2016/02/SS-011, dated February 19, 2016 (received on February 22, 2016).*

Enclosed please find herewith Determination of the Authority in the matter of Application of "Ourson Pakistan Limited (OSPL)" for the "Grant of Generation Licence" along with Generation Licence No. SPGL/17/2016 annexed to this determination granted by the National Electric Power Regulatory Authority (NEPRA) to "Ourson Pakistan Limited (OSPL)" for its 50.00 MW Solar Generation Facility located located on Sindh Coastal Highway Near Gharo, District Thatta in the Province of Sindh, pursuant to Section 15 of the Regulation of Generation, Transmission and Distribution of Electric Power Act (XL of 1997).

2. Please quote above mentioned Generation Licence No. for future correspondence.

Enclosure: Generation Licence
(SPGL/17/2016)

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09.12.16

(Syed Safeer Hussain)

Copy to:

1. Secretary Ministry of Water & Power, 'A' Block, Pak Secretariat, Islamabad
2. Chief Executive Officer, NTDC, 414-WAPDA House, Lahore.
3. Chief Executive Officer, CPPA-G, 6th Floor, Shaheed-e-Millat Sectariat, Jinnah Avenue, Blue Area, Islamabad.
4. Chief Executive Office, Alternative Energy Development Board, 2nd Floor, OPF Building, G-5/2, Islamabad
5. Chief Executive Officer, K-Electric, KE House, Sunset Boulevard, DHA Phase-II, Karachi.
6. Director General, Environment Protection Agency, 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 Oursun Pakistan Limited for the Grant of Generation Licence

December 01, 2016
Case No. LAG-339

(A). Background

(i). The power sector of the country is experiencing a supply-demand gap. In order to bridge the said deficit, all efforts are being made to set up generation facilities using cheaper resources. The efforts include projects by the federal as well as provincial governments.

(ii). Government of Pakistan has set up Alternative Energy Development Board (AEDB) for development of Renewable Energy (RE) resources in the country. AEDB has issued Letter of Intent (LoI) to various RE developers for setting up projects in the country.

(iii). Further, the provinces are also empowered to set up generation facilities of any size, location and fuel of their choice. In line with the above efforts, the K-Electric Limited (K-Electric) issued an LoI to Oursun Pakistan Limited (OSPL) for setting up 50.00 MW ±10% Solar Photo Voltaic (PV) based generation facility/solar farm at Gharo, District Thatta in the Province of Sindh. According to the terms and conditions of the LoI, the sponsors carried out feasibility study for the project. Further, OSPL decided to approach the Authority for the grant of generation licence and upfront tariff.

(B). Filing of Generation Licence Application

(i). In accordance with Section-15 of Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (hereafter referred to as the NEPRA Act), OSPL filed an application on July 22, 2015 requesting for the grant of generation licence. However, the Authority returned the application of OSPL on February 04, 2016 as K-Electric had not conducted the grid study to determine the share of renewable energy to be absorbed in its system.

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(ii). OSPL re-submitted the application on February 22, 2016 requesting for the grant of generation licence. Further, K-Electric through Siemens carried out preliminary assessment report to determine the share of renewable energy to be absorbed in its system and submitted the same to the Authority.

(iii). In view of above, the Authority admitted the application of OSPL for consideration of the generation licence under Regulation-7 of the NEPRA Licensing (Application and Modification Procedure) Regulations, 1999 (hereafter referred to as the Licensing Regulations), on May 31, 2016 and approved the advertisement containing (a). the prospectus; (b). a notice to the general public about the admission of the application of OSPL, to invite the general public for submitting their comments in the matter as stipulated in Regulation-8 of the Licensing Regulations. Further, under Regulation-9(2) of the Licensing Regulations, the Authority also approved the list of the relevant stakeholders to inform about the admission of the application of OSPL and seeking their comments to assist the Authority in the matter.

(iv). Accordingly, the advertisement was published in the national newspaper on June 04, 2016. Further, separate letters dated June 06, 2016 were also sent to government ministries, their attached departments and representative organizations etc. The said stakeholders were requested to submit their views/comments for the assistance of the Authority.

(C). Comments of Stakeholders

(i). In reply to notice of admission, the Authority received comments from five (05) stakeholders. These included Board of Investment, Pakistan Council of Renewable Energy Technologies, Energy Department Government of Sindh, Whistleblower Pakistan and Ministry of Water & Power.

(ii). The salient points of the comments offered by the above mentioned stakeholders are summarized in the following paragraphs:

(a). Board of Investment in its comments submitted that energy sector is the priority sector of the government to cater the short fall in the country. Smooth and affordable supply of energy is the backbone for industrial growth as well as attracting foreign direct investment in the country. In view thereof, Board of Investment

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supports the grant of generation licence, subject to consumer friendly and competitive tariff and fulfilling codal/technical formalities and rules & regulations. However, Board of investment has no specific comments on determination of tariff of the applicant;

(b). Pakistan Council of Renewable Energy Technologies commented that contents of the application have been examined and it has no objection on the grant of generation licence. However, Pakistan Council of Renewable Energy Technologies cannot comment on the financial or other TOR's of the project;

(c). Energy Department, Govt. of Sindh submitted that it is actively supporting the project sponsors for early development of environmental friendly and fuel free power projects in line with RE policy, keeping in view the current energy crisis in the country;

(d). Whistleblower Pakistan in its comments submitted that that financial and economic viability of the induction of RE power plants in K-Electric's power system needs to be analyzed in detail. Since the control period of tariff is generally for 20 to 25 years from commercial operation date, the timing of induction of these RE Power plants, the tariff numbers as well as 'terms and conditions' on which these RE power plants are being inducted are very important. While making any decision with regard to the induction of RE power plants some important facts need to be kept in mind including:

(i). The generation capacity of existing power plants in the power system of K-Electric is surplus; the existing generation capacity is not being utilized to full available capacity;

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(ii). Consumers of electricity in K-Electric are paying for idle generation capacity due to 'take or pay' contracts between the power producers and the power purchaser;

(iii). The real problem of the K-Electric power sector is affordability not the generation capacity;

(iv). BQPS-I power plants are dual fuel (oil and gas) power plants and the prices of RFO in the international market are very low;

(v). It is being announced that after signing of RLNG contract between Pakistan and Qatar, there is no issue of availability of gas for power plants;

(vi). Solar and wind power plants are non-base-load plants having very low plant factor power, the generation capacities of which vary on hourly basis;

(vii). Seasonal availability of solar and wind power plants does not permit their use as base load plants; therefore, in order to meet the load demand, parallel investment is needed to develop base-load power plants in addition to these wind and solar plants;

(viii). Solar and wind power plant technologies are in the phase(s) of rapid development therefore the project cost, in terms of per MW, of these power plants is coming down sharply on yearly basis;

(ix). Despite the fact that the fuel cost component in solar and wind power plants is zero, even then the first 10 years' tariffs of non-base load, low plant factor solar and wind power plants are quite high as compared to existing and up-coming base load thermal power plants;

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(x). Levelized tariffs of solar and wind power plants are also higher than the average generation basket price of CPPA-G;

(xi). Due to maturity in technology, the cost of solar and wind power plants, in terms of per unit cost, is decreasing sharply in the international market; this cost is in the range of 4 to 6 cent/kWh in India, China and the USA;

(xii). The life of solar power plants as taken in the up-front tariff is 20 years while these plants are being commissioned on Built-Own-Operate (BOO) basis;

(xiii). The validity of this up-front tariff is going to expire on 30th June 2016 while the next up-front tariff is expected to be lower than the existing one, which can easily be judged from the up-front tariff determined by NEPRA in the last two years;

(xiv). Why RE power plants are not being inducted through competitive bidding in Pakistan?

(xv). If cheaper, reliable, base-load power plants, with an availability factor of 85%-95% are available in the market, then why are consumers of electricity in Pakistan being forced to buy electricity from costlier solar and wind power plants?

(xvi). Despite unfavorable conditions, if NEPRA or any provincial or federal government or any utility wants to promote these costlier power plants, for any reason whatsoever, the concerned Government or the utility should give a subsidy to these power plants directly from their own budgets but the cost of someone's vested interest/greed should not be passed on to the electricity consumers. NEPRA is including these costlier power plants, non-base load power plants in the name of energy security without mentioning affordability whereas it is a proven fact that affordability is the biggest security. Whistleblower Pakistan has

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contested that if NEPRA wants to promote clean energy, why it has allowed power plants (Saba, Lalpir, Pakgen, K-Energy) to convert from the cleaner fuel (oil) to coal and that too by using sub-critical technology. Whistleblower Pakistan wants to know the financial impact of the induction of Agrreko power plant in K-Electric system;

(xvii). The RE power plants are 'must run plants' and will generate and supply power to the consumers even if it does not come in the economic merit order. Has NEPRA ever calculated the financial impact of using the costlier RE power plant over the cheaper base load plant which too have executed a 'Take or Pay' agreement with the power purchaser? Whistleblower Pakistan agree with policy statement of NEPRA regarding exploring potential of RE in the country however, RE based power only be inducted after ensuring its' economic viability in the power sector of Pakistan; and

(e). Ministry of Water & Power submitted that NEPRA may ensure that panels selected for the plants would deliver optimum operating efficiency over its useful life. However the efficiency of polycrystalline based solar panels is typically 13-18% compared to mono-crystalline having 15-20% efficiency due to which they require larger space and surface area. Furthermore, polycrystalline panels have lower heat tolerance than mono-crystalline in high temperature which may have shorten their life span and efficiency. NEPRA may obtain comments from K-Electric on relevant aspects for effective dispersal of power and tariff acceptability. NEPRA may process the application as per provisions of NEPRA Act and GoP policy guidelines.

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(iii). The above comments of the stakeholders have been examined. Comments of Board of Investment, Pakistan Council of Renewable Energy Technologies and Energy Department, Govt. of Sindh were found in favor of the grant of generation licence to the OSPL. Whereas, Whistleblower Pakistan and

Ministry of Water & Power in their comments have raised certain observations. Accordingly, it was considered appropriate seeking perspective of the applicant on the comments/observations of Whistleblower Pakistan and Ministry of Water & Power.

(iv). In response to the comments/observations of Whistleblower Pakistan, OSPL submitted that comments of Whistleblower are time barred and should not be entertained. However, OSPL submitted detailed response to the queries of Whistleblower Pakistan.

(v). Regarding observations of Whistleblower on the induction of RE projects on higher tariff and long term power purchase agreements, OSPL submitted that governments are obligated to abide by international commitments. Therefore, reduction of carbon emissions is a must, may it be through use of solar energy, wind energy or hydel energy. The 50MWp power coming from OSPL generating facility is less than 2% of K-Electric's overall supplies, so this should not have a material effect on overall tariff. The NEPRA inducting small portion of RE and is continually revising the rates at which such power is inducted. Ten years from now, solar power from these plants is going to be cheaper than any other sources at that time.

(vi). Regarding observations of Whistleblower on the induction of RE projects for energy security, OSPL has submitted that sun remains shining uninterruptedly, other than cloudy/rainy days. Hence, energy security is ensured by undisrupted supply of electricity even in strikes/riot etc. Further, no economic embargo/blockade can be imposed on the sun.

(vii). On the observations regarding coal conversion of RFO based plants, OSPL submitted that every system has to have mix of various kinds of capacities in its basket. These provide flexibility to reap fruits of prices differentials. Conversion to coal was allowed to take benefit of delta in RFO prices vs. coal prices.

(viii). Regarding surplus generation capacity of K-Electric, OSPL clarified that this observation is not true, as K-Electric faces a shortfall in generation capacity during peak season and hence there is a need to introduce more power generation sources. Further, generation capacity of K-Electric is decreasing due to closure of old/uneconomic generation facilities, whereas demand is increasing. To meet the

demand, K-Electric is entering into power purchase agreements with Sindh Nooriabad Power Company-I, Sindh Nooriabad Power Company-II and FFBL Power Company Limited, for a total of 150MW. K-Electric is also in the process of developing new power plants on coal, LNG and dual fuel either itself or in collaboration with internationally reputed parties.

(ix). Regarding the query of Whistleblower on must run condition of RE projects, OSPL clarified that NERPA, while determining upfront tariff makes a public hearing, which is attended by various stakeholders and after due consideration, NEPRA announces the upfront tariff. OSPL believes the process adopted by NEPRA takes care of all kinds of analysis suggested by Whistleblower Pakistan. Hence, if the must-run option is taken out, the output from renewable may decrease thus burdening the consumers with an even higher tariff. RE plants, wherever installed all over the world, are must run plants since they cannot control the supply of the natural fuel (wind or sunshine).

(x). On the observations of Whistleblower regarding economic viability of RE projects, OSPL replied that while assessing viability of any project, though economic viability is very important and ensured by NEPRA while conducting public hearings, but considering only monetary viability is not sustainable. The functionaries in the policy making have to consider the overall impact on the quality of life of people of the country at large. If such considerations are ignored, even most viable project could bring disaster. In this instance, RE is source of improvement in the quality of life of masses through reduction in harmful emissions. Additionally, the RE form is an emerging technology and is the future and not investing in such opportunity will deprive the country of its substantial benefits when such technology reaches its maturity.

(xi). On the observations regarding transmission and interconnection cost in addition to higher per unit cost from RE projects, OSPL submitted that the observations of Whistleblower Pakistan are not relevant in this case as OSPL has to accept solar upfront tariff announced by NEPRA in December 2015. Transmission losses are to be similar for RE/thermal/nuclear/hydel plants. It is clarified that power plants do not supply to consumers, instead they supply to K-Electric/NTDC/CPPA-G and then DISCO's/K-Electric in turn supply to consumers at tariff separately

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determined by NEPRA. In case Rs. 6 to 8 applies to supply of energy to K-Electric by the power producers, then it appears to be fuel cost only. Furthermore, after ten years when the debt is paid off, the rate drops to being the lowest in the system, since there is no fuel, and also there is no risk of fuel based escalation over time.

(xii). Regarding the low plant utilization factor and seasonal variation of RE power plants, OSPL submitted that Quaid-e-Azam Solar seems to be very close to assumed utilization factor for solar plants. This proves that while determining plant utilization factor, the NERPA has considered the facts on ground.

(xiii). Regarding the query of installation of new plants, OSPL has submitted that the need to add more plants is evident by the amount of shortfall in power supply during peak season in license areas of K-Electric and WAPDA/DISCOs. Regarding the query that RE projects should be complemented by adding base load power at the same time, OSPL informed that K-Electric has several base load power projects in the pipeline with similar timelines to this 50 MW project. Regarding rapid reduction in prices of solar equipment over past few years, OSPL has submitted that NEPRA has rightly been lowering the tariff as the equipment prices in the market have lowered. This mechanism is working just fine. It is submitted that cost of not having power is much more than even the highest cost of power generated by using High Speed Diesel. As economic activities are suffering due to persistent load shedding in the country. Industrialists are crying for more power that they can use their plants at the full capacity and hence reduce unit cost to make them competitive in the market place. The high economic cost resulting from non-availability of power required to run our idle industrial capacities justifies introduction of renewable energy projects that can be developed at a rapid pace to bridge demand-supply gap. Today the world as a whole has become a single market. Whosoever is unable to compete he will have to face challenge from imported products and will also lose export markets.

(xiv). On the comments of Whistleblower that K-Electric is not purchasing power from the plant of Tapal and Gul Ahmed, OSPL provided documents confirming that K-Electric maintains a high dispatch from Tapal Energy and Gul Ahmed Energy throughout the year in spite of the fact that these plants were originally envisaged as peaking power plants.

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(xv). Regarding induction of RE projects in the current scenario (i.e. reduction in oil prices, RLNG contract with Qatar, upcoming coal power projects and introduction of competitive market etc.) OSPL submitted that the recent fall in oil prices cannot be taken as trend which will continue in the future also. Different projections indicate that by 2019 (in 3 years time), the oil prices are going to be US$72.3, which is 241% of US$30 (the minimum oil price reached). When that happens there will be a run on solar and other alternate energy sources. That will increase solar equipment prices also. So this a matter of making a choice, pay now and reap fruit in the future or save now and pay much higher prices in the future. Our suggestion is to induct more RE plants while oil prices are low and reap benefit when the oil prices will bounce back in less than 3 years from now.

(xvi). Regarding competitive induction of RE projects on take and pay basis, elimination of must run condition and take or pay base power purchase agreement, OSPL submitted that as per current system, electricity is a necessity, essentially required by everyone. To ensure the delivery of the same, the Federal Government has to keep supporting the distribution companies. In the future, when the distribution companies have strong balance sheets and the physical transmission constraints are removed, it would be a welcome change to start trading electricity in an open market. In fact, that is what NEPRA wishes to achieve over the medium to long term. But until such time, contractual supplies are necessary.

(xvii). On the objection regarding affordability of electricity from RE, OSPL submitted that by advertising and holding public hearing before approval of generation licenses and tariff determinations and incorporating concerns raised by the stakeholders, NEPRA is already ensuring that affordable electricity is provided to people of Pakistan through an informed process.

(xviii). In response to the comments of Ministry of Water and Power regarding efficiency of solar panels, OSPL submitted that during the development of upfront tariff for solar projects, NEPRA has already considered every such aspect and has came up with project cost and required efficiency level for the solar plants. The tariff approved by NEPRA has put risk of lower output on the company to ensure maximum output from the plant throughout the life of the project. Since it is upfront

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tariff case, therefore, there is no need to require any comments from K-Electric on the subject.

(xix). The reply submitted by the OSPL were examined and found satisfactory. In view of the clarification and justifications given above, the Authority is of the considered view that the project of OSPL fulfils the eligibility criteria for grant of generation licence as given under the NEPRA Act, rules and regulations and other applicable documents.

(D). Analysis of the Authority

(i). The Authority has examined the entire case in detail. This included the information provided by the applicant along with the generation licence application, feasibility study of the project, the interconnection and dispersal arrangement studies, environmental study, provisions of the RE Policy and other relevant information.

(ii). The main features of the application under consideration are that the applicant company i.e. OSPL is a private limited company incorporated under Section-32 of the Companies Ordinance 1984 (XLVII of 1984), having Corporate Universal Identification No. 0093453, dated May 15, 2015. The memorandum of association the company includes the business of power generation and sale as one of its objectives.

(iii). OSPL plans to install Poly-Crystalline PV modules of Renesola or equivalent. OSPL has proposed installing 156250 modules each of 320 watt making the total Installed Capacity of the PV power plant to 50.00 MW_P. The project land is situated at almost the sea shore and there is very little vegetation in the area comprising of small bushes.

(iv). Regarding grid interconnection of the project, the Authority observes that sponsors have got completed the interconnection study for the project. According to the study, the power generated from the solar power plant of OSPL will be dispersed to the load centre of K-Electric and will be connected to 132 KV Gharo grid station through 132 KV transmission lines (on ACSR conductor). Further, power K-Electric has issued the required power evacuation certificate to OSPL confirming that

the offered power from the RE project of OSPL will be evacuated without any adverse impact on the K-Electric system.

(v). Regarding impact of the project on environment, the Authority is of the opinion that the proposed generation facility/solar power plant of OSPL is based on a renewable energy source and does not cause any pollution however, the operation of the solar power plant may cause some other type of pollution including soil pollution, water pollution and noise pollution during construction and operation. In this regard, the sponsors of the project carried out an Initial Environment Examination study and Environmental Protection Agency, Government of Sindh has accorded its approval for the same.

(vi). Regarding feasibility study of the project it is observed that the feasibility study has been defined in Regulation-3(5)(h) of the Licensing Regulations and inter-alia consists of the type, technology, model, technical details and design of the facilities proposed to be constructed, developed or installed, the expected life of the facility and the location of the facility. It is further observed that OSPL has submitted a document tilted feasibility study which fulfills the requirements of the Regulation-3(5)(h) of the Licensing Regulations.

(vii). Regarding land of the project, the Authority has observed that the sponsors of the project have acquired 144 acres of land for the solar power plant. The proposed project site is located on Sindh Coastal Highway at approximately 5.6KM from intersection of Sindh Coastal Highway near Gharo and N5, District Thatta in the Province of Sindh.

(viii). In view of the clarification and justifications given above, the Authority is of the considered view that the project of OSPL fulfills the eligibility criteria for grant of generation licence as given under the NEPRA Act, rules and regulations for grant of generation licence.

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(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 renewable energy must be developed on priority basis.

(ii). The existing energy mix of the country is heavily skewed towards the costlier thermal power plants, mainly operating on imported furnace oil. The import of furnace oil for electric power generation not only causes depletion of 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 be encouraged. The Energy Security Action Plan 2005 (ESAP) of GoP, also recognizes this very aspect of power generation through RE and envisages that at least 5% of total national power generation capacity to be met through RE resources by 2030. The Authority considers that the proposed project of OSPL is consistent with the provisions of ESAP. 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 furnace oil but will also help reduction in carbon emission by generating clean electricity, thus improving the environment.

(iii). The term of a generation licence under Rule-5(1) of the NEPRA Licensing (Generation) Rules 2000 is to commensurate with the maximum expected useful life of the units comprised in a generating facility, except where an applicant for a generation licence consents to a shorter term. As per international benchmark, the useful life of solar PV panels is considered as more than 25 years and majority of manufacturers offer the 25-year standard solar panel warranty. In this regard, it is observed that the solar power plant of OSPL will be achieving commercial operation date (COD) by October 31, 2017 and will have a useful life of more than twenty five (25) years from its COD. Further, OSPL has requested that the term of the proposed generation licence may be fixed to twenty five (25) years. Forgoing in view, the Authority fixes the term of the generation licence as twenty five (25) years from COD of the project.

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(iv). Regarding the tariff that OSPL will charge from its power purchaser/K-Electric, 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. Further, the Authority through its determination No. NEPRA/TRF-363/OSPL-2016 dated July 22, 2016 has already granted upfront tariff to OSPL. In view of the said, the Authority directs OSPL to follow the terms and conditions of the granted up-front tariff in letter and spirit and charge the power purchaser/K-Electric only such tariff which has been determined, approved or specified by the Authority.

(v). Regarding land of the of the project, it is clarified that the sponsors of the project have acquired 144 acres of land for the project as shown in schedule-I of the licence. In this regard, the Authority directs OSPL that the aforementioned land shown in schedule-I shall be exclusively used by OSPL for the proposed solar power project and OSPL cannot carry out any other activity on this land except with prior approval of the Authority.

(vi). Regarding compliance with the environmental standards, the Authority directs OSPL to ensure that the project will comply with the environmental standards during the term of the generation licence. In view of the said, the Authority has included a separate article (i.e. Article-10) in the generation licence along with other terms and conditions that the licensee will comply with relevant environmental standards.

(vii). The proposed solar power plant of OSPL 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. OSPL has informed that the project will achieve COD by October 31, 2017 which is within the deadline of the Kyoto Protocol. In view of this, an article (i.e. Article-14) for carbon credits and its sharing with the power purchaser has been included in the generation licence. In view of the said, the Authority directs OSPL to initiate the process in this regard at the earliest so that proceeds for the carbon credits are materialized. OSPL shall be required to share the proceeds of the carbon credits with the power purchaser as stipulated in Article-14 of the generation licence.

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

Authority:

Maj. (R) Haroon Rashid
(Member)

Syed Masood-ul-Hassan Naqvi
(Member)

Himayat Ullah Khan
(Member/Vice Chairman)

Tariq Saddozai
(Chairman)

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National Electric Power Regulatory Authority (NEPRA)
Islamabad – Pakistan

GENERATION LICENCE

No. SPGL/17/2016

In exercise of the powers conferred upon the National Electric Power Regulatory Authority (NEPRA) under Section 15 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997, the Authority hereby grants a Generation Licence to:

OURSUN PAKISTAN LIMITED

Incorporated under the Companies Ordinance, 1984
Corporate Universal Identification No. 0093453, dated May 15, 2015

for its Solar Generation Facility/Solar Power Plant Located on Sindh Coastal Highway Near Gharo, District Thatta in the Province of Sindh

(Installed Capacity: 50.00 MW_P Gross ISO)

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

Given under my hand this 9th day of December Two Thousand & Sixteen and expires on 30th day of October Two Thousand & Forty Two

09-12-16

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";

(b). "Applicable Documents" mean the Act, the NEPRA rules and regulations, 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;

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

(d). "Bus Bar" means a system of conductors in the generation facility/Solar Farm of the Licensee on which the electric power of all the photovoltaic cells is collected for supplying to the Power Purchaser;

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

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(f). "Commercial Operations Date (COD)" means the Day immediately following the date on which the generation facility/Solar Farm of the Licensee is Commissioned;

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

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

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

(j). "Grid Code" means the grid code prepared by NTDC or KEL and approved by the Authority, as it may be revised from time to time by NTDC or KEL with any necessary approval by the Authority;

(k). "IEC" means International Electrotechnical Commission or any other entity created for the like purpose and its successors or permitted assigns;

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

(m). "KEL" means "K-Electric Limited" and its successors or permitted assigns;

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(n). "Law" means the Act, relevant rules and regulations made there under and all the Applicable Documents;

(o). "Licensee" means **Oursun Pakistan Limited** and its successors or permitted assigns;

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

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

(r). "Power Purchaser" means KEL and its successors or permitted assigns;

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

(t). "Rules" mean "the National Electric Power Regulatory Authority Licensing (Generation) Rules, 2000";

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

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

1.2 Words and expressions used but not defined herein bear the meaning given thereto in the Act or or rules and regulations issued under the Act.

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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 and functional specifications and other details specific to the generation facility/Solar Farm of the Licensee are set out in Schedule-I to this Licence.

3.2 The net capacity of the generation facility/Solar Farm of the Licensee is set out in Schedule-II hereto.

3.3 The Licensee shall provide the final arrangement, technical and financial specifications and other specific details pertaining to its generation facility/Solar Farm before its COD.

Article-4
Term of Licence

4.1 The Licence is granted for a term of twenty five (25) years from COD of the generation facility/Solar Farm.

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 Regulations.

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Article-5
Licence fee

After the grant of the Generation Licence, the Licensee shall pay to the Authority the Licence fee, in the amount and manner and at the time set out in the National Electric Power Regulatory Authority (Fees) Rules, 2002.

Article-6
Tariff

The Licensee shall charge only such tariff 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 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 from time to time.

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Article-10
Compliance with Environmental Standards

The Licensee shall comply with the environmental standards as may be prescribed by the relevant competent authority from time to time.

Article-11
Power off take Point and Voltage

The Licensee shall deliver power to the power purchaser at the outgoing bus bar of its grid station. The up-gradation (step up) of generation voltage up to the required dispersal voltage level will be the responsibility of the Licensee.

Article-12
Performance Data of Generation Facility/Solar Farm

The Licensee shall install properly calibrated automatic computerized solar radiation recording device(s) and a compatible communication/SCADA system both at its generation facility/Solar Farm and control room of the Power Purchaser for transmission of solar radiation data and power output data to the control room of the Power Purchaser for recording of data.

Article-13
Provision of Information

13.1 The obligation of the Licensee to provide information to the Authority shall be in accordance with Section-44 of the Act.

13.2 The Licensee shall in addition to 13.1 above, supply information to the Power Purchaser regarding solar data specific to the site of the Licensee and other related information on a regular basis and in a manner required by the Power Purchaser.

13.3 The Licensee shall be subject to such penalties as may be specified in the relevant rules made by the Authority for failure to furnish such information as may be required from time to time by the Authority and which is or ought to be or has been in the control or possession of the Licensee.

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Article-14
Emissions Trading /Carbon Credits

The Licensee shall process and obtain emissions/Carbon Credits expeditiously and credit the proceeds to the Power Purchaser as per the Policy.

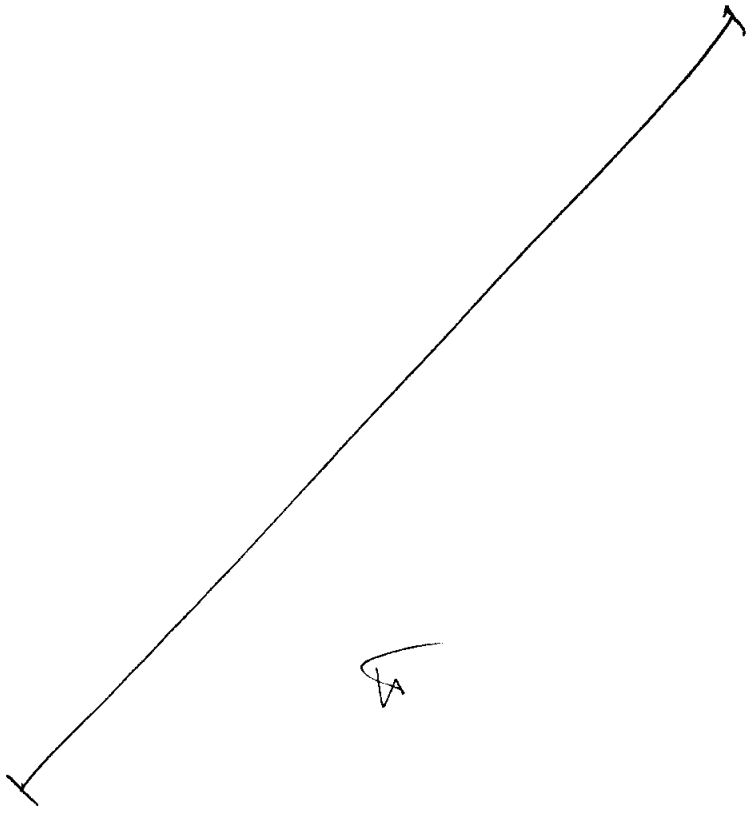
Article-15
Design & Manufacturing Standards

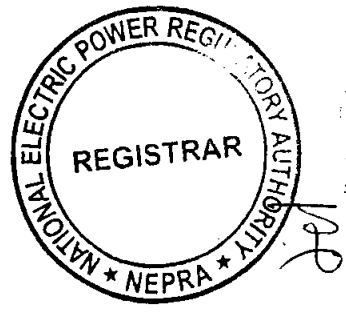
15.1 Solar photovoltaic cells shall be designed, manufactured and tested according to the latest IEC, IEEE or any other equivalent standards. All plant and equipment shall be unused and brand new.

15.2 All the plant and equipment of the generation facility/Solar Farm shall be unused and brand new.

Article-16
Power Curve

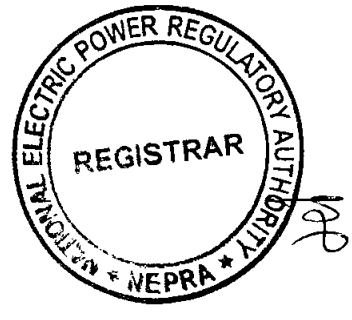
The power curve for the individual solar photovoltaic cell provided by the manufacturer and as mentioned in this generation licence shall form the basis in determining the cumulative power curve of generation facility/Solar Farm.



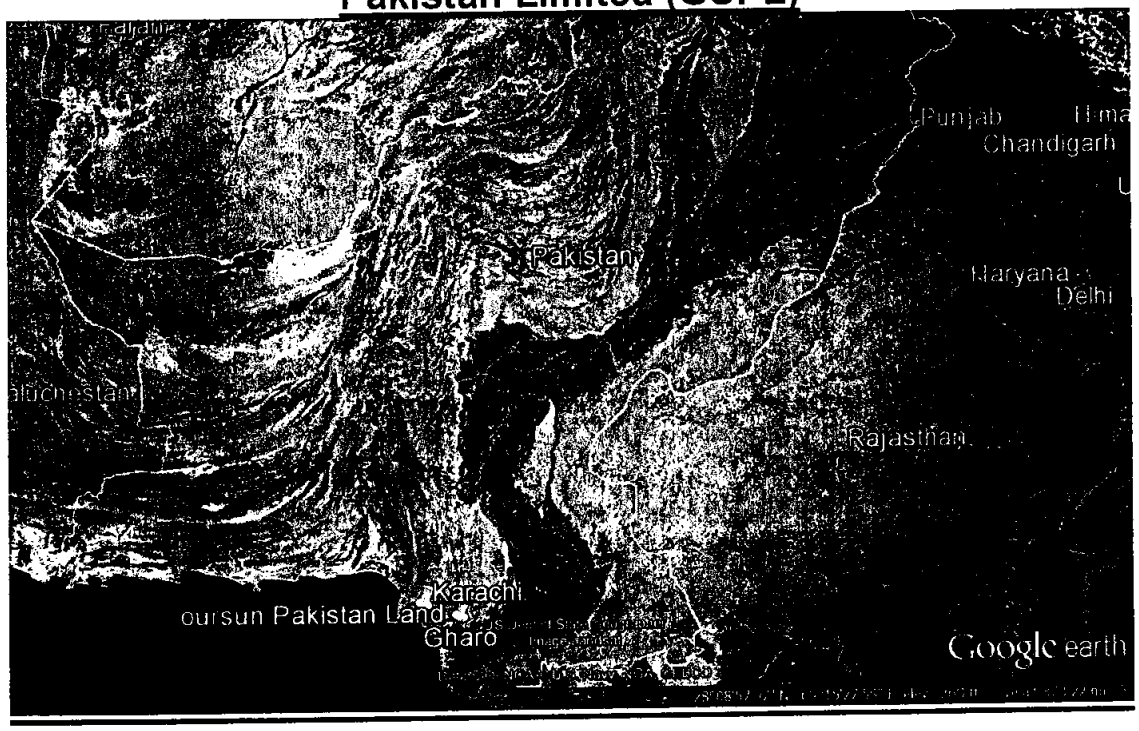


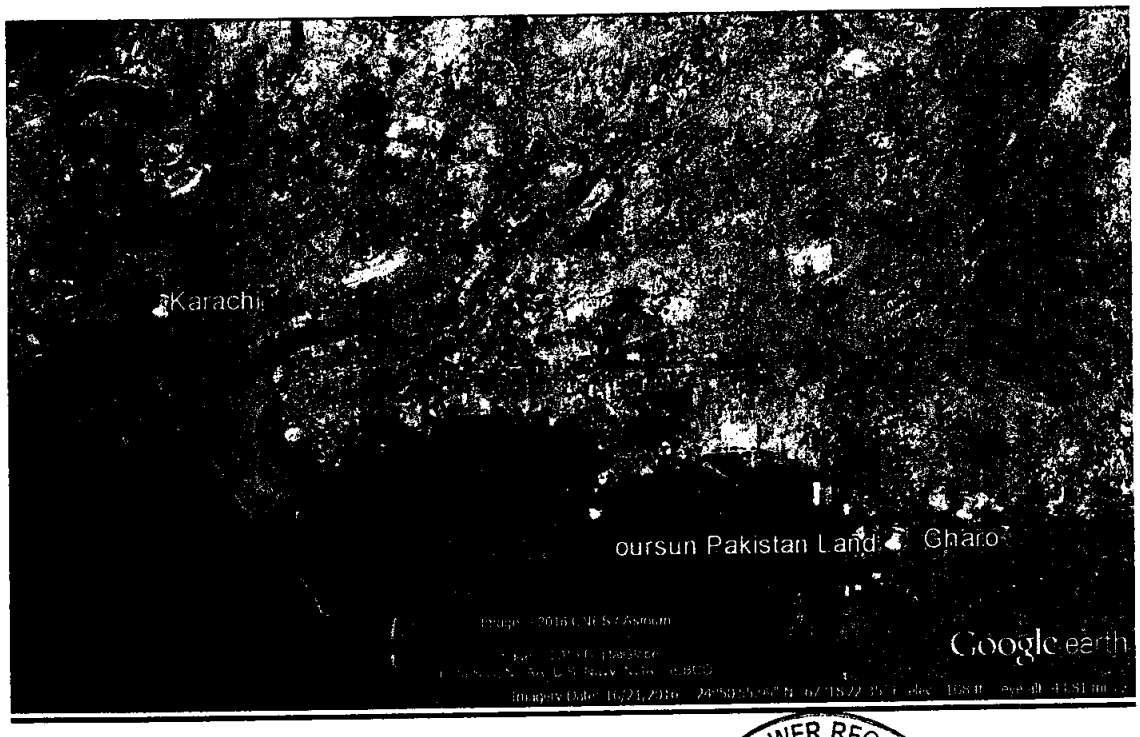
SCHEDULE-I

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.



Location of the Solar Power Plant/Solar Farm of Oursun Pakistan Limited (OSPL)





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Land Coordinates of the Generation Facility/Solar Farm of OSPL

S. No.	Latitude	Longitude
1	24°43'18N	67°32'1E
2	24°42'57N	67°32'15E
3	24°42'47N	67°32'05E
4	24°42'47N	67°31'58E

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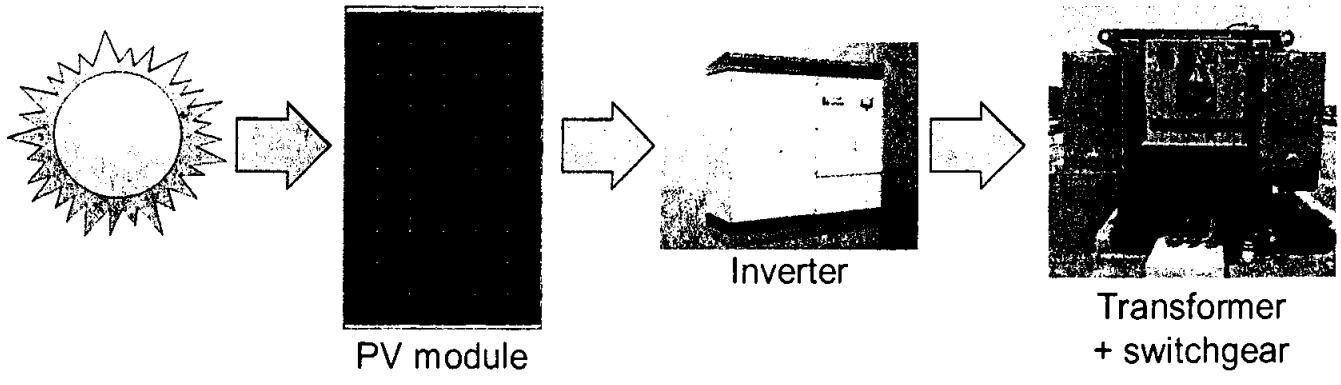
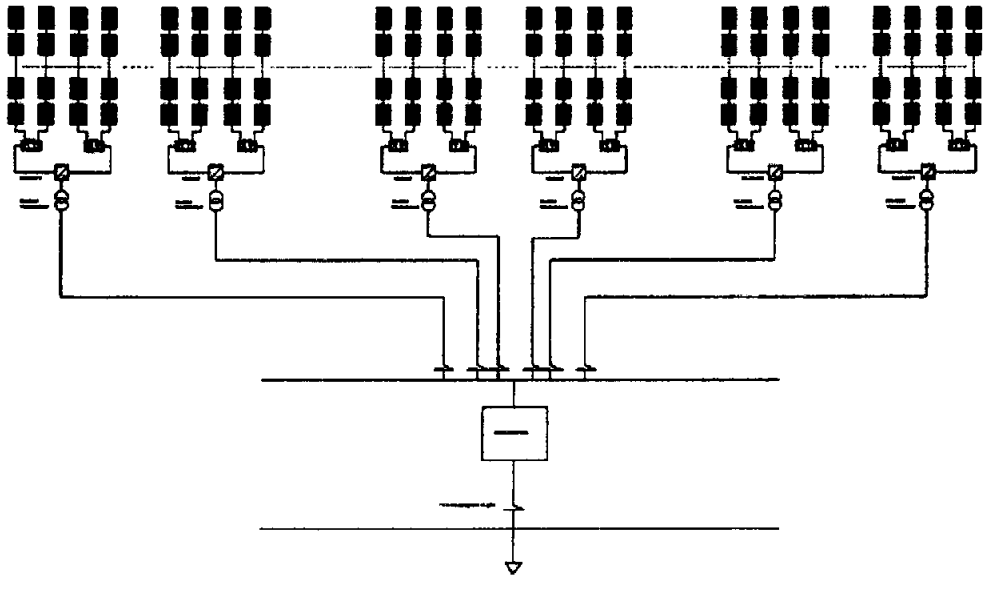
Process Flow Diagram of the Solar Power Plant/Solar Farm of OSPL





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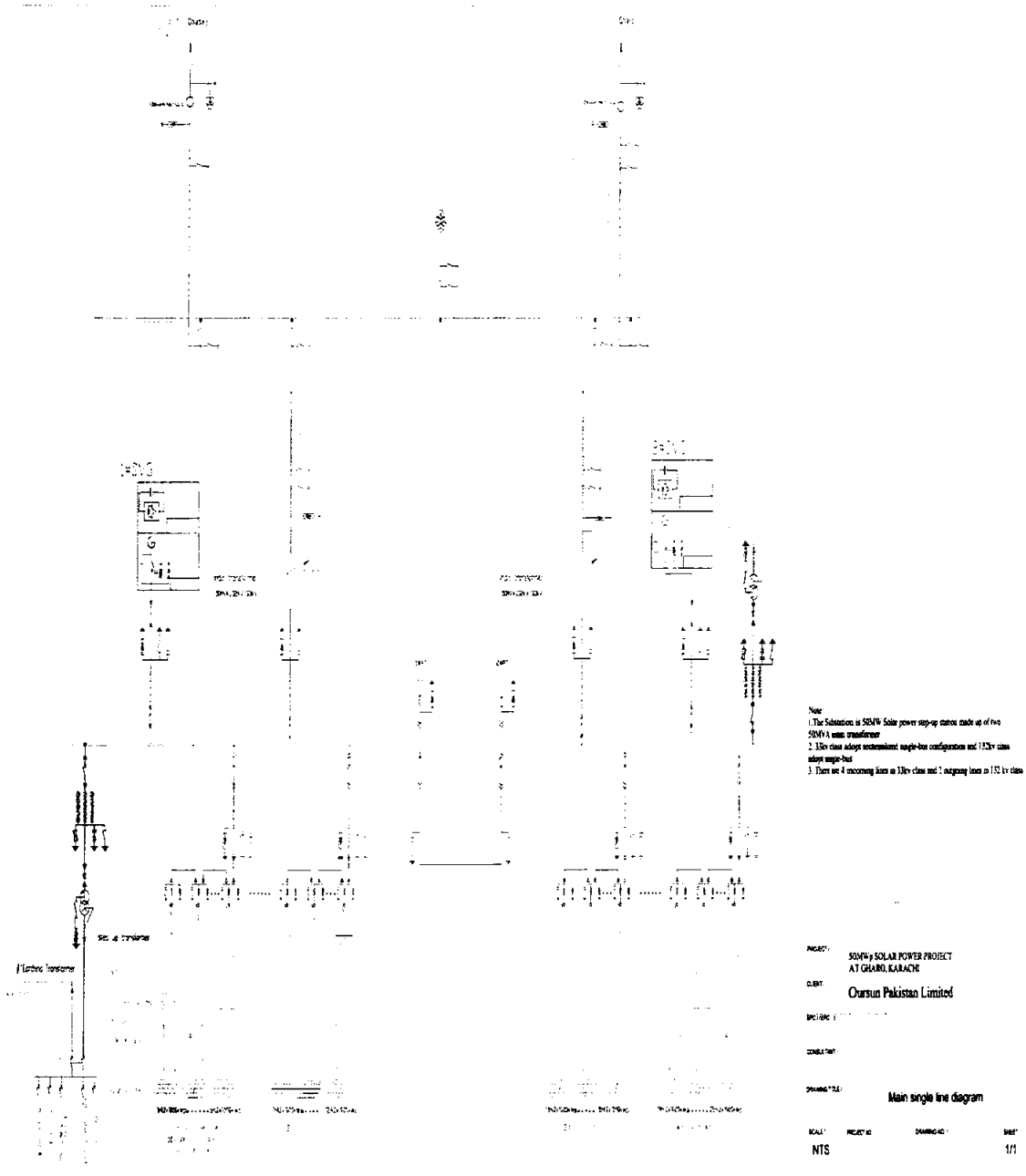
Single Line Diagram (Electrical) of the Generation Facility/Solar Farm of OSPL



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

The power generated from the Generation Facilities/Solar Farm of Oursun Pakistan Limited (OSPL) shall be dispersed to the load center of K-Electric Limited.

2. The proposed interconnection/dispersal arrangement for the project will be consisting of 132 kV double circuit transmission lines of 5.7KM for looping in-out of the existing 132 kV Dhabeji-Gharo 132 kV single circuit transmission lines connecting the generation facility/Solar Farm of OSPL with the Gharo grid.

3. Any change in the above interconnection arrangement/transmission facility duly agreed by Licensee/OSPL, NTDC and K- Electric Limited

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Detail of Generation Facility/Solar Farm

(A). General Information

(i).	Name of Licensee	Oursun Pakistan Limited
(ii).	Registered/ Business Office	10 Ali block, new garden town Lahore Pakistan.
(iii).	Plants Location	Gharo, Sindh costal highway district Thatta, in the province of Sindh
(iv).	Type of Generation Facility	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 Solar Farm(MW)	$50MW_{peak}$

(C). Technical Details of Equipment

(a).	**Solar Panels – PV Modules**		
(i).	Type of Module	JAP6-72/320/4B	RSM72-6-320P
(ii).	Type of Cell	Polycrystalline	Polycrystalline
(iii).	Dimension of each Module	1960mmx991mmx40mm	1956mmx992mmx40mm
(iv).	No. of Panel /Modules	156250	
(v).	Module Area	1.94 m^2	1.94 m^2
(vi).	Panel's Frame	Aluminium Alloy	Aluminium Alloy
(vii).	Weight of one Module	23 kg	24kg
(viii).	No of Solar Cells in each module	72	72
(ix).	Efficiency of module	16.48 %	16.5%
(x)	Maximum Power (Pmax)	320 W	320 W

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(xi).	Voltage @ (Pmax)	37.38 V	37.3 V
(xii).	Current @ Pmax	8.56 A	8.6 A
(xiii).	Open circuit voltage (Voc)	46.22V	45.6V
(xiv).	Short circuit current (Isc)	9.06A	9.1A
(xv).	Maximum system open Circuit Voltage	1000 V	1500 V
(b).	**PV Array**		
(i).	Nos. of Strings	8700	
(ii).	Modules in a string	18	
(c).	**Inverters**		
(i).	Capacity of each unit	2MW	
(ii).	Manufacturer	TBEA or equivalent	
(iii).	Input Operating Voltage Range	460 to 850 V DC	
(iv).	Number of Inverters	25	
(v).	Total Power	50 MW	
(vi).	Efficiency of inverter	98.6 %	
(vii).	Max. Allowable Input voltage	1000 V DC	
(viii).	Max. Current	2×2465 A	
(ix).	Max. Power Point Tracking Range	2×2465 A	
(x).	Output electrical system	3 phase, 3 wire	
(xi).	Rated Output Voltage	0.315KV (adjustable)	
(xii).	Power Factor (adjustable)	0.9 lead ~ 0.9 lag	
(xiii).	Power control	Mpp tracker	
(xiv).	Rated Frequency	50/60 Hz	
(xv).	Environmental Protection	Relative Humidity	5% to 95 %

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		Audible Noise	< 55 dB(A)
		Operating Elevation	Upto 2000 m
(xvi).		Operating temperature	--30°C~+60°C
(xvii).	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).	Number of J/Box units		550
(ii).	Input circuits in each box		16
(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		2x50 MVA
(ii).	Type of transformer		ONAF
(iii).	Purpose of transformer		Step-up (33 kV/132 kV)
(iv).	Output Voltage		132 KV

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(g).	**Unit Transformer**	
(i).	Rating	25x2,000 KVA
(ii).	Type of transformer	33KV Box-type transformer
(iii).	Purpose of transformer	Step-up (0.315KV/33KV)
(iv).	Output Voltage	33 KV

(D). Other Details

(i).	Project Commissioning date	October 31, 2016
(ii).	Expected Life of the Project from Commercial Operation date (COD)	25 years

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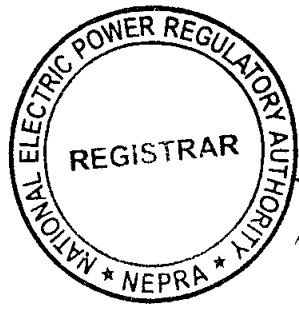
SCHEDULE-II

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 is given in this Schedule.



SCHEDULE-II

(1).	Total PV Installed Capacity of the Generation Facility/Solar Farm	50 MW_p
(2).	Average Sun Hour Availability/Day (Irradiation on Inclined Surface)	5.08 Hrs
(4).	PV Plant Generating Capacity Annually (As Per Simulation)	78,840.00MWh
(5).	Expected Total Generation in 25 years Life Span	1,747,898.93 MWh
(6).	Generation per Year from plant keeping 24 Hours Working	438,000 MWh
(7).	Net Capacity Factor	18.00%

Note

All the above figures are indicative as provided by the Licensee. The Net energy available to the Power Purchaser for dispatch will be determined through procedures contained in the Energy Purchase Agreement.

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