National Electric Power Regulatory Authority
Islamic Republic of Pakistan

Registrar

NEPRA Tower, Attaturk Avenue (East), G-5/1, Islamabad
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No. NEPRA/R/DG(Lic)/LAG-473/ 8059-65 May 25, 2022

Mr. Abdul Basit Javed
Chief Executive Officer
AB Solar Park (Private) Limited
House No. 28, Street No. 2
MPCHS E/11-1, Islamabad

Subject: **Grant of Generation Licence No. SGC/167/2022**
Licence Application No. LAG-473
AB Solar Park (Private) Limited

Reference: ABSPPL's application vide letter No. nil dated 13-11-2019

Enclosed please find herewith Generation Licence No. SGC/167/2022 granted by National Electric Power Regulatory Authority (NEPRA) to AB Solar Park (Private) Limited for its 20.00 MWp solar based generation facility located at Village Chab, Tehsil Jhand, District Attock in the Province of Punjab, pursuant to Section 14(B) of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997. Further, the determination of the Authority in the subject matter is also attached.

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

Enclosure: Generation Licence (SGC/167/2022)

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

25 05 22
(Syed Safeer Hussain)

Copy to:

1. Secretary, Ministry of Energy (Power Division), A-Block, Pak Secretariat, Islamabad.
2. Managing Director, NTDC, 414 -WAPDA House, Lahore.
3. Chief Executive Officer, CPPA(G), 73 West, A.K. Fazl-ul-Haq Road, Blue Area, Islamabad
4. C.E.O Alternative Energy Development Board (AEDB), 2nd Floor, OPF Building, G-5/2, Islamabad
5. Chief Executive Officer, Islamabad Electric Supply Company Ltd, IESCO Head Office Street 40, Sector G-7/4, Islamabad.
6. Director General, Environmental Protection Department, Government of the Punjab, National Hockey Stadium, Ferozpur Road, Lahore

National Electric Power Regulatory Authority (NEPRA)

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

May 25, 2022
Case No. LAG-473

(A). Filing of Application

(i). AB Solar Park (Private) Limited (ABSPPL) submitted an application on November 13, 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 and found that the application was deficient in terms of the Licensing Regulations. Accordingly, the Registrar directed ABSPPL to submit the missing information/documents as required under the said regulations. ABSPPL completed the submission of missing information/documents by December 13, 2019. The Authority considered the matter and found the form and content of the application in substantial compliance with Regulation-3 of the Licensing Regulations. Accordingly, the Authority admitted the application on January 01, 2020 for consideration of the grant of generation licence as stipulated in Regulation-7 of the Licensing Regulations. The Authority approved a Notice of Admission (hereafter the "Notice") to be published in the press to invite comments of general public, interested and affected persons in the matter as stipulated in Regulation-8 of the Licensing Regulations. Accordingly, the Notices were published in one (01) Urdu and one (01) English newspapers on January 03, 2020.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(iii). In addition to the above, the Authority also approved a list of stakeholders for seeking their comments for its assistance 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 January 03, 2020, soliciting their comments for assistance of the Authority.

(B). Comments of Stakeholders

(i). In reply to the above, the Authority received comments from five (05) stakeholders including Gujranwala Chamber of Commerce and Industry (GCCI), Central Power Purchasing Agency (Guarantee) Limited (CPPAGL), Islamabad Electric Supply Company Limited (IESCO), Ministry of Planning, Development and Special Initiatives Energy Wing of Government of Pakistan (MPD&SI) and Energy Department of Punjab Power Development Board (PPDB). The salient points of the comments offered by stakeholders are summarized below: -

(a). GCCI expressed its no objection to the grant of generation licence to ABSPPL in respect of its proposed 20.00 MW photovoltaic (PV) based generation facility/Solar Power Plant at village Chab, tehsil Jhand, district Attock, in the province of Punjab;

(b). CPPAGL submitted that the company/ABSPPL intends to set up a PV based generation facility of 20.00 MW in district Attock in the province of Punjab. The company intends to sell generated power to the Bulk Power Consumer(s)-BPC(s), located in Sector I-9 Islamabad through wheeling using the network of IESCO pursuant to the NEPRA (Wheeling of Electric Power) Regulations, 2016 (the "Wheeling Regulations"). In this regard, some of the key technical, commercial and financial issues are highlighted including

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

(a). Non-Recovery of Cost of Technical Losses of DISCO(s); (b). Avoiding Cross-Subsidy Charges-CSC; (c). Non-recovery of Use of System Charges (UoSC) of NTDC; (d). Non-recovery of Stranded Costs; (e). Hybrid Consumers-BPC(s); and (f). Dispatch of Generators. About the Non-Recovery of Cost of Technical Losses of DISCO(s), it was submitted that the existing relevant regulations on wheeling do not levy any charges on account of the losses on bilateral trading parties and resultantly the remaining consumers of DISCO have to bear the same. The said regulations allow the trading parties to inject energy at one point and withdraw the same amount of energy from any other point on the grid without considering the effect of losses. The formula for Use of System Charge (UoSC), given in the tariff determination of DISCO(s) does not recognize the cost of losses and therefore, the utilities will not be able recover the cost of losses of BPC(s) being supplied by generators. Based on the currently notified tariff, the total cost of losses in system is Rs. 250 billion as the financial impact of losses to DISCO(s) ranges from Rs. 13.24/kWh (for Gujranwala Electric Power Company Limited-GEPCO) to Rs. 21.24/kWh (for Hyderabad Electric Supply Company Limited-HESCO). It is evident that IESCO will only be able to recover its Distribution Margin (DM) which is fixed and does not include the cost of losses. The problem with this formula is that it only includes impact of losses on allocating gross DM to BPC however, it does not include the actual cost of losses in the gross DM. However, DISCO(s) will incur losses while taking injections from generators and supplying the BPC(s). Therefore, the cost of the losses should be charged to the BPC(s) opting for wheeling under bilateral contract with the

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

generators. Regarding the avoiding of CSC(s), it was stated that under the current tariff structure, large consumers pay higher tariff to cross-subsidize the small consumers. Cross-subsidization is a policy/regulatory decision and is applicable to all consumers irrespective of purchase of electricity from DISCO(s) or having bilateral contract with generators. However, charging of cross subsidy is not addressed in existing wheeling regulations and therefore, the BPC(s) will be avoiding the cross-subsidy payments. With regards to bulk and industrial consumers, the resulting financial impact on DISCO(s) due to avoidance of cross subsidy is huge. Under the Section-31(3)(g) of the NEPRA Act the Authority may set tariffs below the level of cost of providing the service to consumers consuming electric power below such consumption levels as may be prescribed, as long as such tariffs are financially sustainable. In view of the said, the Authority while determining the tariff under the current practice cross subsidizes low consumption consumers mainly from bulk and industrial consumers. As the BPC(s) will only be contracting with a generator therefore, all the relevant cost for competition is the cost of generation (energy and capacity charges) of this private generator versus the power purchase price of the pool (energy and capacity charges). The cross subsidy is a policy/regulatory decision and as such big consumers cannot be discriminated on the basis that if these consumers apply for wheeling, they can avoid the same while the same category of consumers of DISCO(s) continue to pay. If this practice is not discontinued, this in turn will become an undue incentive for the remaining regulated BPC(s) to leave DISCO(s). This will result in an increase of burden of cross-subsidy payments

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

on the remaining consumers. In view of the above, the CSC(s) should accordingly be charged to all the BPC(s) irrespective of whether they are consumers of DISCO or doing bilateral trade through wheeling. In relation to the Non-recovery of UoSC of NTDC, it was stressed that the UoSC of NTDC and fee of CPPAGL (system services) should also be applicable to all BPC(s) being supplied either by generators or by DISCOs. This system service charge is not addressed in the existing wheeling regulations and therefore, the BPC(s) opting for wheeling would avoid the system service charges and as such DISCO(s)/their consumers will continue to pay this cost on their behalf to NTDC and CPPAGL. The resulting average financial impact is Rs. 0.39 /kWh on DISCOs/their remaining consumers that accumulates into a total of Rs. 11.31 Billion if all the bulk and industrial consumers do not pay this charge. Therefore, the cost of system services should accordingly be charged to the BPC(s) opting for wheeling. On the issue of Non-recovery of Stranded Costs, CPPAGL stated that the long term contracts with take-or-pay capacity regime are already committed resulting in capacity adequacy for the next few years. It is apprised that DISCO(s) are charged Capacity Charges (as fixed cost) which is independent of their end-consumer sales. However, DISCO(s) charge almost all of their Energy and Capacity Charges through a volumetric rate structure (i.e. per kWh basis) to the end consumers. It is submitted that the fixed charges being charged to DISCO(s) are 70.00% of the total cost of energy billed by the pool. However, DISCO(s) only recover 3.00% as fixed charges from the consumers and the rest 97.00% of the total cost is recovered on a per kWh basis. Due to this mismatch of cost

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

structure (i.e. occurrence of fixed cost to DISCO(s) and recovery of fixed cost from end-consumers), any reduction in sales (kWh) due to BPC(s) leaving the market during this commitment period, will result in non-recovery of capacity charges. It would be pertinent to mention here that the Capacity Purchase Price (CPP) in 2017-18 was Rs. 3.88/kWh which was 38% of the total Power Purchase Price (PPP). It is estimated that the CPP will increase to Rs. 9.32/kWh in 2022-23 which will account for 66% of the total PPP. On the basis of the said projection, it is evident that the issue of stranded costs will become significant in the years to come if the same is not addressed immediately due to increase in the CPP. The current resulting financial impact on DISCO(s)/their consumers is. Rs. 13.00 Billion if there is 1.00% reduction in total energy sales due to wheeling. Therefore, a mechanism for charging such costs should be devised to recover the stranded costs. In this regard, there are several possible ways to charge stranded costs during this commitment period which may include charging of stranded costs to (i). all consumers; (ii). consumers leaving the market; (iii). only the BPC(s); (iv). the remaining regulated consumers; (v). subsidy provided by GoP to cover such stranded fixed costs etc. Therefore, the Authority must provide for recovery of stranded costs arising on account of open access/wheeling in the consumer-end tariff. Moreover, it is important that the demand/supply planning cycle starting from demand projections to the approval of IGCEP should be adjusted to account for (i). advance notices by the BPC(s) to exit the DISCO(s) and intimation to the planner to incorporate its planned generation capacity in the generation planning exercise as firm commitment; (ii). recognition by the

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

DISCO(s) in demand forecasting that the demand of the BPC will only be utilized for planning of wires/distribution network and not for sale/supply of electric power and (iii). rationalization of timing of exit and return to the grid by the BPC. These changes are also very important for determining not only the period of stranded costs but also reducing further firm commitments for the pool to the extent of advance notices given by BPC(s) opting bilateral trade. The total BPC(s) accounts for around 17.00% in terms of sales volume and 23.00% in terms of revenue generation for DISCO(s). If the issues of cross subsidy and stranded costs are not accounted for, the tariffs of different classes of remaining consumers of DISCO(s) will increase exponentially resulting in reduction of sales for such consumers jeopardizing the viability of the utilities. As regard the Hybrid Consumers-BPC(s), it was elaborated that the existing Wheeling Regulations do not restrict a BPC from purchasing part of its load from DISCO as its consumer and part from another supplier/generator through bilateral contract. This is totally restricted in any other markets i.e. either a BPC is solely a consumer of DISCO(s) or contracts up to its full peak demand in bilateral trade from a generator. Due to the hybrid nature of consumers, the Authority will have to determine tariff for remaining energy purchased from the DISCO(s) on a case to case basis. This is required because the new load factor of the remaining energy will be different from the original load factor [if the BPC is purchasing its total energy from the DISCO(s)]. Therefore, allocation of fixed cost/kWh basis to such consumers based on new load factors will change and as such should be charged to these consumers. Due to the said complexity for

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

determining the tariff on an individual basis, which is a big hurdle for opening of the market and other related issues. It is submitted that the BPC(s) are generally not allowed to buy from DISCO(s) partially and from the individual generators at the same time. Therefore, the BPC(s) should not be allowed to purchase part of their load from DISCO(s) and part from another supplier/generator under bilateral contract. On the observation of desptach of Generators, it was stated that all the power plants connected to the grids must be centrally dispatched economically, which is a legal requirement under the NEPRA Act. However, by not following economic dispatch (i.e. allowing self-dispatch) there, will be an increase in the total variable cost of the generation (fuel cost) and result in higher cost for bilateral contracting parties as well. In consideration of the electric power system of the country having central economic dispatch, the total variable cost of generation is far less than the total variable cost in the self-dispatch. In this regard, an analysis has been carried out to quantify this impact and the financial impact is estimated to be in billions of rupees. The analysis has revealed that the financial impact will be around Rs. 326 billion for a 1200 MW gas fired power plant during a period of FY2019 to FY2030;

(c). IESCO stated that the matter has been deliberated at length and in this regard there are various observations which are being submitted for the consideration of the Authority including:- (a). Non-recovery of Cost of Losses and Investment; (b). Avoiding CSC(s); (c). Non-recovery of UoSC(s) of NTDC and fee (system services) of CPPAGL; (d). Non-recovery Stranded Costs; (e). Issues due to

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Banking of Energy; (f). Settlement of Imbalances not the Role of DISCO(s); (g). Wheeling of Renewable Energy (RE) not Addressed; (h). Hybrid Consumers-BPC(s); (I). Despatch of Generators and (i). Settlement of difference in Cross DISCO Scenario. In consideration of the above, it was submitted that the existing Wheeling Regulations ignore losses and investments to be made for system reinforcements for bilateral trading parties resultantly the same shall be borne by the remaining consumers of DISCO(s). The formula for UoSC given in the Tariff Determination of the DISCO(s) including IESCO does not recognize the said aspect and due to the said the utility/IESCO will not be able to recover the cost of losses and investments from BPC(s) being supplied by generators. The Authority is well aware of the fact that Transmission and Distribution losses are an inherent part of the electric power system and investments are required to be made to ensure system supply and reliability. The existing UoSC of IESCO is estimated as Rs. 0.2499/kWh and does not compensate the above costs. About avoiding the CSC(s), IESCO remarked that under the current tariff structure, large consumers pay higher tariff to cross-subsidize the small consumers. The cost of cross-subsidization is a policy/regulatory decision and is applicable to all consumers irrespective of the fact they are purchasing electricity from utility/IESCO or having bilateral contract with generator(s). The charging of cross subsidy is not addressed in existing Wheeling Regulations which will result in BPC(s) avoiding the same. The estimated impact of the cost of the cross subsidization to IESCO pertaining to the bulk and industrial consumers is estimated to be around Rs. 3.94./kWh to

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

Rs.7.95/kWh for off-peak consumption and is estimated to be around Rs.9.84/kWh to Rs.14.75/kWh for peak consumption therefore, such charges should be charged to BPC(s) opting wheeling. In consideration of the observation of Non-recovery of UoSC of NTDC and fee (system services) of CPPAGL, it was submitted the UoSC and fee for the system services of CPPAGL should also be applicable to all BPC(s) being supplied either by generators or by DISCO(s). The said charges are not addressed in the existing Wheeling Regulations and therefore, the BPC(s) opting for wheeling will avoid these charges whereas IESCO and its other consumers will continue to pay this cost to NTDC and CPPAGL causing serious discrimination among different consumers. In this regard, the financial impact has been estimated to be around Rs. 0.32/kWh for IESCO and its consumers. Therefore, IESCO suggests that this cost should be charged to all the BPC(s) opting for wheeling. Regarding the Non-recovery of Stranded Costs, IESCO stated that long term contracts on Take or Pay basis have already been entered with different generation companies. IESCO is charged Capacity Charges (as fixed cost) which is independent of its sales to end-consumer whereas the utility charges almost all of its Energy and Capacity charges through a volumetric rate structure (i.e. per kWh basis) to the end consumers. Due to said mismatch of cost structure (i.e. occurrence of fixed cost to IESCO and recovery of fixed cost from end consumers), any reduction in sales (kWh) due to BPC(s) leaving the market during this commitment period, will result in non-recovery of capacity charges. During this commitment period, the resulting financial impact on IESCO/its consumers ranges from Rs. 4.58/kWh to

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

6.89/kWh at 11kV and 132 kV respectively. Therefore, a mechanism for charging such costs should be devised to recover the stranded cost. About the issues due to Banking of Energy, it was stated that the supply and consumption of electricity in real time against the bilateral contracts result in imbalances. The existing Wheeling Regulations provide the concept of banked energy for settlement of imbalances which is similar to virtually storing the energy for later use. This would result in significant cost implications on IESCO and its consumers. This is because the electricity has different prices for peak and off-peak hours, and banking (virtually storing energy) e.g. during non-peak hours and drawing (physically consuming energy) during peak hours would result in significant cost difference that will be paid by the remaining consumers. Moreover, such BPC(s) will/may draw the banked energy from the utility/IESCO during peak hours, this will increase the overall peak of IESCO by that amount. Therefore, induction of additional capacity would be needed by IESCO/system to serve this inflated peak, the fixed cost of which would also be borne by the remaining consumers of IESCO. Banking is a negotiated transaction that will vary from contract to contract and it will be very difficult for any DISCO/utility/IESCO to manage such transactions. Furthermore, it will be almost impossible for a generator to sell power to multiple DISCO(s) involving banking mechanism. IESCO highlighted that the existing Wheeling Regulations require DISCO(s) to make settlements between two private parties (generator and BPC) which is against the best global practices. IESCO expressed that under the legal and regulatory framework, the mandate of DISCO(s) is limited to manage the

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

distribution network/wire business and the supply of electric power to the consumers and the settlement of imbalances between private parties is not even envisaged in its licence. IESCO expressed that activities regarding signing of Energy Wheeling Agreements, performing settlement of bilateral transactions between BPC(s) and generators and managing dispatch coordination with the generators, is an additional responsibility for it and the same is outside the regulatory scope enshrined in its distribution licence. IESCO stressed that under the current legal and regulatory framework, the role of settlement and dispatch of power plants lies with other specialized institutions such as the Market Operator and the System Operator and not with the DISCO(s). In consideration of the said, DISCO(s) are required to sign Connection Agreements not Wheeling Agreements for dispatch and settlements. Further to the above, IESCO stated that the existing Wheeling Regulations do not address the concept of Firm Capacity and also don't cover the intermittency aspect of Renewable Energy (RE) by not differentiating between a despatchable and RE generator. In the event of a solar or wind generation facility being not available for dispatch, the BPC will be using the grid system as backup to get continuous supply of power without paying the capacity charges that will be borne by the IESCO and its remaining consumers. Therefore, Firm Capacity Factors should be introduced against the RE generators having bilateral contract with BPC(s) for wheeling and the RE generators. Further, such generators be directed to maintain the required power factor without any exception. Regarding the Hybrid BPC(s), it was submitted that the existing Wheeling Regulations allow the BPC(s) to purchase part of

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

its load from DISCO as its consumer and rest from another supplier/generator under bilateral contract arrangement. The said provision is not in-line with other such markets in the worldwide wherein a BPC is either a solely consumer of the utility or otherwise contracts to its full peak demand with a generator through a bilateral arrangement. Due to the hybrid nature of consumers, the Authority will have to determine tariff for remaining energy purchased from the DISCO(s) on a case to case basis considering the fact that the new load factor of the remaining energy will be different from the original load factor (if the BPC is purchasing its total energy from the DISCOs). In view of the said, the allocation of fixed cost/kWh basis to such consumers will also change based on new load factor and will be charged accordingly. The said complexity of determining the tariff on a case to case basis will be a hurdle to the opening of the proposed electricity market along with other raised issues. IESCO stressed that BPC(s) should not be allowed to purchase part of their load from DISCO and part from another supplier/generator under bilateral contract and the Wheeling Regulations need to be amended. About the Dispatch of Generators, IESCO submitted that as per the legal and regulatory framework, economic dispatch is the criteria for all the generating facilities, even at 132kV level and the same must be adhered to instead of allowing self despatch allowed in the Wheeling Regulations. About the settlement of difference in Cross DISCO Scenario, IESCO expressed that the current Wheeling Regulations are silent on such a scenario involving multiple DISCO(s) and NTDC. In view of the above submissions and the fact that the observations are already under discussion at the level of different stakeholders

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

therefore, it is recommended that the Wheeling Regulations may please be amended before entertaining any wheeling of power applications/modification in generation licence;

(d). MPD&SI expressed that the proposed plant will produce electric power using RE source of solar which is an indigenous resource for generation of electric power. In view of the said, Planning Commission supports the grant of generation licence to the company which will also result in an increase in the overall share of RE in the generation mix in the country however, the required codal and technical formalities for the project may be fulfilled; and

(e). PPDB submitted that the provincial Government of Punjab (GoPb) attaches great importance to the promotion of RE in the country, including solar power projects. With the efforts of GoPb and active facilitation role by PPDB, 4x100 MW grid-connected projects have been successfully completed and are supplying electric power to the National Grid. GoPb is also working on the options to supply affordable electricity under the Wheeling arrangement to load clusters in the province. In view of the above, PPDB supports the Wheeling arrangement for the proposed 20.00 MW generation facility of ABSPPL therefore, the Authority may process the generation licence application as per provision of the NEPRA Act, relevant rules & regulations and relevant policies and guidelines in the matter.

(ii). The Authority considered the above comments and in view of the observations raised by CPPAGL and IESCO, considered it appropriate to seek perspective of ABSPPL on the same. On the observations of CPPAGL regarding (a). Non-Recovery of Cost of Technical Losses, ABSPPL agreed that the existing

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Wheeling Regulations do not address the technical losses in the transmission and/or distribution system of NTDC/DISCO during wheeling of power. Therefore, a fair cost of technical losses should be included in the wheeling charge and accordingly allocated to the Wheeler of power and/or BPC as per the bilateral wheeling contract. In this regard, ABSPPL is of the opinion that the Authority shall decide the methodology of determining the cost of technical losses in the wheeling charges/UoSC. Therefore, ABSPPL is waiting for the Authority to give its decision on the allocation of cost of technical losses per unit by DISCO(s). About avoiding CSC, it was stated that as per Section-31 of NEPRA Act, the inter-class cross-subsidy is practiced and low consumption level consumers are cross-subsidized by the bulk and industrial consumers. Without prejudice to the said, the CSC, if part of the wheeling charges, shall be applied on the principle of fairness and equality with the DISCO serviced BPC of the same category. ABSPPL is of the opinion that the Authority through the cost of service study should identify the subsidizing and subsidized consumers and accordingly determine the amount of CSC that a BPC should pay as part of the wheeling charges/UoSC. In this regard, ABSPPL believes that CSC can be a part of the wheeling charges based on uniform application of CSC to BPC(s) being served from DISCO(s) or through wheeling. Therefore, sponsors of the projects are waiting for the Authority to give a decision on the allocation of cost of CSC per unit. Regarding the Non-recovery of UoSC(s) of NTDC, it was submitted that the system of NTDC is necessary to provide stability (frequency and voltage control) and reliability to the overall grid system. Accordingly, NTDC undertakes investments in its system therefore, UoSC should be treated uniformly across all power that flows in the system. ABSPPL agrees that UoSC can be a part of the wheeling charge(s) based on fairness which had been discussed with stakeholders and therefore the company is waiting for the Authority to give its decision on the allocation of UoSC per unit. On the issue of Non-recovery of Stranded Costs, ABSPPL expressed that the current Wheeling Regulations do not address the stranded assets cost therefore, it is agreed that there is a need to evaluate the quantum of the same. The Authority may analyze that quantum

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

and the period by which these costs are to be recovered. Furthermore, the Authority may conduct an independent study in this regard. Further, different mechanisms may be considered for the recovery of stranded assets cost that are employed in various global markets (i). Stranded assets cost are charged to those consumers that are leaving the market for wheeling; (ii). All categories of BPC(s) are charged with stranded assets cost; (iii). The regulated consumers (other than those leaving the market for wheeling) are charged with stranded assets cost; (iv). All categories of consumers are charged with stranded assets cost; or (v). The government provides subsidy to offset the stranded assets cost. ABSPPL is willing to accept any mechanism based on fairness for the recovery of stranded assets cost that the Authority may formulate. On the issue of Hybrid BPC(s), it was submitted that the Authority should provide a level playing field, with fair price signals for wheelers of power and captive generation. ABSPPL is of the opinion that the Authority must consider the effect caused by captive generation, which takes advantage of system capacity for intermittent load, to allow level playing field for wheeling and also provide a fair price signal to captive consumers as well. Therefore, it is totally the prerogative of the Authority to decide on this matter. Regarding the Despatch of generators, it was stated the Economic Despatch may allow benefits to both the wheeler of power and the system to reduce costs at both ends. If the wheeler of power is despatched when the marginal price is higher than its own variable cost, and its BPC does not draw power from the system, the wheeler of power recovers additional revenue by getting payment according to the marginal price. The system benefits by avoiding the despatch of an expensive generator. If the Wheeler of power is not dispatched when the marginal price is lower than its own variable cost, it will recover the contracted revenue from its BPC and will procure from the market at a cost below its own variable cost to serve the demand of its BPC which will result in additional revenue. The settlement of imbalances through marginal pricing has tax implications as there are different tax rates applicable on electricity generation, purchase(s), trading and sale(s). In addition to the said, there are other ancillary services such as start-up and ramp- up/ramp-down costs which should be

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

recovered by the wheeler of power in the Economic Despatch system. It is expected that the Authority shall be determining the costs of such type of ancillary services which must be pragmatic and must have feedback of the relevant stakeholders. Moreover, the dispatch under system constraints has no bearing on the marginal price. The System Operator may from time to time dispatch a generator to ensure system stability and reliability – the variable cost of that generator dispatched under technical constraint is not included in the determination of marginal price. ABSPPL suggested that the Authority should review the implications and propose way forward accordingly which shall be acceptable by all the relevant stakeholders including itself/the company/ABSPPL.

(iii). Regarding the observations/comments of IESCO, it was submitted that some of the observations had also been raised by CPPAGL including (a). Non-recovery of Cost of Losses and Investment; (b). Avoiding CSC; (c). Non-recovery of UoSC(s) of NTDC; (d). Non-recovery Stranded Costs; (e). Hybrid BPC(s); and (f). Despatch of generators. In this regard, the company/ABSPPL had submitted a rejoinder as explained in the preceding paragraph and the same are reiterated. However, rejoinder for the balance observations of IESCO including (a). Issues due to Banking of Energy; (b). Settlement of Imbalances is not the Role of DISCOs; (c). Wheeling of RE is not Addressed; (d). Settlement of difference in Cross DISCO Scenario; and (e). Issues due to Banking of Energy was submitted respectively. In this regard, ABSPPL on the "Issues due to Banking of Energy" it was submitted that the injections and actual withdrawals of energy cannot be equal at all times and results in imbalances which need to be settled. Furthermore, marginal pricing mechanism could be more efficient in settling imbalances arising therein. It is pertinent to mention that The Market Operator and System Operator are in the process of implementing IT systems to automate the settlement process based on marginal pricing which will be implemented in near future. In consideration of the said, ABSPPL stressed that the concerns of the utilities may be addressed by placing suitable caps on maximum units and period for banked energy. A band or range of acceptable

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

deviations from the contracted amount may be set and restrict the frequency and magnitude of such deviations within a month. The withdrawals within the said band may be balanced out by requiring similar injections during rest of the month(s) without any additional costs. On operations beyond these bands, reasonable charges may be applied on the BPC(s) to compensate the utilities. The DISCO(s)/utilities concerns on scenario where BPC(s) will draw the banked energy from IESCO during peak hours does not apply to solar power projects which naturally generate during the wider peak hours of day time and do not produce or feed into the grid during wider off peak hours of the night time. Therefore, the solar power projects contrary to the concerns of DISCO will decrease the pressure that is put on system imbalances and improve its overall efficiency. ABSPPL suggested that till the implementation of marginal pricing mechanism, the existing practice of banking, at rates approved by the Authority, may continue. Further to the said, ABSPPL submitted that it is willing to accept any role of DISCO that the Authority defines in upcoming modifications to the relevant regulations on wheeling of electric power. Further, it is agreed that the current Wheeling Regulations do not take into account the concept of firm capacity of different technologies, especially RE. Moreover, a methodology to determine the firm capacity allocation to renewables is required to allow them to adequately and justifiably participate in the power system that takes into account the intermittent nature of resource, contribution during periods of peak loads etc. There are many methods adopted globally to determine firm capacity of renewables. One such method requires a scientific study to look at the contribution of RE technologies during n-sampled (say 100) periods of peak load to allocate a firm capacity factor to RE technologies with variable resources. The wheeler of renewable power can therefore choose to (a). Contract not more than the allocated firm capacity factor with its BPC and any imbalances will be settled through the marginal pricing mechanism, including the effect of variability in load; (b). Include multiple technologies offering firm capacity in contracting with BPC to cover its peak demand. ABSPPL stated that it is willing to accept any methodology that the Authority may approve to calculate firm capacity factors for

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

generation technologies with variable resources. In this regard, the company has considered this factor when choosing the project location and the BPC(s) therefore, the settlement of difference in Cross-DISCO Scenario is not applicable. The applicant is willing to accept any mechanism for "Settlement of differences in Cross-DISCO Scenario" that the Authority will define in any upcoming modifications in the Wheeling Regulations.

(iv). The Authority considered the above submissions of ABSPPL and considered it appropriate to proceed further in the matter of the application of ABSPPL for consideration of the grant of generation licence as stipulated in the NEPRA Licensing (Generation) Rules, 2000 (the "Generation Rules") and Licensing Regulations.

(C). Evaluations/Findings

(i). The Authority examined the submissions of ABSPPL including the information provided with its application for the grant of generation licence, comments of the stakeholders, rejoinder(s) submitted by the company/applicant/ABSPPL and the relevant provisions of NEPRA Act, the relevant rules & regulations framed thereunder in the matter.

(ii). The Authority has observed that the applicant i.e. ABSPPL is an entity incorporated under Section-16 of the Companies Act, 2017 (XIX of 2017), having Corporate Universal Identification No. 0141691 dated October 31, 2019. It is a private limited company with the principal line of business to generate and sell electricity and to carry on all or any ancillary businesses relating to generation, production, sale, storage, supply and distribution of electricity and to provide such services as are associated with or required for the said business activities and completion installation of projects of generation and sale of electricity. Further, the Memorandum of Association (MoA) also envisages to perform all other acts which are necessary or incidental to the business of electricity generation, installation, storage, transmission, distribution, supply and sale subject to permission of concerned authorities. Also the MoA envisages to

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

establish, construct, install, equip, operate, use, manage and maintain electricity generation power plants of all types and capacities subject to permission of the relevant authorities.

(iii). The Authority has observed that ABSPPL has planned setting up a Photo Voltaic-PV based generation facility of 20.00 MW to be located at village Chab, tehsil Jhand, district Attock, in the province of Punjab. According to the submitted information, the total cost of the project will be about USD 12.00 million which will be financed through a combination of debt (80% of the total cost of project i.e. USD 09.60 million) and equity (of 20% of the total cost of project i.e. USD 02.40 million). In this regard, a number of financial institution/commercial banks have shown their willingness to finance the debt portion of the project.

(iv). The Authority has observed that ABSPPL carried out a feasibility study of the project including *inter alia*, solar power plant equipment details, PV-siting details, power production estimates based on solar irradiation data of the project sites, soil tests reports, technical details pertaining to selected PV panels and other allied equipment to be used in the solar power plant, electrical studies, environmental study and project financing etc. The review of the feasibility study reveals that in order to achieve the capacity of 20.00 MW the company will be installing 46,536 PV cells each of 430 Watt. In consideration of the said, it is clarified that the company plans installing PV cells from Tier-I manufacturers including Jinko Solar, JA Solar, Renesola and LONGi Green Energy Technology Co. Limited/LONGi. It is pertinent to mention that the company has confirmed that deal for purchase of PV modules of LR4-72HPH 420-440M has been locked with LONGi where the manufacturer has assured an average capacity factor of 20.10% at P50.

(v). The Authority has considered the submissions and has observed that project envisages a wheeling arrangement whereby it will be injecting the generated electric power into the system of IESCO. According to the Grid Interconnection Study (GIS)/System Study of the project, the generation facility

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

will be connected to the network of IESCO through a 132 kV Double-Circuit-D/C transmission line measuring about 1.00 kM in length on ACSR LYNX conductor by making an In-Out arrangement from the existing 132kV Single Circuit-S/C Lakkarmar-Tamman Transmission line.

(vi). In consideration of the above, the Authority has observed that ABSPPL envisages supplying to four (04) different telecommunication service provider through the wheeling arrangement including Telenor Pakistan Limited, Pakistan Mobile Communications Limited, Pak Telecom Mobile Limited/Ufone Limited and CMPak Limited, located at I-9 Industrial Area, Islamabad-ICT, as its BPC(s) and all of the said, will be consuming more than 1.00 MW. In this regard, it is pertinent to mention BPC is defined term as stipulated in Section-2 (ii) of the NEPRA Act. According to the said, a BPC is a consumer which purchases or receives electric power, at one premises, in an amount of one megawatt or more or in such other amount and voltage level and with such other characteristics as the Authority may specify and the Authority may specify different amounts and voltage levels and with such other characteristics for different areas. In terms of Section-2 (xxva) of the NEPRA Act, for the purpose of specified means specified by regulations made by the Authority under the NEPRA Act. It is pertinent to mention that the relevant regulations in this regard are still under formation and in the absence of the same the Authority has been allowing even amount of less than 1.00 MW to be treated as BPC therefore, the Authority considers that the load of the above mentioned entities qualify the criteria to be considered as BPC(s).

(vii). The Authority observed that the proposed project, for which generation licence is being sought, is based on RE source and does not cause pollution as in the case of conventional power plants. However, the operation of the 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 ABSPPL carried out the Initial Environment Examination (IEE) study for the project and submitted the required

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

No Objection Certificate (NoC) from the Environmental Protection Agency of the Govt. of Punjab confirming that there will be no harmful impact on the environment.

(viii). The Rule-5(1) of the Generation Rules stipulates that the term of a generation licence is to be consistent with the maximum expected useful life of the units comprised in a generating facility, except where an applicant consents to a shorter term. According to the information provided by ABSPPL, its generation facility/Solar Power Plant/Solar Farm will achieve COD by September 30, 2023 and will have a useful life of more than twenty five (25) years from its COD. In this regard, ABSPPL has requested that the term of the proposed generation licence may be fixed as twenty five (25) years. In consideration of the said, the Authority has observed that the submissions of ABSPPL are in line with the industry standards and norms. In view of the said and considering the fact that ABSPPL has consented for a shorter term of twenty five (25) years, the term of the proposed generation licence may be set to twenty five (25) years from COD of the project.

(ix). 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. As the matter of rates, charges and terms and conditions of tariff between ABSPPL and its proposed BPC(s) do not affect any other consumer or third party therefore, for the purpose of tariff, it will be appropriate asking ABSPPL and the BPC(s) agreeing to a bilateral agreement and accordingly, ABSPPL may be allowed to charge the agreed tariff from the BPC(s) subsequent to the grant of the generation licence. In view of the said, a suitable article on tariff in the generation licence is proposed to be included.

(x). Regarding the Rule-3(5) of the Generation Rules which 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/power plant proposed in an application for a generation licence

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

are either not suitable on environmental grounds or do not satisfy the Least Cost Option Criteria (LCOC). In this regard, the Rule-3(5) of the Generation Rules stipulates the conditions pertaining to LCOC which includes: (a). sustainable development or optimum utilization of the RE or non-RE 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/co-generation facility/power plant 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/co-generation facility/power plant 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/co-generation facility/power plant; and (h). the optimum utilization of various sites in the context of both the short-term and the long-term requirements of the electric power industry as a whole.

(xi). In consideration of the above, it is considered that the proposed project will result in optimum utilization of the RE which was earlier untapped, resulting in pollution free electric power. It is pertinent to mention that solar is an indigenous source and such resources should have a preference for the energy security. As explained in the preceding paragraphs above, the company will be dispersing electric power into the system of IESCO for further wheeling to the BPC(s). In this regard, the Authority has observed that the Interconnection arrangement for the generation facility will involve only a 132 kV D/C transmission line measuring about 1.00 kM in length and no further constraints. In view of the said, the Authority considers that the project of ABSPPL fulfills the eligibility criteria for grant of generation licence as stipulated in the NEPRA Act, rules and regulations and other applicable documents.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(D). Grant of Licence

(i). The Authority considers that 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, the Authority is of the considered opinion that for sustainable development, all indigenous power generation resources especially RE must be developed on priority basis.

(ii). The Authority observes that the existing energy mix of the country is heavily skewed towards the thermal power plants, mainly operating on imported fossil fuels. The continuous import of fossil fuels not only creates pressure on the precious foreign exchange reserves of the country but is also an environmental concern. Therefore, in order to achieve sustainable development, it is imperative that indigenous RE resources are given priority for power generation and their development is encouraged. The Authority is really encouraged to observe that with each passing day, the cost of RE technologies is showing downward trend making the same affordable for commercial use. The Authority is also encouraged to observe that the Govt. of Pakistan is planning to enhance the share of RE from its current level of 5% of the Installed capacity to 30% of the total installed capacity by 2030. Furthermore, a number of initiatives are also being undertaken in the private sector in this regard.

(iii). The Authority has observed that in the current case, ABSPPL has approached for the grant of a generation licence for setting up a 20.00 MW_P PV based generation facility for supplying to different BPC(s) which are also existing consumers of IESCO through the Wheeling arrangement. The Authority considers that the above proposal of ABSPPL is in line with the provisions of the NEPRA Act, relevant rules and regulations framed thereunder and vision of the Govt. of Pakistan to enhance the contribution of RE in generation of electric power. The project will not only help in the development of the untapped RE

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

resource which will enhance the energy security of the country. Further, the project will also help in reducing the carbon emission by generating clean electricity, thus improving the environment.

(iv). As explained above, ABSPPL has provided the details of location, technology, size, net capacity/energy yield, interconnection arrangements, technical details and other related information for the proposed PV based generation facility/solar power plant/Solar Farm. In this regard, the Authority has observed that sponsors of the project have acquired/available with them the required land for setting up the PV based generation facility. The said details are being incorporated in the generation licence.

(v). The Authority has observed that proposed generation facility of ABSPPL will be used for supplying to different BPC(s) through wheeling arrangement. According to Section-2(ii) of the NEPRA Act, a consumer which purchases or receives electric power at one premises, in an amount of one megawatt or more or in such amount and voltage level and with such characteristics as the Authority may determine/specify is treated as BPC. It is pertinent to mention that the relevant regulation in this regard are still under formation and in the absence of the same the Authority has been allowing even amount of less than 1.00 MW to be treated as BPC therefore, the Authority allows all the above mentioned entities explained in the preceding Paras to be BPC(s) of ABSPPL.

(vi). The term of a generation licence under Rule-5(1) of the Generation Rules is required to match with the maximum expected useful life of the units comprised in a generating facility. According to the information provided by ABSPPL, the Commercial Operation Date (COD) of the proposed generation facility/solar power plant/Solar Farm will be September 30, 2023 and it will have a useful life of around twenty five (25) years from its COD. In this regard, ABSPPL has requested that the term of the proposed generation licence may be fixed as per the said useful life of generation facility/solar power plant/Solar Farm. The

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

Authority considers that said submission of ABSPPL about the useful life of the generation facility/solar power plant/Solar Farm and the subsequent request of ABSPPL to fix the term of the generation licence is consistent with international benchmarks; therefore, the Authority fixes the term of the generation licence to twenty five (25) years from COD of the project subject to provisions of Section-14B(5) of the NEPRA Act.

(vii). Regarding compliance with the environmental standards, the Authority has observed that the proposed generation facility of ABSPPL is based on PV technology which is considered as a RE resource. In this regard, ABSPPL has carried out the required IEE for the project and has obtained the required NoC from EPAGoPb. Further, ABSPPL has also confirmed that it will comply with the required standards during the term of the generation licence. In view of the importance of the issue, the Authority has decided to include a separate article in the generation licence along with other terms and conditions making it obligatory for ABSPPL to comply with relevant environmental standards at all times.

(viii). Regarding the rates, charges and terms and conditions of tariff between ABSPPL and its BPC(s), it is reiterated that under Section-7(3)(a) of the NEPRA Act, determining tariff, rate and charges etc. is the sole prerogative of the Authority. However, the Authority observes that tariff between ABSPPL and its BPC(s), does not affect any other consumer or third party. Therefore for the purpose of tariff, the Authority considers it appropriate directing ABSPPL and its BPC(s) to agree on a bilateral agreement(s) and accordingly ABSPPL will be allowed to charge the agreed tariff subsequent to the grant of the generation licence.

(ix). The Authority has duly considered the comments of different stakeholders as explained at Para-B above. In this regard, the Authority has observed that apart from CPPAGL and IESCO have raised various issues including (a). Non-Recovery of Cost of Technical Losses by DISCOs; (b). Avoiding CSC; (c). Non-recovery of UoSC of NTDC; (d). Non-recovery of

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

Stranded Costs; (e). Hybrid Consumers-BPC; (f). Dispatch of Generators; (g). Issues due to Banking of Energy: (h). Settlement of Imbalances is not the role of DISCO(s); (i). Wheeling of RE is not addressed in the relevant regulations; and (j). Settlement of difference in Cross DISCO Scenario.

(x). In this regard, the Authority vide its notification dated December 12, 2020 has made amendments in the relevant Wheeling Regulations to address the issues arising of Banking of Energy duly considering the observations of CPPAGL and IESCO. Further to the said, the Authority after detail deliberations with all the relevant stakeholders gave its determination dated January 11, 2021 addressing issues of (a). Technical Losses for Wheeling arrangement; (b). Energy Overdrawn by BPC; (c). UoSC of NTDC in Wheeling; (d). Hybrid BPC(s); and (f). Stranded Costs and CSC(s) and the same are reiterated. Regarding the balance of the observations of CPPAGL and IESCO including (a). Dispatch of Generators; (b). Settlement of Imbalances not the role of DISCO(s); (c). Wheeling of RE is not addressed in the relevant regulations; and (d). Settlement of difference in Cross DISCO Scenario, the Authority considers that all these issues are under deliberation and are likely to be addressed in the context of the forthcoming Competitive Trading Bilateral Contract Market (CTBCM) which is likely to commence shortly. According to the high level/detailed design of the said market, all the generators of the market will be dispatched centrally. Further to the said, the Market Operator will be managing the settlement of the imbalances in the CTBCM which may include the transactions occurring within any DISCO as well as within the different DISCO(s). About the observation that RE is not addressed in the Wheeling Regulations, the Authority considers that in light of discussions with the different stakeholders, certain modifications have already been made to the Wheeling Regulations. Further, if at any later stage, any additional changes are necessitated, the Authority will be making such changes as deemed fit later and the applicant/licensee(s)/registered entities/BPC(s) shall be obligated to abide the same. In view of the said, the Authority considers that all the observations of CPPAGL and IESCO stand addressed.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(xi). In consideration of the above, the Authority has observed that the DISCO(s) did not agree to the above mentioned determination of the Authority pertaining to Determination of the Wheeling Charges dated January 11, 2021 and filed Writ Petition No. 568 of 2021 in the honourable Islamabad High Court (IHC) which is pending adjudication. The honourable IHC in its judgement dated February 19, 2021 issued a restraining order on the execution of the Energy Wheeling Agreement between DISCO(s) and Wheeler(s)/Generator(s) pursuant to the impugned decision /determination of the Authority dated January 11, 2021. Further, honourable IHC vide its judgement dated July 8, 2021 in the Writ Petition No. 1592/2020 has held that exclusive right to distribute and sell electric power to the consumers by virtue of distribution licence remains intact till the expiry of the licence of the respective distribution company.

(xii). In consideration of the above, the Authority considers that current application of ABSPPL pertains to the grant of the generation licence for which it has completed all the relevant requirements of the relevant rules and regulations and therefore, qualifies for the grant of licence. The Authority acknowledges that subsequent to the grant of generation licence, ABSPPL plans to supply the generated electric power to different BPC(s) through a wheeling arrangement using the distribution network of IESCO for which it plans entering into an Energy Wheeling Agreement (EWA) subsequently. In view of the restraining order of the IHC, the utility/DISCO/IESCO is not obligated to enter into EWA but may enter the same if agreed mutually. About the decision of the IHC dated July 8, 2021 that during the term of distribution licence the utilities/DISCO(s), will hold exclusive rights in providing electric power supply to BPC(s). In this regard, the Authority has observed that the original term of the distribution licence of IESCO has already expired on November 01, 2021 therefore, its exclusivity ceased to exist anymore. In view of the said, the Authority is authorized under the relevant provisions of the NEPRA Act to allow a generation company supplying to a BPC.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(xiii). In consideration of the above, the Authority hereby approves the grant of the generation licence to ABSPPL on the terms and conditions set out in the generation licence annexed to this determination. The grant of the generation licence is subject to the provisions contained in the NEPRA Act, relevant rules, regulations framed thereunder and other applicable documents. Further to the said, the Authority directs ABSPPL to apply for a Supplier Licence under Section-23E of the NEPRA Act, once the necessary/required rules and regulations on the subject are notified and if there is a requirement for such a licence.

Authority:

Engr. Maqsood Anwar Khan
(Member)

Engr. Rehmatullah Baloch
(Member)

Retired

Rafique Ahmed Shaikh
(Member)

Engr. Tauseef H. Farooqi
(Chairman)

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

25 05 22

National Electric Power Regulatory Authority
(NEPRA)
Islamabad – Pakistan

GENERATION LICENCE
No. SGC/167/2022

In exercise of the powers conferred upon the National Electric Power Regulatory Authority (NEPRA) under Section-14(B) of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997, as amended or replaced from time to time, the Authority hereby grants a Generation Licence to:

AB SOLAR PARK (PRIVATE) LIMITED

Incorporated under Section-16 of
the Companies Act, 2017 (XIX of 2017) having Corporate Universal Identification No. 0141691, dated October 31, 2019

for its Generation Facility/Solar Farm/Solar Power Plant Located at Village Chab, Tehsil Jhand, District Attock in the Province of Punjab

(Installed Capacity: 20.00 MW_P Gross ISO)

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

Given under my hand on 25th day of May Two Thousand & Twenty Two and expires on 29th day of September Two Thousand & Forty-Eight

25 05 22

Registrar

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Article-1
Definitions

1.1 In this Licence

(a). "Act" means the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 as amended or replaced from time to time;

(b). "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;

(c). "Applicable Law" means all the Applicable Documents;

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

(e). "Bulk Power Consumer (BPC)" means a consumer which purchases or receives electric power, at one premises, in an amount of one (01) megawatt or more or in such other amount and voltage level and with such other characteristics as the Authority may specify and the Authority may specify different amounts and voltage levels and with such other characteristics for different areas;

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

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

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

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

(i). "Commissioned" means the successful completion of commissioning of the generation facility/Solar Power Plant/Solar Farm for continuous operation and despatch to the Power Purchaser;

(j). "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;

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

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

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

(m). "Distribution Company" means "a company to whom the Authority has granted a distribution licence under Section 20-21 of the Act and engaged in the distribution of electric power;

(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 electrical energy generated by the generation facility, as may be amended by the parties thereto from time to time;

(o). "Energy Wheeling Agreement-EWA" means the energy wheeling agreement, entered or to be entered into by and between IESCO and the Licensee, for the Wheeling of electrical energy generated by the generation facility/Solar Power Plant/Solar Farm, as may be amended by the parties thereto from time to time;

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

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

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

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

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

(t). "IESCO" means Islamabad Electric Supply Company Limited and its successors or permitted assigns;

(u). "Licence" means this licence granted to the Licensee for its generation facility/Solar Power Plant/Solar Farm;

(v). "Licensee" means AB Solar Park (Private) Limited and its successors or permitted assigns;

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

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

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

(z). "Power Purchaser" means the BPC(s) which will be purchasing electricity from the Licensee, pursuant to an Energy Purchase Agreement-EPA for procurement of electricity;

(aa). "Service Territory" means the service territory as defined in the distribution licence of a Distribution Company under the Act;

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

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(cc). "Wheeling" means supplying/injecting electrical energy by the Licensee into the Grid System of any Distribution Company (i.e. IESCO in the current case), at one point and receiving the same amount at any other location located in its Service Territory upon payment of use of system charges as determined by the Authority;

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

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

Article-2
Applicability of Law

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

Article-3
Generation Facilities

3.1 The location, size (capacity in MW), technology, interconnection arrangements, technical limits, technical functional specifications and other details specific to the generation facility/Solar Power Plant/Solar Farm of the Licensee are set out in Schedule-I of this Licence.

3.2 The net capacity/Net Delivered Energy of the generation facility/Solar Power Plant/Solar Farm of the Licensee is set out in Schedule-II of this Licence. The Licensee shall provide the final arrangement, technical and financial specifications and other specific details pertaining to its generation facility/Solar Power Plant/Solar Farm before its COD.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

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, subject to the provisions of Section-14(B) of the Act.

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 Generation Rules read with 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) Regulations, 2021 as amended or replaced from time to time.

Article-6
Tariff

The Licensee is allowed to charge the Power Purchaser/BPC(s) a mutually agreed tariff.

Article-7
Competitive Trading Arrangement

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

7.2 The Licensee shall in good faith work towards implementation and operation of the aforesaid Competitive Trading Arrangement in the manner and time period specified by the Authority. Provided that any such participation shall be subject to any contract entered into between the Licensee and another party with the approval of the Authority.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

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 as amended or replaced from time to time.

10.2 The Licensee shall provide a certificate on a bi-annual basis, confirming that the operation of its generation facility/Solar Power Plant/Solar Farm is in conformity with required environmental standards as prescribed by the relevant competent authority as amended or replaced from time to time.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

Article-11
Provision of Information

In accordance with provisions of Section-44 of the Act, the Licensee shall be obligated to provide the required information in any form as desired by the

Authority without any exception.

Article-12
Power off take Point and Voltage

12.1 The Licensee shall deliver electric power from its generation facility/Solar Power Plant/Solar Farm at the outgoing Bus Bar of its 132 KV grid station to IESCO. The Licensee shall be responsible for the up-gradation (step up) of generation voltage up to the required dispersal voltage level.

12.2 IESCO shall transport the above mentioned injected electric power in its system from the generation facility/Solar Power Plant/Solar Farm of the Licensee to different BPC(s) through Wheeling arrangement as stipulated in EWA.

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 on mutually agreed terms and conditions.

Article-15
Design & Manufacturing Standards

The photovoltaic cells and other associated equipment of the generation facility/Solar Power Plant/Solar Farm shall be designed, manufactured and tested according to the latest IEC, IEEE standards or any other equivalent standard in the matter. All the plant and equipment of generation facility/Solar Power Plant/Solar Farm shall be unused and brand new.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY ★ NEPRA ★ REGISTRAR

Article-16
Power Curve

The power curve for the individual photovoltaic cell provided by the manufacturer and as mentioned in Schedule-I of this generation licence, shall

form the basis in determining the cumulative power curve of the generation facility/Solar Power Plant/Solar Farm.

Article-17
Compliance with Applicable Law

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

Article-18
Corporate Social Responsibility

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

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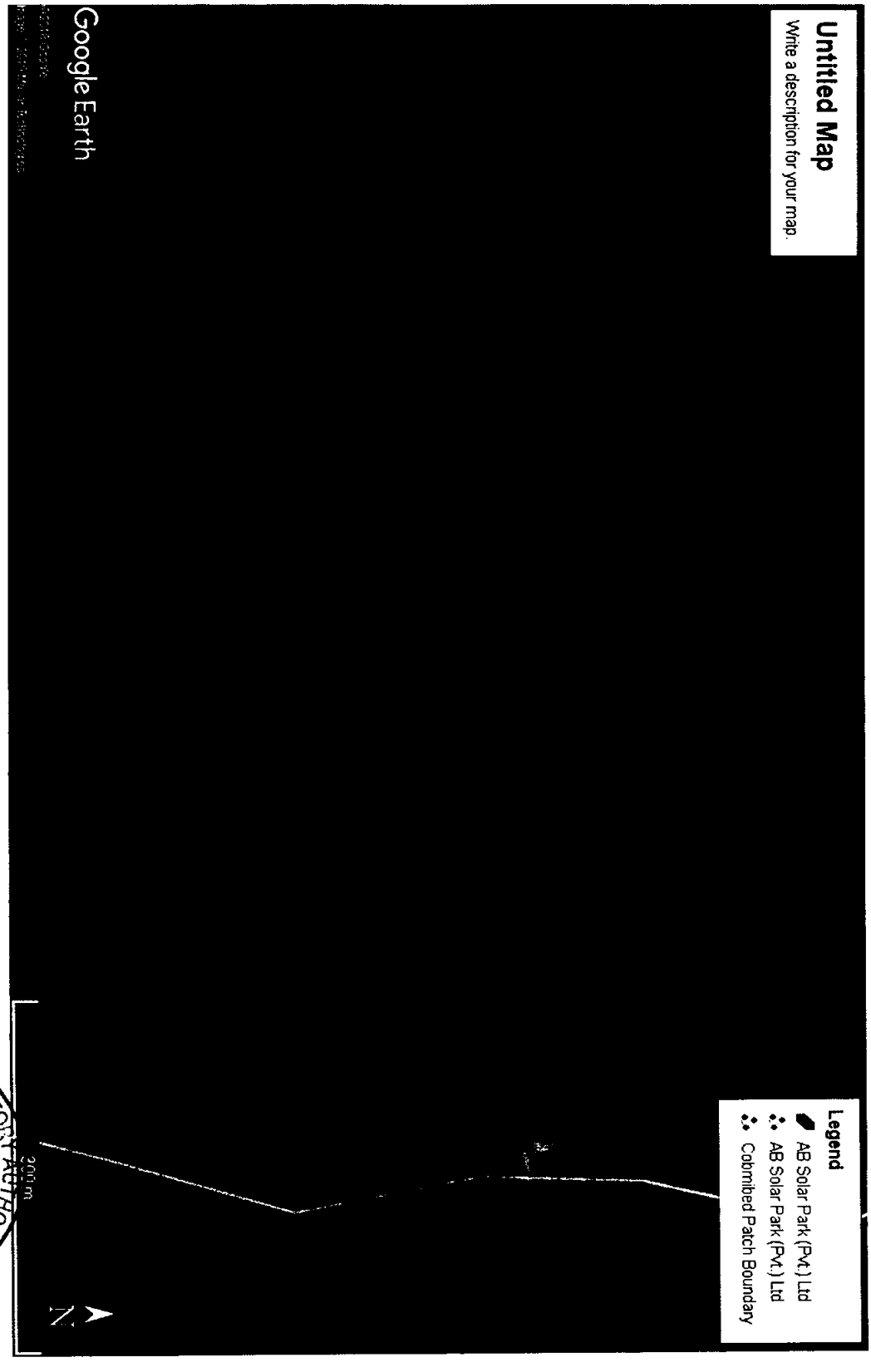
REGISTRAR
NEPRA

SCHEDULE-I

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

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

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



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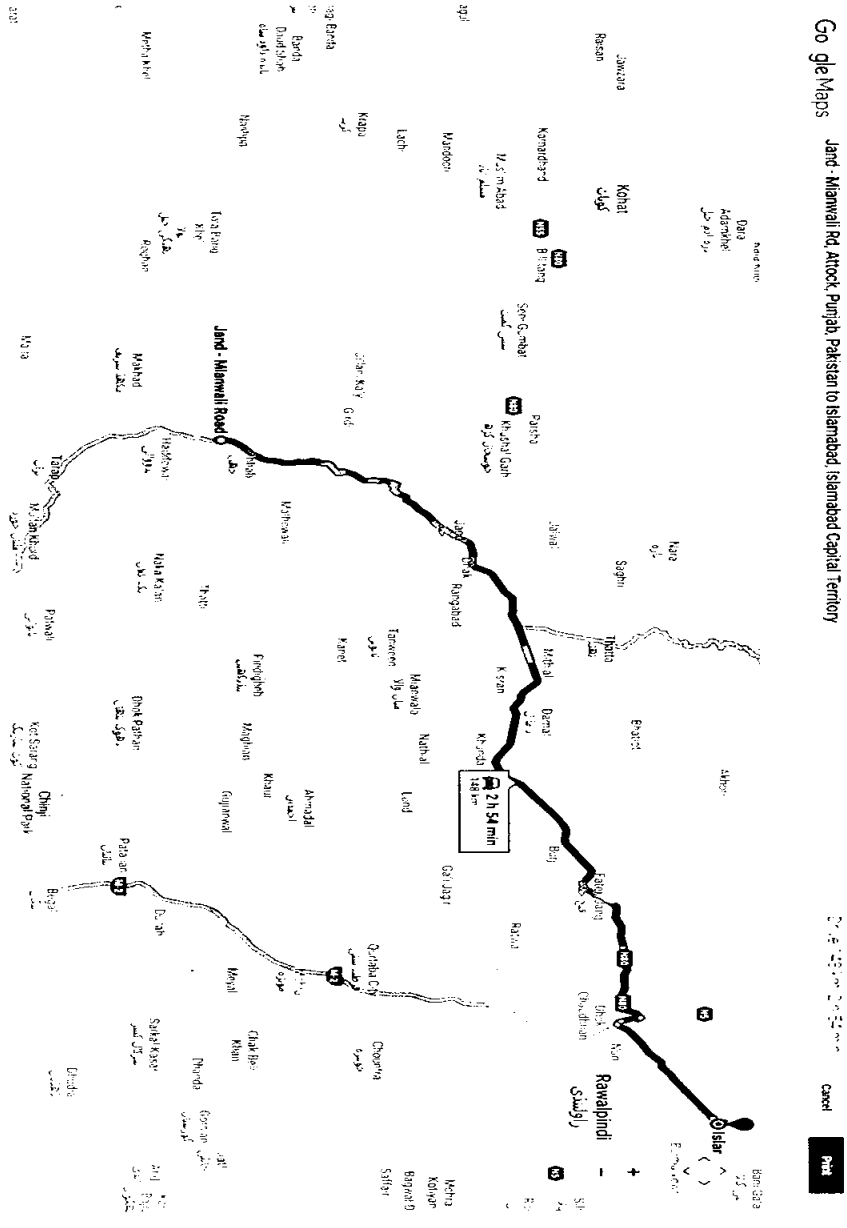
Location of the Generation Facility/Solar Power Plant/Solar Farm of the Licensee



Site of the generation facility/project	Village Chab
Tehsil/District/Province	Jhand/Attock/Punjab
Latitude	33°12'48.53"N
Longitude	71°51'14.52"E
Site Area of the generation facility/Project (Assessed)	70 Acres

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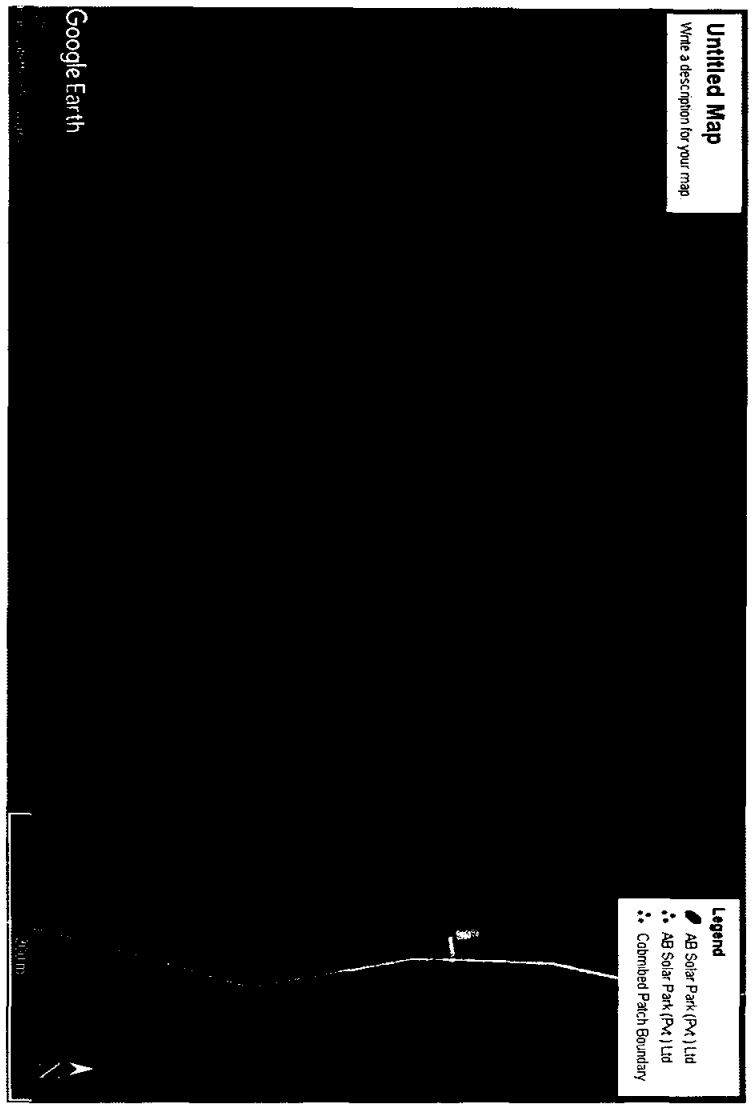
REGISTRAR
NEPRA

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



Serial Number	Location	Latitude	Longitude
1.	Village Chab	33°12'53.07"N	71°51'8.53"E
2.		33°12'42.47"N	71°51'20.95"E
3.		33°12'53.39"N	71°51'21.08"E
4.		33°12'42.53"N	71°51'8.71"E

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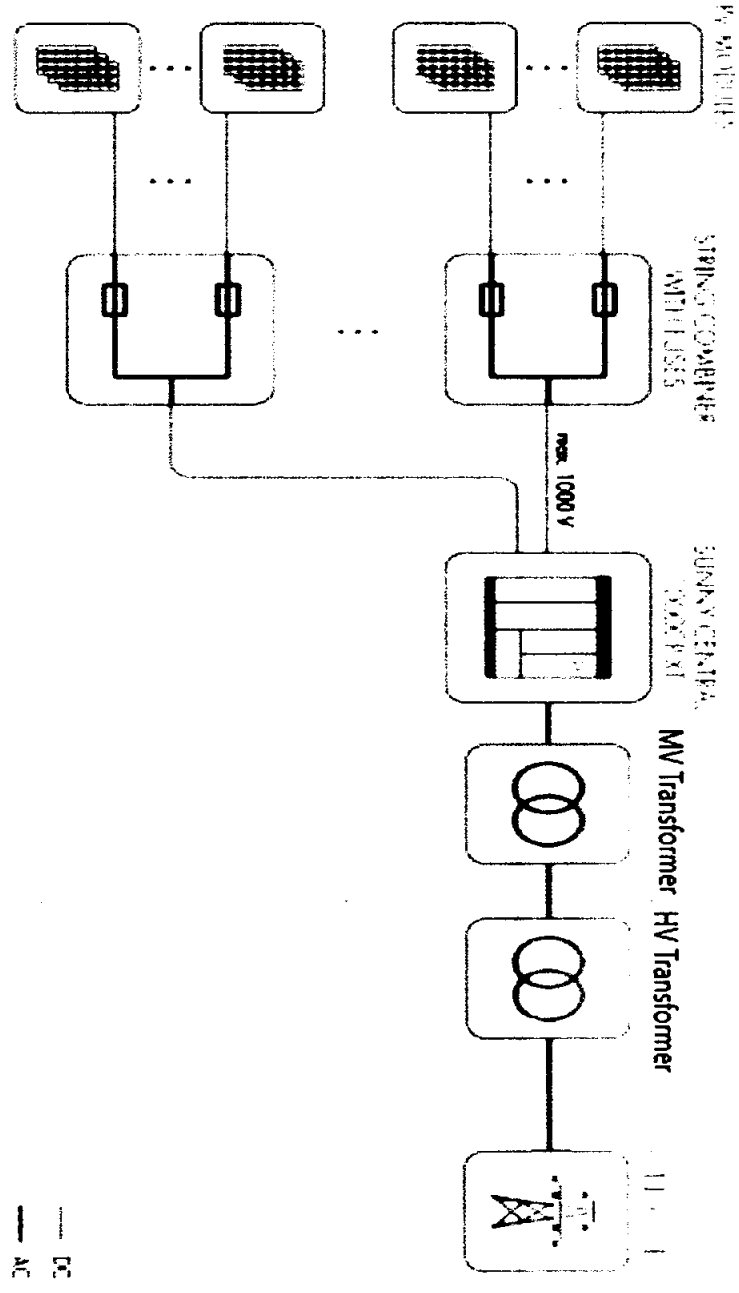
Process Flow Diagram of the Generation Facility/Solar Power Plant/Solar Farm of the Licensees



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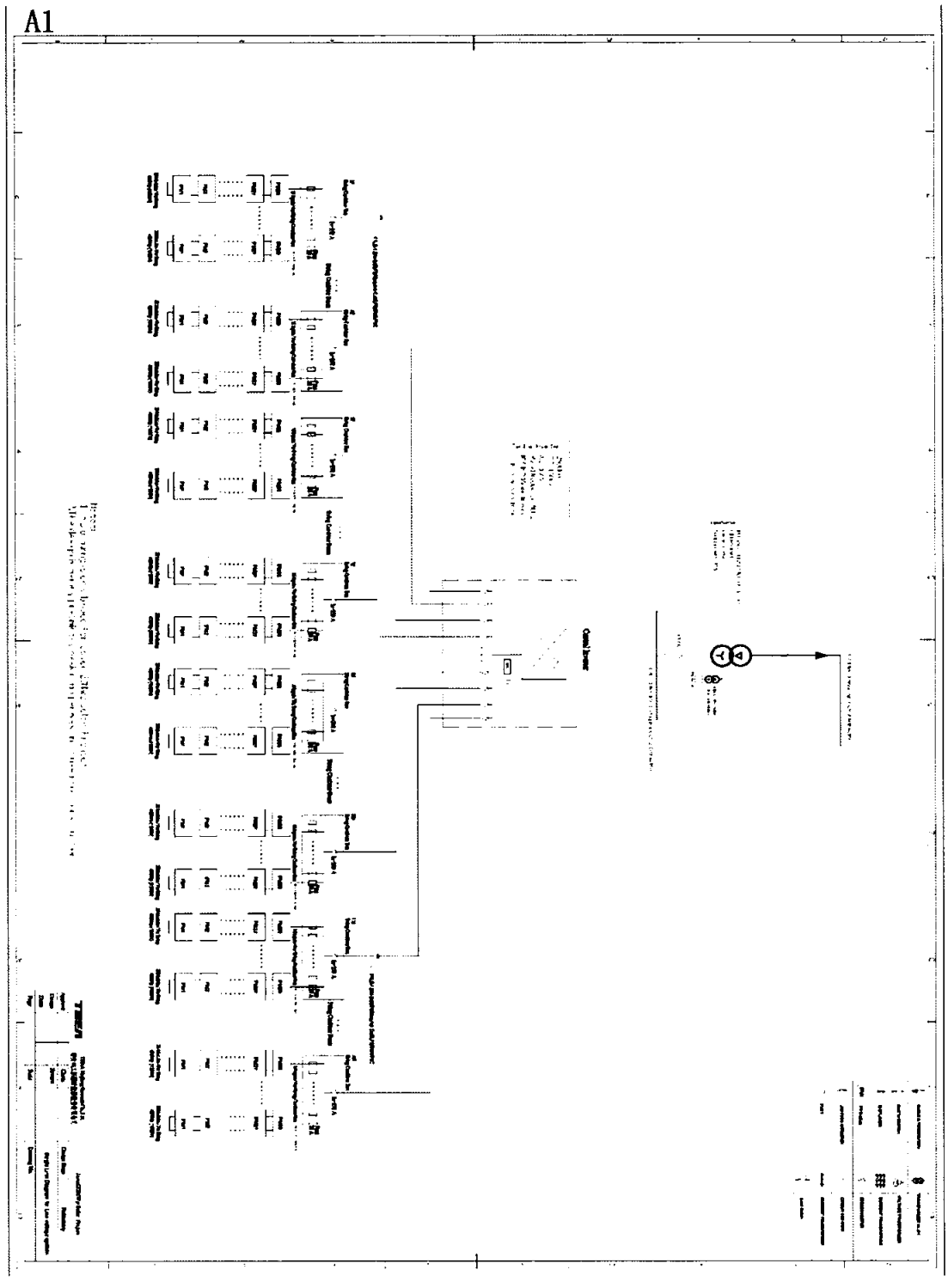
REGISTRAR
NEPRA

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



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

The electric power generated from the generation facility/Solar Power Plant/Solar Farm of the Licensee/AB Solar Park (Private) Limited-ABSPPL shall be dispersed to the load center of IESCO for wheeling.

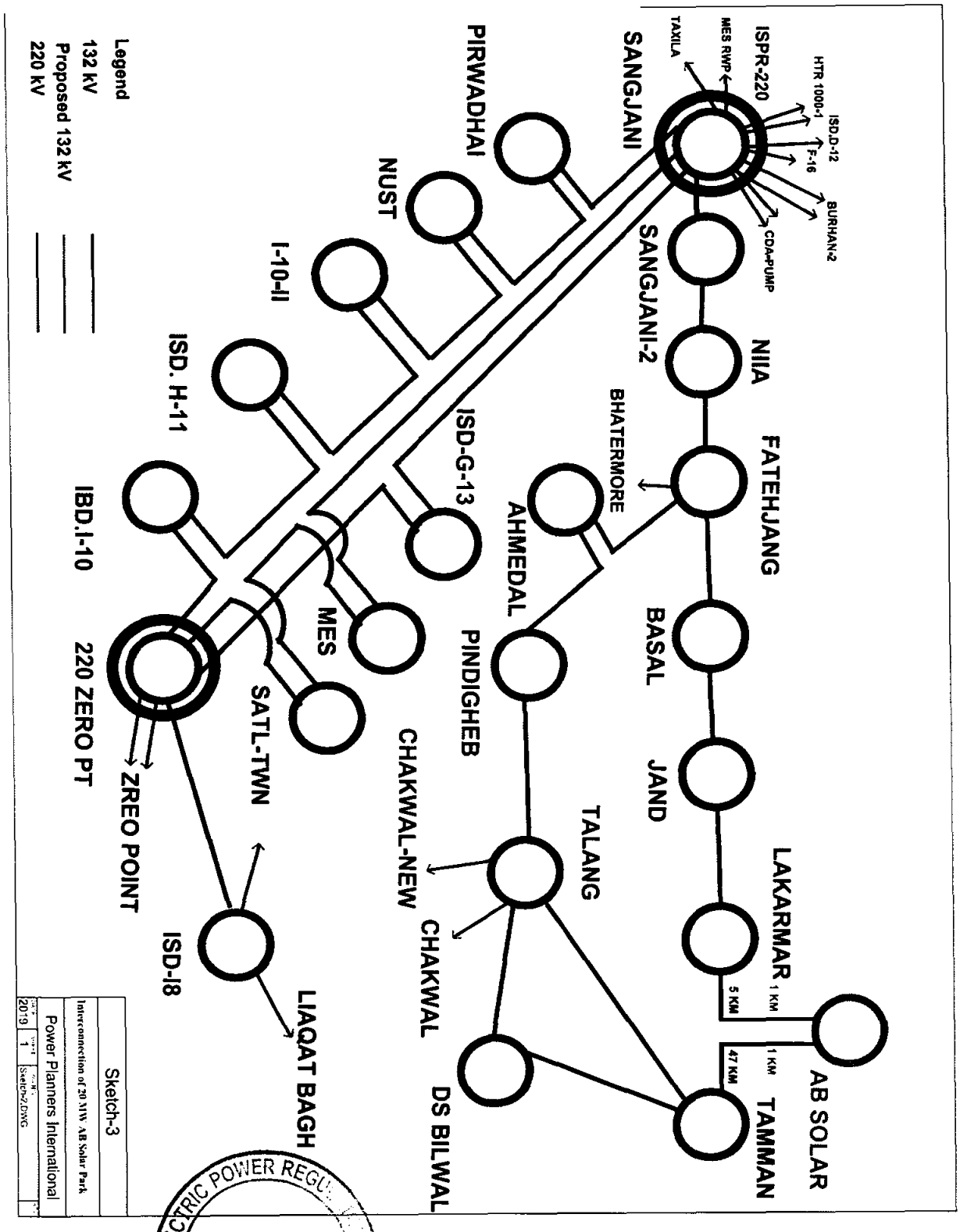
(2). In this regard, the Interconnection/Transmission Facilities for dispersal of power will be a 132 KV Double Circuit (D/C) Transmission Line measuring about 1-km in length on ACSR LYNX Conductor by making an In-Out of 132 S/C Lakarmar-Tamman trasnmission line.

(3). The electric power injected by the Licensee in the system of IESCO will be wheeled to the network of IESCO and will be supplied to different BPC(s) as indicated/including in the Second Tier Supply Authoritzation attached herewith[1]. In order to wheel the power, IESCO will be charging the Licensee a Use of System Charge (UoSC) as per the determination of the Authority.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

[1] The Licensee/company/ABSPPL shall provide the detail(s) of any new/additional BPC(s) other than mentioned above, before starting supply of electric power to it and will get the name of BPC included in the Generation Licence through a modification as stipulated in the Licensing Regulations.

Schematic Diagram
for Interconnection Arrangement/Transmission Facilities for Dispersal of Power



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Details of Generation Facility/Solar Power Plant/ Solar Farm

(A). General Information

(i).	Name of the Company/Licensee	AB Solar Park Private Limited
(ii).	Registered/Business office of the Company/Licensee	House no. 28, Street No. 2, Sector E-11/1, MPCHS, Islamabad
(iii).	Location of the generation facility Solar Power Plant/ Solar Farm	Village Chab, Jhand Tehsil, District Attock, Punjab
(iv).	Type of the generation facility/ Solar Power Plant/ Solar Farm	Solar Photovoltaic (PV)

(B). Solar Power Generation Technology & Capacity

(i).	Type of Technology	Photovoltaic (PV) Cell
(ii).	System Type	Grid Connected
(iii).	Installed Capacity of the generation facility Solar Power Plant/ Solar Farm (MW)	20.00 MW_P

(C). Technical Details of Equipment

(a).	**Solar Panels – PV Modules**	
(i).	Type of Module	PV Modules crystalline silicon (Mono-crystalline)
(ii).	Type of Cell	Low LID mono PERC half cut
(iii).	Dimension of each Module	Dimensions (L×W×H) (mm) 2115×1052×35
(iv).	Module Surface Area	2115x1052 (mm)
(v).	No. of Panel /Modules	46,536 Solar PV modules
(vi).	Total Module Area	103,541 sq. m
(vii).	Total Land Area Used	70 acres

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(viii).	Panel's Frame	Anodized aluminium alloy frame.
(ix).	Weight of one Module	24 kg
(x).	Module Output Warranty	10 year product warranty
		25 years Linear power output warranty
(xi).	Number of Solar Cells in each module	144-cell (6x24)
(xii).	Efficiency of module	19.3%
(xiii).	Environment Protection System	ISO 14001:2004: ISO Environment Management System
(xiv).	Nominal Maximum Power (P_{max}) at STC	430 W
(xv).	Power Tolerance at STC	0 - +5 W
(xvi).	Open circuit voltage (V_{oc}) at STC	49.2 V
(xvii).	Short circuit current (I_{sc}) at STC	11.19 A
(xviii).	Maximum system Voltage at STC	1500 DC (IEC/UL)
(b).	**PV Array**	
(i).	No. of PV modules	46,536
(ii).	Modules in a string	28 module
(iii).	Total number of strings	1662
(c).	**PV Capacity**	
(i).	Total	20 MWp
(ii)	Junction Boxes	IP 68, three diodes
(d).	**Inverters**	
(i).	Inverter Model	TC2500KF
(e).	**Input (DC)**	
(i).	Max. Allowable Input voltage	1500V

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(ii).	MPP voltage range [@ 25°C/@ 40°C/@ 60°C]	900V to 1300V	
(iii).	Maximum DC Current	3118A	
(iv).	Rated Input Voltage	900V	
(v).	Max. Number of Inputs	16*400A or 20*250A	
(f).	**Output (AC)**		
(i).	Max. AC power @ 40°C	2,750kVA	
(ii)	AC frequency operation range	48/52Hz	
(iii).	Rated power frequency/rated grid voltage	50 Hz / 630 V	
(iv).	Power factor at rated power/ Displacement power factor, adjustable	1/0.8 leading to 0.8 lagging, adjustable	
(v).	Feed-in phases/ connection phases	3/3	
(g).	**Efficiency**		
(i)	Max. efficiency/ European efficiency/ CEC efficiency	99% / 98.7%	
(h).	**Protective Devices**	(a). Input-side disconnection device (b). Output-side disconnection device (c). DC overvoltage protection (d). Stand-alone grid detection active/passive (e). Grid monitoring (f). Ground fault monitoring (g). Insulation monitoring (h). Surge arrester for auxiliary power supply	
(i).	**Environmental Enclosures**	Operating Temperature Range	-25C - +60C (above 50C, derating)
		Maximum permissible value for relative humidity (non-condensing)	0% - 95% (non-condensing)
		Noise emission	68 dB(A)

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
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		Operating Elevation	4000m, without derating ≤ 2000m (according to GB/T3859.2)
(j).	**Grid Operation Protection**	(a).	Over-voltage/undervoltage Protection
		(b).	Over-frequency/under frequency protection
		(c).	Anti-island protection strategy
		(d).	Over-current protection
		(e).	Anti-discharge protection
		(f).	Overload protection
		(g).	Low voltage ride through
		(h).	Lightning protection
		(i).	ZVRT
		(j).	Anti-discharge protection
		(k).	Stand-alone Grid detection
(k).	**<u>Data Collection System</u>**		
(i).	Weather Data	(a).	Pyranometer – Sets (Incline to record irradiation level) [Yes]
		(b).	Thermometer – Sets (to record ambient temp) [Yes]
(ii).	System Data	(a).	DC input voltage (V) & current (A) of each inverter (phase, line) [Yes]
		(b).	Total DC power (kw) generated by PV array [Yes]
		(c).	AC output voltage (V) and current (A) of each Inverter (Phase, Total)

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

			[Yes]
		(d).	AC output power (kW) and energy (kwh) of each inverter [Yes]
		(e).	Frequency (Hz) [Yes]
		(f).	Power Factor (PF) [Yes]
		(g).	Temperature inside inverter station [Yes]
(l).	**Isolating Transformer**		
(i).	Model	Siemens	
(m).	**Medium Voltage Side**		
(i).	Rating	630V // 33kV step-up	
(ii).	Type of Transformer	Oil and Natural Air	
(iii).	Input voltage	630V	
(iv).	Output Voltage	33kV	
(v).	Purpose of Transformer	Step-up	
(n).	**Low-Voltage Side**		
(i).	Nominal Input Voltage	630 V	
(o).	**Outdoor Cubicle Control Room**		
(i).	Data record	Continuous logging with data logging software [Yes]	
(ii).	Control room system	Computerized data acquisition system [Yes]	
(iii).	Control room system detail	Interfacing hardware & software, Industrial type PC, which will be robust & rugged suitable to operate in the control room environment [Yes]	
(p).	**Mounting Structure**		
(i).	Application	Ground Mounted	
(ii).	Model	Sigma I XL	

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

(iii).	Module Layout	Multi-variation, maximum table length 25 m
(iv).	Module inclination	26°
(v).	Quantity	70,000
(vi).	Structure Profile/s	Steel Zinc –flake-coated Stainless Steel Extruded aluminium
(vii).	Foundation structure	Reinforced concrete pile or Spiral steel piles

(D). Other Details

(i).	Expected COD of the generation facility Solar Power Plant/ Solar Farm	September 30, 2023
(ii).	Expected useful Life of the generation facility Solar Power Plant/ Solar Farm from the COD	25 years

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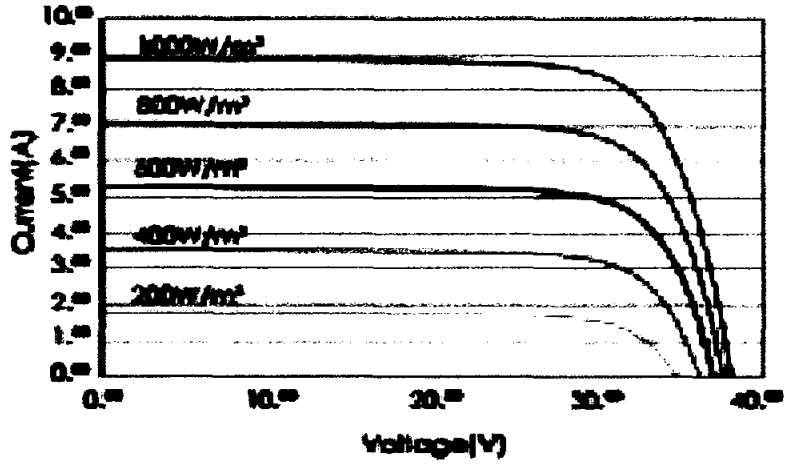
V-I Curve
of Solar Cell of Generation Facility/Solar Power Plant/ Solar Farm



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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/Solar Farm of Licensee are given in this Schedule.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

SCHEDULE-II

(1).	Total Installed Capacity of the Generation Facility/Solar Power Plant/Solar Farm	20.00 MW_P
(2).	Average Sun Hour Availability/Day (Irradiation on Inclined Surface)	6 Hours
(3).	No. of days per year	365 days
(4).	Annual generating capacity of Generation Facility/Solar Power Plant/Solar Farm (As Per Simulation)	35,357 MWh
(5).	Total expected generation of the Generation Facility/Solar Power Plant/Solar Farm during the twenty five (25) years term of this licence	883,925 MWh
(6).	Annual generation of Generation Facility/Solar Power Plant/Solar Farm based on 24 hours working	20 x 24x 365 = 175,200
(7).	Net Capacity Factor of Generation Facility/Solar Power Plant/Solar Farm	20.10% at P_{50}

Note

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

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

Authorization of Authority for Allowing AB Solar Park (Private) Limited-ABSPPL for Supplying to Bulk Power Consumer(s)

Incorporated under Section-16 of the Companies Act, 2017 (XIX of 2017) having Corporate Universal Identification No. 0141691, dated October 31, 2019

GENERATION LICENCE No. SGC/167/2022
For
Sale to Bulk Power Consumer(s)

Pursuant to Section-22 of the Act and Rule-7 of the Generation Rules, the Authority hereby authorizes the AB Solar Park (Private) Limited-ABSPPL /(the Licensee) to engage in Second-Tier Supply business, limited to the consumer(s) as follows:-

(1). Telenor Pakistan Limited, I-9 Industrial Area, Islamabad, ICT;

(2). Pakistan Mobile Communications Limited, I-9 Industrial Area, Islamabad, ICT;

(3). Pak Telecom Mobile Limited-Ufone Limited, I-9 Industrial Area, Islamabad, ICT; and

(4). CMPak Limited, I-9 Industrial Area, Islamabad, ICT.

Authority

Engr. Maqsood Anwar Khan Engr. (Member)	Engr. Rehmatullah Baloch (Member)
Engr. Rafique Ahmad Sheikh (Member)	Engr. Tauseef H. Farooqi (Chairman)

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