# National Electric Power Regulatory Authority
## Islamic Republic of Pakistan

Registrar

NEPRA Tower, Attaturk Avenue (East), G-5/1, Islamabad
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Web: www.nepra.org.pk, E-mail: registrar@nepra.org.pk

No. NEPRA/R/DL/LAG-463/29890-96 September 10, 2020

**Mr. Mujtaba Haider Khan,**
Chief Executive Officer,
Grid Edge (Private) Limited,
3rd Floor, Dawood Centre, MT Khan Road,
Karachi
Contact No. 021-35632200

Subject: **Grant of Generation Licence No. SGC/144/2020**
**Licence Application No. LAG-463**
**Grid Edge (Private) Limited (GEPL)**

*Reference: GEPL's application submitted vide letter dated August 07, 2019.*

Enclosed please find herewith Generation Licence No. SGC/144/2020 granted by National Electric Power Regulatory Authority (NEPRA) to Grid Edge (Private) Limited (GEPL) for its 03.06 MW Solar Power Plant located at Crescent Bahuman Limited, Tehsil Pindi Bhattian, District Hafizabad, in the Province of Punjab, pursuant to Section 14B of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997/Amendment Act, 2018. Further, the determination of the Authority in the subject matter is also attached.

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

**Enclosure: As Above**

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**(Syed Safeer Hussain)**

Copy to:

1. Secretary, Ministry of Energy, Power Division, A-Block, Pak Secretariat, Islamabad.
2. Chief Executive Officer, Alternative Energy Development Board (AEDB), 2nd Floor, OPF Building, G-5/2, Islamabad.
3. Chief Executive Officer, CPPA-G, ENERCON Building, Sector G-5/2, Islamabad.
4. Managing Director, NTDC, 414-WAPDA House, Lahore.
5. Chief Executive Officer, Faisalabad Electric Supply Company Limited, Abdullahpur, Canal Road, Faisalabad.
6. Director General, Environmental Protection Department, Government of Punjab, National Hockey Stadium, Ferozpur Road, Lahore

# National Electric Power Regulatory Authority (NEPRA)

## Determination of the Authority in the Matter of Application of Grid Edge (Private) Limited for Grant of the Generation Licence

**September 10, 2020**
**Case No. LAG-463**

## (A). Filing of Application

**(i).** Grid Edge (Private) Limited (GEPL) submitted an application on August 09, 2019 for the grant of generation licence in terms of Section-14B of the 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 application was deficient in terms of the Licensing Regulations. Accordingly, the Registrar directed GEPL for submitting the missing information/documents as required under the said regulations. GEPL completed the submission of missing information/documentation by September 05, 2019. Accordingly, the Registrar submitted the matter for the consideration of the Authority to decide the admission of the application or otherwise.

**(iii).** 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 October 25, 2019 for consideration of the grant of the generation licence as stipulated in Regulation-7 of the Licensing Regulations. The Authority also approved an advertisement to invite comments of general public, interested and affected persons in the matter as stipulated in Regulation-8 of the

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Licensing Regulations. Subsequently, notices were published in one (01) Urdu and one (01) English newspaper on October 30, 2019.

**(iv).** In addition to the above, the Authority approved a list of stakeholders 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 October 30, 2019, soliciting their comments for assistance of the Authority.

## (B). Comments of Stakeholders

**(i).** In reply to the above, the comments were received from two (02) stakeholders including Central Power Purchasing Agency (Guaranteed) Limited (CPPAGL) and Ministry of Science and Technology Govt. of Pakistan (MoST). The salient points of the comments offered by the said stakeholder are summarized in the paragraphs as below:

**(a).** CPPAGL submitted that GEPL plans to set up a 3.06 $MW_P$ Photovoltaic (PV) based generation facility for supplying to Crescent Bahuman Limited (CBL). In this regard, the Authority is required to scrutinize all the applications for the grant of generation licence based on the Least Cost Option Criteria (LCOC) as stipulated in the NEPRA Licensing (Generation) Rules, 2000 (the "Licensing Rules") including (a). the costs and rights-of-way considerations related to the provision of transmission and interconnection facilities; (b). the constraints on the transmission system likely to result from the proposed generation facility and the costs of the transmission system expansion required to remove such constraints; (c). the short-term and the long-term forecasts for additional capacity requirements; (d). the tariffs resulting or likely to result from the construction or

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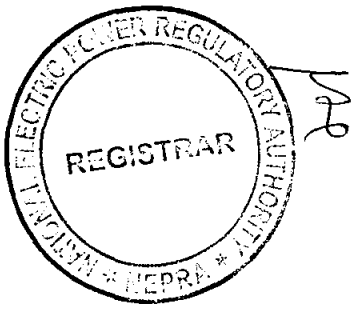
operation of the proposed generation facility; and (e). the optimum utilization of various sites in the context of both the short-term and the long-term requirements of the electric power industry as a whole. As per the existing tariff structure for the end consumer, the major portion of fixed charge (Capacity, UoSC, MOF, DM) is being recovered through sale of energy to end consumers (i.e. Volumetric Charges). As a result, the more the number of units being sold, the less will be the per unit rate for the fixed capacity charges and vice versa.

**(b).** In the view of foregoing, CPPAGL suggested (a). a Quantum for Distributed Generation needs to be ascertained in light of the demand projections (against which agreements/procurements have already taken place) while keeping in view the energy charge avoided by the Distributed Generation consumers/source against which the capacity charge was supposed to be recovered (as per existing tariff structure of the end consumers); (b). a uniform tariff required to be introduced (in the existing end consumer tariff setting framework) for the Grid Connected Distributed Generator Consumer (be it for Net-Metering or Self-Consumption) by incorporating a new tariff category in the Schedule of Tariff (SOT); (c). A separate Category for Grid-Connected Distribution Generation (be it for Net-Metering or Self-Consumption) needs to be introduced through a Central Planning Mechanism in order to ensure proper registration and charge of respective tariff; (d). The design of the competitive wholesale market i.e. CTBCM has already been submitted to the Authority for its approval. Unless the design of the competitive wholesale market is approved and the wholesale market



become functional, the retail suppliers could not carry out the sales/purchase transactions without any market framework. Therefore, the first prerequisite in this regard is to have an approved model of the competitive wholesale market from the regulator in order to proceed further towards the retail market; and

**(c).** MoST stated that installation of the PV based generation facility at CBL will help in overcoming electricity shortage and decrease load on the grid of the area. In this regard, Polycrystalline PV modules are being proposed for the proposed generation facility and it is recommended that the same must be from the Tier-I manufacturers as well as IEC and UL certified.

**(ii).** The Authority considered the above comments and in view of the observations of CPPAGL and MoST, considered it appropriate to seek the perspective of GEPL in the matter. In reply to the comments of CPPAGL, it was submitted that the relevant rules and regulations does not restrict the Bulk Power Consumer (BPC) to shift load to captive or RE in line with government policy of reducing carbon footprint and sustainable indigenous energy sources. The demand fluctuation by BPC can be attributed to reasons including but not limited to business cycle, seasonality and market trends. There is no regulation which imposes energy charge in case consumer uses less electricity for any reason. The proposed BPC has its own Captive Power Plant using furnace oil and its reliance on grid is already minimal (i.e. less than 10% of its energy needs) and with this project, the consumer will end up relying more on grid because solar integration in this case is aimed at reducing dependency on captive fuel mix. Regarding the observation of CPPAGL that the CTBCM must be approved before considering the case of GEPL for the grant of the generation licence. In this regard, the Authority has already approved the CTBCM. About the

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observations of MoST, it was confirmed that the proposed PV modules will not only be of Tier-I manufactures but will also be IEC and UL certified.

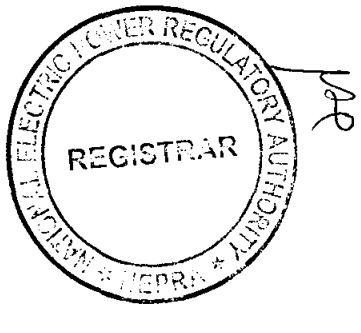
**(iii).** The Authority considered the above submissions of GEPL and considered it appropriate to proceed further in the matter of the application of GEPL for consideration of grant of Generation Licence as stipulated in the Licensing Regulations and NEPRA Licensing (Generation) Rules, 2000 (the "Generation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

## (C). Evaluations/Findings

**(i).** The Authority examined the submissions of GEPL including the information provided with its application for the grant of Generation Licence, the comments of the stakeholders, rejoinder submitted by company/applicant/GEPL, the relevant rules & regulations in the matter.

**(ii).** The Authority has observed that the applicant i.e. GEPL is an entity incorporated under Section 16 of the Companies Act, 2017 (XIX of 2017), having Corporate Universal Identification No. 0122474, dated August 08, 2018 complying with the provisions of Section-24 of the NEPRA Act. Further, it has also been observed that GEPL is a private limited company with the principal line of business of to generate, accumulate, transmit, distribute, purchase, sell and supply electric power or any other energy and power generated by any source i.e. conventional or non-conventional resources.

**(iii).** The Authority has duly considered the provisions of the Memorandum of Association and Articles of Association of the company and has observed that the applicant company i.e. GEPL has been incorporated jointly by Reon Energy Limited (REL) and Eni International B.V. (ENIIBV) having equity contribution in the proportion of 60:40 specifically to operate in the Renewable Energy (RE) Sector of Pakistan. REL, is Renewable Energy arm of Dawood Group looking after the solar energy business for the Group.



REL has delivered projects at various locations for different industrial consumers having sizing of 1.00 MW and above including Service Industries, Kohinoor Textiles and Nobel Energy- a part of the Wah Nobel Group. REL with an installed distributed captive capacity of over 10.00MW in the cement sector with another 15.00 MW is underway, is now recognized as the leader in high quality installations whilst providing customers with clean energy and minimizing their energy price risk. The company has successfully obtained ISO 14001 Certification. As explained above, the other equity holder of the applicant company is ENIIBV which is a company of Eni S.p.A. (ENI) is the ultimate shareholder of ENIIBV. It has been noted that ENI is one of the world's largest integrated energy company, operating in more than seventy (70) countries worldwide. It has also been noted that as of March 31, 2018, the market capitalization of the parent company was calculated at US $ 64.00 billion. In terms of the said revenue, the parent company has been consistently ranked among the top 150 companies in the Fortune Global 500 list. ENI is working closely with all the stakeholders towards improving access to energy in the countries where it operates and making maximum effort to reduce direct emissions of CO2.

**(iv).** As explained above, the company i.e. GEPL pursuing a Generation Licence, has been incorporated to operate in the RE sector of the country and the current project being undertaken is setting up a PV solar based generation facility of 3.06 $MW_P$ for providing the generated electricity to the CBL. It is observed that currently CBL has a Captive Power Plant (CPP) with a cumulative installed capacity of 23.03 MW (consisting of 2 x 5.20 MW RFO engine + 1 x 0.83 MW Diesel Engine + 1 x 3.07 MW Gas Engine + 1 x 8.73 MW Gas Engine). Further, CBL is also an existing consumer (B3 with connected load of 4.85 MW) of GEPCO. However, with the setting up of the proposed PV based generation facility, CBL will have three different resources i.e. its CPP, GEPCO and the proposed PV based generation facility. The proposed arrangement will result in reducing emissions of $CO_2$ to the atmosphere thus benefitting to the environment. According to the submitted information, the total cost of the project will be

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approximately PKR 280.00 Million. Out of which 75% (PKR 210.00 Million) will be the debt and 25% (PKR 70.00 Million) will be equity. The debt portion of the project will be arranged through SBP Green Financing for which JS Bank has shown interest.

**(v).** The Authority has considered the submissions of GEPL and observed that the company carried out a feasibility study of the project including, *inter alia*, details of equipment of PV solar plant, PV-sitting details, power production estimates and other allied equipments. According to the feasibility study, the project company/GEPL will be setting up a PV based generation facility/solar power plant/ Roof-Top Solar to the tune of 3.06 $MW_P$ to be located on roof top of CBL at Pindi Bhattian, District Hafizabad, in the province of Punjab. In this regard, the proposed generation facility/solar power plant/ Roof-Top solar will be requiring about 10 acres of land which will be provided by the CBL under the arrangement entered with GEPL.

**(vi).** The review of the feasibility study reveals that for the proposed approximately 3.06 $MW_P$ generation facility/solar power plant/ Roof-Top Solar the company will be installing 9576 PV cells each of 320 Watt. In consideration of the said, the project company/GEPL has submitted that PV cells/panels of Golden Concord Group (GCL) China have been selected for the project. It is pertinent to mention that GCL is an international energy conglomerate specializing in clean and sustainable energy. The selected PV cells and other allied equipment will result in capacity factor of about 15.85 % supplying more than 27.00 million units (kWh) annually of green and clean energy to CBL.

**(vii).** As explained above, GEPL will be supplying the generated electric power from its proposed PV based generation facility/solar power plant/Roof-Top Solar only to CBL as BPC as stipulated in Section-22 of the NEPRA Act. According to the system study of the project, the dispersal to the BPC will be made at 11 kV through underground cables/feeders located on private property owned by the BPC itself without involving any public or

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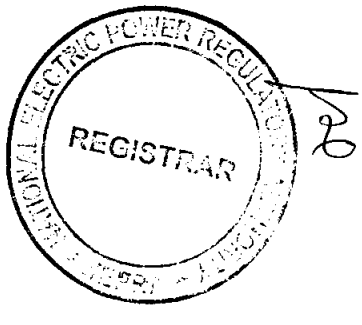
third party. It is confirmed that GEPL has completed the Initial Environmental Examination (IEE) for the project and Environmental Protection Agency, Government of Punjab (EPAGoPb), has also issued the No Objection Certificate (NOC) for the project.

**(viii).** Further to the above, Section 2(v) of the NEPRA Act defines the term "Distribution" wherein the ownership, operation, management and control of distribution facilities located on private property and used solely to move or deliver electric power to the person owning, operating, managing and controlling those facilities or to tenants thereof is not included in the definition of "distribution". As explained above, the distribution facility to be used for delivery of electric power to aforementioned entity is located on private property (without involving any public property or any third party) will be owned, operated, managed and controlled by the entity being supplied therefore, the supply of electric power to this entity by GEPL does not constitute a distribution activity under the Act, and a distribution licence will not be required by the company.

**(ix).** The grant of a generation licence is governed by the provisions of Rule-3 of the Generation Rules. It is pertinent to mention that GEPL has provided the details of the proposed generation facility about (a). location; (b). size; (c). technology; (d). interconnection arrangement; (e). technical limits; (f). technical functional specification and (g). other specific/relevant details as stipulated in Rule-3 (1) of the Generation Rules. According to the Rule-3(5) of the Generation Rules, the Authority may refuse to issue a generation licence where the site, technology, design, fuel, tariff or other relevant matters pertaining to the proposed generation facility/solar power plant/ Roof-Top Solar proposed in an application for a generation licence are either not suitable on environmental grounds or do not satisfy the 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/solar power plant/ Roof-Top Solar 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/solar power plant/Roof-Top Solar 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/solar power plant/Roof-Top Solar; and (h). the optimum utilization of various sites in the context of both the short-term and the long-term requirements of the electric power industry as a whole.

**(x).** In view of the above, the Authority considers 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 resource and such resources should be given preference for the energy security. As explained in the preceding paragraphs above, the company will be supplying electric power to a BPC directly which only involve laying a feeder measuring a few meters in length, this concludes that the project will not face any constraints in transmission of electric power. Further, being located in the same vicinity as that of the BPC, the project will not result in cost and right-of-way issue for the provision of interconnection facilities. In view of the said, it is considered that the project of GEPL fulfills the eligibility criteria for grant of generation licence as stipulated in the NEPRA Act, rules and regulations and other applicable documents.

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## (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, GEPL has approached for the grant of a Generation Licence for setting up a generation facility with Installed Capacity of 3.06 $MW_p$ for supplying to a BPC which is also existing consumer of its respective DISCO. The Authority considers that the above proposal of GEPL 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 GEPL in diversifying its portfolio but will also

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

**(iv).** As explained above, GEPL 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/ Roof-Top Solar. In this regard, the Authority has observed that sponsors of the project have acquired/available with them the required land for setting up the distinct PV based generation facility. The said details are being incorporated in the generation licence.

**(v).** The Authority has observed that proposed generation facility of GEPL will be used for supplying to a BPC. 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 entity explained in the preceding Paras to be BPC of GEPL.

**(vi).** Regarding supply to the BPC, the Authority observes that the BPC and the proposed generation facility of GEPL is located within the same premises and the BPC will be supplied through underground cable/feeder of 11kV. Pursuant to proviso to Section-21 of the NEPRA Act, the Authority is empowered to allow a generation company to sell electric power to a BPC located in the service territory of a distribution company. In view of the said, the Authority allows the GEPL to sell electricity to BPC. Further, under Section-2(v) of the NEPRA Act, ownership, operation, management and control of distribution facilities located on private property and used solely to move or deliver electric power to the person owning, operating, managing

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and controlling those facilities or to tenants thereof has not been included in the definition of "distribution". Based on the said considerations that the proposed BPC is located within the same premises and no public areas are involved, the supply of power to BPC by GEPL does not constitute a distribution activity under the NEPRA Act, and GEPL will not require a distribution licence for supplying to the BPC.

**(vii).** 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 generation facility unless where an applicant consents to a shorter term. According to the information provided by GEPL, the Commercial Operation Date (COD) of the proposed generation facility/solar power plant/ Roof-Top Solar will be December 31, 2020 and it will have a useful life of around twenty five (25) years from its COD. In this regard, GEPL has informed that it will enter into a Power Purchase Agreement (PPA) for fifteen (15) years with CBL and consequently requested that the term of the proposed generation licence may be fixed for 15 years. In view of the said that GEPL has consented to shorter term, the Authority fixes the term of the generation licence to fifteen (15) years from COD of the project subject to Section-14 B of the NEPRA Act.

**(viii).** Regarding compliance with the environmental standards, GEPL has 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 GEPL to comply with relevant environmental standards at all times.

**(ix).** Regarding the rates, charges and terms and conditions of tariff between GEPL and its BPC, 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 GEPL and its BPC, does not affect any other consumer or third party. Therefore for

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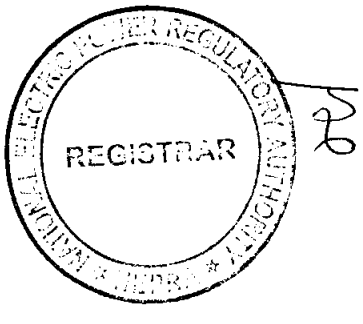
the purpose of tariff, the Authority considers it appropriate directing GEPL and its BPC to agree on a bilateral agreement and accordingly GEPL will be allowed to charge the agreed tariff subsequent to the grant of the generation licence.

**(x).** The Authority has duly considered the comments of different stakeholders as explained above. In this regard, the Authority has observed that CPPAGL has raised various concerns including (a). compliance of the LCOC; (b). New tariff for consumers having dual connection; (c). specifying share of distributed generation in the IGCEP; and (f). approval of design of competitive wholesale market.

**(xi).** In consideration to the above, the Authority hereby confirms that it has duly considered the relevant provisions of related rules to confirm that proposal of GEPL fulfils the requirements prescribed under the relevant rules and regulations including LCOC as explained in preceding paragraph. About the proposal of CPPAGL to have a new tariff for such consumers having dual supply arrangement (i.e. from the grid through DISCO as well as self-generation/third party source as in the current case), the Authority considers this an important issue but at the same time is of the view that it is not relevant to current case being an application of a generation licence. The Authority is cognizant of the situation and has already included this issue as part of the proceedings for the tariff petitions of the DISCO(s) which is under deliberation and is expected to be decided in due course of time without affecting the grant of generation licence to GEPL. Regarding the suggestion to specify the share of distributed generation in the IGCEP, the Authority considers that planning function needs special consideration to have a true picture of the demand-supply situation of the system. The Authority emphasizes that DISCO(s) and NTDC must refine their process to capture a true picture for the future requirements by revitalizing their planning function by having suitable tools in the matter including the process of registration for entities like GEPL etc. As regards the approval of design of competitive wholesale market, the Authority through its determination



NEPRA/DG(Lic)/LAM01-26389-398 dated December 05, 2019, has already approved the same. In consideration of the said, the observations of CPPAGL stand addressed and settled.

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

## Authority:

Rafique Ahmed Shaikh
(Member)

Rehmatullah Baloch
(Member)

Engr. Bahadur Shah
(Member)

**(Did not Attend-Away)**

Saif Ullah Chattha
(Member/Vice Chairman)

8.9.2020

Engr. Tauseef H. Farooqi
(Chairman)

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

## GENERATION LICENCE
## No. SGC/144/2020

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:

**GRID EDGE (PRIVATE) LIMITED**

Incorporated under Section-16
of the Companies Act, 2017 (XIX of 2017) having Corporate Universal Identification No. 0122474, dated August 08, 2018

**for its Generation Facility/Solar Power Plant/Roof-Top Solar Located at Crescent Bahuman Limited, Tehsil Pindi Bhattian, District Hafizabad in the Province of Punjab**

(Installed Capacity: 3.06 $MW_P$ Gross ISO)

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

Given under my hand on 10th day of September Two Thousand & Twenty and expires on 30th day of December Two Thousand & Thirty-Five

10.09.20

Registrar

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## Article-1
## Definitions

**1.1** In this Licence

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

**(b).** "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;

**(f).** "Bus Bar" means a system of conductors in the generation facility/Solar Power Plant/Solar Farm of the Licensee on which the

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electric power from all the photovoltaic cells is collected for supplying to the Power Purchaser;

**(g).** "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;

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

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

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

**(m).** "Licence" means this licence granted to the Licensee for its generation facility/Solar Power Plant/Roof-Top Solar;

**(n).** "Licensee" means **Grid Edge (Private) Limited** or its successors or permitted assigns;

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

**(p).** "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;

**(q).** "Power Purchaser" means the BPC which will be purchasing electric power from the Licensee, pursuant to a PPA for procurement of electric power;

**(r).** "Power Purchase Agreement-PPA" means the energy purchase agreement, entered or to be entered into by and between the Power Purchaser and the Licensee, for the purchase and sale of electric energy generated by the generation facility/Solar Power Plant/Solar Farm, as may be amended by the parties thereto from time to time;

**(s).** "Roof Top Solar" means a cluster of photovoltaic cells installed on the roof top of a building or any other suitable place in the same location used for production of electric power ;

**(t).** "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.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
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## 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.

## Article-4
## Term of Licence

**4.1** This Licence shall become effective from the date of its issuance and will have a term of fifteen (15) 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) Rules, 2002 as amended or replaced from time to time.

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## Article-6
## Tariff

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

**7.2** Any variation or modification in the above-mentioned contracts for allowing the parties thereto to participate wholly or partially in the Competitive Trading Arrangement shall be subject to mutual agreement of the parties thereto and such terms and conditions as may be approved by the Authority.

## Article-8
## Maintenance of Records

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

## Article-9
## Compliance with Performance Standards

The Licensee shall comply with the relevant provisions of the National Electric Power Regulatory Authority Performance Standards (Generation) Rules 2009 as amended or replaced from time to time.

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## 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.

## Article-11
## Power off take Point and Voltage

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

## Article-12
## 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-13
## Compliance with Applicable Law

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

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# SCHEDULE-I

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

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# Location of the Generation Facility/Solar Power Plant/Roof-Top Solar of the Licensee


**Crescent Bahuman Limited (CBL)**

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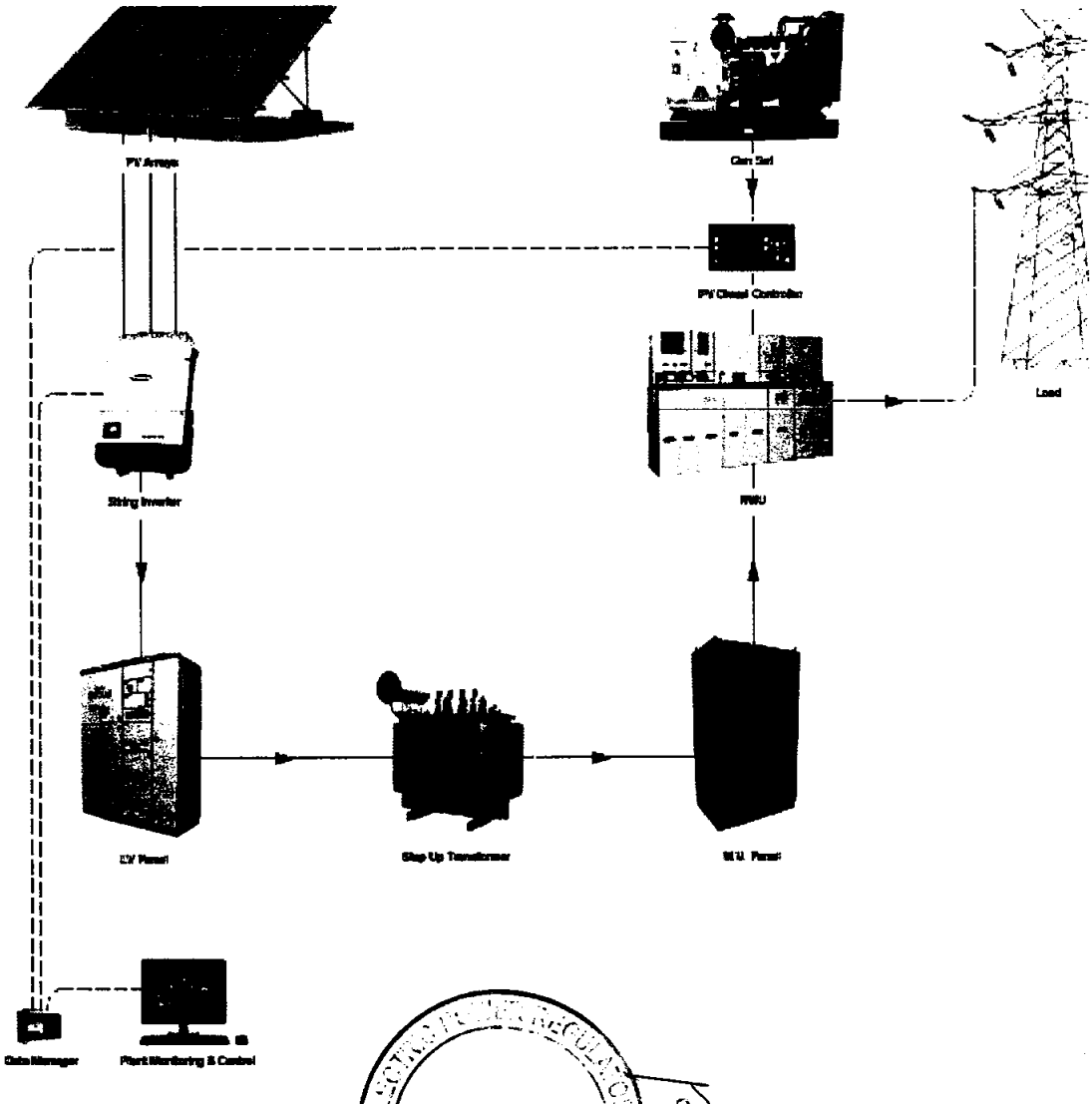
# Land Coordinates of the Generation Facility/Solar Power Plant/Roof-Top Solar of the Licensee

| Land Coordinates of CBL | | | |
|---|---|---|---|
| **Serial Number** | **Location** | **Latitude** | **Longitude** |
| **1.** | Boundary 1 | 31°53'06.7"N | 73°22'02.1"E |
| **2.** | Boundary 2 | 31°53'06.9"N | 73°22'11.5"E |
| **3.** | Boundary 3 | 31°53'12.4"N | 73°22'11.6"E |
| **4.** | Boundary 4 | 31°53'13.5"N | 73°22'02.8"E |

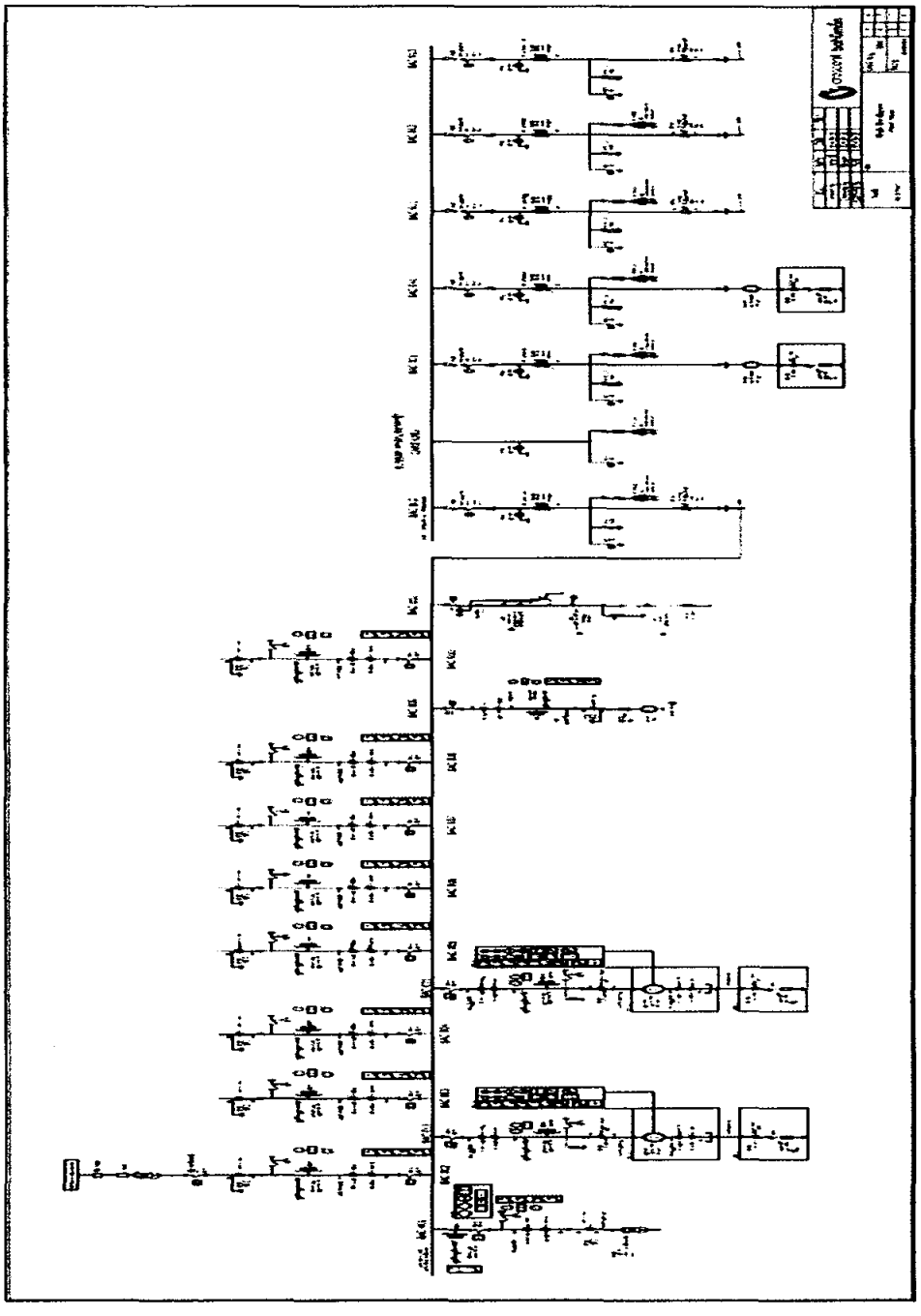
REGISTRAR

# Process Flow Diagram of the Generation Facility/Solar Power Plant/Roof-Top Solar of the Licensee




REGISTRAR

# Single Line Diagram of the Generation Facility/Solar Power Plant/Roof-Top Solar of the Licensee



**Single Line Diagram of CBL**

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# Interconnection Arrangement/Transmission Facilities for Dispersal of Power from the Generation Facility/Solar Power Plant/Roof-Top Solar of the Licensee

The electric power generated from the generation facility/Solar Power Plant/Roof-Top Solar of the Licensee/Grid Edge Pvt. Ltd. will be delivered/supplied to a Bulk Power Consumer (BPC) in the name of CBL located on Lahore Road near Pindi Bhattian, in the province of Punjab.

(2). The details pertaining to BPC, supply arrangement and other relating information is provided in the subsequent description of this Schedule. Any change in the said, shall be communicated to the Authority in due course of time.

REGISTRAR

# Details of Generation Facility/Solar Power Plant/ Roof-Top Solar

## (A). General Information

| | | |
|---|---|---|
| (i). | Name of the Company/Licensee | Grid Edge Pvt. Limited |
| (ii). | Registered/ Business office of the Company/Licensee | 3rd Floor, Dawood Center, M T Khan Road, Karachi |
| (iii). | Location of the generation facility Solar Power Plant/ Roof-Top Solar | Crescent Bahuman Limited, near Pindi Bhattian Interchange Motorway, Tehsil Pindi Bhattian, District Hafizabad, in the province of Punjab |
| (iv). | Type of the generation facility/ Solar Power Plant/ Roof-Top Solar | Solar Photovoltaic (PV) |

## (B). Solar Power Generation Technology & Capacity

| | | |
|---|---|---|
| (i). | Type of Technology | Photovoltaic (PV) Cell |
| (ii). | System Type | On Grid |
| (iii). | Installed Capacity of the generation facility Solar Power Plant/ Roof-Top Solar (MW) | 3.06 $MW_P$ |

## (C). Technical Details of Equipment

| | | |
|---|---|---|
| **(a).** | **Solar Panels – PV Modules** | |
| (i). | Type of Module | Polycrystalline Silicon Solar Modules 320W |
| (ii). | Type of Cell | Polycrystalline |
| (iii). | Dimension of each Module | 1956×992×40mm |

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| | | |
|---|---|---|
| (iv). | No. of Panel/Modules | 9,576 |
| (v). | Total Module Area | 1.940 $m^2$ per module |
| (vi). | Frame of Panel | Anodized Aluminium Frame |
| (vii). | Weight of one Module | 23 kg |
| (viii). | No of Solar Cells in each module | 72 |
| (ix). | Efficiency of module | 17% |
| (x). | Maximum Power (Pmax) | 320 |
| (xi). | Voltage @ Pmax | 37.80 |
| (xii). | Current @ Pmax | 8.74 |
| (xiii). | Open circuit voltage (Voc) | 46.20 |
| (xiv). | Short circuit current (Isc) | 9.24 |
| (xv). | Maximum system open Circuit Voltage | 1500 V |
| **(b).** | **PV Array** | |
| (i). | Nos. of Strings | 532 |
| (ii). | Modules in a string | 18 each |
| **(c).** | **Inverters** | |
| (i). | Capacity of each unit | 110 kW |
| (ii). | Manufacturer | Sungrow SG110CX |

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| | | | |
|---|---|---|---|
| (iii). | Input Operating Voltage Range | 200-1100 V | |
| (iv). | Number of Inverters | 25 | |
| (v). | Efficiency of inverter | 98.7% | |
| (vi). | Max. Allowable Input voltage | 1100 V DC | |
| (vii). | Max. Current | 158.8 A | |
| (viii). | Max. Power Point Tracking Range | 550-850 V | |
| (ix). | Output electrical system | 3 phases, 4 wires | |
| (x). | Rated Output Voltage | 480 V | |
| (xi). | Power Factor (adjustable) | > 0.99; 0-1 adjustable | |
| (xii). | Power control | MPP tracker | |
| (xiii). | Rated Frequency | 50/60 Hz | |
| (xiv). | Environmental Enclosures | Relative Humidity | 0-100%, condensing |
| | | Audible Noise | 68 dB(A) @ 1m |
| | | Operating Elevation | 4000 m |
| | | Operating temperature | -30 to +60°C |
| (xv). | Grid Operating protection | A | DC circuit breaker |

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| | | | |
|---|---|---|---|
| | | B | AC circuit breaker |
| | | C | DC overload protection (Type 2) |
| | | D | Overheat protection |
| | | E | Grid monitoring |
| | | F | Insulation monitoring |
| | | G | Ground fault monitoring |
| **(d).** | **Data Collecting System** | | |
| (i). | System Data | Continuous online logging with data logging software to portal. | |
| **(e).** | **Unit Transformer** | | |
| (i). | Rating | 3 x 1000 kVA | |
| (ii). | Type of transformer | 1000 ONAN | |
| (iii). | Purpose of transformer | Step-up (0.48 / 11kV) | |
| (iv). | Output Voltage | 11 KV | |

## (D). Other Details

| | | |
|---|---|---|
| (i). | Expected COD of the generation facility Solar Power Plant/ Roof-Top Solar | December 31, 2020 |
| (ii). | Expected useful Life of the generation facility Solar Power Plant/ Roof-Top Solar from the COD | 25 years |

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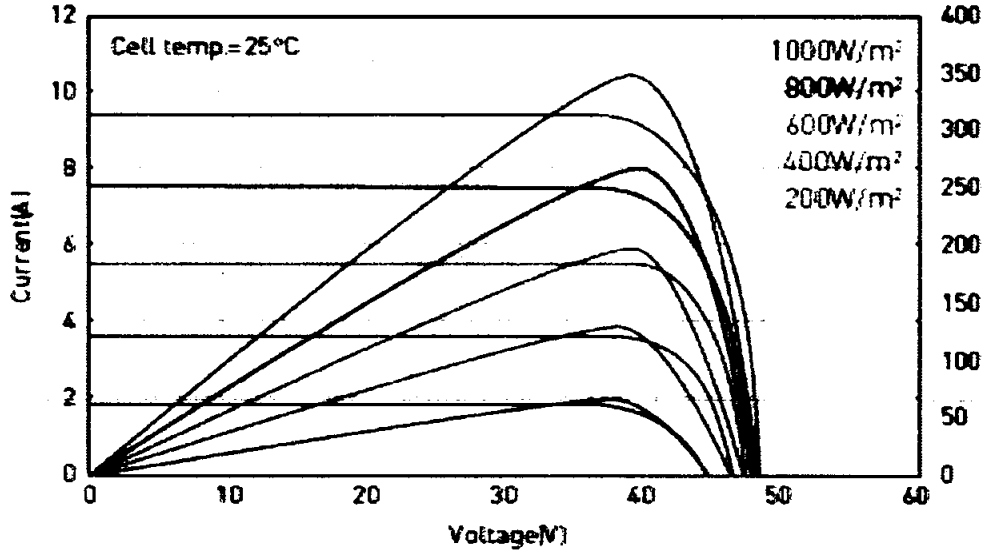
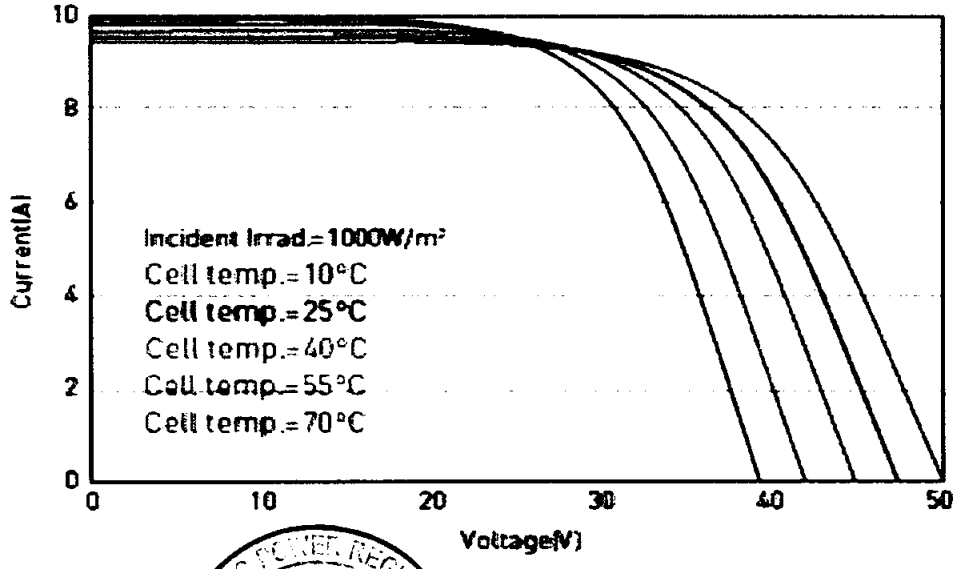
# V-I Curve
# of Solar Cell of Generation Facility/Solar Power Plant/ Roof-Top Solar

## U-I/P-U Curve at Different Irradiation (350W)




## U-I Curve at Different Temperature (350W)

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# Information
# Regarding Bulk Power Consumer (BPC) i.e. CBL

| | | | |
|---|---|---|---|
| (i). | No. of Consumers | | One (01) |
| (ii). | Location of consumer (distance and/or identity of premises) | | Crescent Bahuman Limited, near Pindi Bhattian Interchange Motorway, Tehsil Pindi Bhattian, District Hafizabad, in the province of Punjab |
| (iii). | Contracted Capacity | | 3.06 $MW_P$ |
| (iv). | Specify Whether | | |
| | (a). | The consumer is an Associate undertaking of the Grid Edge -If yes, specify percentage ownership of equity; | CBL does not have direct association with GEPL. |
| | (b). | There are common directorships: | No |
| | (c). | Either can exercise influence or control over the other. | No |
| (v). | Specify nature of contractual Relationship | | |
| | (a). | Between each consumer and Grid Edge. | GEPL will construct and operate solar plant and provide electricity for CBL operations. |
| | (b). | Consumer and DISCO. | CBL is B3 Consumer of GEPCO with sanctioned load of 4.85 MW |
| (vi) | Any other network information deemed relevant for disclosure to or consideration of the Authority. | | N/A |

REGISTRAR

# Information
# Regarding Distribution Network for Supply of Electric Power to BPC in the name of CBL

| | | | |
|---|---|---|---|
| (i). | No. of Feeders | | One (01) |
| (ii). | Length of Each Feeder (Meter) | | 50-100m |
| (iv). | In respect of all the Feeders, describe the property (streets, farms, Agri land, etc.) through, under or over which they pass right up to the premises of customer, whether they cross-over. | | The feeder supplying power to CBL is located on private property owned by the CBL itself, without crossing of any public or third party private property etc. |
| (v). | Whether owned by CBL, Consumer or DISCO-(deal with each Feeder Separately) | | |
| | (a). | If owned by DISCO, particulars of contractual arrangement | NA |
| | (b). | Operation and maintenance responsibility for each feeder | CBL |
| (vi). | Whether connection with network of DISCO exists (whether active or not)- If yes, provide details of connection arrangements (both technical and contractual) | | CBL is B3 Consumer of GEPCO |
| (vii). | Any other network information deemed relevant for disclosure to or consideration of the Authority. | | NA |

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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.**

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# SCHEDULE-II

| | | |
|---|---|---|
| (1). | Total Installed Capacity of the Generation Facility/Solar Power Plant/Roof-Top Solar | 3.06 $MW_P$ |
| (2). | Average Sun Hour Availability/Day (Irradiation on Inclined Surface) | 8 to 8.5 Hours |
| (3). | No. of days per year | 365 |
| (4). | Annual generating capacity of Generation Facility/Solar Power Plant/Roof-Top Solar (As Per Simulation) | 4,390 MWh |
| (5). | Total expected generation of the Generation Facility/Solar Power Plant/Roof-Top Solar during the twenty five (25) years term of this licence | 105,360 MWh |
| (6). | Annual generation of Generation Facility/Solar Power Plant/Roof-Top Solar based on 24 hours working | 27,681 MWh |
| (7). | Net Capacity Factor of Generation Facility/Solar Power Plant/Roof-Top Solar | 15.85% |

**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 Power Purchase Agreement (PPA) or the Applicable Document(s).

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# Authorization of Authority to Grid Edge (Private) Limited (GEPL)

**Incorporated under Section-16 of the Companies Act, 2017 (XIX of 2017) having Corporate Universal Identification No. 0122474, dated August 08, 2018**

## GENERATION LICENCE No. SGC/144/2020
## For
## Sale to Bulk Power Consumer

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

**(1).** Crescent Bahuman Limited (CBL) located at Tehsil Pindi Bhattian, District Hafizabad in the Province of Punjab

**Authority**

Rafique Ahmed Shaikh
(Member)

Rehmatullah Baloch
(Member)

**Did not Attend-Away**

Engr. Bahadur Shah
(Member)

Saif Ullah Chattha
(Member)/Vice Chairman

Tauseef H. Farooqi
Chairman

REGISTRAR

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