National Electric Power Regulatory Authority
Islamic Republic of Pakistan

Registrar

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Web: www.nepra.org.pk, E-mail: registrar@nepra.org.pk

No. NEPRA/DG(Lic)/LAG-369/ 33526-32

September 28, 2023

Chief Executive Officer
HNDS Energy Limited
G-30/4, KDA Scheme No. 5
Block-8, Clifton Karachi

Subject: **Modification in Generation Licence No. SPGL/21/2017 (Modification-I)**
Licence Application No. LAG-369
HNDS Energy Limited (HEL), formerly HNDS Energy (Private) Limited

Reference: HEL's LPM submitted vide letter No. & dated nil (received on 01.02.2021)

It is intimated that the Authority has approved Modification-I in Generation Licence No. SPGL/21/2017 dated August 16, 2017 in respect of HNDS Energy Limited (HEL), formerly HNDS Energy (Private) Limited pursuant to Section 26 of the NEPRA Act read with Regulation 10(11) of the NEPRA Licensing Regulations.

2. Enclosed please find herewith determination of the Authority in the matter of Licensee Proposed Modification of HEL alongwith Modification-I in the Generation Licence No. SPGL/21/2017, approved by the Authority.

Enclosure: As Above

28/9/23

(Iftikhar Ali Khan)

Copy to:

1. Secretary, Power Division, Ministry of Energy, 'A' Block, Pak Secretariat, Islamabad
2. Managing Director, Private Power & Infrastructure Board (PPIB), Ground & 2nd Floors, Emigration Tower, Plot No. 10, Mauve Area, Sector G-8/1, Islamabad
3. Managing Director, NTDC, 414 WAPDA House, Lahore
4. Chief Executive Officer, CPPA(G), 73 West, A.K. Fazl-ul-Haq Road, Blue Area, Islamabad
5. Chief Executive Officer, Sukkur Electric Power Company (SEPCO), Thermal Power Station,, Old Sukkur, Sukkur
6. Director General, Environmental Protection Department, Government of Sindh, Plot No ST2/1, Sector 23, Korangi Industrial Area, Karachi

National Electric Power Regulatory Authority (NEPRA)

Determination of the Authority in the Matter of Licensee Proposed Modification in the Generation Licence of HNDS Energy (Private) Limited

September 28th, 2023
Case No. LAG-369

(A). Background

(i). HNDS Energy (Private) Limited (HDEPL) holds a Generation Licence (No. SPGL/21/2017, dated August 16, 2017) in terms of Section-15 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (the "NEPRA Act").

(ii). The Authority granted the above mentioned licence to HDEPL for setting up a Photo Voltaic (PV) Cell based generation facility of 50.00 MW_P to be located at Goth Gagrawara, Taluka Saleh Pat, district Sukkur in the province of Sindh.

(B). Communication of Modification

(i). HDEPL in accordance with Regulation-10(2) of the NEPRA Licensing (Application & Modification Procedure) Regulations, 1999 (the "Licensing Regulations") communicated a Licensee Proposed Modification (LPM) in its above mentioned Generation Licence on February 01, 2021.

(ii). In the "text of the proposed modification", HDEPL stated that it plans to change the type of the PV Cell from existing Poly Crystalline to Bi-facial Mono-crystalline. In view of the said, there will be changes in the Number of Panels/ Modules, Maximum Power (P_{max}), Installed Capacity, Expected Commercial Operation Date (COD), and Net Capacity Factor of the project.

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(iii). Regarding the "statement of the reasons in support of the modification", HDEPL, inter alia, submitted that the Project site is located in a desert area and has reflective sandy surface. In view of the said, HDEPL is considering the use of bifacial panels that best suit the site conditions. The use of the proposed technology will result in improvement in the energy production of the project. In this regard, HDEPL submitted that the company in its tariff petition has indicated and locked the above said technology. Accordingly, the Authority based on the parameters given in the petition and its own benchmarking determined the tariff through its determination dated February 21, 2020.

(iv). About the statement of "the impact on tariff", "Quality of Service (QoS)" and "the performance by the licensee of its obligation under the licence", HDEPL submitted that the proposed changes will not have any negative impact on any of the said parameters and in fact will have a positive impact on tariff as the new technology will result in higher energy yield resulting less per kWh of rate. Further, HDEPL confirmed that the proposed modification will not have any effect on the QoS and the performance by the Licensee of its obligations under its existing Generation Licence.

(C). Processing of Modification

(i). After completion of all the required information as stipulated under the Regulation-10(2) and 10(3) of the Licensing Regulations, the Registrar published the communicated LPM in one (01) English and one (01) Urdu daily newspaper on February 17, 2021, informing the general public, interested/affected parties and other stakeholders about the said LPM as required under the Regulation-10(4) of the Licensing Regulations.

(ii). The Registrar also invited comments of the relevant Govt. Ministries, their attached Departments, representative organizations and individual experts etc. for the assistance of the Authority, by sending separate letters to the said stakeholders dated February 17, 2021, in favour or against the communicated LPM as stipulated in Regulation-10(9) of the Licensing Regulations.

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(D). Comments of Stakeholders & Findings of the Authority

(i). In response to the above, the Authority did not receive any comment from any of the stakeholders. Accordingly, the Authority considered it appropriate to proceed further as stipulated in the NEPRA Licensing (Generation) Rules, 2000 (the "Generation Rules") and the Licensing Regulations. The Authority has examined the entire case in details including the already granted licence, communicated LPM, provisions of the relevant rules and regulations in the matter and the findings are elaborated in the following paragraph.

(ii). As explained above, the Authority granted HDEPL a Generation Licence (No. SPGL/21/2017, dated August 16, 2017) for setting up a PV based generation facility of 50.00 MWP to be set up at Goth Gagrawara, Taluka, Saleh Pat, district Sukkur in the province of Sindh. The above generation licence envisaged installing PV cells of 156,260 x 320Wp having polycrystalline technology on single axis tracking. Further, the generation licence envisaged a Net Capacity Factor of 20.00% with COD of the project December 31, 2018. HDEPL submitted the LPM to change the PV technology to Monocrystalline, having a total of 93,548 x 530 WP PV Modules with single axis tracking. Further, the LPM envisages making necessary changes in the Capacity Factor (23.27%) and COD (April 30, 2023) of the project.

(iii). The Authority observed that in terms of the Section-26 of the NEPRA Act read Regulation-10(5) of the Licensing Regulations, it is empowered to modify an existing licence of a licensee subject to and in accordance with such further changes as it may deem fit, if in the opinion of the Authority such modification (a). does not adversely affect the performance by the licensee of its obligations; (b). does not cause the Authority to act or acquiesce in any act or omission of the licensee in a manner contrary to the provisions of the NEPRA Act or the rules or regulations made pursuant to it; (c). is or is likely to be beneficial to the consumers; (d). is reasonably necessary for the licensee to effectively and efficiently perform its obligations under the licence; and (e).is reasonably necessary to ensure the

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continuous, safe and reliable supply of electric power to the consumers keeping in view the financial and technical viability of the licensee.

(iv). In consideration of the above, the Authority considers that (a). the LPM which is meant to utilize the latest technology for PV cells will not adversely affect the performance of the licensee of its obligations under its generation licence but will result in better performance due to lowering of tariff because of higher yield etc.; (b). the LPM will not cause it to act or acquiesce in any act or omission of the licensee in a manner contrary to the provisions of the NEPRA Act or the rules or regulations made pursuant to it; (c). the LPM is likely to be beneficial to the consumers as it will result in lowering of end tariff; (d). the LPM is reasonably necessary for the licensee to effectively and efficiently perform its obligations under the licence; and (e). is reasonably necessary to ensure the continuous, safe and reliable supply of electric power to the consumers keeping in view the financial and technical viability of the licensee.

(v). During the course of processing of this LPM, the company informed the Authority that (a). its status has been changed from Private Limited to Public Limited i.e. HNDS Energy Limited (HDEL) there are further changes in the capacity and quantity of the PV modules to 540W_P and 545W_P instead of it a total of 92,008 modules (64,176 x 545Wp & 27,832 x 540Wp modules) as against a total modules of 93,548 (84,112 x 535Wp & 9,436 x 530Wp modules) as given at the time of communication of the LPM. In this regard, the Authority has observed that in terms of Regulation-10(11) of the Licencing Regulations it has the powers to approve the LPM with or without changes therefore, the above changes submitted during the processing of the LPM can be handled under the said provisions of the regulations and there is no need to have a fresh notice as had been done previously in the case of Access Solar (Pvt.) Limited and Access Electric (Pvt.) Limited.

(vi). Regarding the impact on tariff, it is hereby clarified that under Section-7(3)(a) of the NEPRA Act, the Authority has the sole prerogative to determine tariff, rate and charges etc. In this regard, the Authority at the time of the grant of the Original Licence (No. SPGL/21/2017, dated August 16, 2017) directed HDEPL

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through Article-6 of the said licence to charge the power purchaser only such tariff which the Authority has determined, approved or specified for the project. Further to the said, the Authority through its determination No. NEPRA/R/TRF-479/HNDS-2019/6094-6096 February 21, 2020 determined the tariff of the project with different parameters *inter alia,* fixing the net Annual CF to be 23.27%. As explained in the preceding paragraphs, HDEPL while submitting the current communicated modification for the change in technology and other associated parameters, has confirmed that the LPM will not have any negative impact on the tariff of the project.

(vii). In this regard, HDEPL submitted that the above mentioned changes in technology will have a positive impact on tariff as the new technology will result in higher energy yield resulting less per kWh of rate. In this regard, the Authority has observed that proposed changes in technology as explained in the preceding paragraphs, will have a positive impact on Net Annual CF of the project and according to assessments that the Authority has made it will now be around 23.97%. The Authority considers that extra yield that may arise from the use of bifacial Monocrytaline PERC Half-cell (144 cells) Double Glass modules that HDEPL has proposed and the same should also benefit the consumers. In view of the above, the Authority decides to change the sharing mechanism given in Para 21 (c) of the determination of the tariff of HDEPL dated February 21, 2020 as below:-

Net annual plant CF	% of the prevalent tariff allowed to Power Producer
Above 23.27% to 23.97%	-
Above 23.97% to 24.72%	20%
Above 24.72% to 25.47%	40%
Above 25.47% to 26.22%	60%
Above 26.22%	70%

(viii). The Authority directs the Licensee/Company/HDEPL/HDEL to adhere to the Article-6 of the generation licence in letter and spirit without any exception. Further, the Authority also directs the Licensee/Company/HDEPL/HDEL to file the modification petition to get the aforesaid changes incorporated in its tariff determination.

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(E). Approval of LPM

(i). In view of the above, the Authority is satisfied that the Licensee has complied with all the requirements of the Licensing Regulations pertaining to the modification. Therefore, the Authority in terms of Section-26 of the NEPRA Act read with Regulation-10(11) of the Licensing Regulations approves the communicated LPM of HDEPL/HDEL with changes.

(ii). Accordingly, the Generation Licence (No. SPGL/21/2017, dated August 16, 2017) of HDEPL/HDEL is hereby modified. The changes made in the said licence are attached as annexure to this determination. The approval is subject to the provisions contained in the NEPRA Act, relevant rules, regulations, terms & conditions of the generation licence and other applicable documents.

Authority

Maqsood Anwar Khan
(Member)

Rafique Ahmed Shaikh
(Member)

Mathar Niaz Rana (nsc)
(Member)

Amina Ahmed
(Member)

Tauseef H. Farooqi
(Chairman) — Retired

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28/9/23

National Electric Power Regulatory Authority
(NEPRA)
Islamabad – Pakistan

GENERATION LICENCE
No. SPGL/21/2017

In exercise of the Powers conferred under Section-26 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (as amended from time to time), the Authority hereby modifies the Generation Licence (No. SPGL/21/2017, dated August 16, 2017) granted to **HNDS Energy Limited** [formerly HNDS Energy (Pvt.) Limited] to the extent of changes mentioned hereunder: -

(a). The expiry date of the Licence mentioned on the face sheet of the original licence may be read as **29th day of April 2048**;

(b). The Changes made in Articles of the Generation Licence are attached as **Revised/Modified Articles of Generation Licence**;

(c). The Changes made in Schedule-I of the Generation Licence are attached as **Revised/Modified Schedule-I**;

(d). The Changes made in Schedule-II of the Generation Licence are attached as **Revised/Modified Schedule-II**.

This **Modification-I** is given under my hand on this 28th **day** of **September Two Thousand & Twenty Three.**

Registrar

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Article-1
Definitions

1.1 In this licence, unless there is anything repugnant in the subject or context:

(a). "Act" means the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (Act No. XL of 1997) as amended or replaced from time to time;

(b). "AEDB" means the Alternative Energy Development Board or any other entity created for the like purpose established by the GoP to facilitate, promote, and encourage the development of renewable energy in the country;

(c). "Applicable Documents" means, the rules, regulations, terms, and conditions of any licence, registration, authorization, determination, any codes, manuals, directions, guidelines, orders, notifications, agreements, and documents issued or approved under the Act;

(d). "Applicable Law" means the Act and the Applicable Documents;

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

(f). "Bus Bar" means a system of conductors in the generation facility/Solar Power Plant/Solar Farm of the Licensee on which the electric power from all the Photo Voltaic Cells is collected for supply 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

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obtained in relation to the generation facility/Solar Power Plant/Solar Farm after the COD;

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

(i). "Commissioning" means the undertaking of the Commissioning Tests of the generation facility/Solar Power Plant/Solar Farm as stipulated in the EPA;

(j). "CPPAGL" means Central Power Purchasing Agency (Guarantee) Limited or any other entity created for the like purpose;

(k). "CTBCM" or "Competitive Trading Bilateral Contract Market" means electric power market established in accordance with the high-level and detailed designs approved by the Authority vide its determinations dated December 05, 2019 and November 12, 2020, respectively as may be amended by the Authority from time to time;

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

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

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

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(o). "GoP" means the Government of Pakistan acting through the AEDB or PPIB which has issued or will be issuing to the Licensee a LoS for the design, engineering, construction, insuring, commissioning, operation, and maintenance of the generation facility/Solar Power Plant/Solar Farm;

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

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

(r). "Implementation Agreement (IA)" means the implementation agreement signed or to be signed between the GoP and the Licensee in relation to this particular generation facility/Solar Power Plant/Solar Farm, as may be amended from time to time;

(s). "Letter of Support (LoS)" means the letter of support issued or to be issued by the GoP through the AEDB or PPIB to the Licensee;

(t). "Licensee" means **HNDS Energy Limited** or its successors or permitted assigns;

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

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

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

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

(y). "Power Purchaser" means CPPAGL which will be purchasing electric energy from the Licensee either on behalf of all XW-DISCOs or any single XW-DISCO, pursuant to an EPA for procurement of electric energy;

(z). "PPIB" means the Private Power and Infrastructure Board or any other entity created for the like purpose established by the GoP to promote private investments in the power sector, and to facilitate public sector power and related infrastructure projects in IPP mode.

(aa). "SCADA System" means the supervisory control and data acquisition system for gathering data in real-time from remote locations to control equipment and conditions;

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

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

(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 Generation Rules and Licensing Regulations issued under the Act.

Article-2
Applicability of Law

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

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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 is effective from the original date of its issuance i.e. August 16, 2017 and will have a term of twenty-five (25) years from the COD of the generation facility/Solar Power Plant/Solar Farm of the Licensee subject to Section 14-B of the Act.

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

Article-5
Licence fee

The Licensee shall pay to the Authority the licence fee, in the amount, time and manner specified in the National Electric Power Regulatory Authority (Fees) Regulations, 2021, as amended or replaced from time to time.

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Article-6
Tariff

The Licensee shall charge only such tariff from the Power Purchaser which has been determined, approved or specified by the Authority.

Article-7
Obligations with Respect to CTBCM

7.1 The Licensee shall participate in such manner as may be directed by the Authority from time to time for the 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.

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 a 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.

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Article-9
Compliance with Performance Standards

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

Article-10
Compliance with Environmental & Safety Standards

10.1 The generation facility/Solar Power Plant/Solar Farm of the Licensee shall comply with the environmental and safety standards as may be prescribed by the relevant competent authority from time to time.

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

Article-11
Power off-take Point and Voltage

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

Article-12
Performance Data

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

12.2 The Licensee shall install SCADA System or compatible communication system at its generation facility/Solar Power Plant/Solar Farm as well as at the side of the Power Purchaser.

12.3 The Licensee shall transmit the solar radiation data and power output data of its generation facility/Solar Power Plant/Solar Farm to the control room of the Power Purchaser.

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Article-13
Provision of Information

In accordance with provisions of Section-44 of the Act, the Licensee shall be obligated to provide the required information in any form as desired by the Authority without any exception.

Article-14
Emissions Trading /Carbon Credits

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

Article-15
Design & Manufacturing Standards

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

Article-16
Power Curve

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

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Article-18
Corporate Social Responsibility

The Licensee shall comply with the NEPRA Social Investment Guidelines, 2021, as may be amended from time to time, and submit a report on its activities pertaining to Corporate Social Responsibility (CSR) on an annual basis.

Article-19
Compliance with the Cyber Security Regulations

The Licensee shall comply with National Electric Power Regulatory Authority (Security of Information Technology and Operational Technology) Regulations, 2022 as amended from time to time.

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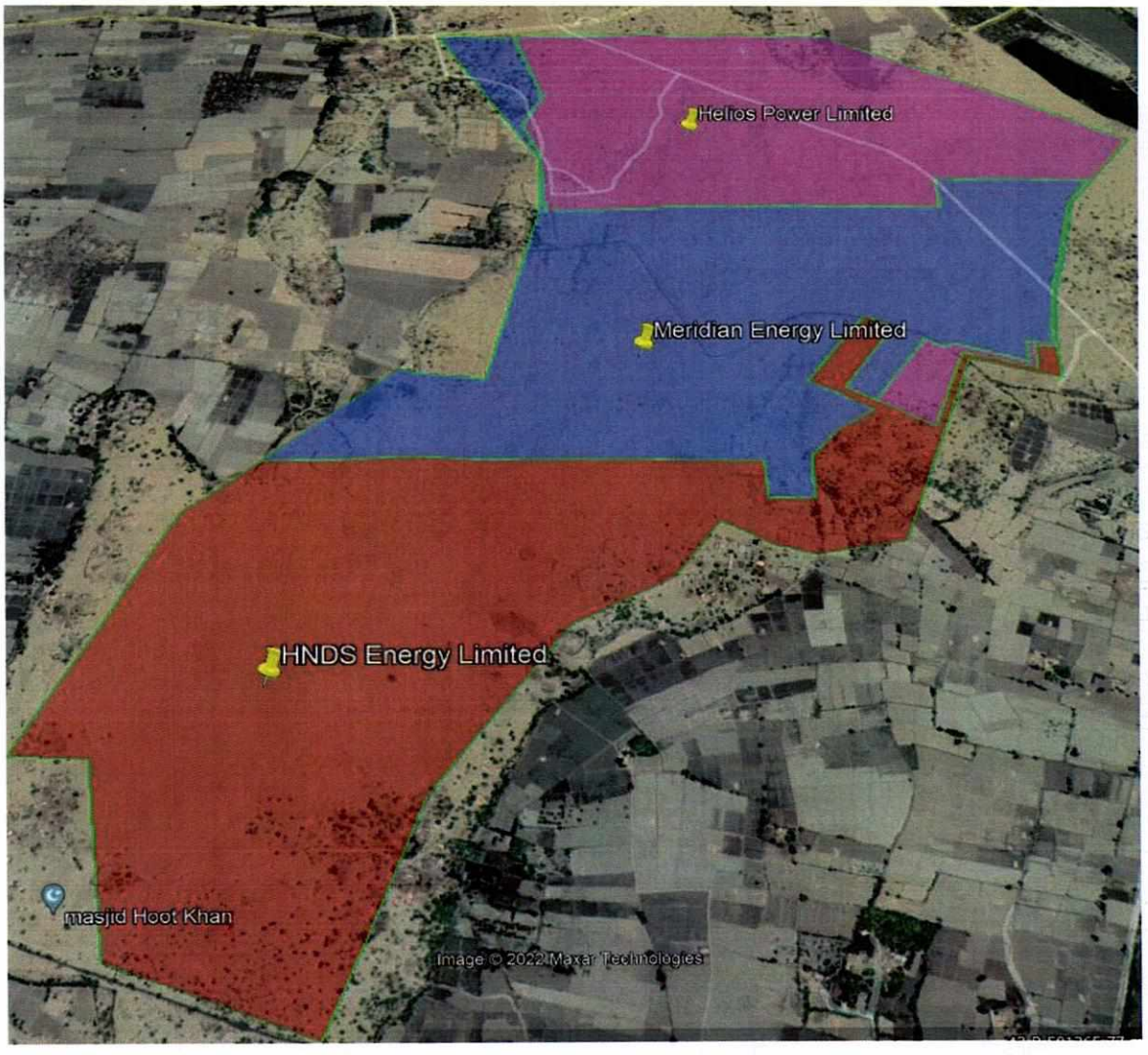
Revised/Modified
SCHEDULE-I

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

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



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

No.	Northing	Easting
1	3031757.00 m N	502181.00 m E
2	3031757.00 m N	502199.00 m E
3	3031755.00 m N	502226.00 m E
4	3031665.00 m N	502221.00 m E
5	3031720.00 m N	502042.00 m E
6	3031234.00 m N	501858.00 m E
7	3031198.00 m N	501689.00 m E
8	3031221.00 m N	501611.00 m E
9	3031277.00 m N	501515.00 m E
10	3031146.00 m N	501431.00 m E
11	3031032.00 m N	501233.00 m E
12	3030669.00 m N	500997.00 m E
13	3030241.00 m N	500861.00 m E
14	3030372.00 m N	500511.00 m E
15	3030747.00 m N	500428.00 m E
16	3030752.00 m N	500291.00 m E
17	3031302.00 m N	500509.00 m E
18	3031441.00 m N	500646.00 m E
19	3031438.00 m N	501608.00 m E
20	3031339.00 m N	501609.00 m E
21	3031338.00 m N	501697.00 m E
22	3031452.00 m N	501704.00 m E
23	3031521.00 m N	501763.00 m E
24	3031556.00 m N	501815.00 m E
25	3031573.00 m N	501835.00 m E
26	3031657.00 m N	501714.00 m E
27	3031853.00 m N	501844.00 m E
28	3031817.00 m N	501900.00 m E
29	3031635.00 m N	501784.00 m E
30	3031527.00 m N	501950.00 m E
31	3031738.00 m N	502032.00 m E
32	3031693.00 m N	502178.00 m E

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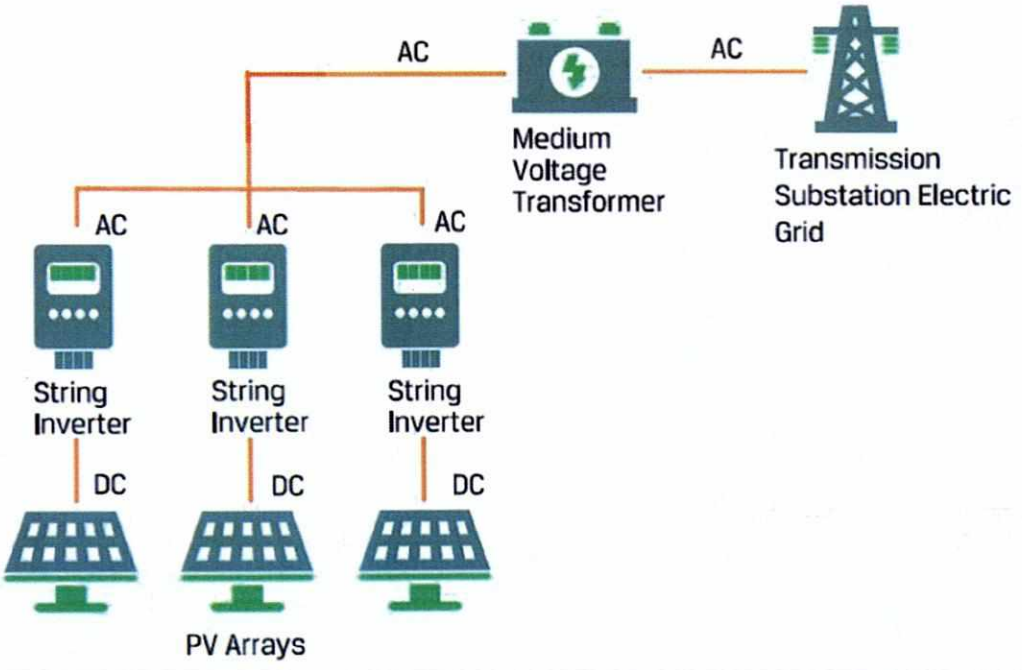
Process Flow Diagram of the Layout of the Generation Facility/Solar Power Plant/Solar Farm of the Licensee



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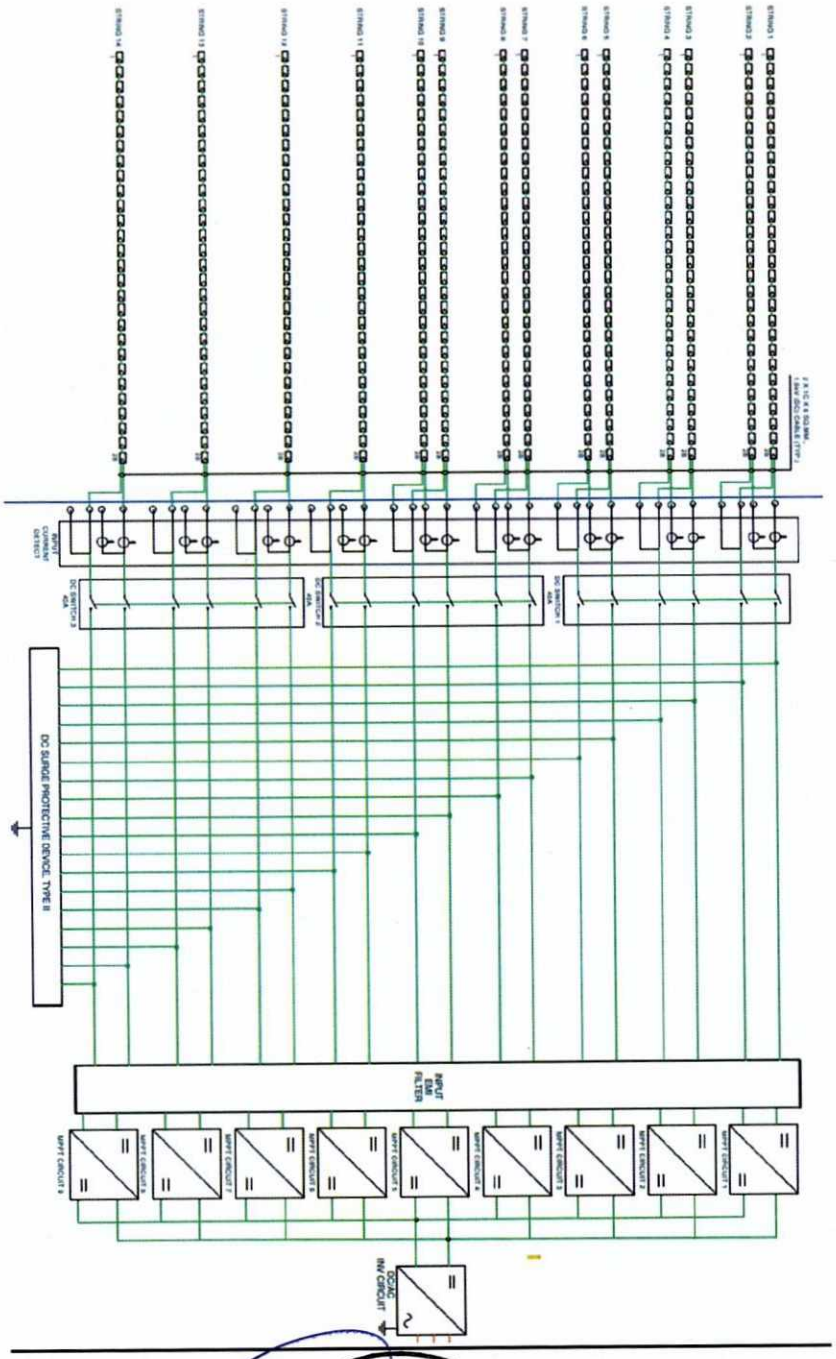
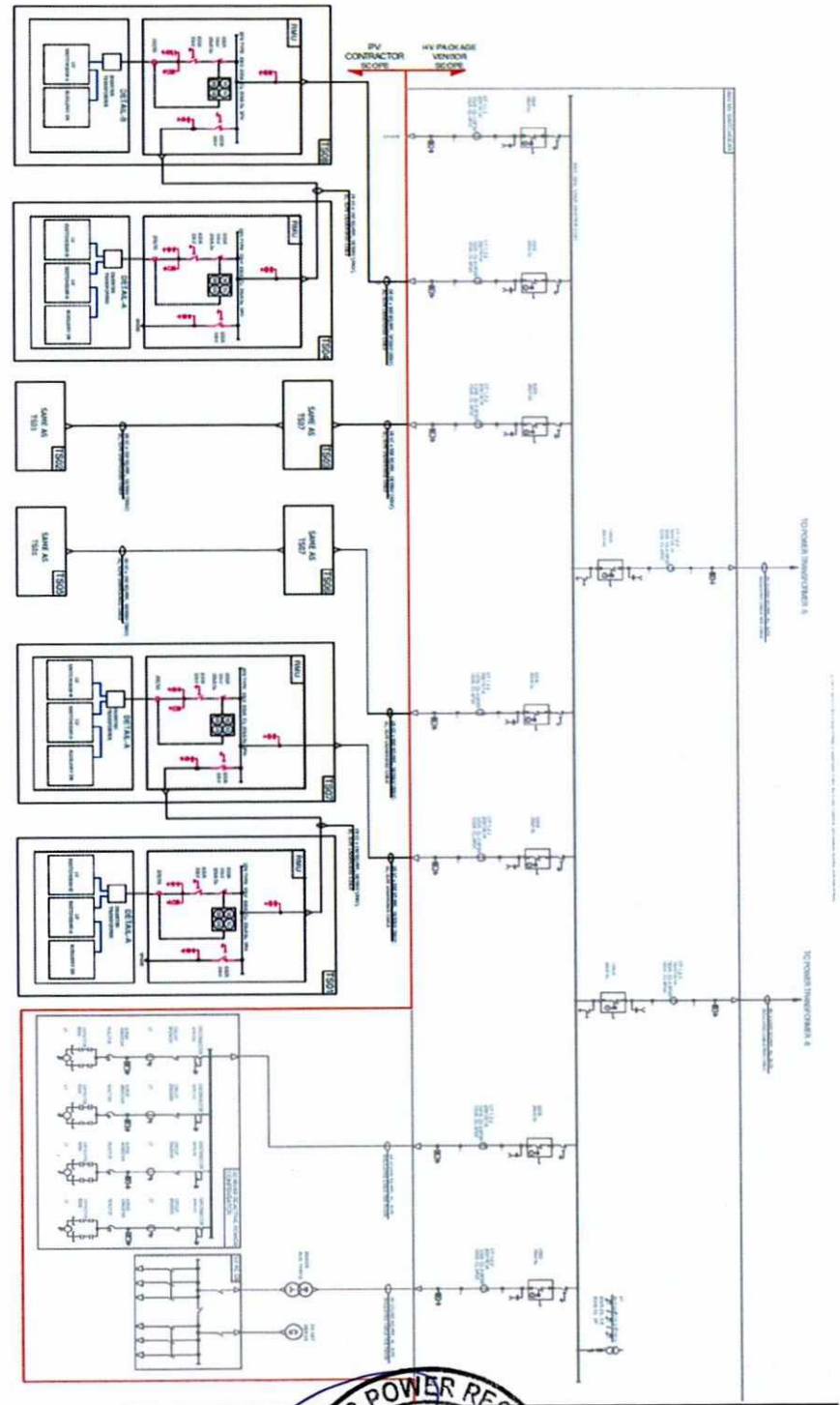
Single Line Diagram of the Generation Facility/Solar Power Plant/Solar Farm of the Licensee



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



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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/Power Plant/Solar Farm of HNDS Energy Limited-HDEL shall be dispersed to the load center of SEPCO.

(2). The sponsors of the project are developing three (03) generation facilities/Solar Power Plants/Solar Farms namely HDEL, Helios Power Limited and Meridian Energy Limited.

(a). A 132kV Double Circuit (D/C) transmission line on ACSR Rail conductor, for making an In-Out of one circuit of 132 KV D/C transmission line from new 220/132 KV new Rohri grid station to 132 KV Nara C-1 grid station. The distance for making In-Out arrangement will be approximately two (02) KM in length whereas the distance between substations of each of the above mentioned generation facilities/Solar Power Plants/Solar Farms will be approximately 0.11 KM

(3). Any change in the above Interconnection Arrangement/Transmission Facility duly agreed by HDEL, NTDC or SEPCO shall be communicated to the Authority in due course of time.

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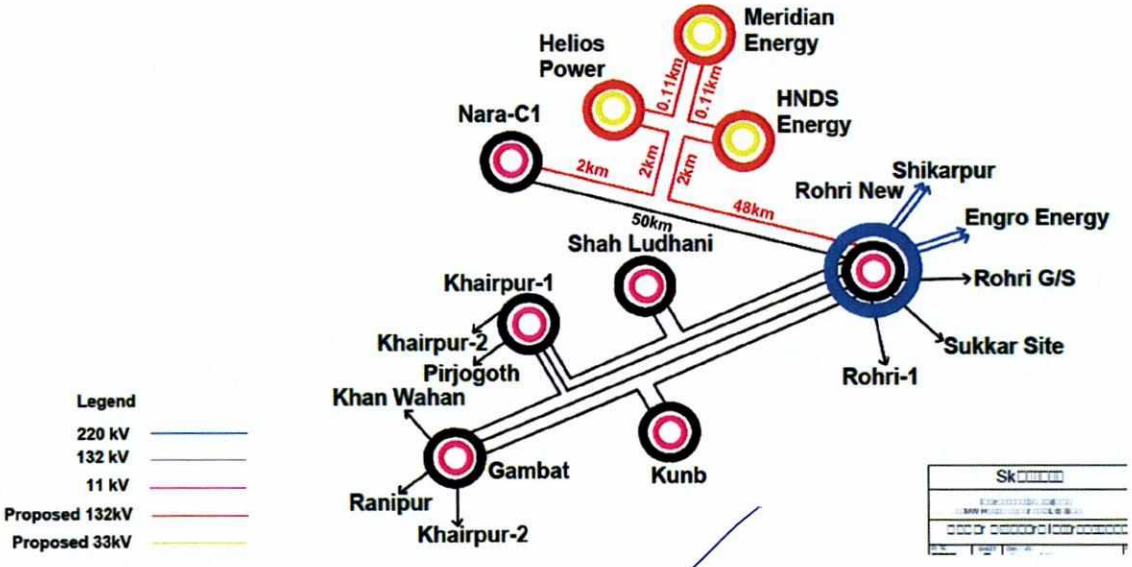
Schematic Diagram of the Interconnection Arrangement/Transmission Facility for Dispersal of Power from the Generation Facility/Solar Power Plant /Solar Farm



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Detail of Generation Facility/Solar Power Plant/ Solar Farm

(A). General Information

(i).	Name of the Company/Licensee	HNDS Energy Limited
(ii).	Registered/ Business office of the Company/Licensee	G-30/4, KDA Scheme No. 5, Block 8, Clifton, Karachi, Pakistan
(iii).	Location of the generation facility Solar Power Plant/ Solar Farm	Goth Gagrawara, Taluka Saleh Pat, District Sukkur, Sindh
(iv).	Type of the generation facility/ Solar Power Plant/Solar Farm	Solar PV Power Plant

(B). Solar Power Generation Technology & Capacity

(i).	Type of Technology	Photovoltaic (PV) with single-axis tracking	
(ii).	System Type	Grid Connected	
(iii).	Installed Capacity of the generation facility Solar Power Plant/Solar Farm (MW)	50.00 MW_P	
(iv).	No. of Panel/Modules	92008	
(v).	PV Array	Nos. of Strings	3286
		Modules in a string	28
(vi).	Invertor(s)	Quantity	233
		Make	Huawei
		Capacity of each unit	189 kVA at 50°C

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(C). Technical Details of Equipment

(a).	**Solar Panels – PV Modules**	
(i).	Type of Module	Mono 540 and 545
(ii).	Type of Cell	Bifacial mono-crystalline
(iii).	Dimension of each Module	2266mm X 1134mm X 30mm
(iv).	Total Module Area	2.57 m^2
(v).	Frame of Panel	Anodized Aluminum Alloy
(vi).	Weight of one Module	32.1 kg
(vii).	No. of Solar Cells in each module	144 (2 X (12 X 16)
(viii).	Efficiency of module	540 – 21.0% 545 – 21.2%
(ix).	Maximum Power (P_{max})	540Wp and 545Wp
(x).	Voltage @ P_{max}	540 – 41.3V 545 – 41.5V
(xi).	Current @ P_{max}	540 – 13.08A 545 – 13.14A
(xii).	Open circuit voltage (V_{oc})	540 – 49.2V 545 – 49.4V
(xiii).	Short circuit current (I_{sc})	540 – 13.90A 545 – 13.95A
(xiv).	Maximum system open Circuit Voltage	1500VDC
(b).	**PV Array**	
(i).	No of string	3286
(ii).	Modules in string	28
(c).	**Inverters**	
(i).	Rated AC output power(@50℃)	189 kVA
(ii).	Efficiency of inverter	99%
(iii).	Max. Allowable Input voltage	1500VDC
(iv).	Max. Current	Output: 155.2A

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(v).	Max. Power Point Tracking Range	500-1500V	
(vi).	Output electrical system	3 phase, 3 wire	
(vii).	Rated Output Voltage	800	
(viii).	Power Factor (adjustable)	0.8 leading to 0.8 lagging	
(ix).	Power control	MPP tracker	
(x).	Rated Frequency	50/60 Hz	
(xi).	Environmental Enclosures	Relative Humidity	0-100%
		Audible Noise	N/A
		Operating Elevation	4000m
		Operating temperature	-25℃~+60℃
(xii).	Grid Operating protection	A	Input side Disconnection Device
		B	Ant-islanding protection
		C	AC Overcurrent Protection
		D	DC Reverse polarity protection
		E	PV string fault monitoring
		F	DC Surge Arrester
		G	AC Surge Arrester
		H	DC Insulation resistance detection
		I	Residual Current Monitoring Unit
(d).	**<u>Junction Boxes Installed and fixed on main steel structure in Array Yard</u>**		
(i).	Number of Junction Box units	N/A	
(ii).	Input circuits in each box	N/A	

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(iii).	Max. Input current for each circuit	N/A
(iv).	Protection Level	N/A
(v).	Over Current protection	N/A
(vi).	Surge Protection	N/A
(e).	**Data Collecting System**	
(i).	System Data	Fibre network
(f).	**Power Transformer**	
(i).	Rating	2 X 60MVA
(ii).	Type of Transformer	ONAF
(iii).	Purpose of Transformer	Step-up (33kv/132kv)
(iv).	Output Voltage	132kv
(g).	**Unit Transformer**	
(i).	Rating	7 X 5920kVA (@50°C) 1 X 2960kVA (@50°C)
(ii).	Type of Transformer	33kv Oil Typed Transformer
(iii).	Purpose of Transformer	Step-up (800V/ 33kV)
(iv).	Output Voltage	33kv

(D). Other Details

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

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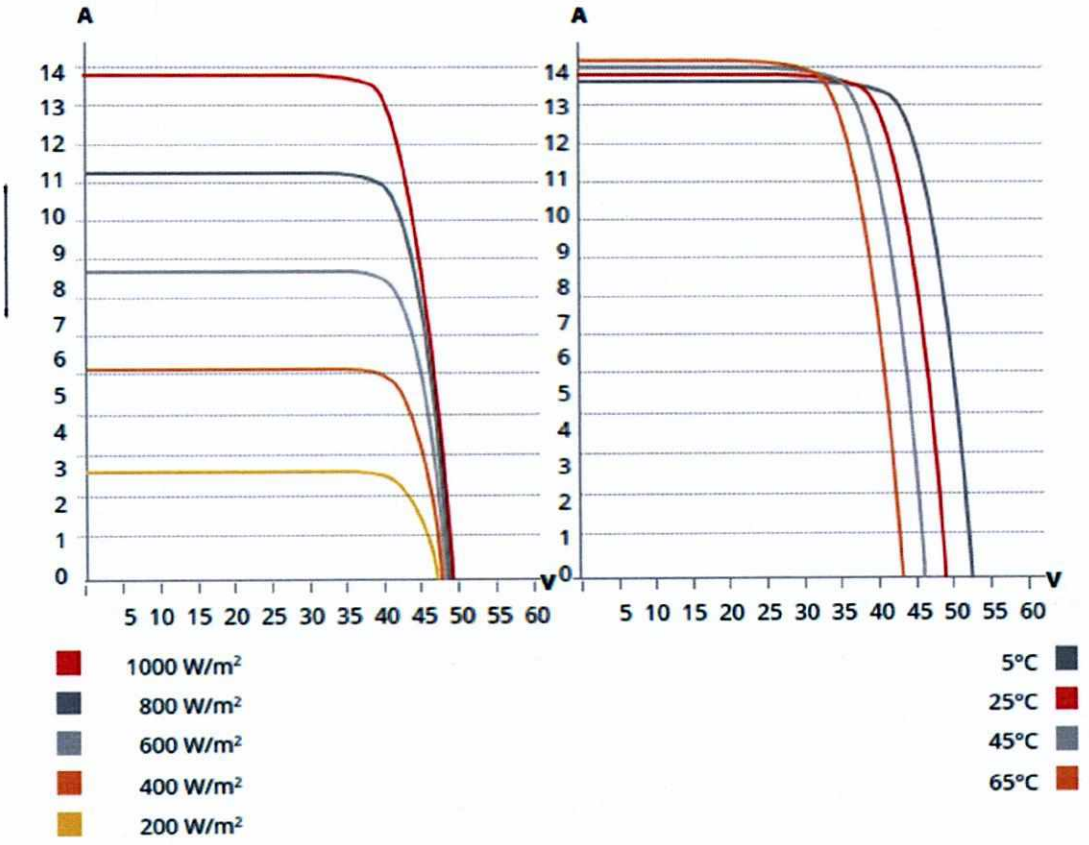
V-I Curve of PV Cell of Generation Facility/Solar Power Plant/ Solar Farm



Revised/Modified
SCHEDULE-II

The Total Installed Gross ISO Capacity of the Generation Facility/Power Plant/Solar Plant (MW), Total Annual Full Load (Hours), Average Sun Availability, Total Gross Generation of the Generation Facility/Solar Farm (in kWh), Annual Energy Generation (25 years Equivalent Net Annual Production-AEP) KWh and Net Capacity Factor of the Generation Facility/Power Plant/Solar Farm of Licensee is given in this Schedule.

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SCHEDULE-II

(1).	Total Installed Capacity of the Generation Facility/Solar Power Plant/Solar Farm	50.00 MW_P
(2).	Average Sun Hour Availability/Day (Irradiation on Inclined Surface)	5-8 hours
(3).	No. of days per Year	365
(4).	Annual generating capacity of Generation Facility/Solar Power Plant/Solar Farm (As Per Simulation)	102,613 MWh (first year)
(5).	Total expected generation of the Generation Facility/Solar Power Plant/Solar Farm during the twenty five (25) years term of this licence	2,445,456 MWh
(6).	Annual generation of Generation Facility/Solar Power Plant/Solar Farm based on 24 hours of working	50MWx24hx365 =438,000 MWh
(7).	Net Capacity Factor of Generation Facility/Solar Power Plant/Solar Farm	22.33% (first year)

Note

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

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