National Electric Power Regulatory Authority
Islamic Republic of Pakistan

Registrar

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

No. NEPRA/R/LAG-244/ 2968-73 September 09, 2020

Mr. Amir Altaf,
Manager Accounts,
Access Electric (Private) Limited,
Unit No. 02, 17 Aziz Avenue, Canal Bank,
Lahore.
Contact No. 042-357-60173

Subject: **Modification-I in Generation Licence No. SPGL/05/2014**
Licence Application No. LAG-244
Access Electric (Private) Limited (AEPL)

Reference: AEPL's LPM submitted vide Letter dated September 05, 2019.

The Authority has approved Modification in Generation Licence No. SPGL/05/2014 dated June 26, 2014 in respect of Access Electric (Private) Limited (AEPL), pursuant to Section-26 of the NEPRA Act read with Regulation 10(11) of the NEPRA Licensing (Application and Modification Procedure) Regulations 1999.

2. Enclosed please find herewith determination of the Authority in the matter of Licensee Proposed Modification in the Generation Licence of AEPL along with Modification-I in the Generation Licence No. SPGL/05/2014 as approved by the Authority.

Encl: As above

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(Syed Safeer Hussain)

Copy to:

1. Secretary, Power Division, Ministry of Energy, A-Block, Pak Secretariat, Islamabad.
2. Managing Director, NTDC, 414-WAPDA House, Lahore.
3. Chief Executive Officer, CPPA-G, ENERCON Building, Sector G-5/2, Islamabad.
4. Chief Executive Officer, Islamabad Electric Supply Company Limited (IESCO), Head Office Street 40, Sector G-7/4, Islamabad.
5. Director General, Pakistan Environmental Protection Agency, Plot No. 41, Street No. 6, H-8/2, Islamabad.

National Electric Power Regulatory Authority (NEPRA)

Determination of the Authority in the Matter of Licensee Proposed Modification in the Generation Licence of ACCESS Electric (Private) Limited

September 09, 2020
Case No. LAG-244

(A). Background

(i). In terms of Section-14B (previously Section-15) of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (the "NEPRA Act"), the Authority granted a generation licence (No. SPGL/05/2014, dated June 26, 2014) to Access Electric (Private) Limited (AEPL).

(ii). The above mentioned licence envisaged setting up a 10.00 MW_P Photo Voltaic (PV) cell based generation facility/Solar Farm/Solar Power Plant near village Hattar, tehsil Pind Dadan Khan, district Jhelum in the province of Punjab, using single glass Poly-crystalline PV modules.

(B). Communication of Modification

(i). AEPL 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 September 11, 2019.

(ii). In the "text of the proposed modification", AEPL stated that under the original scheme, the generation facility was supposed to be set up using PV modules (each of 250 Watt) of Polycrystalline technology however, now the sponsors plan to use Monocrystalline technology (each of 400 Watt) for the project. Due to the said, the number of panels/modules will now be reduced to

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25002 from the original estimation of 40,000. Further, the expected Commercial Operation Date (COD) of the project which has been delayed for a number of reasons, is now being envisaged to be August 31, 2020 instead of December 01, 2015.

(iii). Regarding the "statement of the reasons in support of the modification", AEPL, *inter alia*, submitted that in order to incorporate the proposed changes in technology and other related matters in the existing generation licence as explained above, a modification is necessary and accordingly the same has been communicated under the relevant regulations for the consideration and approval of the Authority.

(iv). About the "statement of the impact on the tariff", AEPL submitted that the Authority has already determined a tariff of the project (of Rs. 6.2343/kWh) vide its determination dated October 11, 2018 which is far less than what was originally determined (Rs. 15.7793/kWh) at the time of issuance of generation licence.

(v). Regarding the "Statement of the impact on the quality of service (QoS)" and "the performance by the licensee of its obligation under the licence", AEPL confirmed the proposed changes in technology whereby Mono-crystalline PV modules are envisaged to be deployed, the same will result in improved QoS and its performance of its obligation under its granted 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, by AEPL, the Registrar published the communicated LPM on October 05, 2019, in one (01) Urdu (Daily "Nawa-e-Waqat") and one (01) English (the "Business Recorder") newspaper, informing the general public about the communicated LPM and

inviting their comments within a period of fourteen (14) days from the date of the said publication.

(i). Apart from the above, separate letters were also sent to other stakeholders including Government Ministries and their attached departments, various representative organization, individual experts and others on October 08, 2019 inviting their views and comments for the assistance of the Authority as stipulated in Regulation-10(9) of the Licensing Regulations.

(D). Comments of Stakeholders

(i). In reply to the above, the Authority received comments from Power Division, Ministry of Energy (PDMoE) only. The comments offered by said stakeholder are summarized in the following paragraph:-

(a). PDMoE submitted that the sponsors of the project have proposed Monocrystalline PV Modules instead of Polycrystalline which is more suitable in improving the efficiency of the system. The modification apparently has no adverse impact provided that the tariff for the project is not changed. Further to the said, the sponsors of the project have estimated that the expected life of the project from the COD will be twenty five (25) years, which is also reasonable.

(ii). The Authority considered the above comments and found the same favourable and accordingly considered it appropriate to proceed further as stipulated in the NEPRA Licensing (Generation) Rules, 2000 (the "Generation Rules") and the Licensing Regulations.

(E). Evaluation/Findings

(i). The Authority examined the entire case in detail including the already granted licence, communicated LPM and comments of stakeholder. In this regard, the Authority observed that a Generation Licence (No. SPGL/05/2014, dated June 26, 2014) was granted to AEPL for setting up a Photovoltaic (PV) cell based generation facility/ /Solar Farm/Solar Power Plant with a cumulative installed capacity of 10.00 MW_P.

(ii). The Authority has observed that the main features of the LPM communicated by the company/Licensee/AEPL are (a). change in the type of PV modules from Polycrystalline to Mono Crystalline; (b). change in number of Panel/Modules for selecting PV Cell of 400 Watt; (c). change in the COD of the generation facility and expected useful life of the generation facility ; and (d). modification in the schedule-I & II of the existing generation licence to reflect the above mentioned changes in the equipment and other related characteristics, etc.

(iii). In this regard, the Authority in terms of Section-26 of the NEPRA Act read with Regulation-10(5) of the Licensing Regulations, 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 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 observes that (a). LPM will not be affecting adversely the performance by the Licensee of its obligations but will enable the Licensee to have better performance as the new equipment will be more efficient and reliable in terms of performance at site; (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 proposed LPM will be beneficial to the consumers due to selection of more robust and efficient equipment which will result in better capacity factor; (d). the LPM is reasonably necessary for the Licensee to effectively and efficiently perform its obligations under the licence; (e). it is reasonably necessary for the Licensee to have this LPM to ensure the continuous, safe, cheap and reliable supply of electric power to the utility/consumers keeping in view its financial and technical viability.

(F). 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 and therefore the modification can be allowed. In this regard, AEPL during the processing of its LPM has informed that it will be using PV cells of 450 Watt Mono-Crystalline module instead of 400 Watt.

(ii). In this regard, the Authority has observed that in terms of Regulation-10(11) of the Licensing Regulations any LPM can be allowed with or without changes. In the particular case, the Authority has observed that 450 Watt PV Modules are of latest generation as compared to PV cells of 400 Watt and are more efficient. Therefore, the Authority considers that deploying said modules will be more beneficial for the project as it will result in lower tariff. Therefore, the Authority in terms Section-26 of the NEPRA Act read with Regulation-10(11) of the Licensing Regulations approves the communicated LPM with changes.

(iii). Accordingly, the generation licence (No. SPGL/05/2014, dated June 26, 2014) of AEPL 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

Rafique Ahmed Shaikh
(Member)

2/9/20

Rehmatullah Baloch
(Member)

2/9/2020

Engr. Bahadur Shah
(Member)

Did Not Attend

Saif Ullah Chattha
(Member)

3.9.2020

Tauseef H. Farooqi
(Chairman)

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National Electric Power Regulatory Authority
(NEPRA)
Islamabad – Pakistan

GENERATION LICENCE
No. SPGL/05/2014

In exercise of the Powers conferred under Section-26 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997, the Authority hereby modifies the Generation Licence (No. SPGL/05/2014, dated June 26, 2014 granted to Access Electric (Private) Limited, to the extent of changes mentioned hereunder:

(a). The expiry date of the Licence mentioned on the face sheet may be read as **30th day of March 2046**;

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

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

(d). 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 09th **day** of **September Two Thousand & Twenty**

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Article-1
Definitions

1.1 In this licence

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

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

(c). "Applicable Documents" mean the Act, the rules and regulations framed by the Authority under the Act, any documents or instruments issued or determinations made by the Authority under any of the foregoing or pursuant to the exercise of its powers under the Act, the Grid Code, the applicable Distribution Code, the Commercial Code if any, or the documents or instruments made by the Licensee pursuant to its generation licence, in each case of a binding nature applicable to the Licensee or, where applicable, to its affiliates and to which the Licensee or any of its affiliates may be subject;

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

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

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

(g). "Carbon Credits" mean the amount of Carbon Dioxide (CO2) and other greenhouse gases not produced as a result of generation of electric energy by the generation facility/Solar Power Plant/Solar Farm and other environmental air quality credits and related emissions reduction credits or benefits (economic or otherwise) related to the generation of electric energy by the generation facility/Solar Power Plant/Solar Farm, which are available or can be obtained in relation to the generation facility/Solar Power Plant/Solar Farm after the COD;

(h). "Commercial Code" means the National Electric Power Regulatory Authority (Market Operator, Registration, Standards and Procedure) Rules, 2015 as amended or replaced from time to time;

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

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

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

(l). "Distribution Code" means the distribution code prepared by the concerned XW-DISCO and approved by the Authority, as 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;

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

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

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

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

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

(t). "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;

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

(v). "Licensee" means **Access Electric (Private) Limited** or its successors or permitted assigns;

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

(x). "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;

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

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

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

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

(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.

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Article-2
Applicability of Law

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

Article-3
Generation Facilities

3.1 The location, size (capacity in MW), technology, interconnection arrangements, technical limits, technical 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. June 26, 2014 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.

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Article-5
Licence fee

The Licensee shall pay to the Authority the licence fee as stipulated in the National Electric Power Regulatory Authority (Fees) Rules, 2002 as amended or replaced from time to time.

Article-6
Tariff

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

Article-7
Competitive Trading Arrangement

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

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

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

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Article-8
Maintenance of Records

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

Article-9
Compliance with Performance Standards

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

Article-10
Compliance with Environmental & Safety Standards

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

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.

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Article-12
Performance Data

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

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

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

Article-13
Provision of Information

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

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.

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Article-15
Design & Manufacturing Standards

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

Article-16
Power Curve

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

Article-17
Compliance with Applicable Law

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

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.

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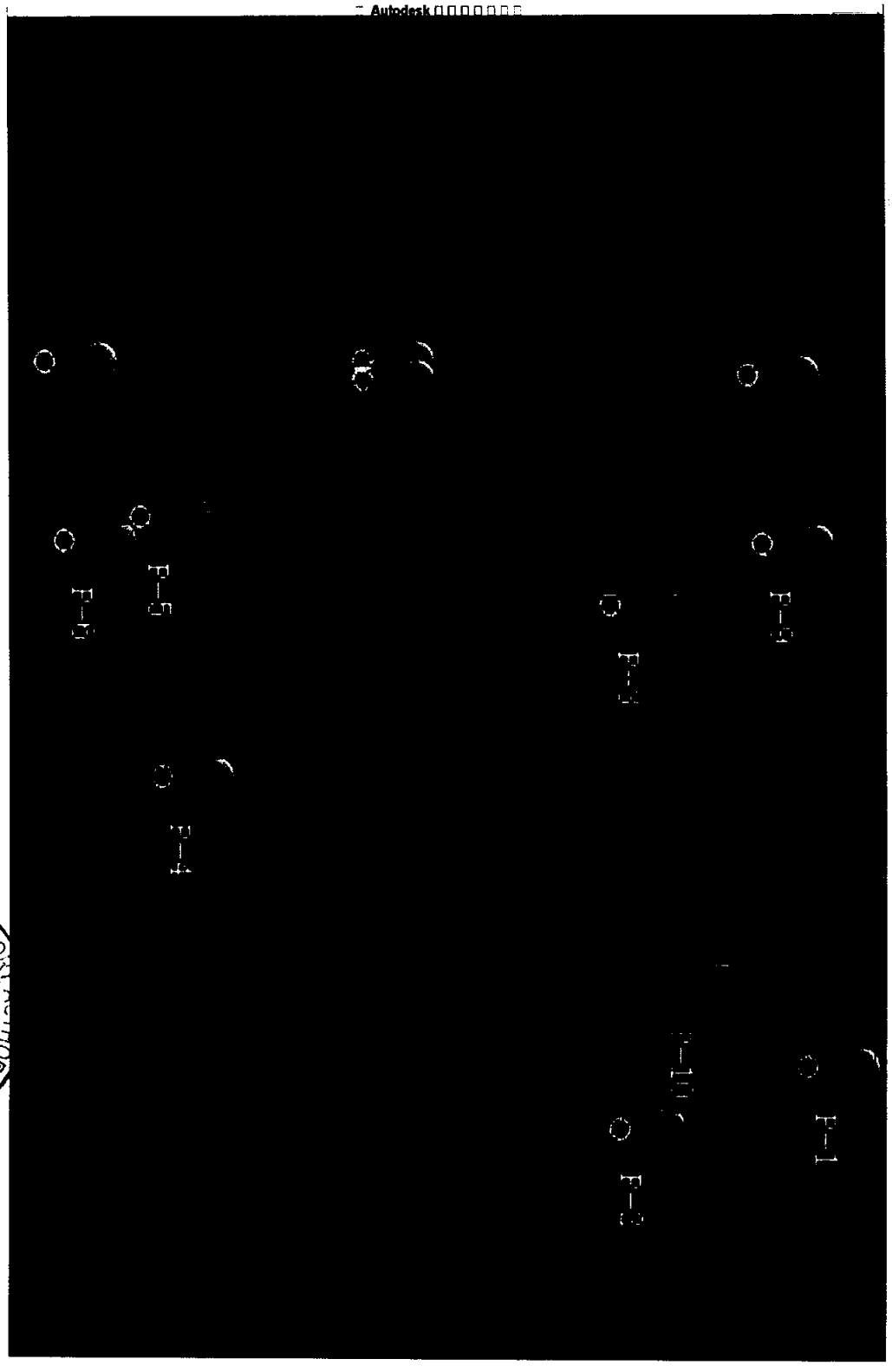
Land Coordinates of the Generation Facility/Solar Power Plant/Solar Farm of the Licensee



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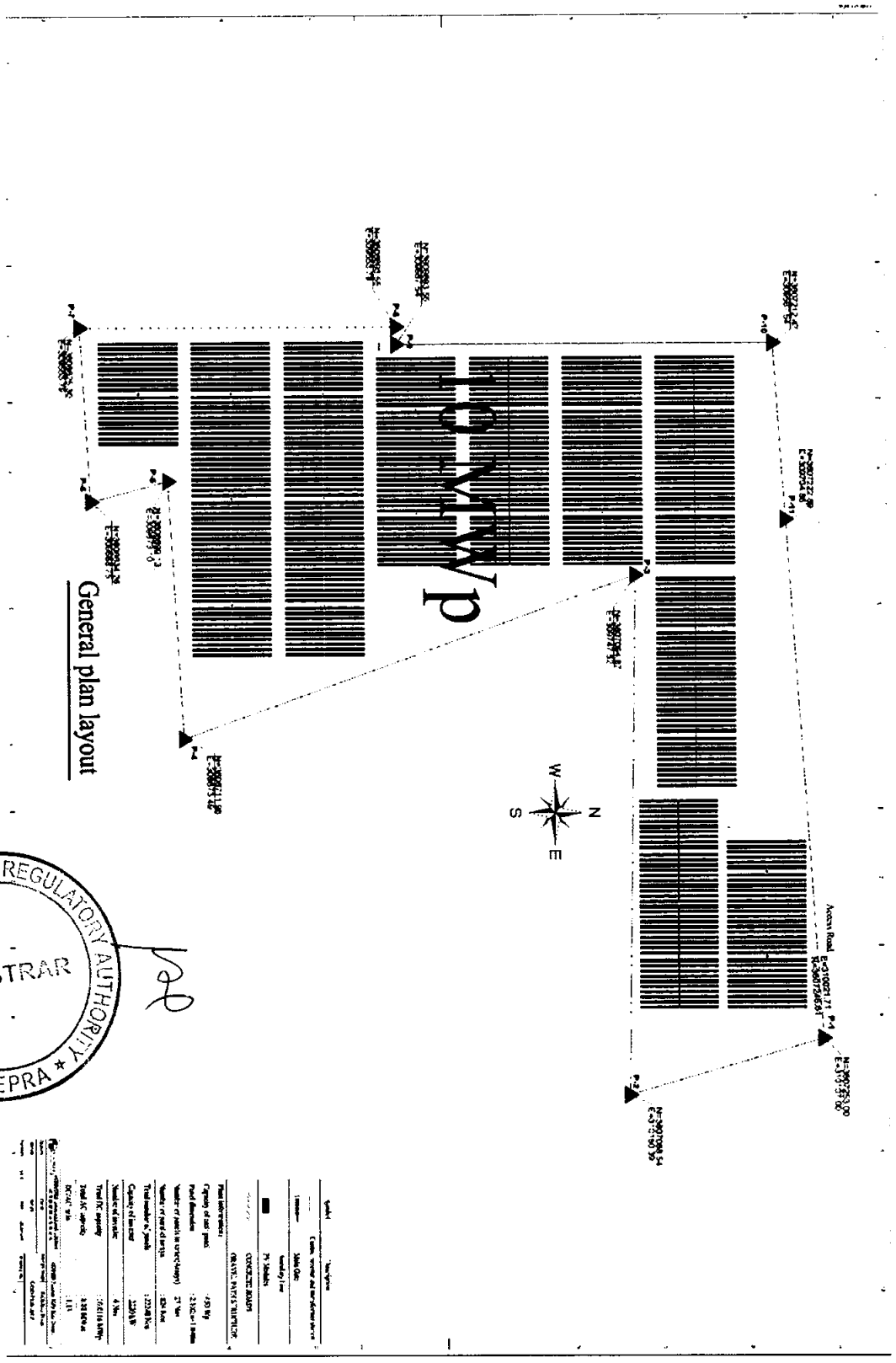
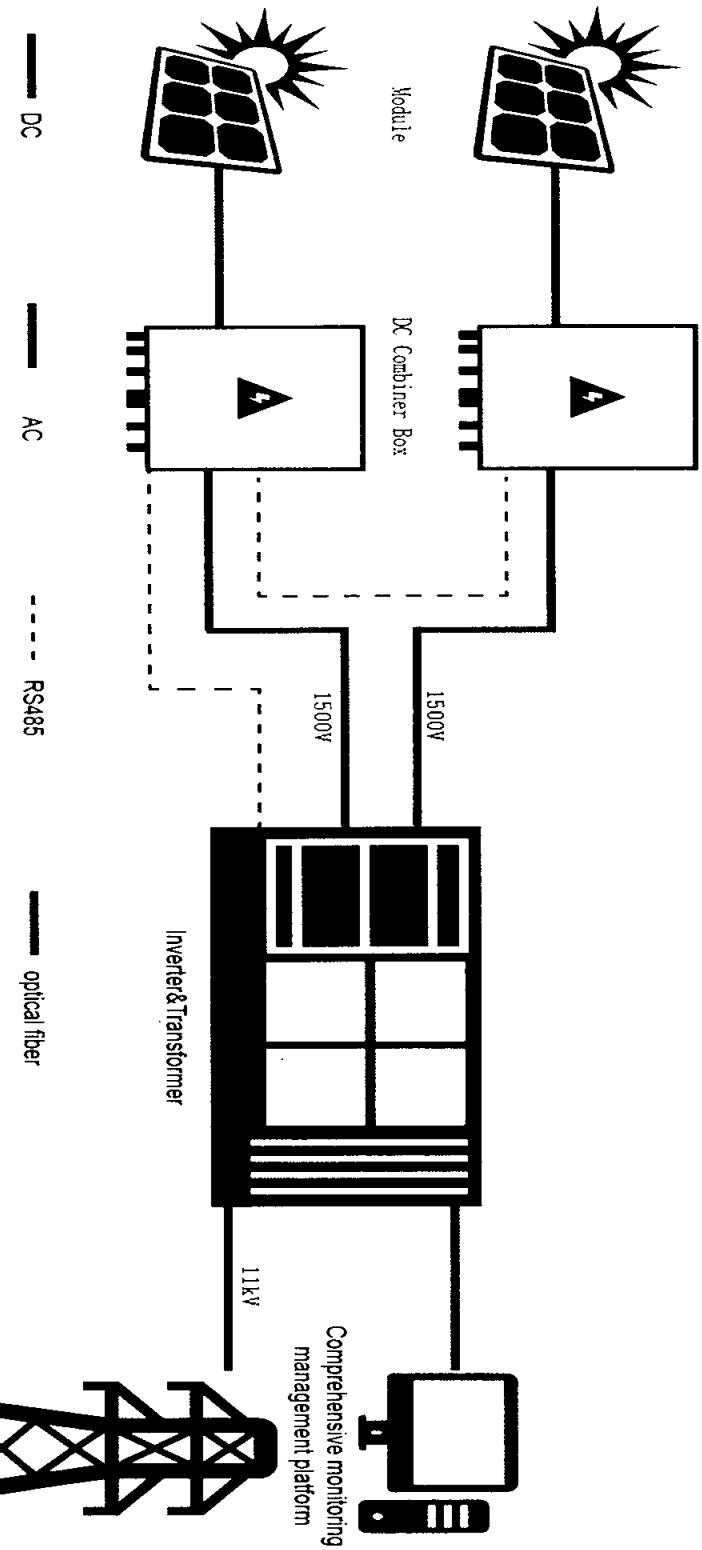
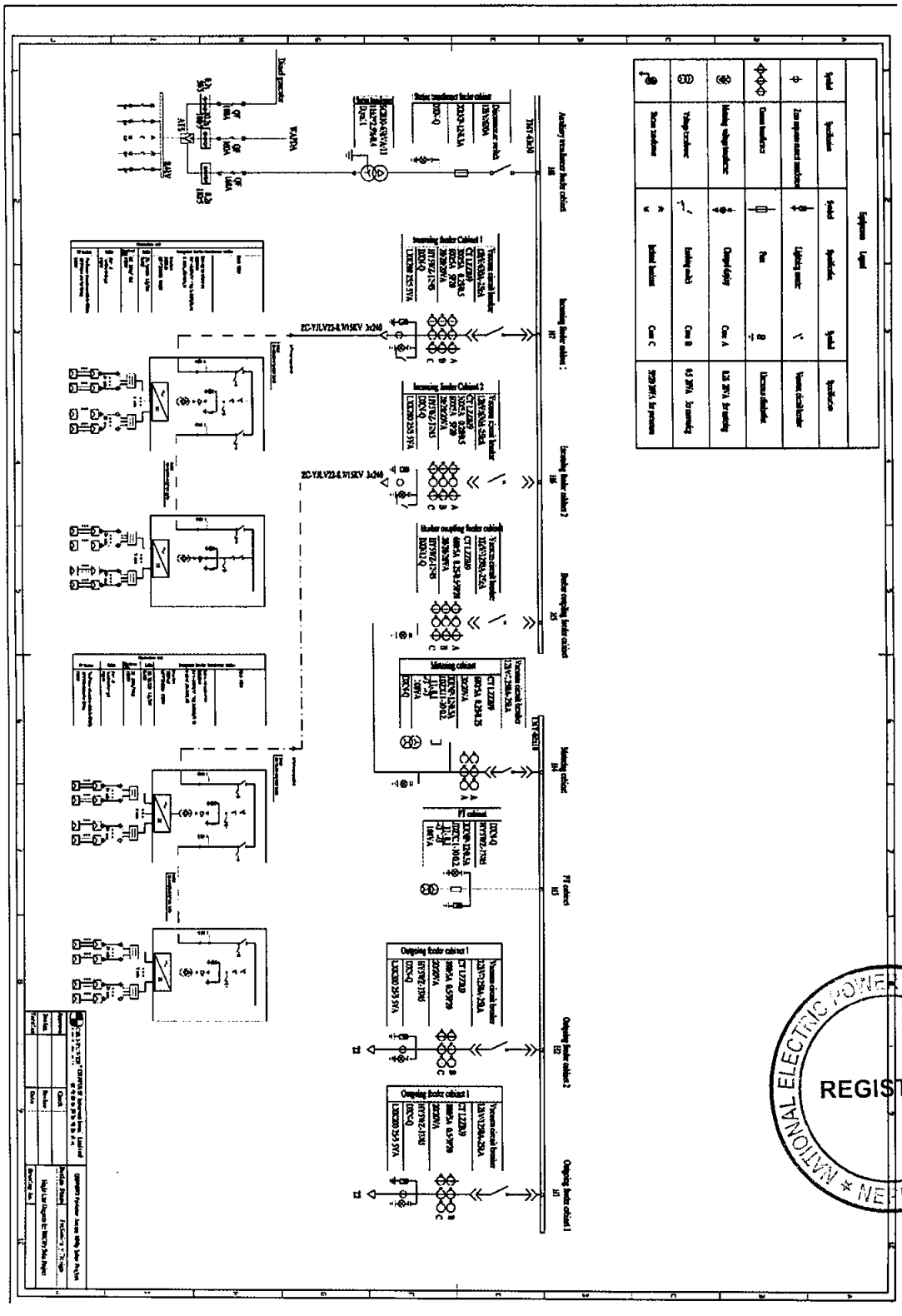
Schematic Diagram of the Layout of the Generation Facility/Solar Power Plant/Solar Farm of the Licensee



Process Flow Diagram of the Layout 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



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

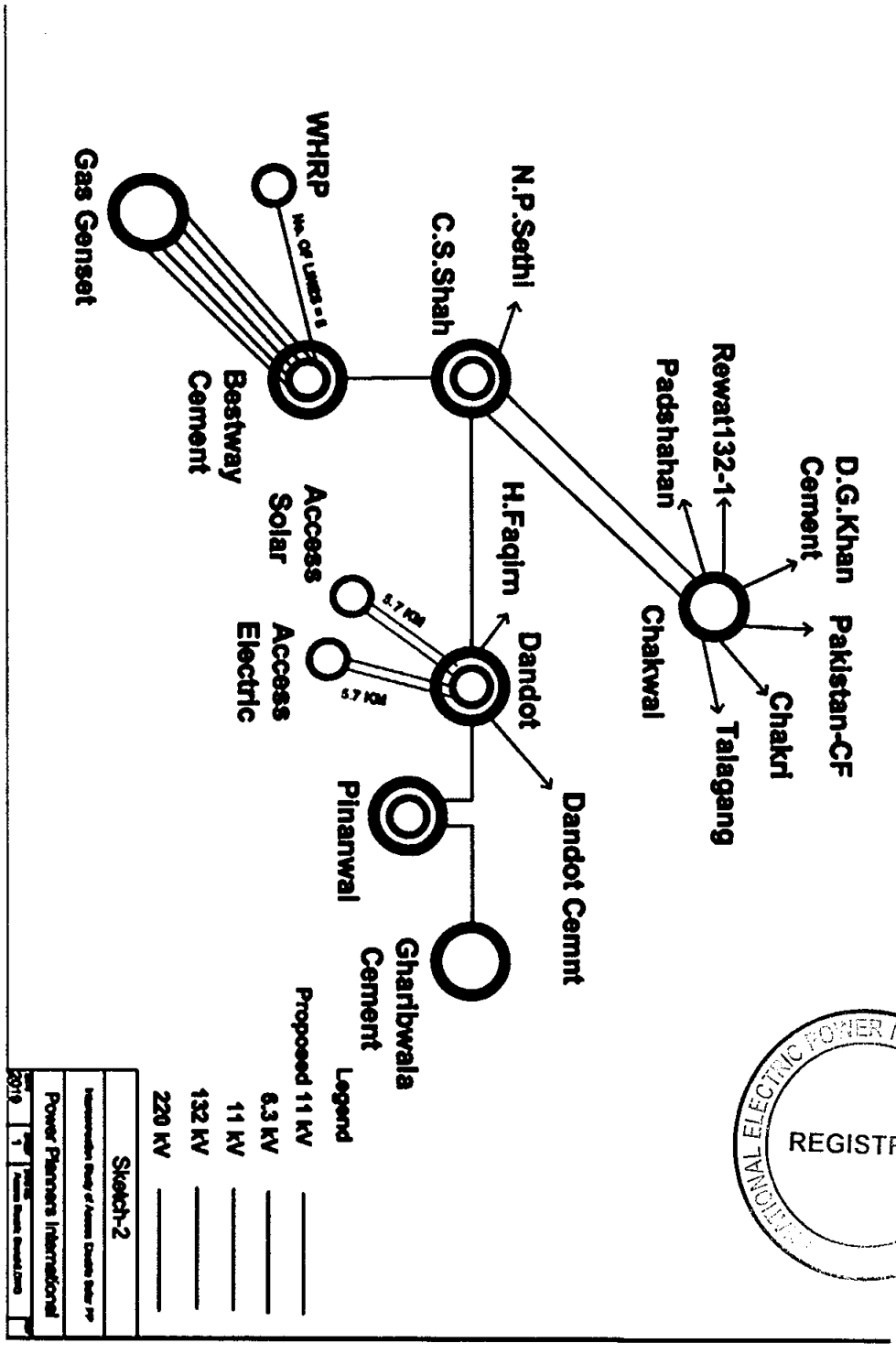
The electric power generated from the Generation Facility/Power Plant/Solar Farm of Access Electric (Private) Limited-AEPL shall be dispersed to the load center of IESCO.

(2). The proposed Interconnection Arrangement/Transmission Facility for dispersal of electric power for the Generation Facility/Solar Power Plant/Solar Farm comprises the following: -

(a). 11 kV double circuit feeder consisting of ACSR OSPREY measuring about 5.70 km in length, connecting the generation facility of the Licensee to 132 KV Dandot Grid Station of IESCO.

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

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	Access Electric (Private) Limited.
(ii).	Registered/ Business office of the Company/Licensee	C/o Howath Chaudhary & Co. 25E, Main Market, Gulberg, Lahore.
(iii).	Location of the generation facility Solar Power Plant/ Solar Farm	39-C, Ahmed Block, New Garden Town Lahore.
(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)	10.00 MW_P

(C). Technical Details of Equipment

(a).	**Solar Panels – PV Modules**	
(i).	Type of Module	Monocrystalline PV Module
(ii).	Type of Cell	Monocrystalline
(iii).	Dimension of each Module	2102 × 1040 × 35 mm
(iv).	Module Surface Area	2.186 sq.m.

(v).	No. of Panel/ Modules	22248 pcs	
(vi).	Total Module Area	48634 sq.m.	
(vii).	Total Land Area Used	17.5 Hectors (approximately)	
(viii).	Frame of Panel	Anodized Aluminum	
(ix).	Weight of one Module	24kg	
(x).	Module Output Warranty	For 1st year	For 2nd to 25th year
		97.5%	The loss of power output shall not exceed 0.7% per year
(xi).	Number of Solar Cells in each module	144	
(xii).	Efficiency of module	20.6%	
(xiii).	Environment Protection System	Encapsulation and sealing arrangements for protection from environment.	
(xiv).	Maximum Power (P_{max})	450W, 0 ~ +5W	
(xv).	Voltage @ (P_{max})	41.0V	
(xvi).	Current @ P_{max}	10.98A	
(xvii).	Open circuit voltage (V_{oc})	49.6V	
(xviii).	Short circuit current (I_{sc})	11.53A	
(xix).	Maximum system open Circuit Voltage	1500Vdc	
(b).	**PV Array**		
(i).	No. of Sub-arrays	412	
(ii).	Total No. of Strings	824	
(iii).	Modules in Sub-Array	54 pcs/ sub-array	
(iv).	Modules in a strings	27 pcs	
(v).	Total Modules	22248	
(c).	**PV Capacity**		
(i).	Total	10.00 MW_P	

(d).	**Inverters**		
(i).	Capacity of each unit	2220 kVA	
(ii).	Inverter Model	PVH-L2220E	
(iii).	Manufacturer	TMEIC	
(iv).	Rated Input Voltage	800~1300Vdc	
(v).	Input Operating Voltage Range	800~1300Vdc	
(vi).	Number of Inverters	4	
(vii).	Total Power	8880 kVA	
(viii).	Efficiency	Max.:99%; EU: 98.5%	
(ix).	Max. Allowable Input voltage	1500V	
(x).	Max. Current	input: 2834A; output: 2332A	
(xi).	Max Power Point Tracking Range	800~1300Vdc	
(xii).	Output electrical system	3 phase	
(xiii).	Rated Output Voltage	550V	
(xiv).	Rated Frequency	50/60Hz	
(xv).	Power Factor	>0.99	
(xvi).	Power Control	Adjustable from 0.85 leading to 0.85 lagging	
(xvii).	Environmental Enclosures	Operating Temperature Range	-20°C ~ +60°C (derating above 50°C)
		Relative Humidity	5% ~ 95% (non-condensing)

		Audible Noise	<70 dB
		Operating Elevation	3000m (derating above 2000m)
		Warranty Period	5 years
(xvii).	Grid Operation Protection	(a).	Islanding protection
		(b).	short-circuit protection
		(c).	over/under voltage protection
		(d).	over/under current protection
		(e).	over/under frequency protection
		(f).	over temperature protection
		(g).	DC input protection
(e).	**Junction Boxes Installed and fixed on main steel structure in Array Yard**		
(i).	Number of Junction Box units	35	
(ii).	Input circuits in each box	24	
(iii).	Max. Input current for each circuit	15A	
(iv).	Max. Input voltage	1500V	
(v).	Power at each box	291.6kWp	
(vi).	Protection Level	IP65	
(vii).	Over-Current protection	Fuse	
(viii).	Output switch	315A, 1500V circuit breaker	
(ix).	Surge protection	1500V, Type II	
(x).	Purpose of Junction Box	(a).	Combine groups of modules into sub-arrays that will be wired into the inverter.

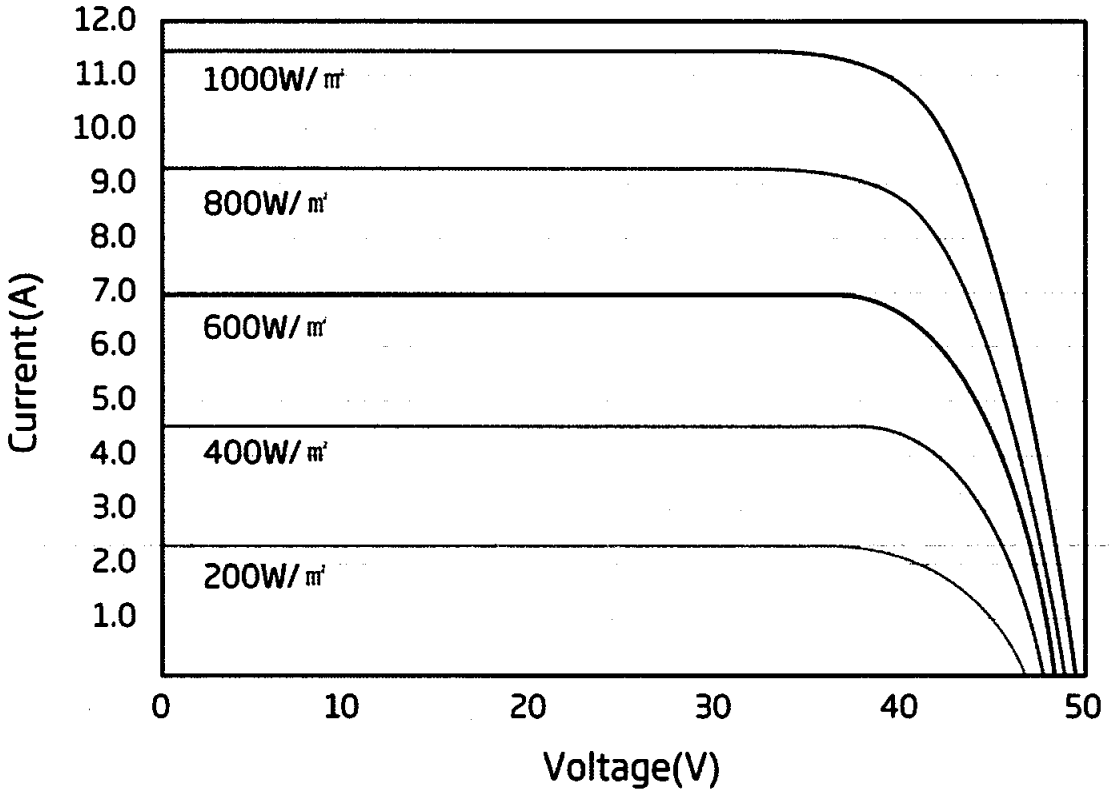
		(b).	Provide arrangement for disconnection for each of the groups.
		(c).	To provide group array isolation.
		(d).	The current carrying ratings of the junction boxes shall be suitable with adequate safety factor to inter-connect the solar PV array.
		(e).	24 protected inputs at 15A to prevent backflow of short circuit current.
(f).	**Data Collecting System**		
(i).	Weather Data	(a).	Total radiation
		(b).	Ambient temperature
		(c).	Solar panel temperature
		(d).	Wind direction
		(e).	Wind speed
(ii).	System Data	(a).	DC input voltage(V)&current(A) of each Inverter (Phase, Line)
		(b).	Total DC power (kW) generated by PV array.
		(c).	AC output voltage(V)&current(A) of each Inverter (Phase, Total)
		(d).	AC output power(KW) & energy (kWh) of each Inverter
		(e).	Frequency(Hz)
		(f).	Power Factor(PF)
		(g).	Temperature inside inverter station
(g).	**Isolating Transformer**		
(i).	Rating	2220 kVA, 11±2x2.5%/0.55kV	
(ii).	Type of Transformer	Oil Natural Air Natural	

(iii).	Input voltage	0.55kV
(iv).	Output Voltage	11kV
(v).	Purpose of Transformer	Step up voltage, galvanic isolation and eliminate DC current injection
(vi).	Efficiency	>99%
(h).	**Outdoor Cubicle Control Room**	
(i).	Data Record	Continuous logging with data logging software
(ii).	Control Room System	Computerized data acquisition system
(iii).	Control room System Detail	Interfacing hardware & software, industrial type PC, which will be robust & rugged suitable to operate in the control room environment
(i).	**Mounting Structure**	
(i).	Structure	HDG steel/aluminum with concrete pile foundations
(ii).	Tilt of Array System	±45°
(iii).	Array Specification	Certified for wind and seismic requirements
(j).	**Foundation Pillars**	
(i).	No. of foundations	4017 (Preliminary design)
(ii).	Foundation Structure	Reinforced concrete

(D). Other Details

(i).	Expected COD of the generation facility Solar Power Plant/Solar Farm	August 31, 2020
(ii).	Expected useful Life of the generation facility Solar Power Plant/Solar Farm from the COD	25 years

V-I Curve of PV 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/Power Plant/Solar Farm of Licensee is given in this Schedule.

SCHEDULE-II

(1).	Total Installed Capacity of the Generation Facility/Solar Power Plant/Solar Farm	10.00 MW_P
(2).	Average Sun Hour Availability/Day (Irradiation on Inclined Surface)	1781 hours
(3).	No. of days per Year	365
(4).	Annual generating capacity of Generation Facility/Solar Power Plant/Solar Farm (As Per Tariff Determination)	17,827 MWh
(5).	Total expected generation of the Generation Facility/Solar Power Plant/Solar Farm during the twenty five (25) years term of this licence	445,675 MWh
(6).	Annual generation of Generation Facility/Solar Power Plant/Solar Farm based on 24 hours of working	10.00 X 24 X 365 = 87,600 MWh
(7).	Net Capacity Factor of Generation Facility/Solar Power Plant/Solar Farm (4/6)	20.35%

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).

MODIFICATION-I

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