



شمس دبي
Shams Dubai

CONNECTION CONDITIONS FOR GENERATORS OF ELECTRICITY FROM SOLAR ENERGY

FOR THE IMPLEMENTATION OF EXECUTIVE COUNCIL RESOLUTION NO. 46 OF 2014
CONCERNING THE CONNECTIONS OF GENERATORS OF ELECTRICITY FROM SOLAR ENERGY TO
THE POWER DISTRIBUTION SYSTEM IN THE EMIRATE OF DUBAI

ATTACHMENT TO APPLICATION FOR CONNECTION OF GENERATORS OF
ELECTRICITY FROM SOLAR ENERGY AND CONNECTION AGREEMENT

VERSION 4 | JUNE 2022

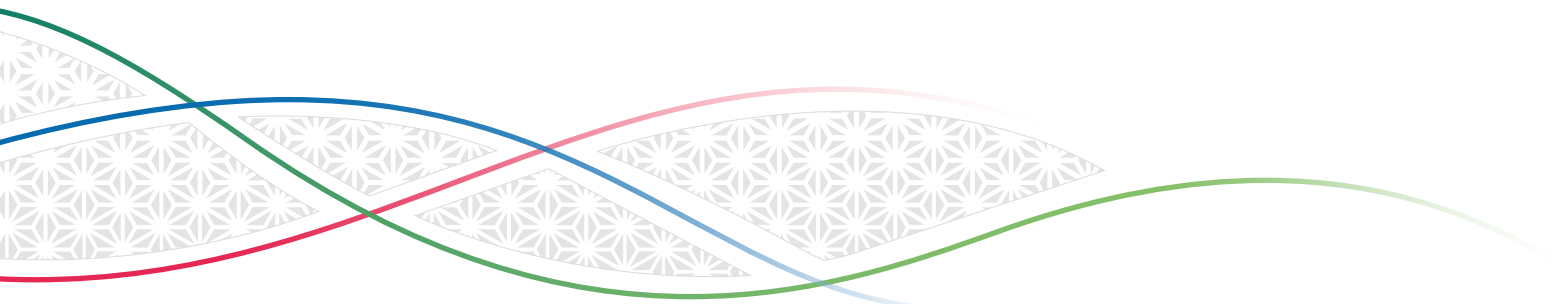


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1 GENERAL PROVISIONS

1.1 Subject Matter

These 'Connection Conditions for Generators of Electricity from Solar Energy' are issued by Dubai Electricity and Water Authority PJSC (DEWA) for the implementation of Executive Council Resolution No. 46 of 2014 concerning the connection of generators of electricity from solar energy to the Power Distribution System in the Emirate of Dubai, and forms an integral part of the Application for Connection of Generators of Electricity from Solar Energy and Connection Agreement.

These Connection Conditions for Generators of Electricity from Solar Energy shall come into effect as of publication on the website of Dubai Electricity and Water Authority PJSC.

1.2 Reference Documents

The following documents are available on DEWA website (www.dewa.gov.ae), and the Producer shall comply with the applicable requirement set forth in such documents:

- DEWA Standards for Distributed Renewable Resources Generators Connected to the Distribution Network;
- DEWA Connection Guidelines for Distributed Renewable Resources Generators Connected to the Distribution Network.
- (for LV installations) DEWA Regulations for Electrical Installations;
- (for MV installations) DEWA Distribution Substation Guideline; General conditions/requirements for providing direct 11 kV supply; Power Supply Guidelines for Major Projects; Design Requirements & Guidelines for MV (11kV-22kV) supply;
- Safety of People for Renewable Resources Generators;
- Safety of Environment for Renewable Resources Generators;
- DEWA Inspection and Testing Guidelines for Distributed Renewable Resources Connected to the Distribution Network;
- Connection Agreement for Generators of Electricity from Solar Energy;
- Executive Council resolution no. 46 of 2014.

1.3 Definitions

Annual Connection Cap – The maximum electricity generation capacity from Solar Energy that may be connected to the Distribution System in a calendar year, as determined by the Authority.

Authority – Dubai Electricity and Water Authority PJSC (DEWA).

Approved Load – the maximum power that can be drawn from the Distribution System under one Consumption Account at any point in time, as approved by the Authority for that Consumption Account.

Billing Cycle – The interval of time for which an electricity bill is issued by the Authority. A Billing Cycle is recurrent and currently has a monthly duration.

Connection Point - Is the location at which the Renewable Generator is connected to the Distribution System.

Consumption Account – The account of specific premise for metering the electricity imported from Distribution System by a meter dedicated for such purpose.

Distribution System - The electrical network at 33kV and below, and its components which are owned and operated by the Authority with the main purpose of delivering electricity to consumers from the Power Transmission System, including but not limited to all associated equipment such as lines and cables, electrical substations, pole mounted transformers, analogue electrical elements such as resistors, inductors, capacitors, and switches.

Export Electricity – Electricity that is generated by the Producer and injected into the Distribution System by Renewable Generator.

Hosting Account – The Consumption Account under which a Renewable Generator is connected.

Import Electricity – Electricity that is drawn from the Distribution System and consumed by the Producer under one or more Consumption Accounts held by the Producer within the Plot.

Maximum Capacity - The maximum active power which a Renewable Generator can feed into the Distribution System at any point in time. This corresponds to the sum of the maximum active power deliverable by the inverters at the AC side of the Renewable Generator.

Net Import – The difference between the electricity imported from the Distribution System and the electricity exported to the Distribution System during a certain period of time, in case the import is greater than the export.

Plot – A portion of land identified by a unique number assigned by Dubai Municipality or by the competent authority in charge of issuing development permits for the area where the land is located.

Person – Natural or legal person whether public or private.

Producer – Any Person that generates electricity from solar energy and connects it to the Distribution System as per terms and conditions set forth by the Resolution and by the Authority.

Renewable Generator – One or more generating units that generate electricity exclusively from Solar Energy connected under one Consumption Account (Hosting Account).

Resolution - Executive Council Resolution no. 46 of 2014.

Solar Energy – The radiant light energy emitted by the Sun.

Surplus Electricity – The excess of Export Electricity over Import Electricity in an applicable Billing Cycle.

Total Connected Load (TCL) – The sum of Approved Load for the Consumption Accounts held by the Producer within the Plot.

Transmission System – The system belonging to the Authority which entirely or mainly comprises the high-voltage electricity cables, lines and electricity installations and facilities owned and/or operated by the Authority and used to transmit electricity from a power unit to a power substation or other electricity generation unit.

2 PROVISIONS RELATED TO RENEWABLE GENERATORS CONNECTION AND TO ELECTRICITY BILLING

2.1 Installation of Renewable Generators

The Producer shall:

1. Make sure that only equipment compliant with requirements set forth in DEWA Standards for Distributed Renewable Resources Generators Connected to the Distribution Network and any other applicable regulation is installed as part of the Renewable Generator;

Note: the information presented on DEWA website ('Non-Exhaustive list of eligible equipment under DEWA Standards for Distributed Renewable Resources Generators Connected to the Distribution Network') provides an overview of the manufacturers and equipment that meet DEWA technical standards. However, this does not constitute an endorsement or warranty of any kind, whether express, implied or statutory, including but not limited to warranties of title, merchantability, satisfactory quality, fitness for particular purpose, warranty for performance, professional advice, professional financial guidance, and shall not be relied upon as the only source of information for purchasing, contracting, investment decisions or for executing other binding agreements.

2. Rely on DEWA Enrolled Consultants and Contractors for design, installation and verification of the Renewable Generator.

Note: DEWA website only provides the list of enrolled Consultants and Contractors whose personnel have attended DEWA's Solar PV Training Course and possess the necessary qualification and skill ('List of Electrical & DRRG Solar PV Consultants and Contractors'). However, DEWA will not be responsible for any professional or boundary advice or other professional technical guidance given by the Consultant and Contractor or for any injuries, damage, loss, substandard designs, construction, building, installation, delays and for any negative consequences arising from the services delivered by the listed Consultants and Contractors.

A Renewable Generator should be located entirely in the Plot where the Hosting Account is located. Renewable Generators shall be installed on rooftops, facades, and other existing structures. Ground mounted installations are not envisaged.

2.2 Limits to capacity of Renewable Generators

A Producer who wishes to connect one or more Renewable Generators to the Distribution System shall ensure that the sum of the Maximum Capacity of Renewable Generators connected by the Producer in a certain Plot does not exceed:

- 1) The applicable share of the Total Connected Load (TCL) resulting from the application of the table below.

| TCL slab, kW | Slab size, kW | PV capacity allowed as share of TCL in slab | Maximum contribution from the slab, kW | Maximum PV capacity allowed (top of slab), kW |
|--------------|---------------|---|--|---|
| 0-100 | 100 | 100% | 100 | 100 |
| 100-200 | 100 | 75% | 75 | 175 |
| 200-400 | 200 | 50% | 100 | 275 |
| 400-600 | 200 | 25% | 50 | 325 |
| > 600 | - | 5% | 675 | 1,000 |

As per the above table, the applicable share is 100% for the first 100 kW of TCL, and gradually decreases for additional TCL slabs in excess of 100 kW. This implies that the Maximum Capacity of Renewable Generators connected by the Producer in a certain Plot cannot exceed 1,000 kW.

- 2) Any more stringent technical limit that the Authority might specify for the Connection Point of the Renewable Generators in order to ensure the safe and efficient operation of the Distribution System.

2.3 Electricity metering

A Producer who wishes to connect a Renewable Generator to the Distribution System, shall:

- 1) Allow the Authority to install, test, inspect, maintain, connect or disconnect, replace or remove the required metering infrastructure. A safe access should be provided for the Authority to perform such activities;
- 2) Allow the Authority to access data registered by the metering infrastructure, via remote communication with the devices and via on site readings. A safe access should be provided for the Authority to perform on site readings;
- 3) Allow the Authority to use the data provided by the metering infrastructure for the purpose of billing, network operation and planning, and statistical reporting.

The metering infrastructure installed by the Authority consists of two electricity meters:

- One bi-directional meter ('tariff meter') measuring the electricity imported from the Distribution System and the electricity exported to the Distribution System for the Consumption Account under which the Renewable Generator is connected (Hosting Account). This meter will be installed by the Authority without any additional cost to the Producer over the normal service charges that the Authority applies to electricity customers.
- One meter measuring the electricity generated by the Renewable Generator ('PV generation check meter'). This meter will be installed by DEWA and charged as part of the one-off connection fees payable by the Producer.

For dense developments of identical solar PV systems with capacity below 10 kW (for example villa communities developed or retrofitted with solar systems) the PV generation check meter requirement can be limited to a representative sample of installations to be agreed by the project developer with DEWA.

For individual projects with capacity below 10 kW, the installation of the PV generation check meter is not mandatory. Customers can opt to waive the installation upon signing the applicable undertaking, and reduced connection fees apply in this case. This option might not be made available by DEWA in areas with high penetration of solar installations.

2.4 Net metering and billing

The following provisions are issued in application of Article (4.6) of the Resolution and further detail the content of Article (9) of the same Resolution (Consumption and export of electricity).

- 1) Any Renewable Generator shall be connected under one Consumption Account (Hosting Account), specified by the Producer during the application process for connection of the Renewable Generator. One Consumption Account cannot be Hosting Account for more than one Renewable Generator, and one Renewable Generator cannot be connected under more than one Consumption Account.

- 2) For the first Billing Cycle after connection of the Renewable Generator (or after successful completion of performance tests, for Renewable Generators with Maximum Capacity equal to or larger than 100 kW) the Authority will compute the difference between the electricity imported from the Distribution System (import reading of the tariff meter) and the electricity exported to the Distribution System (export reading of the tariff meter) under the Hosting Account and proceed as follows:
 - a. Where the import is greater than the export, the difference (Net Import) will be billed by the Authority to the Hosting Account according to the tariff slabs applicable to such account;
 - b. Where the export is greater than the import, no charges for electricity consumption will be billed to the Hosting Account for the Billing Cycle. Moreover:
 - i. For a Producer holding only one Consumption Account (the Hosting Account) within the same Plot, the excess of Export Electricity over Import Electricity (Surplus Electricity) will be carried forward to the next Billing Cycle.
 - ii. For a Producer holding multiple Consumption Accounts within the same Plot, the excess of Export Electricity over the electricity imported from the Distribution System under the Hosting Account will be deducted from consumption readings of other accounts held by the Producer within the same Plot, following the sequence of accounts indicated by the Producer during the application process for connection of the Renewable Generator. I.e. the excess of Export Electricity over the electricity imported from the Distribution System under the Hosting Account will be deducted from the consumption reading of the first Consumption Account in the sequence. Should the excess be larger than the consumption reading of the first account, no charges for electricity consumption will be billed to the same account for the Billing Cycle, and the remaining excess will be deducted from the consumption reading of the second Consumption Account in the sequence. The process will continue until offset of the entire excess against consumption of accounts held by the producer within the Plot, or until the last Consumption Account in the sequence. Should Export Electricity be larger than the sum of electricity imported by the Producer from the Distribution System under all accounts the Producer holds in the Plot (Import Electricity), the difference (Surplus Electricity) will be carried forward to the next Billing Cycle.
- 3) For any subsequent Billing Cycle, the Authority will add any Surplus Electricity carried forward from the previous month to Export Electricity, and follow the same billing procedure described under clause No. 2 above.
- 4) Surplus Electricity will be carried forward indefinitely from one Billing Cycle to the next, without any limitation of time or quantity.
- 5) Surplus Electricity can only be offset against future electricity consumption of Consumption Accounts held by the Producer within the same Plot, and cannot, in any case:
 - a. Be transferred for offsetting against electricity consumption of any other Person;
 - b. Be transferred for offsetting against electricity consumption of the Producer under Consumption Accounts in a different Plot;
 - c. Be used by the Producer to claim disbursement by the Authority of any monetary compensation.
- 6) The Producer may request the Authority to add any new Consumption Account that the Producer might come to hold within the Plot, to the sequence of accounts relevant for offsetting purposes. The Producer may also request a modification of the order of the accounts in the sequence. Once one of such modification requests is approved by DEWA, any further modification cannot be requested for a period of 90 days from the date of approval.

- 7) In case the Hosting Account will be closed (issuance of final bill) any remaining Surplus Electricity will be forfeited, without any payment obligation for the Authority.
- 8) In case of rent or transfer of the property, a joint request from the Producer and the new tenant or owner can be submitted to the Authority requesting the transfer of the Renewable Generator from the Hosting Account to the account of the new tenant or owner. Any Surplus Electricity that might be recorded for the Hosting Account will not be transferred to the account of the new tenant or owner, and will be forfeited upon closure of the Hosting Account as per clause No. 7 of this same Article.
- 9) In case of disconnection of the Hosting Account for non-payment, the Authority will stop any import and export of electricity to/ from the Hosting Account.
- 10) Should comprehensive readings of the tariff meter not be available for a certain Billing Cycle, the Authority will estimate the import and export of electricity under the Hosting Account based on historical data and on any other practicable consideration that might help deriving an accurate estimate. To the extent possible, reconciliation of estimates with actuals will be performed in future Billing Cycles.
- 11) Any minimum charge constraint imposed by the Authority for the Hosting Accounts is applied to the electricity imported from the Distribution Network under the Hosting Account (should such electricity be below the kWh specified in the minimum charge threshold, for billing purposes the minimum charge threshold will be used instead of the actual import electricity reading from the tariff meter).

The intent of Shams Dubai is to give Customers the opportunity to generate solar PV energy at their premises for their own use. Arrangements in which a Producer rents out space allowing tenants to make use of electricity generated under Shams Dubai by the Producer are not acceptable.

2.5 Note about applicable Plot boundaries

Executive Council Resolution #46 of 2014 and DEWA Connection Conditions for Generators of Electricity from Solar Energy rely on the concept of Plot for establishing certain rights and limitations. It is understood that a Plot is a portion of land with a homogeneous intended use, and that any design or re-design of Plot boundaries (including merging or subdividing existing Plots) with the intent to alter such rights and limitations is not acceptable. In case of abuse, DEWA reserves the right to reject the application or cancel the connection.

3 PROVISIONS RELATED TO RENEWABLE GENERATORS SAFETY, OPERATION, INSPECTION, MAINTENANCE AND DISPOSAL

3.1 Safety

A Producer shall:

- 1) Avoid any manipulation of the Renewable Generator by any non-qualified Person.
- 2) Ensure that the Renewable Generator and any associated infrastructure and equipment is installed and maintained in safe working order at all times and in accordance with the specifications and manuals of each piece of equipment;
- 3) Have an isolation procedure displayed prominently and effectively secured at the main switchboard and keep a copy of the Renewable Generator operations manual in or near the main switchboard at all times;
- 4) Comply with any directions imparted by the Authority in order to ensure the safe and stable operation of the Renewable Generator and of the Distribution System;
- 5) Comply with the relevant requirements and regulations issued by the Authority for the installation, inspection and operation of Renewable Generators.

3.2 Operation of Renewable Generators and compensation

- 1) The Producer shall:
 - a. Comply with any request from the Authority to de-energise the Renewable Generator at the AC isolator switch (or switches) for reasons related to the operation or maintenance of the Distribution System.
 - b. Without prejudice to the penalties stipulated by the Resolution, compensate the Authority for any reasonable direct losses from damage to the Distribution System.
- 2) The Producer shall be responsible for protecting, at Producer's sole cost and expense, the Renewable Generator from any condition or disturbance in Authority's Distribution System, including, but not limited to, voltage sags or swells, system faults, outages, loss of a single phase of supply, equipment failures, and lightning or switching surges. For avoidance of doubt, the Authority shall not be liable for any loss of damage of whatsoever nature, including consequential or otherwise suffered by the Producer as a result of the connection or disconnection of the Renewable Generator.
- 3) The Authority shall not be liable to the Producer for losses of generation output, including those arising from:
 - a. Any request from the Authority to de-energise the Renewable Generator for reasons related to the operation or maintenance of the Distribution System;
 - b. Temporary inability of the Distribution System to accept the surplus of energy generated by the Renewable Generator;

- c. Tripping off of the Renewable Generator due to Distribution System transient events, Distribution System failure or any event of black-out;
- d. Remote actions of the Authority altering the operation of the Generator, including those related to limiting the active power or changing the reactive power contribution based on temporary requirements of the Distribution System, or disconnecting the Generator if there is a risk for the safe and secure operation of the Distribution System.

3.3 Inspection, maintenance and disposal

The Producer shall:

- 1) Ensure that inspection and maintenance of all components of the Renewable Generator is performed in accordance with the manufacturer's recommendations and with requirements set forth in DRRG Inspection and Testing Guidelines;
- 2) For components for which no specific recommendations are indicated by the manufacturer, ensure that regular inspection and condition-based maintenance is performed;
- 3) Ensure that routine general maintenance of the generator is conducted as appropriate for the site condition, and in any case at least once a year. This should include cleaning of the panels, ground maintenance, pest control and vegetation management.

The Producer shall also:

- 4) Ensure that all critical maintenance activities (including all repairs and equipment replacements) are performed only by a DEWA enrolled Electrical & DRRG Solar PV Contractor;
- 5) Ensure that any component of the Renewable Generator replaced during maintenance is compliant with the Authority's applicable standards and regulations;
- 6) Have a valid maintenance contract in place with a DEWA enrolled Electrical & DRRG Solar PV Contractor for performing at least once every twelve months the following activities:
 - a. Inspection of PV System and supporting structure, including:
 - i. Visual check of PV panels condition, with detection of damages or impaired ventilation, due to obstructing objects, dirt or any other causes;
 - ii. Check that the mounting structure is firmly secured; tightening of bolts and fixing systems; detection of rusting or any other damage;
 - iii. Visual check and tightening of the string cables, combiner boxes and switchgears
 - b. Inverter/Combiner Box inspection & preventive maintenance according to the manufacturer's operation and maintenance requirements, including:
 - i. Visual inspection of inverter box, seals and electrical connections;
 - ii. Inspection and replacement where necessary of the inverter's air filters;
 - iii. Inverter electrical performance testing;
 - iv. Any other action recommended by the manufacturer in the Inverter's O&M Manual;

- c. P V electrical system testing and servicing, including:
 - i. String level voltage and current testing
 - ii. Inspection operation of switches, disconnectors and circuit breakers
 - iii. Verification of fuses
 - iv. Insulation resistance measurements
 - v. Verification of PV systems performances to detect possible failures
- d. Functional checks of all protections and safety installations
- e. Compile, after each inspection, a maintenance report recording all findings (documented by pictures when relevant), any actions taken and any recommendation for further actions.

It is responsibility of the Producer to ensure that the obligations under such contract are timely honoured by the DEWA enrolled Electrical & DRRG Solar PV Contractor. Inspection is mandatory at least every 12 months. Nevertheless, inspection every 6 months is recommended.

The Producer shall also:

- 7) Provide within 5 working days, upon request of the Authority:
 - a. The inspection reports resulting from any inspections carried out in accordance with the requirements of the Authority
 - b. Proof of a valid maintenance and service contract with a DEWA enrolled Electrical & DRRG Solar PV Contractor
- 8) Grant a safe access to the Authority in order to inspect the Renewable Generator at discretion of the Authority with prior notification of 1 working day, except in case of emergency, where the Authority shall inspect without prior notice

Finally, the Producer shall:

- 9) Ensure that disposal for solar PV panels and other equipment complies with the applicable waste management legislation and regulations.

4 PROVISIONS RELATED TO THE ANNUAL CONNECTION CAP

4.1 Annual cap and management of connection queues

- 1) The Authority may impose an Annual Connection Cap in accordance to provisions under article (4.2) of the Resolution.
- 2) Should the Annual Connection Cap set by the Authority be reached for a certain calendar year, DEWA will continue to receive, process and approve connection requests for Renewable Generators. Approved connection requests will be put on hold by the Authority and connected as of the following calendar year starting with those that received earlier approval (i.e. the connection queue will be managed on a 'first approved - first connected' basis).