

Resolution No. (2) of year 2017

Concerning the Connections of Renewable Generators to the Distribution System of the Electricity and Water Authority

The Minister of Electricity and Water Affairs

After reviewing:

The Law by the Royal Decree No. (1) year 1996 on Electricity and Water

The Royal Decree No (98) year 2007 pertaining to the establishment of Electricity and Water Authority

Resolution No. (2) 2010 on Electrical Installations

And upon the proposal from the Electricity and Water Authority

Resolved the following:

Article (1)

Definitions

In the application of the provisions of this Resolution, the following terms and expressions shall have the meanings assigned to each of them, unless otherwise specified:

Kingdom: The Kingdom of Bahrain.

Authority: The Electricity and Water Authority.

Person: Natural or legal person with one or several Consumption Accounts.

Renewable Energy: Energy generated from renewable sources including, but not limited to solar, wind, geothermal energy, biomass or biogas.

Connection: the connection of a generating unit from Renewable Energy with the Electricity Distribution System.

Connection Agreement: The agreement between the Authority and a Producer, which stipulates the terms and conditions for the operation of a Renewable Energy Generator and its Connection to the Electricity Distribution System.

Connection Conditions: The requirements and standards approved by the Authority, including technical, health, safety and environmental quality standards to be fulfilled by the Producer in order to connect a Renewable Energy Generator to the Electricity Distribution System.

Renewable Energy Generator: A generating unit or units that generate electricity from Renewable Energy sources that is connected to the Electricity Distribution System and is registered under one Consumption Account.

Electricity Distribution System: is the electrical network and its components in the range from 400 Volts to 11 kilovolts (low and medium voltage) that are owned and operated by the Authority with the purpose of delivering electricity to consumers including but not limited to all associated equipment such as lines, cables, electrical substations, analogue electrical elements such as resistors, inductors, capacitors, and switches.

Annual Connection Cap: The maximum electricity generation capacity from Renewable Energy that may be connected to the Electricity Distribution System in a calendar year, as determined by the Regulator.

Producer: any Person that generates electricity from Renewable Energy and connects it to the Electricity Distribution System in accordance with the terms and conditions of this Resolution, with the exception of the Authority.

Regulator: An entity in charge of the regulation of the electricity market in the Kingdom. Until such entity is formally established, the Minister of Electricity and Water Affairs assumes the role of the Regulator.

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

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

Imported Electricity: Electricity that is drawn from the Electricity Distribution System by the Producer, registered in its associated Consumption Account that is consumed under one or more Consumption Accounts held by the Producer.

Exported Electricity: Surplus Electricity that is generated by the Producer and injected into the Electricity Distribution System by a Renewable Energy Generator.

Net Metering Credit: Exported Electricity in kilowatt-hours, which exceeds the Imported Electricity in kilowatt-hours during a single billing period and is credited to the following billing period.

Surplus Electricity: The excess of the Exported Electricity over the Imported Electricity in an applicable billing period.

SEU: Sustainable Energy Unit.

Article (2)

Applicability

The provisions of this Resolution shall apply to all Producers who have one or more Consumption Accounts for self consumption purposes in the Kingdom.

Article (3)

Objectives

The objectives of this Resolution are to:

- A - Establish a clear legislative framework regulating the Connection of Renewable Energy Generators to the Electricity Distribution System.
- B - Encourage community members and entities to generate electricity from Renewable Energy.
- C - Contribute to diversifying energy sources through increasing the share of Renewable Energy in the energy mix.
- D - Comply with the policy and targets issued by the Kingdom for Renewable Energy.
- E - Contribute to the protection of environment through reducing Kingdom's carbon footprint.
- F - Promote the growth of the green economy for sustainable development.
- G - Ensure the open access and the right of every electricity customer to install Renewable Energy Generators at the customer's site, and interconnect them to Electricity Distribution System without discrimination.

Article (4)

Responsibilities of the Regulator

The Regulator shall have the following duties:

- A - In coordination with the Authority and SEU ensure the enforcement, dissemination and implementation of Renewable Energy policies as recommended by the Supreme Committee for Natural Resources and Economic Security and as approved by the Cabinet.
- B - When deemed necessary determine the Annual Connection Cap and the maximum generation capacity that can be exported by the Producers to the Electricity Distribution System upon the recommendation of the Authority.
- C - Find amicable solutions to the disputes between market actors by balancing different interests.
- D - Form the Grievance Committee and the related grievance procedures as prescribed by Article (18) of this Resolution.
- E - Ensure that any changes to tariffs or the Net Metering scheme will not negatively impact the financial viability of already installed Renewable Energy Generators.

Article (5)

Responsibilities of the Authority

The Authority shall have the following duties:

- A - Establish, review and regularly update the terms of the Connection Conditions.
- B - Formulate, review and regularly update a standard template for Connection Agreement and enter into Connection Agreements with Producers.

- C - Recommend to the Regulator the Annual Connection Cap and the maximum generation capacity that can be exported by the Producers to the Electricity Distribution System based on technical constraints.
- D - Set the mechanism of crediting the Surplus Electricity which is exported to the Electricity Distribution System.
- E - Monitor and ensure compliance of the Producers with the provisions of this Resolution and the Connection Agreement and take appropriate actions and measures against Producers found to be in violation.
- F - Establish an electronic registrar of the Producers in the Kingdom which shall include all data and information related to the Renewable Energy Generators. The Authority shall track the following:
 - 1 - the size, generation type and location of each Renewable Energy Generator;
 - 2 - the aggregate capacity of Renewable Energy Generators that are connected to the Electricity Distribution System, and those for which the request for connection has been submitted to the Authority;
 - 3 - the penetration levels at the 11 kV feeder network and the availability of system capacity in the Electricity Distribution System.
 - 4 - process the information and publish data with the support of SEU on its website tracking the aggregate capacity of already connected Renewable Energy Generators and those for which the request for connection has been submitted. The information shall be updated at least on a monthly basis.
- G - Ensure open access to the Electricity Distribution System and general responsiveness to customers' requests who fulfil the terms of the Connection Conditions within the timeframe determined by the Authority and within the limits of the available Connection Cap and the absorptive capacity of the feeder in the area concerned.
- H - Establish a list of electrical consultants and contractors for Renewable Energy Generators approved by the Authority.
- I - Establish a list of renewable energy equipment approved by the Authority for the installation of Renewable Energy Generators.

Article (6)

Responsibilities of the Sustainable Energy Unit

SEU shall have the following duties:

- A - Propose strategies, policies and legislations in order to stimulate investment in energy efficiency and renewable energy.
- B - Assist the Authority in publishing data on its website tracking the aggregate capacity of already connected Renewable Energy Generators to the Electricity Distribution System, and those for which the request for connection has been submitted.

Article (7)

Connection

It is forbidden for any Person to connect a Renewable Energy Generator to the Electricity Distribution System without obtaining prior written approval and consent of the Authority. The approval shall be granted in accordance with the Connection Agreement, this Resolution and the attached Connection Conditions.

Article (8)

Connection Agreement

A Connection Agreement shall be concluded with the Producer upon submission and approval of an application to the Authority with the required documents attached. The Producer shall not transfer his rights and obligations established in the Connection Agreement to third parties. For Renewable Energy Generators not exceeding 11 kW, the Authority may introduce a simplified interconnection procedure.

Article (9)

Connection Conditions

The Connection Conditions attached to this document shall be considered an integral part of this Resolution.

Article (10)

Connection Costs

The Authority shall estimate the costs associated with the connection of a Renewable Energy Generator to the Electricity Distribution System.

Article (11)

Responsibilities of the Producer

The Producer shall comply with the following:

- A - Perform the design and installation of a Renewable Energy Generator in accordance with the technical standards and guidelines approved by the Authority and its safety and security regulations.
- B - Submit an application for installation of a Renewable Energy Generator in accordance with the format and requirements of the Authority.

- C - Obtain the approval of the relevant authorities if required.
- D - Grant access to the Authority's personnel to perform inspections of Renewable Energy Generators prior and after the approval of the connection.
- E - Provide all necessary equipment, including metering system and remote communication required by the Authority and ensure their continuous and effective operation.
- F - Set the parameters of the inverter of the Renewable Energy Generator according to the standards established by the Authority.
- G - Comply with the provisions of this Resolution, the attached Connection Conditions, the provisions of the Connection Agreement, and with any other relevant requirements adopted by the Authority.
- H - Refrain from exceeding the maximum generation capacity authorized by the Authority for exporting energy to the Electricity Distribution System.
- I - Not take any action that directly or indirectly may impact the safety and the efficiency of the Electricity Distribution System.
- J - Cooperate with the Authority's personnel in all matters related to the provisions of this Resolution.

Article (12)

Consumption and Export of Electricity

The following shall be applied on the consumption and export of the electricity generated by the Renewable Energy Generator:

- A - The electricity generated by the Renewable Energy Generator may be consumed within the premises associated to one Consumption Account; in case the Producer holds more than one Consumption Account, it can be consumed within any premises associated to the Consumption Accounts according to the sequence specified by the Producer in the Connection Agreement.
- B - For the purposes of calculating the value of consumed electricity, the Authority shall offset the quantity of units (kilowatt hour) of Imported Electricity against the units of Exported Electricity on a monthly basis.
- C - If the quantity of Import Electricity is greater than the quantity of Export Electricity, the producer shall pay for the net difference of electricity consumed from the Electricity Distribution System.
- D - If the quantity of the Exported Electricity is greater than the Imported Electricity, the Authority shall carry forward the Surplus Electricity to the Consumption Account of the Producer in the following month and credit the Surplus Electricity at the value of the upper tariff bracket applicable to that Consumption Account. The Regulator reserves the right to amend the Net Metering scheme to a Net Billing scheme by making adjustments to the value of the Surplus Electricity according to the tariff issued by the decision of the Regulator after the approval of the Cabinet. The Net Billing scheme shall not apply retroactively.
- E - The ownership or financing agreement of the Renewable Energy Generator does not affect the eligibility to produce Renewable Energy under this Net Metering Resolution.

- F - The Regulator may introduce, with the support of the SEU, additional incentives to further encourage the use of Renewable Energy for self-consumption purposes.

Article (13)

Amending Conditions and Annual Connection Cap

Regulator may amend the Connection Conditions in consultation with the Authority. Such amendments shall be announced in the official gazette and be published on the Authority's website.

The Regulator may increase or reduce the Annual Connection Cap in some specific conditions in order to secure efficiency and safety of the Electricity Distribution System in consultation with the Authority.

If an Annual Connection Cap is deemed necessary, the Annual Connection Cap has to be announced at least six months prior to the effective date of the new Annual Connection Cap.

Should the Annual Connection Cap set by the Regulator be reached, the Authority will continue to receive and consider connection requests for Renewable Energy Generators on a first come first served basis within the available connectivity and absorptive capacity of the feeder in the area concerned.

Article (14)

Protection of the Electricity Distribution System

If there is a risk for the safety or the security of the Electricity Distribution System and the electricity network the Authority is entitled to disconnect the Renewable Energy Generator from the Electricity Distribution System, including taking all reasonable safeguard measures as stipulated in the Resolution No. (2) of 2010 on Electrical Installations and its amendments.

Article (15)

Compliance Notice

In the event of a violation of any of the provisions of this Resolution, the Connection Agreement or provisions of the Connection Conditions the Authority shall notify the Producer of such violation. Such notice shall include the following information:

- A - The description of the violation and its nature.
- B - A time limit, not exceeding three months, for remedying the violation.
- C - The measures to be imposed by the Authority in case the violation is not remedied within the specified time limit.

Article (16)

Remedies

Subject to the provisions of Article 15 of this Resolution, without prejudice to criminal liability, the Authority may take any of the measures provided for in this Article if any person connects the Renewable Energy Generator to the Electricity Distribution System in violation of this Resolution or the attached Connection Conditions or in violation of the provisions of the Connection Agreement:

- A - Terminate the Connection Agreement.
- B - Disconnect the Renewable Energy Generator from the Electricity Distribution System.

Article (17)

Judicial Officers

The employees of the Authority shall have the right to determine the offenses that constitute violations of the provisions of the Law No. (1) of 1996 on Electricity and Water and the decisions issued in implementation thereof which fall within their jurisdiction and are related to their area of responsibilities.

Article (18)

Grievance

The Producer may submit to the Regulator a written grievance regarding any decision or measure taken against the concerned Producer within 30 (thirty) days from the date of being aware of such decision or measure. An arbitrator shall take a decision on the grievance within thirty days from the date of receiving the grievance. Failure to respond within such period shall be considered as an implicit rejection of the grievance.

Article (19)

Entry into Force

The concerned authorities shall implement this Resolution. The Resolution shall come into force on the day following the date of its publication in the Official Gazette.

Dr. Abdul Hussein Bin Ali Mirza

Minister of Electricity and Water Affairs

Issued on: 7th Rabea Al-Thani 1439

Corresponding to: 26th December 2017

Connection Conditions

1 General Provisions

1.1 Reference Documents

The Producer shall comply with technical standards and safety requirements determined by the Authority related to Renewable Energy Generators published on the Authority's website (www.mew.gov.bh).

1.2 Definitions

The words and phrases contained in the Connection Conditions shall have the meanings as defined in the Resolution. The following words and expressions shall have the meanings assigned to each of them, unless otherwise specified in the text:

Approved Load – Is the maximum power that can be imported from the Electricity Distribution System under one Consumption Account according to the tariff category at any point in time, as approved by the Authority for that Consumption Account and tariff category.

Billing Cycle –The interval of time, equivalent to one month, for which an electricity bill is issued by the Authority to the Producer.

Connection Point – Is the location at which a Renewable Energy Generator is connected to the Electricity Distribution System.

Maximum Capacity - The maximum power which a Renewable Energy Generator can feed into the Electricity 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 Energy Generator.

Net Import – The excess of Imported Electricity over Exported Electricity in an applicable Billing Cycle.

2 Provisions related to electricity billing and connecting Renewable Energy Generators

2.1 Installation of Renewable Energy Generation Units

- A - The Producer shall ensure that all equipment comply with the standards and technical requirements set forth by the Authority for connecting Renewable Energy Generators to the Electricity Distribution System and with any other applicable regulations.
- B - The Authority's website shall provide all relevant information related to the equipment conforming to the approved standards and technical specifications applicable to Renewable Energy Generators connected to the Electricity Distribution System.
- C - The list of equipment shall be subject to revision from time to time, as the Authority deems necessary.
- D - The Producer shall ensure that only contractors and consultants approved by the Authority are used for the design, installation and inspection of Renewable Energy Generators.

2.2 Limits to capacity of Renewable Generators

A producer who wishes to connect one or more Renewable Energy Generators to the Electricity Distribution System shall ensure that the sum of the maximum capacity of the Renewable Energy Generators does not exceed the total Approved Load for the Consumption Accounts held by the Producer within the plot, unless the Regulator issues a special permit.

2.3 Electricity Metering

- A. A Producer, who wishes to connect a Renewable Energy Generator to the Electricity Distribution System, shall comply with the following:
 - 1 - allow the Authority to install, test, inspect, maintain, replace or remove the required metering infrastructure and ensure a safe environment for the Authority to perform such activities;
 - 2 - allow the Authority to access all the data registered by the metering infrastructure, via remote communication with the devices and via on-site readings and ensure a safe environment for the Authority to perform such activities;
 - 3 - allow the Authority to use the data provided by the metering infrastructure for the purpose of billing, invoicing, network operation, planning, and statistical reporting.
- B. The metering infrastructure consists of two electricity meters:
 - 1 - One bi-directional meter ('tariff meter') measuring the Imported Electricity from the Electricity Distribution System and the Exported Electricity to the Electricity Distribution System from the Hosting Account. This meter will be installed by the Authority without any additional cost to the Producer.

- 2 - One meter ('renewable generation meter') measuring the electricity generated by the Renewable Energy Generator. This meter will be installed by a contractor approved by the Authority at the expense of the Producer.

2.4 Net Metering and Billing

- A. Any Renewable Energy Generator shall be connected to one Hosting Account specified by the Producer during the application process. In all cases one Renewable Energy Generator cannot be connected under more than one Hosting Account.
- B. For the first Billing Cycle after connection of the Renewable Energy Generator, the Authority shall calculate the difference between the Imported Electricity and the Exported Electricity (in kilowatt hours). The net difference is calculated according to the following:
 - 1 - When the Import Electricity is greater than the Export Electricity the Net Import will be billed by the Authority to the Producer according to the tariff brackets applicable to the Producer's Consumption Account.
 - 2 - When the Export Electricity is greater than the Import Electricity, the billing will be performed in the following manner:
 - For a Producer holding only one Consumption Account, the Surplus Electricity is carried forward to the next Billing Cycle.
 - For a Producer holding multiple Consumption Accounts, the Surplus Electricity will be deducted from the consumption readings of the other accounts held by the Producer in the sequence as specified by the Producer during the application process. Should the Export Electricity be greater than the Import Electricity under all Consumption Accounts of the Producer, the Surplus Electricity will be carried forward to the next Billing Cycle and follow the same billing procedure as prescribed earlier. The Surplus Electricity will be carried forward indefinitely to the next Billing Cycle without any limitation in time or quantity. The Producer cannot claim any financial settlement for such Surplus Electricity.
- C. The Producer may request the Authority to add any new Consumption Account that the Producer might open to the sequence of accounts for offsetting purposes. The Producer may also request to modify the sequence of accounts.
- D. In the event of the closure of the Hosting Account any remaining Surplus Electricity shall be credited to the future Consumption Account of the Producer.
- E. In case of rent or transfer of the Hosting Account, a joint request from the Producer and the new Hosting Account holder (the lessee or the new owner) may be submitted to the Authority requesting the transfer of Renewable Energy Generator from the Consumption Account of the original Producer to the Consumption Account of the new Hosting Account holder. Any Surplus Electricity that may have been recorded for the closed Hosting Account shall be credited to the future Consumption Account of the original Producer.
- F. In the event of disconnection of the Hosting Account due to non-payment, the Authority shall stop any import and export of electricity from and to the Hosting Account.
- G. Should comprehensive readings of the tariff meter not be available for a certain Billing Cycle, the Authority shall estimate the quantity of imported and exported electricity under the Hosting Account based on historical data and / or any other practical considerations that might help to

derive the accurate estimates. To the extent possible, the reconciliation of estimates with actuals will be performed in future Billing Cycles.

3 Provisions related to the safety, operation, inspection and maintenance of Renewable Energy Generators

3.1 Safety

The producer shall comply with the following:

- A - Ensure that the maintenance of the Renewable Energy Generator is performed by a qualified person from the Authority's approved list of contractors and consultants.
- B - Ensure that the Renewable Energy Generator is properly labelled and complies with the safety instructions of the Authority, Fire Brigade and Civil Defence
- C - Ensure the Renewable Energy 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 operating manuals for all components of the Renewable Energy Generator.
- D - Have an isolation procedure displayed prominently and effectively at the main switchboard and maintain a copy of operations manual for the Renewable Energy Generator in or near the main switchboard at all times.
- E - Comply with any directives issued by the Authority to ensure the safe and stable operation of the Renewable Energy Generator and the Electricity Distribution System.
- F - Comply with the relevant requirements and regulations of the Authority for the installation, testing, operation and maintenance of the Renewable Energy Generator.

3.2 Operation of Renewable Energy Generators and compensation

- A - The producer shall comply with any request by the Authority to disconnect the Renewable Energy Generator at the AC isolator (or switches) for reasons related to the operation or maintenance of the Electricity Distribution System and to provide technical studies as requested by the Authority.
- B - The Producer shall be responsible for protecting, at Producer's sole cost and expense, the Renewable Energy Generator from any condition or disturbance in the Electricity 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 the avoidance of doubt, the Authority shall not be liable for any loss or damage of whatsoever nature, including consequential or otherwise, suffered by the Producer as a result of connection or disconnection of the Renewable Energy Generator.
- C - The Authority shall not be liable to the Producer for losses of generation output, including those arising from:
 - 1 - Any request by the Authority to disconnect the Renewable Energy Generator for reasons related to the operation or maintenance of the Electricity Distribution System;
 - 2 - The inability of the Electricity Distribution System to accept the Surplus Electricity for technical or operational reasons;
 - 3 - Tripping off the Renewable Energy Generator due to Electricity Distribution System transient events, failure or in any event of a blackout;

- 4 - Remote actions of the Authority altering the operation of the Renewable Energy Generator, including those related to limiting the active power or changing the reactive power contribution based on the temporary requirements of the Electricity Distribution System, or the disconnecting the Renewable Energy Generator if there is a risk to safe and secure operation of the Electricity Distribution System.

3.3 Inspection and Maintenance

A - 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 Renewable Energy Inspection and Testing Guidelines. For components where there are no specific manufacturer recommendations, regular inspection and condition-based maintenance is to be ensured.
2. Ensure that routine general maintenance of the Renewable Energy Generator is conducted as appropriate for the site condition, and in any case at least once a year.
3. Ensure that all critical maintenance activities, including all repairs and equipment replacements, are performed only by a qualified person from the Authority's approved list of contractors and consultants.
4. Ensure that replacement components of the Renewable Energy Generator comply with the Authority's applicable standards and regulations.

B - In the case of using a solar Renewable Energy Generator, the Producer shall comply with the following:

- 1 - Have a valid maintenance contract in place with a contractor from the Authority's approved list of contractors and consultants to perform the following activities:
 - 1) Inspection of PV System and supporting structure, including:
 - Visual check of PV panels condition, with detection of damages or impaired ventilation, due to obstructing objects, dirt or any other causes;
 - Check that the mounting structure is firmly secured; tightening of bolts and fixing systems; detection of rusting or any other damage;
 - Visual check and tightening of the string cables, combiner boxes and switchgears
 - 2) Inverter/Combiner Box inspection and preventive maintenance according to the manufacturer's operation and maintenance requirements, including:
 - visual inspection of inverter box, seals and electrical connections;
 - inspection and replacement where necessary of the inverter's air filters;
 - inverter electrical performance testing; and
 - any other action recommended by the manufacturer in the Inverter's Operation and Maintenance Manual;
 - 3) PV electrical system testing and servicing, including:
 - string level voltage and current testing;

- inspection operation of switches, disconnectors and circuit breakers;
- verification of fuses;
- insulation resistance measurements; and
- verification of PV systems performances to detect possible failures.

4) Functional checks of all protections and safety installations.

5) Compile, after each inspection, a maintenance report recording all findings (documented by pictures when relevant), any actions taken and any recommendation for further actions.

2 - It is responsibility of the Producer to ensure that the obligations of the contract are timely honoured by a contractor from the Authority's approved list of contractors and consultants.

3 - The producer shall:

1) Provide upon request of the Authority, within ten working days:

- the maintenance reports resulting from any inspections carried out in accordance with the requirements of the Authority;
- proof of a valid maintenance and service contract with a contractor from the Authority's approved list of contractors and consultants.

2) Grant safe access to the Authority's personnel in order to inspect the Renewable Energy Generator at the Authority's discretion, with prior notification of five working days.