

KM-PW-PL01

KAHRAMAA Policy for Renewable Energy Systems Connected to the Distribution Network



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1. Purpose

1.1 This Policy has been issued to:

- a) Establish and specify requirements and provisions related to the implementation of Distributed Renewable Energy Generation (DREG) systems connected to the distribution network, with the primary aim of self-consumption.
- b) Regulate the rights of parties involved in DREG systems (whether they are owners of these systems or customers benefitting from them).
- c) Regulate the incentive framework to encourage the use of RE systems.
- d) Ensure the effectiveness and safety of RE systems in terms of construction, installation, maintenance, and operation.
- e) Regulate details related to self-consumption, billing arrangements, and surplus power exported to the distribution network.
- f) Protect parties involved in DREG systems and raise their awareness of RE systems.

2. Scope

2.1 This policy shall apply to all DREG systems installed and operated for the purpose of individual or collective self-consumption.

2.2 This policy shall apply to KAHRAMAA, parties involved in DREG systems, and any other party involved in the following:

- a) Connecting RE systems to the distribution network to conclude self-consumption arrangements with KAHRAMAA.
- b) Designing, developing, implementing, building, testing, piloting, operating, and maintaining RE systems.

2.3 This policy shall apply to all RES-based power generation technologies, with a capacity greater than 1 kW and lower than 25 MW.

2.4 The provisions of this policy shall not apply to any private developer looking to develop a renewable energy system exclusively for the purpose of selling power to KAHRAMAA's distribution network under a Power Purchase Agreement (PPA).

3. Key Responsibilities, Powers, and References

Customer Services Department: The department responsible for receiving solar energy installation requests from eligible customers (owner of the building where the DREG system will be installed), collecting meter readings for network-connected systems, and developing and updating guidelines regarding the qualification of contractors, and issuing monthly invoices to customers, showing the excess amount of power generated by renewable energy systems and exported to the network in accordance with this policy. Also, inspection & commission of solar systems.

prequalify, test & license contractors of solar systems and developing and updating guidelines to assist contractors and consultants in preparing the required information and technical documents for PV system design to be submitted to KAHRAMAA.

Information Technology Department: The department responsible for ensuring the modification of the billing system to enable the implementation of the net billing mechanism.

Planning & Development of Production and Water Resources Department: The department responsible for developing and updating customer guidelines for network-connected renewable energy systems and preparing statistics on the number of network-connected systems.

Electricity Network Affairs Directorate: The directorate responsible for developing and updating technical specifications and designing guidelines for distributed solar PV and wind power systems, developing and updating technical guidelines for connecting renewable energy systems to low and medium-voltage distribution networks conducting network impact assessment studies, approving network connections at specified locations. Additionally, Electricity Network Affairs is responsible for developing and updating guidelines for qualifying manufacturer equipment and for developing and updating safety guidelines.

4. Key Abbreviations, Definitions, and Sources

Contracted Load - The total load of all electrical equipment installed at eligible customers' premises, as contracted with KAHRAMAA.

Electrical Installations - Any cables, wires, fixed circuit breakers, equipment, or other devices installed and used within customers' premises to provide the required power for covering the loads of customers or to transfer power generated within the premises to the distribution network.

Consultant - Any qualified consultant responsible for designing network-connected renewable energy systems.

Customer - The owner or tenant contracting with the competent department to supply the place, building or facility with electricity or water or both, whether a natural or legal person.

Eligible Customer - The person eligible to apply to KAHRAMAA to connect a grid-connected renewable energy system and is the owner of the facility where the renewable energy system will be installed. This term also refers to the person who possesses a connection point that complies with the stipulations of this policy and the connection conditions between the distribution network and his premises, as per relevant codes and imposed requirements. The eligible customer must be a customer of power generated from renewable energy sources via a DREG system, primarily for self-consumption purposes, with the option to feed excess self-generated power into KAHRAMAA's distribution network, provided that this is not his primary business or professional activity.

Contractor - Any qualified contractor responsible for installing network-connected renewable energy systems.

Connection Point (or Junction Point) - The point of connection that allows KAHRAMAA to supply power to the customer or enables eligible customers' premises to transfer power to KAHRAMAA.

Distributed Renewable Energy Generation (DREG) Systems - DREG systems that generate electricity from photovoltaic (PV) renewable sources. These systems are installed at an eligible customer's premises, connected to a distribution network system, and consist of one or more units with a capacity greater than 1 kW but less than 25 MW and must not exceed the eligible customer's contracted load demand.

Distributed Renewable Energy Generation (DREG) System Connection Agreement - An appendix to the service delivery agreement between eligible customers and KAHRAMAA concerning network-connected renewable energy systems.

Terms and Conditions Document – A customer's guide explaining the terms and conditions of self-consumption, net-billing, and operation of the renewable energy system.

Connection Procedures for Distributed Renewable Energy Generation (DREG) Systems - The procedures that an eligible customer must complete in accordance with the requirements before granting authorization for the operation of a network-connected DREG system.

Distribution Network - KAHRAMAA's electrical infrastructure, including overhead lines, underground cables, transformers, and related components, all operated by KAHRAMAA. This infrastructure typically operates at a capacity of 33 kV or less and can encompass both medium and low voltage systems, in accordance with the provisions outlined in this document and international standards.

- **A low-voltage distribution network** is a network with a nominal voltage of less than 1 kV AC. The capacity of the low-voltage network in Qatar is 240/415 volts \pm 6%, 3-Phase and 4-Wire.

- **A medium-voltage distribution network** is a network with a nominal voltage ranging from 1 kV AC to 33 kV. The nominal voltage of medium-voltage distribution networks in Qatar is 11 kV, 22 kV, and 33 kV.
- This policy does not encompass electrical networks with a voltage equal to or exceeding 33 kV, as networks with a voltage of 33 kV are classified as sub-transmission networks in accordance with the Distribution Grid Code.

Power Transmission Network - KAHRAMAA's electrical infrastructure, including overhead lines, underground cables, transformers, and related components, which KAHRAMAA operates at a capacity greater than 33 kV and up to 400 kV.

Network-Connected Distributed Renewable Energy Generation (DREG) System - A renewable energy system, installed within the eligible customer's premises alongside electrical installations, and connected to the low or medium-voltage distribution network through a junction point.

Maximum Available Active Power Production - The active power generated from the primary source (e.g., solar radiation) and the maximum stable efficiency of the renewable energy system at the point of operation.

Main Electricity Meter for Billing - It is the meter installed by KAHRAMAA for customers, which will utilize the feature of measuring the electric current in both directions to measure the amount of electrical energy exchanged (imported and exported) between the eligible customer and KAHRAMAA distribution network.

Non-Networked Distributed Renewable Energy Generation (DREG) System - A system, installed within the eligible customer's premises alongside electrical installations, with the purpose of supplying power to installations or electrical loads without any connection to the distribution network.

Peak Power (Watt-peak) - The power generated by a photovoltaic (PV) panel under standard test conditions, measured in watt-peak (Wp). The total peak load of a solar PV line or array is determined by the peak load of the individual panels or units and is often measured in kWp (kilowatt-peak). The peak load of a solar PV array under standard test conditions is typically determined based on the average power generated by the entire array.

Power Purchase Agreement (PPA) - A contract signed between a private developer and KAHRAMAA, with KAHRAMAA acting as the purchaser of power generated from renewable energy by the private developer, specifically for export to KAHRAMAA's electricity distribution network. This power is not intended for the private developer's self-consumption. The agreement outlines terms related to the quantity of power to be supplied, the agreed-upon price, the respective risks of each party, and the penalties and fines imposed in the event of non-compliance with the terms. Typically, this agreement is a long-term bilateral contract.

Premises - Any property equipped with a renewable energy system and a junction point, provided that the systems operate in parallel with the distribution network.

Private Developer - Any individual or entity legally responsible for planning, developing, constructing, operating, and maintaining a project aimed at generating power from renewable energy for the exclusive purpose of selling it to KAHRAMAA through its distribution network.

Self-Consumption - The utilization of self-generated power within an eligible customer's premises and electrical installations to satisfy their own energy demand or the demand of a tenant.

Surplus Power - The power generated by the DREG system that exceeds the customer's own energy demand during an hourly-based metering interval and is subsequently exported to the distribution network, in accordance with the agreement between the eligible customer and KAHRAMAA.

Surplus Electricity Price (SEP) - The price paid by KAHRAMAA for the surplus power injected into KAHRAMAA's distribution network by the eligible customer.

Collective Self-Consumption - Occurs when at least 1 or 2 groups of eligible customers utilize power generated from DREG systems located within a distance of 4 km or within the same transformer station, depending on which option is more beneficial for the group of eligible customers, to fulfill their own energy demand, as per the agreed-upon arrangement. KAHRAMAA shall implement collective self-consumption arrangements only at the premises owner's meter.

Key Sources

- Article (4) of Emiri Resolution No. (35) of 2014, which regulates the Qatar General Electricity and Water Corporation (KAHRAMAA), as subsequently amended by Emiri Resolution No. (69) of 2018.
- Article (4) of Emiri Resolution No. (69) of 2018, which amends the provisions of Emiri Resolution No. (35) of 2014, regulating the Qatar General Electricity and Water Corporation (KAHRAMAA).

5. KAHRAMAA Policy for Renewable Energy Systems

Legal Reference for the Policy:

- Article (2) of Emiri Resolution No. (35) of 2014, which regulates the Qatar General Electricity and Water Corporation (KAHRAMAA), as subsequently amended by Emiri Resolution No. (69) of 2018, which states that:

KAHRAMAA aims to achieve the highest performance rates in the provision and distribution of power and potable water, ensuring the consistent fulfillment of national requirements and the advancement of new and renewable energy utilization. Consequently, it may, in collaboration with the relevant authorities, undertake the following powers, including "*conducting studies and research on the utilization and advancement of new and renewable energy.*"

- Article (4) of Emiri Resolution No. (69) of 2018, amending the provisions of Emiri Resolution No. (35) of 2014, which regulates the Qatar General Electricity and Water Corporation (KAHRAMAA), specifies that: "A unit by the name of 'New and Renewable Energy Department'

shall be established within KAHRAMAA's administrative units, reporting directly to the president, and shall be responsible for the following:"

1. Preparing proposals for policies and strategies related to new and renewable energy.
2. Preparing studies and reports on the status of new and renewable energy sources in the country and methods for their advancement.
3. Exploring solutions and incentives to improve investment opportunities in new and renewable energy.
4. Conducting studies and research in the field of applying renewable energy for electricity generation and water desalination.

6. General Provisions

6.1 KAHRAMAA shall assume the following responsibilities in relation to DREG systems:

- a) Developing and implementing technical guidelines for the connection of RE systems to low- and medium-voltage distribution networks, as well as establishing the necessary procedures and documents.
- b) Implementing and offering self-consumption billing arrangements to eligible customers in a non-discriminatory manner, following a first-come, first-served approach.
- c) Implementing additional incentive mechanisms, as necessary, to encourage eligible customers and enhance the feasibility of installing a renewable energy system or to expedite their adoption rate.
- d) Protecting the rights of all parties involved in DREG systems (eligible customers or customers) as outlined in the Connection Agreement.
- e) Assessing the impact of the generation capacity of renewable energy systems on the distribution network.

6.2 Eligible customers shall undertake the following responsibilities concerning DREG systems:

- a) Complying with all relevant laws and regulations pertaining to KAHRAMAA and ensuring that the renewable energy system meets the stipulations outlined in the technical guidelines for connecting solar PV systems to low- and medium-voltage distribution networks, along with any other applicable regulations, including safety standards related to both RE systems and the distribution network.
- b) Executing the Connection Agreement and abiding by all the terms, conditions, and responsibilities associated with the operation and maintenance of the private renewable energy system.

- c) Complying with all relevant international laws, regulations, and standards when disposing of equipment related to the renewable energy system.
- d) Taking responsibility for the safety of the renewable energy system and any damages that may arise from its usage.
- e) Promptly informing KAHRAMAA of any planned modifications to the technical capacity of the renewable energy systems, as well as reporting any accidents or disruptions that might impede the fulfillment of obligations, whether on a temporary or permanent basis.

6.3 The Connection Agreement shall be attached as an annex to the Service Connection Agreement.

6.4 In case of any complaint or dispute related to this Policy, the affected eligible customer may submit a complaint to KAHRAMAA, following the approved procedures for handling customer complaints.

7. Requirements Concerning Eligible Customers

7.1 Any eligible customer who wishes to install or expand a network-connected renewable energy system for self-consumption purposes must adhere to the following requirements:

- a) He must either be the owner of the premises or have written authorization from the owner to construct and operate the proposed renewable energy system, through an authorization designated for this purpose.
- b) He must either already be connected to KAHRAMAA's distribution network or have submitted an application for connection.
- c) The customer must comply with the maximum connected capacity specified for the renewable energy system within a single premises, as outlined in the provisions of this policy.

7.2 Collective self-consumption shall be permitted for a group comprising a minimum of two eligible customers, and the net-billing arrangements shall be implemented at the premises owner's meter only.

8. Incentive Mechanisms, Charges, and Fees

8.1 KAHRAMAA is striving to introduce a net billing incentive mechanism aimed at enhancing the efficiency of implementing both individual and collective self-consumption arrangements on individual meters and premises owners' meters.

8.2 The net billing mechanism aims to achieve a balance between the cost of power supplied by KAHRAMAA to the eligible customer and the cost of surplus power injected by the eligible customer into KAHRAMAA's distribution network.

8.3 KAHRAMAA may establish an upper limit for the installed capacity of the renewable energy system and the RE power generated within a particular target year. This approach allows for adequate time to adjust the distribution network to accommodate the capacity of RE systems.

8.4 KAHRAMAA may levy charges and fees for connecting the renewable energy system to its distribution network, which will be determined based on justified costs and in alignment with established procedures for calculating fees for services provided by KAHRAMAA.

9. Net Billing Mechanism

a) Billing and Billing Cycle

9.1 The net billing mechanism shall be implemented for both individual and collective self-consumption arrangements to all customer categories. In the case of collective self-consumption, net-billing shall only be applied on the premises owner's meter.

9.2 The clearance applied in each billing cycle may result in a credit balance for the customer if the monetary value of the electricity exported to the network exceeds the monetary value of the electricity imported from Kahramaa. If the credit balance exceeds the value of the electricity delivered to the customer, the balance from the current billing cycle is carried over to the next cycle with a deduction from the electricity consumption value for the next billing cycle.

9.3 Under this mechanism, excess power generated by the renewable energy (RE) system shall be fed into KAHRAMAA's distribution network and documented in the billing system as

a credit balance, in accordance with the surplus electricity price in Annex 1, which may be subject to annual review by KAHRAMAA.

9.4 KAHRAMAA retains the right to reduce or reset the credit balance at the end of each calendar year.

9.5 If the Connection Agreement is terminated, KAHRAMAA shall deduct any accumulated surplus credit balance, if available, from the final invoice within sixty (60) days from the date of termination. Any amount exceeding the value of the final invoice shall be forfeited and will not be refunded by KAHRAMAA.

9.6 The invoice issued by KAHRAMAA shall include information on the exported electricity and the credit balance for the customer in accordance with the defined surplus electricity price.

Metering Data

9.7 Net billing arrangements are calculated using meter data recorded by the Main Electricity Meter for Billing installed at junction points and in compliance with KAHRAMAA regulations.

d) Collective Self-Consumption

9.8 The net-billing arrangement shall only be applied for the services meter of the facility or building or the meter designated by Kahramaa.

10. Metering Systems

- 10.1 The metering system must adhere to the technical guidelines for connecting solar PV systems to low and medium-voltage distribution networks, as well as the regulations established by KAHRAMAA concerning metering.
- 10.2 KAHRAMAA has the right to obtain production data from distributed renewable energy systems, and to access them remotely.
- 10.3 The metering system comprises the Main Electricity Meter for Billing and a generation meter, in accordance with the KAHRAMAA policies. The Main Electricity Meter for Billing is a two-way smart meter installed at the junction point to measure the exchanged power (imported and exported) between the customer and KAHRAMAA's distribution network. The generation meter is a smart meter placed at the junction point of the renewable energy system to measure the total power generated by the system and to monitor technical data on instantaneous power in accordance with the specifications of KAHRAMAA.
- 10.4 KAHRAMAA shall be responsible for installing and reading the Main Electricity Meter for Billing, whether manually or remotely, to facilitate the implementation of the net billing mechanism.
- 10.5 The eligible customer shall be responsible for covering the expenses associated with the installation and periodic charges for the Main Electricity Meter for Billing.
- 10.6 KAHRAMAA shall undertake the pilot testing of the metering system as part of the relevant incentive mechanism.

11. DREG System Connection Procedures

- 11.1 The eligible customer must submit a connection request for the network-connected renewable energy system, on the condition that its capacity does not exceed 25 MW (and doesn't exceed the customer's contracted load demand). This request should be made through the Ministry of Municipality Building Permit System which will be integrated with KAHRAMAA's systems.
- 11.2 KAHRAMAA shall establish internal procedures for the connection of renewable energy systems, ensuring that the design of these procedures aligns

with the provisions outlined in this Policy. These procedures shall encompass the following:

- a) The roles and responsibilities of the parties involved in the procedures.
- b) The documentation, data, and forms that are necessary for the process.
- c) The maximum time frame for carrying out the various activities specified within the procedures.
- d) Technical guidelines for connecting solar PV systems to KAHRAMAA's low and medium-voltage distribution networks, along with applicable codes for designing, constructing, connecting, and operating renewable energy systems. This also includes all the necessary studies and certificates.
- e) The analysis conducted by KAHRAMAA during the application submission stage, as well as the criteria for approval.

12. Contractor Qualification

12.1 KAHRAMAA shall be responsible for qualifying contractors for DREG systems, enabling them to design, inspect, and install these systems while ensuring their adherence to the technical guidelines for connecting solar PV systems to KAHRAMAA's low and medium-voltage distribution networks, as well as KAHRAMAA regulations. Additionally, this qualification will permit them to test and pilot RE systems and share records with KAHRAMAA as required.

12.2 KAHRAMAA shall maintain a registry of qualified contractors responsible for designing, constructing, testing, piloting, inspecting, installing, and maintaining renewable energy systems. This registry shall be made publicly accessible on KAHRAMAA's website.

12.3 KAHRAMAA shall guarantee the utilization of approved components in renewable energy systems.

12.4 The eligible customer shall assign a consultant approved by the Ministry of Municipality to submit the request for installing a DREG system.

13. Statistics

13.1 KAHRAMAA shall release an annual report no later than January 31, providing the following information:

- a. The rate of installation of renewable energy systems, categorized by customer categories (residential, commercial, industrial, agricultural, or governmental), as well as the installation category (individual or collective), encompassing:
 - 1) The total number of power units generated by renewable energy systems on a monthly and yearly basis.
 - 2) The maximum combined capacity of network-connected and non-networked renewable energy systems per year.
 - 3) The number of approved and connected renewable energy systems.
- b. The number of approved renewable energy systems that are still awaiting full connection.
- c. The minimum, maximum, and average timeframes required for connecting an RE system to the distribution network from the date of application submission.
- d. The total number of power units exported from renewable energy systems to the network on a monthly and yearly basis.
- e. Technical and regulatory challenges that arise as a result of the implementation of this policy.
- f. Projects and actions carried out to address and overcome the aforementioned challenges.
- g. Environmental benefits, particularly in terms of greenhouse gas emissions avoidance.

14. Awareness

14.1 KAHRAMAA shall provide all customers with current information and guidelines related to the installation of renewable energy systems, which include:

14.1.1 Information pertaining to procedures related to connection requests.

14.1.2 Information on all relevant technical specifications and guidelines for DREG systems.

14.1.3 Information pertaining to the economic and environmental outcomes for customers.

14.2 KAHRAMAA shall initiate awareness programs targeting potential eligible customers to encourage them to install renewable energy systems on their premises.

14.3 KAHRAMAA shall develop and execute consulting services designed to assist eligible customers who wish to install renewable energy systems on their premises.

14.4 KAHRAMAA shall publish general information, data, and statistics related to the utilization of renewable energy systems on a dedicated website. This information shall include details such as the number of systems, installation categories, and installed capacities, as outlined in Article 11.

Annex No. 1

Proposed Price for Surplus Electricity

15. Annex 1 - Proposed Price for Surplus Electricity (SEP)

Price of surplus power exported to the KAHRAMAA network, categorized based on the consumption categories established by KAHRAMAA:

Category	Surplus Electricity Purchase Price (QAR/kWh)
Governmental	0.237
Collective - Industrial	0.237
Industrial	0.237
Commercial	0.237
Hotel (major hotels)	0.237
Agricultural	0.237
Residential	0.237