

# **Grid connected Renewable Generators and Net-metering Amendment Policy**

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This policy outlines the arrangements required to achieve an effective and consistent implementation of Grid-connected Renewable Generation, to clarify the criteria for current Net-metering incentives, and to introduce the Gross-metering and Independent Power producer categories. This Policy replaces the previous Policy No. DPO 03 Issue 2.0

## 1 – Definitions

### **Renewable Generator (RG)**

Is any facility or installation that generates electricity using renewable sources including wind energy and solar energy.

### **Grid**

This is the electrical power network of TAU.

### **Net-metering**

Net-metering refers to the situation whereby the electricity exported by the RG to the grid is offset by the electricity imported from the grid by the consumer. In essence the meter winds backwards when electricity is exported and winds forwards when it is imported.

### **Net-energy**

Is the difference between the energy that is imported from the grid by the consumer and that which is exported to the grid by the renewable generator, for a specified duration.

### **Embedded Generation:**

This refers to any generator that is interconnected with the grid and is providing electricity back to the grid as well as drawing from it. This can include Renewable Generators connected for Net-metering purposes.

### **Interconnection**

Refers to the procedures and requirements to enable customers to be connected or "plugged in" to the grid.

## 2 – Discussion

### 2.1 – Objectives of TAU

TAU's main objectives include the provision of reliable, high quality and secure supply of electricity to the consumers of Rarotonga in a sustainable manner. TAU also actively pursues renewable energy development in order to reduce the country's dependence on fossil fuel for electricity generation in line with Cook Islands Government policy.

### 2.2 – Renewable targets

Government has set a target of achieving 50% renewable energy by 2015 and 100% by 2020.

### 2.3 – Grid connected systems:

- a) There are currently technical constraints on the grid which, unfortunately, limit the amount of Embedded Generation that can be directly connected to the grid. These constraints, if not managed carefully, could adversely impact on the reliability, quality and security of electricity supply.
- b) The technical limit on uncontrolled Embedded Generation varies from grid to grid. The intermittent nature of the source also complicates the situation. The level of penetration of renewable Embedded Generation needs grid analysis as it increases, with that experience determining the acceptance of new generation.
- c) In the current TAU system, renewable Embedded Generation is 750kW, which is 18% of peak demand. New Renewable Generation scheduled for installation will lift the level to 50% of peak demand.

2.4 – Technical guidelines when interconnecting solar or wind systems with the grid:  
The following factors will be considered when assessing applications from customers wishing to interconnect Renewable Generation systems with the grid:

- a) Impact on the spinning reserve or engines to be in operation to absorb the solar energy when it is displaced
- b) Impact on the stability of the network due to the possible rapid changes caused by renewable generation
- c) Impact on the reactive power produced by the diesel system and the associated increase in losses
- d) Impact on the voltage at the customer premises to ensure that it does not exceed safe limits
- e) Impact of harmonics on communication systems
- f) Impact on the distribution system, in particular on transformer capacity

The assessment will take into account the Renewable Generation capacity already connected to the grid at the time of application, and will help determine what, if any, grid reinforcement, control equipment, or other measures are required to allow the Renewable Generation to be connected.

### **3 - Policy**

In order to ensure the effective management of the Grid-connected systems the following policy guidelines are to be followed:

#### **3.1 – Existing installations:**

All installations that have been approved for connection under earlier policies may continue on the basis of their prevailing arrangements. Clients also have the option to apply to change the definition of their installation to one off the new categories listed below.

#### **3.2 – Net-metered systems:**

In respect of Net-metered systems:

- a) Renewable Generators up to 2kW may be connected on a Net-metering basis, and will be approved by TAU for connection automatically, unless TAU identifies a specific technical constraint to such a connection.
- b) One 2kW Net-metered installation is permitted per customer connection as defined by the presence of an existing distinct TAU kWh meter.
- c) Applications for Net-metering are to be made on TAU's prescribed Net-metering form.
- d) The size of the installation shall be defined as the maximum export rating (in kW) of the inverter, or equivalent grid-interface device, rather than the generation source. A maximum 2kW inverter is therefore permitted for Net-metering.
- e) In the event that TAU identifies a technical constraint to the 2kW connection, TAU shall itemise and cost technical upgrades required to allow the Embedded Generation to be connected. The client shall then have the option to pay for the upgrade cost to allow the connection to proceed.
- f) Net-metering applications will be processed and approved within 10 working days of applications, unless specific technical constraints to connection are identified.
- g) If technical upgrades to the network are required, these will be identified by TAU and costed to the client within 20 working days of application.
- h) The Net-metered consumers may export to the grid all excess energy they produce, and then be able to draw on it when not producing (especially at night or when there is no sun, for PV solar installations). Energy imported, that exceeds energy exported in a given billing period, shall be billed to the client at the prevailing tariff.
- i) There shall not be a direct payment to the client for any excess energy that may be exported to the grid.
- j) In the event that TAU cannot provide a reversible tariff meter for a Net-metering installation, TAU may, at its option, install an import and export meter, or a dual meter of

the same function. In that event, the number of units (kWh) exported to the grid, shall be deducted from the number of units imported from the grid, and billing shall be made for the difference, if any. If exports exceed imports, the difference shall be carried forward as a credit. No multiplier shall be applied to either imports or exports (except as necessitated to compensate for current transformers).

- k) The credits for exported energy may be accumulated for a period of up to 12 months, after which the consumer will lose any unused credit greater than 12 months old.
- l) To provide confidence to investors in Net-metering installations, TAU undertakes to maintain the terms and conditions for such installations on a basis not less beneficial to the client than that prevailing at the time of application, for a minimum period of 5 years from date of first connection.
- m) The fee for Net-metering Applications and Approvals is set out in Schedule 1.

### **3.3 – Gross-metered systems:**

In respect of Gross-meter systems:

- a) Renewable Generators up to 7kW (single phase) or 21kW (three phase) may be connected on a Gross-metering basis, unless TAU identifies a specific technical constraint to such a connection.
- b) The size of the installation shall be defined as the maximum export rating (in kW) of the inverter, or equivalent grid-interface device, rather than the generation source.
- c) Applications for Gross-metering are to be made on TAU's prescribed Gross-metering application form. Applications will either be approved for connection without network upgrade, or TAU will identify any necessary network upgrades required.
- d) In the event that TAU identifies a technical constraint to the Gross-metering connection, TAU shall itemise and cost technical upgrades required to allow the Embedded Generation to be connected. The client shall then have the option to pay for the upgrade cost to allow the connection to proceed.
- e) In addition, TAU may determine that a smaller installation would be technically feasible without any network upgrade, and the client shall have the option to proceed with the smaller installation.
- f) Gross-metering applications shall be processed and approved within 20 working days of applications, unless specific technical upgrades to the network are identified as being necessary.
- g) If upgrades to the network are required, these will be identified by TAU and costed to the client within 45 working days of application.
- h) Gross-metered Renewable Generation installations shall export all of the energy produced by way of a non-reversible export kWh meter.
- i) Gross-metered export energy shall be sold to TAU at the feed-in tariff set out in Schedule 1.
- j) Payment for Gross-metered energy may first be applied by TAU as a credit against any other debit balances the client has with TAU.
- k) Payment for Gross-metered energy shall be made to the client on the same basis, terms and conditions that TAU requires payment from its regular electricity consumers.
- l) To provide confidence to investors in Gross-metering installations, TAU undertakes to maintain the terms and conditions for such installations on a basis not less beneficial to the client than that prevailing at the time of application, for a minimum period of 5 years from date of first connection.
- m) The fee for Gross-metering Applications and Approvals is set out in Schedule 1.

### **3.4 Independent Power Producers**

In respect of Independent Power Producer (IPP) installations:

- a) Renewable Generators exceeding 7kW (single phase) or 21kW (three phase) may be connected on an IPP basis, unless TAU identifies a specific technical constraint to such a connection.
- b) IPPs are subject to the relevant conditions of the Energy Regulations 2006.

- c) The size of the installation shall be defined as the maximum total export rating (in kW) of the inverter(s), or equivalent grid-interface device(s), rather than the generation source.
- d) Applications for IPP installations are to be made on TAU's prescribed IPP application form, together with full technical details, specifications and drawings of the proposed installation. Applications will either be approved for connection without network upgrade, or TAU will identify any necessary network upgrades required.
- e) In the event that TAU identifies a technical constraint to the IPP connection, TAU shall itemise and cost technical upgrades required to allow the Embedded Generation to be connected. The client shall then have the option to pay for the upgrade cost to allow the connection to proceed.
- f) In addition, TAU may determine that a smaller installation would be technically feasible without any network upgrade, and the client shall have the option to proceed with the smaller installation.
- g) A distinction will be drawn between different types of Renewable Generation; wind, solar, hydro and biomass have different characteristics, and therefore vary in their impact on, and value to, the network. Intermittent (both controlled and uncontrolled), despatchable, and base-load generation also differ in their useful contribution to the network. Interface, network upgrade and commercial factors will all be negotiated on a case-by-case basis. IPPs incorporating energy storage, with or without on-site energy generation capacity, will also be considered.
- h) IPP applications shall be processed and approved within 8 weeks of application, unless specific technical upgrades to the network are identified as being necessary.
- i) If upgrades to the network are required, these will be identified by TAU and costed to the client within 12 weeks of application.
- j) IPP Renewable Generation installations shall export all of the energy produced by way of a non-reversible export kWh meter.
- k) IPP export energy shall be sold to TAU at a feed-in tariff, and under terms and conditions, to be determined by mutual agreement. Alternative commercial arrangements, such as (but not limited to) payment on a capacity basis, will also be considered on a case by case basis. Any IPP contract shall be subject to the oversight and prior approval of the Office of the Energy Commissioner.
- l) The cost of evaluating the technical constraints of an IPP installation shall be borne by the Applicant. Applicants are encouraged to provide the fullest possible information with their applications, to reduce the analysis work required. Evaluation costs will be negotiated with the Applicant on a transparent basis.

### **5.5 All Grid-Connected systems:**

- a) If a client intends to interconnect any Renewable Generator with the grid, an application should first be submitted to TAU. The purpose of this is to enable TAU to carry out the necessary assessment that will help the customer determine the appropriate size of his installation.
- b) Once approved, the client will be required to adhere to the installation details provided in the application. It is therefore advisable not to procure equipment until the application has been processed.
- c) If network constraints prevent a generator from being connected to the grid, the customer may be given the opportunity to pay for the cost required to reinforce the network.
- d) An assessment of the system will be undertaken during installation to ensure that the equipment being installed complies with what has been approved.
- e) The maximum size of the system (kW) for each customer will be determined based on the relevant technical parameters in relation to the grid. This may mean that the system will not meet the expected maximum demand requested by the customer, without additional network upgrade.

- f) The total number of installations connected to a TAU sub-station transformer (hence in a specified area) will be determined by the kW rating of the relevant transformer. That is, the total combined capacity will be limited to the size of the transformer.
- g) Once TAU has grid storage in place, the opportunity will exist for some of these limits to be increased.
- h) Customers are encouraged to provide their own storage capability, thereby removing the limitations of the grid constraints.
- i) A review of the cost implications will continue to be undertaken by TAU including other options to compensate the consumer.
- j) This policy does not in any way prevent anyone from installing their own standalone renewable systems to provide for his energy requirements.
- k) Oversight of all tariff and renewable energy matters comes under the authority of the Office of the Energy Commissioner (OEC), and any issues, disputes or arbitration are referred to the OEC.

#### SCHEDULE 1

<u>ITEM</u>	<u>FEE</u>
Net-metered Renewable Generation	
Application fee	\$0
Approval fee	\$0
Network upgrade evaluation and design {if required}	\$380
Gross-metered Renewable Generation	
Application fee- single phase	\$50
Application fee - three phase	\$150
Approval fee	\$0
Network upgrade evaluation and design {if required}	\$380
Feed-in tariff	\$0.45/kWh
Independent Power Producer installation	
Application fee	\$18/kW
Network upgrade evaluation and design (if required)	To be determined
Interface costs, contract drafting etc	At cost
Feed-in tariff or alternative remuneration	Individual contract

All pricing excludes VAT.