

**INTERCONNECTION APPLICATION FOR ALL BUT UL1741 CERTIFIED  
INVERTER BASED SYSTEMS LESS THAN 10 KW**

In addition to the information provided below, a complete Interconnection Application includes:

1) a single-line diagram, 2) relay list, trip scheme and settings of the Generating Facility, 3) Generating Facility Equipment List, and 4) three-line diagram (if needed), which identify the circuit breakers, relays, switches, synchronizing equipment, monitoring equipment, and control and protective devices and schemes, shall, after having obtained prior consent from the Company, be attached to and made a part of the interconnection agreement that is signed between the Customer and the Company at the end of the interconnection process.

The single-line diagram shall include pertinent information regarding operation, protection, synchronizing, control, monitoring and alarm requirements. The single-line diagram and three-line diagram shall expressly identify the point of interconnection of the Generating Facility to the Company's Distribution System. The relay list, trip scheme and settings shall include all protection, synchronizing and auxiliary relays that are required to operate the Generating Facility in a safe and reliable manner. The three-line diagram shall show potential transformer and current transformer ratios, and details of the Generating Facility's configuration, including relays, meters, and test switches.

**Section 1, Applicant Information**

Customer

Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Telephone  
Area Code (Daytime): \_\_\_\_\_ Number \_\_\_\_\_ Area Code (Evening): \_\_\_\_\_ Number \_\_\_\_\_

E-mail: \_\_\_\_\_ Account Number: \_\_\_\_\_

Facility Location (if different from above): \_\_\_\_\_

Facility Location Tax Map Key number: \_\_\_\_\_

Owner (if different from Customer)

Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

E-mail: \_\_\_\_\_

HAWAIIAN ELECTRIC COMPANY, INC.

Decision and Order Dated November 29, 2011, Docket No. 2010-0015  
Transmittal Letter Dated December 2, 2011.

Telephone (Daytime): Area Code \_\_\_\_\_ Number \_\_\_\_\_ Area Code (Evening): \_\_\_\_\_ Number \_\_\_\_\_

Operator (if different from Customer)

Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

E-mail: \_\_\_\_\_

Telephone (Daytime): Area Code \_\_\_\_\_ Number \_\_\_\_\_ Area Code (Evening): \_\_\_\_\_ Number \_\_\_\_\_

## **Section 2, Generator Qualifications**

Is the generator a Qualifying Facility as defined under Subpart B, Section 201 of the Federal Energy Regulatory Commission's regulations per the Public Utility Regulatory Policies Act of 1978, or the PUC's Standards for Small Power Production and Cogeneration (Hawaii Administrative Rules Title 6, Chapter 74)?

Yes  No

Is Generator powered from a Nonfossil Fuel Source?

Yes  No

Type of Qualifying Facility or Nonfossil Fuel Source (if applicable):  Solar  Wind  Hydro

Biomass  Geothermal

Other generator energy source:  Diesel  Other Fuel Oil  Other: \_\_\_\_\_

PV Array DC Rated Output: \_\_\_\_\_ kW PV Array AC Rated Output: \_\_\_\_\_ kW  
(CEC-CSI)<sup>2</sup>

Maximum Site Load without Generation: \_\_\_\_\_ kW Maximum Generator Capability: \_\_\_\_\_ kW

Minimum Site Load without Generation: \_\_\_\_\_ kW Maximum Export: \_\_\_\_\_ kW

<sup>2</sup> CEC-CSI means the California Energy Commission's ratings under the California Solar Initiative program.

HAWAIIAN ELECTRIC COMPANY, INC.

Decision and Order Dated November 29, 2011, Docket No. 2010-0015  
Transmittal Letter Dated December 2, 2011.

**Section 3, Generator Technical Information**

Type of Generator:  Synchronous  Induction  Inverter-Based Generating Facility

Generator (or solar collector) Manufacturer, Model Name & Number: \_\_\_\_\_  
(A copy of Generator Nameplate and Manufacturer's Specification Sheet may be substituted)

\_\_\_\_\_ Nameplate Rating in kW: \_\_\_\_\_  
Operating Power Factor: \_\_\_\_\_

Inverter Manufacturer, Model Name & Number (if used): \_\_\_\_\_  
(A copy of Inverter Nameplate and Manufacturer's Specification Sheet may be substituted)

\_\_\_\_\_ Rating in kW: \_\_\_\_\_  
Operating Power Factor: \_\_\_\_\_

Number of Starts Per Day: \_\_\_\_\_ Maximum Starting kVA: \_\_\_\_\_

UF Trip Setting: \_\_\_\_\_ UF Time Delay (Secs) \_\_\_\_\_

Generator Grounding Method:

- |  |   |
|--|---|
| <input type="checkbox"/> Effectively Grounded    | <input type="checkbox"/> Resonant Grounded        |
| <input type="checkbox"/> Low-Inductance Grounded | <input type="checkbox"/> High-Resistance Grounded |
| <input type="checkbox"/> Low-Resistance Grounded | <input type="checkbox"/> Ungrounded               |

Generator Characteristic Data (for rotating machines):  
(Not needed if Generator Nameplate and Manufacturer's Specification Sheet are provided)

Direct Axis Synchronous Reactance,  $X_d$ : \_\_\_\_\_ P.U.    Negative Sequence Reactance: \_\_\_\_\_ P.U.  
Direct Axis Transient Reactance,  $X'_d$ : \_\_\_\_\_ P.U.    Zero Sequence Reactance: \_\_\_\_\_ P.U.  
Direct Axis Subtransient Reactance,  $X''_d$ : \_\_\_\_\_ P.U.    KVA Base: \_\_\_\_\_  
Inertia Constant, H: \_\_\_\_\_ P.U.  
Excitation Response Ratio: \_\_\_\_\_  
Direct Axis Open-Circuit Transient Time Constant,  $T'_{do}$ : \_\_\_\_\_ Seconds  
Direct Axis Open-Circuit Subtransient Time Constant,  $T''_{do}$ : \_\_\_\_\_ Seconds  
Fault Current Contribution of Generator: \_\_\_\_\_ Amps

HAWAIIAN ELECTRIC COMPANY, INC.

Decision and Order Dated November 29, 2011, Docket No. 2010-0015  
Transmittal Letter Dated December 2, 2011.

**Section 4, Interconnecting Equipment Technical Data**

Will an interposing transformer be used between the generator and the point of interconnection?  Yes  No

Transformer Data (if applicable, for Customer Owned Transformer):

(A copy of transformer Nameplate and Manufacturer's Test Report may be substituted)

Size: \_\_\_\_\_ KVA. Transformer Primary: \_\_\_\_\_ Volts  Delta  Wye  Wye Grounded

Transformer Secondary: \_\_\_\_\_ Volts  Delta  Wye  Wye Grounded

Transformer Impedance: \_\_\_\_\_ % on \_\_\_\_\_ KVA Base

Transformer Fuse Data (if applicable, for Customer Owned Fuse):

(Attach copy of fuse manufacturer's Minimum Melt & Total Clearing Time-Current Curves)

At  Primary Voltage  Secondary Voltage

Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_ Size: \_\_\_\_\_ Speed: \_\_\_\_\_

Transformer Protection (if not fuse):

Please describe: \_\_\_\_\_

Interconnecting Circuit Breaker (if applicable):

(A copy of circuit breaker's Nameplate and Specification Sheet may be substituted)

Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_

Continuous Load Rating: \_\_\_\_\_ Interrupting Rating: \_\_\_\_\_ Trip Speed: \_\_\_\_\_  
(Amps) (Amps) (Cycles)

HAWAIIAN ELECTRIC COMPANY, INC.

Decision and Order Dated November 29, 2011, Docket No. 2010-0015  
Transmittal Letter Dated December 2, 2011.

Circuit Breaker Protective Relays (if applicable):

(Enclose copy of any proposed Time-Overcurrent Coordination Curves)

Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_ Style/Catalog No.: \_\_\_\_\_ Proposed Setting: \_\_\_\_\_  
Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_ Style/Catalog No.: \_\_\_\_\_ Proposed Setting: \_\_\_\_\_  
Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_ Style/Catalog No.: \_\_\_\_\_ Proposed Setting: \_\_\_\_\_  
Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_ Style/Catalog No.: \_\_\_\_\_ Proposed Setting: \_\_\_\_\_  
Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_ Style/Catalog No.: \_\_\_\_\_ Proposed Setting: \_\_\_\_\_

Current Transformer Data (if applicable):

(Enclose copy of Manufacturer's Excitation & Ratio Correction Curves)

Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_ Accuracy Class: \_\_\_\_\_ Proposed Ratio Connection: \_\_\_\_\_ /5  
Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_ Accuracy Class: \_\_\_\_\_ Proposed Ratio Connection: \_\_\_\_\_ /5

Generator Disconnect Switch:

A generator disconnect device (isolation device) must be installed with features as described in the "HECO, HELCO, MECO Distributed Generating Facility Interconnection Standards, Technical Requirements" as set forth in Rule No. 14 (Paragraph H.1) of the Company's tariff, and which is accessible to Company.

Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_ Catalog No.: \_\_\_\_\_ Rated Volts: \_\_\_\_\_ Rated Amps: \_\_\_\_\_

Single or 3 Phase: \_\_\_\_\_ Mounting Location: \_\_\_\_\_

**Section 5, General Technical Information**

Enclose copy of site single-line diagram showing configuration and interconnection of all equipment, current and potential circuits and protection and control schemes.

Is Single-Line Diagram Enclosed? Yes

Enclose copy of site relay list and trip scheme, which shall include all protection, synchronizing and auxiliary relays that are required to operate the Facility in a safe and reliable manner.

Are Relay List and Trip Scheme Enclosed? Yes

Enclose copy of site three-line diagram (if the Facility's capacity is greater than or equal to 30 kW) showing potential transformer and current transformer ratios, and details of the Facility's configuration, including relays, meters, and test switches.

Is Three-Line Diagram Enclosed? Yes

HAWAIIAN ELECTRIC COMPANY, INC.

**Section 6, Installation Details**

Installing Electrical Contractor: \_\_\_\_\_ Firm: \_\_\_\_\_ License No.: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Telephone: Area Code: \_\_\_\_\_ Number: \_\_\_\_\_

Installation Date: \_\_\_\_\_ Interconnection Date: \_\_\_\_\_

Supply certification that the generating system has been installed and inspected in compliance with the local Building/Electrical code of the county of \_\_\_\_\_ .

Signed (Inspector): \_\_\_\_\_ Date: \_\_\_\_\_  
(In lieu of signature of Inspector, a copy of the final inspection certificate may be attached)

**Section 7, Generator/Equipment Certification**

Generating systems that utilize inverter technology must be compliant with *Institute of Electrical and Electronics Engineers IEEE Std 1547* and *Underwriters Laboratories UL 1741* in effect at the time this Agreement is executed. Generating systems that use a rotating machine must be compliant with applicable National Electrical Code, Underwriters Laboratories, and Institute of Electrical and Electronics Engineers standards and rules and orders of the Hawaii Public Utilities Commission in effect at the time this Agreement is executed. **By signing below, the Applicant certifies that the installed generating equipment meets the appropriate preceding requirement(s) and can supply documentation that confirms compliance.**

Signed (Customer): \_\_\_\_\_ Date: \_\_\_\_\_

**Section 8, Insurance**

Insurance Carrier: \_\_\_\_\_

HAWAIIAN ELECTRIC COMPANY, INC.

Superseding REVISED SHEET NO. 34C-13  
Effective May 27, 2010

REVISED SHEET NO. 34C-13  
Effective December 3, 2011

IN WITNESS WHEREOF, the Company and the Customer have executed  
this Agreement as of the day and year first above written.

By \_\_\_\_\_  
Name  
Title  
Date

By \_\_\_\_\_  
Name  
Title  
Date

By \_\_\_\_\_  
Name  
Title  
Date

"Company"

"Customer"

HAWAIIAN ELECTRIC COMPANY, INC.

Decision and Order Dated November 29, 2011, Docket No. 2010-0015  
Transmittal Letter Dated December 2, 2011.