

*Project Specific Addendum*  
*For*  
*Renewable Dispatchable Generation*  
*Projects Located on Moloka‘i*

*Project Type: PV + BESS Community Based Renewable Energy*

*Contract Capacity: \_\_\_\_\_MW of Generation*

*BESS Contract Capacity: \_\_\_\_\_MWh of Storage*

*Are the PV System and the BESS DC-Coupled? No  Yes*

*CBRE Facility Location: \_\_\_\_\_*

*Execution Date: \_\_\_\_\_*

## PROJECT SPECIFIC ADDENDUM

This **PROJECT SPECIFIC ADDENDUM** is incorporated by reference into the **MID-TIER STANDARD FORM CONTRACT FOR RENEWABLE DISPATCHABLE GENERATION** for this CBRE Facility and entered into coterminous with such Mid-Tier Standard Form Contract as of \_\_\_\_\_, 20\_\_ (the “Execution Date”), by Maui Electric Company, Ltd., a Hawai‘i corporation (“Company”) and \_\_\_\_\_ (“Subscriber Organization”). Together, the Company and Subscriber Organization are the “Parties” and may singularly each be referred to as a “Party”.

**WHEREAS**, the Company has certain technical and contractual requirements are specific to the individual islands;

**WHEREAS**, the CBRE Facility will be located at \_\_\_\_\_ on the island of Moloka‘i;

**WHEREAS**, this Project Specific Addendum (“PSA”) contains all of the Island Specific provisions for the island of Moloka‘i that apply to this CBRE Facility;

**WHEREAS**, the Parties agree to abide by the provisions of this PSA, as hereinafter set-forth.

### **NOW, THEREFORE THE PARTIES AGREE AS FOLLOWS:**

1. The text of Section 26.J (Hawai‘i General Excise Tax) of the Mid-Tier Standard Form Contract for this CBRE Facility shall read as follows:

Hawai‘i General Excise Tax. Subscriber Organization shall, when making payments to Company under this Contract, pay such additional amount as may be necessary to reimburse Company for the Hawai‘i general excise tax on gross income and all other similar taxes imposed on Company by any Governmental Authority with respect to payments in the nature of gross receipts tax, sales tax, privilege tax or the like, but excluding federal or state net income taxes. By way of example and not limitation, as of the Execution Date, all payments subject to the Hawai‘i general excise tax, (i) on the islands of on Maui, Moloka‘i and Lana‘i (totaling 4.0% as of the Execution Date) would include an additional 4.166% so that the underlying payment will be net of such tax liability; and (ii) all payments subject to general excise tax plus surcharge on Hawai‘i island (totaling 4.5% as of the Execution Date) would include an additional 4.7120% so the underlying payment will be net of such tax liability.

2. If the CBRE Facility is located on the Company-owned Site then Attachment COS – COMPANY-OWNED SITE shall be attached to this Project Specific Amendment and be a part hereof. Such Attachment COS provides additional requirements for use of the Company-owned Site.

3. Attachment F (Facility Owned Subscriber Organization) to the Mid-Tier Standard Form Contract for this CBRE Facility shall consist of the following Attachment F and Exhibits F-1 to F-8 that are attached to this Project Specific Addendum. In the event this CBRE Facility is DC-coupled, Attachment DCC - DC-COUPLED STORAGE shall be attached to this Project Specific Amendment and be a part hereof. Such Attachment DCC replaces certain terms and conditions found in the Mid-Tier Standard Form Contract and the attached Attachment F.

<b>Moloka'i</b>	
<b>ATTACHMENT F</b>	Facility Owned by Subscriber Organization
<b>Exhibit F-1</b>	Description of Generation and Battery Storage Facilities
<b>Exhibit F-2</b>	Consultants List
<b>Exhibit F-3</b>	Modeling Requirements
<b>Exhibit F-4</b>	Generator and Energy Storage Capability Curve(s)
<b>Exhibit F-5</b>	Single-Line Drawing and Interface Block Diagram
<b>Exhibit F-6</b>	Relay List and Trip Scheme
<b>Exhibit F-7</b>	Control System Acceptance Test Criteria
<b>Exhibit F-8</b>	Acceptance Test General Criteria

**IN WITNESS WHEREOF**, the Parties hereto have caused this Project Specific Addendum to be executed by their duly authorized representatives. This Project Specific Addendum is effective as of the Effective Date set forth above.

[Subscriber Organization]		Maui Electric Company, Limited, a Hawai'i corporation
By: _____		By: _____
Name: _____		Name: _____
Date: _____		Date: _____

**MAILING ADDRESS:**

Maui Electric Company, Ltd.  
 Attn: Renewable Energy Projects Division  
 P.O. Box 398  
 Kahului, HI 96733-6898

**ATTACHMENT F**  
**FACILITY OWNED BY SUBSCRIBER ORGANIZATION**

**1. THE FACILITY.**

**A. Drawings, Diagrams, Lists, Settings and As-Built.**

1. Single-Line Drawing, Interface Block Diagram, Relay List, Relay Settings and Trip Scheme.  
A preliminary single-line drawing (including notes), Interface Block Diagram, relay list, relay settings, and trip scheme of the Facility shall, after Subscriber Organization has obtained prior written consent from Company, be attached to this Contract on the Execution Date as Exhibit F-5 (Single-Line Drawing and Interface Block Diagram) and Exhibit F-6 (Relay List and Trip Scheme). A final single-line drawing (including notes), Interface Block Diagram, relay list and trip scheme of the Facility shall, after having obtained prior written consent from Company, be labeled the "Final" Single-Line Drawing, the "Final" Interface Block Diagram and the "Final" Relay List and Trip Scheme and shall supersede Exhibit F-5 (Single-Line Drawing and Interface Block Diagram) and Exhibit F-6 (Relay List and Trip Scheme) to this Contract and shall be made a part hereof on the Commercial Operations Date. After the Commercial Operations Date, no changes shall be made to the "Final" Single-Line Drawing, the "Final" Interface Block Diagram and the "Final" Relay List and Trip Scheme without the prior written consent of Subscriber Organization and Company. The single-line drawing shall expressly identify the Point of Interconnection of Facility to Company System.
2. As-Built. Subscriber Organization shall provide final as-built drawings of the Subscriber Organization-Owned Interconnection Facilities within 30 Days of the successful completion of the Acceptance Test.
3. Modeling. Subscriber Organization shall provide the models as set forth in Exhibit F-4.
4. No Material Changes. Subscriber Organization agrees that no material changes or additions to the Facility as reflected in the "Final" Single-Line Drawing (including notes), the "Final" Interface Block Diagram and the "Final" Relay List and Trip Scheme, shall be made without Subscriber Organization first having obtained prior written consent from Company. The foregoing are subject to changes and additions as part of any Performance Standards Modifications. If Company directs any changes in or additions to the Facility, records and operating procedures that are not part of any Performance Standards Modifications, Company shall specify such changes or additions to Subscriber Organization in writing, and, except in the case of an emergency, Subscriber Organization shall have the opportunity to review and comment upon any such changes or additions in advance.

**B. Certain Specifications for the Facility.**

1. Subscriber Organization shall furnish, install, operate and maintain the Facility including breakers, relays, switches, synchronizing equipment, monitoring equipment and control and protective devices approved by Company as suitable for parallel operation of the Facility with Company System. The Facility shall be accessible at all times to authorized Company personnel.
2. The Facility shall include:

**[LIST OF THE FACILITY**

**Examples may include, but are not limited to:**

- **Subscriber Organization-Owned Interconnection Facilities**
  - **Substation**
  - **Control and monitoring facilities**
  - **Transformers**
  - **Generating and/or Battery Energy Storage System (“BESS”) equipment (as described in Exhibit F-1)**
  - **"Lockable" cabinets or housings suitable for the installation of the Company-Owned Interconnection Facilities located on the Site**
  - **Relays and other protective devices**
  - **Leased telephone line and/or equipment to facilitate microwave communication]**
3. The Facility shall comply with the following [**some requirements may be removed by Company following completion of technical review or IRS**]:
- a. Subscriber Organization shall install a \_\_\_\_ kV gang operated, load breaking, lockable disconnect switch and all other items for its switching station (relaying, control power transformers, high voltage circuit breaker). Bus connection shall be made to a manually and automatically (via protective relays) operated high-voltage circuit breaker. The high-voltage circuit breaker shall be fitted with bushing style current transformers for metering and relaying. Downstream of the high-voltage circuit breaker, a structure shall be provided for metering transformers. From the high-voltage circuit breaker, another bus connection shall be made to another pole mounted disconnect switch, with surge protection.
  - b. Subscriber Organization shall provide within the Subscriber Organization-Owned Interconnection Facilities a separate, fenced area with separate access for Company. Subscriber Organization shall provide all conduits, structures and accessories necessary for Company to install the Revenue Metering Package. Subscriber Organization shall also provide within such area, space for Company to install its communications, supervisory control and data acquisition ("SCADA") equipment (remote terminal unit or equivalent) and certain relaying if necessary for the interconnection. Subscriber Organization shall also provide AC and DC source lines as specified by Company. Subscriber Organization shall provide a telephone line for Company-owned meters. Subscriber Organization shall work with Company to determine an acceptable location and size of the fenced-in area. Subscriber Organization shall provide an acceptable demarcation cabinet on its side of the fence where Subscriber Organization and Company wiring will connect/interface.
  - c. Subscriber Organization shall ensure that the Subscriber Organization-Owned Interconnection Facilities have a lockable cabinet for switching station relaying equipment. Subscriber Organization shall select and install relaying equipment acceptable to Company. At a minimum, the relaying equipment will provide over and under frequency (81) negative phase sequence (46), under voltage (27), over voltage (59), ground over voltage (59G), over current functions (50/51) and direct transfer trip (if required). The settings shall be consistent with the requirements for over/under frequency and voltage ride-through. Subscriber Organization shall install protective relays that operate a lockout

relay (86), which in turn will trip the main circuit breaker and not allow it to be reclosed without reset.

- d. [Reserved]
- e. Subscriber Organization's equipment also shall provide at a minimum:
  - 1) Interface with Company's Telemetry and Control, or designated communications and control interface, to provide telemetry of electrical quantities such as total Facility net MW, MVar, power factor, voltages, currents, and other quantities as identified by the Company;
  - 2) Interface with Company's Telemetry and Control, or designated communications and control interface, to provide status for circuit breakers, reactive devices, switches, and other equipment as identified by the Company;
  - 3) Interface with Company's Telemetry and Control, or designated communications and control interface, to provide control to incrementally raise and lower the voltage target at the point of regulation operating in automatic voltage regulation control;
  - 4) Interface with Company's Telemetry and Control, or designated communications and control interface, to provide the active power control requirements of this Contract
  - 5) Interface with Company's Telemetry and Control, or designated communications and control interface, for the Company to specify control system modes of operation and parameters, for remotely configurable parameters and operating states required under this Contract;
  - 6) For Variable Energy Facilities: Interface with Company's Telemetry and Control, or designated communications and control interface, to provide telemetry of equipment availability and meteorological and production data required under Section 8 (Data and Forecasting) of this Attachment F (Facility Owned by Subscriber Organization) and the Facility's Power Possible; and
  - 7) Provision for Loss of Telemetry and Control: If Company's Telemetry and Control, or designated communications and control interface, is unavailable, due to loss of communication link, Telemetry and Control failure, or other event resulting in loss of the remote control by Company, provision must be made for Subscriber Organization to be able to institute via local controls, within 5 minutes (or such other period as Company accepts in writing) of the verbal directive by the Company System Operator, such change in voltage regulation target and real power export or import as directed by the Company System Operator. If all local and remote active power controls become unavailable or fail, the Facility may be required disconnect from the Company's System **[to be based upon the size of the system]**
  - 8) If the direct transfer trip is required and is unavailable due to loss of communication link, Telemetry and Control failure, or other event resulting in the loss of the remote control by the Company, provision must be made for the Subscriber Organization to shutdown Facility and open and lockout the main circuit breaker.
- f. If Subscriber Organization adds, deletes and/or changes any of its equipment, or changes its design in a manner that would change the characteristics of the equipment and specifications used in the IRS, Subscriber Organization shall be required to obtain Company's prior written approval. If an analysis to revise parts of the IRS is required, Subscriber Organization shall be responsible for the cost of revising those parts of the IRS,

and modifying and paying for the cost of the modifications to the Facility and/or the Company-Owned Interconnection Facilities based on the revisions to the IRS.

g. Cybersecurity and Critical Infrastructure Protection.

**[DRAFTING NOTE: COMPANY RETAINS SOLE DISCRETION TO CONSIDER THE LESS STRINGENT REQUIREMENTS (WHICH ARE INCLUDED IN THE FIRST SET OF ALTERNATIVE CYBER-SECURITY PROVISIONS UNDER G. (i) THROUGH (iv)) FOR PROJECTS THAT DO NOT EXCEED 1 MW.]**

- 1) Safety and Security Procedures. The Subscriber Organization shall maintain and enforce safety and security procedures to safeguard: all data provided by Company to Subscriber Organization pursuant to this Contract or in any way connected with the CBRE Program and the administration of the CBRE Program including but not limited to Subscriber names, Subscriber account numbers and information on such accounts, Subscriber addresses, Subscriber rate schedules and Subscriber CBRE bill credit information (“Company CBRE Data”); and all information regarding Company’s customers, customer lists, any of the data and testing results produced under this Contract and any information identified by Company as confidential (“Company Customer Data” and together with Company CBRE Data, collectively referred to as “Company Confidential Information”); all generation and telemetry data provided by the Subscriber Organization to the Company (“SO Data”); in Subscriber Organization’s possession, including Company Confidential Information that Subscriber Organization provides to any contractors, consultants, and other third parties retained by Subscriber Organization to assist Subscriber Organization to perform under this Contract in the course of Subscriber Organization’s performance pursuant to this Contract. Subscriber Organization warrants that it shall (A) use the National Institute of Standards and Technology (“NIST”) industry best practices for physical and systems security measures to prevent destruction, loss, alteration or unauthorized access to, use of, or tampering with, the CBRE Facility, Subscriber Organization software, and Company Confidential Information, including to protect the confidentiality and integrity of any of Company Confidential Information, operation of Company’s systems, and to prevent viruses and similar destructive code from being placed in any software or data provided to Company, on Subscriber Organization’s or Company’s website, or in Subscriber Organization’s or Company’s programming; and (B) use NIST industry best practices physical security and precautionary measures to prevent unauthorized access or damage to the CBRE Facility, including to protect the confidentiality and integrity of any of Company’s Confidential Information as well as the operation of Company’s systems. Subscriber Organization shall, at a minimum, protect Company’s Confidential Information and provide the standard of care required by NIST cybersecurity requirements, and the same measures it uses to protect its own confidential information.
- 2) Exception to Certain NIST Requirements. Company, at its sole and absolute discretion, may waive the requirements concerning NIST industry best practices as set forth in subsection 1(A) and (B) above provided that Subscriber Organization implements alternate measures that Company deems acceptable and not inconsistent with Company’s standards with respect to (A) physical and systems security measures to prevent destruction, loss, alteration or unauthorized access to, use of, or tampering with, the CBRE Facility, software and Company’s Confidential Information, including to protect the confidentiality and integrity of any of Company’s Confidential Information, operation of Company’s systems, and to prevent viruses and similar



destructive code from being placed in any software provided to Company, on Subscriber Organization's or Company's website, or in Subscriber Organization's or Company's programming; and (B) physical security and precautionary measures to prevent unauthorized access or damage to the CBRE Facility, including to protect the confidentiality and integrity of any of Company's Confidential Information as well as the operation of Company's systems.

- 3) Security Breach. In the event that Subscriber Organization discovers or is notified of a breach, potential breach of security, or security incident at the CBRE Facility or of Subscriber Organization's systems (a "Security Breach"), Subscriber Organization shall immediately (i) notify Company of such Security Breach, whether or not such breach has compromised any of Company Confidential information, (ii) investigate and remediate the effects of the Security Breach, (iii) cooperate with Company with respect to any such Security Breach and provide necessary information on the Security Breach as requested by Company; and (iv) comply with all applicable privacy and data protection laws, including any notification obligations. Any remediation of any Security Breach will be at Subscriber Organization's sole expense.
- 4) "Subscriber" means a retail customer of the Company who owns a subscription of Subscriber Organization's CBRE project interconnected with the Company.

**[ALTERNATIVE ENHANCED CYBER-SECURITY PROVISIONS-WAIVED SOLELY AT DISCRETION OF COMPANY.]**

- (i) Security Policies and Documentation. Subscriber Organization shall implement and document security policies and standards in accordance with industry best practices (e.g., aligned with the intent of NERC CIP-003-8 R1) and consistent with Company's security policies and standards. Subscriber Organization shall submit documentation describing the approach, methodology, and design to provide physical and cyber security (i.e., aligned with the intent of NERC CIP-003-8 R2) with its submittal of the design drawings pursuant to Section 1.C (Design Drawings, Bill of Materials, Relay Settings and Fuse Selection) of Attachment F (Facility Owned by Subscriber Organization) which shall be at least sixty (60) Days prior to the Acceptance Test.
  - (a) The design shall meet industry standards and best practices, consistent with the National Institute of Standards and Technology ("NIST") guidelines as indicated in Special Publication 800-53 Rev. 4 "Security and Privacy Controls for Federal Information Systems and Organizations" and Special Publication 800-82 Rev. 2 "Guide to Industrial Control Systems (ICS) Security". The system shall be designed with the criteria to meet applicable compliance requirements and identify areas that are not consistent with NIST guidelines and recommendations.
  - (b) The cybersecurity documentation shall include a block diagram of the control system with all external connections clearly described.
  - (c) Subscriber Organization shall provide such additional information as Company may reasonably request as part of a security posture assessment.

- (d) Subscriber Organization shall, at the request of Company or, in the absence of any request from Company, at least annually during the term of this Contract, provide Company with updated documentation and diagrams including a record of changes.
- (ii) Network and Application Security. Subscriber Organization shall implement appropriate network and application security processes and practices commensurate with the level of risk as determined by periodic risk assessments (i.e., aligned with the intent of NERC CIP-005-5):
- (a) Segment and segregate networks and functions, including physical and logical separation between business networks and control system networks (i.e., aligned with the intent of NERC CIP-005-5 R1).
  - (b) Limit unnecessary lateral communications (i.e., aligned with the intent of NERC CIP-005-5 R1).
  - (c) Harden network devices (i.e., aligned with the intent of NERC CIP-007-6 R1).
  - (d) Secure access to infrastructure devices (i.e., aligned with the intent of NERC CIP-004-6 R4).
  - (e) Perform out-of-band (OoB) network management (i.e., aligned with the intent of NERC CIP-005-5 R2).
  - (f) Validate integrity of hardware and software (i.e., aligned with the intent of NERC CIP-010-3 R1 and NERC CIP-006-6 R1 Part 10).
- (iii) Endpoint and Server Security. Subscriber Organization shall implement appropriate endpoint and server security processes and practices commensurate with the level of risk as determined by periodic risk assessments:
- (a) Mechanisms to identify vulnerabilities and apply security patches in a timely manner (i.e., aligned with the intent of NERC CIP-007-6 R2).
  - (b) Malware defense and anti-phishing capabilities (i.e., aligned with the intent of NERC CIP-007-6 R3).
  - (c) Access Controls to enforce the least privilege principle and provide access to resources only for authorized users (i.e., aligned with the intent of NERC CIP-004-6 R4).
  - (d) Secure authentication mechanisms including multi-factor authentication for systems with higher risk exposure (i.e., aligned with the intent of NERC CIP-007-6 R5 and NERC CIP-005-5 R2).
  - (e) Data confidentiality, protection, and encryption technologies for endpoints, servers, and mobile devices (i.e., aligned with the intent of NERC CIP-011-2 R1 and NERC CIP-005-5 R2).

Subscriber Organization shall (consistent with the following sentence) ensure that no malicious software ("Malware") or unauthorized code is introduced into any aspect of the Facility, Interconnection Facilities, the Company Systems interfacing with the Facility and Interconnection Facilities, and any of Subscriber Organization's critical control systems or processes used by Subscriber

Organization to provide energy, including the information, data and other materials delivered by or on behalf of Subscriber Organization to Company, (collectively, the "Environment"). Subscriber Organization shall periodically review, analyze and implement improvements to and upgrades of its Malware prevention and detection programs and processes that are commercially reasonable and consistent with the then current technology industry's standards and, in any case, not less robust than the programs and processes implemented by Subscriber Organization with respect to its own information systems.

- (iv) Cybersecurity Program. Subscriber Organization shall establish and maintain a continuous cybersecurity program (i.e., aligned with the intent of NERC CIP-003-8) that enables the Subscriber Organization (or its designated third party) to:
- (a) Define the scope and boundaries, policies, and organizational structure of the cybersecurity program.
  - (b) Conduct periodic risk assessments to identify the specific threats to and vulnerabilities of the Subscriber Organization's Organization consistent with guidance provided in NIST Special Publication 800-30 Rev. 1 "Guide for Conducting Risk Assessments".
  - (c) Implement appropriate mitigating controls and training programs and manage resources.
  - (d) Monitor and periodically test the cybersecurity program to ensure its effectiveness. Subscriber Organization shall review and adjust their cybersecurity program as appropriate for any assessed risks.
  - (e) Applicability is extended to Cloud Service providers and other third-party services the Subscriber Organization may use.
- (v) Security Monitoring and Incident Response. Company and Subscriber Organization shall collaborate on security monitoring and incident response, define points of contact on both sides, establish monitoring and response procedures, set escalation thresholds, and conduct training (i.e., aligned with the intent of NERC CIP-008-6). Subscriber Organization shall, at the request of Company or, in the absence of any request from Company, at least quarterly, provide Company with a report of the incidents that it has identified and describe measures taken to resolve or mitigate.

In the event that Subscriber Organization discovers or is notified of a breach, potential breach of security, or security incident at Subscriber Organization's Facility or of Subscriber Organization's systems, Subscriber Organization shall immediately (aa) notify Company of such potential, suspected or actual security breach, whether or not such breach has compromised any of Company's confidential information; (bb) investigate and promptly remediate the effects of the breach, whether or not the breach was caused by Subscriber Organization; (cc) cooperate with Company with respect to any such breach or unauthorized access or use; (dd) comply with all applicable privacy and data protection laws governing Company's or any other individual's or entity's data; and (ee) to the extent such breach was caused by Subscriber Organization, provide Company with reasonable assurances satisfactory to Company that such breach, potential breach, or security incident shall not recur. Subscriber Organization shall provide documentation to

Company evidencing the length and impact of the breach. Any remediation of any such breach will be at Subscriber Organization's sole expense.

If malicious software or unauthorized code is found to have been introduced into the Environment, Subscriber Organization will promptly notify Company. Subscriber Organization shall take immediate action to eliminate and remediate the effects of the Malware, at Subscriber Organization's expense. Subscriber Organization shall not modify or otherwise take corrective action with respect to the Company Systems except at Company's request. Subscriber Organization shall promptly report to Company the nature and status of all efforts to isolate and eliminate malicious software or unauthorized code.

- (vi) Monitoring and Audit. Subscriber Organization shall provide information on available audit logs and reports relating to cyber and physical and security (i.e., aligned with the intent of NERC CIP-007-6 R4). Company may audit Subscriber Organization's records to ensure Subscriber Organization's compliance with the terms of this Section 1.B.3.g (Cybersecurity and Critical Infrastructure Protection) of this Attachment F (Facility Owned by Subscriber Organization), provided that Company has provided reasonable notice to Subscriber Organization and any such records of Subscriber Organization's will be treated by Company as confidential.
  - (vii) Contingency Plans. Subscriber Organization shall implement and maintain a business continuity plan, a disaster recovery plan, and an incident response plan ("Contingency Plans" – i.e., aligned with the intent of NERC CIP-009-6) appropriate for the level of risk based on the impact of Subscriber Organization's associated facilities, systems and equipment, which, if destroyed, degraded, misused, or otherwise rendered unavailable, would affect the reliable operation of the Company System. The Contingency Plans shall be provided to Company upon request. Such Contingency Plans shall be updated to reflect lessons learned from real recovery events.
- h. Available Power Production.
- 1) Variable Energy Systems. Subscriber Organization's available power production considering equipment and resource availability (Power Possible) will be determined at any given time using the best-available data and methods for an accurate representation of the amount of available active power at the Point of Interconnection.
  - 2) Variable Energy Systems Paired with Storage Operated through a Single Active Power Control Interface. For variable energy systems paired with storage operated through a single active power control interface (i.e., charging indirectly controlled through dispatch), Subscriber Organization's available power production considering equipment and resource availability and BESS state of charge ("Power Possible") will be determined at any given time using the best-available data and methods for an accurate representation of the amount of available active power at the Point of Interconnection. Telemetry will be provided to indicate state of charge, including available estimated duration at the current dispatch given state of charge and forecast production.
- i. For variable resources where Power Possible is derived, in part or in whole, from a measured available variable energy source such as solar or wind: To the extent available, the Parties shall use Subscriber Organization's real time Power Possible communicated to Company through the SCADA system except to the extent that the potential energy does

not accurately reflect the actual available active power at the Point of Interconnection (plus or minus 0.1 MW). During those periods of time when the SCADA derived Power Possible is unavailable or does not accurately represent the available power production considering equipment and resource availability and BESS State of Charge, the Parties shall use the best available data obtained through commercially reasonable methods to determine the Power Possible. Follow up actions to resolve the discrepancy will be as provided in Section 1.J (Demonstration of Facility) of this Attachment F (Facility Owned by Subscriber Organization).

- 1) If, at any time during the Term, there is a material discrepancy or pattern of discrepancies in the accuracy of Power Possible, the Parties shall review the method for determining Power Possible and develop modifications with the objective of avoiding future discrepancies. If the Parties are unable to resolve the issue, then (aa) the Parties shall promptly commission a study to be performed by one of the engineering firms then included on the Qualified Independent Third-Party Consultants List attached to the Agreement as Attachment D (Consultants List) to evaluate the cause of the Power Possible discrepancy and to make recommendations with the objective of avoiding future Power Possible discrepancies ("Study"); and (bb) if the Company decides that its ability to effectively optimize the benefits of its right of Company Dispatch to dispatch the Facility's Net Energy Potential is materially impaired by the lack of an accurate method to determine Power Possible, the Company shall have the right to derate the Facility and the Facility shall be deemed to be in Subscriber Organization-Attributable Non-Generation status until the Study has been completed and the Study's recommendations have been implemented by Subscriber Organization to Company's reasonable satisfaction. Subscriber Organization shall pay for the cost of the Study. The Study shall be completed within ninety (90) days from the date the Study is commissioned, unless otherwise reasonably agreed to in writing by Subscriber Organization and Company. The Consultant shall send the Study to Company and Subscriber Organization. Subscriber Organization (and/or its Third-Party consultants and contractors), at Subscriber Organization's expense, shall take such action as the Study shall recommend (e.g., modifications to the model, modifications and/or additions to the data inputs used in the model, modifications to the procedures for maintaining and/or recalibrating the Monitoring and Communication Equipment used to provide data inputs, replacement of such Monitoring and Communication Equipment, modifications of procedures for Facility operations) with the objective of avoiding future Power Possible discrepancies. Such recommendations shall be implemented by Subscriber Organization to Company's reasonable satisfaction no later than forty-five (45) Days from the Day the completed Study is issued by the consultant, or such other longer commercially reasonable timeframe otherwise agreed to in writing by Company.
- j. Subscriber Organization shall reserve space within the Site for possible future installation of Company-owned meteorological equipment (such as wind speed, direction and relative humidity monitors, SODAR and irradiance monitors) and AC and DC source lines for such equipment as may be required depending on the Facility resource type and location. In the event Company decides to install such meteorological equipment: (i) Subscriber Organization shall work with Company to determine an acceptable location for such equipment and any associated wiring, interface or other components; and (ii) Company shall pay for the needed equipment, and installation of such equipment, unless otherwise agreed to by the Parties. Company and Subscriber Organization shall use commercially

reasonable efforts to facilitate installation and minimize interference with the operation of the Facility.

- k. The Facility shall, at a minimum, satisfy the wind load and seismic load requirements of the International Building Code and any more stringent requirements imposed under applicable Laws.
- C. Design Drawings, Bill of Material, Relay Settings and Fuse Selection. Subscriber Organization shall provide to Company for its review the design drawings, Bill of Material, relay settings and fuse selection for the Facility, and Company shall have the right, but not the obligation, to specify the type of electrical equipment, the interconnection wiring, the type of protective relaying equipment, including, but not limited to, the control circuits connected to it and the disconnecting devices, and the settings that affect the reliability and safety of operation of Company's and Subscriber Organization's interconnected system. Subscriber Organization shall provide the relay settings and protection coordination study, including fuse selection and AC/DC Schematic Trip Scheme (part of design drawings), for the Facility to Company during the 60% design. Company, at its option, may, with reasonable frequency, witness Subscriber Organization's operation of control, synchronizing, and protection schemes and shall have the right to periodically re-specify the settings. Subscriber Organization shall utilize relay settings prescribed by Company, which may be changed over time as Company System requirements change.
- D. Disconnect Device. Subscriber Organization shall provide a manually operated disconnect device which provides a visible break to separate Facility from Company System. Such disconnect device shall be lockable in the OPEN position and be readily accessible to Company personnel at all times.
- E. Other Equipment. Subscriber Organization shall install, own and maintain the infrastructure associated with the Revenue Metering Package, including but not limited to all enclosures (meter cabinets, meter pedestals, meter sockets, pull boxes, and junction boxes, along with their grounding/bonding connections), CT/PT mounting structures, conduits and duct lines, enclosure support structures, ground buses, pads, test switches, terminal blocks, isolation relays, telephone surge suppressors, and analog phone lines (one per meter), subject to Company's review and approval.
- F. Maintenance Plan. Subscriber Organization shall maintain Subscriber Organization-Owned Interconnection Facilities in accordance with Good Engineering and Operating Practices.
- G. Active Power Control Interface. **[COMPANY TO REVISE THIS SECTION BASED ON SPECIFICS OF THE PROJECT.]**
  1. Subscriber Organization shall provide and maintain in good working order all equipment, computers and software associated with the control system (the "Active Power Control Interface") necessary to interface the Facility active power controls with the Company System Operations Control Center for real power control of the Facility by the Company System Operator.

The detailed design will be tailored to the specific resource type and configuration to achieve the functional requirements of the Facility.

The Active Power Control Interface will be used to control the net real power export (or import, as applicable) from the Facility for load following, system balancing, energy arbitrage, and/or supplemental frequency control as required under this Attachment F (Facility Owned by Subscriber Organization).

For variable resources paired with storage: The implementation of the Active Power Control Interface will allow the Company System Operator to control the net real power export or import, as applicable from the entire Facility, up to Power Possible, remotely from the Company System Operations Control Center through control signals from the Company System Operations Control Center. The Facility will maintain the power level specified by the Company through the variable resource and BESS available energy, subject to the availability of resource and BESS State of Charge.

The Active Power Control interface may also direct the charging/discharging of energy from the BESS.

The Facility real power output (or import, if grid storage charging is enabled) will automatically adjust to a change in frequency in accordance with the frequency response requirements provided in this [Attachment F](#) (Facility Owned by Subscriber Organization).

2. Company shall review and provide prior written approval of the design for the Active Power Control Interface to ensure compatibility with Company's centralized control systems and use of Facility available energy and storage capabilities. To ensure such continued compatibility, Subscriber Organization shall not materially change the approved design without Company's prior review and written approval. This will include design description and parameters for the Subscriber Organization's control system(s), which determine provision of net real power from the variable resource System (PV) and/or the BESS storage, and charging of the BESS storage, in response to the Active Power Control signal or signals.
3. The Active Power Control Interface shall include, but not be limited to, a demarcation cabinet, ancillary equipment and software necessary for Subscriber Organization to connect to Company's Telemetry and Control, located in Company's portion of the Facility switching station which shall provide the control signals to the Facility and send feedback status to the Company System Operations Control Center. The control type shall be analog output (set point) or raise/lower controls and will be established by the Company prior to final design approval.
4. The Active Power Control Interface shall also include provision for feedback points from the Facility indicating when active power target in MW for the Active Power Control signal(s). The Facility shall provide the MW target feedback to the Company SCADA system immediately upon receiving the respective control signal from the Company.
5. Subscriber Organization shall provide to the telemetry interface analogs for the gross production of the energy resource(s) at the Facility (for example, DC or AC MW production of the variable resource generator(s), depending on design; gross DC MW of the BESS, etc.). Subscriber Organization shall also provide the total net AC MW production at the Point of Interconnection.
6. The Active Power Control Interface shall provide for remote control of the real power output of the Facility by the Company at all times. If the Active Power Control Interface is unavailable or disabled, the Facility may not export electric energy to Company and the Facility shall be deemed to be in Subscriber Organization-Attributable Non-Generation status, unless the Company, in its sole discretion, agrees on an alternate means of dispatch. The alternate means of dispatch, including but not limited to local controls, is to be the temporary dispatch mechanism until the Active Power Interface is returned to service and must be capable of changing the real power export or import as directed by the Company System Operator within a mutually agreed response time by the Subscriber Organization receiving the directive from the Company System Operator, verbal or otherwise available by such alternate means. The

mutually agreed upon response time will be established in writing after the completion of the IRS. If Subscriber Organization fails to provide such remote control capability (whether temporarily or throughout the Term), then, notwithstanding any other provision of this Attachment F (Facility Owned by Subscriber Organization), Company shall have the right to derate or disconnect the entire Facility during those periods that such control capability is not provided and the Facility shall be deemed to be in Subscriber Organization-Attributable Non-Generation status for such periods.

- If all local and remote active power controls become unavailable or fail, the Company shall have the right to immediately disconnect the Facility from the Company System.
  - If the direct transfer trip or other communications assisted protection scheme is unavailable due to loss of communication link, Telemetry and Control failure, or other event resulting in the loss of the remote control by the Company, provision must be made for the Subscriber Organization to ramp down and shutdown Facility and open and lockout the main circuit breaker.
7. The rate at which the Facility changes net real power in response to the active power control shall not be less than the greater of 4 MW per minute, and shall make available through agreed parameters, such faster ramp as the installed equipment can support. The Facility's Active Power Control Interface will be used by Company to control the rate at which electric energy is changed to achieve the active power limit for load-following and regulation. The Facility will respond to the active power control request immediately with an echo of the set point and measurable change within the specified control cycle (0.5 to 4 seconds).
8. The Facility shall accept the following controls related to active power and frequency response to or from the Company centralized control system:
- **[NOTE – APPLICABILITY TO BE DETERMINED BY IRS]:** Maximum Power Import and Export Limits: The Facility is not allowed to exceed these settings under any circumstances. The primary frequency response control specified in Section 3.M. (Primary Frequency Response) of Attachment F (Facility Owned by Subscriber Organization) is not allowed to increase the Facility's net real power import or export above the Import and Export limits, respectively.
  - Power Reference Setpoint from Company (based on the input to the Facility, from the Active Power Control Interface): The Facility output shall match this setting from the Variable Resource and/or BESS so long as it can be supported by the variable resource and/or BESS State of Charge (Power Possible does not change). This net output should be accurate within +/- 0.05 MW under normal frequency conditions. This setpoint will be modified as appropriate in the controls by the appropriate frequency response consistent with Section 1.G.11 (Active Power – Frequency Response (DROOP)) and Section 1.G.12 (Dynamic Active Power – Frequency Performance) of this Attachment F (Facility Owned by Subscriber Organization).
  - From Subscriber Organization:
    - Power Possible (Available maximum capacity; Maximum Load Frequency Control (Regulation) Limit (lfmx, ecomx)): See above, instantaneous limit for available energy, represents max level the Facility can produce under present resource, BESS State of Charge (if applicable) and equipment conditions. This is used as upper limit for Company Dispatch.



- For variable energy resources, maximum level the variable generation resources can produce under present variable resource and equipment conditions.
  - Minimum Sustained Limit: Minimum output level the Facility can be reduced to continuously without delay (ecomn). For projects with BESS: If BESS charging from the grid is permitted, and charging capacity is available, this will be a negative value.
  - Minimum Load Frequency Control (Regulation) Limit (lfcmn). This is the Company dispatch low limit for frequency regulation. For projects with BESS: If BESS charging from the grid is permitted, and charging capacity is available, this may be a negative value.
  - Maximum Dispatchable Ramp Rate: Controlled ramp rate available under Company dispatch for controlled changes in output.
  - For projects with a BESS, Subscriber Organization shall also provide the following:
    - BESS potential (BESS State of Charge and projected number of hours at present dispatch, minimum dispatch, and maximum dispatch).
9. Subscriber Organization shall not override Company's active power controls without first obtaining specific approval to do so from the Company System Operator unless there is a system emergency. Disabling of the remote Active Power Control shall initiate telemetry notification to the Company.
10. The requirements of the Active Power Control Interface may be modified as mutually agreed upon in writing by the Parties.

**Active Power Communications between Company and Subscriber Organization**

Company will receive and send telemetry and control data through the communications interface in accordance with Company standards. The data points covered under this Contract, as described below, may overlap with data requirements described elsewhere.

**Data Points to be sent from Subscriber Organization to Company via SCADA**

. In addition to the items listed above, The following data points will be transmitted via SCADA or similar control system from Subscriber Organization to Company and represent Facility level data [Note: Data is representative and may be modified based on resource type and Facility requirements]:

<u>Description</u>	<u>Units</u>
Power Reference Set-Point (echo)	KW
Auxiliary Power demand	KW
Actual power output at POI	KW
Power Possible	KW
Actual reactive power at POI	Kvars
Average 3 phase Voltage at the POI	Kv

Variable Generation potential	KW
BESS State of Charge	Pct
BESS Inverters Online	Integer
Inverters online	Integer
Facility duration at current output	HRS
Active Power Control	Remote/Local
Indication of Frequency Response Mode [For facilities with alternate modes of frequency response]	Integer Droop, ISOCH

### **Response times and limitations of Facility in regard to Active Power Control**

The following protocols outline the expectations for responding to the Power Reference Set-Point.

**Frequency of Changes.** Company may send a new Power Reference Set Point to the Facility at up to the control cycle (between 0.5 and 4 seconds).

**Range of Power Reference Set-Point.** The range of set point values can be between 0% and 100% of Power Possible. For projects offering grid-charging storage, negative set-point values may be required.

The response time of the CBRE Facility to commanded active and reactive power setpoints provided by the Company System Operator shall be within the specified control cycle. Reaction time is defined as the time interval between the moment of receiving external control setpoints for active power and voltage control/reactive power from the Company System Operator and the moment when the CBRE Facility's active and reactive power reach the designated setpoint (as measured at the POI).

### **Backup Communications**

In the event of an Active Power Control Interface failure, Company and Subscriber Organization shall communicate via telephone, or other method mutually agreeable between the Parties, in order to correct the failure.

#### **11. Active Power - Frequency Response (DROOP).**

The Facility shall provide a primary frequency response with a frequency droop characteristic reacting to system frequency at the Point of Interconnection in both the overfrequency and underfrequency directions except as limited by the minimum and maximum available capacity and energy potential at the time of the event including BESS state of charge. This response must be timely and sustained rather than injected for a short period and then withdrawn. For over-frequency events, response may include absorption through charging (as applicable under the terms of this Contract). Subscriber Organization shall provide minimum operational limits for each online resource and the Facility for primary frequency response.

Frequency will be calculated over a period of time (e.g., three to six cycles, or other period as specified by Company), and filtered to take control action on the fundamental frequency

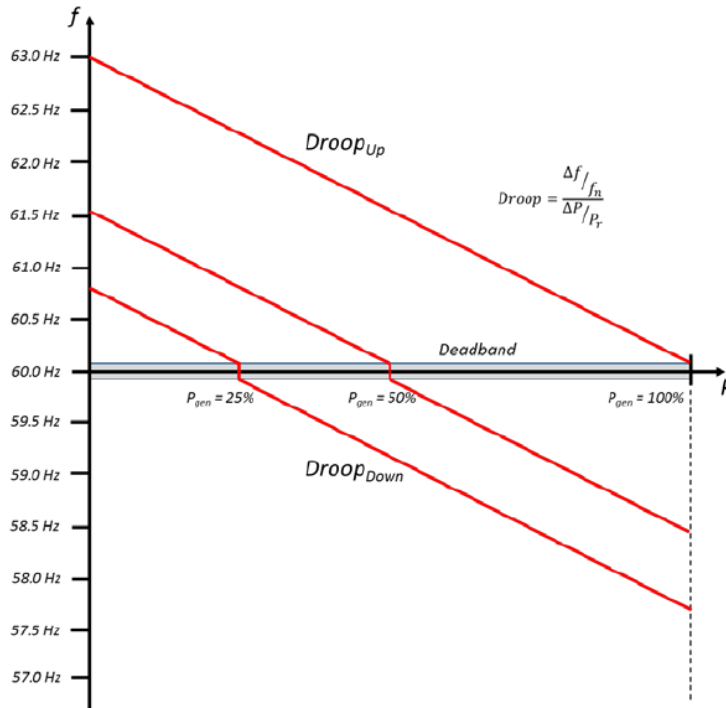
component of the calculated signal. Calculated frequency may not be susceptible to spikes caused by phase jumps on the Company system.

The active power-frequency control system, and overall response of the inverter-based resource (plant), must meet the following performance aspects (see figure below):

The active power-frequency control system shall have an adjustable proportional droop characteristic with a default value of [4%] percent. The droop setting shall permit a setting from 0.1% to 10%. This setting shall be changed upon Company's written request as necessary for grid droop response coordination. The droop setting shall be tunable and may be specified during commissioning. The droop shall be a permanent value based on Pmax (Net Nameplate Capacity) and Pmin (typically 0 for an inverter-based resource, even with a grid charging capable BESS). This keeps the proportional droop constant across the full range of operation and shares the burden fairly across all frequency responsive resources. The curve for an inverter-based BESS may include the negative active power quadrant of this curve, but the droop slope is to be based on the minimum output of 0 MW (Pmin). The droop response must include the capability to respond in both the upward (underfrequency) and downward (overfrequency) directions. Frequency droop will be based on the difference between Net Nameplate Capacity (Pmax) and zero output (Pmin) such that the [4%] percent droop line is always constant for a resource.

Subscriber Organization shall make commercially reasonable efforts to provide frequency response without a deadband, but in any case, not to exceed +/- 0.0166 Hz. If the active power-frequency control system has a deadband, it shall be a nonstep deadband that is adjustable between 0 Hz and the full frequency range of the droop characteristic with a default value of 0.0332 Hz and centered at nominal frequency of 60 Hz (i.e. 59.9834 Hz to 60.0166 Hz). Nonstep deadband is where the change in active power output starts from zero deviation on either side of the deadband. Frequency deadband is the range of frequencies in which the unit does not change active power output.

Inverter-based resources may consider a small hysteresis characteristic where linear droop meets any deadband to reduce dithering of inverter output when operating near the edges of the deadband. The hysteresis range may not exceed  $\pm 0.005$  Hz on either side of the deadband. If measurement resolution is not sufficient to measure this frequency, hysteresis may not be used.



### Active Power - Frequency Control Characteristic

Nominal System Frequency is 60.00 Hz.

The closed-loop dynamic response of the active power-frequency control system of the overall inverter-based resources, as measured at the POI must have the capability to meet or exceed the performance specified in below. Subscriber Organization shall ensure that the models and parameters for the resources and control equipment are consistent with those provided during the IRS process and that any updates have been provided to the Company reflecting currently implemented settings and configuration.

#### 12. Dynamic Active Power-Frequency Performance.

For a step change in frequency at the point of measure of the inverter-based resource [NOTE - MAY BE ADJUSTED AS THE RESULT OF IRS]:

Reaction time: The time between a step change in frequency and the time when the resource active power output begins responding to the change shall be less than 500 milliseconds or as otherwise specified by Company.<sup>1</sup>

Rise time: The time when the resource has reached 90% of the new steady-state (target) active power output shall be less than 4 seconds, or as otherwise specified by Company.<sup>2</sup>

<sup>1</sup> Time between step change in frequency and the time to be within 10 percent of new steady-state value can be used as a proxy for determining this time.

<sup>2</sup> Percentage based on final (expected) settling value.

Settling Time: Time in which the resource has entered into, and remains within, the settling band of the new steady-state active power (target) output shall be less than 10 seconds, or as otherwise specified by Company.

Overshoot: Percentage of the rated active power output that the resource can exceed while reaching the settling band shall be less than 5% or as otherwise specified by Company.<sup>3</sup>

Settling Band: Percentage of rated active power output that the resource should settle to within the settling time shall be less than 2.5%.

When operating in parallel with the Company System, the Facility shall operate with its primary frequency response control in automatic operation and in accordance with Company directions. Notification of changes in the status of the frequency response controls and, where applicable, mode of operation must be provided to the Company System Operator immediately through SCADA telemetry indication.

The Facility frequency response control shall adjust, without intentional delay and without regard to the ramp rate limits in Section 3.D of this Attachment F (Facility Owned by Subscriber Organization), the Facility's net real power export based on frequency deadband and frequency droop settings specified by the Company.

The Facility frequency response control shall increase the net real power export above the Power Reference Setpoint set under Section 1.G.8 of this Attachment F (Facility Owned by Subscriber Organization) or further decrease the net real power export from the Power Reference Setpoint in its operations in accordance with the frequency response settings.

The Facility frequency response control shall be in continuous operation unless directed otherwise by the Company.

13. [Reserved]

#### H. Control System Acceptance Test Procedures.

1. Conditions Precedent. The following conditions precedent must be satisfied prior to conducting the Control System Acceptance Test:
  - Successful completion of the Acceptance Test.
  - Facility has been successfully energized.
  - All of the Facility's generating and storage equipment (as applicable) have been fully commissioned.
  - The control system computer has been programmed for normal operations.
  - All equipment that is relied upon for normal operations (including ancillary devices such as capacitors/inductors, energy storage device, statcom, etc.) shall have been commissioned and be operating within normal parameters.
2. Facility Energy Equipment. In the event that all or any portion of the Facility's energy equipment is not available for the duration of the Control System Acceptance Test, the Control System Acceptance Test will have to be re-run from the beginning unless Subscriber Organization demonstrates to the satisfaction of the Company that the test results attained are

---

<sup>3</sup> Percentage based on final (expected) settling value.

consistent with the results that would have been attained if all of the equipment had been available for the duration of the test.

3. Procedures. The Control System Acceptance Test will be conducted on Business Days during normal working hours on a mutually agreed upon schedule. No Control System Acceptance Test will be scheduled during the final 21 Days of a calendar year. No later than thirty (30) Days prior to conducting the Control System Acceptance Test, Company and Subscriber Organization shall agree on a written protocol setting out the detailed procedure and criteria for passing the Control System Acceptance Test. Exhibit F-7 (Control System Acceptance Test Criteria) provides general criteria to be included in the written protocol for the Control System Acceptance Test. Within fifteen (15) Business Days of completion of the Control System Acceptance Test, Company shall notify Subscriber Organization in writing whether the Control System Acceptance Test(s) has been passed and, if so, the date upon which such Control System Acceptance Test(s) was passed. If any changes have been made to the technical specifications of the Facility or the design of the Facility in accordance with Section 5(f) of Exhibit F-1 (Description of Generation and Battery Storage Facility), such changes shall be reflected in an amendment to this Contract, and the written protocol for the Control Systems Acceptance Test shall be based on the Facility as modified. Such amendment shall be executed prior to conducting the Control System Acceptance Test and Company shall have no obligation for any delay in performing the Control Systems Acceptance Test due to the need to complete and execute such amendment.
- I. Facility Security and Maintenance. Subscriber Organization is responsible for securing the Facility. Subscriber Organization shall have personnel available to respond to all calls related to security incidents and shall take commercially reasonable efforts to prevent any security incidents. Subscriber Organization is also responsible for maintaining the Facility, including vegetation management, to prevent security breaches. Subscriber Organization shall comply with all commercially reasonable requests of Company to update security and/or maintenance if required to prevent security breaches.
- J. Demonstration of Facility. Company shall have the right at any time, other than during maintenance or other special conditions, including Force Majeure, communicated by Subscriber Organization, to notify Subscriber Organization in writing of Subscriber Organization's failure, as observed by Company and set forth in such written notice, to meet the operational and performance requirements specified in Section 1.B.3.i, Section 1.G. (Active Power Control Interface) and Section 3 (Performance Standards) of this Attachment F (Facility Owned by Subscriber Organization), and to require documentation or testing to verify compliance with such requirements. Upon receipt of such notice, Subscriber Organization shall promptly investigate the matter, implement corrective action and provide to Company, within thirty (30) Days of such notice or such longer time period agreed to in writing by Company, a written report of both the results of such investigation and the corrective action taken by Subscriber Organization. If the Subscriber Organization's report does not resolve the issue to Company's reasonable satisfaction, the Parties shall promptly commission a study to be performed by one of the engineering firms then included on the Qualified Independent Third-Party Consultants List attached to the Contract as Exhibit F-2 (Consultants List) to evaluate the cause of the non-compliance and to make recommendations to remedy such non-compliance. Subscriber Organization shall pay for the cost of the study. The study shall be completed within ninety (90) Days, unless the selected consultant determines that such study cannot reasonably be completed within ninety (90) Days, in which case, such longer commercially reasonable period of time as it takes the consultant to complete the study. The consultant shall send the study to Company and Subscriber Organization. Subscriber Organization (and/or its Third-Party consultants and contractors), at Subscriber Organization's expense, shall take such action as the study shall recommend with the objective of resolving the non-compliance.

Such recommendations shall be implemented by Subscriber Organization to Company's reasonable satisfaction no later than forty-five (45) Days from the Day the completed study is issued by the consultant, unless the consultant determines that such recommendation cannot reasonably be implemented within forty-five (45) Days, in which case, such longer commercially reasonable period of time agreed to by the Parties in writing to implement such recommendation as determined by the consultant. Failure to implement such recommendations within this period shall constitute a material breach of this Contract. Unless the aforementioned written report and study are being completed, and any recommendations are being implemented, solely to address Seller's failure to satisfy the storage Round Trip Efficiency Performance Metric of this Agreement, the Company shall have the right to declare the Facility derated and in Subscriber Organization-Attributable Non-Generation status until the Subscriber Organization's aforementioned written report has been completed, any subsequent study commissioned by the Parties has been completed and any recommendations to resolve the non-compliance have been implemented to Company's reasonable satisfaction.

**2. OPERATING PROCEDURES. [NOTE: NUMERICAL SPECIFICATIONS IN THIS SECTION 2 MAY VARY DEPENDING ON THE SPECIFIC PROJECT AND THE RESULTS OF THE PROJECT-SPECIFIC INTERCONNECTION REQUIREMENT STUDY.]**

- A. Reviews of the Facility. Company may require periodic reviews of the Facility, maintenance records, available operating procedures and policies, and relay settings, and Subscriber Organization shall implement changes Company deems necessary for parallel operation or to protect the Company System from damages resulting from the parallel operation of the Facility with the Company System.
- B. Separation. Subscriber Organization must separate from Company System whenever requested to do so by the Company System Operator pursuant to Section 5. (Company Dispatch) and Section 12. (Personnel and System Safety) of the Contract.
- C. Subscriber Organization Logs. Logs shall be kept by Subscriber Organization for information on unit availability including reasons for planned and forced outages, circuit breaker trip operations, relay operations, including target initiation, and other unusual events. Company shall have the right to review these logs, especially in analyzing system disturbances. Subscriber Organization shall maintain such records for a period of not less than six (6) years.
- D. Reclosing and Return to Service. Under no circumstances shall Subscriber Organization, when separated from the Company System for any reason, including tripping during disturbances or due to equipment failure, reclose into the Company System without first obtaining specific approval to do so from the Company System Operator. Ramp rates, behavior and mode of operation upon return to service shall conform to verbal instructions from the System Operator or Active Power control from Company. Following local or system wide outage conditions, the Facility shall not attempt to automatically reconnect to the grid (unless directed by the Company System Operator) so as to not interfere with Company System Operator system restoration procedures.
- E. [Reserved]
- F. [Reserved]
- G. Critical Infrastructure Protection. Subscriber Organization shall comply with the critical infrastructure protection requirements set forth in Section 1.B.3.g (Cybersecurity and Critical Infrastructure Protection) of this Attachment F (Facility Owned by Subscriber Organization).
- H. Allowed Operations. Facility shall be allowed to export energy to the Company System only when the [ ] circuit is in normal operating configuration served by breaker [ ] at [ ]

Substation. **[TO BE DETERMINED BY COMPANY BASED ON THE RESULTS AND REQUIREMENTS OF THE IRS]**

**3. PERFORMANCE STANDARDS.**

**A. PROVISIONS FOR DISTRIBUTION CONNECTION**

Rule 14H. The Facility shall follow the performance standards of Rule 14H Appendix I and the additional provisions set forth below in Section 3.B. (Reactive Power Control) through Section 3.V. (Unintentional Islanding). To the extent any of those additional provisions conflict with Rule 14H, the provisions of this Contract shall control.

**B. Reactive Power Control.** **[THESE REQUIREMENTS MAY BE CHANGED BY COMPANY UPON COMPLETION OF THE IRS.]** Subscriber Organization shall control its reactive power by automatic voltage regulation control. Subscriber Organization shall automatically regulate voltage at a point, the point of regulation, between the Subscriber Organization's generator terminal and the Point of Interconnection to be specified by Company, to within 0.5% of a voltage or power factor specified by the Company System Operator to the extent allowed by the Facility reactive power capabilities as defined in Section 3.C (Reactive Power Characteristics) of this Attachment F (Facility Owned by Subscriber Organization).

**C. Reactive Power Characteristics.** **[THESE REQUIREMENTS MAY BE CHANGED BY COMPANY UPON COMPLETION OF THE IRS.]**

1. The Facility shall install sufficient equipment so that the Facility will have the ability to deliver or receive, at the Point of Interconnection, reactive power as illustrated in the **[generator capability]** curve(s) attached as Exhibit F-4, which represents the Facility Composite (Generator and Energy Storage Capability Curve(s)). Facilities with a BESS with grid charging can operate with negative active power. These facilities shall provide automatic voltage control within their reactive capability while acting as a load (charging, negative active power generation). The automatic voltage control aspects of a BESS shall be seamless across the transition from acting as a generating resource to acting as a load. The Facility must be capable of automatically adjusting reactive control to maintain the bus voltage at the Point of Interconnection to meet the scheduled voltage set point target specified by the Company System Operator and be capable of supplying reactive power in accordance with the **[generator capability]** curve(s) attached to this Agreement as Exhibit B-2 including capability to continue to provide reactive compensation at all active power outputs down to zero active power. The voltage target will be specified remotely by the Company System Operator through SCADA. The Facility's voltage set point target must reflect the Company voltage set point target controlled from SCADA, without delay. The Facility should not normally operate on a fixed var or fixed power factor unless agreed by Company. The voltage setpoint target and present Facility minimum and maximum reactive power limits based on the Facility Composite capability curve shall be provided to the Company SCADA through Company's Telemetry and Control.
2. The Facility shall contain equipment able to continuously and actively control the output of reactive power under automatic voltage regulation control reacting to system voltage changes. The response requirements are differentiated for large and small signal disturbance performance characteristics. Small signal disturbances are those that reflect normal variations under non-disturbance conditions, the continuous operation range for voltage ride through:  $0.80 \text{ pu} \leq V \leq 1.10 \text{ pu}$  at the point of interconnection. Large disturbance is where the voltage at the point of interconnection falls outside the continuous operating range.



3. For small signal disturbances, reaction time between the step change in voltage and the reactive power change shall be less than 500 msec (no intentional time delay). The automatic voltage regulation response speed at the point of regulation shall be such that at least 90% of the initial voltage correction needed to reach the voltage control target will be achieved within 1 second following a step change. The percentage of rated reactive power output that the resource can exceed while reaching the settling band shall be less than five percent (5%).
4. Large disturbances: Large disturbances are characterized by voltage falling outside of the continuous operating range. The Facility shall adhere to the following characteristics for large disturbances:

The response of each generating resource over its full operating range and for all expected grid conditions should be stable. The dynamic performance of each resource should be tuned to provide this stable response. Company will work with Subscriber Organization to ensure during the interconnection process that each resource supports Company System reliability and provides a stable transient response to grid events. **[Note - The performance specifications described here may need to be modified based on studies performed for specific interconnections to provide a stable response.]**

Inverter-based resources shall operate in closed loop automatic voltage control at all times to support voltage regulation and voltage stability. Either the individual inverters or the plant-level closed loop automatic voltage controller must operate with a relatively fast response characteristic to mitigate steady-state voltage issues from causing dynamic voltage collapse. The plant-level controller may send voltage or reactive power set point changes to the individual inverters relatively fast, or the inverters will respond locally (depending on control architecture).

For a large disturbance step in voltage, measured at the inverter terminals, where voltage falls outside the continuous operating range, the positive sequence component of the inverter reactive current response must meet the performance specifications set forth below. These parameters may be adjusted following additional study and/or operational testing and performance.

Reaction time: Time between the step change in voltage and when the resource reactive power output begins responding to the change. The reaction time shall be less than 16 msec.

Rise time: Time between a step change in control signal input and when the reactive power output changes by 90 percent of its final value. The rise time shall be less than 100 msec.

Overshoot: Percentage of rated reactive current output that the resource can exceed when reaching the settling band. Overshoot will be determined following the IRS such that any overshoot in reactive power response does not cause Company System voltages to exceed acceptable voltage limits. The magnitude of the dynamic response may be requested to be reduced based on stability studies or actual operational data review.

If the Facility does not operate in accordance with Section 3.C of this Attachment F (Facility Owned by Subscriber Organization), Company may disconnect all or a part of Facility from Company System until Subscriber Organization corrects its operation (such as by installing supplemental reactive power equipment or additional control modifications, at Subscriber Organization's expense).

D. Ramp Rates.

Subscriber Organization shall ensure that the ramp rate of the Facility is less than 100 KW a minute for all conditions other than those under control of the Company System Operator and/or those due to desired frequency response, including start up, depletion of storage charge and resource, locally controlled startup and shut down.

E. Ride Through.

Ride-Through requires that the resource continues to inject current within the "No Trip" zone of the voltage and frequency ride-through requirements. Unless approved during the Interconnection Requirements Study analysis, resources should not use "momentary cessation" within the ride-through regions for any of the ride-through requirements in this Attachment F (Facility Owned by Subscriber Organization). In the "may trip" regions, the Facility shall initiate trip for over/under voltage and frequency conditions only as required for Facility equipment operating limits to avoid damage. Any such limits of operation should be conveyed to the Company and represented in the provided models.

F. Undervoltage Ride-Through.

The Facility, as a whole, will meet the following undervoltage ride-through requirements during low voltage affecting one or more of the three voltage phases ("V" is the voltage of any three voltage phases at the Point of Interconnection). For alarm conditions the Facility shall not disconnect from the Company System unless the Facility's equipment is at risk of damage. This is necessary in order to coordinate with the existing Company System. **[THESE VALUES MAY BE CHANGED BY COMPANY UPON COMPLETION OF THE IRS. WITHOUT LIMITATION, FOR A DISTRIBUTION-CONNECTED FACILITY, UPON COMPLETION OF THE IRS THE COMPANY MAY SPECIFY REQUIREMENTS FOR A MANDATORY DISCONNECTION FROM THE COMPANY SYSTEM.]**

$0.80 \text{ pu} \leq V \leq 1.10 \text{ pu}$	The Facility remains connected to the Company System and in continuous operation.
$0.70 \text{ pu} \leq V < 0.80 \text{ pu}$	The Facility remains connected to the Company's System and in continuous operation for a minimum of twenty (20) seconds (while "V" remains in this range);
$0.50 \text{ pu} \leq V < 0.70 \text{ pu}$	The Facility remains connected to the Company's System and in continuous operation for a minimum of ten (10) seconds (while "V" remains in this range);
$0.15 \text{ pu} \leq V < 0.50 \text{ pu}$	The Facility remains connected to the Company's System and in continuous operation for a minimum of two (2) seconds (while "V" remains in this range);
$0.00 \text{ pu} \leq V < 0.15 \text{ pu}$	The Facility may initiate disconnection from the Company System if the voltage remains in this range for more than 0.16 seconds.

Protective Undervoltage Relaying (27) shall be set to alarm only to meet the above ride-through requirements, and shall not initiate a disconnect from the Company System unless Subscriber Organization reasonably determines based upon Good Engineering and Operating Practices that the Facility's equipment is at risk of damage. This is necessary in order to coordinate with the existing Company System.

Subscriber Organization shall have sufficient capacity to fulfill the above mentioned requirements to ride-through subsequent events 300 cycles or more apart, between which the voltage at the Point of Interconnection recovers above 0.80 pu. **[THE ACTUAL RIDE-THROUGH TIMES WILL BE DETERMINED BY COMPANY IN CONNECTION WITH THE IRS]**

G. Over Voltage Ride-Through.

The overvoltage protection equipment at the Facility shall be set so that the Facility will meet the following overvoltage ride-through requirements during high voltage affecting one or more of the three voltage phases (as described below) ("V" is the voltage of any of the three voltage phases at the Point of Interconnection). For alarm conditions the Facility should not disconnect from the Company System unless the Facility's equipment is at risk of damage. This is necessary in order to coordinate with the existing Company System. **[THESE VALUES MAY BE CHANGED BY THE COMPANY UPON COMPLETION OF THE IRS. WITHOUT LIMITATION, FOR A DISTRIBUTION-CONNECTED FACILITY, UPON COMPLETION OF THE IRS THE COMPANY MAY SPECIFY REQUIREMENTS FOR A MANDATORY DISCONNECTION FROM THE COMPANY SYSTEM.]**:

$0.80 \text{ pu} \leq V \leq 1.10 \text{ pu}$	The Facility remains connected to the Company System and in continuous operation.
$1.10 \text{ pu} < V \leq 1.20 \text{ pu}$	The Facility remains connected to the Company System and in continuous operation no less than 30 seconds; the duration of the event is measured from the point at which the voltage increases at or above 1.10 pu and ends when voltage is at or below 1.10 pu.
$V > 1.20 \text{ pu}$	The Facility remains connected to the Company System and in continuous operation for as long as possible as allowed by the equipment operational limitations.

Protective Overvoltage Relaying (59) shall be set to alarm only to meet the above ride-through requirements, and shall not initiate a disconnect from the Company System unless Subscriber Organization reasonably determines based upon Good Engineering and Operating Practices that the Facility's equipment is at risk of damage. This is necessary in order to coordinate with the existing Company System.

H. Transient Stability Ride-Through.

In all modes, the Facility shall be designed such that the transient stability of Company System is maintained for normally cleared and secondarily cleared faults. The Facility will be required to remain connected through anticipated rates of change of frequency **[TO BE PROVIDED UPON COMPLETION OF IRS]**

I. [RESERVED]

J. Underfrequency Ride-Through.

The Facility shall meet the following underfrequency ride-through requirements during an underfrequency disturbance, and export of power shall continue with output adjusted as appropriate for Facility droop response consistent with Section 1.G.11 (Active Power – Frequency Response (DROOP)) and Section 1.G.12 (Dynamic Active Power – Frequency Performance) of this Attachment F (Facility Owned by Subscriber Organization) ("f" is the Company System frequency at the Point of Interconnection):

$$57.0\text{Hz} \leq f < 63.0\text{Hz}$$

The Facility remains connected to the Company System and in continuous operation.

$$50.0\text{Hz} \leq f < 57.0\text{Hz}$$

The Facility remains connected to the Company System and in continuous operation for at least twenty (20) seconds per event. The duration of the event is from the point at which the frequency is below 57 Hz and ends when the frequency is at or above 57 Hz. The Facility may initiate an alarm if frequency remains in this range for more than twenty (20) seconds.

$$f < 50.0\text{Hz}$$

The Facility remains connected to the Company System and in continuous operation for the duration allowed by the equipment operational limitations. The Facility may initiate an alarm immediately.

Protective Underfrequency Relaying (81U) shall be set to alarm only to meet the above ride-through requirements, and shall not initiate a disconnect from the Company System unless Subscriber Organization reasonably determines based upon Good Engineering and Operating Practices that the Facility's equipment is at risk of damage. This is necessary in order to coordinate with the existing Company System.

Any tripping on calculated frequency should be based on accurately calculated and filtered frequency measurement over a time frame of minimum six cycles, or other period as specified by the Company, and should not use an instantaneously calculated value.

K. Overfrequency Ride-Through.

The Facility will behave as specified below for overfrequency conditions, and export of power shall continue with output adjusted as appropriate for Facility droop response consistent with Section 1(g)(xi) (Active Power – Frequency Response (DROOP)), Section 1(g)(xii) (Dynamic Active Power – Frequency Performance), and **[FOR FACILITIES WITH STORAGE]** Section 1(g)(xiii) (Alternate Active Power / Frequency Response Modes) ("f" is the Company System frequency at the Point of Interconnection):

$$57.0\text{Hz} \leq f \leq 63.0\text{Hz}$$

The Facility remains connected to the Company System and in continuous operation.

63.0Hz < f ≤ 65.0Hz

The Facility remains connected to the Company System for at least twenty (20) seconds. After twenty seconds, the Facility may initiate an alarm and the Facility remains connected and producing power for the duration allowed by the equipment operational limitations. The duration of condition is from the point at which the frequency is above 63.0 Hz and ends when the frequency is at or below 63.0 Hz.

f > 65.0Hz

The Facility remains connected to the Company System and in continuous operation for the duration allowed by the equipment operational limitations. The Facility may initiate an alarm immediately.

Protective Overfrequency Relaying (81O) shall be set to alarm only to meet the above ride-through requirements, and shall not initiate a disconnect from the Company System unless Subscriber Organization reasonably determines based upon Good Engineering and Operating Practices that the Facility's equipment is at risk of damage. This is necessary in order to coordinate with the existing Company System.

Any tripping on calculated frequency should be based on accurately calculated and filtered frequency measurement over a time frame of minimum six cycles, or other period as specified by the Company, and should not use an instantaneously calculated value.

L. Successive Faults.

If the resource necessitates tripping to protect from the cumulative effects of those successive faults, in a period of time to ensure safety and equipment integrity, the constraint and time periods should be provided for inclusion in the interconnection study. For all cases, at a minimum, the ride-through requirements shall be met for two ride-through events within two seconds to allow for the Company's transmission automatic reclosing attempt. **[Note - this requirement may be modified based on the results of the IRS.]**

M. Rate of Change of Frequency ("ROCOF").

The inverter-based resources in the Facility shall not use rate-of-change-of-frequency protection unless an equipment limitation exists that requires the inverter to trip on high ROCOF. Any ROCOF tripping must be approved by Company.

N. Phase Angle Shift Ride-Through.

The Facility equipment shall ride through phase angle shift of up to ( [ ] ) **[Note – requirements will depend on Facility]**. Inverter phase lock loop (PLL) loss of synchronism shall not cause the inverter to trip or enter momentary cessation within the voltage and frequency ride-through region. Inverters must be capable of riding through temporary loss of synchronism, and regain synchronism, without causing a trip or momentary cessation of the resource.

O. DC Protection.

If the Facility requires DC reverse current protection, such protection must be coordinated with the inverter equipment module ratings and set to operate for short circuits on the DC side. DC reverse current protection shall not operate for transient overvoltage or for AC-side faults.

P. Voltage Flicker.

Any voltage flicker on the Company System caused by the Facility shall not exceed the limits stated in IEEE Standard 1453-2011, or latest version "Recommended Practice – Adoption of IEC 61000-4-15:2010, Electromagnetic compatibility (EMC) – Testing and measurement techniques – Flickermeter – Functional and design specifications".

Q. Harmonics.

Harmonic distortion at the Point of Interconnection caused by the Facility shall not exceed the limits stated in IEEE Standard 519-1992, or latest version "Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems". Subscriber Organization shall be responsible for the installation of any necessary controls or hardware to limit the voltage and current harmonics generated from the Facility to defined levels.

R. Grid Forming Capabilities.

**[NOTE APPLICABILITY BASED ON RESOURCE TYPE AND DESIGN, AND ONLY REQUIRED FOR 1 MW OR LARGER INTERCONNECTION, FOR PV INVERTER BASED RESOURCES PAIRED WITH STORAGE]**

GFM control set an internal voltage waveform reference such that an inverter with the GFM control shall be able to synchronize with the grid and regulate active and reactive power generation appropriately, regardless of the grid's strength, or operate independently of other generation. An inverter with GFM control shall immediately respond to grid disturbances to support stability of grid and maintain its own control stability during the system disturbance.

Subscriber Organization Facility inverters shall be designed with GFM control and be capable of operating in GFM mode supporting system operation under normal and emergency conditions without relying on the characteristics of synchronous machines. While in GFM mode, the inverters shall support grid operation, consistent with tariff requirements, as a continuous ac voltage source during normal and transient conditions (as long as no limits are reached within the inverter) and be capable to synchronize to other voltage sources and operate autonomously if a grid reference is unavailable, and shall be able to share active and reactive power burden with other voltage sources without impacts on system stability.

Subscriber Organization shall provide information to the Company regarding control design, capabilities, characteristics, etc. of the GFM control of the Facility for Company review and approval. Additional specifics of the GFM control may be defined during the IRS.

Specifically, the GFM controls shall have the following functions and characteristics:

- (i) Allow Subscriber Organization Facility to operate in stable manner on low system strength grids (e.g. low short circuit ratio, low inertia, inertia-less system, etc.)
- (ii) Sets an internal voltage waveform reference and is able to synchronize with the grid or operate independently of other generation.
- (iii) Responds to system condition changes (i.e. frequency change and voltage change) beyond the control deadband in a timely manner by contributing towards the subsequent recovery of system frequency and voltage to the pre-disturbance value, assuming energy and power margins are available.

- (iv) Provide damping control function which damps oscillation within the interconnection and other adverse interactions among GFM and Grid following (“GFL”) Inverter Based Resources (IBRs) and other power electronic devices on the grid.
- (v) Upon the loss of the last synchronous machine in the power system, GFM will have the ability to operate autonomously if a grid reference is unavailable and be able to share active and reactive power burden with other voltage sources without impacts on system stability.
- (vi) Ability to transition from an electrical island to a grid-connect configuration without an impact to system stability.
- (vii) Provide active low-order harmonics cancellation (as applicable).
- (viii) Provide black-start capability (as applicable).

Subscriber Organization shall operate the Facility in grid forming mode only as directed by the Company System Operator, in its sole discretion. The Facility shall be required to communicate to the Company its parameters and settings pertaining to grid forming mode.

The grid forming control block diagram shall be submitted to the Company for review. The design shall be approved in writing by the Company and implemented by the Subscriber Organization prior to control system testing. This shall include initial settings for tunable controls parameters based on modeling. The initial control parameters may be modified by Subscriber Organization on Company request, based on field data and performance, subsequent system resource changes, etc. to achieve acceptable system stability.

S. Black Start Capability.

**[NOTE - APPLICABILITY BASED ON RESOURCE TYPE AND DESIGN, FOR INVERTER BASED RESOURCES PAIRED WITH STORAGE, TO BE DELETED IF SUBSCRIBER ORGANIZATION DOES NOT PROPOSE BLACK START]** The BESS shall be capable of grid forming inverter capability so it can generate its own AC waveform rather than relying on a grid voltage to synchronize and maintain frequency.

T. Control Systems and Auxiliary Equipment.

The power source for control systems and auxiliary equipment required for normal operation of the Facility shall be designed to be immune from system transients in accordance with the Public Utilities Commission of the State of Hawai‘i tariff for Maui Electric Company, Ltd. Rule No. 2, Character of Service (Revised Sheet No. 5, effective Oct. 20, 1991) and Section 3.2(A)(6) (Facility Protection and Control Equipment) to meet the performance during under/over voltage and under/over frequency conditions pursuant to Section 3(e) (Undervoltage Ride-Through), Section 3(f) (Over Voltage Ride-Through), Section 3(i) (Underfrequency Ride-Through) and Section 3(j) (Overfrequency Ride-Through) of this Attachment F (Facility Owned by Subscriber Organization).

U. Frequency Response.

Subscriber Organization shall comply with the requirements of Section 1.G.11. (Active Power - Frequency Response (DROOP))and Section 1.G.12. (Dynamic Active Power – Frequency Performance), of this Attachment F (Facility Owned by Subscriber Organization).

V. Unintentional Islanding.

A Facility’s inverters shall be certified to meet the unintentional islanding requirement stated in IEEE 1547-2018 (or latest version), “IEEE Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power System Interfaces.” Ride through

requirements specified herein shall not inhibit the islanding detection performance where a valid unintentional islanding condition exists.

**4. MAINTENANCE OF SUBSCRIBER ORGANIZATION-OWNED INTERCONNECTION FACILITIES.**

- A. Subscriber Organization must address any Disconnection Event (as defined below) according to the requirements of this Section 4 (Maintenance of Subscriber Organization-Owned Interconnection Facilities) of Attachment F (Facility Owned by Subscriber Organization). For the purposes of this Section 4 (Maintenance of Subscriber Organization-Owned Interconnection Facilities), a "Disconnection Event" is the removal of 80% of capacity or more from Company System and/or disconnection of the Facility from the Company's System (i) that is not the result of Company dispatch, frequency droop response, or isolation of the Facility resulting from designed protection fault clearing, and (ii) for which Company does not issue the written notice for failure to meet operational and performance requirements as set forth in Section 1.J. (Demonstration of Facility) of this Attachment F (Facility Owned by Subscriber Organization). Company's election to exercise its rights under Section 1.J. (Demonstration of Facility) shall not relieve Subscriber Organization of its obligation to comply with the requirements of this Section 4 (Maintenance of Subscriber Organization-Owned Interconnection Facilities) for any future Disconnection Event during the pendency of such election or thereafter.
- B. For every Disconnection Event, Subscriber Organization shall investigate the cause. Within three (3) Business Days of the Disconnection Event, Subscriber Organization shall provide, in writing to Company, an incident report that summarizes the sequence of events and probable cause.
- C. Within forty-five (45) Days of a Disconnection Event, Subscriber Organization shall provide, in writing to Company, Subscriber Organization's findings, data relied upon for such findings, and proposed actions to prevent reoccurrence of a Disconnection Event ("Proposed Actions"). Company may assist Subscriber Organization in determining the causes of and recommendations to remedy or prevent a Disconnection Event ("Company's Recommendations"). Subscriber Organization shall implement such Proposed Actions (as modified to incorporate the Company's Recommendations, if any) and Company's Recommendations (if any) in accordance with the time period agreed to by the Parties.
- D. In the event Subscriber Organization and Company disagree as to (i) whether a Disconnection Event occurred, (ii) the sequence of events and/or probable cause of the Disconnection Event, (iii) the Proposed Actions, (iv) Company's Recommendations, and/or (v) the time period to implement the Proposed Actions and/or Company's Recommendations, then the Parties shall follow the procedure set forth in Section 5 (Expedited Dispute Resolution) of this Attachment F (Facility Owned by Subscriber Organization).
- E. Upon the fourth (4th) Disconnection Event (and each subsequent Disconnection Event) within any Contract Year, the Parties shall follow the procedures set forth in Section 4.A. and Section 4.D. of Attachment F (Facility Owned by Subscriber Organization), to the extent applicable. If after following the procedures set forth in this Section 4 (Maintenance of Subscriber Organization-Owned Interconnection Facilities) of Attachment F (Facility Owned by Subscriber Organization), Subscriber Organization and Company continue to have a disagreement as to (1) the probable cause of the Disconnection Event, (2) the Proposed Actions, (3) the Company's Recommendations, and/or (4) the time period to implement the Proposed Actions and/or the Company's Recommendations, then the Parties shall commission a study to be performed by a qualified independent Third-Party consultant ("Qualified Consultant") chosen from the Qualified Independent Third-Party Consultants List ("Consultants List") attached to the Contract as Exhibit F-2 (Consultants List). Such study shall review the design of, review the operating and maintenance procedures dealing



with, recommend modifications to, and determine the type of maintenance that should be performed on Subscriber Organization-Owned Interconnection Facilities ("Study"). Subscriber Organization and Company shall each pay for one-half of the total cost of the Study. The Study shall be completed within ninety (90) Days from such fourth Disconnection Event (and each subsequent Disconnection Event) within any Contract Year, unless otherwise reasonably agreed to in writing by the Subscriber Organization and Company. The Qualified Consultant shall send the Study to Company and Subscriber Organization. Subscriber Organization (and/or its Third-Party consultants and contractors), at Subscriber Organization's expense, shall change the design of, change the operating and maintenance procedures dealing with, implement modifications to, and/or perform the maintenance on Subscriber Organization-Owned Interconnection Facilities recommended by the Study. Such design changes, operating and maintenance procedure changes, modifications, and/or maintenance shall be completed no later than forty-five (45) Days from the Day the completed Study is issued by the Qualified Consultant, unless such design changes, operating and maintenance procedure changes, modifications, and/or maintenance cannot reasonably be completed within forty-five (45) Days, in which case, Subscriber Organization shall complete the foregoing within such longer commercially reasonable period of time agreed to by the Parties in writing. Company shall have the right to derate the Facility to a level that maintains reliable operations in accordance with Good Engineering and Operating Practices, and the Facility shall be deemed to be in Subscriber Organization-Attributable Non-Generation status, until the study has been completed and the study's recommendations have been implemented by Subscriber Organization to Company's reasonable satisfaction. Nothing in this provision shall affect Company's right to dispatch the Facility as provided for in this Contract.

- F. The Consultants List attached hereto as Exhibit F-2 (Consultants List) contains the names of engineering firms which both Parties agree are fully qualified to perform the Study. At any time, except when a Study is being conducted, either Party may remove a particular consultant from the Consultants List by giving written notice of such removal to the other Party. However, neither Party may remove a name or names from the Consultants List without approval of the other Party if such removal would leave the list without any names. Intended deletions shall be effective upon receipt of notice by the other Party, provided that such deletions do not leave the Consultants List without any names. Proposed additions to the Consultants List shall automatically become effective thirty (30) Days after notice is received by the other Party unless written objection is made by such other Party within said thirty (30) Day period. By mutual agreement between the Parties, a new name or names may be added to the Consultants List at any time.

## **5. EXPEDITED DISPUTE RESOLUTION.**

If there is a disagreement between Company and Subscriber Organization regarding (i) whether a Disconnection Event occurred, (ii) the sequence of events and/or probable cause of the Disconnection Event, (iii) the Proposed Actions, (iv) the Company's Recommendations, and (v) the time period to implement the Proposed Actions and/or the Company's Recommendations, then authorized representatives from Company and Subscriber Organization, having full authority to settle the disagreement, shall meet in Hawai'i (or by telephone conference) and attempt in good faith to settle the disagreement. Unless otherwise agreed in writing by the Parties, the Parties shall devote no more than five (5) Business Days to settle the disagreement in good faith. In the event the Parties are unable to settle the disagreement after the expiration of the time period, then such disagreement shall constitute a Dispute for which either Party may pursue the dispute resolution procedure set forth in Section 17. (Dispute Resolution) of this Contract.

## **6. MODELING.**

- A. Subscriber Organization's Obligation to Provide Models. Within 30 Days of Company's written request, but no later than the Commercial Operations Date, Subscriber Organization shall provide detailed data regarding the design and location of the Facility, in a form reasonably satisfactory to Company, to allow the modeling of the inverters and any other equipment within the Facility identified in the IRS which utilizes Source Code (such as energy storage system, STATCOM or DVAR equipment), including, but not limited to, integrated and validated power flow and transient stability models (such as PSS/E models), a short circuit model (such as an ASPEN model), and an electro-magnetic transient model (such as a PSCAD model) of the inverters and any additional equipment identified in the IRS as set forth above, applied assumptions, and pertinent data sets (each a "Required Model" and collectively, the "Required Models"). Thereafter, during the Term, Subscriber Organization shall provide working updates of any Required Model within 30 Days of (i) Company's written request, or (ii) Subscriber Organization obtaining knowledge or notice that any Required Model has been modified, updated or superseded by the Source Code Owner.
- B. Escrow Establishment. If, pursuant to Section 6.A. (Subscriber Organization's Obligation to Provide Models) of this Attachment F (Facility Owned by Subscriber Organization), the Required Models are provided to the Company in a form other than Source Code, Subscriber Organization shall arrange for and ensure that the Source Code for the relevant Required Model is deposited into the Source Code Escrow as set forth below in Section 6.B.1. (Source Code Escrow) of this Attachment F (Facility Owned by Subscriber Organization) no later than the time periods set forth in Section 6.A. (Subscriber Organization's Obligation to Provide Models) of this Attachment F (Facility Owned by Subscriber Organization) for delivery of the Required Models. Subscriber Organization shall be responsible for all costs associated with establishing and maintaining the Source Code Escrow. If, however, Subscriber Organization is unable to deposit the required Source Code into the Source Code Escrow within the time periods set forth in Section 6.A. (Subscriber Organization's Obligation to Provide Models), Subscriber Organization shall, no later than such time periods, instead establish a monetary escrow as set forth below in Section 6.B.2. (Source Code Security) of this Attachment F (Facility Owned by Subscriber Organization).
1. Source Code Escrow.
    - a. Establishment of Source Code Escrow. If the Required Models are not provided to the Company in the form of Source Code pursuant to Section 6.A. (Subscriber Organization's Obligation to Provide Models) of this Attachment F (Facility Owned by Subscriber Organization), Subscriber Organization shall: (a) arrange for and ensure the deposit of a copy of the current version of the Source Code and relevant documentation for all Required Models with the Source Code Escrow Agent under the terms and conditions of the Source Code Escrow Agreement, and (b) arrange for and ensure the update of the deposited Source Code and relevant documentation for Major Releases and Minor Releases of the Required Models as soon as reasonably possible after they are made generally available.
    - b. Release Conditions. Company shall have the right to obtain from the Source Code Escrow Agent one copy of the escrowed Source Code for the Required Models, under the following conditions upon Company's request:
      - 1) A receiver, trustee, or similar officer is appointed, pursuant to federal, state or applicable foreign law, for the Source Code Owner;
      - 2) Any voluntary or involuntary petition or proceeding is instituted, under (x) U.S. bankruptcy laws or (y) any other bankruptcy, insolvency or similar proceeding outside of the United States, by or against the Source Code Owner; or

- 3) Failure of the Source Code Owner to function as a going concern or operate in the ordinary course; or
  - 4) Subscriber Organization and the Source Code Owner fail to provide to Company the Required Models or updated Required Models, or, alternatively, fail to issue a Source Code LC, within the time periods set forth in Section 6.A. (Subscriber Organization's Obligation to Provide Models) of this Attachment F (Facility Owned by Subscriber Organization), Company gives written notice of such failure to Subscriber Organization and the Source Code Owner, and Subscriber Organization and Source Code Owner fail to remedy such breach within five (5) Days following receipt of such notice.
- c. Remedies. If Company has the right to obtain from the Source Code Escrow Agent one copy of the escrowed Source Code for the Required Models pursuant to Section 6.B.1.b. (Release Conditions) of Attachment F (Facility Owned by Subscriber Organization), and Company finds that Subscriber Organization failed to arrange for and ensure the update the Source Code Escrow with the modified and/or updated Source Code and relevant documentation for Major Releases and Minor Releases of the Required Models as provided in Section 6.B.1.a (Establishment of Source Code Escrow) of Attachment F (Facility Owned by Subscriber Organization) or that the Source Code for the Required Models is incomplete or otherwise unusable, Subscriber Organization shall be liable to Company for liquidated damages in the amount of \$500 per Day for each Day Subscriber Organization fails to provide such Source Code to Company or such update to the Source Code to Company from the date such Major Release or Minor Release was first made available by the Source Code Owner to customers of the Source Code Owner. Failure to provide the updated Source Code of the Required Models within 30 Days' notice from Company of a breach of Section 6.B.1.a. (Establishment of Source Code Escrow) of Attachment F (Facility Owned by Subscriber Organization); provided, that Subscriber Organization has also failed to provide a satisfactory Source Code LC as set forth in Section 6.B.2. (Source Code Security) of this Attachment F (Facility Owned by Subscriber Organization) shall constitute an Event of Default pursuant to Section 13. under the Contract.
- d. Certification. The Source Code Escrow Agent shall release the Source Code of the Required Models to Company upon receipt of a signed statement by a representative of Company that reads substantially as follows:
- The undersigned hereby certifies that (i) I am duly authorized to execute this document on behalf of Maui Electric Company, Limited ("Maui Electric"), and (ii) Maui Electric is entitled to a copy of the Source Code of the Required Models Pursuant to Section 6.B.1.b. (Release Conditions) of Attachment F (Facility Owned by Subscriber Organization) of the Mid-Tier Standard Form Contract for Renewable Dispatchable Generation dated as of \_\_\_\_\_, between \_\_\_\_\_, and Maui Electric.
- e. Authorized Use. If Company becomes entitled to a release of the Source Code of the Required Models from escrow, Company may thereafter correct, modify, update and enhance the Required Models for the sole purpose of providing itself the support and maintenance it otherwise would have been entitled to if it had been provided the Required Models by Subscriber Organization under Section 6.A. (Subscriber Organization's Obligation to Provide Models) of this Attachment F (Facility Owned By Subscriber Organization) (the "Source Code Authorized Use").

- f. Confidentiality Obligations. Company shall keep the Source Code of the Required Models confidential pursuant to the confidentiality obligations of the Source Code Escrow Agreement. Company shall restrict access to the Source Code of the Required Models to those employees, independent contractors and consultants of Company who have agreed in writing to be bound by confidentiality and use obligations consistent with those specified in the Escrow Agreement, and who have a need to access the Source Code of the Required Models on behalf of Company to carry out their duties for the Source Code Authorized Use. Promptly upon Subscriber Organization's request, Company shall provide Subscriber Organization with the names and contact information of all individuals who have accessed the Source Code of the Required Models, and shall take all reasonable actions required to recover any such Source Code in the event of loss or misappropriation, or to otherwise prevent their unauthorized disclosure or use.
2. Source Code Security.
- a. Establishment of Source Code Security. If the Required Models and their relevant Source Code are not provided to the Company in the form of Source Code pursuant to Section 6.A. (Subscriber Organization's Obligation to Provide Models) of this Attachment F (Facility Owned by Subscriber Organization) and if the Subscriber Organization is unable to arrange for and ensure the deposit of the Source Code into the Source Code Escrow established for the benefit of the Company pursuant to Section 6.B.1 (Source Code Escrow) of this Attachment F (Facility Owned by Subscriber Organization) then, no later than the time periods set forth in Section 6.A. (Subscriber Organization's Obligation to Provide Models) of this Attachment F (Facility Owned by Subscriber Organization) for delivery of the Required Models and Source Code, Subscriber Organization shall provide an irrevocable standby letter of credit (the "Source Code LC") with no documentation requirement in the amount of Two Hundred Fifty Thousand Dollars (\$250,000) per Required Model (and its relevant Source Code) substantially in the form attached to this Contract as Exhibit G-1 (Form of Letter of Credit) from a bank chartered in the United States with a credit rating (as measured by Standard & Poor's) of "A-" or better or A3 or better from Moody's. Such letter of credit shall be issued for a minimum term of one (1) year. Furthermore, at the end of each year the security shall be renewed for an additional one (1) year term so that at the time of such renewal, the remaining term of any such security shall not be less than one (1) year. The letter of credit shall include a provision for at least thirty (30) Days' advance notice to Company of any expiration or earlier termination of the letter of credit so as to allow Company sufficient time to exercise its rights under said security if Subscriber Organization fails to extend or replace the security. In all cases, the reasonable costs and expenses of establishing, renewing, substituting, canceling, increasing, reducing, or otherwise administering the letter of credit shall be borne by Subscriber Organization.
- b. Release Conditions. Company shall have the right to draw on the letter of credit the funds necessary to develop and recreate the Required Model or Required Models upon Company's request if Subscriber Organization fails to provide the Company the Required Models or updated Required Models within the time periods set forth in Section 6.A. (Subscriber Organization's Obligation to Provide Models) or Section 6.B.1.c. (Remedies) of this Attachment F (Facility Owned by Subscriber Organization), Company gives written notice of such failure to Subscriber Organization, and Subscriber Organization fails to remedy such breach within five (5) Days following receipt of such notice for a breach under Section 6.A. (Subscriber Organization's Obligation to Provide Models, or within thirty (30) Days following receipt of such notice for a breach under Section 6.B.1.c. (Remedies).

- c. Extend Letter of Credit. If the letter of credit is not renewed or extended no later than thirty (30) Days prior to its expiration or earlier termination, Company shall have the right to draw immediately upon the full amount of the letter of credit and to place the proceeds of such draw (the “Proceeds”), at Subscriber Organization’s cost, in an escrow account in accordance with Section 6.B.2.d (Proceeds Escrow), until and unless Subscriber Organization provides a substitute form of letter of credit meeting the requirements of this Section 6.B.2. (Source Code Security) of this Attachment F (Facility Owned by Subscriber Organization).
- d. Proceeds Escrow. If Company draws on the letter of credit pursuant to Section 6.B.2.c (Extend Letter of Credit) of this Attachment F (Facility Owned by Subscriber Organization), Company shall, in order to avoid comingling the Proceeds, have the right but not the obligation to place the Proceeds in an escrow account as provided in this Section 6.B.2.d (Proceeds Escrow) of this Attachment F (Facility Owned by Subscriber Organization) with a reputable escrow agent acceptable to Company (“Proceeds Escrow Agent”) subject to an escrow agreement acceptable to Company (“Proceeds Escrow Agreement”). Without limitation to the generality of the foregoing, a federally insured bank shall be deemed to be a “reputable escrow agent.” Company shall have the right to apply the Proceeds as necessary to recover amounts Company is owed pursuant to this Section 6 (Modeling) of this Attachment F (Facility Owned by Subscriber Organization). To that end, the Proceeds Escrow Agreement governing such escrow account shall give Company the sole authority to draw from the account. Subscriber Organization shall not be a party to such Proceeds Escrow Agreement and shall have no rights to the Proceeds. Upon full satisfaction of Subscriber Organization’s obligations under Section 6 (Modeling) of this Attachment F (Facility Owned by Subscriber Organization), Company shall instruct the Proceeds Escrow Agent to remit to the bank that issued the letter of credit that was the source of the Proceeds the remaining balance (if any) of the Proceeds. If there is more than one escrow account with Proceeds, Company may, in its sole discretion, draw on such accounts in any sequence Company may select. Any failure to draw upon the Proceeds for any damages or other amounts due Company shall not prejudice Company’s rights to recover such damages or amounts in any other manner.
- e. Subscriber Organization’s Obligation. If the letter of credit is not sufficient to cover Company’s associated consultant fees, costs and expenses to develop and recreate the Required Models, Subscriber Organization shall pay to Company the difference within ten (10) Days of Company’s written notice to Subscriber Organization.
- f. Model Verification. Subscriber Organization shall work with the Company to validate the new Required Models developed by or on behalf of Company within sixty (60) Days of receiving such new Required Models. Subscriber Organization shall also arrange for and ensure that Company may obtain new Required Models directly from the Source Code Owner in the event that Subscriber Organization ceases to operate as a going concern or is subject to voluntary or involuntary bankruptcy and is unable or unwilling to obtain the new Required Models from the Source Code Owner.
- g. Certification. The terms of the letter of credit shall provide for a release of the funds, or in the event the funds have been placed into a Proceeds Escrow, the Proceeds Escrow Agent shall release the necessary funds to Company upon receipt of a signed statement by a representative of Company that reads substantially as follows:

The undersigned hereby certifies that (i) I am duly authorized to execute this document on behalf of Maui Electric Company, Limited (“Maui Electric”), and (ii)

Maui Electric is entitled to \$ \_\_\_\_\_, pursuant to Section 6.B.2.b (Release Conditions) of Attachment F (Facility Owned by Subscriber Organization) of the Mid-Tier Standard Form Contract for Renewable Dispatchable Generation dated as of \_\_\_\_\_, between \_\_\_\_\_, and Maui Electric.

- h. Authorized Use. If Company becomes entitled to a draw of funds from the Source Code Security or a release of funds from the Proceeds Escrow, Company may thereafter use such funds to develop, recreate, correct, modify, update and enhance the Required Models for the sole purpose of providing itself the support and maintenance it otherwise would have been entitled to if it had been provided the Required Models by Subscriber Organization under Section 6.A. (Subscriber Organization’s Obligation to Provide Models) of this Attachment F (Facility Owned by Subscriber Organization).
- 3. Supplementary Agreement. The parties stipulate and agree that the escrow provisions in this Section 6.B. (Escrow Establishment) of Attachment F (Facility Owned by Subscriber Organization) and the Source Code Escrow Agreement and Proceeds Escrow Agreement are “supplementary agreements” as contemplated in Section 365(n)(1)(B) of the Code. In any voluntary or involuntary bankruptcy proceeding involving Subscriber Organization, failure by Company to assert its rights to “retain its rights” to the intellectual property encompassed by the Source Code or the funds in the Proceeds Escrow, pursuant to Section 365(n)(1)(B) of the Code, under an executory contract rejected in a bankruptcy proceeding, shall not be construed as an election to terminate the Contract by Company under Section 365(n)(1)(A) of the Code.

## **7. TESTING REQUIREMENTS.**

- A. Testing Requirements. Once the Control System Acceptance Test has been successfully passed, Subscriber Organization shall not replace and/or change the configuration of the Facility Control, inverter control settings and/or ancillary device controls, without prior written notice to Company. In the event of any such replacement and/or change, the relevant test(s) of the Control System Acceptance Test shall be redone and must be successfully passed before the replacement or altered equipment is allowed to be placed in normal operations. In the event that Company reasonably determines that such replacement and/or change of controls makes it inadvisable for the Facility to continue in normal operations without a further Control Systems Acceptance Test, the Facility shall be deemed to be in Subscriber Organization-Attributable Non-Generation status until the new relevant tests of the Control System Acceptance Test have been successfully passed.
- B. Periodic Testing. Subscriber Organization shall coordinate periodic testing of the Facility with Company to ensure that the Facility is meeting the performance standards specified under this Contract.

## **8. DATA AND FORECASTING.**

Subscriber Organization shall provide Site, meteorological and production data in accordance with the following requirements:

- A. Physical Site Data: Subscriber Organization shall provide Company with an accurate description of the physical Site, including but not limited to the following, **[as appropriate to Facility resource type(s) and use of storage]** which may not be changed during the Term without Company’s prior written consent:

Location Facility Map showing the layout of the Facility (coverage area or footprint) and the coordinates (latitude and longitude) of generating equipment:

Solar PV: elevation (above ground), orientation angle and direction (north-east-south-west plane) of arrays/concentrators.

Location (latitude and longitude) and elevation (above ground) of each MMS and elevation (above ground) of each field measurement device for, e.g., air density, ambient air pressure and ambient air temperature, located at each MMS or each field measurement device located on such MMS.

For solar resource inverters: Inverter type, power rating, array configuration to inverters and DC rating of the Facility at the following standard test conditions: irradiance of 1000 W/m<sup>2</sup>, air mass 1.5, and cell temperature 25° C.

Solar generation technology employed at the Facility with temperature dependence, mounting and module type.

BESS technology and related auxiliary equipment, location and type.

**B. Meteorological and Production Data:**

Subscriber Organization shall install and maintain a minimum of one MMS for facilities with a Contract Capacity of less than 5 MW and a coverage area of not more than one square kilometer.

Subscriber Organization shall install and maintain a minimum of two MMS for facilities that have either (i) a Contract Capacity of 5 MW or greater or (ii) a coverage area greater than one square kilometer.

Placement of each MMS should account for the microclimate of the area and Facility coverage area and shall be oriented with respect to the primary wind direction.

Subscriber Organization shall provide to Company, via SCADA communication and protocol acceptable to Company to support operations and forecasting needs at a continuous scan, all meteorological and production data required under this Contract updated every 2 seconds.

Subscriber Organization shall arrange for a dedicated distribution voltage line to provide separate service from Company, or for such other independent, backup power source as approved by Company in writing, to temporarily store and record the meteorological data from the field measuring devices at the MMSs. Any such backup power source must be capable of providing power for the field measurement devices for a reasonable period of time until primary power is restored. The same backup power source can serve multiple MMSs as needed by the Facility.

**C. Units and Accuracy:**

The Table below shows minimum required solar irradiance measurements for various types of solar generation technology. This value may not be derived.

<b>Solar Technology</b>	<b>Direct Normal Irradiance</b>	<b>Global Irradiance (GHI)</b>	<b>Plane of Array Irradiance (POA)</b>
<b>Flat Plate</b> (fixed horizontal, fixed angle, tracking, roof mounted)		X	X

<b>Flat Panel Solar Thermal</b> (fixed angle, roof mounted, tracking)	X		X
<b>Concentrated PV</b> (flat, trough, tracking)	X	X	X

Units and accuracy of required measured parameters to be provided to Company in real time shall be as shown in the Table below. These represent the minimum required accuracies.

**Table of Units and Accuracy of Meteorological and Production Data (PV)**

Parameter	Measurement Device (typical)	Unit	Range	Accuracy
Global Horizontal Irradiance at MMS	Pyranometer or equivalent	W/m <sup>2</sup>	0 to 1500 W/m <sup>2</sup>	Secondary standard per ISO 9060 or ≤ 3% from 100 W/m <sup>2</sup> to 1500 W/m <sup>2</sup> if using a PV Reference Cell
Plane of Array Irradiance on same axis as array	Pyranometer or equivalent	W/m <sup>2</sup>	0 to 1500 W/m <sup>2</sup>	Secondary standard per ISO 9060 or ≤ 3% from 100 W/m <sup>2</sup> to 1500 W/m <sup>2</sup> if using a PV Reference Cell
Back of Panel temperature at array height	Temperature probe	°C	-20 to +50 °C	+/-1 °C
Ambient air temperature at MMS	Temperature probe	°C	-20 to +50 °C	+/-1 °C
Ambient air pressure at MMS	Piezoresistive transducer or equivalent	Mbar	150 to 1150 mbar	+/-60 mbar  (0 to +50°C)
Wind speed at MMS	Anemometer, sonic device or equivalent	Mph	0 to 134 mph	+/-1 mph



Parameter	Measurement Device (typical)	Unit	Range	Accuracy
Wind direction at MMS	Vane, sonic device or equivalent	Degrees (from True North)	360°	+/-5°
Set point for each inverter	Reported by Subscriber Organization	MW	0 to inverter name plate	Not applicable
Power production of Facility	Measured at POI	MW	Up to Net Nameplate Capacity	+/-0.05 MW
BESS Charging Power	Measured at BESS Charging Interface	MW	Up to Net Nameplate Capacity	+/-0.05 MW
Facility power production ratio	Ratio of Facility's power production (MW)/Net Nameplate Capacity (MW)	%	0 to 100%	+/-0.1 %
Inverters Available	NA	NA	Up to the number installed inverters	NA
Facility Inverter Availability	Ratio of inverters online/number of inverters	%	0 to 100%	NA
Power Possible	Subscriber Organization's Model	MW	0 to Net Nameplate Capacity	+/-4%

- D. Status of Generating Equipment: For each inverter, Subscriber Organization shall provide to Company, via SCADA communication and protocol acceptable to Company at a continuous scan updated not less frequently than every 2 seconds, a signal as to whether such inverter is available or unavailable, and on or offline.
- E. Data Collection. **[NOTE COMPANY TO UPDATE REQUIREMENTS; WILL BE SPECIFIC TO FACILITY EQUIPMENT AND RESOURCE TYPE]** High Resolution Data: Subscriber Organization shall install and make available to the Company time stamped and sequential data recordings for all inverter-based resources (and all generating resources) to perform event analysis and verify Facility performance during steady state and transient disturbance events. This will include a time-synchronized phasor measurement unit at the Facility, and access to multiple sources to provide sufficient clarity as to any abnormal response or behavior within the Facility, including Facility control settings and static values, SCADA data, sequence of events recording (SER) data, dynamic disturbance recorder (DDR) data, and inverter fault codes and inverter-level dynamic recordings. This data will be used to review the Facility response to system dynamics, such as the frequency response (normal droop), reactive response, etc.

1. Plant Data: [Note: specific requirements below are representative of variable energy resources and will be tailored to the Facility resource type(s) and geographic arrangement]

At least two months prior to the Commercial Operation Date, Subscriber Organization shall deliver to Company a report showing (i) manufacturer, model and year of all energy equipment (panels, inverters, energy storage devices), and meteorological instrumentation, and (ii) the latitude and longitude of the center of the energy equipment (i.e., solar panels for every inverter) and every meteorological tower. Beginning upon COD, Subscriber Organization shall transmit and provide to Company the real-time data set forth below, refreshed as frequently as allowed by the SCADA system, not to exceed sixty (60) second intervals:

- Three (3) data points from each inverter:
  - Inverter/turbine generation (MW)
  - Inverter/turbine availability
  - Inverter/turbine on/offline status
- Two (2) data points from each meteorological tower (solar resources):
  - Global horizontal solar irradiance (instantaneous solar intensity, full sky)
  - Plane of array solar irradiance (instantaneous solar intensity at the current angle of the PV array) or as required in the first table of this section

Subscriber Organization shall provide a map and key for each inverter sufficient to allow Company to correlate the data received through Company's data historian system to each individual resource.

## **9. TECHNOLOGY SPECIFIC REQUIREMENTS.**

A. [Reserved]

B. [Reserved]

C. Inverter Systems.

1. Direct current generators and non-power (i.e., other than 60 Hertz) alternating current generators can only be installed in parallel with the Company System using a non-islanding synchronous inverter unless alternate designs are approved by the Company. The design shall comply with the requirements of IEEE Std 1547-2018 (or latest version), except as described in Section 3 (Performance Standards) of this Attachment F (Facility Owned by Subscriber Organization).
2. Self-commutated inverters of the Company-interactive type shall synchronize to the Company System. Line-commutated, thyristor-based inverters are not recommended and will require additional technical study to determine harmonic and reactive power requirements. All interconnected inverter systems shall comply with the harmonic current limits of IEEE Std 519-1992 (or latest version).

D. Battery Energy Storage System. The operating parameters of the BESS for facilities with paired storage shall be as follows:

1. For facilities with variable energy and paired storage: The BESS shall directly charge storage from the variable resource when the Company Active Power Dispatch is for less than the available resource energy.

No more than [ ] % of the BESS energy capacity can be charged from the grid prior to the fifth (5th) anniversary of the Commercial Operations Date. Thereafter, 100% of the BESS energy capacity can be charged from the grid. **[DRAFTING NOTE ONE: 5-YEAR LIMITATION ON GRID CHARGING WILL BE DELETED IF ITC RECAPTURE IS NOT APPLICABLE TO THE BESS.] [DRAFTING NOTE TWO: IF THE BESS WILL NEVER CHARGE FROM THE GRID, REPLACE THIS ENTIRE SUBSECTION WITH THE FOLLOWING: “None of the BESS energy capacity may be charged from the grid during the Term of this Agreement.”]**

The BESS will not be required to discharge more energy than available relative to the available state of charge.

For storage used primarily for energy shifting, the BESS shall be designed for an average annual use of 365 cycle(s) (a cycle is a discharge equal to the portion of the BESS Contract Capacity allocated for energy shifting, and sufficient charging to return the BESS to 100% State of Charge)

--END--

**EXHIBIT F-1**  
**DESCRIPTION OF GENERATION AND BATTERY STORAGE FACILITIES**

1. Name of Facility:

(a) Location: (TMK No. )

(b) Telephone number (for system emergencies):

(c) E-mail Address:

(d) Contact Information for notices pursuant to the Contract:

Mailing Address:

Address for Delivery by Hand or Overnight Delivery:

Email Address:

2. Owner (If different from Subscriber Organization):

If Subscriber Organization is not the owner, Subscriber Organization shall provide Company with a certified copy of a certificate warranting that the owner is a corporation, partnership or limited liability company in good standing with the Hawai'i Department of Commerce and Consumer Affairs which shall be attached hereto as Exhibit F-1-1 (Good Standing Certificates).

3. Operator:

4. Name of person to whom payments are to be made:

(a) Mailing address:

(b) Hawai'i Gross Excise Tax License number:

5. Equipment:

(a) Type of facility and conversion equipment:

**[For example: Small power production facility designated as a  
Qualifying Facility that produces electric energy using  
\_\_\_\_\_.]**

(b) Design and capacity

Contract Capacity: The anticipated maximum net instantaneous active power for export at the Point of Interconnection of the Facility generators upon Commercial Operations: (“Contract Capacity”):

\_\_\_\_\_ kW

Total Number of Generators (PV Modules, BESS Modules, & Inverters):

**Example 1 (PV + BESS; AC-Coupled) :**

**Seventy-five thousand (75000) Brand W, 200 W DC,  
PV Modules;**

**Ten (10) Brand X, 1500 kW AC, PV-Inverters;**

**Ten (10) Brand Y, 1650 kW DC, BESS Modules**

**Ten (10) Brand Z, 1500 kW AC, BESS Inverters**

**Example 2 (PV + BESS; DC-Coupled) :**

**Seventy-five thousand (75000) Brand X, 200 W DC,  
PV Modules;**

**Ten (10) Brand Y, 1650 kW DC, BESS Modules**

**Ten (10) Brand Z, 1500 kW AC, Central Inverters**

Description of Equipment:

**[For example: Describe the type of energy conversion equipment, capacity, and any special features (i.e. modules per converter; AC or DC coupling; DC/AC ratio; plant controller information, etc.).]**

**Individual Unit: [if more than one type of generator, list information for each generator]**

kW	kVAR Consumed	kVAR Produced
<u>Maximum Facility Auxiliary load</u>		

Generator:

Type (PV Inverter, BESS Inverter, Central Inverter) \_\_\_\_\_

Rated Power \_\_\_\_\_ kW (AC)

Voltage \_\_\_\_\_ V, \_ phase

Frequency \_\_\_\_\_ Hz

Class of Protection \_\_\_\_\_

Rated Current \_\_\_\_\_ A

- (c) Installed Nameplate Capacity: Shall be the aggregate sum of the net nameplate active power capability of all generator and converter equipment installed.

The Installed Nameplate Capacity of this Facility shall be: \_\_ kW

- (d) Net Nameplate Capacity : Shall be the net instantaneous active power capability of the Facility at the point of interconnection, considering all generation and converter equipment and power plant controls which may act to limit the Facility capability. The Net Nameplate Capacity shall be not less than the Contract Capacity.

The Net Nameplate Capacity of this Facility shall be: \_\_\_\_\_ kW

- (e) Description of Facility SCADA and control system(s)
- (f) The “Allowed Capacity” of this Contract shall be the lower of (i) Contract Capacity or (ii) the Net Nameplate Capacity of the Facility installed by the Commercial Operations Date.
- (g) Subscriber Organization may propose revisions to this Section 5 (Equipment) of Exhibit F-1 (Description of Generation Battery and Storage Facilities) (“Section 5”) for Company’s approval prior to commencement of construction, provided, however, that (i) no such revision to this Section 5

shall change the type of Facility or conversion equipment deployed at the Facility from a solar energy conversion facility using photovoltaic equipment; (ii) Subscriber Organization shall be in compliance with all other terms and conditions of this Contract; and (iii) such revision(s) shall not change the characteristics of the Facility equipment or the specifications used in the IRS. Any revision to this Section 5 complying with items (i) through (iii) above shall be subject to Company's prior approval, which approval shall not be unreasonably withheld. If Subscriber Organization's proposed revision(s) to this Section 5 otherwise satisfies items (i) and (ii) above but not item (iii) such that Company, in its reasonable discretion, determines that a re-study or revision to all or any part of the IRS is required to accommodate Subscriber Organization's proposed revision(s), Company may, in its sole and absolute discretion, conditionally approve such revision(s) subject to a satisfactory re-study or revision to the IRS and Subscriber Organization's payment and continued obligation to be liable and responsible for all costs and expenses of re-studying or revising such portions of the IRS and for modifying and paying for all costs and expenses of modification to the Facility, the Company-Owned Interconnection Facilities based on the results of the re-studies or revisions to the IRS. Any changes made to this Attachment F of the Contract as a result of this Section 5(f) of Exhibit F-1 (Description of Generation and Battery Storage Facilities) shall be reflected in a written amendment to the Contract.

Subscriber Organization understands and acknowledges that Company's review and approval of Subscriber Organization's proposed revisions to this Section 5 and any necessary re-studies or revisions to the IRS shall be subject to Company's then-existing time and personnel constraints. Company agrees to use commercially reasonable efforts, under such time and personnel constraints, to complete any necessary reviews, approvals and/or re-studies or revisions to the IRS.

Any delay in completing, or failure by Subscriber Organization to meet, the Commercial Operations Date as a result of any revisions pursuant to this Section 5 by Subscriber Organization (whether requiring a re-study or revision to the IRS or not) shall be borne entirely by Subscriber Organization and Company shall not be responsible or liable for any delay or failure to meet any such milestones by Subscriber Organization.

6. Insurance carrier(s): **[SUBSCRIBER ORGANIZATION TO PROVIDE INFORMATION]**
7. If Subscriber Organization is not the operator, Subscriber Organization shall provide a copy of the agreement between Subscriber Organization and the operator which requires the operator to operate the Facility and which establishes the scope of operations by the operator and the respective rights of Subscriber Organization and the operator with respect to the sale of electric energy from Facility no later than the Commercial Operations Date. In addition, Subscriber Organization shall provide a certified copy of a certificate warranting that the operator is a corporation, partnership or limited liability company in good standing with the Hawai'i Department of Commerce and Consumer Affairs no later than the Commercial Operations Date.
8. Subscriber Organization shall provide a certified copy of a certificate warranting that Subscriber Organization is a corporation, partnership or limited liability company in good standing with the

Hawai'i Department of Commerce and Consumer Affairs which shall be attached hereto as Exhibit F-1-1 (Good Standing Certificates).

9. Subscriber Organization, owner and operator shall provide Company a certificate and/or description of their ownership structures which shall be attached hereto as Exhibit F-1-2 (Ownership Structure).
  
10. In the event of a change in ownership or identity of Subscriber Organization, owner or operator, such entity shall provide within 30 Days thereof, a certified copy of a new certificate and a revised ownership structure.

--END--



**EXHIBIT F-2**  
**CONSULTANTS LIST**

(To be completed as per Section 3(F) of Attachment F)

**EXHIBIT F-3**  
**REQUIRED MODELS**

*To be completed based on the Project's characteristics. The Required Models are listed in the RFP Appendix B, Attachment 6 -Model and Interconnection Requirements (IRS) Scope of the RFP.*

*Modeling requirements are set forth in the RFP Appendix B, Attachment 3 Hawaiian Electric Facility Technical Model Requirements and Review Process.*

*[EXHIBIT F-4 WILL BE REVISED TO REFLECT  
THE RESULTS OF IRS]*

**EXHIBIT F-4  
GENERATOR AND ENERGY STORAGE CAPABILITY CURVE(S)**

----

**EXHIBIT F-5**  
**SINGLE-LINE DRAWING AND INTERFACE BLOCK DIAGRAM**  
**(To be attached as per Section 1.A. of Attachment F)**

----

**EXHIBIT F-6**  
**RELAY LIST AND TRIP SCHEME**

**(To be attached as per Section 1.A. of Attachment F.)**

----

**EXHIBIT F-7**  
**CONTROL SYSTEM ACCEPTANCE TEST CRITERIA**

**[THIS ATTACHMENT WILL NEED TO BE MODIFIED BASED ON THE RESULTS OF  
THE IRS]**

1. The Control System Acceptance Test for the Facility will be conducted, following installation of the Facility. The Control System Acceptance Test procedures will be in accordance with criteria set forth herein. The Control System Acceptance Test shall be performed in accordance with Good Engineering and Operating Practices and demonstrate to Company's satisfaction that the Facility and the interconnection portion of the Facility, including Company-Owned Interconnection Facilities, have met the provisions of Section 5. (Company Dispatch) of the Contract and Section 3. (Performance Standards) of Attachment F (Facility Owned by Subscriber Organization).
  - A. Control System Acceptance Test procedures will be developed by Company for the Subscriber Organization's review at least sixty (60) Days in advance of performing the tests based on the date provided by Company.
  - B. The procedures will include, but not be limited to, demonstration of the functional requirements of the Facility defined in Section 5. (Company Dispatch) of the Contract and Section 3. (Performance Standards) of Attachment F (Facility Owned by Subscriber Organization) such as, but not limited to:
    1. Interconnection equipment and communications to support remote monitoring of the Facility and control of Facility breakers
    2. Droop characteristic and change of frequency control / response modes (if applicable)
    3. Real power delivery under remote Company Dispatch, Active Power Dispatch. For facilities with directly controlled storage, the storage will be operated to perform at least two full charging/discharging cycles.
    4. Accurate provision of limits for Minimum and Maximum Dispatch (Power Possible, Minimum load capability)
    5. Ramp rates for controlled actions
    6. Control of Facility breakers
    7. Voltage regulation
    8. Grid forming and Black start (if applicable)
    9. BESS Capacity Test and demonstration of the round-trip efficiency of the BESS, each as described in Attachment H (BESS Requirements)
  - C. Testing of primary and redundant communications between Company System Operator and Facility Operator
  - D. The actual dynamic response of the Facility equipment will be confirmed to allow Company transient stability model to reflect the as-left conditions of the unit. During the commissioning, the following will be required:
    1. A final review by Company engineers of the equipment installed to control the operation and protect the plant will be needed upon installation and prior to the start of commercial operation.

2. The review will include off-line tuning and testing results of the excitation and governor control and/or control system and the IEEE block diagram utilized for the PSS/E dynamics program.
  3. During the commissioning of the actual Facility, equipment system testing will be conducted to ensure that similar, well damped, expected responses will be produced by the facility. The as-left parameters obtained from real and reactive local response tuning will be determined for use in the Company planning model. The Subscriber Organization will provide an estimate of the earliest date for the Control System Acceptance Test at least ninety (90) Days before the date.
- E. The Control System Acceptance Test procedures for the Facility will be mutually agreed upon between Subscriber Organization and Company prior to conducting the test.
  - F. When the Facility is ready for the Control System Acceptance Test, Subscriber Organization shall notify Company at least seven (7) Days prior to the test and shall coordinate with Company. Subscriber Organization shall perform, and Company shall monitor such test no earlier than seven (7) Days from Company's receipt of such notice.
  - G. The Control System Acceptance Test is to be successfully completed prior to the Commercial Operation Date.
2. Examples of the type of tests conducted to meet the aforementioned objectives may include, but are not limited to the following:
    - A. On-site Tests
      1. SCADA Test to verify the status and analog telemetry, and if the remote controls between the Company's EMS and the Facility are working properly end-to-end.
      2. Dispatch Test to verify if the Facility's active power limit controls and the Active Power Control Interface with the Company's EMS are working properly. The Test is generally conducted by setting different active power setpoints and limits and observing the proper dispatch at the appropriate ramp rate limiting of the Facility's real power output.
    - B. Control Test for Voltage Regulation to verify the Facility can properly perform automatic voltage regulation as defined in this Exhibit F-7 and pursuant to Attachment F and the Contract. Test is generally conducted by making small adjustments of the voltage setpoint and verifying by observation that the Facility regulates the voltage at the point of regulation to the setpoint by delivering/receiving reactive power to/from the Company System to maintain the applicable setpoint according to the reactive power control and the reactive amount requirements of Sections 3.B (Reactive Power Control) and Section 3.C (Reactive Power Characteristics) of Attachment F (Facility Owned by Subscriber Organization) to the Contract.
    - C. Frequency Response Test to verify the Facility provides a frequency droop response as defined in the Contract. Test is generally conducted by adjusting of the frequency reference setting and verifying by observation that the Facility responds per droop and deadband settings, and appropriately modifies the Company issued Dispatch Setpoint. If different modes of frequency response are provided, each mode is tested (i.e.; isochronous, fast frequency response, active power droop response).
    - D. Loss-of-Communication Test to verify the Facility will properly shutdown upon the failure of the direct-transfer-trip communication system. Test is generally conducted by simulating a communications failure and observing the proper shutdown of the Facility. [If DTT required for the Project]

- E. Round trip efficiency test, as described in Attachment H (BESS Requirements) Section 1. (BESS Tests) to verify that the round-trip efficiency of the BESS is not less than [\_\_\_\_\_] percent ([\_\_\_\_\_]%). **[DRAFTING NOTE: The round-trip efficiency percentage will be taken from Subscriber Organization’s response to the RFP.]**
- F. BESS Capacity Test to verify the BESS Capacity Ratio.
1. Monitoring Test:
    - a. The monitoring test requires the Facility to operate as it would in normal operations.
    - b. To ensure useful and valid test data is collected for variable facilities, the monitoring test shall end when one of the following criteria is met:
      - 1) For variable energy resources, Facility’s gross power production is greater than 85% of its Net Nameplate Capacity, for at least four (4) hours in any continuous 24-hour CSAT period.
      - 2) For solar facilities, the recorded renewable energy resource at the Facility is above 600 W/m<sup>2</sup> for least eight (8) hours in any continuous 48-hour CSAT period.
- G. At the end of the test, an evaluation period is selected based on the criteria that triggered the end of the test.
- H. The performance of the Facility during the period of the successfully completed monitoring test is evaluated for, e.g., voltage regulation, frequency response, dispatch control, operating limits and ramp rate performance, to verify the performance meets the requirements of this Exhibit F-7, according to the criteria set forth in the testing procedures. Certain requirements, such as disturbance ride-through requirements, cannot be adequately tested without actual grid disturbances. These requirements will be confirmed following a grid event based on operational data, which may be after the completion of the Control System Acceptance Test. The Parties understand and agree that a successful completion of the test does not constitute a waiver of any of the performance standards of Subscriber Organization, all of which are hereby reserved, and shall not alleviate Subscriber Organization from any of its obligations under the Contract, in particular, as required in Section 5. (Company Dispatch) and the Performance Standards in Section 3. (Performance Standards) of Attachment F (Facility Owned by Subscriber Organization).

---END---



**EXHIBIT F-8**  
**ACCEPTANCE TEST GENERAL CRITERIA**

**[THIS ATTACHMENT WILL NEED TO BE MODIFIED  
BASED ON THE RESULTS OF THE IRS]**

Upon final completion of Company review of the Facility's drawings, final test criteria and procedures shall be agreed upon by Company and Subscriber Organization no later than thirty (30) Days prior to conducting the Acceptance Test in accordance with the Contract. The Acceptance Test shall include, but not be limited to, the following:

**1. Interconnection.**

- A. A visual inspection of all Interconnection equipment and verification of as-built drawings.
- B. Phase rotation testing to verify proper phase connections.
- C. Based on manufacturer's specification, test the local operation of the Facility's generator breaker(s) and inter-tie breaker(s), and other breaker(s) which connect the Facility equipment to Company System – must open and close locally using the local controls remotely from Company's EMS. Test and ensure that the status shown on the EMS is the same as the actual physical status in the field.
- D. Relay test engineers to connect equipment and simulate certain inputs to test and ensure that the protection schemes such as any under/over frequency and under/over voltage protection or the Direct Transfer Trip operate as designed. (For example, a fault condition may be simulated to confirm that the breaker opens to sufficiently clear the fault. Additional scenarios may be tested and would be outlined in the final test criteria and procedures.) Subscriber Organization to also test the synchronizing mechanisms to which the Facility would be synchronizing and closing into the Company System to ensure correct operation. Other relaying also to be tested as specified in the protection review of the IRS and on the single line diagram, Attachment E (Single-Line Drawing and Interface Block Diagram) for the Facility.
- E. All breaker disconnects and other high voltage switches will be inspected to ensure they are properly aligned and operated manually or automatically (if designed).
- F. Step-Up Transformer Enclosure(s) inspections – The Step-Up Transformer Enclosure(s) may be inspected to test and ensure that the equipment that Subscriber Organization has installed is installed and operating correctly based upon agreed to design. Wiring may be field verified on a sample basis against the wiring diagrams to ensure that the installed equipment is wired properly. The grounding mat at the Step-Up Transformer Enclosure(s) may be tested to make sure there is adequate grounding of equipment.
- G. Communication testing – Communication System testing to occur to ensure correct operation. Detailed scope of testing will be agreed by Company and Subscriber Organization to reflect installed systems and communication paths that tie the Facility to Company's communications system.
- H. Various contingency scenarios to be tested to ensure adequate operation, including testing contingencies such as loss of communications, and fault simulations to ensure that the Facility's breakers, if any, open as they are designed to open. (Back up relay testing)
- I. Metering section inspection; verification of metering PTs, CTs, and cabinet and the installation of the two Company meters.

2. Telephone Communication.

- A. Test to confirm Company has a direct line to the Facility control room at all times and that it is programmed correctly.
- B. Test to confirm that the Facility operators can sufficiently reach Company System Operator.
- C. Verification of dial-up telephone connection for metering cabinet.

3. Drawings, Documentation and Equipment Warranties.

The items below are required components of the Acceptance Test and must be satisfied for successful completion of this Test.

- A. Electronic and three (3) hard copies of all Switchyard construction drawings, specifications, calibrations, and settings including as-built drawings.
- B. Equipment operating and maintenance manuals, spare parts lists, commissioning notes, as-built equipment settings, and other information related to the switchyard equipment.
- C. Contractor construction warranties and equipment warranties.
- D. Phase rotation testing to verify proper phase connections.
- E. Switching Station inspections – The Switching Station may be inspected to test and ensure that the equipment that Subscriber Organization has installed is installed and operating correctly based upon agreed-to design. Wiring may be field verified on a sample basis against the wiring diagrams to ensure that the installed equipment is wired properly. The grounding mat at the Switching Station may be tested to make sure there is adequate grounding of equipment.
- F. If agreed by the Parties in writing, some requirements may be postponed to the Control Systems Acceptance Test.

