

DRAFT REQUEST FOR PROPOSALS
FOR
VARIABLE RENEWABLE DISPATCHABLE GENERATION
PAIRED WITH ENERGY STORAGE
AND
COMMUNITY-BASED RENEWABLE ENERGY
ISLAND OF LĀNA‘Ī

AUGUST 21, 2020

Docket No. 2015-0389

*Appendix H – Interconnection Facilities and
Cost Information*



**Maui
Electric**

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APPENDIX H - INTERCONNECTION FACILITIES AND COST INFORMATION

Tariff Rule No. 19, approved by the PUC, establishes provisions for Interconnection and Transmission Upgrades (see Appendix I). The tariff provisions are intended to simplify the rules regarding who pays for, installs, owns, and operates interconnection facilities in the context of competitive bidding. Unless otherwise specified in this RFP, Tariff Rule No. 19 will be utilized as the basis for addressing interconnection and transmission upgrades for any projects developed through this RFP. Proposers will comply with the terms and conditions as specified therein.

To assist Proposers in assessing the impacts of location on potential projects, the per unit cost figures provided in the tables below are to be used to provide an approximate estimated cost for interconnecting, including communications and distribution line cost to the existing Lāna‘i Electric System. The per-unit cost figures below should not be used to create a detailed project estimate. A detailed project estimate typically requires a certain level of engineering to assess project site conditions and to factor in other parameters specific to the project.

The Proposer should identify the components assumed for their project and the quantity assumed for each. Each table below provides notes on the assumptions for each of the unit cost estimates. If a Proposer’s project requirements are different than what is assumed in the notes, the Proposer should identify each difference and provide an estimated additional cost or savings resulting from those different requirements.

2.1 Distribution Line Costs

Component	Description	Approximate Cost per Mile
1	New 12kV Overhead line (accessible 250' spans)	\$1,020,000
2	12 kV underbuild on existing line (accessible 250' spans)	\$735,000
3	12 kV underbuild on existing line (inaccessible 250' spans)	\$1,292,000
4	New 12kV Underground line	\$1,369,000
5	Padmount service 500 kVA transformer (for station service)	\$89,000
6	PME9 and PME3 switches for 1-ph and 3-ph transformers	\$307,000

Notes:

1. Component 1 assumes wood pole construction.
2. Components 2 and 3 assume no poles need to be replaced.
3. Component 4 assumes one set of 1000 KCM AL 15kV (600A) cable but does NOT include duct bank and MH construction.

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4. Exclusions to these rough costs are as follows but not limited to the following, Proposers should conduct their own due diligence for these costs:
 - a. Development of the PUC application/proceedings timeline
 - b. State or County right-of-way permitting and SMA
 - c. Environmental studies cost
 - d. Survey of proposed line extension route
 - e. Easement/land issues if discovered in the course of final design
 - f. Archaeological survey and monitoring cost/duration (if needed)
 - g. Clearing/grading along power line corridor and access road
 - h. Final design adjustments required to negotiate terrain, physical landmarks, existing utilities and access
 - i. Construction of permanent roadways/truck access
 - j. Helicopter services
 - k. Traffic control
 - l. Removals (Maui Electric & Hawaiian Telcom as applicable)
 - m. Salvage and depreciation credits
 - n. Street lights
 - o. Delays due to weather and material acquisitions
 - p. Civil infrastructure (duct bank, MH, equipment pads, etc.) construction
5. All estimates are provided in 2022 dollars.
6. The customer shall be responsible to confirm if independent station power is required. Meter requirements should be discussed with Maui Electric during the customer’s design stage. Station power shall emanate from an existing 12kV distribution line to the customer’s point of connection, either by overhead utility poles or underground line extension. For underground line extensions, the customer shall be responsible for installing and maintaining the infrastructure consisting of, but not limited to, concrete encased ducts, manholes/handholes, transformer and switchgear pads, and meter equipment.

2.2 Miki Basin Interconnection Costs

2.2.1 Substation 12kV Interconnection Costs VARIABLE Projects

Component	Description	Approximate Cost
1	2 – 12kV switchgear additions (Maui Electric)	\$1,200,000

Notes:

1. Please refer to Attachment 1 of this Appendix H for a single line diagram depicting the required interconnection to the Company’s Miki Basin substation.
2. Conceptual Design is not intended to cover all interconnection requirements. Final interconnection design will be subject to the results of the IRS.

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3. Substation land has been graded per Maui Electric's civil and structural requirements. No costs for excavation and fill are included in the estimates.
4. Permits are not included in indicated costs.
5. Costs are in 2020 dollars.
6. Estimate does not contain any of the following costs:
 - a. Telecommunication infrastructure
 - b. Relay coordination study
 - c. Land cost
 - d. Environmental Assessment/Environmental Impact Statement
 - e. Project management
 - f. Any required upgrades to existing substations to integrate the new generating facility into the system.
7. Substation relay protection requirements have not been identified, so costs are based upon typical line protection relaying requirements.
8. Local SCADA equipment are included in cost estimates.
9. The estimate is for addition of Miki Basin switchgear, which does not contain any cost for the conceptual design for RFP interconnection.
10. The estimate does not contain any line extension cost.
11. The largest unit size shall be limited to 2.5MW net export.

2.3 Telecommunications

All projects that require telecommunications will require facilities to store the communications equipment. An example for a communications cabinet is provided but other alternatives can be available upon request. The communications equipment will require a communications channel. Some of the communication channel options include microwave, fiber, lease line, or licensed radio. The number of communication circuits (primary/backup) and type of communication circuits required will vary depending on the type/size of the project.

1. Microwave Equipment

- a. Point-To-Point Microwave: \$684,117 with the following assumptions:
 - i. There is radio line-of-sight clearance between the communication endpoints.
 - ii. FCC licensed Microwave Frequencies are available.
 - iii. There are existing structures/buildings with space available on both ends to house the radio equipment.
 - iv. Telecommunications grounding standards are up-to-date at both sites.
 - v. 48 V DC power with 12 hour battery backup is available.
 - vi. This estimate does not include any special site-specific permit/approval activities that may be required including, but not limited to, Neighborhood Board (s), Conservation District Use Application, Environmental Assessment,

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- Shoreline Management Area approval, biological (endangered species or habitat) surveys, and/or cultural (archeological) surveys or the cost of any migration required for approvals to be granted.
- vii. Space is available at both ends to construct antenna towers or structures that are rated to survive a Saffir-Simpson category 4 hurricane.
 - viii. Cost to interconnect to Hawaiian Electric's existing communications network is not included.
 - ix. Costs are in 2022 dollars.
- b. 50 Foot Microwave Tower: \$591,021 with the following assumptions:
- i. Telecommunications grounding standards are up-to-date.
 - ii. This estimate does not include any special site-specific permit/approval activities that may be required including, but not limited to, Neighborhood Board (s), Conservation District Use Application, Environmental Assessment, Shoreline Management Area approval, biological (endangered species or habitat) surveys, and/or cultural (archeological) surveys or the cost of any migration required for approvals to be granted.
 - iii. Costs are in 2022 dollars.
- c. 100 Foot Microwave Tower: \$858,563 with the following assumptions:
- i. Telecommunications grounding standards are up-to-date.
 - ii. This estimate does not include any special site-specific permit/approval activities that may be required including, but not limited to, Neighborhood Board (s), Conservation District Use Application, Environmental Assessment, Shoreline Management Area approval, biological (endangered species or habitat) surveys, and/or cultural (archeological) surveys or the cost of any migration required for approvals to be granted.
 - iii. Costs are in 2022 dollars.
2. Fiber with overbuild and new construction – \$456,000 per mile with the following assumptions:
- a. Accessible 250' average spans.
 - b. The poles are in good condition and do not need replacing.
 - c. The poles are not overloaded.
 - d. The poles and the attachments are in accordance with NESC 2002 and no work is required to upgrade the poles to current standards.
3. Leased Line: Cost will be the responsibility of the developer and to be negotiated with the lease provider.
- a. Communication circuit requirements will be based on applications needed for the project.
 - b. Company can provide communication circuit interconnection requirements and assist with order review as needed.

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4. Communications Cabinet: \$207,365 with the following assumptions:
 - a. Cabinet used to support company equipment and capable of providing communications circuit for SCADA
 - b. Communications cabinet does not include fiber, microwave, or lease circuits.
 - i. Customer to work directly with lease provider if a lease line circuit is needed.
 - ii. Check with company to understand the current lease requirements.
 - c. Customer will provide all conduits, PAD, handholes, AC Power, grounding as required per company standards.
 - d. Cost are in 2022 dollars.
5. Licensed 900 MHz Radio: \$143,626 with the following assumptions:
 - a. This cost will be in addition to the Communication Cabinet cost. The radio equipment will be installed within the Communication Cabinet.
 - b. There is radio line-of-sight clearance between the communication endpoints.
 - c. FCC licensed 900Mhz Frequencies is available.
 - d. There is an existing structure/building with space available on the company side to mount the antenna equipment and house the radio equipment.
 - e. The customer will install a structure to mount the antenna equipment on the customers side.
 - i. Customer will provide any conduit required between the Communications Cabinet and antenna mount structure.
 - f. The cost includes 2 each antenna equipment to create a radio link.
 - g. Cost are in 2022 dollars.

2.4 Security System

2.4.1 Proposals for interconnection via a new substation on a 12 kV network circuit

1. Equipment/Electronics for security – \$350,000 with the following assumptions:
 - a. Civil facilities associated with security (e.g., site fencing, conduits for security systems) for the new 12 kV substation, costs are included under Item 2.2.1.1 above.
 - b. Systems incorporated will be equivalent to the Tier 1 requirements identified in the table below for Company facilities.
 - c. Costs are in 2020 dollars.

2.4.2 Proposals for interconnection via a new substation on a 12 kV radial circuit

1. Equipment/Electronics for security – \$350,000 with the following assumptions:

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- a. Civil facilities associated with security (e.g., site fencing, conduits for security systems) for the new 12 kV substation, costs are included under Item 2.2.2.1 above.
- b. Systems incorporated will be equivalent to the Tier 1 requirements identified in the table below for Company facilities.
- c. Costs are in 2020 dollars.

2.4.3 The developer shall be responsible to incorporate security components and systems for **their facilities** that consider the Security Guidelines for the Electricity Sector (CIP-014-2): Physical Security, as published by the North American Electric Reliability Corporation (NERC) and that at a minimum adhere to Company’s performance requirements outlined in Company’s Physical Security Strategy for the following four security concepts.

- **Deter:** Deploy visible physical security measures to encourage individuals to seek other, less secure targets.
- **Detect:** Utilize state of the art physical security technologies to detect unauthorized intrusion and provide real-time alerts to monitoring personnel. Detection to include 24/7 monitoring personnel.
- **Delay:** Deploy multiple physical security countermeasures to delay an intruder’s access to assets and provide time for incident assessment and appropriate response.
- **Respond:** Take immediate measures to assess, interrupt, and/or respond to the incident, including notification to Company and the use of contracted patrol personnel and/or the involvement of law enforcement assets to apprehend an intruder.

The Company’s Physical Security Strategy is available upon request after execution of an NDA with the Company.

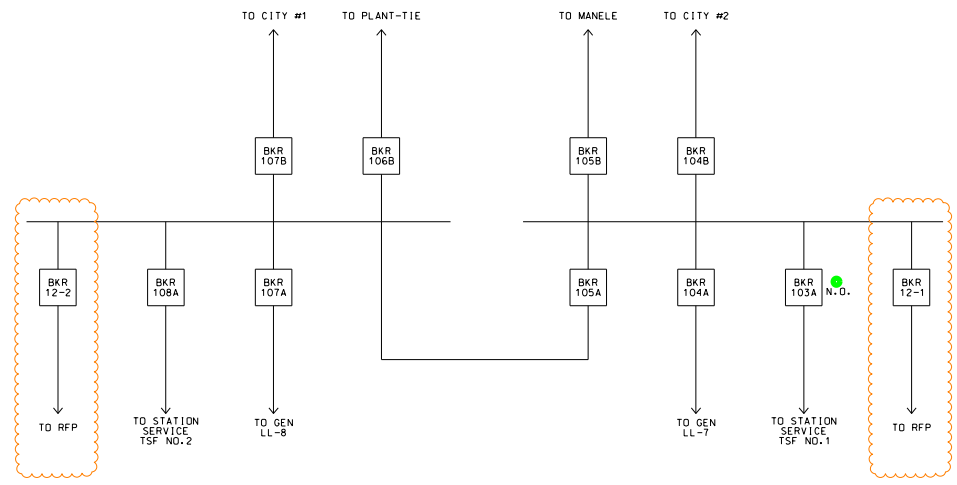
Type of Facility	Tier One High Criticality	Tier Two Medium Criticality	Tier Three Lower Criticality
Substation	<ul style="list-style-type: none"> • FLIR or Similar camera perimeter monitoring. • Secondary perimeter intrusion detection system. • Interior Video monitoring system with motion detection. • Gunfire detection/IP intercom public address system. 	<ul style="list-style-type: none"> • Video monitoring system with motion detection. • Card access on control and microwave houses. • Standard 8’ high security fence with 3-strand barbed wire V-top. • Interior mounted 4’ high cattle fencing. 	<ul style="list-style-type: none"> • Standard 8’ high security fence with 3-strand barbed wire V-top. • Interior mounted 4’ high cattle fencing. • All gates will be secured using a proprietary padlock system.

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	<ul style="list-style-type: none">• Electronic card access system for control & microwave houses.• Standard 8' high security fence with 3-strand barbed wire V-top.• Interior mounted 4' high cattle fencing.• LED perimeter lighting.• All gates will be secured using a proprietary padlock system.	<ul style="list-style-type: none">• All gates will be secured using a proprietary padlock system.	
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SUB. 302
MIKI BASIN PP



- NOTES:
1. THE LARGEST UNIT SIZE SHALL BE 2.5MW NET EXPORT (DRAWING ASSUMES A 17.5MW NET EXPORT PROJECT).
 2. SWITCHES AND OTHER NECESSARY EQUIPMENT SHALL BE ADDED ONTO DRAWINGS AND COST ESTIMATES AS NEEDED.
 3. TRANSFORMER SECONDARY WINDING VOLTAGE TO BE DETERMINED BY PROJECT SPECIFICATIONS. TRANSFORMER SIZE OF 10 MVA ASSUMES 17.5MW TOTAL NET EXPORT PROJECT SIZE.

CONCEPTUAL DESIGN
FOR RFP INTERCONNECTION

