



# **Stage 3 Oahu and Maui Request for Proposals**

**Technical Conference  
February 17, 2023**

**Mahalo for joining us! We'll start promptly at 9 a.m.**



**Hawaiian  
Electric**

# Stage 3 Oahu and Maui Request For Proposals

Technical Status Conference

February 17, 2023



# Today's Purpose

- ◆ Provide information prospective proposers can use as they develop proposals for the Stage 3 Oahu and Maui Request for Proposals (“Stage 3 Oahu RFP”, “Stage 3 Maui RFP”)
- ◆ Question & Answer Period



# Your input is important

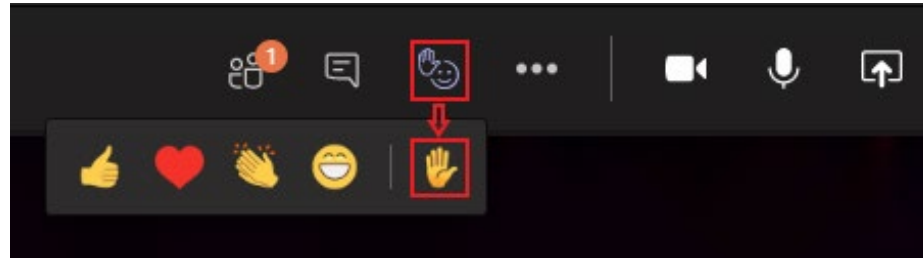
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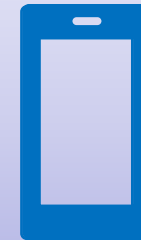
**OahuRenewableRFP@hawaiianelectric.com**

**MauiRenewableRFP@hawaiianelectric.com**

Click “Raise Hand” 



**\*5 by phone**



 Please mute your audio when not speaking.

**REC** This meeting is being recorded.

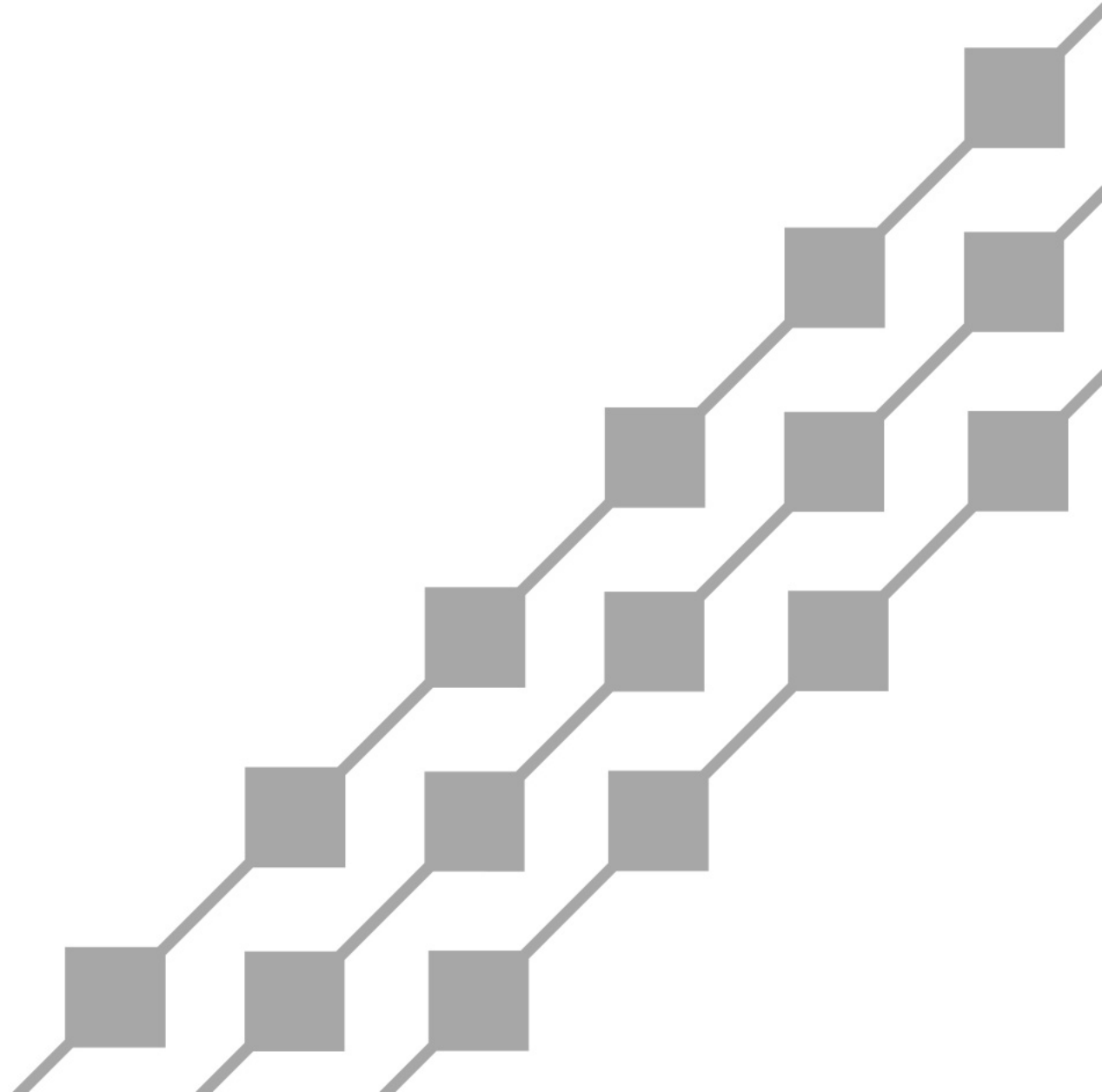
# Agenda

- ◆ Scope of RFPs
- ◆ RFP Process
- ◆ RFP Requirements
- ◆ Technical Requirements
- ◆ Next Steps
- ◆ Questions



# Hawaiian Electric

## Scope of RFPs



# Stage 3 Oahu seeks

- ◆ Acquire
  - At least 965 GWh annually of variable renewable dispatchable generation
  - 500 to 700 MW of renewable firm capacity
- ◆ Acceptable Project Types
  - Firm Renewable Dispatchable Generation Projects
  - Variable Renewable Dispatchable Generation Projects
  - Paired Projects
  - Standalone Storage Projects
- ◆ Eligible Projects
  - New renewable dispatchable generation projects
  - Existing projects



# Oahu - Recommended Interconnections

- ◆ 138 kV Transmission Lines
  - Ewa Nui 1 & 2, between Ewa Nui Substation and Waiau Substation
  - Waiau-Koolau 1 & 2, between Waiau Substation and Koolau Substation
  - Koolau-Pukele 1 & 2, between Koolau Substation and Pukele Substation
- ◆ 138 kV Substations
  - Ewa Nui Substation, CEIP Substation, Hoohana Substation, Kahe Substation, AES Substation, Koolau Substation, Waiau Power Plant

Proposers may request a high-level map identifying the offered 138 kV lines and substations after execution of the NDA.





# Stage 3 Maui seeks

- ◆ Acquire
  - At least 425 GWh annually of variable renewable dispatchable generation
  - At least 40 MW of renewable firm capacity
- ◆ Acceptable Project Types
  - Firm Renewable Dispatchable Generation Projects
  - Variable Renewable Dispatchable Generation Projects
  - Paired Projects
  - Standalone Storage Projects
- ◆ Eligible Projects
  - New renewable dispatchable generation projects
  - Existing projects



# Maui - Recommended Interconnections

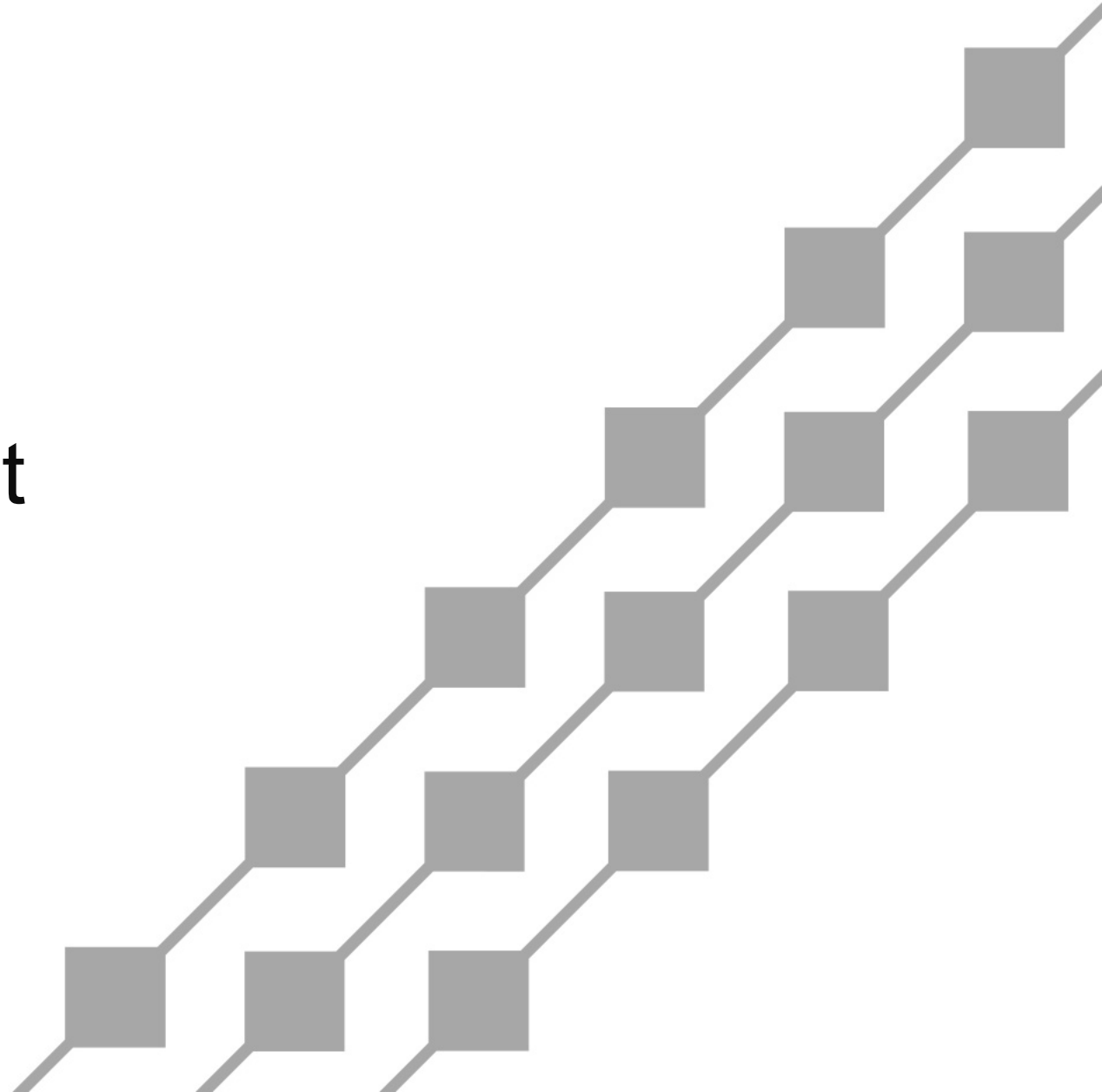
- ◆ 69 kV Transmission Lines
  - MPP-Lahainaluna, MPP-Waiinu, MPP-Waena, Waena-Kealahou, Waena-Pukalani, Pukalani-Kula, Kula-Kealahou
- ◆ 69 kV Offered Substations
  - Lahainaluna Substation, Kealahou Substation

Proposers may request a high-level map identifying the offered 69 kV transmission-level lines and substations after execution of the NDA.



# Hawaiian Electric

## Grid Needs Assessment

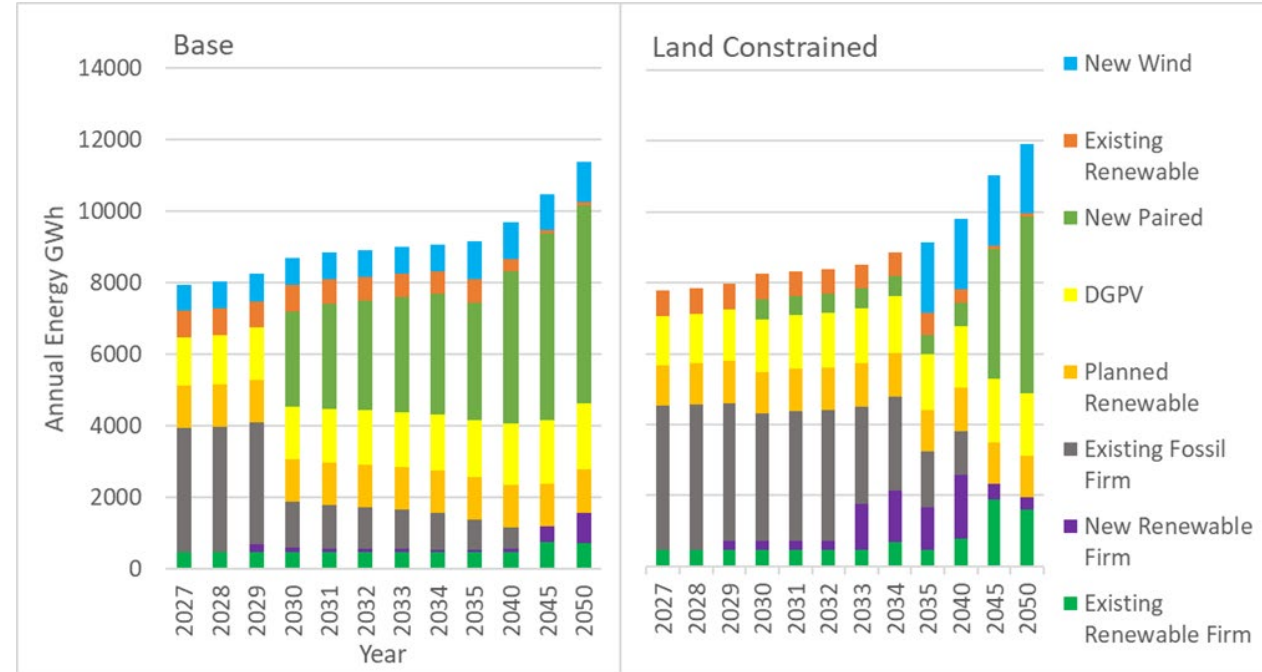
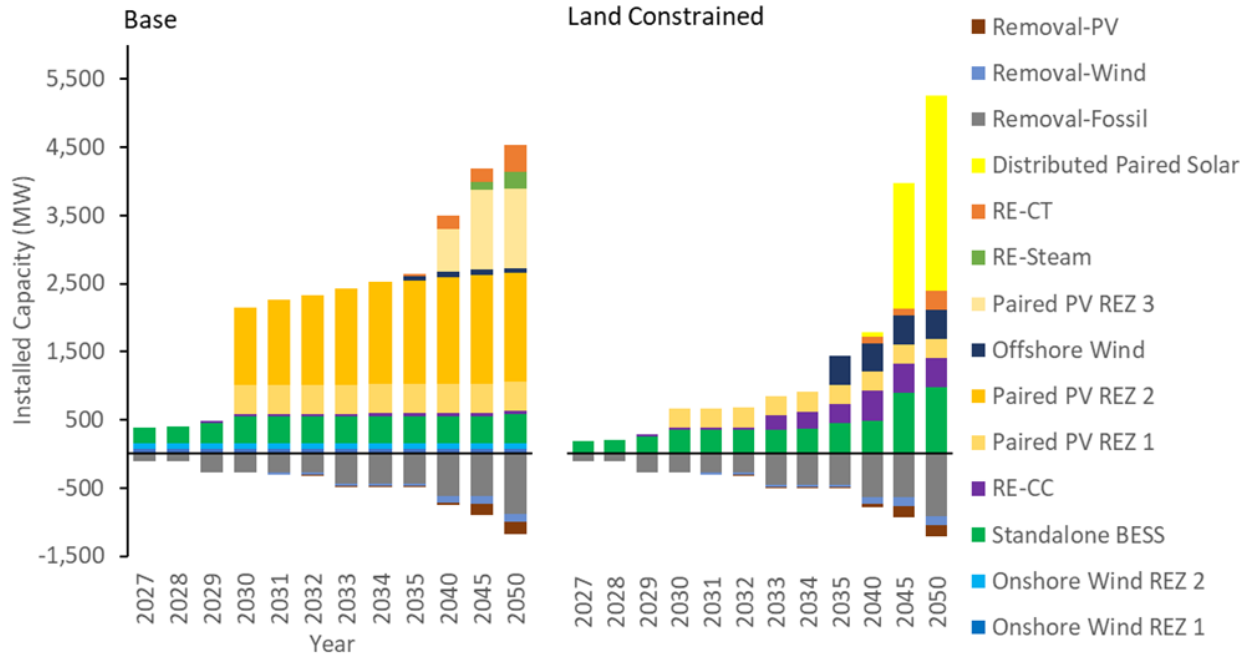


# Oahu Grid Needs Assessment Summary

- ◆ The Base and Land Constrained cases provide two different pathways to meeting near term grid needs.
- ◆ The Base case assumes that future grid-scale PV and onshore wind are available up to their technical potential.
- ◆ The Land Constrained case assumes that biomass and onshore wind are unavailable, future grid-scale PV potential is reduced to 270 MW.



# Oahu Grid Needs Assessment Summary



- ◆ New renewable resources are consistently selected in high amounts over the near term. Renewable firm additions increase with higher assumed load.
- ◆ DER, planned, and future renewables plus storage serve the majority of load and new renewable firm resources are dispatched minimally, except in the Land Constrained scenario where resource options are more limited.



# Oahu Grid Needs Assessment Summary

- ◆ Pictured are heatmaps of unserved energy (MWh) that show when unserved energy may occur based on probabilistic resource adequacy analysis. Shortfalls shift from the evening during the winter months in the Existing System to April, May when PV+BESS resources do not have enough energy to serve demand in the morning and evening peaks.

Existing System

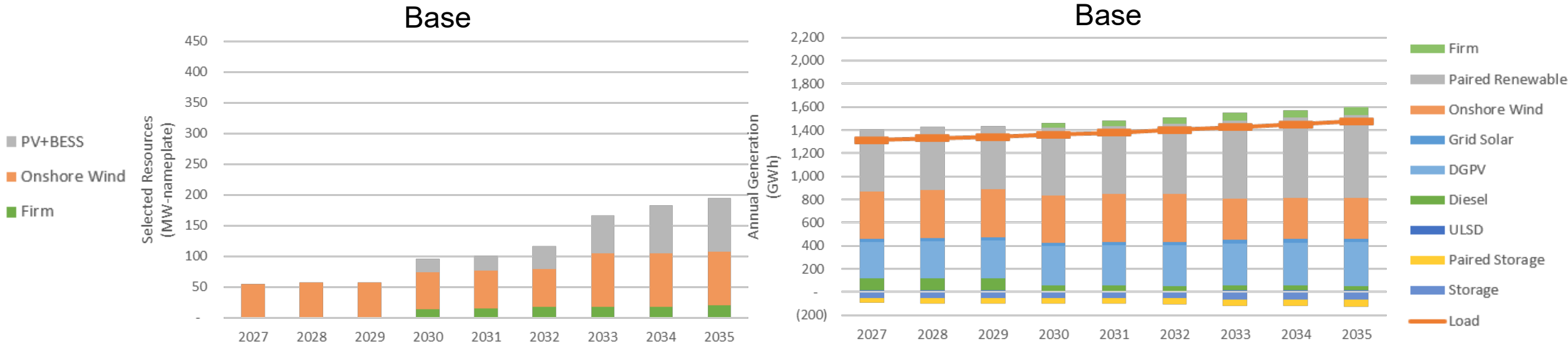
Hours Beginning	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	1
17	0	0	0	0	0	0	0	0	0	0	0	4
18	0	0	0	0	0	0	0	0	9	6	3	12
19	0	0	0	0	0	0	0	4	19	9	3	10
20	0	0	0	0	0	0	0	2	10	3	1	7
21	0	0	0	0	0	0	0	1	3	5	1	9
22	0	0	0	0	0	0	0	0	0	1	0	5
23	0	0	0	0	0	0	0	0	0	0	0	3

Add 270 MW New Paired PV  
Add 300 MW New Firm, Delay 170 MW Firm Removal

Hours Beginning	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	1	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	1	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	1	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	3	1	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	1	0	0	0	0	0	0	0	0
22	0	0	0	4	0	0	0	0	0	0	0	0
23	0	0	0	3	0	0	0	0	0	0	0	0



# Maui Grid Needs Assessment Summary



- ◆ New renewable resources are consistently selected over the near term. Renewable firm additions increase with higher assumed load.
- ◆ DER, planned, and future renewables plus storage serve the majority of load and new renewable firm resources are dispatched minimally.



# Mauí Grid Needs Assessment Summary

- ◆ Pictured are heatmaps of unserved energy (MWh) that show when unserved energy may occur based on probabilistic resource adequacy analysis. Shortfalls shift from the evening in the Existing System to the months of March, April and May when PV+BESS resources do not have enough energy to serve demand in the morning and evening peaks. With the addition of the 9 MW firm generation, shortfalls decrease in magnitude and occur in fewer time periods.

Existing System

Hours Beginning	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.31	0.14	0.20	0.00	0.00	0.00	0.00	0.00	0.03	0.01	0.00	0.01
19	0.09	0.02	0.47	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00
20	0.00	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.05	0.00	0.02	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Base Case with 0 MW Firm Generation

Hours Beginning	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0.00	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.10	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.07	0.22	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.25	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.37	0.32	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.13	0.25	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.52	0.22	0.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.27	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.16	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.13	0.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.33	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.02	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.09	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.48	1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.28	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Base Case with 9 MW Firm Generation

Hours Beginning	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.18	0.06	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.12	0.05	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.02	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.27	0.17	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.01	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.25	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00





# Evaluating Firm and Variable Renewable Proposals

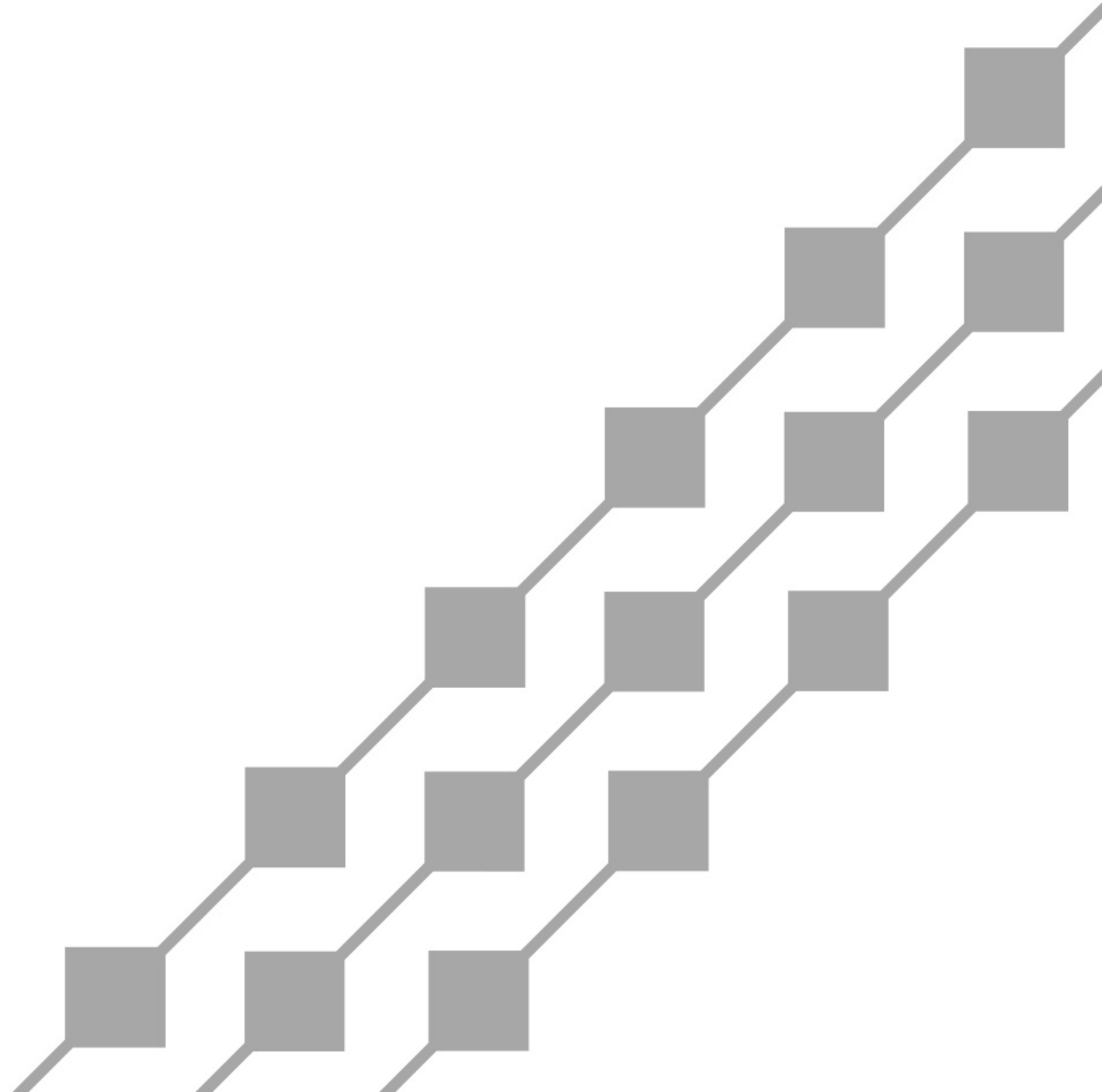
- ◆ In D&O No. 38735, it was noted that:
  - Commission is inclined to treat the “firm” component of the Stage 3 RFPs for Oahu and Maui as an assessment for the market’s potential to provide such renewable generation resources on a cost-effective basis to meet customer needs
  - The Companies shall evaluate if a proposed resource may satisfy the firm capacity target to any extent, for instance, with reasonable assumptions for capacity accreditation depending on the overall portfolio and mix of existing and new resources

- Per Section 4.8 (Selection of the Final Award Group) of the RFP, only firm generation utilizing synchronous generators will be selected to meet the firm renewable generation target and variable renewable dispatchable generation is expected to meet the renewable dispatchable generation target.
- In the event that either target in this RFP is not completely met by Proposals received in either the firm generation or the renewable generation categories, the Company may then, if the Company determines such Proposals can meet the needs identified for such target, consider Proposals responsive to one target to satisfy the needs of the alternate target.

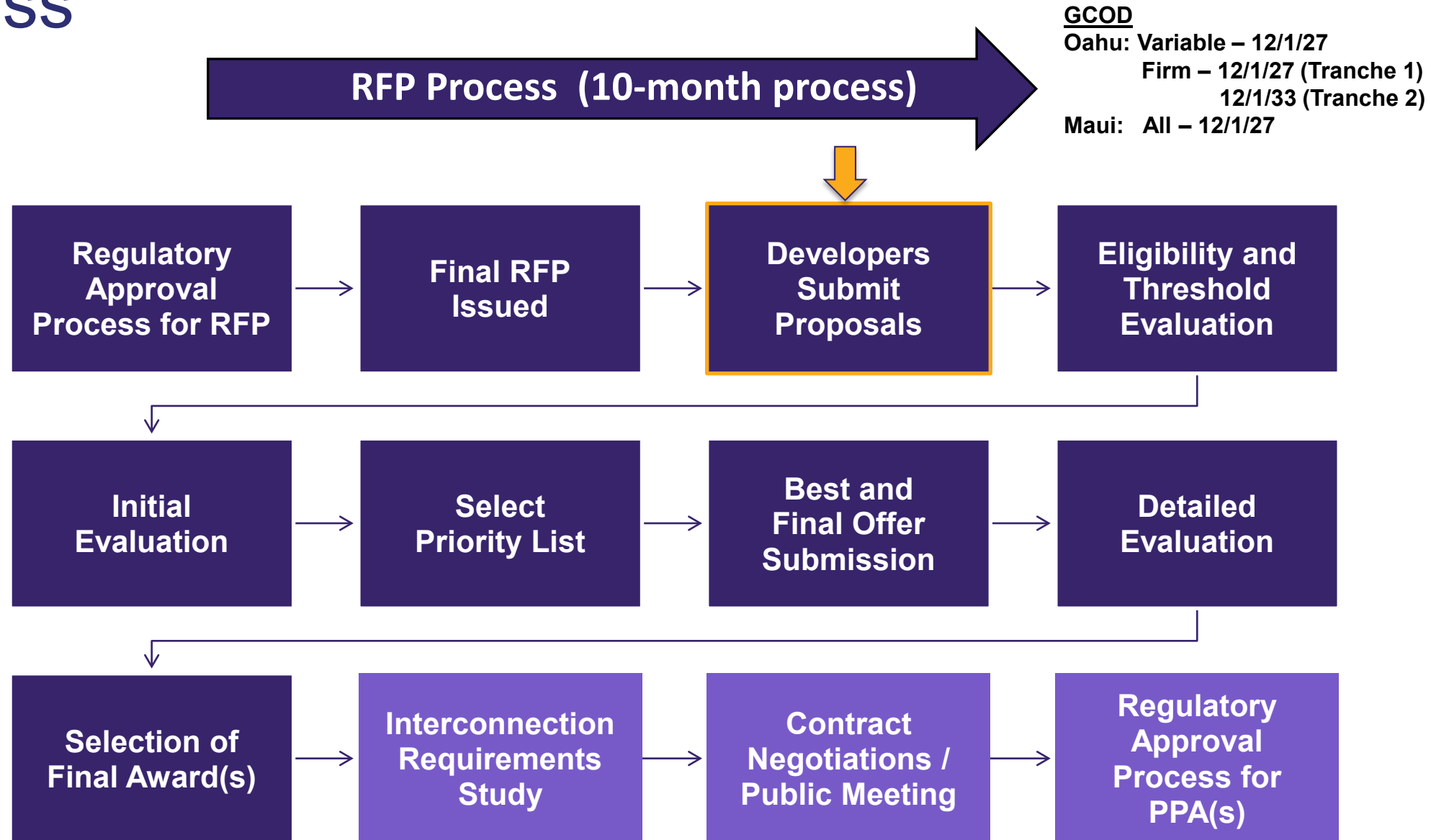


# Hawaiian Electric

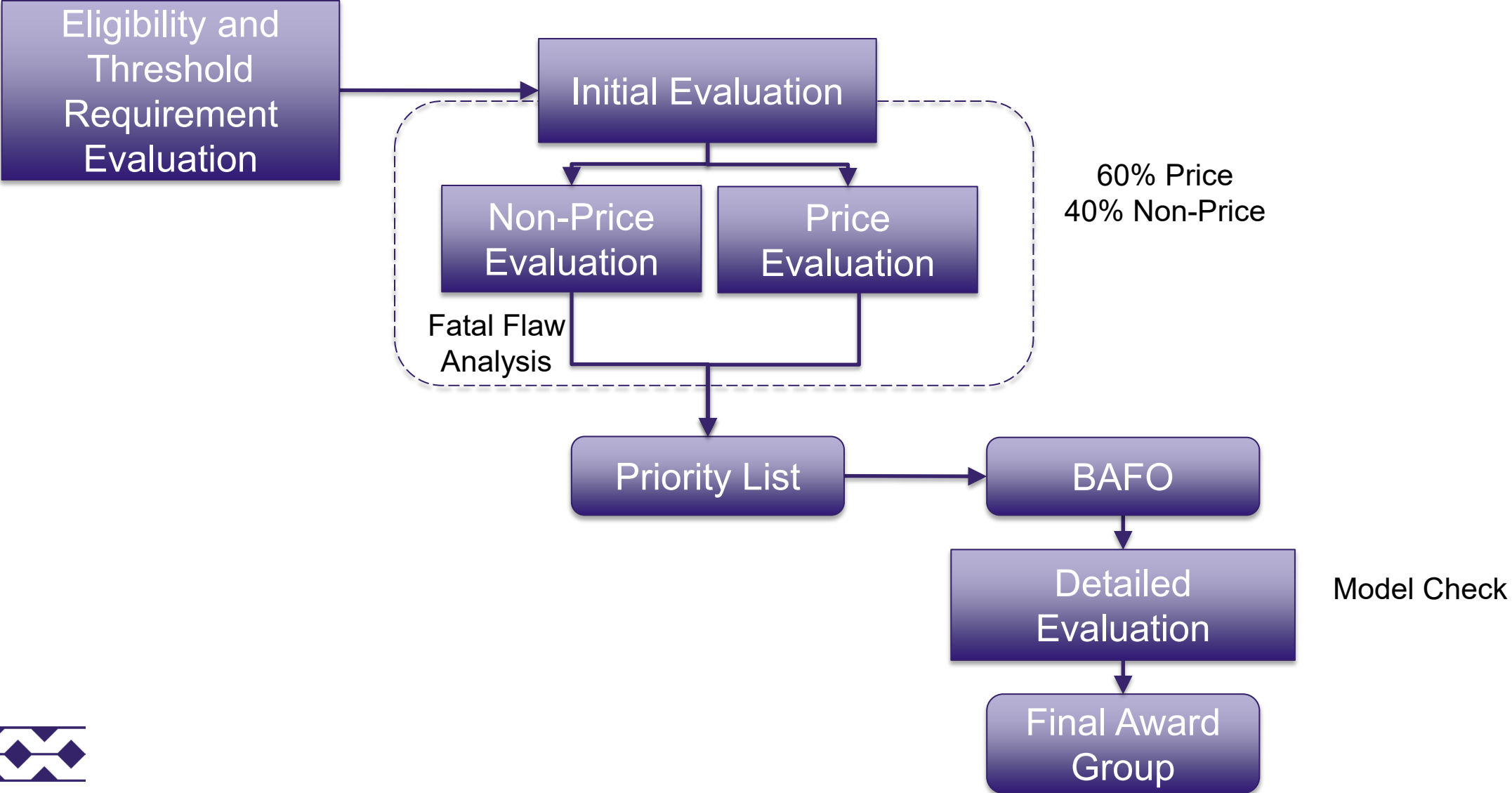
## RFP Process



# RFP Process



# Evaluation Process



## Eleven Non-Price Criteria (40%)

Double Weighted	Single Weighted
Community Outreach	Experience and Qualifications
State of Project Development and Schedule	Environmental Compliance and Permitting Plan
Performance Standards	Financial Strength and Financing Plan
	Proposed Contract Modifications
	Cultural Resource Impacts
	Carbon Emissions
	Technical Model
	Land Use and Impervious Cover

## One Overall Non-Price Criterion

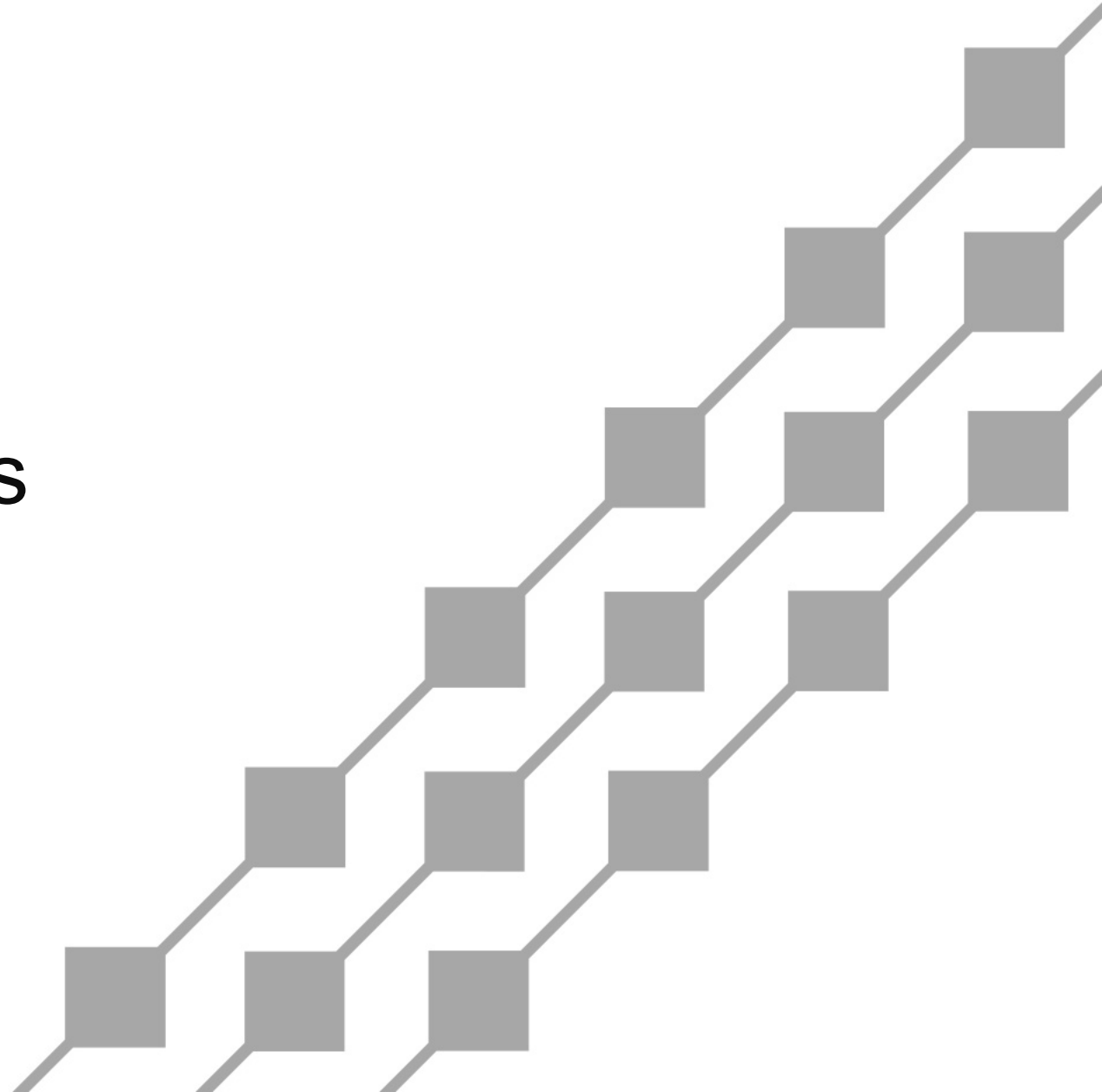
### Underperformance Infractions

Previous Performance



# Hawaiian Electric

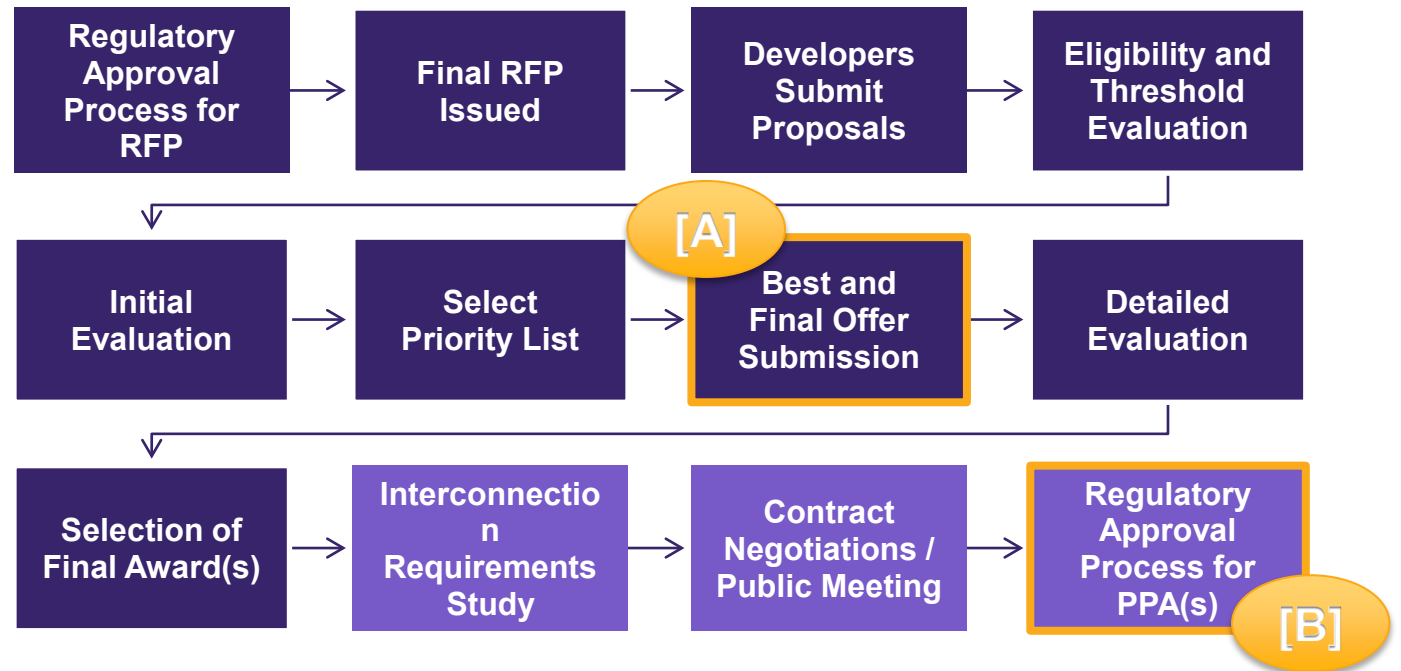
## New RFP Requirements



# Indexed Price Adjustment

$$\text{Indexed Price Adjustment} = \frac{(\text{GDPPI @ [B]}) - (\text{GDPPI @ [A]})}{(\text{GDPPI @ [A]})}$$

- Driven by Environment of Market Volatility
- One Time Price Adjustment of BAFO-defined Prices
- Percentage Difference in the Gross Domestic Producer Price Index (“GDPPI”) at [B] Commission approval date of the Stage 3 Contract and at [A] BAFO
- Capped no greater than 10%



# Previous Performance Non-Price Criterion

- Commission 1/20/22 letter requested Hawaiian Electric consider a non-price criterion that evaluates the performance of a bidder's existing or past projects under contract with Hawaiian Electric
- New criterion is based on underperformance Hawaiian Electric experienced within the past 5 years with any Proposer
- Negative points system that deducts points from total non-price score based on any infractions experienced
- Maximum points deducted capped at -10 points for infractions listed below
- Additional pending litigation infraction, -10 point penalty
  - Declining Priority List or Final Award invitation
  - Breached representations and warranties
  - Terminate or withdrawal from awarded contract
  - Failure to remedy violations
  - Missed GCOD
  - Paid LDs
  - Missed PPA milestones or Seller's Conditions Precedent





# Community Benefits Package

- Funds Proposer will commit to provide on an annual basis and other community benefits (in addition to funding) that the proposer intends to provide
- At a minimum, Proposers should commit to setting aside at least \$3,000 per MW per year, for community benefits
- Directed to a non-profit organization such as Hawaii Community Foundation for distribution to the community
- Part of the Community Outreach non-price criteria



COMMUNITY



ECONOMICS



# Carbon Emissions

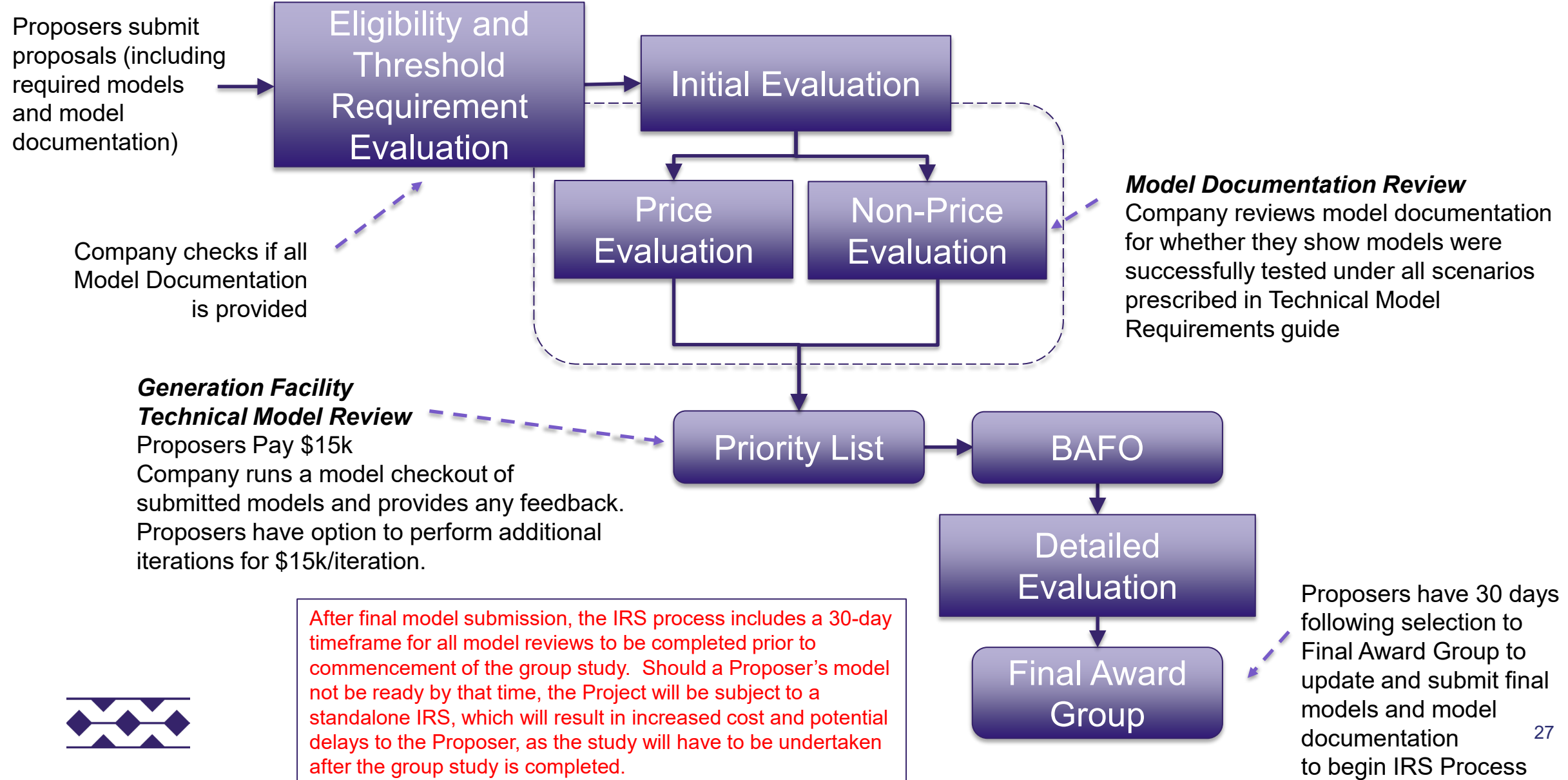
- Aligned to carbon neutral goals Hawaiian Electric and the State of Hawaii set forth
- Questionnaire responses scored to indicate likely impact the Project's likely lifecycle GHG emissions
- Preference will be given to Proposals that commit to further reducing or mitigating their Facility's carbon emissions

# Land Use and Impervious Cover

- Encourage Proposals to site Projects on developed lands to preserve open space and agricultural lands
- Score more favorably for locating Projects on land:
  - With greater existing impervious cover.
  - Zoned for more intensive uses
  - Deemed as reclaimed, such as brownfield

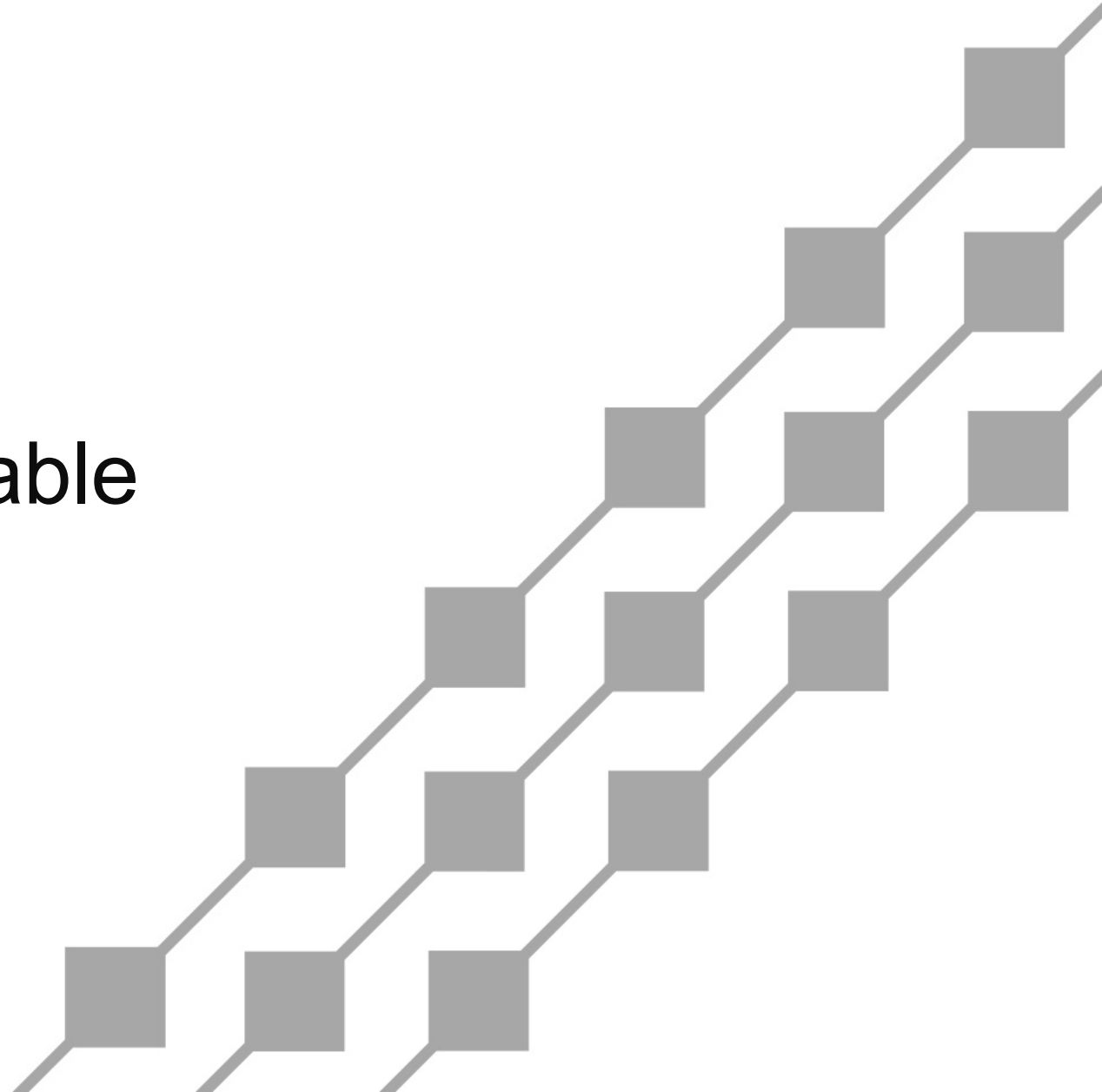


# Technical Model Review in RFP



# Hawaiian Electric

Information Made Available



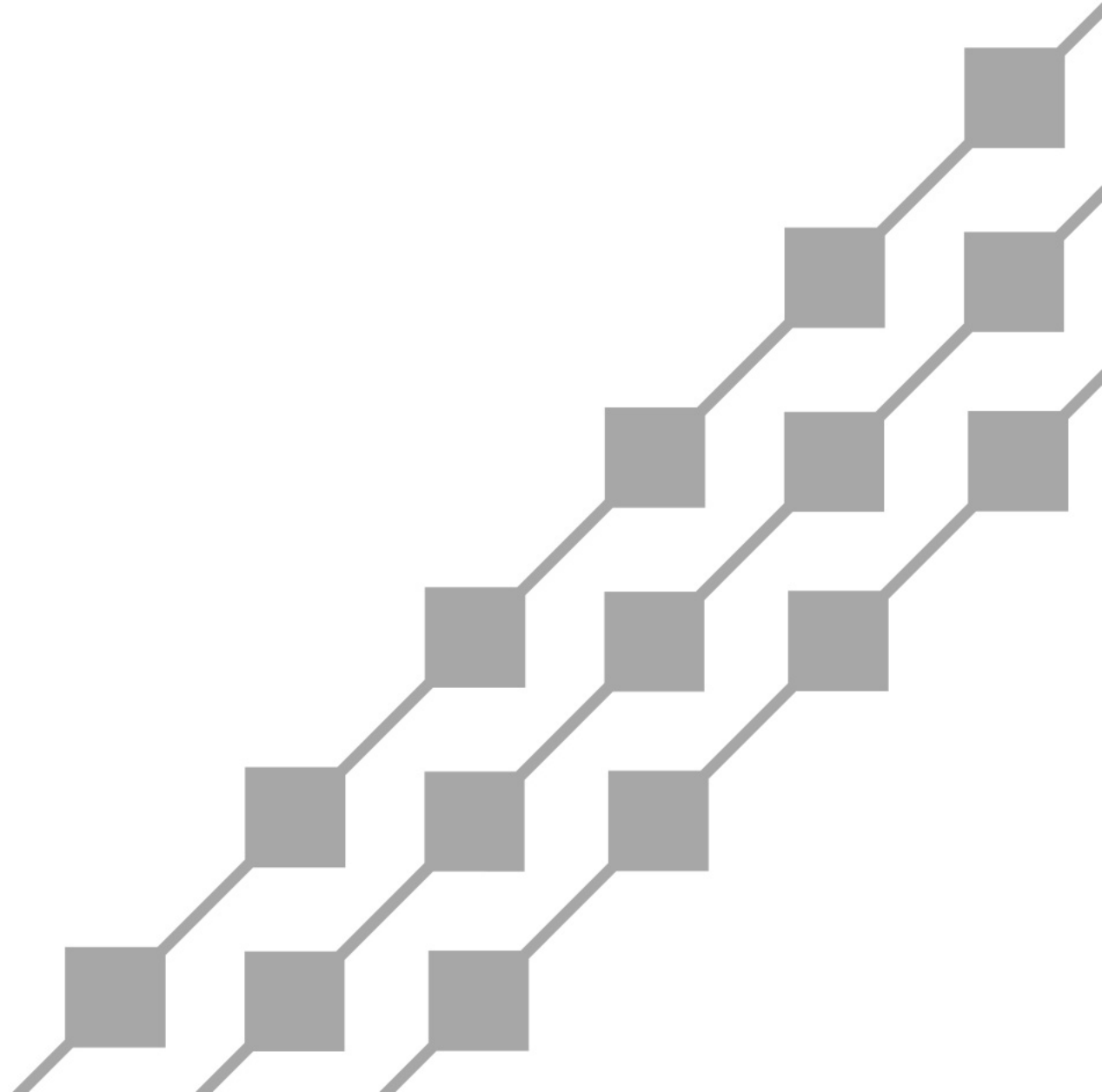
# Notable Sections of the RFPs

- ◆ RFP Requirements – RFP Body, Stage 3 Contracts (Appendix J, K, L, M)
- ◆ Structure of Proposal – Appendix B Proposer’s Response Package
- ◆ Submission - PowerAdvocate
- ◆ Interconnection Facilities and Cost Information – Appendix H
- ◆ Additional Interconnection Information
  - Filed PPAs are public on the PUC DMS (<https://dms.puc.hawaii.gov/dms/>) – Attachment G of the PPA
  - IPP Interconnection Reported Metrics Download on Company’s Key Performance Metrics webpage <https://www.hawaiianelectric.com/performancemetrics>
- ◆ Available MW Capacity can be sent to [oahurenwablerfp@hawaiianelectric.com/mauirenwablerfp@hawaiianelectric.com](mailto:oahurenwablerfp@hawaiianelectric.com).
- ◆ Mutual Confidentiality and Non-Disclosure Agreement – Appendix E, Word doc can be downloaded from [www.hawaiianelectric.com/Stage3OahuRFP/](http://www.hawaiianelectric.com/Stage3OahuRFP/)  
[www.hawaiianelectric.com/Stage3MauiRFP](http://www.hawaiianelectric.com/Stage3MauiRFP).



# Hawaiian Electric

## Stage 3 Contracts



# Stage 3 Oahu and Maui Contracts

- ◆ Four Contracts for Four Types of Projects
  - Exhibit 6 (RFP Appendix J): Model RDG PPA (PV+BESS)
    - Exhibit 8 (Oahu), Exhibit 9 (Maui): Project Specific Addendum (PSA)
    - Exhibit 10: DC-Coupled Storage Attachment (DCC)
  - Exhibit 7 (RFP Appendix K): Model RDG PPA (Wind+BESS)
    - Uses same PSA as Exhibit 8 (Oahu), Exhibit 9 (Maui)
  - Exhibit 14 (Oahu), Exhibit 15 (Maui) (RFP Appendix L): Model Firm PPA
    - No Separate Addendum or Attachments; Equivalentents are in the base model contract
  - Exhibit 11 (RFP Appendix M): Model ESPA
    - Exhibit 12 (Oahu), Exhibit 13 (Maui): Project Specific Addendum (PSA)

RDG – Renewable Dispatchable Generation; PPA – Power Purchase Agreement;  
ESPA – Energy Storage Purchase Agreement



# Model PV+BESS and Wind (+BESS)

- ◆ Renewable Dispatchable Generation PPA:
  - Fixed payment based on modeled “Net Energy Potential” and not actual energy delivered
    - Modeled Net Energy Potential is systematically adjusted for certain project milestones among other reasons
  - Fixed payment is adjusted for equipment availability and performance to ensure routine delivery of the modeled Net Energy Potential
  - Makes traditionally variable resources “dispatchable” allowing them to contribute to reserves among other grid services when available and needed.
  - Self mitigates need for additional reserves required of traditional variable resources
  - Removes concept of “curtailment” and risk to developer compensation of such
- ◆ Active Power Control Interface (along with the many other technical provisions of the PPA) is critical to ensuring Project success in this model





# Model Firm PPA

- ◆ Firm Capacity Renewable Dispatchable Generation PPA:
  - Defines the Contract Firm Capacity as the net dependable active power to be made available to Company from the Facility at the Metering Point subject to Company Dispatch upon Commercial Operations.
  - Payment structure can be purely a Capacity Payment for the Contract Firm Capacity or a combination of a Capacity and Energy Payment.
    - Energy payment is intended to capture variable costs if any
  - Similar methods to adjust the payment as the RDG Contracts based on availability and performance of the generating equipment
- ◆ Active Power Control Interface (along with the many other technical provisions of the PPA) critical to ensuring Project success in this model



# Energy Storage Purchase Agreement

- ◆ Energy Storage Purchase Agreement:
  - No provisions for “energy production” as will be used only for a “stand alone” energy storage device
  - Otherwise many of the same contractual and technical requirements as the RDG PPA
  - Fixed payment adjusted for availability and performance
  - Limitations to the “use case” contractually defined, but many services “bundled” in the technical requirements similar to the RDG contracts
- ◆ Active Power Control Interface (along with the many other technical provisions of the PPA) critical to ensuring Project success in this model



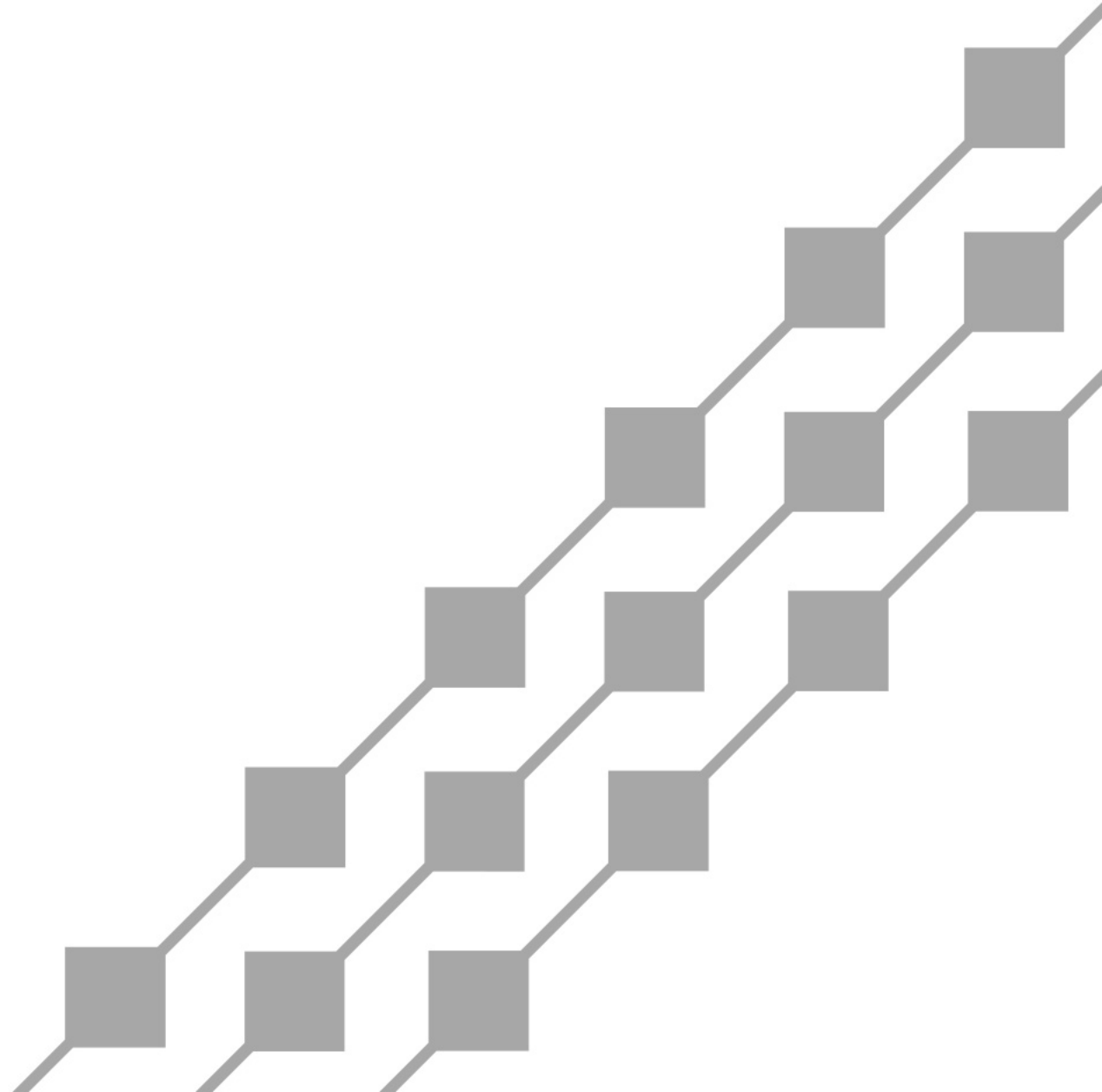
# IEEE 2800-2022

- ◆ February 10, 2023 Letter to the Commission
  - Request PUC approval to incorporate certain specific elements from IEEE 2800-2022 into the PPAs for all Stage 3 RFPs
  - Extension of time to receive bids for Stage 3 Hawaii Island RFP
- ◆ Incorporating IEEE 2800-2022 requirements sets standard baseline bulk power system connected inverter performance requirements to aid in the reliable and stable operations of the Company grids; especially important for the inverter dominated dispatches envisioned in the Companies' future.



# Hawaiian Electric

## Appendix H



# Stage 3 Oahu and Maui Appendix H

- ◆ Section 1 – Cost Responsibilities
- ◆ Section 2 – Company Interconnection Requirements and Costs (Proposer-paid)
- ◆ Section 3 – Proposer-Build Responsibilities
- ◆ Section 4 – Typical Company Durations



# Appendix H – Section 2.1

- ◆ Company costs to support substation work for interconnection to a line
- ◆ O‘ahu
  - 2.1B – 46kV
  - 2.1C – 138kV
- ◆ Contact Company for Remote Sub quantities

## B. Typical Subtransmission Interconnection

The costs in Section 2.1B are reflective of typical standard interconnections to existing circuits at subtransmission voltages. Costs for interconnection to specific Company sites are shown in Section 2.2. Costs are for Proposer-Build projects.

Item	Description	Cost
15	Attachment 2 – 46kV Variable Project	\$403,000
16	Attachment 3 – 46kV Firm Project	\$1,041,000
<b>Remote Sub Work</b>		
21	For Radial Circuits – Components at Company’s 46kV remote substation, including DTT and relaying requirements	\$435,000 / site
22	For Paralleled Circuits – Components at Company’s 46kV remote substation, including DTT and Relay Upgrades	\$561,000 / site

## C. Typical Transmission Interconnection

The costs in Section 2.1C are reflective of typical standard interconnections to existing circuits at transmission voltages. Costs for interconnection to specific Company sites are shown in Section 2.2. Costs are for Proposer-Build projects.

Item	Description	Cost
<b>At New 138kV Switching Station</b>		
32	Attachment 4 – 138kV Interconnection to Two (2) Existing Circuits (4-Bay BAAH configuration)	\$2,105,000
<b>Remote Sub Work</b>		
36a	138kV line relay upgrades	\$452,000 each
36b	138kV circuit breaker replacement	\$569,000 each
36c	DTT for anti-islanding	\$108,000 each



# Appendix H – Section 2.1 (continued)

- ◆ Maui
  - 2.1C – 69kV
- ◆ Contact Company for Remote Sub quantities
- ◆ See other sections for additional costs

## C. Typical Transmission Interconnection

The costs in Section 2.1C are reflective of typical standard interconnections to existing circuits at transmission voltages. Costs for interconnection to specific Company sites are shown in Section 2.2. Costs are for Proposer-Build projects.

Item	Description	Cost
<b>At New 69kV Switching Station</b>		
30	Attachment 2 – 69kV Interconnection to an Existing Circuit	\$875,000
<b>Remote Sub Work</b>		
34a	DTT for anti-islanding	\$108,000



# Appendix H – Section 2.2

- ◆ Company costs to support substation work for interconnection to existing substations
- ◆ O‘ahu
  - 2.2A – Waiau 46kV GIS Substation
  - 2.2B – Company-Identified 138kV Substations
  - 2.2C – Costs
  - Item 41 required for all projects
  - Items 42-47 quantities are listed in Section 2.2B

## A. Waiau 46kV GIS Substation

Please refer to Attachment 5 for a single line diagram depicting the required interconnection to the Company's system at the Waiau 46kV GIS Substation. There are two (2) terminations available at the Waiau 46kV GIS Substation. There are two (2) terminations available at the Waiau 46kV GIS Substation. There are two (2) terminations available at the Waiau 46kV GIS Substation. There are two (2) terminations available at the Waiau 46kV GIS Substation.

## B. Company-Identified 138kV Sites

The following table provides details about interconnecting to the available substations and how to apply the per unit costs to each site. Each termination is limited to the 142MW Single Point of Failure limit.

## C. Costs for Interconnection to Company-Identified 138kV Sites

The following table provides the per unit costs of typical items required for interconnecting at the identified existing substations.

Item	Description	Cost
<b>At Proposer's Project Site</b>		
41	Company work for components at the Project Site on the Company side of the demarcation as shown in Attachments 6-12	\$408,000
<b>At Existing Company Substation</b>		
42	Expansion of substation perimeter (per BAAH bay) <ul style="list-style-type: none"> <li>• Includes grading, fencing, and ground grid</li> </ul>	\$500,000
43	Add BAAH bay with one (1) new termination <ul style="list-style-type: none"> <li>• Includes 2 breakers, PTs, switches, structures, and relays</li> <li>• Assumes no control house expansion needed</li> </ul>	\$2,975,000
44	Add termination to an existing BAAH bay <ul style="list-style-type: none"> <li>• Includes 1 breaker, PTs, and relays</li> </ul>	\$1,151,000
45	Replace existing termination for generation being retired <ul style="list-style-type: none"> <li>• Assumes line relays need to be upgraded but high voltage equipment and structures do not need to be replaced</li> </ul>	\$452,000
46	New control house	\$2,000,000
47	Cut and terminate Kahe-Halawa 2 circuit into Hooahana Substation <ul style="list-style-type: none"> <li>• Includes 3 steel poles, 740 circuit feet of OH conductor, and undergrounding 270 feet of existing lines to accommodate OH termination</li> </ul>	\$3,557,000

- Notes:
- a) C
  - b) In
  - c) D
  - d) C
  - e) S
  - f) D
  - g) F
  - h) F
  - i) F
  - j) F
  - k) F
  - l) F

- Notes:
- a) Costs provided are in 2022 dollars.
  - b) Includes Company costs for engineering, materials, construction, and testing for Company-responsible items (See Section 3) related to Substation & Meter components as shown in Attachments 6-12.
  - c) Does NOT include Telecommunications or Security costs.
  - d) Does NOT include T&D costs for the gen-tie line.
  - e) Civil infrastructure and space for COIF for Item 41 and 47 provided by Proposer.
  - f) Substation relay protection requirements have not been identified so costs are based upon typical line protection relaying requirements.
  - g) Does not include costs for permitting, land rights, or a Relay Coordination Study.
  - h) For T&D costs (including service power costs) – See Section 2.3.
  - i) For Project Management costs – See Section 2.4.
  - j) For Telecommunications costs – See Section 2.5.
  - k) For Security requirements – See Section 2.6.
  - l) For typical durations to support Proposer-Build facilities – See Section 4.3.
  - m) For additional durations to interconnect at an existing substation – See Section 4.4.





# Appendix H – Section 2.2 (continued)

## ◆ Maui

- 2.2A – Lahainaluna Substation
- 2.2B – Kealahou Substation

## ◆ See other Sections for additional costs



### A. Lahainaluna Substation

Please refer to [Attachment 3](#) for a single line diagram depicting the required interconnection to the Company's system at Lahainaluna Substation. Costs shown assume a Proposer-Build project.

Item	Description	Cost
41a	Company work for components at the Project Site on the Company side of the demarcation as shown in <a href="#">Attachment 3</a>	\$379,000
41b	Company work for components at Lahainaluna Substation as shown in <a href="#">Attachment 3</a>	\$1,757,000

Notes:

a)

b)

c)

d)

e)

f)

g)

h)

i)

j)

k)

l)

### B. Kealahou Substation

Please refer to [Attachment 4](#) for a single line diagram depicting the required interconnection to the Company's system at Kealahou Substation. Costs shown assume a Proposer-Build project.

Item	Description	Cost
42a	Company work for components at the Project Site on the Company side of the demarcation as shown in <a href="#">Attachment 4</a>	\$379,000
42b	Company work for components at Kealahou Substation as shown in <a href="#">Attachment 4</a>	\$1,757,000

Notes:

a) Costs provided are in 2022 dollars.

b) Includes Company costs for engineering, materials, construction, and testing for Company-responsible items (See Section 3) related to Substation & Meter components as shown in the referenced attachment.

c) Does NOT include T&D, Telecommunications, or Security costs.

d) Civil infrastructure and space for COIF for Item 42a provided by Proposer.

e) Substation relay protection requirements have not been identified so costs are based upon typical line protection relaying requirements.

f) Does not include costs for permitting, land rights, or a Relay Coordination Study.

g) For T&D costs (including service power costs) – See Section 2.3. Add Item 131 for T&D Baseline cost.

h) For Project Management costs – See Section 2.4.

i) For Telecommunications costs – See Section 2.5.

j) For Security requirements – See Section 2.6.

k) For typical durations to support Proposer-Build facilities – See Section 4.3.

l) For additional durations to interconnect at Kealahou Substation – See Section 4.4.

# Appendix H – Section 2.3

- ◆ Company costs to support all T&D work
- ◆ Oahu
  - Sec 2.3B – 46kV baseline costs
  - Sec 2.3C – 138kV baseline costs

## B. Typical Subtransmission Interconnection Baseline

The costs in Section 2.3B are the baseline T&D costs for interconnections at subtransmission voltages. It includes an OH or UG line extension as specified in the Item description below. For any extensions greater than the specified length, please add costs per Section 2.3D. Costs are for Proposer-Build projects.

Item	Description	Cost
120	46kV OH to OH Final Tap by Company (Attachments 2 and 3) <ul style="list-style-type: none"> <li>• Includes 1 wood pole, 1 span (100ft) OH line extension toward Proposer facility and assumes Proposer designs, procures, and installs the required gang-operated switch</li> </ul>	\$86,000 (1 <sup>st</sup> tap) \$51,000 (2 <sup>nd</sup> tap)
121	46kV OH to UG Final Tap by Company (Attachments 2, 3, & 5) <ul style="list-style-type: none"> <li>• Includes 1 wood pole, 1 span (100ft) OH line extension toward Proposer facility and assumes Proposer designs, procures, and installs the required gang-operated switch</li> </ul>	\$241,000 (1 <sup>st</sup> tap) \$188,000 (2 <sup>nd</sup> tap)

## C. Typical Transmission Interconnection Baseline

The costs in Section 2.3C are the baseline T&D costs for interconnections at transmission voltages. It includes 100ft of OH or UG line extension. For any extensions > 100ft, please add costs per Section 2.3D. Costs are for Proposer-Build projects.

Item	Description	Cost
133	138kV OH to OH Final Tap by Company (Attachment 4) <ul style="list-style-type: none"> <li>• Includes 2 steel poles, 1 span (100ft) OH line extension from each new pole toward Proposer facility and the removal of existing conductors between the new poles</li> </ul>	\$962,000 per circuit
135	138kV OH Final Span for Termination to Existing Substation by Company (Attachments 6-12) <ul style="list-style-type: none"> <li>• Includes 1 span (100ft) of 138kV conductors and 2 spans (100ft each) of shield wire from steel pole to substation termination structure</li> </ul>	\$100,000 each
136	138kV UG Termination to an Existing Substation by Proposer (Attachments 6-12) <ul style="list-style-type: none"> <li>• Includes Company costs for Company-responsible items – See Section 3.</li> </ul>	\$34,000 each



# Appendix H – Section 2.3 (continued)

- ◆ Maui
  - Sec 2.3C – 69kV baseline costs
- ◆ Sec 2.3D – Line extensions (all voltages)
- ◆ Costs for facility service power should be accounted for (Sec 2.3E)

**C. Typical Transmission Interconnection Baseline**

The costs in Section 2.3C are the baseline T&D costs for voltages. It includes 100ft of OH or UG line extension, add costs per Section 2.3D. Costs are for Proposer-Build

Item	Description	Cost
130	69kV OH Final Tap by Company (Attachment) <ul style="list-style-type: none"> <li>• Includes 2 wood poles, 1 span (100ft) OH line each new pole toward Proposer facility and existing conductors between the new poles</li> </ul>	

**D. Line Extensions and Upgrades**

The costs in Section 2.3D are typical per unit costs for T&D line extensions using typical assumptions based on the Company's current standards and practices. Costs are for Proposer-Build projects.

**69kV**

Item	Description	Cost
160	Additional 100ft 69kV OH Line Extension	\$3,300 each
161	Additional 100ft 69kV UG Line Extension	\$5,700 each
165	69kV overbuild on existing accessible 12kV (200ft spans)	\$1,293,000 / mile
166	69kV overbuild on existing inaccessible 12kV (250ft spans)	\$2,191,000 / mile
170	Upgrade existing 69kV OH lines (250ft spans, accessible)	\$744,000 / mile

**Notes:**

- a) Costs provided are in 2022 dollars.
- b) OH/UG route and civil infrastructure drawings provided by Proposer.
- c) Civil infrastructure (pads, MH/HHs, conduits, etc.) designed, procured, and installed by Proposer.
- d) Does not include vegetation clearing, grading, dewatering, permitting or land rights.
- e) Includes Company costs for Company-responsible items – See Section 3.
- f) Items 160 and 161 should be added to the T&D baseline costs for each additional 100ft of Proposer-Build OH or UG line that does not involve Company's existing energized facilities. Includes review and inspection of Proposer design/construction.
- g) Items 165 and 166 includes Company costs to design/construct an OH line extension above Company's existing energized facilities and assumes all poles need to be replaced.
- h) Item 170 includes Company costs to reconductor an existing Company line to a larger size as determined by the SIS and assumes no poles need to be replaced.

**E. Service Power**

Section 2.3E provides typical requirements and costs for distribution-level service power to the Proposer's facility and/or the proposed Company switching station. Execution of a proposal letter provided by Company in response to Proposer's electrical service request, and separate from the Interconnection Agreement, will be required for service power.

Service power to the Proposer's facility shall emanate from an existing distribution line via new Company overhead and/or underground facilities to the Proposer's service connection point.

Item	Description	Cost
188	Facility or Station Service Power <ul style="list-style-type: none"> <li>• Includes 100ft UG 12kV line extension of two (2) feeders and one (1) padmount transformer and assumes no switchgear is required</li> </ul>	\$84,000 each



# Appendix H – Section 2.4

- ◆ Company Project Management costs
- ◆ Required for every project
- ◆ Cost will vary depending on your project schedule

## B. Subtransmission Projects

Item	Description	Cost
196	Engineering Phase <ul style="list-style-type: none"> <li>• Includes facilitation, coordination, and support for Engineering Design and Procurement periods</li> </ul>	\$18,300 / month
	Construction Phase <ul style="list-style-type: none"> <li>• Includes facilitation, coordination, and support from the start of construction through back feed (energization)</li> </ul>	\$23,000 / month
	Testing/Closeout Phase <ul style="list-style-type: none"> <li>• Includes facilitation, coordination and support for Developer system testing and CSAT</li> </ul>	\$11,700 / month
Notes: a) Costs derived using 2022 rates. b) Total costs are tied to schedule and duration of the entire project. c) The Closeout Phase shall extend 4 months past GCOD.		

## C. Transmission Projects

Item	Description	Cost
197	Engineering Phase <ul style="list-style-type: none"> <li>• Includes facilitation, coordination, and support for Engineering Design and Procurement periods</li> </ul>	\$18,300 / month
	Construction Phase <ul style="list-style-type: none"> <li>• Includes facilitation, coordination, and support from the start of construction through back feed (energization)</li> </ul>	\$23,000 / month
	Testing/Closeout Phase <ul style="list-style-type: none"> <li>• Includes facilitation, coordination and support for Developer system testing and CSAT</li> </ul>	\$11,700 / month
Notes: a) Costs derived using 2022 rates. b) Total costs are tied to schedule and duration of the entire project. c) The Closeout Phase shall extend 4 months past GCOD.		



# Appendix H – Section 2.5

- ◆ Telecommunication requirements and costs
- ◆ Determine what is required for project and pick which items/costs are needed based on comm option chosen

<b>Communications Cabinet or Enclosure</b>		
Item	Description	Cost
201	Communications Cabinet with circuits to support SCADA (Projects $\geq 1$ MW and $\leq 3$ MW) <ul style="list-style-type: none"> <li>Projects with SCADA and DTT but no diverse communication circuits</li> </ul>	\$164,000 / site
202	Communications Cabinet with circuits to support SCADA, Relay Protection, monitoring devices, etc.	\$192,000 / site

<b>Lease Line Options</b>		
Item	Description	Cost
205	Lease Line one-time and recurring costs	Will vary based on 3rd

<b>Fiber-Optic Cable Option</b>		
Item	Description	Cost
210	New Fiber-only pole line (200' avg spans, 60-strand ADSS) <ul style="list-style-type: none"> <li>Includes new wood poles</li> </ul>	\$312,000 / mile
211	Fiber underbuild on new or existing pole line (200' avg spans, 60-strand ADSS)	\$166,000 / mile

<b>Microwave Option</b>		
Item	Description	Cost
215	Point-to-Point Microwave Link <ul style="list-style-type: none"> <li>Includes 2 each antenna equipment to create a radio link</li> </ul>	\$697,000 / link
216	50ft Microwave Tower	\$612,000 each

<b>Projects Interconnecting to a Company Switching Station Only</b>		
Item	Description	Cost
220	Fiber from "meet point" to termination in Company switching station <ul style="list-style-type: none"> <li>Assumes 24-strand fiber cable.</li> <li>Includes splicing, termination, and testing work.</li> <li>Civil infrastructure (HHs, conduits, etc.) is designed, procured, and installed by Proposer.</li> </ul>	\$31,000



# Appendix H – Section 2.6

- ◆ Security requirements for Proposer facilities housing Company equipment
- ◆ Security requirements for a new Company-owned substation
- ◆ Costs provided are for Company-responsible items
- ◆ Proposers must do their own due diligence on Proposer-responsible items



# Appendix H – Section 4

- ◆ Typical Company durations to include in schedule
- ◆ These items should be shown in your project schedule
- ◆ Sec 4.4 is in addition to durations listed in Sec 4.2 and 4.3

4.2 – SUBTRANSMISSION PROJECTS			
Milestone	Duration	Notes	
Proposer-Build			
<b>IRS Phase</b>			
Model Validation	1 month	May increase depending on # of iterations	
System Impact Study (SIS)	150 calendar days	Following Model Acceptance	
<b>4.3 – TRANSMISSION PROJECTS</b>			
Milestone	Duration	Notes	
Proposer-Build			
<b>IRS Phase</b>			
Model Validation	1 month	May increase depending on # of iterations	
System Impact Study (SIS)	150 calendar days	Following Model Acceptance	
<b>4.4 – ADDITIONAL DURATIONS TO INTERCONNECT AT AN EXISTING SUBSTATION</b>			
Milestone	Duration	Notes	
Company-Build			
<b>Engineering Phase</b>			
30% Design & Review	40 business days		
60% Design & Review	50 business days	Following 30% Design acceptance.	
90% Design & Review	50 business days	Following 60% Design acceptance	
Issued for Construction (IFC) Design & Review	30 business days	Following 90% Design acceptance.	
<b>Procurement Phase</b>			
Procurement	Up to 24 months	Procurement of materials typically happens at 60% design completion and after PUC approval. Material lead times dependent on manufacturer availability.	
<b>Construction Phase</b>			
Construction	Up to 12 months	Duration increases up to 12 months for larger sized projects. Construction to begin after procurement completion.	
<b>Notes</b>			
a) For P for C			
b) N/A i			





# Oahu Appendix H – Attachments

- ◆ Attachment 1 – Project Examples
- ◆ Attachment 2 – Typical SLD/Notes for interconnection to 46kV lines for variable generation
- ◆ Attachment 3 – Typical SLD/Notes for interconnection to 46kV lines for firm generation
- ◆ Attachment 4 – Typical SLD/Notes for interconnection to 138kV lines (2 circuits)





# Oahu Appendix H – Attachments (cont.)

- ◆ Attachments 5-12\* – SLD/Notes for interconnection to Waiau 46kV, AES 138kV, Ewa Nui 138kV, Kahe 138kV, Hooohana 138kV, Waiau 138kV, CEIP 138kV, Koolau 138kV

\*Note – Attachments 5-12 can be requested after execution of an NDA



# Maui Appendix H – Attachments

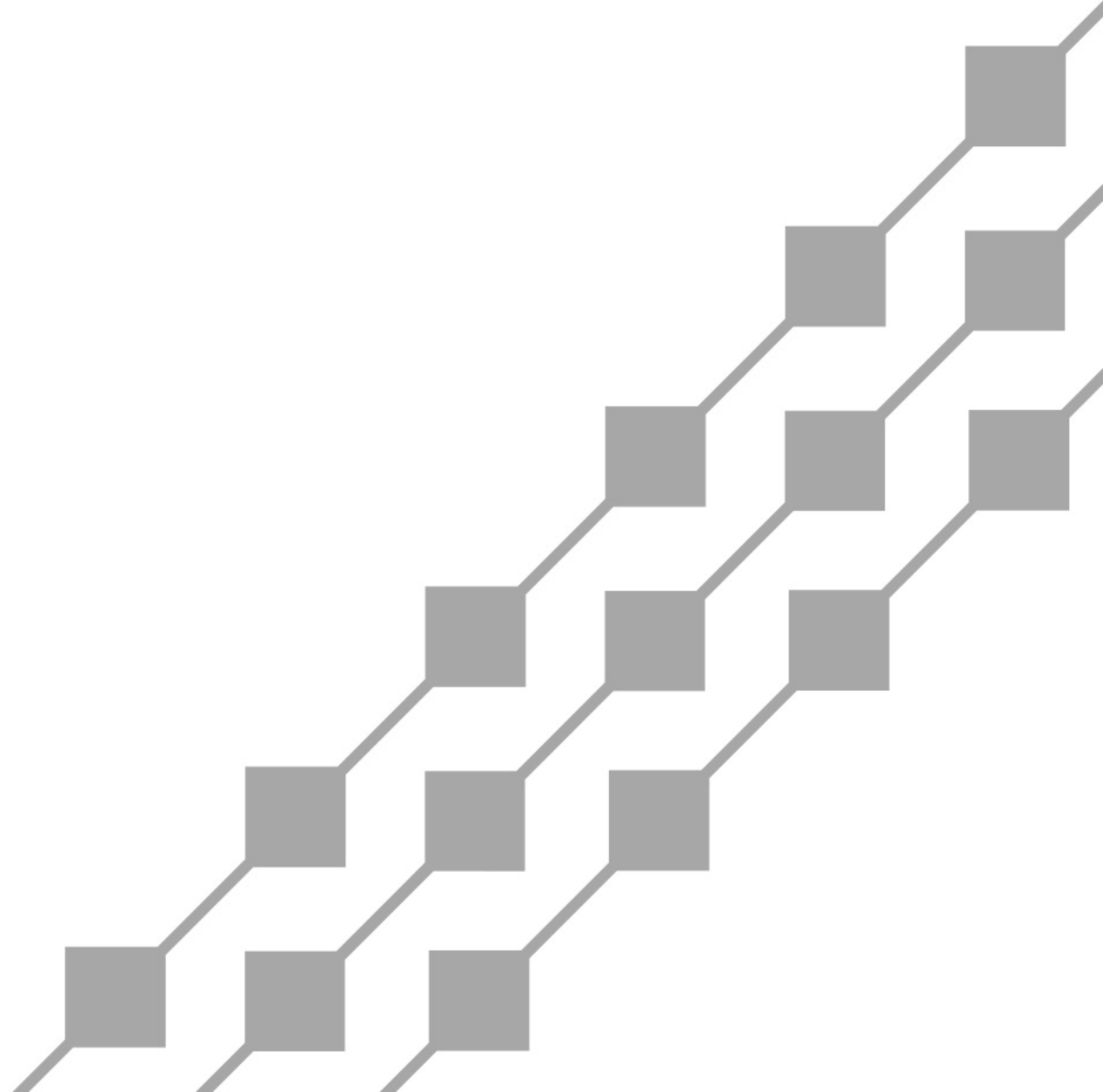
- ◆ Attachment 1 – Project Examples
- ◆ Attachment 2 – Typical SLD/Notes for interconnection to existing 69kV lines
- ◆ Attachment 3 – SLD/Notes for interconnection to Lahainaluna
- ◆ Attachment 4 – SLD/Notes for interconnection to Kealahou

\*Note – Attachments 3 & 4 can be requested after execution of an NDA.



# Hawaiian Electric

## Next Steps



# Stage 3 Oahu and Maui RFP Schedule

Milestone	Schedule Dates
Final RFP Issued	January 20, 2023
Hawaiian Electric and Affiliate Proposal Due Date	April 19, 2023
IPP Proposal Due Date	April 20, 2023
Selection of Priority List	July 6, 2023
Hawaiian Electric and Affiliate BAFOs	July 13, 2023
IPP Proposal BAFOs	July 14, 2023
Selection of Final Award Group	October 27, 2023
IRS and Contract Negotiations Begin	November 3, 2023



# Information

- ◆ RFP email address

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- ◆ RFP webpage

[www.hawaiianelectric.com/Stage3OahuRFP](http://www.hawaiianelectric.com/Stage3OahuRFP)

[www.hawaiianelectric.com/Stage3MauiRFP](http://www.hawaiianelectric.com/Stage3MauiRFP)





Mahalo

Questions?