Hawaiian Electric

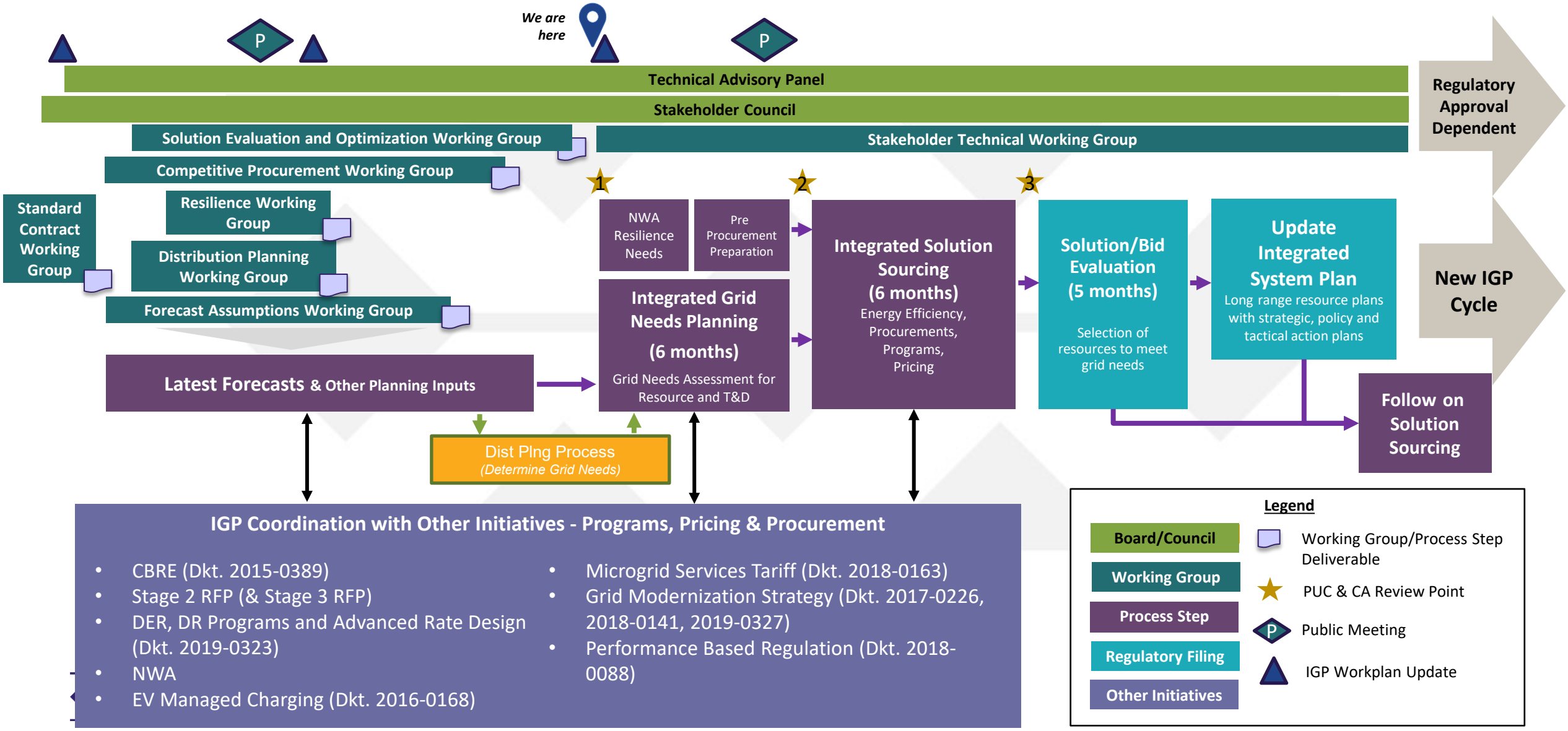
IGP Technical Advisory Panel
Distribution Grid Needs Assessment & Non-Wires Alternatives

November 16, 2022

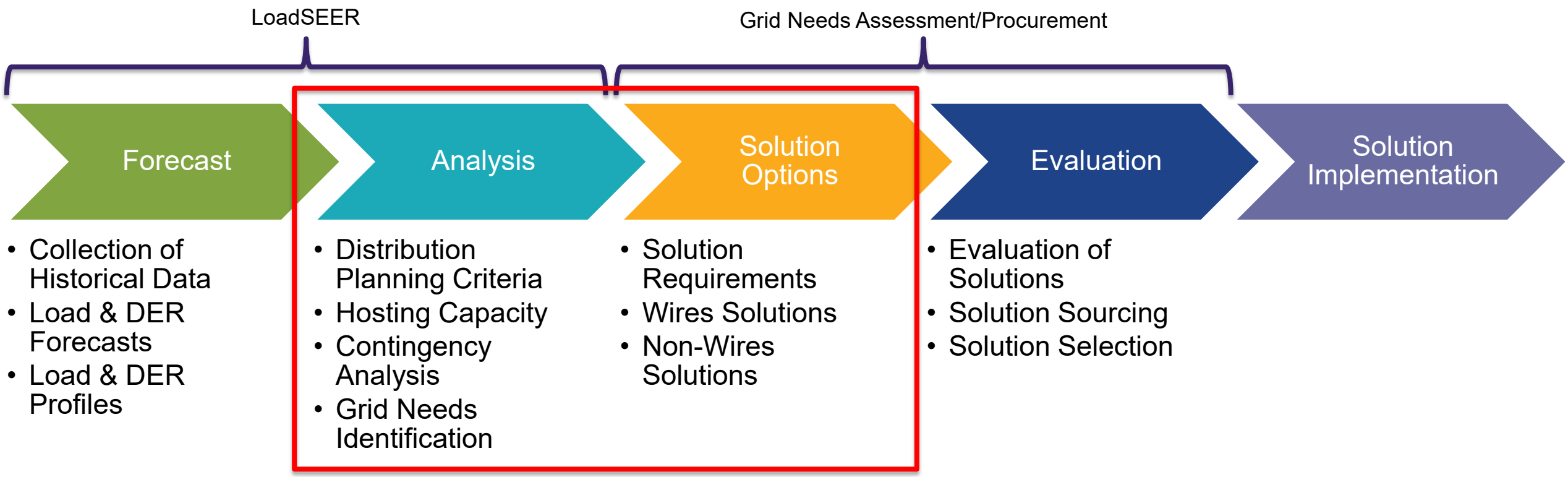
Agenda

- Summary of Grid Needs identified
- Review Non-Wires Alternatives (NWA) Opportunity Evaluation Methodology & Evaluation Criteria
  - Walk through examples of qualified and non-qualified projects
- Seeking TAP Feedback and suggestions on the NWA methodology
- Next Steps

Distribution Planning & IGP Process



Stages of the Distribution Planning Process



Preliminary Distribution Grid Needs Summary

- Grid needs identified for four forecast scenarios

	Description	DER Forecast	EV Forecast	EE Forecast	TOU Load Shape
1	Base	Base	Base	Base	Base
2	High Load Customer Technology Adoption Bookend	Low	High	Low	Unmanaged EV Charging
3	Low Load Customer Technology Adoption Bookend	High	Low	High	Managed EV Charging
4	Fast Customer Technology Adoption	High	High	High	Managed EV Charging

- Grid needs projects identified (minimum wires solutions required) by scenario by island[1]

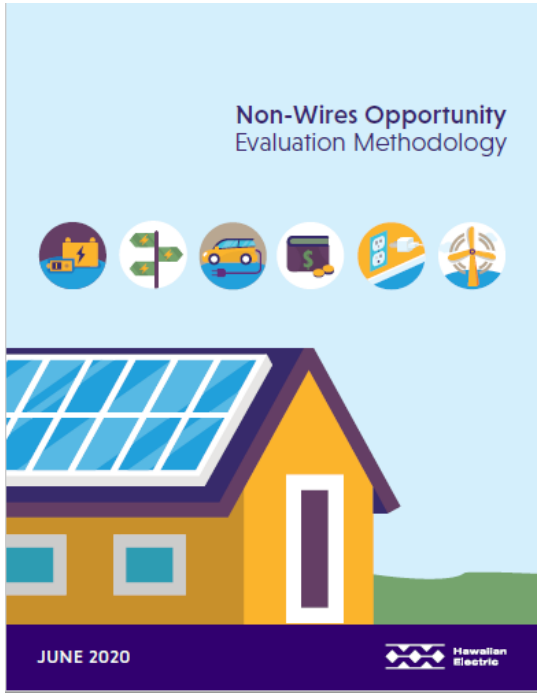
	Scenario			
Island	1	2	3	4
Oʻahu	18	47	27	35
Hawaiʻi Island	7	7	7	8
Maui	5	5	9	9
Lānaʻi	2	2	2	2
Molokaʻi	3	3	5	5
Total	**35**	**64**	**50**	**59**

- Grid need projects identified were run through the NWA opportunity methodology to determine if they are Qualified or Non-Qualified NWA opportunities

[1]Number of unique grid needs solutions identified; does not reflect number of transformers/circuits with overloads that may be solved by the same common solution.

Non-Wires Opportunity Evaluation Methodology

- Non-Wires Opportunity Evaluation Methodology Document
  - Filed on 11/5/2021 as part of "The Hawaiian Electric Companies' Grid Needs Assessment Methodology Review Point" (Docket No. 2018-0165)
  - TAP DP Subcommittee reviewed in 4th quarter 2021
- Methodology Goals
  - *Identify all potential candidate T&D projects that may be cost-effectively deferred through the identified and defined DER services.*
  - *Productively engage the market for NWAs by* ***helping DER aggregators and developers efficiently allocate resources to the best opportunities.***
- Shaped by Industry Best Practices
  - Several states (including New York and California)
  - Organizations (including RMI and SEPA)
  - Stakeholder Working Group Feedback



NWA Methodology – Summary

- Step 1 – Opportunity Screen
- Step 2 – Opportunity Sourcing Evaluation
  - Project economics
  - Performance requirements
  - Forecast certainty
  - Market assessment
  - Timing
- Step 3 – Action Plan

Figure 3: NWA Opportunity Evaluation Methodology

NWA Evaluation Criteria – **Step 1 Opportunity Screen**

Step 1: Apply technical & timing screen

- Qualified categories
  1. Expanding distribution system **capacity** to meet load and/or hosting capacity needs (e.g., new substation, new feeders, reconductoring)
  2. Ensuring a **reliability** requirement for circuit back-tie upgrade deferral
  3. Enhancing system **resilience**
- Non-Qualified Categories
  - Line/pole relocation or undergrounding
  - Emergency and preventative equipment
  - Replacement infrastructure (circuit breakers, relays, transformers) due to asset condition
  - Replacement of damaged or failed equipment/poles/conductor
  - New customer requests for new physical connection to the electric grid (e.g. line extension or new circuits)
- Project Timing: Is the need (in-service) date beyond 2 years?
  - **Qualified** projects: in-service date year **2025 and beyond**
  - **Non-qualified** projects: in-service date year **2024 and earlier**

NWA Evaluation Criteria – **Step 1 Opportunity Screen cont.**

- The identified Grid Needs were evaluated based on the Step 1 opportunity screening criteria

Island	Scenario 1		2		3		4	
	Qualified	Non-Qualified	Qualified	Non-Qualified	Qualified	Non-Qualified	Qualified	Non-Qualified
Oʻahu	7	11	29	18	6	21	13	22
Hawaiʻi Island	0	7	0	7	0	7	1	7
Maui	0	5	0	5	0	9	0	9
Lānaʻi	0	2	0	2	0	2	0	2
Molokaʻi	0	3	0	3	0	5	0	5
Total	**7**	**28**	**29**	**35**	**6**	**44**	**14**	**45**
Total by Scenario	**35**		**64**		**50**		**59**	

[1]Number of unique grid needs solutions identified; does not reflect number of transformers/circuits with overloads that may be solved by the same common solution.

Step 2: Identify NWA opportunities in greater detail

Five Categories:

- **Project Economics**
  - Project cost deferral value
- **Performance**
  - Thresholds based on capacity & duration
- **Forecast Certainty**
  - Service Request – new load request from residential and/or commercial developers
  - Developer Forecast/Spatial Allocation – estimated load growth from anticipated developments/corporate forecast allocated amongst circuits
- **Market Assessment**
  - Technical potential based on the number of customers available for behind-the-meter solutions
  - Land availability for in-front-of-meter solutions
  - Based on % of Overload
    - % Overload = [Peak Load – Equipment Rating] / Equipment Rating
- **Timing**
  - Reassess NWA opportunity in the future for long-term grid needs.

NWA Evaluation Criteria – **Step 2 Opportunity Sourcing Evaluation cont.**

- Evaluation criteria details/thresholds aren't specified in the NWA Methodology (except **Project Economics**)
  - Remaining criteria selected favors being more inclusive

Category	Favorable	Moderate or Uncertain	Unfavorable
Project Economics	$1M and above	Between $500K and $1M	Less than $500K
Performance	• Capacity: Up to 5 MW *and* • Duration: Up to 4 hours	• Capacity: > 5 MW and < 10 MW *or* • Duration: > 4 hours and < 8 hours	• Capacity: 10 MW and larger • Duration: 8 hours or more
Forecast Certainty	Service Request	Developer Forecast and/or Spatial Allocation	
Market Assessment	0-10%	>10%	
Operating Date (Timing)	2025-2027	2028 and later	2024 and earlier (Per Step 1)

- No projects are deemed non-qualified based on **Forecast Certainty** or **Market Assessment** due to current lack of market data
  - Criteria may be revised based on market response during future RFPs

NWA Evaluation Criteria – **Step 3 Action Plan**

Step 3: Assign project to action plan track

- Projects are categorized into Tracks based on the evaluation criteria rating in Step 2
  - **Track 1**: **Favorable** NWA Opportunity
    - Greater than $1M
    - In-service in 2 to 5 years
  - **Track 2**: **Re-evaluate** NWA opportunity in the future (or Pricing approach)
    - Greater than $1M (timing and uncertainty of need)
    - Greater than $1M, performance likely met
    - Less than $1M (timing sufficiently long to account for customer adoption)
  - **Track 3**: **Non-qualified** NWA Opportunity
    - Requirements cannot be reasonably met by NWA solutions
    - Performance or Economics unfavorable
- Currently, only Overall Performance and Economics drive Track Selection
  - Forecast Certainty and Market Assessment do not have Unfavorable rating options in Step 2 due to limited data

Track	Timing	Overall Performance	Economics
1	2025-2027	Favorable	
1	2025-2027	Favorable or Moderate/Uncertain	Favorable
2 (Pricing)	2025-2027	Favorable or Moderate/Uncertain	Moderate/Uncertain
2 (Reassess)	2028 and later	Favorable or Moderate/Uncertain	
3	2025-2027 or 2028 and later	One or both are Unfavorable	

Qualified NWA Example – Track 1

- Project Description: CEIP 46 Reconductor
  - Reconductor approximately 1.91 miles of 556 conductor to 795 conductor

- Overload Summary (Base Forecast Scenario):

Transformer/Circuit	Timing	Overall Performance	Forecast Certainty	Economics	Market Assessment
CEIP / CEIP 46 (N-1)	2025	• Capacity: 4.7 MW • Duration: 3 hours • 14 calls per year	Favorable (Service Request & Developer Forecast)	$ 3.9M	7.4%

- Evaluation Summary:
  - Due to all evaluation criteria being favorable, Track 1 was selected

Qualified NWA Example – Track 1 cont.

- Project Description: New Ewa Nui Transformer and 46 kV Circuit
  - Install a new 138/46kV 80MVA substation transformer at Ewa Nui substation
  - Install a new 46kV circuit at Ewa Nui substation extending to take over a portion of the Waiau-Mililani circuit

- Overload Summary (Base Forecast Scenario):

Transformer/Circuit	Timing	Overall Performance	Forecast Certainty	Economics	Market Assessment
Wahiawa 3 / Wahiawa-Waimano	2026	• Capacity: 8.5 MW • Duration: 8 hours • 118 calls per year	Moderate (Developer Forecast)	$ 15M	17.9%

- Evaluation Summary:
  - Despite Overall Performance being graded as Moderate, Track 1 was selected since the Timing and Economics were favorable.

Qualified NWA Example – Track 2

- Project Description: New Kuilima 2 Transformer Upgrade to 10 MVA
  - Replace the existing 5 MVA transformer at Kuilima substation with a 10 MVA transformer

- Overload Summary (Base Forecast Scenario):

Transformer	Timing	Overall Performance	Forecast Certainty	Economics	Market Assessment
Kuilima 2	2028	• Capacity: < 1 MW • Duration: 2 hours • 1 call per year	Favorable (Service Request & Developer Forecast)	$ 3.2M	0.63%

- Evaluation Summary:
  - Due to the grid need timing, Track 2 (reassess) was selected. The project will be revaluated at a later date.

Non-Qualified NWA Example – Track 3

- Project Description: New Waipio 10 MVA Transformer
  - Install a new 46/12KV 10 MVA transformer at Waipio substation

- Overload Summary (Base Forecast Scenario):

Transformer	Timing	Overall Performance	Forecast Certainty	Economics	Market Assessment
Waipio 1 (Normal, Base)	2025	• Capacity: 10.6 MW • Duration: 23 hours • 365 calls per year	Moderate (Developer Forecast)	$ 2.9 M	88%
Waipio 1 (N-1, Base)	2025	• Capacity: 11.5 MW • Duration: 14 hours • 365 calls per year	Moderate (Developer Forecast)	$ 2.9 M	70%

- Evaluation Summary:
  - Due to the Overall Performance being unfavorable for an NWA, this project was graded as Track 3.

NWA Evaluation Summary – Action Plan

- Summary of the grid need projects assigned to each Track

Track	Island	Scenario			
		1	2	3	4
1	O‘ahu	5	3	1	6
2	O‘ahu	1	4	3	1
3 (Non-Qualified)	O‘ahu	1	22	2	6
	Hawai‘i Island				1
Total (All Tracks)		7	29	6	14

Proposed Actions
Track 1: Proceed with RFP, Pricing or Program
Track 2: Reassess Procurement in Next Planning Cycle or Pursue Pricing/Program
Track 3: NWA not suitable, Implement “Wires”

- Of the 35 grid need projects identified using the Base Forecast (Scenario 1), 5 projects are categorized as Track 1 (Favorable NWA Opportunity)

Transformer/Circuit	Description
CEIP 3/CEIP 46	CEIP 46 Reconductor
Kamokila 2	Install new conductor
Kapolei 2/Kapolei 4	Install new conductor
Kewalo T3	New 50 MVA transformer
Wahiawa 3 (138 kV)/Wahiawa-Waimano	New transformer & 46 kV circuit

Discussion

1. Step 2 – Market Assessment: Suggestions for evaluation criteria?
   - Revisit when we obtain more market data through RFPs and Pricing Programs?
   - NWA would require even greater amounts of DER/EE/EV for potential solutions above what is already large quantities in the forecast scenarios. How can this be quantified and feasibility measured?

2. Any other criteria that should be considered or revisions to the process?

Next Steps

- Finalize or revise list of qualified NWA opportunities (based on discussion today, if necessary)
- Final Grid Needs Projects and NWA opportunities to be included in the IGP optimized resource plan evaluation
- December 1st TAP Meeting – Provide update on Distribution Grid Needs Effort for IGP.

Mahalo