TWG MEETING
October 11, 2018

AGENDA

11:00 am	Welcome & Introduction
11:05	EEPS Review Research Action Plan
11:30	EEPS Research Tasks for 2019 Report to Legislature
11:40	Potential Study Update Overview
11:45	Baseline Study Plan
12:15 pm	General Discussion
12:30	Adjourn

SPEAKER INTRODUCTIONS

Ingrid Rohmund leads the Potential Study Task and is the overall Project Director. She has more than 25 years of experience modeling and performing statistical analysis of energy use at the national, regional, and utility service-area levels. She has executed dozens of large-scale market research efforts for utilities across the U.S. Ms. Rohmund has been the project director on more than 60 planning and forecasting studies conducted by AEG since 2007.

Kelly Marrin leads the EEPS Review Task. She is a Director for AEG with more than 15 years of experience in the energy industry. She leads AEG's Program Evaluation practice and focuses her efforts on projects that deal with DR & EE Evaluation, demand response potential analysis, demand response program design, load analysis and load forecasting.

Dr. David Lineweber leads the Baseline Study Task. He has more than 25 years of experience providing marketing and marketing research services to clients in the fields of energy, information technology, and telecommunications. In the energy industry, he has worked with dozens of electric and gas utilities, as well as with a wide range of other organizations with an interest in the field, including regulators, manufacturers, trade allies, associations, and others.

EEPS Research Action Plan Overview

RESEARCH ACTION PLAN PURPOSE AND CONTENTS

The objective: lay out, at a high level, the remaining EEPS Research as it is associated with each major task

- Focus on AEG/EEM research not meant to outline all EEPS activities, i.e. deliberative process with TWG
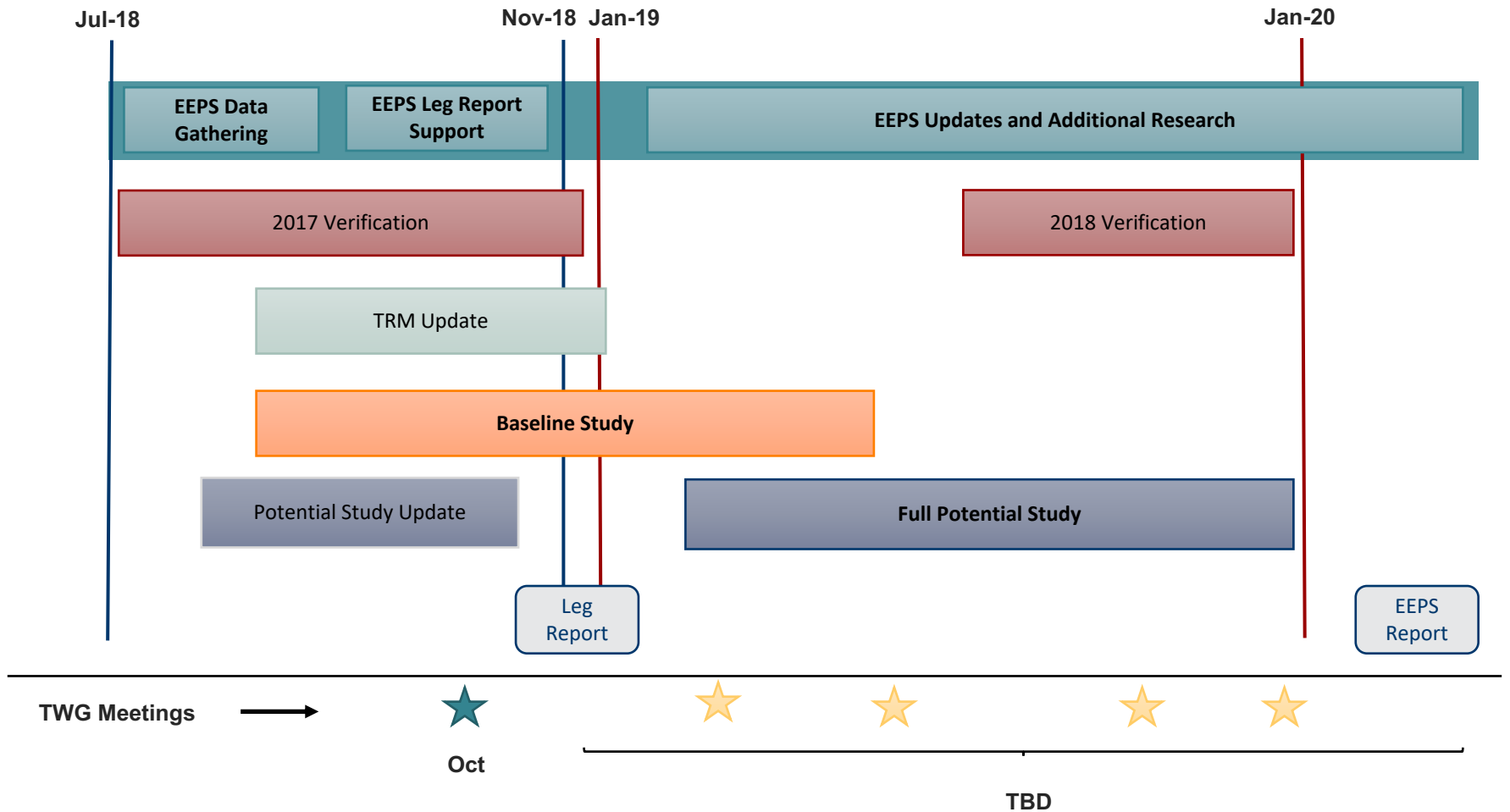
The plan contains:

- Overall timeline of activities including planned and potential meetings with the TWG

- Key research questions which the EEPS research will seek to answer. Questions were sourced from the Framework and past TWG discussions

- Description of the interactions and interdependencies between all EM&V tasks (EEPS, Potential Study, Baseline Study, Verification and TRM update) and how they relate to the key research questions.

- Listing of current workplans and a description of future workplans to be developed to answer the key research questions

EEPS RESEARCH ACTIVITIES

At a high level, our approach to the EEPS Research has two distinct pieces:

- 1) Work that can be completed by November 2018 in support of the Legislative Report (which includes a preliminary update of the potential study)
  - EEPS Data Gathering Workplan
  - EEPS Legislative Report Workplan
- 2) Ongoing work that will support the larger EEPS review process
  - 2017 & 2018 Verification
  - TRM Update
  - Baseline Study
  - Potential Study
  - Additional EEPS Research
- Plus reporting and TWG meetings

HIGH-LEVEL EEPS TIMELINE

Jul-18   Nov-18   Jan-19   Jan-20

EEPS Data Gathering	EEPS Leg Report Support

EEPS Updates and Additional Research

2017 Verification   2018 Verification

TRM Update

Baseline Study

Potential Study Update   Full Potential Study

Leg Report   EEPS Report

TWG Meetings

Oct

TBD

EEPS RESEARCH QUESTIONS

From the master list, we developed four key themes or groups of questions:

- The first set of questions deals with whether Hawaii is on track to meet the current goals.

- Second, we examine how programs and savings have evolved since the last report.

- Third, we include questions that address how emerging trends will affect future savings.

- Finally, we address whether changes should be made to EEPS metrics and goals.

The first two groups should be relatively straightforward to answer, while the second two require additional research

KEY QUESTIONS BY CATEGORY

Are we on track to meet current goals?

- What are the PBF savings to date?
- What are the contributions of non-regulated entities?
- Contribution of codes and standards?
- Historical penetration of DERs?
- Address baselines, measure life, persistence

How have savings evolved since the first EEPS Review period?

- Changes to PBF measure and/or class contributions?
- Change in the make-up of overall savings – EE, C&S, DER?
- Policy and/or context changes?
- Changes in market conditions?

How will emerging trends affect future savings?

- Traditional EE savings moving into the baseline?
- Impacts of locational grid resources?
- Interaction of DERs and EE?
- Electrification of transportation?
- Battery Storage?

Should changes be made to EEPS metrics and goals?

- Lessons learned to inform decisions?
- Are the EEPS goals appropriate?
- Are the metrics appropriate?
- What aspects of the framework need to change?
- Can we glean insights from other jurisdictions?

EEPS ACTIVITIES: RELATIONSHIPS AND INTERDEPENDENCIES

The following slides describe

- Activities that support the Legislative Report
- Activities supporting the final EEPS review

The slides

- Show how the various tasks relate to each other
- Are designed to help us answer
  - Near-term research questions
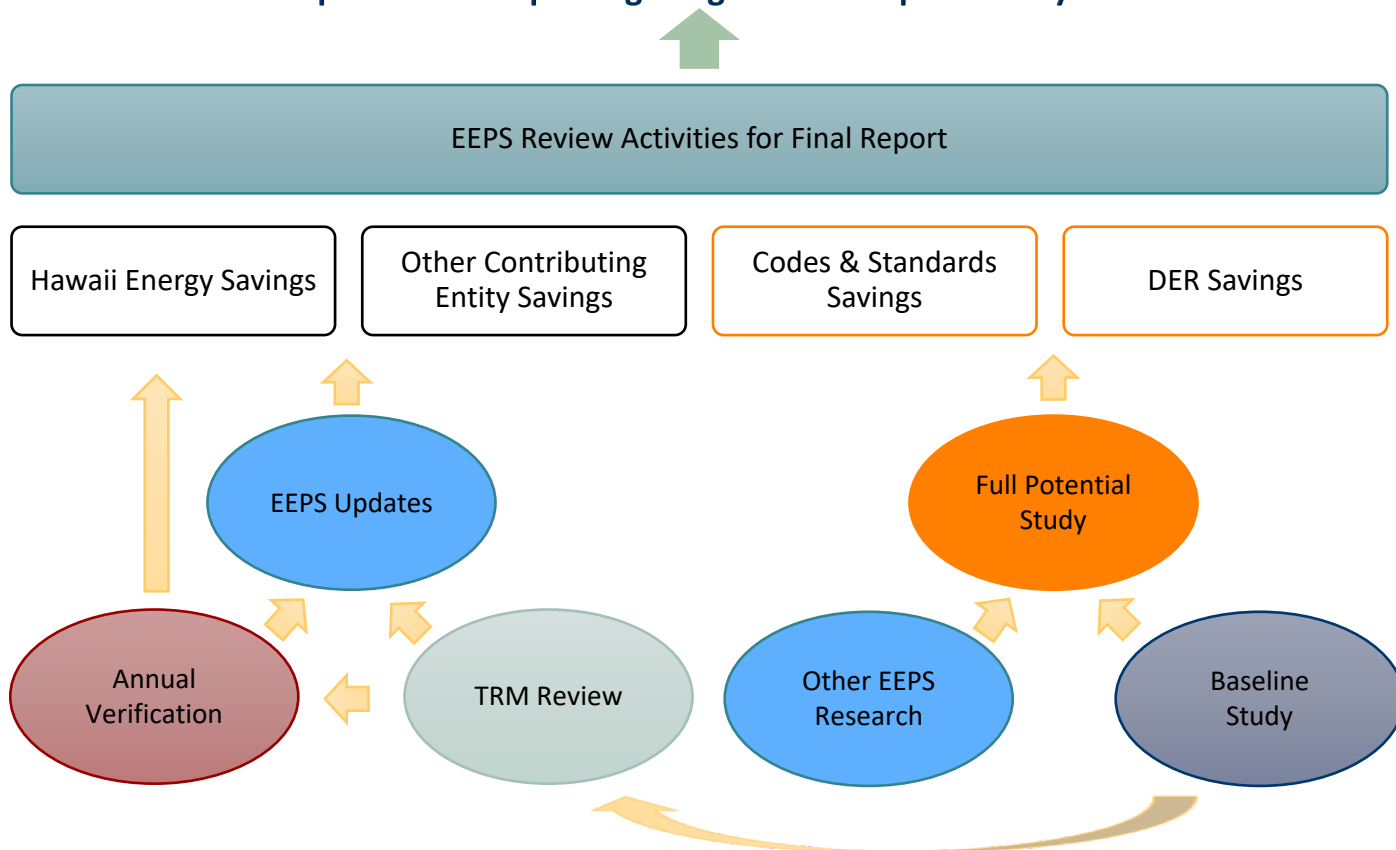 - Longer-term research questions

ACTIVITIES SUPPORTING THE LEGISLATIVE REPORT

Are we on track to meet current goals?
How have savings evolved since the 1st EEPS review period?
**Initial analyses helps plan for answering long-term research questions.**
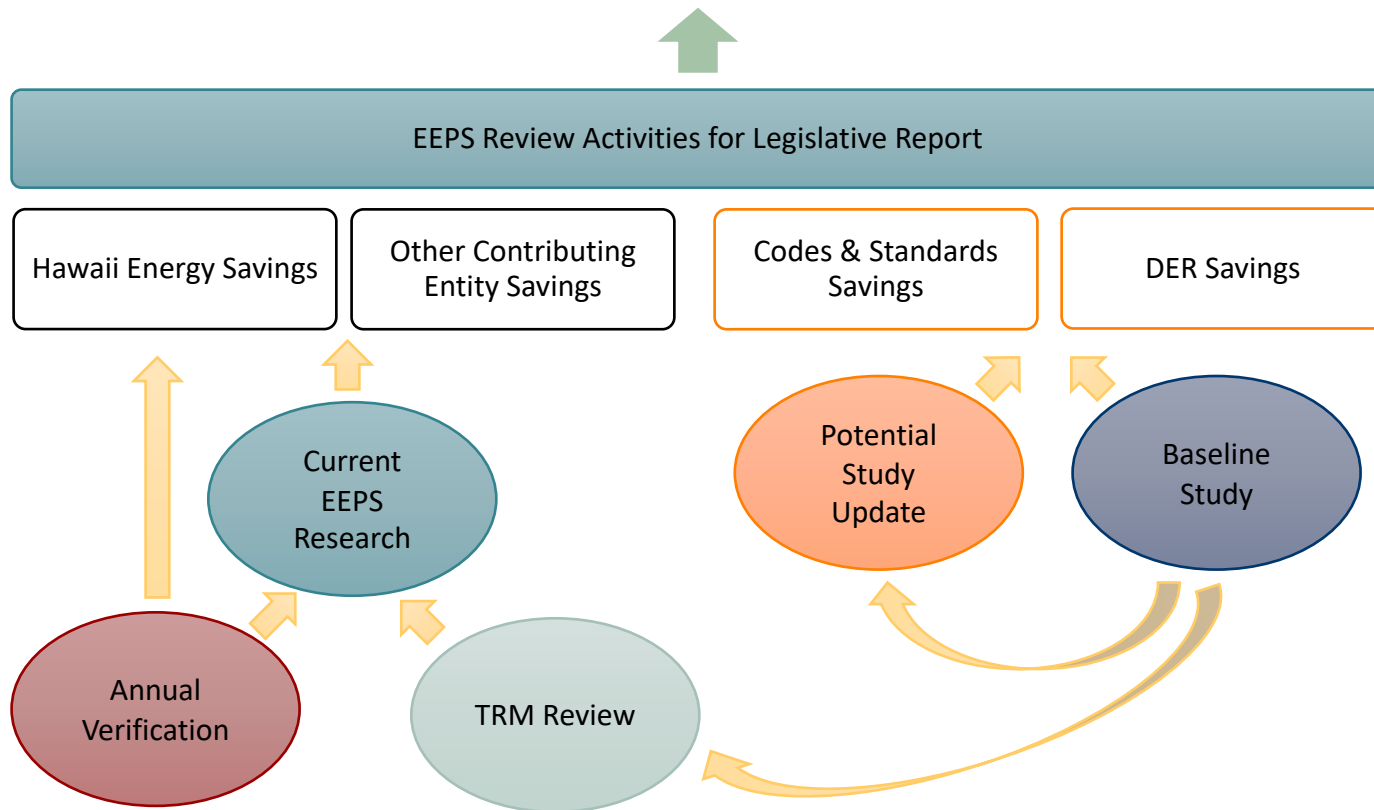
ACTIVITIES SUPPORTING THE FINAL EEPS REVIEW

How will emerging trends affect the future?
Should any changes be made to EEPS goals or metrics and what are the implications?
Update EEPS reporting in light of a complete analysis.

EEPS Review Activities for Final Report

Hawaii Energy Savings

Other Contributing Entity Savings

Codes & Standards Savings

DER Savings

EEPS Updates

Full Potential Study

Annual Verification

TRM Review

Other EEPS Research

Baseline Study

KEY TAKEAWAYS

- The EEPS Research Plan represents our current approach to the tasks, but is not inclusive of the entire EEPS review process

- We won't be able to tackle the really big questions right away

- BUT much of our initial research is designed to jump start later analyses and help us think about those questions

- Each of the tasks are interrelated
  - We view this as an opportunity for tasks to inform one another throughout the process

Research

Input and Review

Draw Conclusions

Revise and Repeat
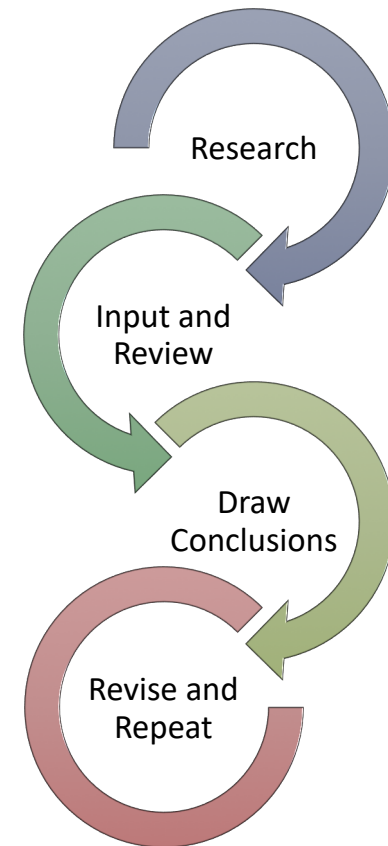
EEPS Research Tasks for the 2019 Report to Legislature

2019 REPORT TO THE LEGISLATURE

- Required element of the EEPS Program...last EEPS Report to Legislature was 2014 with forecast through 2015

- 2019 Report to Legislature will assess the first full EEPS performance period (2009-2015) with a forecast through 2020 (the end of the second performance period)

- Topics covered:
  - PBF and total EEPS impacts
  - Lessons learned from first EEPS performance period
  - Partial Potential Study update
  - Key findings, trends, and conclusions

- Draft in process with final report due to Legislature in late December

ALL CONTRIBUTING ENTITY SAVINGS

Hawaii Energy (aka PBF) Savings

- Historical gross verified savings 2009-2016 – preliminary savings for 2017
- Lifetime savings
- Lifetime spending
- Total lifetime $/kWh

Other Contributing Entity Savings

- Counties
- Hawaii State Energy Office (HSEO)
- GEMS
- KUIC
- HECO
- Military
- University of Hawaii
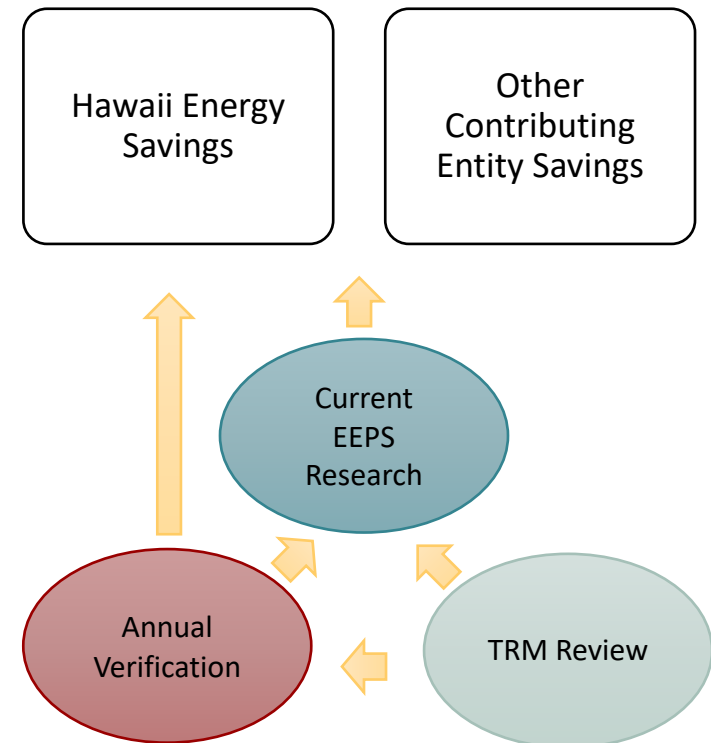
HAWAII ENERGY SAVINGS SUMMARY

Program Year	Program and Admin Expenditures ($M)	System Level Demand Reduction[1] (MW)	System Level Year 1 EEPS Savings[2] (GWh)	Lifetime Cost of Saved Energy[3] (cents/kWh)	Lifetime Customer Bill Savings ($M)
2009	$18.20	28.12	153.8	1.5	$255
2010	$20.10	21.02	146.6	1.8	$473
2011	$27.30	21.34	178.3	2.5	$408
2012	$32.80	18.74	158.5	3.1	$405
2013	$32.00	21.6	162.2	1.8	$517
2014	$36.00	23.7	148.2	2.4	$436
2015	$36.90	25.3	157.8	2.2	$332
2016	$29.50	23.2	140.5	1.3	$441
2017 (reported)	TBD	TBD	TBD	TBD	TBD

[1] Tracked demand savings adjusted for system losses
[2] First year verified gross savings adjusted for system losses
[3] Lifetime system level gross tracked energy savings divided by program and administration expenditures

OTHER CONTRIBUTING ENTITY SAVINGS UPDATE

Completed initial outreach with the PUC's assistance

Speaking with representatives by phone regarding

- Energy efficiency actions outside of Hawaii Energy
- Planned activities
- PV installations

Excellent response so far

- 18 contacts
  - 8 complete interviews
  - 1 scheduled interview
  - 4 received questions and are preparing response
  - 5 need follow up
- 5 sets of data provided

University of Hawaii	County Offices
HSEO	GEMS
KIUC	U.S. Armed Forces

Potential Study Update

OAHU POTENTIAL UPDATE

Converted the 2014 Potential study models to current version of LoadMAP, AEG's potential study tool. LoadMAP has been updated to:

- Handle PV (and other DERs, including storage)
- Include EVs and the newest emerging technologies
- Incorporate the most recent trends in codes and standards

In the coming weeks, we will complete our update for the Legislative report which will include updated assumptions for:

- Energy and Peak projections
- Distributed Solar PV
- Programmatic EE from HE and other contributing entities (high level)
- Codes and standards

In addition to supporting the Leg report, it will provide insights for the full-scale potential study next year

Baseline Study: Research and Sample Design

2018 BASELINE STUDY: OBJECTIVES

Build detailed information about how customers use electricity

Provide a baseline against which future changes in energy use can be measured

Provide information that supports efforts to monitor the effectiveness of Hawai'i Energy (HE) programs

Provide data to support the Statewide Potential Study

Provide data to support the planned Technical Reference Manual (TRM) update
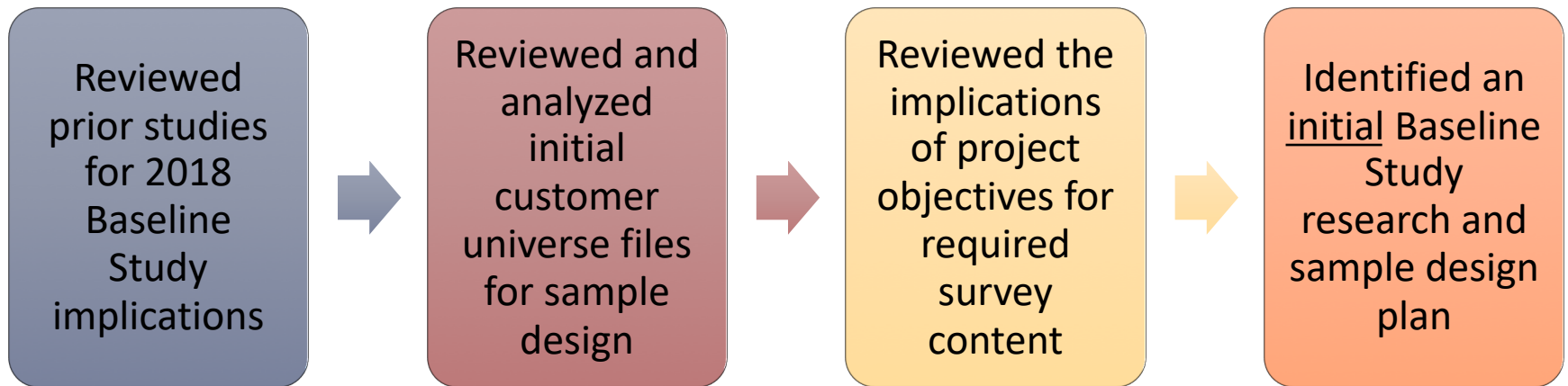
Support planning for future policies and programs

Understand likelihood to participate in future HE programs (and the reasons for these preferences)

Support HE program marketing efforts by identifying program barriers, benefits, and messaging

BASELINE STUDY: PROCESS AND STATUS

Our goals in this discussion are to share our current status with you, and to solicit your feedback on our current direction

| Reviewed prior studies for 2018 Baseline Study implications | → | Reviewed and analyzed initial customer universe files for sample design | → | Reviewed the implications of project objectives for required survey content | → | Identified an <u>initial</u> Baseline Study research and sample design plan |

BASELINE STUDY: TAKEAWAYS FROM PRIOR RELEVANT STUDIES

The team reviewed key prior studies for takeaways relevant to this effort:

- 2012 Baseline Study

- HECO biannual RASS studies

- 2014 Potential Study

AEG identified three takeaways from that work that are most relevant:

- Leverage the 2018 HECO RASS by coordinating on survey content and sample design

- Ensure that information for KIUC customers is appropriately included

- Use utility customer files as the sample source, rather than starting with telephone numbers (as the 2012 Baseline Study did)

BASELINE STUDY: <u>NONRESIDENTIAL</u> POPULATION SAMPLE DESIGN ISSUES

Population	Number of Accounts	Annual Energy Usage (GWh)	% of Energy Use	Treatment
Total	**64,000**	**6,300**	**100%**	
Government (including military)	5,700	1,700	28%	Special treatment
Home-owner assoc. (HOAs)	2,500	310	5%	Special treatment
Water / irrigation accounts	660	200	3%	Special treatment
Outdoor structures	2,700	120	2%	Exclude
Non-qualified owners	160	29	0.3%	Exclude
Less than 6 months data	3,500		0.3%	May exclude
Very low usage (<200 kWh/month)	6,000		0.1%	May exclude
Remaining Core Accounts	**42,780**		**61.3%**	**Mail / phone survey**

Large accounts (using 1 million+ kWh annually) were also flagged for special handling

The remaining "core" group of nonresidential accounts was sorted by size and island

BASELINE STUDY: <u>RESIDENTIAL</u> POPULATION SAMPLE DESIGN ISSUES

AEG reviewed a file of approximately 480,000 total residential accounts

We identified several subgroups for special treatment (shown below)

The remaining Core accounts will be sorted by island and size

	Accounts		GWh	
	Number	%	% of Annual	Notes
Starting point—total accounts	481,000	100%	100%	
Less than 6 months usage history	15,000	3%	1.7%	Exclude from Baseline research sample
Small accounts (LT 1,200 kWh)	73,500	15%	1.4%	Exclude from Baseline research sample
Homeowners Associations (HOAs)	1,250	0.3%		Include with nonres. HOA sample
Billed to businesses	10,000	2%		Hold for special handling
Billed to State / Count government	315	0.07%	3.0%	Hold for special handling
Large accounts	75	0.02%		Hold for special handling
PV accounts	70,000	14.6%	n/a	Hold for special handling
Remaining ("Core") accounts	**312,000**	**64.9%**	**93.9%**	**Base sample for Baseline survey**

BASELINE STUDY: QUESTIONNAIRE CONTENT

The research team worked with the EEM and all portions of the EM&V team to define the information content that should be captured

AEG concluded that:

- A 30-minute survey is required to capture all the technical information required
- 12-15 minutes more will be needed to capture the desired attitudinal / market potential information
- Onsite surveys will be needed to reliably collect some data elements

IMPORTANT TAKEAWAY: More than one survey per customer class will be required in order to capture all of the required information

BASELINE STUDY: STATUS OF THE RESEARCH DESIGN

AEG has shared an initial research design to the EEM team

- The design suggests a tiered series of customer surveys within customer class
- AEG considers this design a reasonable starting point

But, it is critical to note that this is not considered a final action plan at this point

- We are still working through scenarios on survey cost and customer coverage
- Because of this, the EEM has not signed off on the plan and what follows should be considered as tentative and subject to change

The EEM intends to provide a mechanism for interested TWG members to provide feedback on the final research design and on the survey questionnaires

BASELINE STUDY: RESEARCH DESIGN GUIDING PRINCIPLES

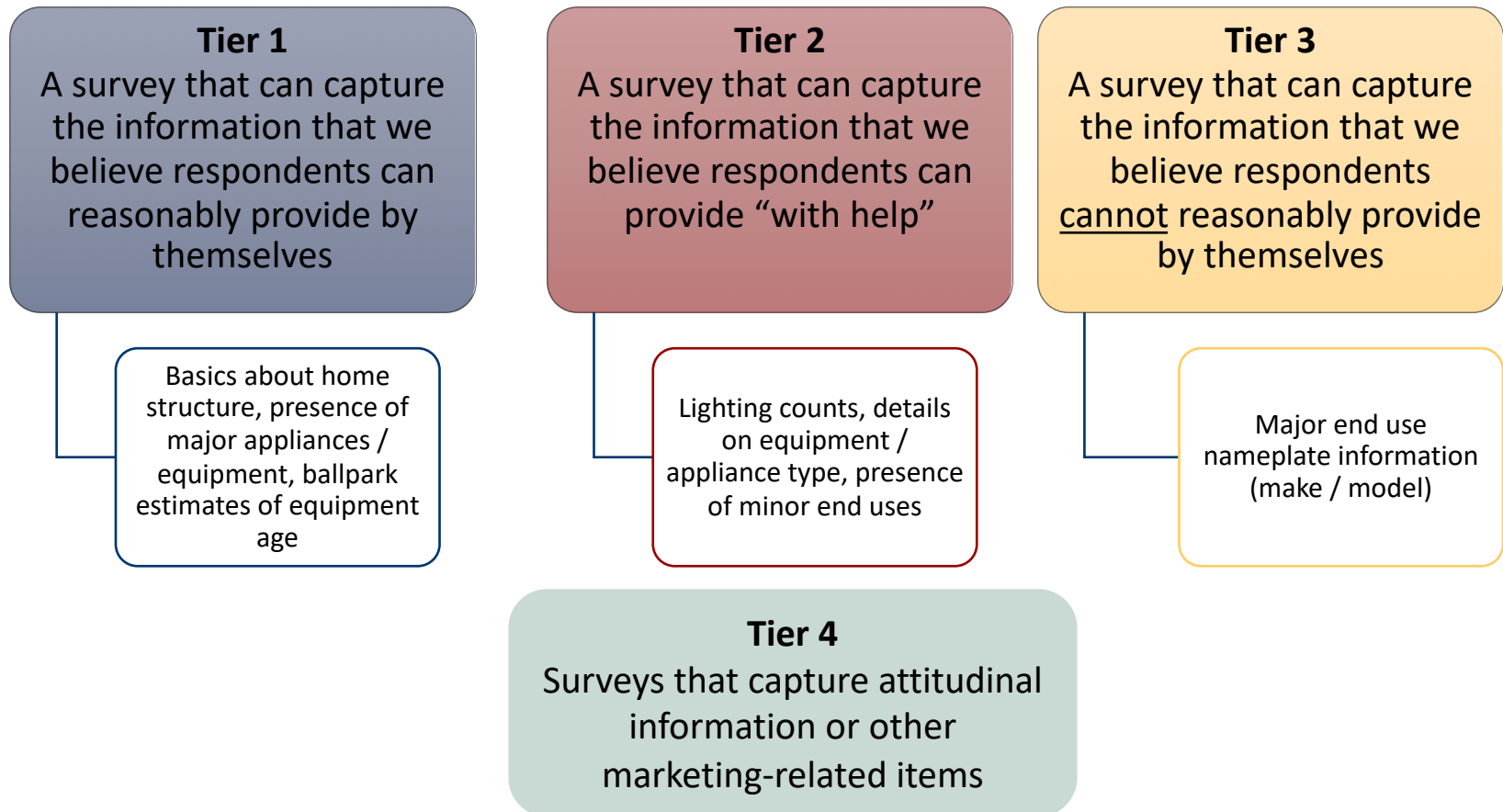The initial, overall research design approach considered the following:

- Collect the required information in the most efficient way possible (use lower cost survey methods when this is possible)

- Parse the content required across multiple surveys that can be linked / validated

- Allocate customers to the type of survey that is most appropriate for them

- Offer appropriate incentives for participation

Ensure that final survey samples provide sample sizes that make it possible to compare responses by:

- Island

- Housing type / business type

- Geography within island (residential sector)

BASELINE STUDY: THE DIFFERENT TYPES OF SURVEYS PER CUSTOMER CLASS

AEG is suggesting that the research design leverage a tiered approach to research and questionnaire design:

Tier 1
A survey that can capture the information that we believe respondents can reasonably provide by themselves

Basics about home structure, presence of major appliances / equipment, ballpark estimates of equipment age

Tier 2
A survey that can capture the information that we believe respondents can provide "with help"

Lighting counts, details on equipment / appliance type, presence of minor end uses

Tier 3
A survey that can capture the information that we believe respondents cannot reasonably provide by themselves

Major end use nameplate information (make / model)

Tier 4
Surveys that capture attitudinal information or other marketing-related items

BASELINE STUDY: RESEARCH DESIGN FOR LARGE FACILITIES

On-site Individual Depth Interviews (IDIs) are planned for respondents representing larger / more sophisticated facilities

- In contexts, telephone interviews may be more appropriate
- Initial plans call for conducting 100+ of these interviews

These interviews are currently planned for:

- Large nonresidential establishments (1 million+ kWh annually)
- Government / military accounts (as possible)
- Master-metered buildings
- Military housing owners / managers
- Property management firms
- Chain accounts
- Large residential accounts (100,000+ kWh annually)

BASELINE STUDY: RESEARCH DESIGN FOR <u>NONRESIDENTIAL</u> CUSTOMERS

Tier 1: Random sample of 1,000 respondents using a mail-online survey

- Capture base equipment / building envelope information that can be included in a 20-minute survey

Tier 2: Random sample of 400 respondents using a phone-audit survey

- Create an incentive for respondents to provide more detailed and comprehensive information about their equipment / facility

Tier 3: Recruit 200 respondents from Tier 1 or Tier 2 to complete an onsite validation survey

- These surveys will focus on validating key responses to their prior survey and to capture other useful information (e.g., nameplate)

Tier 4: Recruit 200-400 respondents total from Tier 1 or Tier 2 to complete an additional attitudinal survey

- These surveys will capture approximately 100-200 respondents per survey

BASELINE STUDY: RESEARCH DESIGN FOR RESIDENTIAL CUSTOMERS

Tier 1: Leverage HECO RASS with

- Expected sample size approximately 4,000 – 5,000

Tier 2: Random sample of 400 respondents using a phone-audit survey methodology

Tier 3: Recruit 200 respondents from Tier 1 or Tier 2 to complete an onsite validation survey

Tier 4: Recruit 200-400 respondents total from Tier 1 or Tier 2 to complete an additional attitudinal survey

BASELINE STUDY: NEXT STEPS

Work with HECO to resolve outstanding sample cleaning issues

Resolve outstanding sample design questions:

- Eliminate accounts with short customer tenures (e.g., LT 6 months)?
- Eliminate accounts with low usage (e.g., LT 200 kWh per month)?
- Eliminate free-standing wireless structures?

Ensure that data for the island of Kaua'i is appropriately developed and integrated

Revise research design once sample cleaning is finalized

Prepare questionnaires and data collection procedures

Q&A

Mahalo!

EEM and AEG Team