

EEPS Technical Working Group Meeting

September 27, 2017

1132 Bishop Street, Honolulu

Agenda

- 2:30 PM Welcome/Introductions/Agenda Review
- 2:40 PM Commission Welcome Comments
- 2:50 PM EEPS Background—Legislative and Regulatory Framework for EEPS
- 3:05 PM EEPS Review Process Overview
- 3:20 PM *--Break--*
- 3:35 PM Hawai'i Electricity Trends and Forecast
- 4:05 PM *--Quick Break--*
- 4:10 PM Stakeholder “Hopes and Dreams” for EEPS
- 5:00 PM Stakeholder Input on Research Scope and Questions
- 5:20 PM Next Steps/Meeting Wrap Up

Commission Welcome

Policy Background

- **Hawaii Clean Energy Agreement (HCEI), 2008**
 - 70% clean by 2030 – 30% EE, 40% RE (now 100% by 2045)
- **EEPS Law June HRS §269-96, 2009**
 - Commission lead
 - Maximize cost-effective EE
 - 4,300 GWH by 2030
 - Goals 2015, 2020, 2025
 - Reports every 5 years
 - Commission to adjust goals if needed
- **EEPS Framework -- Technical Working Group (TWG), 2010-2012**
 - Decision & Order 50089 Docket 2010-0037 on January 3, 2012
 - EEPS Framework is Exhibit A

EEPS Framework (Document Structure)

- Introductions
- Performance & evaluation periods
- Goals & metrics
- Strategies to meet EEPS
- Roles & responsibilities
- Tracking, reporting, timeline
- EEPS evaluation, measurement & verification (EM&V)
- Cost effectiveness & consumer bill impacts
- Funding, incentives & penalties

Roles & Responsibilities

- **Commission**
 - Responsible for EEPS, review/adjust EEPS Goals and Framework, Overarching EEPS EM&V, may help contributing entities' EM&V
- **EEPS Technical Working Group (TWG)**
 - Steering committee of members, make recommendations to Commission, identify contributing entities, recommend EM&V
- **Contributing Entities**
 - Implement programs or activities designed to produce EE savings that contribute to EEPS, submit reports and EM&V
 - Regulated Entities
 - PBFA
 - Utilities
 - Non-Regulated Entities
 - Everyone else

Performance & Evaluation Periods

- **Performance periods**

- End on December 31:
- 2015 (7 years)
- 2020 (5 years)
- 2025 (5 years)
- 2030 (5 years)

- **Evaluation periods**

- (~3 years after close of each performance period)
- Due to Legislature in January:
 - 2014 – EEPS & PBFA start up
 - 2019 – 1st perf. period
 - 2029 – 2nd perf. period
 - 2034 – 3rd perf. period
- Delay between performance and evaluation periods allows time for 1 year+ of billing data after performance period ends analysis begins.

GWH Goals & Metrics

- **4,300 GWH by 2030**
- **30% of forecasted sales in 2030**
 - Gross GWH measured at system including transmission & distribution
 - Updated utility sales forecasts for each evaluation period
 - 2008 forecast baseline
- **Fixed % of sales relative to 2-year average of most recent sales**
- ***Also additional EEPS EM&V info to be reported, later section***

Strategies to Meet EEPS

- **Resource acquisition** - usually rebates to a specific address or an identifiable mid-stream actor (stores that sell EE equipment, contractors that install EE equipment)
- **Market transformation** - long term effects, harder to measure but “plow the field” -- education, outreach, training, etc.
 - Resource acquisition is not as effective unless market transformation activities set the stage
- **EEPS Portfolio approach – portfolio is cost effective**
 - Can include specific approaches, activities or measures that are not cost effective on a stand-alone basis provided that they are useful in producing EE and that the overall portfolio is cost-effective

Delivery Channels

- **Regulated Entities**
 - Traditional programs (PBFA, KIUC, HECO)
 - Utility system efficiency
- **Non-regulated Entities**
 - Codes & standards (federal, state, local)
 - Legislative mandates
 - Government programs
 - Non-profits
- **Coordinated programs**
 - Multiple contributors (regulated and/or non-regulated)

Eligible Measures & Approaches

- **External factors do not count** – e.g., departure of a military base, stores close or reduce hours.
- **Customer-sited, grid-connected renewable energy systems** (i.e., PV) shall count toward RPS, not EEPS beginning Beginning January 1, 2015.” HRS § 269-91
 - **Solar hot water heating and seawater cooling do count for EEPS**
- **TWG to develop/maintain list of eligible measures**
- **Updated EE Potential Study**
 - Updated baselines studies aka “saturation studies” (survey actual buildings, appliances, demographics, electricity use in HI)
 - Include TWG in baseline study planning to meet multiple objectives for the state

EEPS Tracking & Schedule

- **Designate a “Reporting Entity” / “Reporting Contractor”**
- **Develop a reporting system**
- **Review reported savings**
 - Regulated Entities
 - Annually
 - Non-regulated entities
 - Work with EEPS Reporting Contractor to work out a schedule (ultimately translated to annual savings)
- **Primary metric for all is: gross kWh at the system level, 2008 baseline**

EEPS Evaluation, Measurement & Verification

- **EM&V**

- Savings estimates must be “defensible in regulatory and legislative proceedings”
- Summary of lessons learned to assist with future EEPS implementation
- Contributing Entities must submit savings estimates & funding for their EM&V but Commission may assist
- Commission to fund/conduct overarching EEPS EM&V to adjust for double-counting, free ridership, etc.
 - EEPS EM&V Contractor
 - May assist Contributing Entities evaluate savings from their programs/activities

EEPS EM&V Planning

- **EM&V Planning**
 - EEPS EM&V plan
 - Annual EM&V Work Plan
 - Budgets, timeline, allocation of resources between programs, activities measures
 - Activity-specific research plans
 - If needed
 - EEPS Technical Reference Manual (TRM)
 - Maintained by EEPS EM&V Contractor, based on existing information where practicable

Metrics

- Gross savings at generation
 - First-year
 - Lifecycle
 - Cumulative
- Free-ridership (net-to-gross)
- Persistence
- Baseline assumptions (2008 forecast baseline)
- Spillover
- Takeback & Rebound
- Replacement
- Implementation
- Co-benefits (GHG reductions, jobs created) etc. TWG to recommend
- Other metrics if desired
- EM&V must be based on current industry best practices + value of information from EM&V

Cost Effectiveness

- **Tests**
 - Ratepayer-funded EE shall be cost-effective based on Total Resource Cost test (TRC) aligned with supply alternatives
 - Program portfolios must also pass Utility/Administrator cost test
- **Benefits**
 - Avoided electricity, avoided generation/capacity, T&D, non-electric benefits (jobs, GHGs resilience, etc.)
- **Costs**
 - Renewable energy + capacity costs/IRPs
 - Avoided costs for various EE
 - Utilities to provide avoided costs + forecasting info

Bill Impacts and EEPS Funding

- **TWG and Consumer Advocate (especially) focus on**
 - Bill impacts for participant and non-participant ratepayers
 - Rate class totals
- **EEPS Funding, Incentives, Penalties**
 - Funding for Commission-regulated entities to be evaluated regularly + during EEPS reviews
- **Incentives/Penalties**
 - PBFA -- \$ withheld until verified performance
 - No goals, incentives, penalties for non-PBFA within the current EEPS Framework

1st EEPS Evaluation Period (2014 Report)

- **Covered EEPS Start-up**
 - PBFA launch, EEPS Framework development, EE Potential results, PBFA accomplishments-to-date
- **Results**
 - On track to meet interim (2009-2015) EEPS Goals
 - Potential study indicates that 6,300 GWH is available by 2030; ~50% more than the 4,300 GWH target
 - 86% of savings 2009-2015 expected to come from PBFA
 - Most of the rest from federal lighting standards
 - EEPS goals are cost-effective and achievable

1st EEPS Evaluation Period (2014 Report)

Topics to Monitor/Discuss with TWG

- Modify overall or interim goals?
- Set targets, incentives, penalties, etc. for contributing entities (other than PBFA)?
- Adjust PBF collections? If so, how?
- How to modify PBFA programs/services based on results of the baseline and potential studies?
- Should the PBF/PBFA programs expand to include KIUC?
- Should PUC ask Legislature to “encourage” non-regulated entities to more actively produce/measure/report energy efficiency (e.g., codes and standards, other activities)?

2nd EEPS Evaluation Report (this Review)

- **Evaluate results 2009-2015**
 - Progress toward goals – GWH and other metrics
 - Updated potential study
 - Updated baseline studies
- **Follow-up on questions from 1st EEPS Evaluation Report and new issues**
- **Lessons learned**
- **Updates to EEPS, EEPS Goals and/or EEPS Framework, if needed**

Context for this EEPS Review

- **Many changes since 2008 (HCEI)!**
- **Grid, technology and market developments**
 - Efficiency is one of many options to manage the amount (and timing) of electricity use
 - 100% renewables mandate
 - Avoided costs of efficiency / value proposition for EE is changing
 - Load served by utilities is declining and rates are going up
 - in Oahu load has declined since 2004 (before PBFA programs)
 - New building codes and appliance/equipment standards
 - PBF Funding is down
 - Equity is still a concern

EEPS Review Roles and Responsibilities

- **Commission** -- lead the review, set priorities, decide
- **TWG** – make recommendations
Provide expertise and perspective, information on TWG-based activities and policies, review and comment on documents and reports (informally and occasionally via the EEPS Docket),
- **EEM team** – support the Commission
Facilitate TWG, prepare and memoranda and summary reports, manage EEPS EM&V.
- **EEPS EM&V** -- evaluation, measurement & verification
Conduct several large studies and provide additional analytic support as needed throughout

EEPS EM&V for Current Review

- **EEPS Load Impact Evaluation (GWH) 2009-2015**
 - Energy efficiency program tracking data
 - Electricity sales and forecasts
 - Account for influences e.g.,: weather, rates, codes & standards, rooftop PV, electric vehicles, etc.
- **Baseline studies – current electricity use in HI**
 - Detailed surveys of buildings, equipment, and customer demographics (onsite, mail, phone and web).
- **Energy efficiency potential study and scenario analyses**
 - Available cost-effective EE potential based on updated baseline info, avoided costs, rates, technologies, etc.
 - Use or develop estimates of likely DER penetration in order to identify opportunities, costs and benefits of efficiency.

EEPS Review Approach (this cycle)

- **Four research “tracks” based on discussion topics**
 - Regulatory, market and programmatic environment and priorities
 - EEPS Progress 2009-2015 (GWh)
 - PBF and PBFA programs
 - EEPS goals, targets and Framework
- **Tracks operate on individualized schedules as needed**
 - Improved ability to prioritize resources and avoid bottlenecks
 - Tracks feed together and eventually merge
 - Crossover topics are identified in the EEPS plan
 - Memoranda to launch each track, then as needed based on progress

Track 1: Current Conditions in HI

- **Regulatory, market context, technologies, programs & state priorities**
 - Summary of regulatory and market info, technologies
 - TWG to identify all programs/activities at their organizations affecting annual electricity demand/use
 - Contributing Entities count toward EEPS goals
 - Other info for use in demand forecasting to track EEPS progress & potential
 - TWG to ensure EEPS review addresses state priorities & provides info for other purposes if possible
 - Baseline studies of current elec. use, buildings, equipment

Timeline

- Launch Q4 2017
- Baseline studies Q2 2018 – Q1 2019
- Ongoing discussion as needed

Track 2: EEPS Progress 2009-2015 (GWH)

- **Assess EEPS progress (GWh) based on load impact evaluation**
 - Compare forecasts to baseline goals + actual sales + forecasts through 2030
 - Load impact evaluation assessing EEPS w/multiple factors
 - Program tracking info
 - Codes & standards
 - Other activities/programs that affect sales
 - Weather, demographics, etc.
 - Location/timing of effects if possible
 - Identify info needed for resource planning forecasts going forward

Timeline

- Launch Q1 2018
- Load impact evaluations Q2 2018 – Q4 2018
- Ongoing discussion as needed

Track 3: PBFA Programs

- **Assess PBFA programs, monitor progress, make recommendations**
 - Review/discuss PBF status
 - Review PBFA accomplishments-to-date (GWH + other goals, e.g., equity, program scope)
 - Monitor, PBFA programs, recommend changes (if needed)
 - Work with PBFA Technical Advisory Committee (TAG)
 - TWG especially focused on “big picture” issues

Timeline

- Launch Q1 2018
- Ongoing/recurring, as new info is developed for EEPS review, PBFA EM&V and other factors

Track 4: EEPS Goals & Framework

- **Assess EEPS Goals & Framework**
 - EE Potential Study + scenarios
 - Will include DER forecasts in order to identify remaining potential
 - Review EEPS Framework issues and topics
 - Goals, metrics, incentives/penalties, etc.
 - Modify any of above if needed
 - EEPS tracking

Timeline

- Launch 2018, then mostly dormant until \approx Q2 2019 when EE potential study starts (after baseline studies are finished Q1 2019)
- EE potential study + scenarios – Q2 2019-Q4 2019
- Ongoing discussion as needed

Break

Forecasting the Impacts of EEPS

An Overview

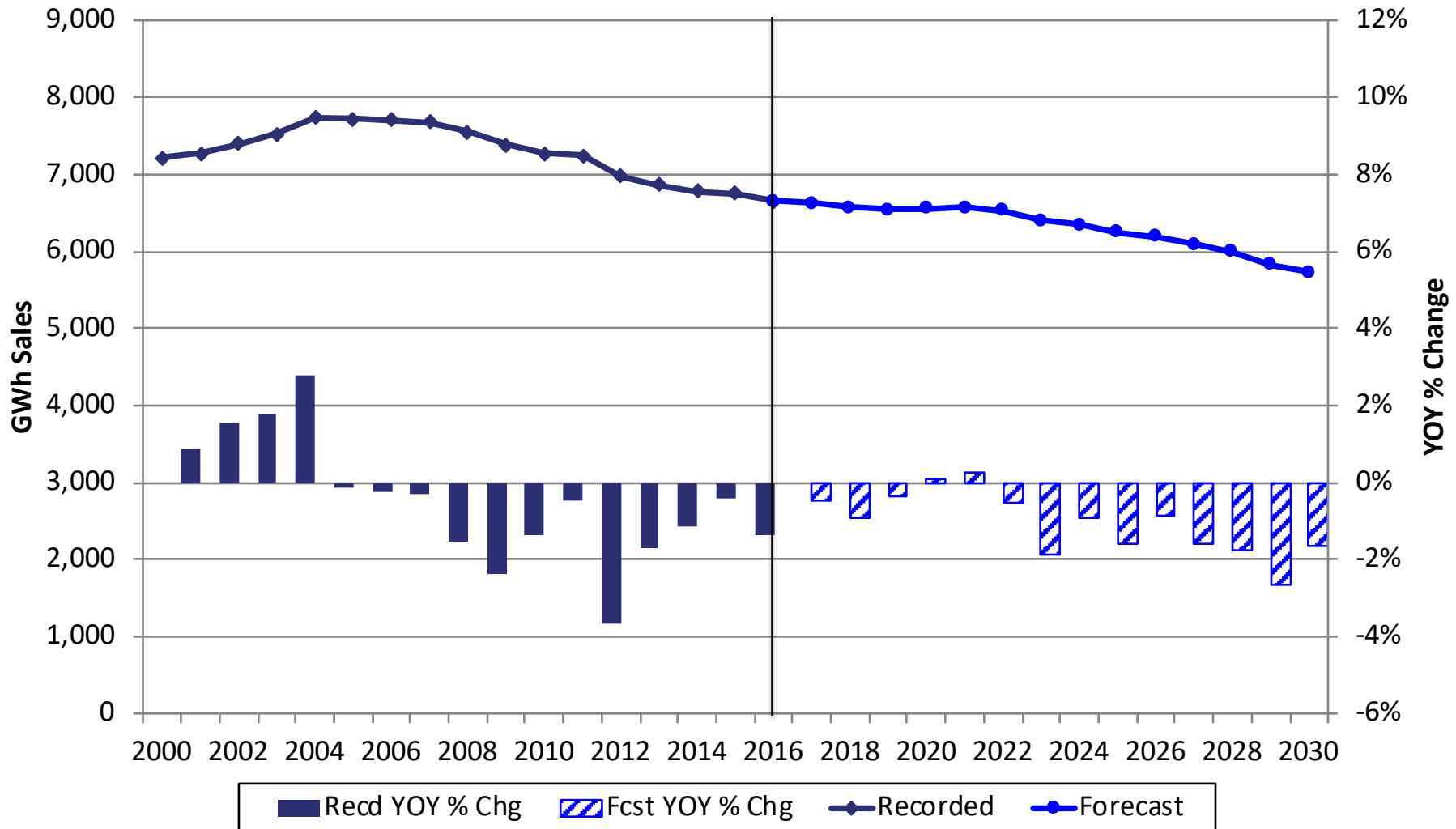
Therese Klaty, MECO

Uses of the sales forecast

- Used in 2 of the three 3 metrics for achieving EEPS
 - Energy efficiency to meet 30% of forecasted energy sales in 2030 (which assumes updated utility sales forecasts are used for each evaluation period)
 - Energy efficiency to meet a fixed percentage of sales relative to a two-year average of total most recent statewide energy sales.
- The forecast is used for all things planning

Hawaiian Electric's sales have been declining since 2005

The decline in sales is primarily attributed to the impacts of energy efficiency, conservation and customer-sited generation and is assumed to continue



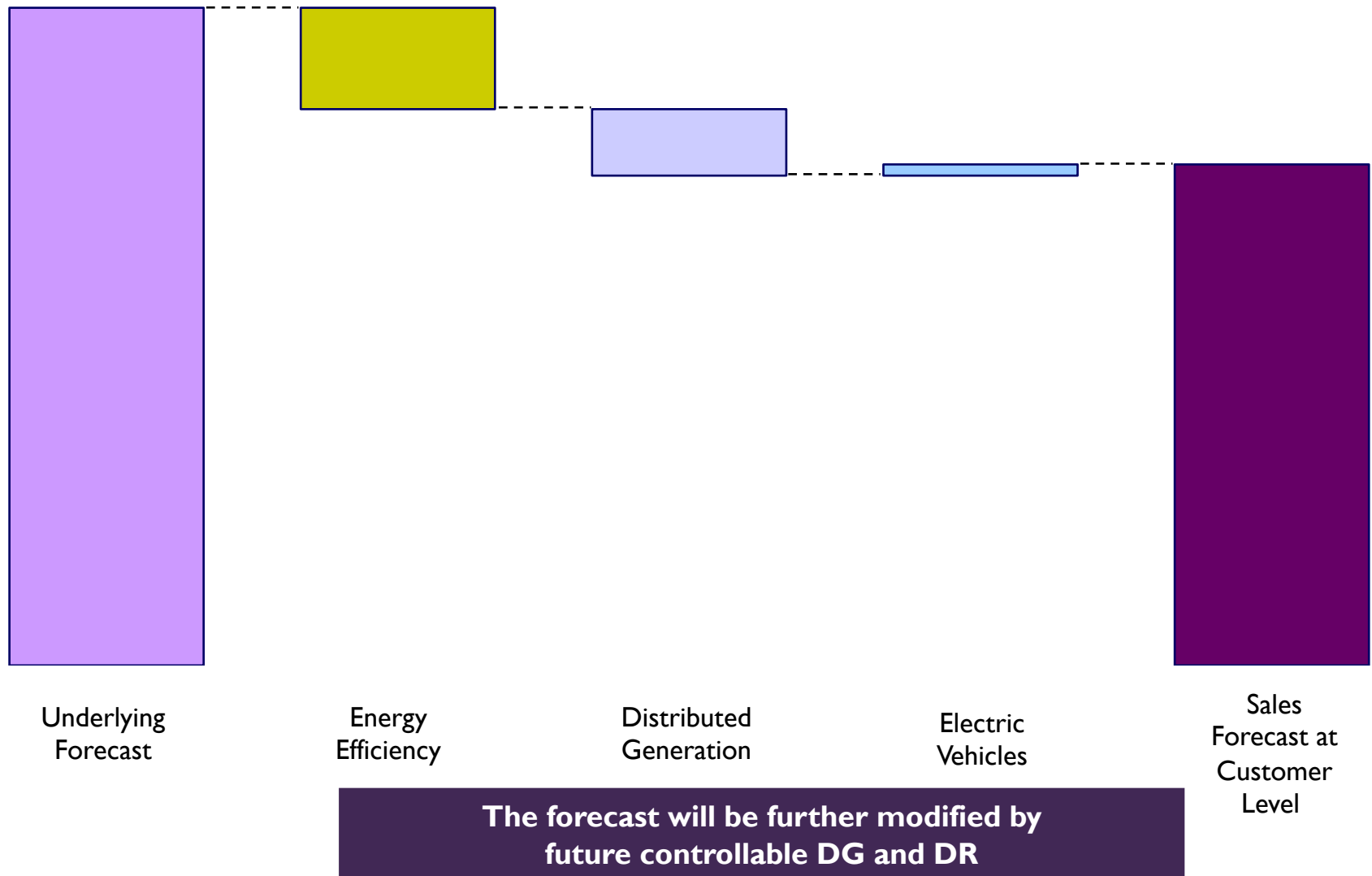
Different methods used by utilities for forecasting energy efficiency (“EE”) impacts

- EE embedded in historical sales data used for modeling with no further adjustment to model results
- EE embedded in historical sales data used for modeling followed by adjustments for future incremental EE
- **Reconstruct sales as if no EE then add historical and future EE**
- Model EE as a independent driver of sales
- Statistically adjusted end-use model
- Combination of the above

Assumptions we use to forecast EE impacts

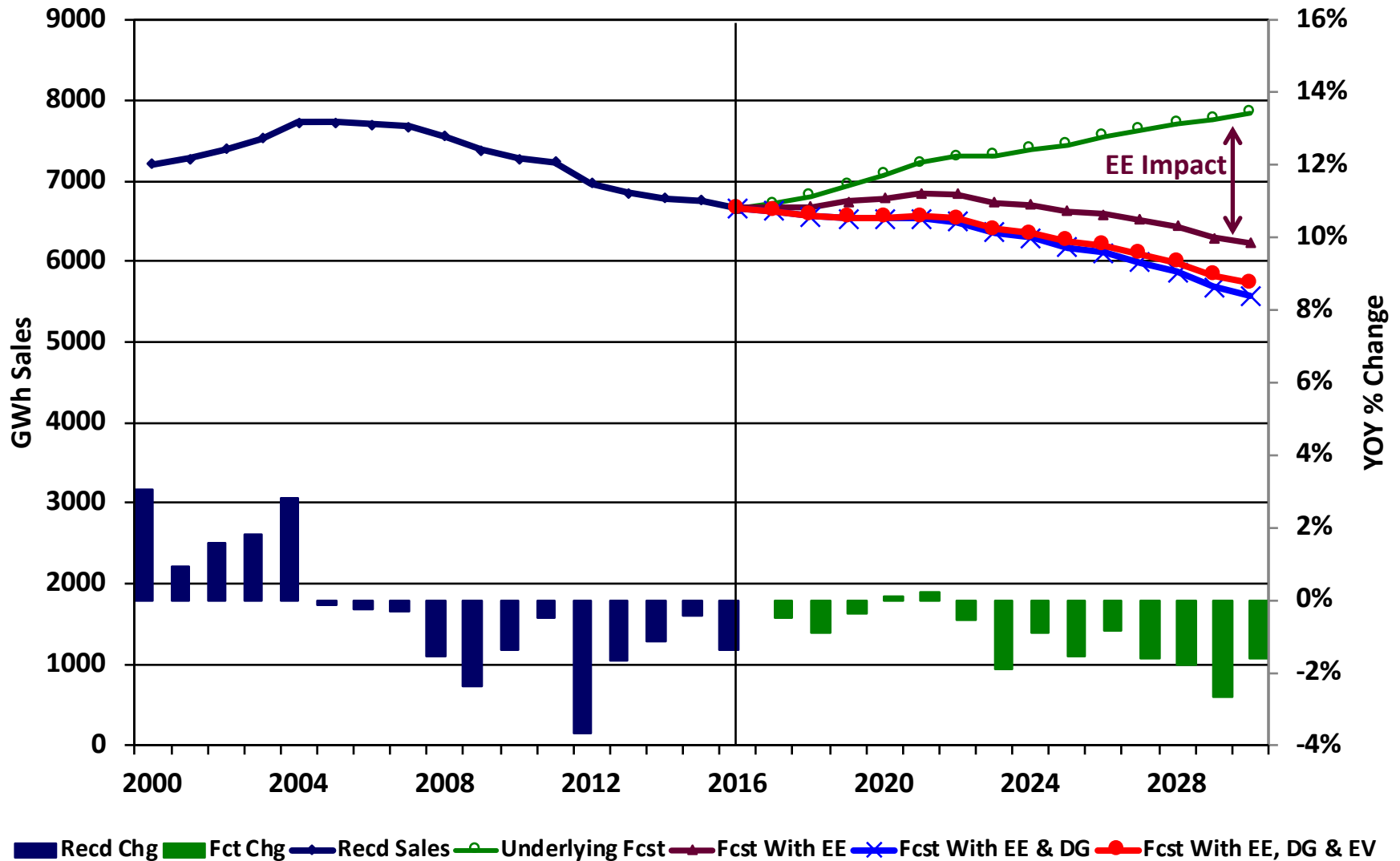
1. The EEPS target of 30% reduction of sales by 2030 will be achieved
2. Near term sales reductions from Hawaii Energy and a percentage of impacts from codes and standards identified by EnerNOC in the potential study
3. S-curve using historical impacts starting in 2009 with point of inflection around 2030
4. Evening peak demand reduction uses a historical relationship of annual energy savings to peak demand

The forecast is developed in layers



Sales Forecast With Layers

Energy Efficiency Provides the Largest Reduction to Sales



Requests for Information to Support EEPS Forecasting

- Projected behind the meter EE impacts
 - Incentive programs
 - Codes & Standards
 - Naturally occurring
- Aggregate hourly profiles by island
- Time frame – near term (1-5 years) out to 2030 and beyond
- Sensitivities

Data Sources

- Updated EE potential study
- Surveys
- Borrow studies from other utilities
- Database to track and report impacts from various sources

Conclusions

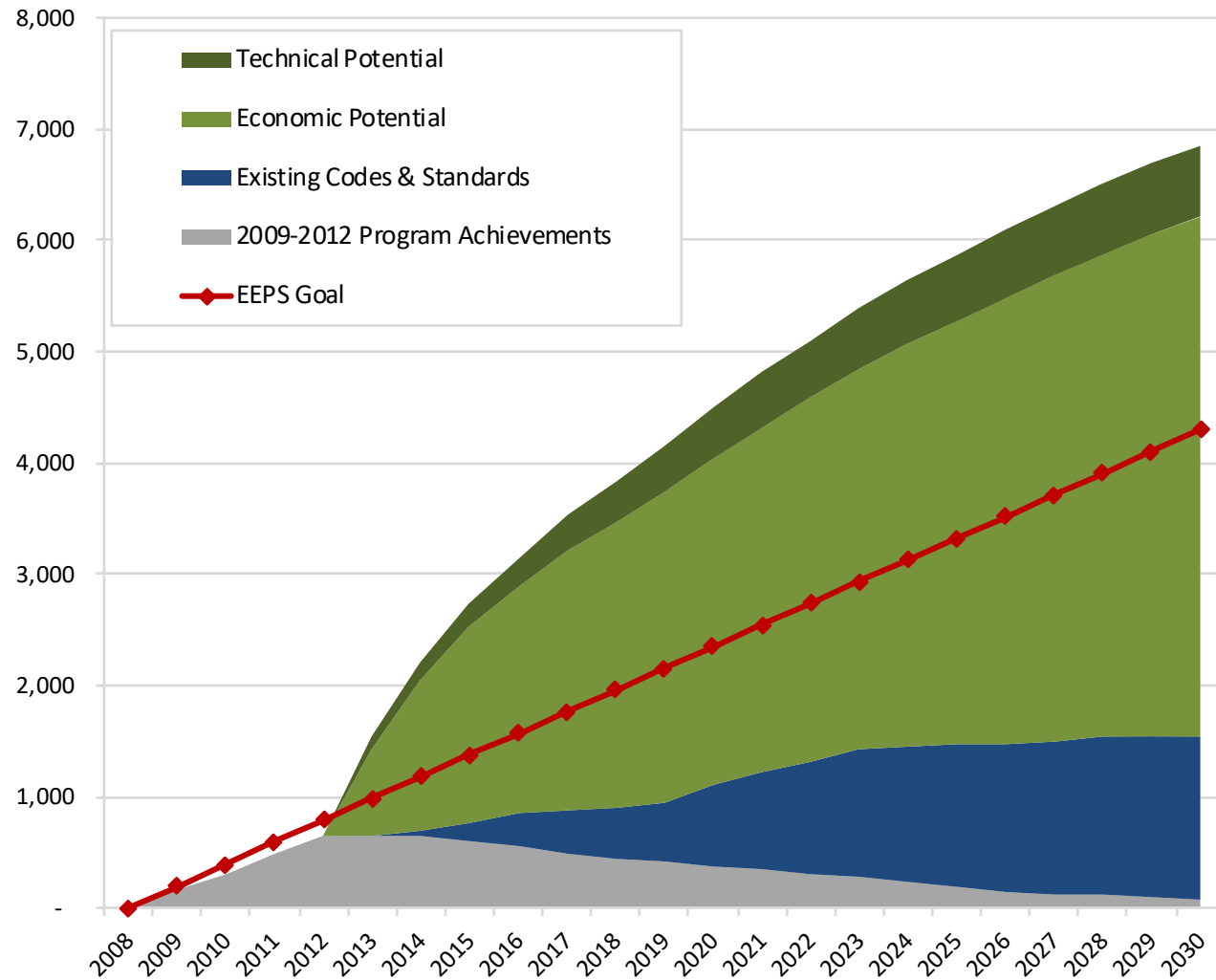
- Forecasting the impacts of energy efficiency is a challenging yet crucial task
- We are counting on achieving the EEPS targets in our forecasts and resource plans
- Energy efficiency makes up the largest component of the reduction to sales
- A lot more information is needed to track and develop energy efficiency forecasts
- It will take a collective effort to track and achieve the EEPS goals

Mahalo

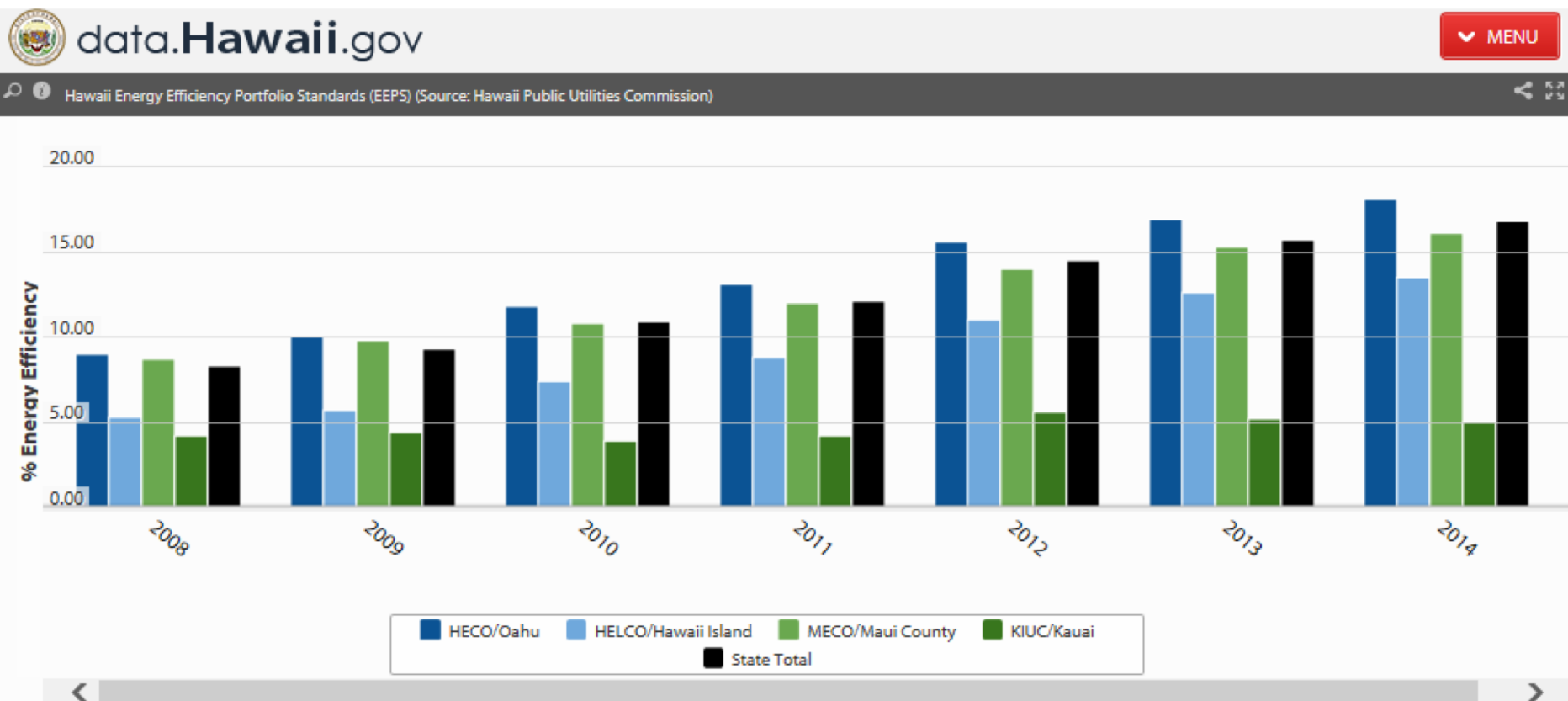
EEPS Potential Study

Potential savings compared to EEPS 4,300 GWh goal

- Goal is likely to be met through a combination of:
 - Energy efficiency programs, such as those offered by the PBFA and KIUC
 - Existing codes and standards already on the books



Removing Impacts Prior to 2008 Results in Achieving 8.5% Energy Efficiency in 2014



KIUC Electricity Trends

Tim Blume

KIUC Historical Annual Sales

Annual kWh Sales								
Year	Schedule D: Residential	Schedule G: Small (<30kW) Commercial	Schedule J: Large (30-99kW) Commercial	Schedule P: Industrial (>=100kW) Secondary Metered	Schedule L: Industrial (>=100kW) Primary Metered	PPA (Non-Tariff) Customers	Schedule SL: Street Lights	Total
2009	161,946,254	58,775,630	54,387,913	114,413,017	42,638,562	1,409,589	2,702,271	436,273,236
2010	159,425,808	59,481,202	53,235,877	114,521,985	44,990,571	148,199	2,729,677	434,533,319
2011	159,071,128	59,790,431	51,859,338	116,823,510	44,379,446	104,788	2,716,421	434,745,062
2012	157,278,152	59,663,973	51,607,028	115,389,124	46,285,546	175,336	2,759,910	433,159,069
2013	157,866,897	59,077,990	51,396,701	112,213,941	47,900,542	264,086	2,758,039	431,478,196
2014	159,151,338	60,426,103	50,187,490	109,838,487	47,426,575	124,668	2,768,844	429,923,505
2015	161,826,042	61,801,021	50,791,819	104,433,662	50,125,564	319,884	2,780,067	432,078,059
2016	163,958,718	61,187,770	52,044,639	106,753,049	52,481,360	97,972	2,564,454	439,087,962

Short Term Forecast - 2018

- Challenges:
 - Recent upward swing in 2017 sales not present in prior years;
 - Still analyzing, but seems residential AC may be playing a significant part in the sales increase;
 - Also some increase in commercial and industrial classes;
 - Maybe due to much hotter summers over the past two years;
 - KIUC anticipates this trend toward AC adoption will continue.

Long Term Forecast – 10 years

- Difficult to predict amount of DER:
 - Technologies: new and improved
 - Economics:
 - DER system costs
 - Retail energy costs
 - Export energy rates/non-export periods
 - Utility rate designs
 - Future of tax credits
 - The greater the amount of renewable grid saturation, the more challenging the issues become.

TWG Stakeholder “Hopes and Dreams”

Group Discussion

Short Break

TWG Hopes & Dreams for EEPS Review

- Current conditions in HI? State needs/coordination?
- Load assessment/forecasting needs?
- PBFA Programs?
- EEPS Goals & Framework?
- Other?

Stakeholder Input on Research Scope and Questions

Next Steps for TWG Input

- Discussion during today's TWG to be summarized
- Written questions to be sent to TWG shortly
- EEPS Review Plan finalized
- TWG written responses ~2 weeks thereafter
- Subsequent TWG meeting to be scheduled later in the year

Thank You For Participating!

Special thanks to Hawai'i Energy for hosting today's meetings and providing the refreshments!

And to Therese & Tim for their presentations.

Questions/Comments?

Contact us at:

tedpope@2050partners.com

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Appendix

Crossover Between Tracks

- **Track 1: Current Conditions in HI**
- **Assess HI status + TWG ensure EEPS review meets broad state needs**
 - Input to all tracks especially T4: EEPS Goals & Framework
- **TWG to identify all programs/policies that affect electricity use**
 - Especially to T2: Load impacts + forecasting
- **Baseline studies**
 - Especially to T3: PBFA Programs + T4: EE potential study

Crossover Between Tracks

- **Track 2: Load Impacts 2009-2015 + Forecasts to 2030**
- **Assess EEPS progress considering multiple factors**
 - Input to all tracks, especially
 - T3: PBFA Programs
 - T4: Info for EE potential study
 - T4: Progress toward EEPS Goals
 - T4: EEPS tracking (forecasting needs)
- **Track 3: PBFA Programs**
 - Input to all tracks especially T4: EEPS Goals
 - Progress toward EEPS Goals
 - Strategies to meet EEPS – PBFA programs

Crossover Between Tracks

- **Track 4: EEPS Goals, Framework**
 - **Input** from all tracks, especially
 - **Track 1:**
 - T1: Memo on regulatory, market, technological environment
 - T1: TWG ensures EEPS review meets state goals
 - T1: Baseline studies (input to EE potential)
 - **Track 2: GWH Impacts 2009-2015 + forecasts to 2030**
 - T2: Load forecasts (input to EE potential)
 - T2: Forecasting needs EEPS (EEPS Framework + tracking)
 - **Track 3: PBFA Programs**
 - Strategies to meet EEPS (PBFA component)

EEPS Timeline

- **2017**
 - Launch EEPS review
 - EEPS Docket
 - Launch T1
 - HI current conditions + TWG info
 - Check to make sure T4 topics EEPS + EEPS Framework are correct for review
- **2018**
 - T1: ongoing
 - Baseline studies Q2 2018-Q1 201
 - Launch T2: GWH
 - Impacts 2009-2015
 - Forecasts through 2030
 - Results by Q4
 - Launch T3: PBFA
 - Ongoing
 - Report to legislature
 - Based on T1, T2, T3 progress-to-date

EEPS Timeline

- **2019**

- T1: State needs – ongoing
 - Q1 Baseline studies done Q1 2019 + final touches as needed
- T2: GWH impacts- final touches if needed
- T3: PBFA – ongoing/recurring
- T4: Launch EEPS Goals & Framework
 - EE Potential Q2-Q4

- **2020**

- T1: State needs – if needed
- T2: GWH impacts -- done
- T3: PBFA – ongoing
- T4: TWG recommendations re: EEPS goals + Framework + tracking -- Q1 2020
 - Final report Q1 2020
 - Commission decision Q1 2020

Key Research Questions

- Where does EEPS fit within the current regulatory, market and programmatic environment?
- How can the Commission and the TWG make sure the EEPS stays relevant to the core challenges confronting Hawaii over the next decade and through 2030?
- How much energy efficiency has been produced through programs or policies designed to contribute to EEPS, based on recorded or estimated impacts (the information submitted to the EEPS review)?

Key Research Questions

- How well do tracked savings identified reconcile with actual vs. projected electricity sales 2009-2015?
- Where and when are the EEPS savings occurring on the grid? What hourly changes to net electricity demand have those changes caused?
- What data do the utilities need for forecasting and resource planning (from PBFA and others?)

Key Research Questions

- How have reductions in PBF collections played out thus far for the PBF portfolio and what are projections for the future?
- Should the structure or amount of the PBF be modified?
- Is the current PBFA program portfolio properly balancing the multiple policy goals (cost-effective energy efficiency, inter-island equity, serving hard to reach customer segments, deep savings, etc.)? Are the PBFA programs supporting customers equitably?
- Would it be useful and cost-effective to direct the PBFA to incorporate support for a wider variety of DERs in their program portfolio, in addition to energy efficiency, in instances where a different technology or approach or a combination of these would more effectively help customers reduce the amount of electricity they need to buy from utilities?

Key Research Questions

- Given the changing utility industry and technology innovation, how might energy efficiency be valued differently as a grid resource than it has in the past and how might that change estimates of available potential?
- How are the joint effects of DER penetration and other grid modifications affecting the available potential amount and costs of energy efficiency?
- Are the EEPS goals by 2030 reasonable and achievable? Are adjustments required, if so, what adjustments?
- Do any provisions of the EEPS Framework need to be adjusted or modified?
- How are the EEPS metrics working?

Key Research Questions

The EEPS Framework specifies development of EEPS tracking mechanisms. It was not really necessary to track annual savings from multiple entities during the first EEPS performance period since almost all of the savings were expected to be from PBFA programs, but going forward there will likely be more participation from Contributing Entities.

- What should be tracked (e.g., annual reductions, location, load shapes, lifecycle savings, etc.)?
- How should Contributing Entities estimate, evaluate and convey savings for inclusion in subsequent EEPS reviews?