ENERGY EFFICIENCY PORTFOLIO STANDARD (EEPS) TECHNICAL WORKING GROUP (TWG)

OCTOBER 19, 2022

1:30 TO 3:00 P.M.



COMMISSION WELCOME

COMMISSIONER POTTER

AGENDA & MEETING OBJECTIVES

JENNIFER BARNES ENERGY EFFICIENCY MANAGER TEAM

AGENDA

- Commission welcome
- EEPS Policy Overview
- MPS & EEPS Expansion Opportunity
- Overview of Hawaiian Electric Demand Response Programs
- Discussion:
 - Extending EEPS to 2045
 - Savings Measurement
 - Demand Response
 - Other Policy Objectives
- TWG in 2023

MEETING OBJECTIVES

- Commission is interested in exploring extending & expanding EEPS in the following areas:
 - Extending the EEPS horizon to 2045
 - Updating the target to align with the new time horizon
 - Adding a demand response ("DR") element
- The objectives of this meeting are:
 - To seek the TWG's initial feedback on these subjects
 - Identify areas of deeper discussion & analysis in 2023

EEPS POLICY OVERVIEW

JENNIFER BARNES ENERGY EFFICIENCY MANAGER TEAM

A HISTORY OF LEADERSHIP

2001	2009	2015	2023
Act 272: 9% RPS established	Act 155: Established EEPS; increased RPS to 40%	Act 97: 100% RPS by 2045 "Moonshot" "gamechanger"	??

- Rocky Mountain Institute highlighted lessons from their 2020 report Powering Paradise:
 - A willingness to try Hawai'i is constantly pushing boundaries without always having a clear script for where it will go
 - Clear guidance from leadership Hawai'i demonstrates the importance of establishing reasoned, clear, and compelling
 intentions for the energy transition
 - Stakeholder engagement Hawai'i has consistently crowdsources invaluable wisdom from local stakeholders

POLICY BACKGROUND

Hawaii Clean Energy Agreement (HCEI), 2008

70% clean by 2030 – 30% EE,40% RE(now 100% by 2045)

EEPS Law - HRS §269-96 - 2009

- Commission is lead
- Maximize cost-effective ⊞
- 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

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
- Metric for the 2030 GWh goal was clarified as cumulative persisting GWh

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 <u>programs</u> or <u>activities</u> designed to produce EE savings that contribute to EEPS, submit reports and EM&V
 - Regulated Entities
 - PBFA
 - Utilities
 - Non-Regulated Entities

PERFORMANCE & EVALUATION PERIODS

EEPS Performance Periods (calendar years)	Evaluation Reports	Due to Legislature
2009-2015	First Report (EEPS & PBFA start up)	January 2014
	Second Report	January 2019
2016-2020	Third Report	January 2024
2021-2025	Fourth Report	January 2029
2025-2030	Fifth Report	January 2034

Delay between performance and evaluation periods allows time for 1 year+ of billing data after performance period ends analysis begins

MEETING EEPS

Strategies

- Resource acquisition usually rebates to a specific address or an identifiable mid-stream actor
- Market transformation long term effects, harder to measure but "plow the field" -- education, outreach, training, etc.
 - Resource acquisition is not as effective <u>unless</u> 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 agencies
 - 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 <u>do</u> 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

SUMMARY OF SAVINGS SOURCES IN EEPS

Counts towards EEPS:

- Traditional EE programs (resource adequacy) delivered by PBFA & KIUC
- Market transformation
- Solar hot water heating
- Seawater cooling
- Utility rate design or advanced metering
- Utility system improvements, such as high-efficiency transformer replacement, re-conductoring and voltage regulation or optimization
- Building and federal, state and local appliance standards
- Legislative Mandates:
 - State building retrofits
 - Time of Sale reporting
 - ESCO contracts & benchmarking
- Education by non-profits, environmental groups, and community organizations

Does not count towards EEPS:

- Customer-sited, grid-connected renewable energy systems (i.e., PV) after 2014
- External factors do not count e.g., departure of a military base, stores close or reduce hours.

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Potential Assessment Review

Date: October 19, 2022 Prepared for: October TWG Meeting



Energy Efficiency Portfolio Standards

The EEPS target appears to be attainable under the Achievable business-as-usual (BAU) scenario

- ◎ Based on 2019 analysis which assumes similar levels of spending and savings
- ⊘ Does not include any COVID implications i.e. supply constraints

There is substantial amount of additional cost-effective savings – economic potential (in green) – available through 2030



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Looking Farther into the Future





- As we push toward 2045, the future impacts are <u>larger</u> compared to the persisting impacts
- Savings from previous interventions (persisting impacts) continue to <u>decline</u>
- Savings from future
 programs (achievable BAU)
 must continue and increase
 to fill the gap

Achievable Potential EE Savings by End Use

The commercial sector is expected to contribute more savings than residential

By 2030, the residential sector is expected to achieve between 549 GWh and 770 GWh

- Cooling, water heating, and lighting measures account for the majority of savings \odot
- By 2030, the commercial sector is expected to achieve between 780 GWh and 986 GWh
- Substantial savings come from lighting measures followed by cooling \odot

All Island Residential End-Use Savings as a Percent of Total







Residential Lighting and EISA Backstop



- ✓ Under the current administration the EISA backstop is scheduled to <u>take effect</u> (again) <u>in July 2023</u>
- ✓ HE has proactively addressed this in its portfolio by <u>shifting away</u> from residential lighting
- We expect savings to <u>shift back to C&S</u> (it does not disappear) and it will change the picture

DR Target vs. Peak Demand Metric



DSM Type	On-Peak Impact (aMW)	On-Peak Impact (% of Baseline)
Energy Efficiency	182.4	20%
TOU+CPP	66.4	7%
Capacity-Decrease	29.6	3%
All DSM Classes	278.4	30%



A Future EEPS Metric could take on various shapes

- DR Metric could be considered as dispatchable DR/GS providing capacity reduction through Control of end-use loads (3%)
- DR Metric Could also include incremental impacts of rates with "event-day" structures (7%)
- Peak Demand Metric Would also include reductions from EE (20%)
- Peak Demand Metric for EEPS Could further consider peak reductions from codes and standards (not quantified in 2020 MPS)

EE + DR/GS + Rates – Hourly Peak Impacts







Hourly impacts:

- EE (under the purple line)
- Shows substantial potential for overall reduction on peak days

DR/GS (btw. purple and green lines)

Shows high potential during the peak period for residential

Rates (btw. green and grey lines)

- Show the highest ability to target peak periods
- ✓ Impacts used may not be reflective of Hawaii response to programs

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Demand Response & Grid Services In Hawaii

ANUS

Technical Working Group October 19, 2022



Agenda

- Demand Response and Grid Services
- Current Portfolio offering
- Success/Challenges
- Innovation
- Link to IGP
- Future Portfolio shaping



What is Demand Response (DR)?

Traditional Demand Response programs offer customers the opportunity to provide services to support the operation of the grid.

These programs have promoted the decreased electricity consumption at specific times of the day or upon system emergency events through direct payment incentives to Customers.





What are DR Resources?

DR represents the act of controlling a DER



Directive of Demand Response

Order 32054 issued on April 28, 2014 under Docket No. 2007-0341 "The Commission is directing the utilities to address the benefits of costs of using demand response to (1) assist in integrating additional renewable resources into the grid; (2) providing additional ancillary services, including, but not limited to , frequency management, regulation (up and down), dispatchable resources, and contingency reserves; and (3) manage distribution system requirements.

The Companies agrees with this directive from the Commission and believes demand response has a critical role in the path to 100% renewable energy.



Grid Services (System-level)

Capacity Grid Service

Capacity: for dispatchable resources the rating of the unit; for variable resources- the capacity that can be assured in the next 4 hours; for controlled load- the minimum of load under control during the 24-hour day.

Fast Frequency Response

Fast Frequency Response is needed to reduce the rate of change of frequency (RoCoF) to help stabilize system frequency immediately following a sudden loss of generation or load, proportional to the loss.

Regulating Reserve Grid Service

Regulating Reserves are maintained to respond to supply/demand imbalances over much shorter time frames, typically on the order of one to several seconds. (EMS Integration required)

Replacement Reserve Grid Service

Replacement reserves replace the output of faster responding reserves (or restoration of shed loads) enabling their redeployment; meet sustained ramps and forecast errors beyond Regulating Reserve duration.



Capacity Build & Reduction



Source: California Energy Commission, Electricity Supply and Analysis Division (ESAD)



DR Programs (1-way technology)



DLC (Direct Load Control) programs for residential, small and medium business, and commercial and industrial customers. (RDLC, SBDLC, and CIDLC)

Collectively known as EnergyScout Programs and has been operating since 2005



DR Programs (2-way technology)



Utility sends alert to alert via Internet

OpenADR 2.0b gateway device retrieves the alert

Gateway

0000

Facility's EMS carries out the predetermined directives

EMS



Fast DR has a 10-min notification to the participating customers. This program has been active since 2012 and expanded to Maui on 2018.



Demand Response Current Programs Summary (2021)

Program	Load Reduction (MW)	FFR (MW)	Customer	Appliance(s)
Residential DR (RDLC)	13.6	13.6	33,010	water heater, A/C
Large Commercial (CIDLC)	10.1	5.0	30	generators, industrial loads
Small & Medium Business (SBDLC)	1.0	1.0	161	water heater, A/C
Fast DR (Hawaiian Electric)	4.2	0	20	HVAC, pumps, generator
Fast DR (Maui Electric)	4.9	0	16	HVAC, generators, batteries
Total:	34.8	19.4	33,487	



Aggregator Model



- Aggregators very much treated like an Independent Power Producer (IPP) with a Power Purchase Agreement (PPA).
- 5-year/10-year Grid Service Purchase Agreement (GSPA) contract will be signed.
- Self-aggregators sign GSPA-type contract and likely engage aggregator-type entity to provide technical services



Aggregator Current Contracts Summary (2021)

Islands	Load Build (MW)	Load Reduction (MW)	FFR (MW)	Appliance(s)
Oahu	14.8	26.3	37.3	water heater, batteries
Maui	2.0	7.1	6.1	water heater, batteries
Hawaii	3.2	4.0	6	batteries

Contracted with 2 aggregators.

Summary does not include GSPA3 currently pending with Commission for decision.

Current enrollment is 1MW or less for each grid services and each island.



Number of DR events





----- DR Customer Load (MW) ----- Number of Events



Summary of Portfolio Requirements

Requirements	Upfront Incentive	Monthly Incentive	Energy Incentive	Event Duration	Number of Event Cap
RDLC	\$0	\$3/water heater \$5/ac		1 hours	365*
CIDLC	\$0	\$5/kW \$10/kw	\$0.50/kWh	1-4 hours	Emergency only
SBDLC	\$0	\$3/water heater \$5/tonnage		1 hour	365*
Fast DR	\$250/kW	\$5/kW \$10/kW	\$0.50/kWh	1 hour	40 hours or 80 hours
Aggregator	Enablement fee	\$5/kW – Red. \$5/kW - FFR \$3/kW - Build		4 hours	104 or 144 events
Battery Bonus	\$850/kW	\$5/kW	Add Export	2 hours	365 days



Success & Challenges

Pro

- Maintaining legacy DR programs for 15 years.
- All programs (less Battery Bonus) operatable from DRMS/DERMS.
- Usage of DR is much higher than typical US mainland programs.

Con

- Slowed customer enrollment due to COVID.
- Aggregators working with subcontractors that are also promoting battery bonus. Confirmed cases of cannibalization.
- Battery is primarily for customer use, incentivizing for grid services use is still difficult.



Innovation – Planning & Developing Pilots for:

- Using Smart Panels as a resource for DR
- Applying utility-owned battery to deliver grid services.
- Targeting a solution of virtual NEM to deliver grid services
- Preparing framework for electric vehicle participation in grid services





- Benefits of programs are calculated with value of services from the integrated grid planning (IGP) process.
- Modeling of DER freeze case during the solution sourcing phase of IGP and evaluate the difference in cost.
- IGP is currently able to provide value of services for capacity and regulation but not for FFR. FFR uses the regulation signal as a proxy. Currently IGP does not believe there is a lot of value to replacement reserves.
- IGP has not calculated distributional grid services at this time, but will be reviewing as a long term strategy.



Future Activities

- Complete AMI deployment.
- Hawaiian Electric proposed Smart DER Tariff and Bring Your Own Device (BYOD) program.
- GSPA3 RFP for Maui proposed.
- Assess value of DER for other system level grid services as well as distributional grid services.





A Mahalo

DISCUSSION

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DEFINITIONS & EEPS COVERAGE

- Demand Response: change in rate of electricity consumption in response to price signals or specific requests of a grid operator (DOE)
- **Grid Flexibility**: the capability of a power system to maintain balance between generation and load during uncertainty, resulting in increased grid efficiency, resiliency and the integration of variable renewables into the grid
- Load Management: the process of balancing the supply of electricity on the network with the electrical load by adjusting or controlling the load rather than the power station output

Strategy	Status
Energy efficiency (resource adequacy programs)	Included in EEPS
Codes & standards	Included in EEPS
Utility rate design (tariffs:TOU, critical peak pricing)	Included in EEPS
Customer-sited battery storage	Clarify whether it counts towards RPS
Dispatchable DR (e.g. day-ahead, hour-ahead)	Not currently in EEPS

EXTENDING EEPS TO 2045

- Extending EEPS to 2045 would dovetail well with Hawai'i's goal of 100% renewable energy by 2045
- Several aspects of the EEPS Framework would need to be extended:
 - Performance Periods: End on December 31st of 2015, 2020, 2025 & 2030
 - Evaluation Periods: For assessing progress toward EEPS goals during each performance period & for Commission to determine if EEPS remains effective & achievable
 - Reporting schedule: Shown on slide 11

Are there other considerations when extending EEPS to 2045?

Can the performance, evaluation, and reporting periods be extended in their current form or should other modifications be made?

SAVINGS MEASUREMENT & TARGET

- The 2045 equivalent is 6,000 GWh in cumulative persisting savings (using the MPS data)
 - The current EEPS goal is just shy of the sum of all eligible impacts including BAU Achievable potential in 2030
- Significant past TWG discussion & agreement that EUL of savings is an important aspect & that savings should be counted as cumulative persisting savings

Are there advantages to using a different method to determine the 2045 EEPS goal?

Are there other changes to the methodology that should be considered?

- 4,300 GWh of electricity use reductions statewide by 2030
- Energy efficiency to meet 30% of forecasted energy sales in 2030
- Energy efficiency to meet a fixed percentage of sales relative to a two-year average of total most recent statewide energy sales
- Gross energy savings measured at system level (including energy savings from reduced transmission and distribution losses)

- DR programs are an increasingly valuable resource option whose capabilities and potential impacts are expanded by grid modernization efforts
- DR is frequently defined broadly to include TOU & CPP rates which are already included in EEPS

Arizona utilities are required to achieve at least 1.3% annual EE savings over 3-year planning period, including a demand side resource capacity equal to at least 30% of	Vermont, Indiana & Minnesota allow DR & load management to count towards EE goal	Michigan RPS allows for a limited number of "energy waste reduction credits" to be used for RECS.
2020 peak demand		Energy waste reduction includes "Load management, to the extent that the load
Measures "shall include rate-enabled, load- shifting technologies, including, but not limited to, demand response, energy storage, and smart thermostats, that provide customer bill savings and clean energy benefits"		management reduces provider costs."

What form could a DR/demand flexibility goal take in EEPS? A specific capacity target? A contribution to the GWh goal or a (new) general peak demand target? Should separate goals be set for each island? Other considerations for the goal?

OTHER POLICY OBJECTIVES

- The TWG has identified other important policy objectives in the past:
 - Equity
 - Time & locational value of savings
 - GHG emissions reductions
 - Peak demand savings

Should any of these policy objectives be considered in the EEPS be expansion? If so, how would they be incorporated?

TWG IN 2023

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EEM RECOMMENDATION FOR 2023 TWG CALENDAR

- Important items that need TWG attention in 2023:
 - EEPS extension & update
 - EEPS 3rd Evaluation Report (report to Legislature)
- Will likely require quarterly meetings, as follows:
- QI 2023:
 - Discussion of EEPS extension & expansion topics TBD
 - AEG to lay out scope of Third EEPS Evaluation Report on 2nd performance period (2016-2020)
- Q2 2023:
 - Convergence around EEMS extension & expansion
 - AEG to present preliminary analysis & findings/results; solicit input
- Q3 2023:
 - AEG to report out on final findings from Third EEPS Evaluation Report
- Q4 2023:
 - PUC/EEM to present final form/scope of revised EEPS proposal

QUESTIONS?

Please contact Jennifer Barnes at 510-756-1501 or jenniferbarnes@2050partners.com. Meeting materials will be posted on www.HawaiiEEPS.org

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