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# EEPS TECHNICAL WORKING GROUP MEETING

November 30, 2021  
1:00 p.m. to 2:15 p.m.

via Zoom Webconference

COMMISSION WELCOME

COMMISSIONER POTTER

# AGENDA & MEETING OBJECTIVES

JENNIFER BARNES

ENERGY EFFICIENCY MANAGER TEAM

# AGENDA

- 1:00 p.m. Commission Welcome
- 1:05 p.m. Agenda & Meeting Objectives
- 1:10 p.m. EEPS Policy Overview
- 1:20 p.m. 2020 Potential Study Findings Refresher
- 1:30 p.m. GEBs Hawaii Working Group Update
- 1:35 p.m. IGP Update
- 1:45 p.m. EEPS Metrics Update Recap
- 2:05 p.m. Next Steps/Meeting Wrap Up

# EEPS POLICY OVERVIEW

TED POPE

ENERGY EFFICIENCY MANAGER TEAM

# 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 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

# 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
- **Calculation of the GWH metric was clarified in 2020**

# 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



# 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 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 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 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



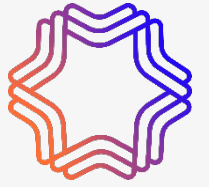
# Potential Assessment Review

Date: November 30, 2021

Prepared for: November TWG Meeting



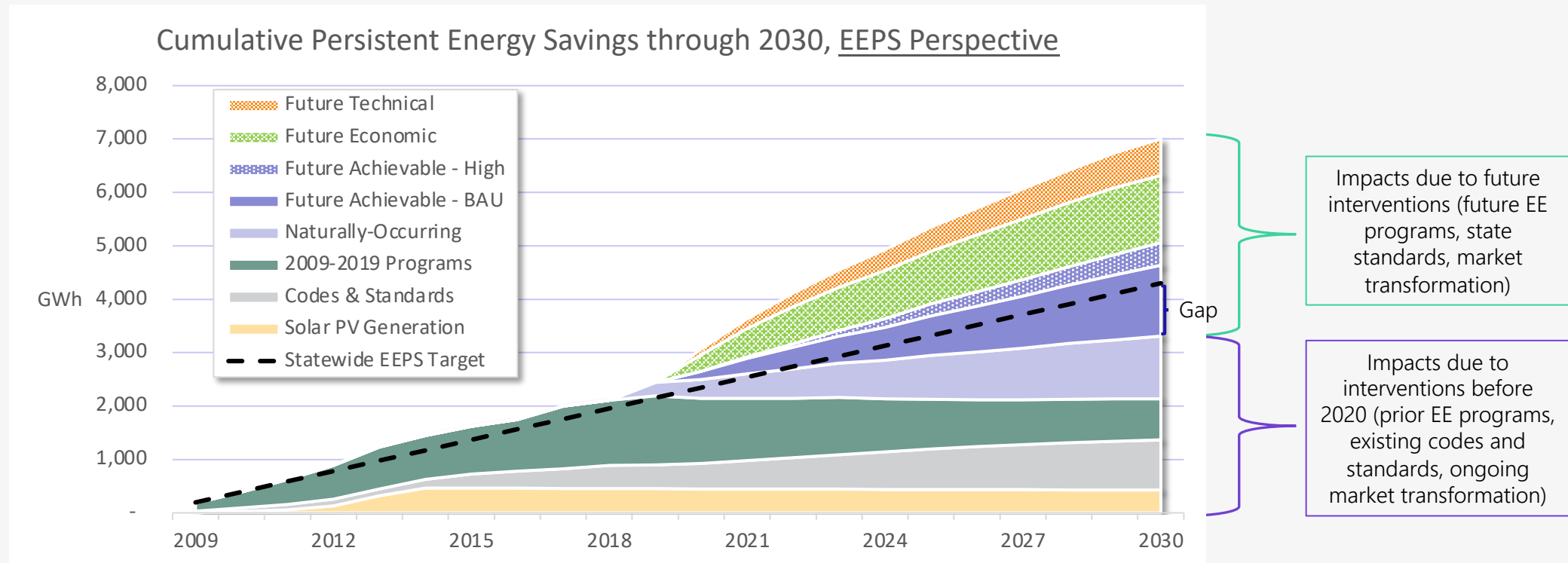
# Energy Efficiency Portfolio Standards



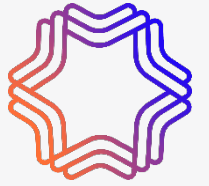
The EEPS target appears to be attainable under the Achievable business-as-usual (BAU) scenario

- ✔ 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



# Achievable Potential EE Savings by End Use



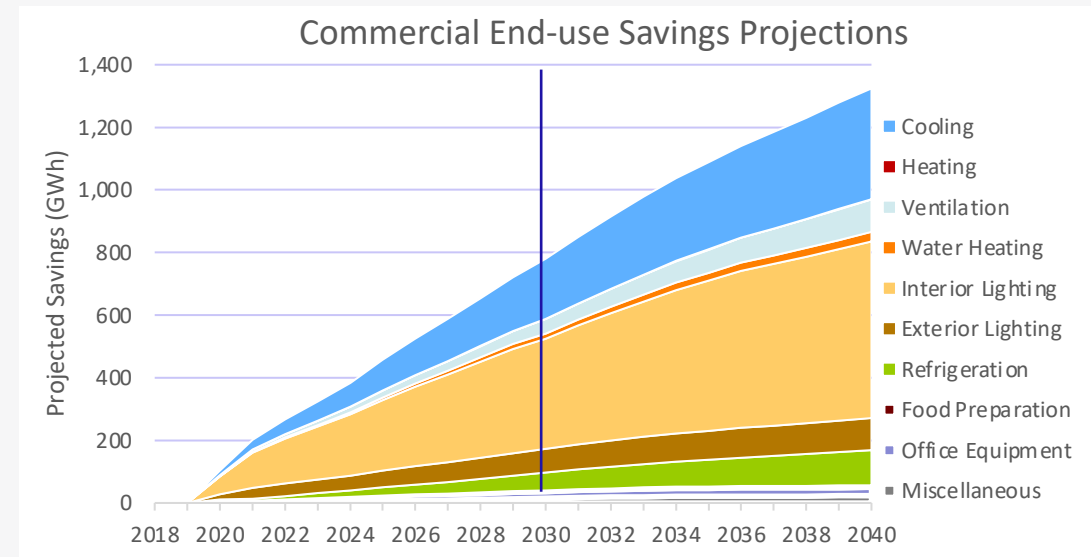
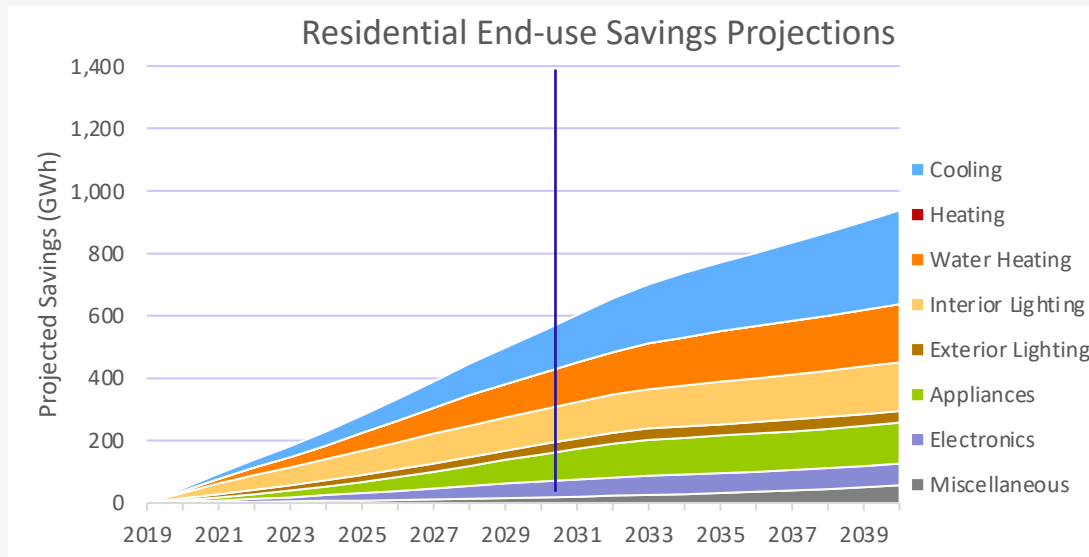
The commercial sector is expected to contribute more savings than residential

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

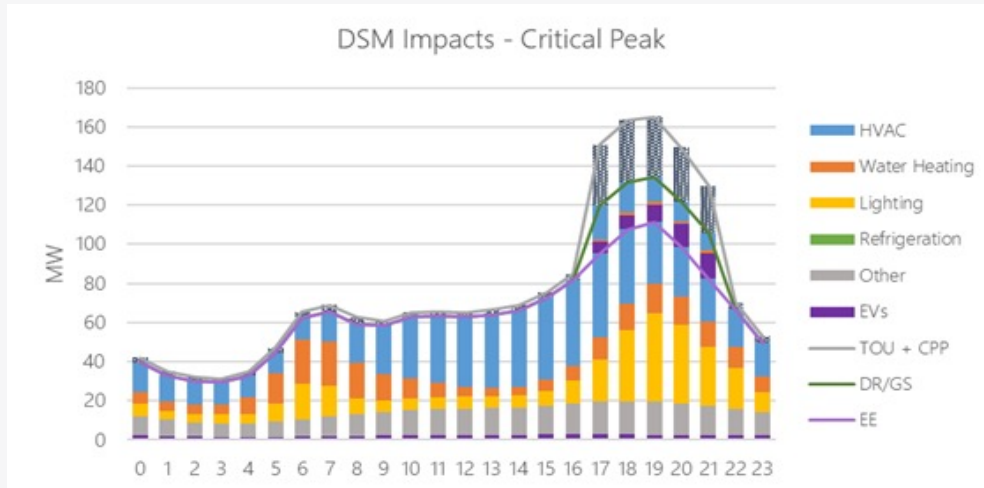
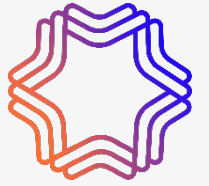
- ✔ Cooling, water heating, and lighting measures account for the majority of savings

By 2030, the commercial sector is expected to achieve between 780 GWh and 986 GWh

- ✔ Substantial savings come from lighting measures followed by cooling



# How do EE, DERs, and Rates Interact to Reduce Peaks?



Residential

## Hourly impacts:

EE (under the purple line)

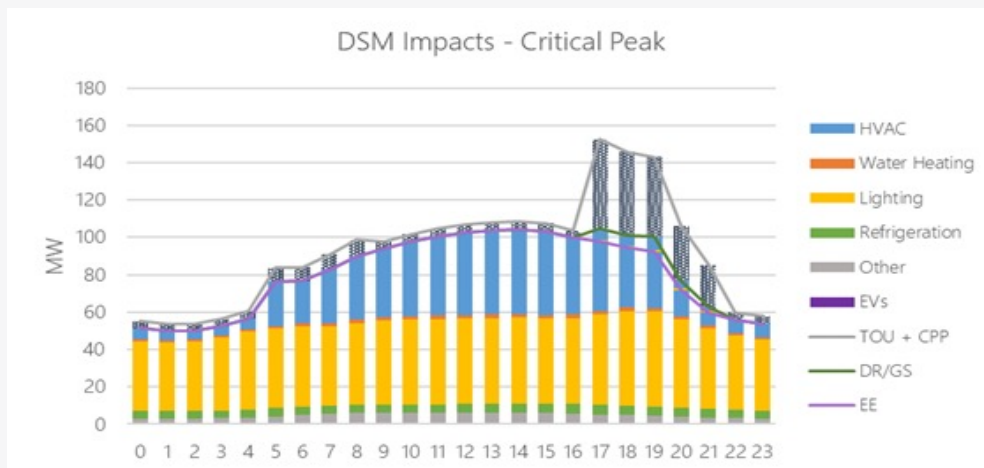
- ✔ Shows substantial potential for overall reduction on peak days

DR/GS (btw. purple and green lines)

- ✔ shows high potential during the peak period for residential

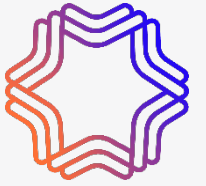
Rates (btw. green and grey lines)

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



Commercial

# EEPS Metric



Areas for improving or updating the EEPS metric

4300 GHW total

- ✔ With the total achievable siting at about 5,000 GWH, is the overall total goal at the right level?

What other metrics might also be appropriate for Hawaii?

- ✔ Time Dependent MW goal(s) that better align with capacity issues and grid needs
- ✔ GHG and/or Carbon metrics that align with zero emission goals for the State

Additional metrics should:

- ✔ Align with the IGP and could vary by island
  - In terms of defining peak
  - Capacity resource requirements
- ✔ Include carbon or GHG factors that are specific to Hawaii's generation mix and vary by time of day and season
- ✔ Be supported by Hawaii specific studies that can be used to quantify potential, i.e. TOD pilots, EE peak impacts, DR impacts



# Thank You.

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Ingrid Rohmund, Sr. Vice President  
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Phone: 631-434-1414



# **GRID-INTERACTIVE EFFICIENT BUILDINGS (GEB)**

## **Hawaii Working Group Update For TWG**

**November 30, 2021**

**Presented by**

**Ashley Norman, Hawaii Public Utilities Commission**

**Gail Suzuki-Jones, Hawaii State Energy Office**

# GEBS - BACKGROUND



## EFFICIENT

Persistent low energy use minimizes demand on grid resources and infrastructure



## CONNECTED

Two-way communication with flexible technologies, the grid, and occupants



## SMART

Analytics supported by sensors and controls co-optimize efficiency, flexibility, and occupant preferences



## FLEXIBLE

Flexible loads and distributed generation/storage can be used to reduce, shift, or modulate energy use

# GEBS - BACKGROUND

- **National**
  - NASEO-NARUC
  - NREL, PNNL, LBNL
  - GEBs Roadmap →
- **Hawaii**
  - Working group
  - PNNL support: Technical Brief

## A National Roadmap for Grid-Interactive Efficient Buildings

PREPARED BY

U.S. DEPARTMENT OF  
**ENERGY** | Office of ENERGY EFFICIENCY  
& RENEWABLE ENERGY  
BUILDING TECHNOLOGIES OFFICE

# HAWAII GEB-RELATED EFFORTS & UPDATES

- **Pilots**
  - Resilient Community Hubs – Hawaii DOE School and CCSR
- **Benchmarking**
  - State Benchmarking project and HRSI 96-30
- **Energy Code Updates**
  - 2021 Zero Code and 2024 IECC Grid Integration
- **Technical Assistance - PNNL and NEEA**
  - on code proposals for 2021 IECC

## DECEMBER EVENTS

- **NASEO-NARUC GEB Working Group Virtual Forum** – December 2<sup>nd</sup>
- **Net-Zero Energy Residential Design Webinar** – December 2<sup>nd</sup>, Noon-1:30
- **2018 IECC Compliance Webinar** – December 9<sup>th</sup>, Noon-1:30

[Webinar flyer and registration link: https://energy.hawaii.gov/hawaii-energy-building-code](https://energy.hawaii.gov/hawaii-energy-building-code)

***IECC 2018 code** comes into effect December 2021 (for State building projects)*



## DON'T MISS OUT ON THESE FREE WEBINARS!



Each webinar qualifies for 1.5 AIA/CES LUs (HSW).

*BIA New Hawaiian Home – image courtesy Jeff Brink*

[Registration: https://energy.hawaii.gov/hawaii-energy-building-code](https://energy.hawaii.gov/hawaii-energy-building-code)

### Zero Energy Home Design

December 2, 2021  
12:00pm - 1:30pm

This free webinar provides guidance on net zero energy design for architects, contractors and others involved in low-rise residential development. Topics:

- Recent UH research on how Hawai'i homes consume energy
- Cost effective beyond-code energy efficiency strategies
- Integrating solar energy for net-zero performance

Presenters: Wendy Meguro, Assoc. Prof., UH Sea Grant/School of Architecture, Eileen Peppard of UH Sea Grant, Rocky Mould of Hawai'i Solar Energy Association and energy consultant Erik Kolderup, P.E.

### Complying With the Energy Code - 2018 IECC with Hawaii Amendments

December 9, 2021  
12:00pm - 1:30pm

A new energy code takes effect for Hawai'i State building projects on December 14 and for other projects no later than December 2022 depending on adoption by the Counties. This free webinar will provide guidance on the energy code compliance process and cover a range of project types including new construction and alteration projects.

Architects, engineers, project managers, county planning & permitting staff, developers and contractors are encouraged to attend.

Presenters: Howard Wiig, Energy Analyst with the State Energy Office and Chair of the State Building Code Council and Erik Kolderup, building energy consultant and energy code specialist.



**Hawaiian  
Electric**

# Integrated Grid Planning: Energy Efficiency Modeling

November 30, 2021





# Energy Efficiency in Load Forecasts

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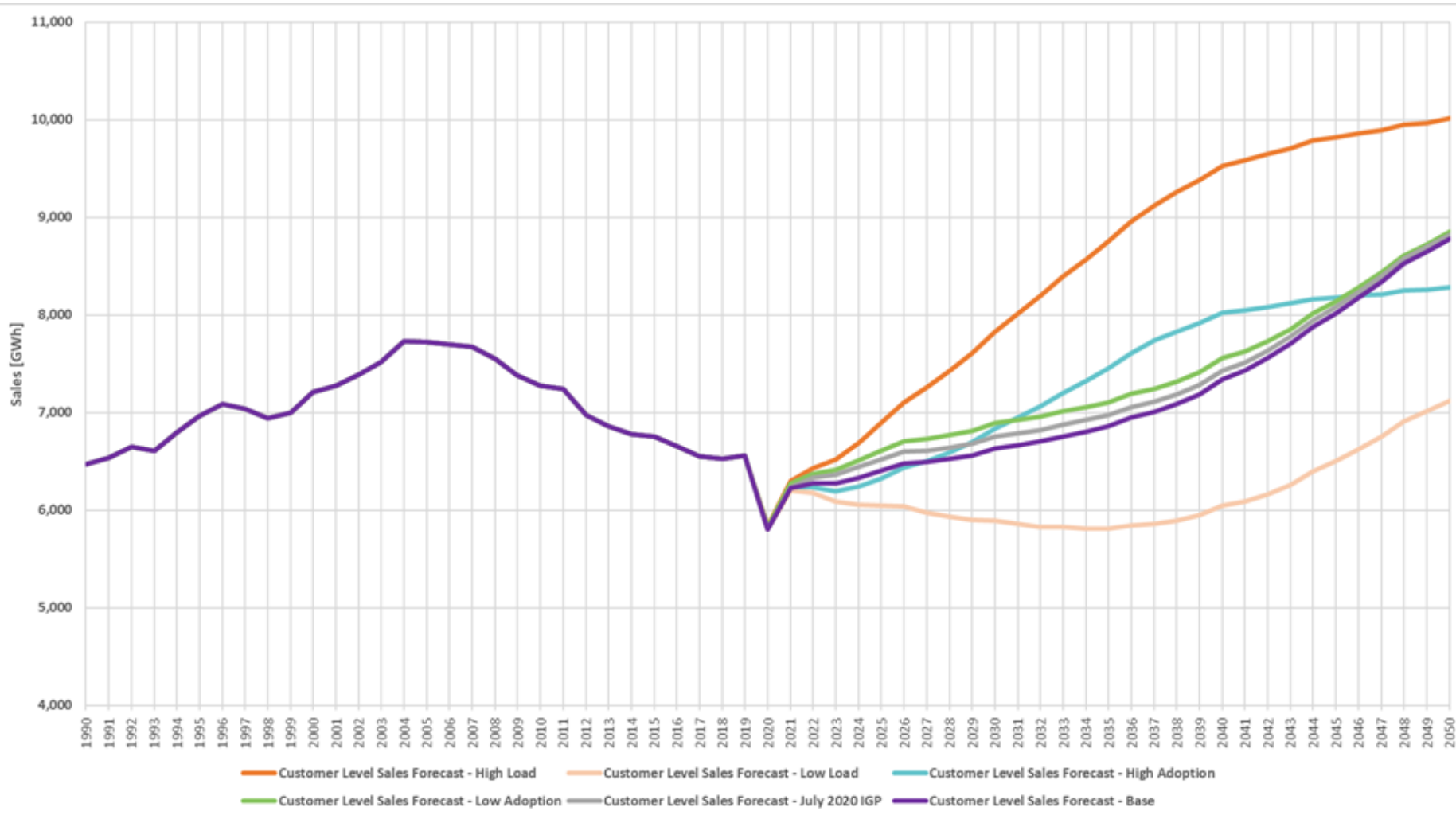
Data provided by AEG from the 2020 State Market Potential Study (MPS)

- ◆ Base Forecast: Business as Usual and Codes & Standards
- ◆ Low Forecast: Business as Usual
- ◆ High Forecast: Achievable High and Codes & Standards
- ◆ Freeze Forecast: Base Forecast frozen at 2021

Additional data on Hawaiian Electric's IGP forecasts can be found at  
[https://www.hawaiianelectric.com/documents/clean\\_energy\\_hawaii/integrated\\_grid\\_planning/stakeholder\\_engagement/working\\_groups/forecast\\_assumptions/20210818\\_finaligp\\_inputs\\_and\\_assumptions.pdf](https://www.hawaiianelectric.com/documents/clean_energy_hawaii/integrated_grid_planning/stakeholder_engagement/working_groups/forecast_assumptions/20210818_finaligp_inputs_and_assumptions.pdf)



# Energy Efficiency in Load Forecasts



A range of low load, high load bookends (orange lines) are being modeled in IGP, consistent with the IGP Technical Advisory Panel feedback to test the sensitivity of the models and resulting portfolios against a wide range of load forecasts.

O'ahu Sales Forecast Bookends

# Energy Efficiency Supply Curves

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- ◆ Supply Curves were developed by AEG using MPS data<sup>1,2</sup>
  - Uses the achievable technical potential which is a subset of the technical potential, assuming customer participation rates from the Future Achievable – High case
- ◆ The supply curves will be modeled as part of EE Freeze scenario in IGP
  - Allows the model to assess which incremental EE bundle is cost effective, above what is currently installed
  - Results of the EE Freeze scenario can inform whether the base forecast for EE should be modified to include the additional amount of energy efficiency that was found to be cost effective

<sup>1</sup> Energy efficiency supply curve data available at <https://www.hawaiianelectric.com/clean-energy-hawaii/integrated-grid-planning/stakeholder-engagement/key-stakeholder-documents>

<sup>2</sup> See AEG's memo summarizing their process and results at

[https://www.hawaiianelectric.com/documents/clean\\_energy\\_hawaii/integrated\\_grid\\_planning/20211105\\_heco\\_igp\\_supply\\_curve\\_inputs.pdf](https://www.hawaiianelectric.com/documents/clean_energy_hawaii/integrated_grid_planning/20211105_heco_igp_supply_curve_inputs.pdf)



# Energy Efficiency Supply Curves

Figure 5 Oahu Annual Energy Savings Potential (Achievable Technical) by Measure Bundle

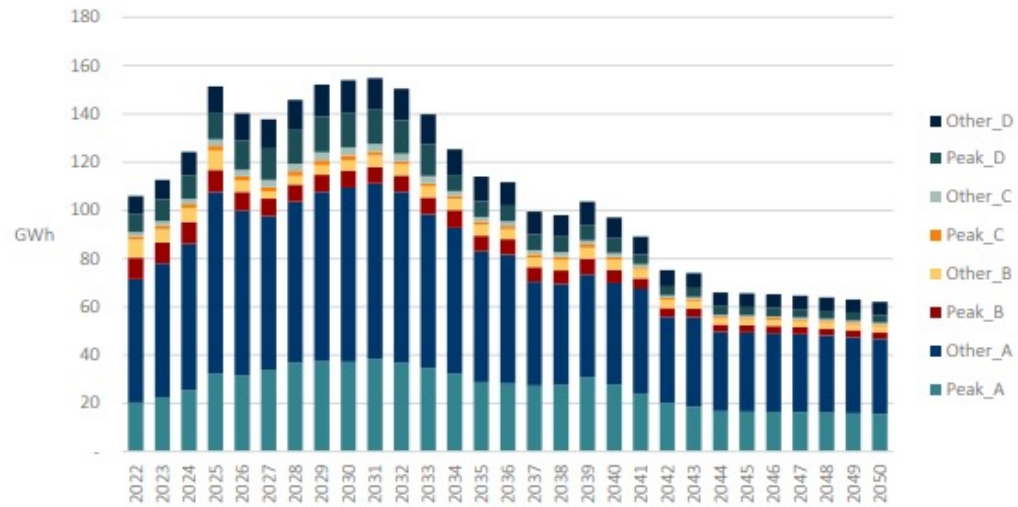


Figure 6 Oahu Achievable Technical Energy Savings (GWh) by Measure Grouping and End Use

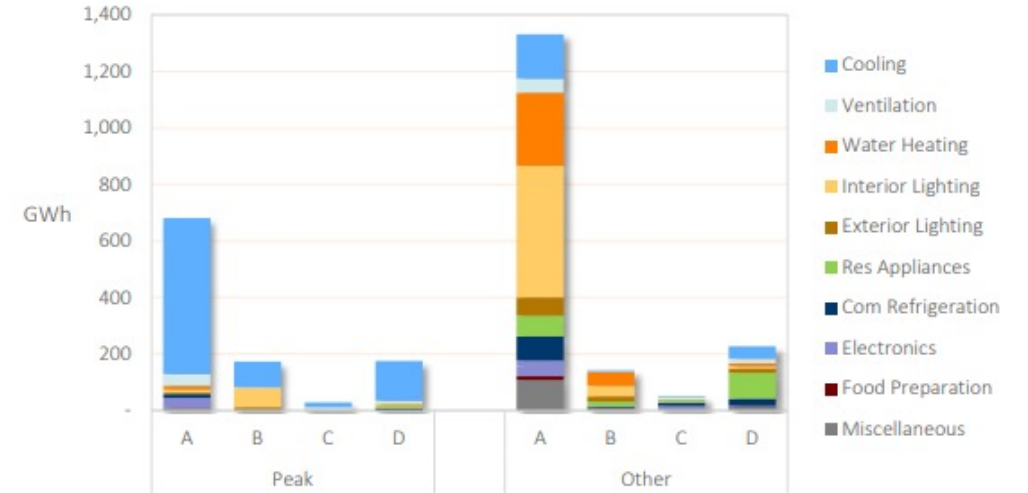
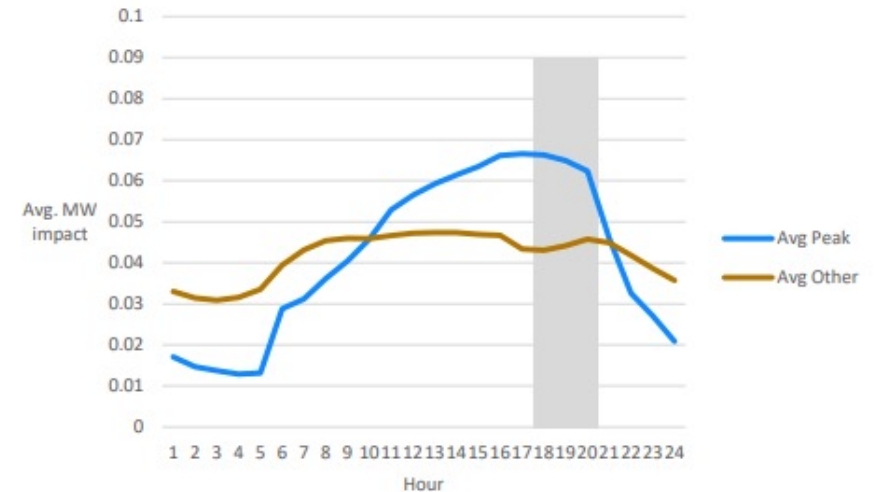


Figure 2 Averaged Weekday Impacts by Measure Classification, Cumulative in 2030 (Peak vs Other, Oahu)



Bundle	Benefit-Cost Ratio Range
A	>1.2
B	1.0 - <1.2
C	0.8 - <1.0
D	< 0.8



# EEPS METRICS UPDATE RECAP

TED POPE

ENERGY EFFICIENCY MANAGER TEAM

# EVOLVING HAWAII ENERGY POLICY LANDSCAPE

- The context for energy efficiency in Hawaii has changed significantly since 2012 when the EEPS Framework was adopted; it has even changed since the EEPS First Review Period (2009-2015)
- EEPS complements but could better support newer Hawaii policy goals, such as Energy Optimization, Carbon Neutrality and Resiliency

COVID  
Economic  
Impacts

Customer-Sited  
DERs

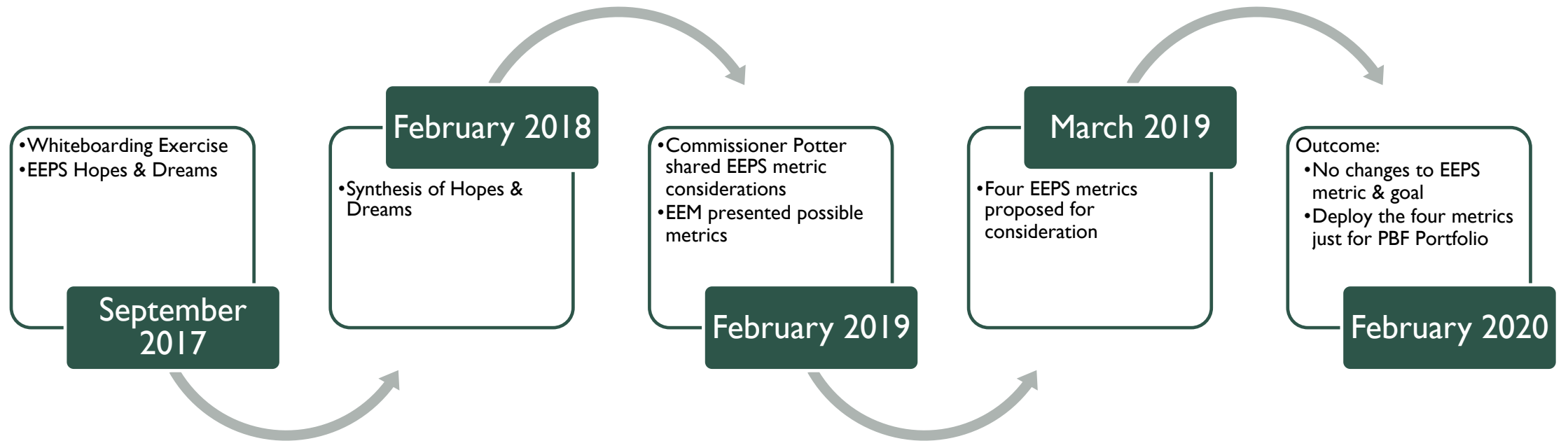
Variable  
Generation in  
Utility Mix

Customer  
Technologies

# EEPS WAS DESIGNED FOR FLEXIBILITY

- Built-in requirements for periodic review and, if needed, modifications to EEPS goals, EEPS Framework or both
- PUC is responsible for EEPS process
- TWG is responsible for input/advice on EEPS
- Review (and if needed, adjustment) deemed necessary to keep EEPS relevant and integrated with other activities and conditions in the state.

# TIMELINE OF EEPS METRICS UPDATE DISCUSSIONS





# FALL 2017 TWG "HOPES & DREAMS" FOR EEPS REVIEW

## TRACK 1

### Current HI

RPS → EEPS  
Gen avoided is sometimes EE - timing matters

- Identify EE + DER
- EV/Storage 40K by 2030
- Storage
- DR Prgs.
- Reduce silos
- Baseline Studies
- IDSM
- Military
- Mandatory Reporting
- Market data
  - Join industry
  - get data
- Countries
- State agencies
- Feds

## TRACK 2

### Load Impact + FORECASTS

- How has storage + EV Load shift?
- Planners need info
- EEPS is largest forecast assumes forces analysis of EE
- Need tracking info
- Progs + Codes + Standards
- granular location, Island
- Location / Load shapes
- Baseline forecasts
- Weather
- Check Therese's
- PPT
- BJM Incentives
- NJC
- Aggregate hourly by Island
- Time Frame 1-5 years → 2030
- Sensitivities

## TRACK 3

### PBFA Rapid EE

- Value of EE Load shape / Value / Location
- Reduce Silos
- Equity
- PBFA
- MT Behavior
- IPSM
- PBF Structure
- Volumetric
- HTR Valuation
- Join industry get data
- PBFA Goals for EEPS

## T4

### EEPS + FRAMEWORK

#### Rapid EE

- Utility benes
- Avoided costs
- New capacity so value ↓
- PPAs Lower
- EE-cost effective societal tests
- Compare w/ EE/RE
- Optimize (planning)
- 15 H already meeting goals w/ used → Hurts EVs
- Load shapes / peak reduction
- is objective to reduce fossil or when it reduces RE
- strip pack
- SOcial goals / Benefits
- Reduce silos

## WIFI

6th floor  
1132 Bishop

If av costs screen need to be higher

- Kiuc 12.8 needs societal added
- RIM Test
- cumulative goals
- last bit might be harder \$
- Tests
- cumulative may help RPS + EUL
- EE Goals faster?
- EE / Demand savings (integrated)
- Do nothing scenario
- Behavior costs?
- EQUITY
- valuation
- IDSM

## FEBRUARY 2018 TWG

- Options for Future EEPS & Hawai'i Energy Metrics Consideration
  - Cumulative persisting savings of EEPS achievements (kWh & peak kW)
  - Time-related energy efficiency impacts (when savings occur)
  - Location-related energy efficiency impacts (where savings occur)
  - DR (event) ready and smart appliance (load shift) market penetration
  - Reduction in imported fossil fuel (barrels of oil avoided)
  - Reduction of net greenhouse gas emissions
  - Level of service to HTR and income-constrained communities (PBF)
  - Enhanced program level market transformation metrics (PBF)

## FEBRUARY 2020 TWG

- Four metrics proposed for statewide tracking (not EEPS):
  - Cumulative persisting energy savings (kWh) [Clarified for EEPS]
  - Cumulative persisting peak demand reduction (kW)
  - Avoided generation fuel consumption (barrels of fuel oil)
  - Emissions reductions (tons CO<sub>2</sub>e)

# ENERGY OPTIMIZATION OPPORTUNITY

- The Baseline Study and Market Potential Study completed by AEG confirm that substantial savings remain in Hawaii for both “anytime” energy efficiency and energy optimization (efficiency and demand flexibility)
- The Commission has actively supported increased development of energy optimization strategies and sees the opportunity increasing
- Development of hourly avoided costs will:
  - Clarify the time-dependent economic value of the energy efficiency and other energy optimization impacts delivered by the PBF portfolio and Other Contributing Entities
  - Support expanded potential for a variety of energy optimization market interventions

# EE METRICS EVOLVING IN OTHER JURISDICTIONS

- CPUC Total System Benefits
  - Adopted by California PUC to replace energy and peak demand savings goals as the single goals metric
  - Expression, in dollar terms, of the lifecycle energy, capacity, and GHG benefits, expressed on an annual basis
    - Represents the total benefits, or “avoided costs,” that a measure provides to the electric and natural gas systems
- SMUD Avoided Carbon Metric
  - First in the country to have carbon as an EE metric
  - Carbon equivalent to convert therms to kWh; updated annually (2020: 24 kWh/therm)
  - Rebrands electrification as EE

# NEXT STEPS FOR METRICS AND GOALS DISCUSSIONS

- Next TWG meeting planned for Q1 2022
- Purpose will be to continue this discussion on updating the EEPS metrics and goals

- Please contact Jennifer Barnes at 510-756-1501 or [jenniferbarnes@2050partners.com](mailto:jenniferbarnes@2050partners.com).
- Meeting materials will be posted on [www.HawaiiEEPS.org](http://www.HawaiiEEPS.org)

QUESTIONS?