



# HAWAII POTENTIAL STUDY CONTEXT AND CONSIDERATIONS

TWG Meeting, March 25, 2019

# OBJECTIVES AND TOPICS

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During this session of the TWG meeting, we will:

1. Discuss the key issues involved in conducting a study of the potential for energy efficiency in Hawaii
2. Solicit your input on key assumptions and results

Topics presented in the following slides:

- Recap of the 2014 Potential Study
- Important changes that have taken place in Hawaii since that study was done
- Preliminary recommendations for how to proceed with the analysis for the 2019 Market Potential Study (MPS)
  - The HPUC, EEM and TWG will all weigh in to determine the best path forward for the study

# RECAP OF THE 2014 POTENTIAL STUDY



## Context

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Load was forecast to increase through 2030 at an annual growth rate of 1.5%

In 2011 and 2012 solar PV and other DERs had a lower saturation in Hawai'i; the Potential Study focused on energy efficiency

For EVs, we assumed that they would only be charged at home

We segmented residential customers by housing type and by whether they were occupied by home owners or renters; commercial customers were segmented by building type

We assumed a robust set of appliance standards, including those in the Energy Independence and Security Act (EISA)

The study estimated the first-year and cumulative savings from appliance standards and building codes and identified the economic and technical potential for enhancing these savings;

- Economic potential was assessed using Total Resource Cost test; high estimates of avoided costs caused most measures to pass the test
- Achievable and program potential were not assessed

# RECAP OF THE 2014 POTENTIAL STUDY

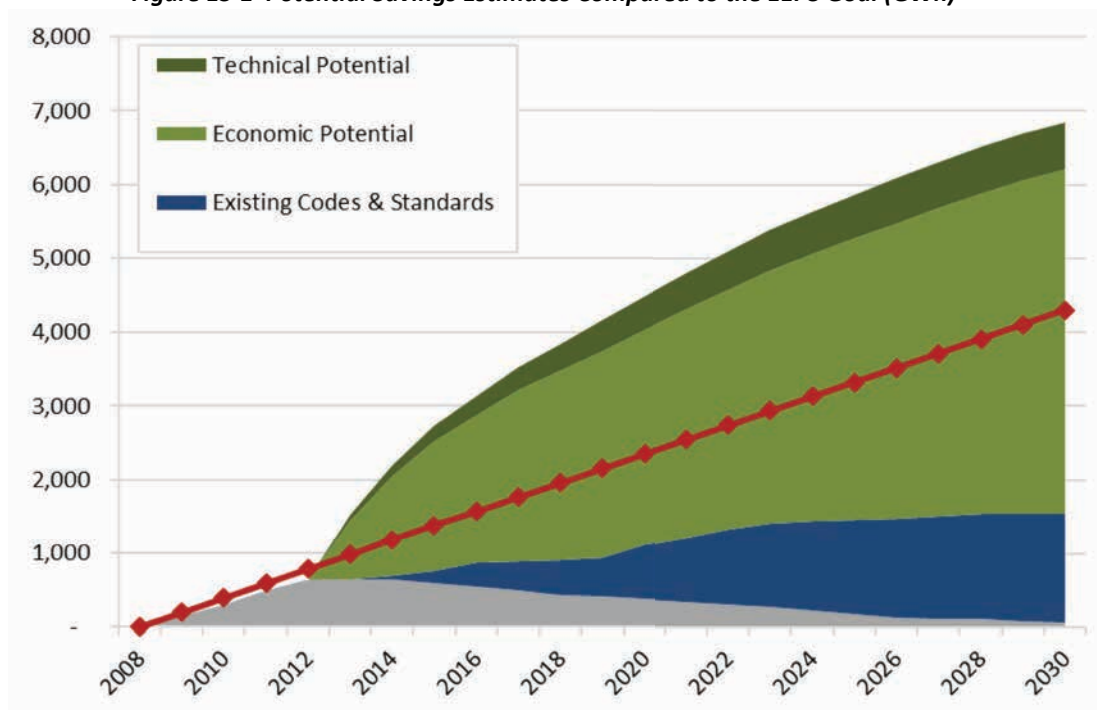
## Summary of results

The study found a substantial potential for annual electricity savings

- Lighting measures accounted for the majority of the savings
  - In residential and commercial
- Residential water heating savings were also substantial

The cumulative economic potential far exceeded the cumulative EEPS target

**Figure ES-1 Potential Savings Estimates Compared to the EEPS Goal (GWh)**



# THE 2019 STUDY WILL ADDRESS A BROADER SET OF OBJECTIVES

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Since 2013, much has changed in Hawaii:

DERs are present in substantial numbers

Electrification of transportation (EoT) is a goal

Federal and state standards are in place but may change in the future

iDSM programs are important

Non energy benefits (NEBs) are becoming more important

Additional metrics are under consideration

Desire to estimate achievable potential in addition to economic potential

It will be important to quantify more than annual energy savings

Program plans for next triennial should be reflected in the study

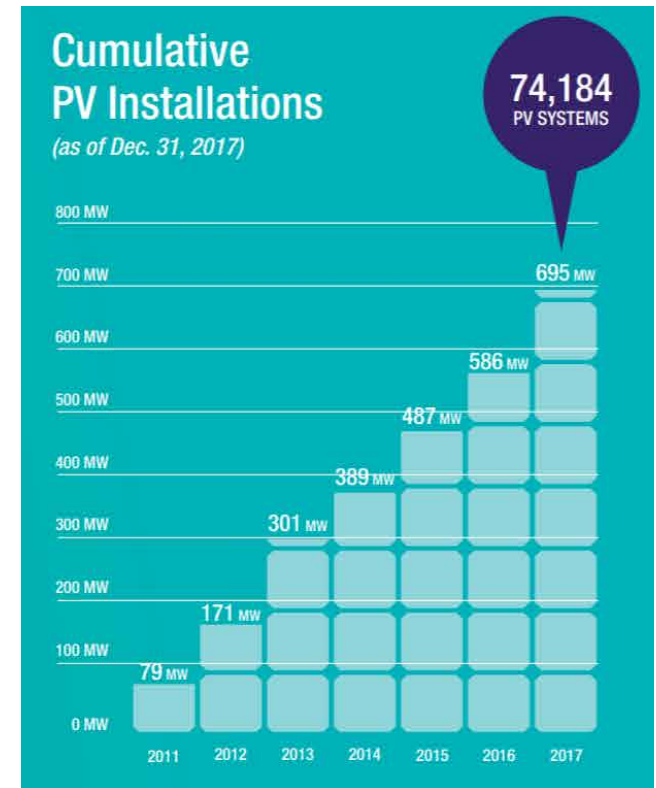
We will discuss these in the remaining slides

# Q1. ARE DER CUSTOMERS DIFFERENT FROM NON-DER CUSTOMERS?

With so much DER in Hawaii, we need to understand if customers with DERs are different than those without. The types of differences might vary by sector:

- Residential:
  - What are the characteristics of customers with DER? For example, do they tend to be high-income customers?
  - Are customers with DERs more or less inclined toward saving energy and buying high-efficiency options?
  - Do the characteristics vary according to the tariff customers are on?
- Business:
  - Will they be more or less inclined toward saving energy and buying high-efficiency options?
  - Other differences?

The supplemental customer surveys we are conducting in the coming months will help answer these questions.



Source:  
<https://view.hawaiianelectric.com/2017-sustainability-report/page/4-5>

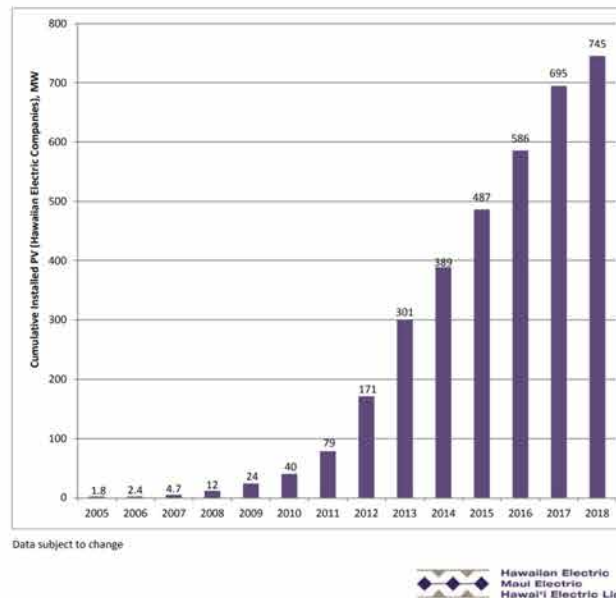
# Q2. WHAT WILL THE PACE OF GROWTH BE FOR CUSTOMER SITED SOLAR PV?

Is Hawaii reaching a plateau for customer-sited solar PV?

What role will newly emerging solar PV + battery play in each sector?

**Cumulative Installed PV -- As of Dec 31, 2018**

	Number of PV Systems			PV Capacity, MW		
	Number	% Residential	% Commercial	Capacity	% Residential	% Commercial
Hawaiian Electric	53,123	96%	4%	533	54%	46%
Hawai'i Electric Light	12,594	94%	6%	97	65%	35%
Maui Electric	12,429	92%	8%	116	57%	43%
Total	78,146			745		



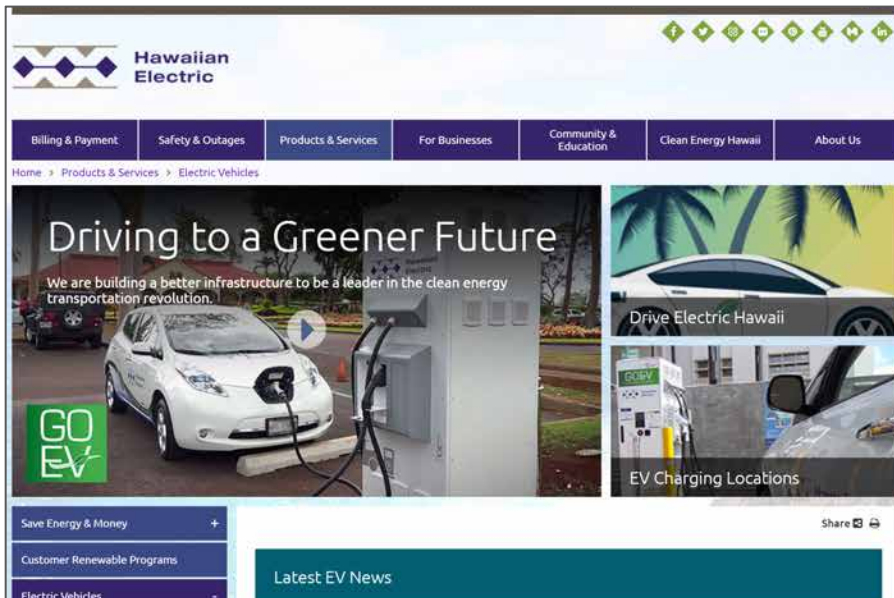
Source:  
[https://www.hawaiianelectric.com/documents/clean\\_energy\\_hawaii/clean\\_energy\\_facts/pv\\_summary\\_4Q\\_2018.pdf](https://www.hawaiianelectric.com/documents/clean_energy_hawaii/clean_energy_facts/pv_summary_4Q_2018.pdf)



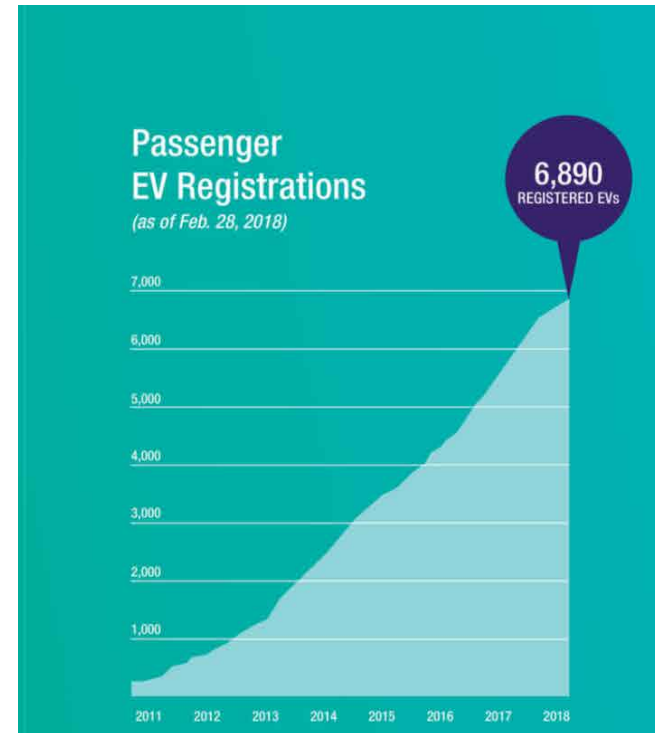
# Q3. WHAT WILL THE PACE OF GROWTH BE FOR ELECTRIC VEHICLES?

EVs provide a growth opportunity for electricity use / sales and EE

When connected to the grid, they provide storage and an opportunity for demand response and flexible load shaping



Source:  
<https://www.hawaiianelectric.com/products-and-services/electric-vehicles>



Source:  
<https://view.hawaiianelectric.com/2017-sustainability-report/page/4-5>

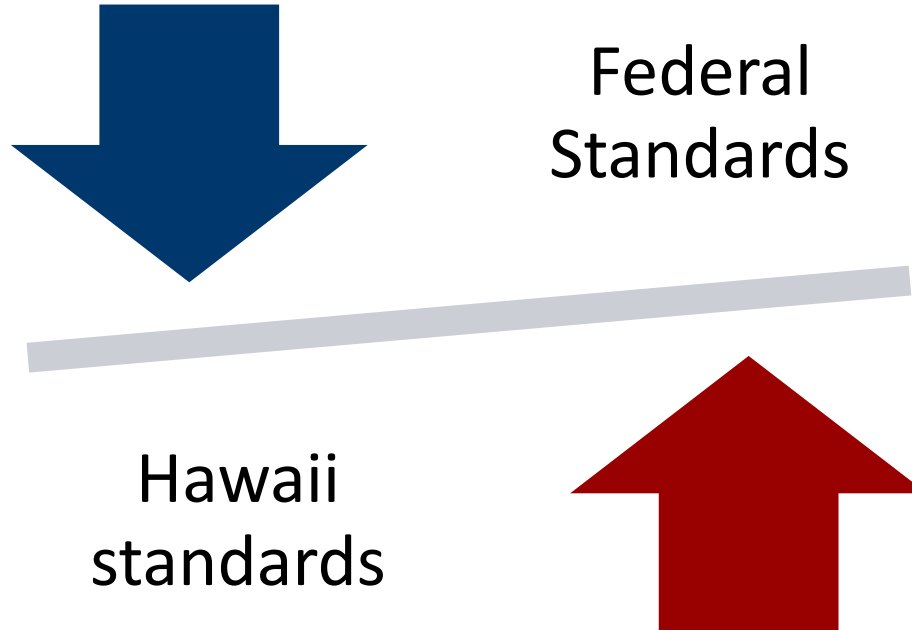


## Q4. WHAT IS THE OUTLOOK FOR CODES AND STANDARDS?

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The federal government is considering a rollback of long-standing standards across appliances and transportation

State of Hawaii is considering additional standards to supplement federal standards



## Q5. HOW LARGE A ROLE WILL iDSM PLAY?

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Typically, integrated DSM (iDSM) is a program or measure that provides both energy savings and peak demand savings

- Smart thermostat is an example of an iDSM measure
- In practice, iDSM programs can use one truck-roll to meet more than one objective. For example:
  - A utility installs a demand controller (e.g., smart thermostat) and “upsells” energy-efficiency measures that are installed immediately and/or scheduled for a later date
  - An implementer installs a high-efficiency air conditioner and “upsells” a smart thermostat (or other demand controller)

As the scope of DSM expands to include behavioral programs, DERs, fuel switching, and electrification, iDSM will also likely evolve to include some or all of these aspects.

## Q6. ARE NEBS IMPORTANT?

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Our industry is starting to include **non energy benefits (NEBs)** from energy-efficiency measures in potential studies:

- Greenhouse gas emissions
- Quality of life
- Productivity
- Water savings
- Job creation

When these are quantified, they count as a benefit in the cost-effectiveness calculation

- However, many are difficult to quantify

## Q7. SHOULD THE STUDY EXPLORE ALTERNATIVE METRICS?

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Several **new metrics** are being considered in Hawai'i:

- Reduced imported fossil fuels
- Reduce greenhouse gas emissions
- Time and location-based metrics
- DR controls, iDSM
- Level of service for hard-to-reach (HTR) and low- to moderate-income customers

The potential study can help inform the creation of new metrics. For example,

- Low- to moderate-income programs – amount of potential savings
- Sub-island level analysis
- GHG reductions

# RECOMMENDATIONS FOR THE STUDY OPEN FOR DISCUSSION

## Customer segmentation

- By island
- Sector, housing / building type, income level for residential
- Presence of DERs by tariff

## Technologies and measures

- Cast a wide net, include iDSM, emerging technologies, EVs and DERs

## Appliance standards and building codes

- Include those “on the books”
- Consider additional C&S as sensitivity

## NEBs

- Use the TRC as the primary cost-effectiveness test
- Include NEBs that can be easily quantified

## Hourly analysis

- Provide results and develop inputs at 8,760 level
- Technical, technical achievable, economic and economic achievable

## Expanded set of metrics

- 1<sup>st</sup> year & cumulative energy and peak savings
- Cost of conserved energy
- Others TBD

The study will provide savings estimates for 2020 – 2040 and will align with Hawaii Energy plans for the next triennial period

And, we recommend performing sensitivity analyses

- We will work together to identify key variables
- We know, at a minimum, this will include avoided cost forecasts and additional C&S

# NEXT STEPS

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Obtain feedback on

- Key issues identified above
- Recommendations we have proposed
  - We are happy to follow up individually with you if you would like to discuss

Establish a potential-study working group

- Anyone interested?

Formally initiate the potential study in April

Plan to complete the study in September, 2019



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