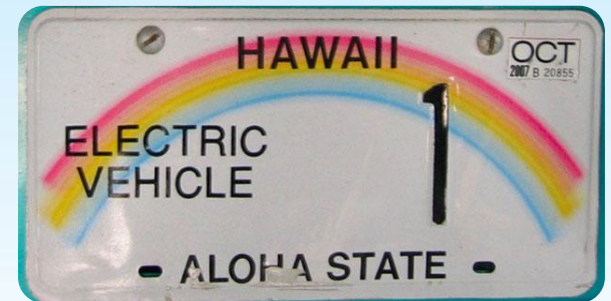


# Hawaii State Energy Office

**Chris Yunker**  
**Energy Systems Planning Branch Chief**

Act 164 - Working Group Meeting  
October 1, 2015



# Act 164: Working Group Goals

- **Address** the installation of EV charging systems at apartments, condominiums, cooperative housing corporations, and planned community associations.
- **Examine** the issues regarding requests to the board of directors of an association of apartment owners, condominium association, cooperative housing corporation, or planned community association for the installation of EV charging systems.
- **Report** findings and recommendations, including any proposed legislation, to the legislature no later than twenty days prior to the convening of the regular session of 2016.

# Energy Resource Coordinator

## Statutory Role

**§196-4 Powers and duties.** Subject to the approval of the governor, the coordinator shall:

...

**(2) Conduct systematic analysis of existing and proposed energy resource programs, evaluate the analysis conducted by government agencies and other organizations and recommend programs that represent the most effective allocation of resources for the development of energy resources;**

...

**(10) Review proposed state actions that the coordinator finds to have significant effect on the State's energy objectives and report to the governor their effect on the energy program, and perform other services as may be required by the governor and the legislature;**

...

**(14) Assist public and private agencies in identifying utility transmission projects or infrastructure required to accommodate and facilitate the development of renewable energy resources;**

# Statutory Energy Planning Objectives

Achieving energy independence requires addressing transportation and electrifying ground transportation has significant implications for the electric sector

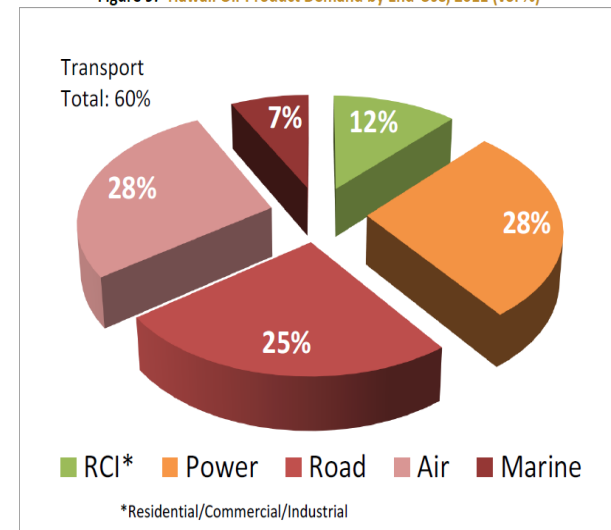
## Act 38 (15) §226-18

Increased energy security and self-sufficiency through the reduction and ultimate elimination of Hawaii's dependence on imported fuels for electrical generation and ground transportation

## Act 97 (15) §269-92

Increases renewable portfolio standards to 30 percent by December 31, 2020, 70 percent by December 31, 2040, and 100 percent by December 31, 2045.

Figure 9: Hawaii Oil-Product Demand by End-Use, 2011 (vol %)



*Energy independence means breaking our addiction on imported fossil fuels.*

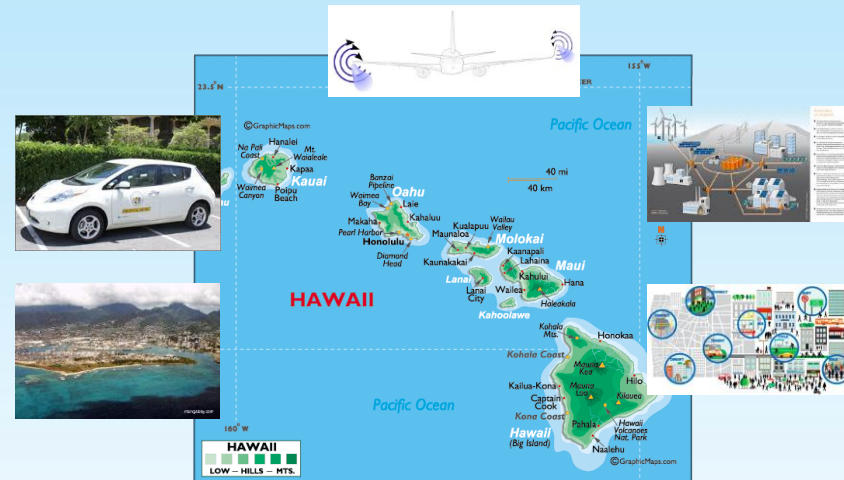
# Hawaii State Energy Office

## Energy Systems & Planning Branch (ESP)

### Comprehensive Energy Eco-System Roadmap: *Our goal is to put the whole energy eco-system into perspective*

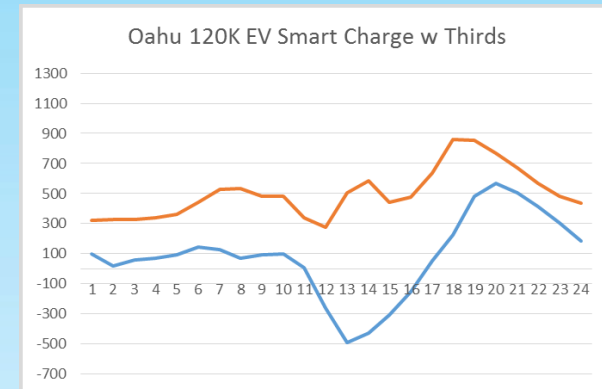
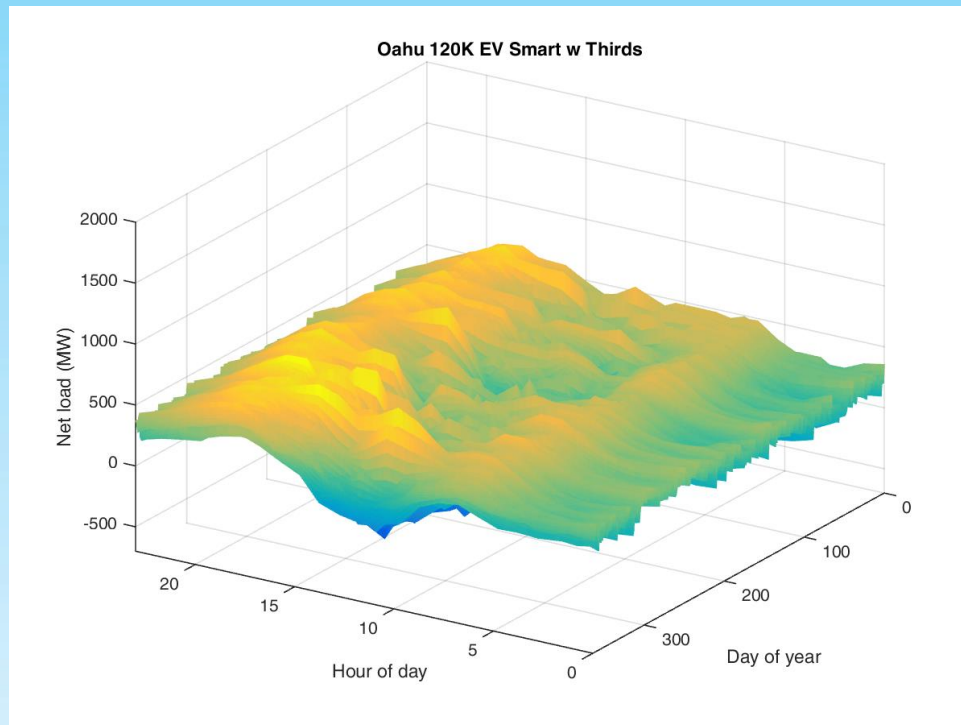
In order to prioritize high impact, cost effective activities to achieve energy independence ESP assess' and reports the impact of existing and potential energy policies and projects on Hawaii's energy eco-system.

We then look to enable high value activities through demonstrations and programs, legislation and regulatory proceedings.



# Energy Transfer Between Sectors

## Electric and Ground Transportation



	Peak Load (MW)	System Storage Requirements	
Base Case	~1,200	~500 MW (min. load)	~0 MWh
70% RPS	~900	~ -550 MW	~ +1,500 MWh
70% w/ Evening Charge	~+15%	~+12%	~+14%
70% w/ Smart Charge	~0%	~ -12%	~ -20%

RPS Modeled with 1/3 wind, 1/3 solar and 1/3 baseload renewables (e.g. biomass, geothermal, OTEC)  
Assumes 120k EVs on Oahu (roughly 15% of passenger vehicles)

# Hawaii EV Enablers

- ✓ Free parking: State and County government parking lots
- ✓ Access to HOV lanes with single passenger
- ✓ Parking lots with 100+ spaces available to public to have one (1) EV parking space with a charging system
- ✓ A non-EV parked in an EV parking space shall be fined, \$50 -\$100
- ✓ Hawaiian Electric Companies offer pilot EV Time of Use Rates (TOU) with a proposal to update the rates in front of the PUC, currently installing DC Fast Chargers
- ✓ City and County of Honolulu offers online permits for residential charging station installations
- ✓ Multi-family dwellings cannot prohibit installation of EV chargers

# Technology Overview: Electric Vehicles

	Battery Electric Vehicle (BEV)	(Plug-in Hybrid Electric Vehicle) PHEV
<b>Emissions</b>	Zero emissions from vehicle; only emissions are from utility electricity generation mix	Zero emissions from vehicle when driving on electricity. Emissions when driving on gasoline depend on engine emissions certification
<b>Range</b>	Generally 70 to 100 miles (proportional to battery size); some models are higher	All electric range varies from 15 to 35 miles (proportional to battery size); gasoline range is about 200+ miles
<b>Propulsion</b>	Electric motor/ battery only	Electric motor/battery <i>plus</i> gasoline engine
<b>Re-fueling</b>	Recharge with electricity	Recharge with electricity <i>and/or</i> refuel with gasoline

Source: CA PEV Collaborative (CG2-2)



# Technology Overview: Charging Equipment



## LEVEL 1 CHARGER

If you have existing electrical outlets, this is the easiest and most basic type of charging you could provide. Level 1 is the slowest charging rate and might be suitable for some drivers, but it is not ideal for properties that may have multiple electric vehicles.

### Estimated Charge Time

6-18 hours<sup>1</sup>

### Estimated Miles Per Hour of Charging

2-5 miles<sup>2</sup>

### Impact on Environment

1.2 kW, the equivalent of one toaster<sup>3</sup>



## LEVEL 2 CHARGER

Provides approximately five times the charging power over Level 1, decreasing the typical full-charge time, depending on the vehicle. Level 2 chargers typically require the installation of wall-mounted chargers and a dedicated circuit (similar to a clothes dryer), but it is the perfect charger for complexes with multiple electric vehicles that require a shared charger.

### Estimated Charge Time

3-8 hours<sup>1</sup>

### Estimated Miles Per Hour of Charging

10-20 miles<sup>2</sup>

### Impact on Environment

3.3-7.2 kW, the equivalent of 3-6 toasters<sup>3</sup>



## DC QUICK CHARGER

An off-board device that connects directly to a vehicle's high-voltage battery, allowing for high-power transfer that can typically charge to approximately 80% in under 30 minutes. This type of charger should be considered if you have, or anticipate having, multiple EV drivers on your property, or cannot install multiple Level 2 chargers.

### Estimated Charge Time

Less than 30 minutes<sup>1</sup>

### Estimated Miles Per Hour of Charging

60-80 miles<sup>2</sup>

### Impact on Environment

35-50 kW, the equivalent of 42 toasters<sup>3</sup>

<sup>1</sup> Charge times may vary.

<sup>2</sup> Miles per hour of charging may vary. Based on typical rates for light-duty vehicles provided by U.S. Department of Energy (<http://www.afdc.energy.gov>).

<sup>3</sup> Equivalents based on typical wattage of EV charger compared to typical wattage for household appliances provided by U.S. Department of Energy (<http://www.afdc.energy.gov>).

- 61% Hawaii residents reside in single family homes
- 39% Hawaii residents reside in multi family dwellings



# Hawaii EV Market Overview

As of September 2015, the number of EVs in the state was 3,750, an increase of 829 (28.4%) from the same month last year, and an increase of 61 vehicles (1.7%) from August 2015. As of September 2015, there were 1,035,653 passenger vehicles in the State. EVs make up 0.36% of all passenger vehicles.

## Registered Electric Vehicles and Publically Available Charging Stations

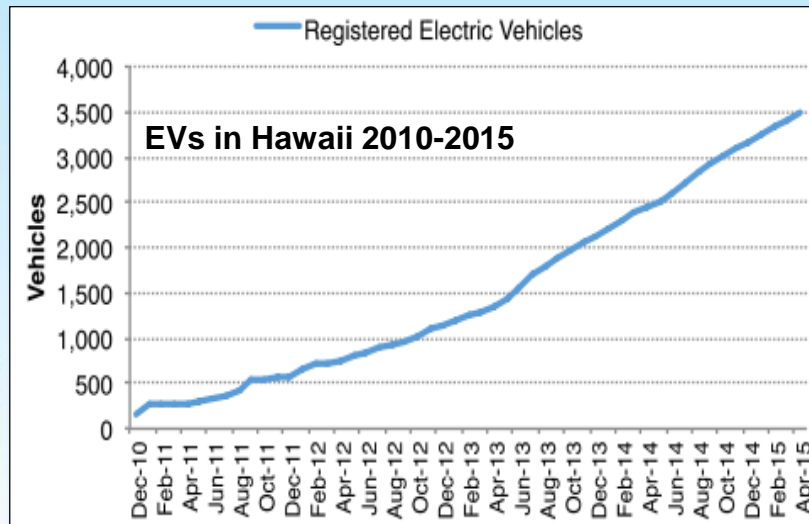
County	Electric Vehicles	Level 2 Charging Ports	Level 3 Charging Ports	Total Ports
Oahu	2824	244	5	249
Maui	633	68	22	90
Hawaii	164	51	2	53
Kauai	129	32	1	33
<b>Total Statewide</b>	<b>3,750</b>	<b>395</b>	<b>30</b>	<b>425</b>

## EV Dealers by County, 12 EV models available statewide

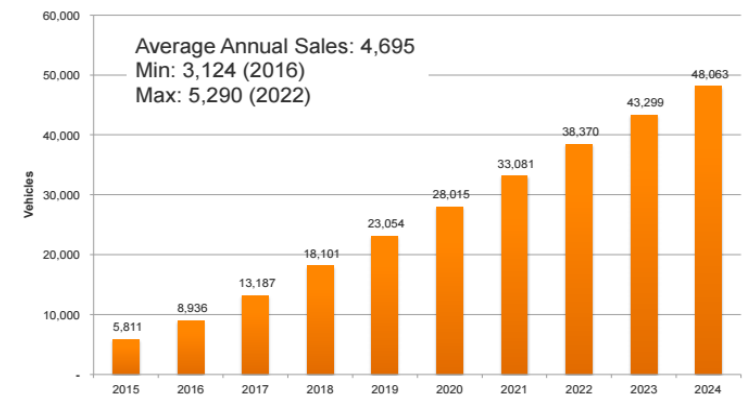
County	Nissan Leaf	GM/Chevy Volt	Mitsubishi iMiEV	Toyota Plug-In Prius	Ford Focus, C-Max, Fusion	BMW i3	Cadillac ELR	Porsche Panamera Hybrid & Cayenne Hybrid	Tesla	Kia
Oahu	3	3	1	3	4	1	1	1	1	3
Maui	1	1	0	1	1	0	0	0	0	1
Hawaii	1	1	0	2	0	0	0	0	0	2
Kauai	1	1	0	1	1	0	0	0	0	1
<b>Total Statewide</b>	<b>6</b>	<b>6</b>	<b>1</b>	<b>7</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>7</b>

# Hawaii EV Forecast

- U.S. Energy Information Administration ranks Hawaii second in the nation behind California in the number of EVs registered in the state
- Navigant Research anticipates Hawaii passing 30,000 in EV registration by 2020
- ICCT's Transportation Energy Analysis baseline, shows sales of EVs increase to account for one in ten vehicles sold in 2030 (resulting in 43,000 EVs on the road)



## Hawai'i EVs in Operation Forecast



Source: Navigant Research, 2015

# Hawaii EV Leadership: § 196-2.5

- Current legislation prevents any entity from restricting the right of property owners in MUDs to install EV charging systems;
  - However, legislation does not guarantees the right of tenants to install charging systems,
  - Nor provides a mechanism for charging systems that are shared among multiple units.
- EV drivers and industry representatives have stated this law isn't doing enough to encourage the installation of EV chargers in MUDs, and pointed out a variety of challenges to installing EV chargers in MUDs, including but not limited to:
  - installation costs,
  - electrical capacity,
  - parking availability, and billing management.

# Challenges: No Silver Bullet, Case by Case Scenario

- **Assignment of parking spaces:** Deeded parking spaces, assigned and unassigned availability
- **Property layout, Electric Service Access:** Building's existing electrical wiring, proximity of electrical service room to charging location
- **Electric Capacity:** Transformer load capacity
- **Design:** Building architecture and ADA considerations
- **Operation and billing management:** charging facilities
- **Coordination:** building managers and homeowners associations
- **Legal:** covenants between property owner/manager and EV owner/resident
- **Costs:** Installation & infrastructure



# Policy: Actions to address MUD challenges

## States with policies preventing exclusion of charging installation at MUDs

- ✓ CA mandatory building standards for chargers at MUDs, and renter right to install charger
- ✓ OR homeowner association decision time limit
- ✓ CO allowing installation

## States offering grants or rebates for EV chargers and/or installation

- ✓ CA, DE, IL, FL, IN, MD, MA, PA, CO, CT

## Mainland utilities offering resources and/or incentives for charging stations and installation

- ✓ Southern California Edison
- ✓ Pacific Gas and Electric
- ✓ Alabama Power
- ✓ Los Angeles Department of Water and Power
- ✓ Northern Indiana Public Service Company
- ✓ Consumers Energy- Michigan

## Mainland cities requiring new buildings, MUDs to be EV charging ready

- ✓ New York City
  - ✓ Every new parking lot or garage in NYC has to install conduit and provide the electrical capacity for future chargers for 20% of parking spaces
  - ✓ Building code required the conduit to be installed so that wire can be easily threaded at a later date
  - ✓ Within 2 years, up to 2,000 parking spot are expected to be charger-ready
  - ✓ Within 7 years, up to 5,000 parking spots in NYC will likely be charger-ready
  - ✓ End goal calls for 10,000 spots to be charger-ready

# Questions for Discussion

- **What are Working Group member priorities?**
- **What additional data does the Working Group need?**
- **What alternatives does the Working Group want more information on?**
- **What are the critical questions that need to be answered in the next meeting so that a recommendation can be reached?**

# Mahalo



[energy.hawaii.gov](http://energy.hawaii.gov)



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