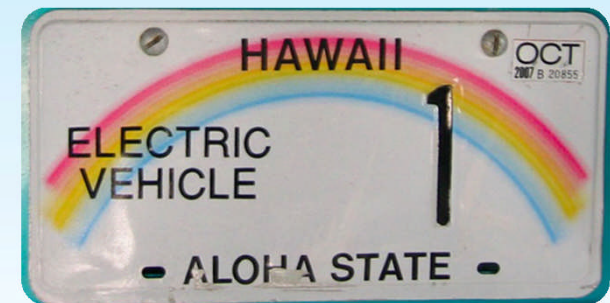


# Hawaii State Energy Office

Act 164 - Working Group Meeting  
October 28, 2015



# Agenda

AGENDA	
9:00 - 9:10	Call to order, welcome and brief overview of Working Group goals
9:10-9:20	Working Group Member and Attendee Introductions
9:20 - 9:30	October 1 Meeting Summary and highlights
9:30 - 10:45	Solution Avenues Discussion: Existing MUDs
10:45 - 11:45	Solution Avenues Discussion: New MUDs
11:45 - 12:00	<b>Next Steps</b> <ul style="list-style-type: none"><li>• <i>Determine if an additional half day meeting is needed to further discuss topic. Proposing week of November 2 or 9.</i></li><li>• <i>DBEDT and LRB will begin to develop a draft report capturing the working group's findings and recommendations. DBEDT will forward the draft report to members for review.</i></li><li>• <i>The final meeting (if possible before Thanksgiving, or latest early December) would be to establish a working agreement on the report and its recommendations. If needed a fourth meeting or conference call could be arranged to sign off on report.</i></li></ul>
12:00	Adjourn



# 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.



# Draft Timeline to Meet Statutory Deadline

2<sup>nd</sup> Meeting: Oct. 28<sup>th</sup>

Potential additional meetings by Nov 13<sup>th</sup> to provide time to draft report for committee review

Nov 20<sup>th</sup>: Draft report provided to stakeholders

Dec. 8<sup>th</sup> :Final stakeholder feedback received

Dec. 18<sup>th</sup>: Meeting for final report signoff

Dec. 31<sup>st</sup>: Statutory deadline to submit report to legislature

*Sunshine laws require posting meeting agenda 6 days in advance*



# October 1st Meeting: Summary and Highlights

The October 1, 2015 Working Group meeting documents, are posted to the Hawaii State Energy EV web page <http://energy.hawaii.gov/testbeds-initiatives/ev-ready-program/laws-incentives> .



# October 1st Meeting: Summary and Highlights

## **Significant challenges and costs to installing charging stations in existing MUDs**

- Economic Impacts & Liabilities
  - Installation costs
  - Electrical capacity, electrical upgrades
- Parking availability, parking proximity to power
- Billing management
- Insurance

## **Multi-faceted complexities need to be resolved to develop robust solutions**

- “No one size fits all” solution.
- Working Group may want to consider following scenarios:
  - >> Existing MUD (age, capacity, etc. etc. can impact solution)
  - >> New MUD Construction (Greater opportunity to design for Charging Stations before the building is built)

**Is MUD charging infrastructure addressing the barrier to EV adoption by MUD residents?**

**Sub metering could be explored by Hawaiian Electric Company to potentially help reduce costs**

**Will MUD charging build daytime electric load to match renewable energy availability?**

**Consideration of planning / matching incremental condo grown, EV adoption forecast/demand**



# Public Charging Station Locations

## EV Stations Hawaii



<http://energy.ehawaii.gov/ev/#/app/home>



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# October 1st Meeting: Summary and Highlights

- There are many components that go into the cost of charging installations
- Individual scenarios can result in wide ranges in total cost
- Hawaii charging station installation cost averages are higher than the mainland, primarily due to material shipping costs, and labor— anywhere from 20% to 30% higher depending on materials and labor rate increases.
- Hawaii likely has more complexity due to limited space, power available for expansion. The mainland usually has more room in buildings than HI which helps keep cost and complexity lower.

- “Installation is the major contributor to public station cost (60–80 percent of total).”

Pulling Back the Veil on EV Charging Station Costs,  
[http://blog.rmi.org/blog\\_2014\\_04\\_29\\_pulling\\_back\\_the\\_veil\\_on\\_ev\\_charging\\_station\\_costs](http://blog.rmi.org/blog_2014_04_29_pulling_back_the_veil_on_ev_charging_station_costs)





# MUD Example: Level 2 EV Charging Station Cost Estimates

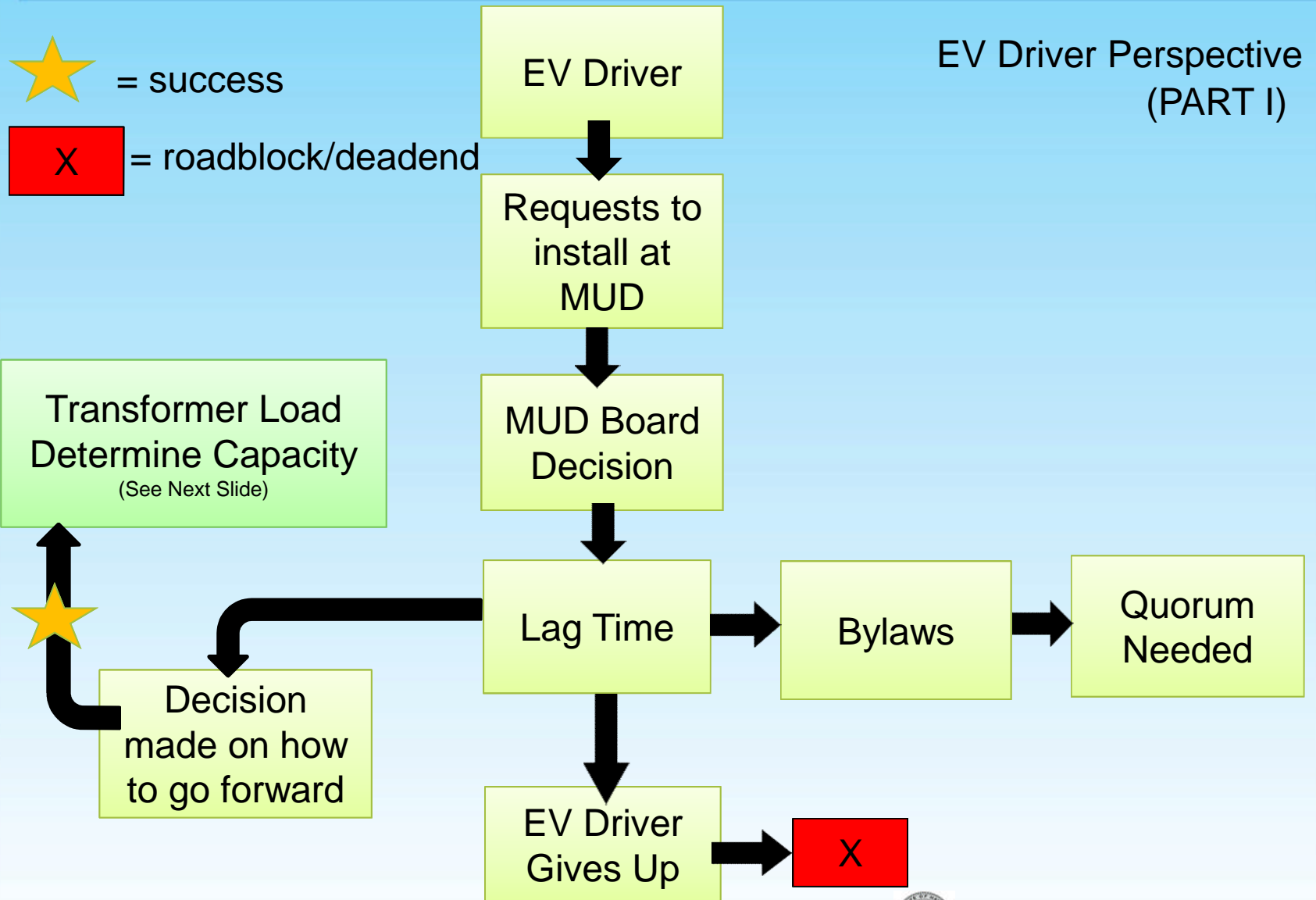
## Hawaii Summary: Estimated itemized cost, Level 2 EV Charging Station in MUD

- **Level 2 charging station equipment costs = \$499 to \$7,000+**
  - >> Personal Parking Stall Charger (home charger): \$499.00 to \$2,000
  - >> Shared Common Area Charger: \$2,500 (non-networked) to \$7,000 + (premium functionality, multiple port)
  - >> Networking Fees: up to \$25 a month
  - >> Maintenance, Credit Card Fees= extra
- **Charging station installations = \$4,000 to \$25,000 to \$100,000+**
  - >> A relatively simple project= \$6,000 to \$8,000 per station, however prices vary considerably
  - >> Union labor and materials costing, without trenching= \$3,000 to \$ 6,000.00
  - >> Trenching= \$3,000 to \$10,000 depending on distance
  - >> Main breaker for some of the older buildings = \$200 to \$1,000 based on if the breaker is obsolete and getting an approved rebuilt breaker
- **Consultant & engineering fees= estimated \$3,000 to \$5,000** this is in addition to infrastructure costs
- **Permitting Costs**

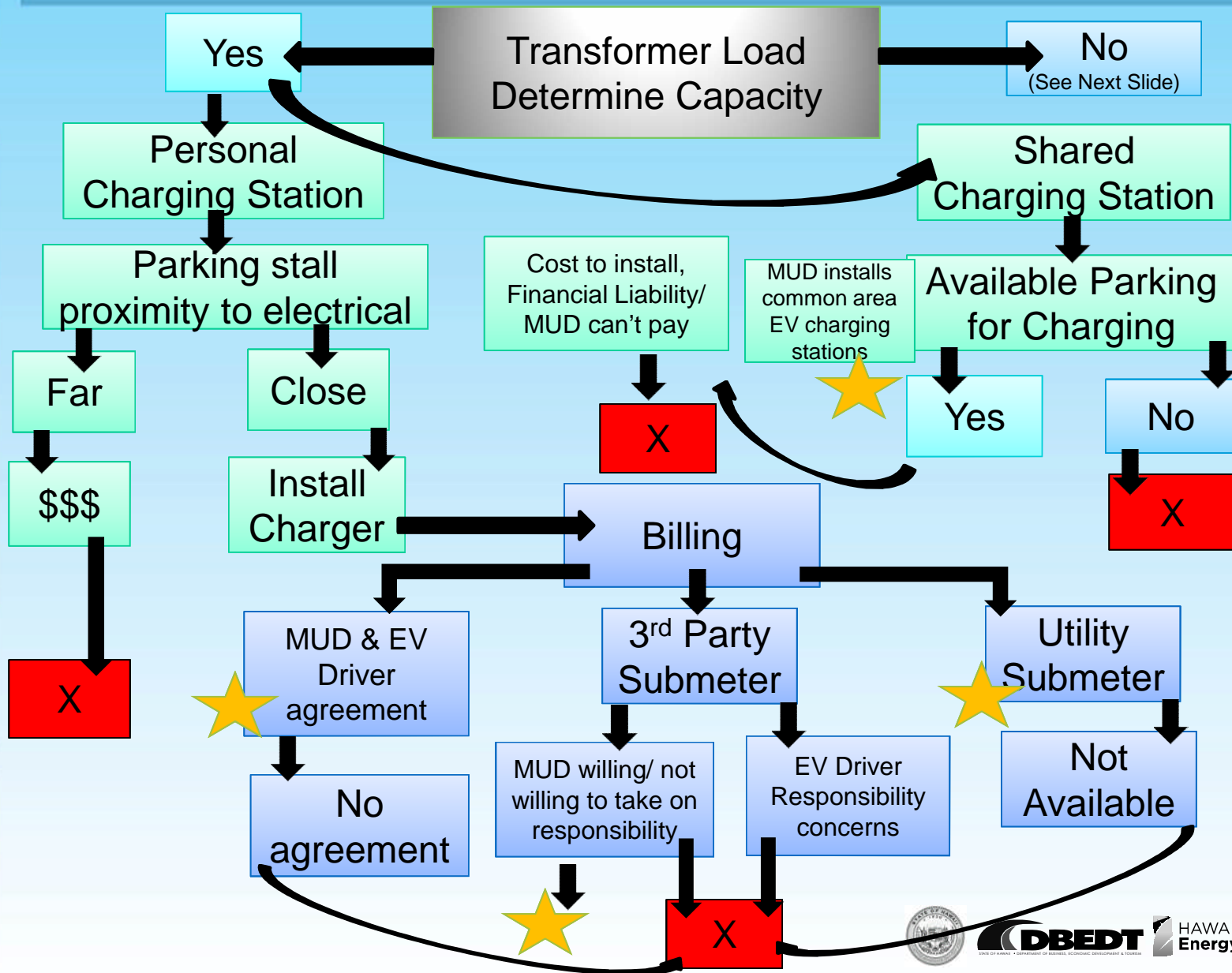
### Level 1

- In most existing building scenarios, Level 1 chargers are less cost than Level 2 charging stations.
- Some Level 1 charging installation costs are as little as half the Level 2 cost.
- Obsolete breakers causes cost issues.

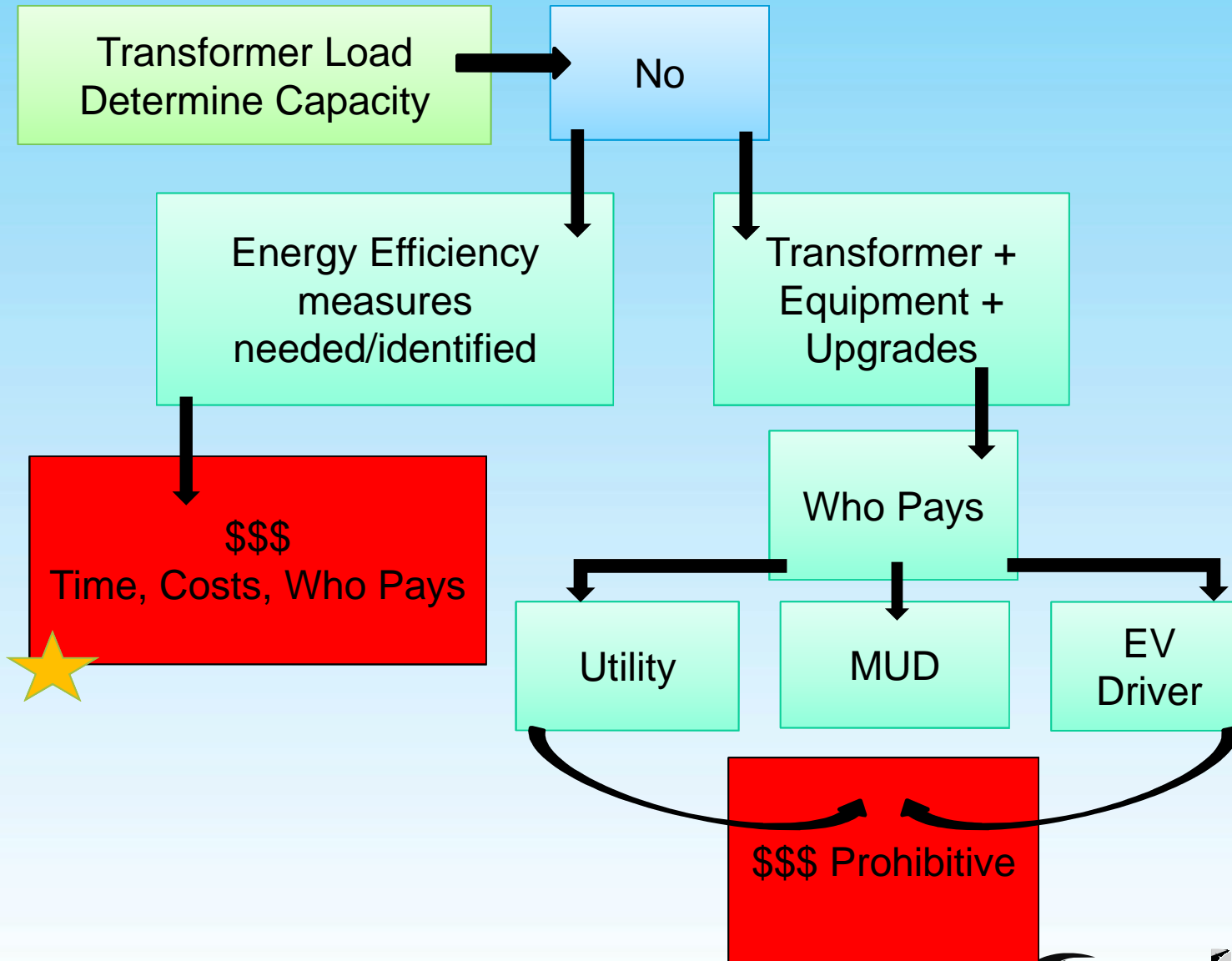
## Condominium Example: Level 2 EV Charging Station Decision/ Approval Flow Chart



# Condominium Example: Upon Approval, Installation Process Flow Chart (PART II)

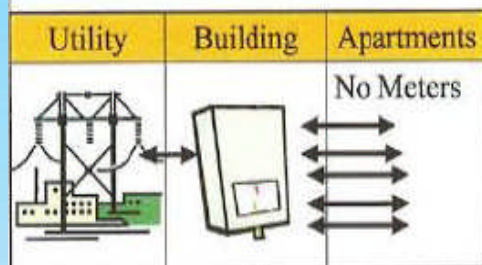


## Condominium Example: Upon Approval, Installation Process Flow Chart (PART III)



# Sub Metering

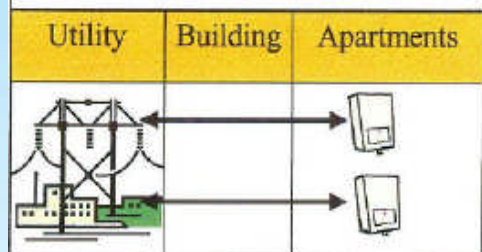
## Master Metered



### Master Metered

When a building is master-metered, all energy use is routed through a single meter that is owned by the utility. Typically, the property owner pays a bulk-rate price for any electricity consumed by tenants, and then bills the tenants equally for those electricity costs.<sup>6</sup>

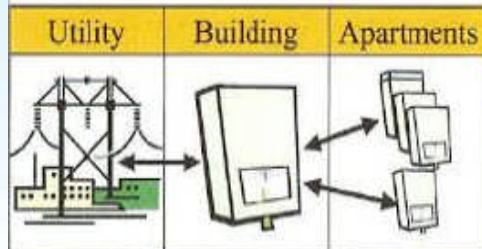
## Direct Metered



### Direct Metered

In direct metered buildings (also known as individually metered) each unit is supplied with a utility-owned meter. The utility directly bills each tenant for electricity usage at a retail residential rate.<sup>7</sup>

## Submetering



### Submetered

In a submetered building, the utility supplies electricity through a utility-owned master meter at a bulk rate paid by the property owner. That electricity is then distributed to the tenants through property-owned submeters.<sup>8</sup> The property owner then charges each unit for its individual usage.



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# Additional Slides for Discussion

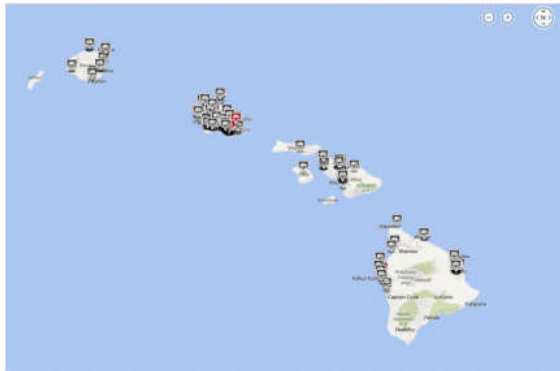


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# Existing MUDs Statewide= 3,263

## Statewide Apartment Properties

Total Count - 2454 Properties



## Statewide Condos and Co-Ops

Total Count - 809 Properties



### Apartment Properties

County	Unit Count	Number of Communities	Average Age
Hawaii	4064	55	1968
Honolulu	46242	2308	1961
Kauai	507	15	1979
Maui	2777	76	1977

### Condominium/Co-Op Properties

County	Unit Count	Number of Communities	Average Age
Hawaii	1768	20	1975
Honolulu	72526	746	1974
Kauai	544	7	1983
Maui	3369	36	1986





# Consideration: Combination Solution

Does the Working Group need to solve all of EV drivers charging needs at the MUD, or could a combination solution be adequate?

**Combination example-** shared MUD charger, workplace charging, fast charging.

**Assuming the following conclusions are correct:**

- >> Total charging service at existing MUDs may be prohibitive (cost, space, etc.)
- >> If an MUD can't handle total service (full charging needs) some service could be helpful.

## **Scenario:**

- >> A building has limited capacity and cannot fully charge all EV drivers every night
- >> Example: The building could install 1 (one) shared level 2 charging station, several level 1 chargers, or a combination thereof.
- >> Assumes every EV driver wouldn't be able to fill up every night
- >> **Question:** How long (days/miles) would an EV driver be able to "go" before they need to go to a fast charging station?



# How much charge do EV drivers need?

## Could Level 1 Charging meet a basic needs?

Average Miles Per Year	Average Miles Per Year		
	9,000	12,000	15,000
Miles per Day (Simple Average)	25	33	41
<i>assumes drive same distance every day</i>			
Vehicle Range on Full Charge	Days before Battery Depleted Assuming 6 hours of Level 1 charge per Night		
	75 miles	100 miles	125 miles
75 miles	NA	10 - NA	5 - 21
100 miles	NA	13 - NA	6 - 28
125 miles	NA	16 - NA	8 - 35

Average Miles Per Year	Average Miles Per Year		
	9000	12000	15000
Miles per Day (Average Weekday)	31	42	52
<i>assuming only 10% of miles are driven on weekends</i>			
Vehicle Range on Full Charge	Days before Battery Depleted Assuming 6 hours of Level 1 charge per Night		
	75 miles	100 miles	125 miles
75 miles	12 - NA	5 - 19	3 - 5
100 miles	16 - NA	6 - 25	4 - 7
125 miles	20 - NA	8 - 31	5 - 9

NA means no need to charge anyplace else

AC Level 1 Charging provides roughly 4 to 6 miles

>> Total miles driven and driving patterns have significant impact on customer charging needs

>> Level one charging could potentially meet much of EV customer charging needs

*Level 1 charging for 6 hours provides roughly 24 to 36 miles of range*

*As battery range increases EV drivers can go longer before needing to top off at a public fast charger*



# High Level EV Charging Solutions: Existing MUD

- **If capacity is limited:** Shared Charging Stations
- **Allocating energy costs and potentially building capacity limitations:** Submeters
- **To address high costs:** Subsidized Programs
  - >> Example: CalCAP Electric Vehicle Charging Station EVCS Financing Program
  - >> Utility program
- **Legislation**
  - >> Example: Legislation to compel PUC to explore programmatic solution
  - >> Example: Legislation to fund robust survey studying EV charging barriers



# New MUD: High Level EV Charging Solutions:

## New Construction: Building Codes

- There's any number of ways to address building codes
  - >> Example: Requiring Building Code Council to adopt rules for EV Ready requirements.

**State of Washington, State Building Code Council- Proposal.** New buildings serving MUD and Workplace, etc. required to have EV charging Infrastructure (5%-20%) where parking is provided, electrical room(s) shall be designed to accommodate to serve a minimum of 20 percent of the total parking spaces with 208/240 V 40-amp EV charging infrastructure. Electric vehicle charging infrastructure for accessible parking spaces.

Conclusions from Washington State Building Code Council Amendment Proposal

>> Basic EV charging infrastructure in the design and construction of new buildings will reduce the cost of providing EV charging infrastructure. If the basic design of the building electrical room and EV designated parking are considered during design, cost for adding EV charging will be minimized

**The California Building Code.** All new construction to be wired for Level 2 electric-car charging stations beginning in 2015. Electrical infrastructure at new buildings and parking lots include enough capacity to support charging stations. Multifamily housing includes a specified percentage (3 percent) of multifamily parking spaces to have capability for future EV charging. By ensuring that new construction comes prewired for electric-car charging, the California rule streamlines the process of installing a charging station at a later date.

<http://www.hcd.ca.gov/codes/calgreen/docs/calgreen-report-to-legislature-2014.pdf>

**Other:** Shared Charging Stations,  
Utility Enablement: Submeters, Utility Program



# MUD: High Level EV Charging Solutions

Given the potential expense around installation of MUD charging stations, the Working Group may want to consider charging solutions for MUD dwellers beyond just their building.

## Survey

Funding a robust survey could help to understand:

- Where EVs reside, how are they charging, all barriers to MUD and non-MUD customer EV adoption, MUD capacity analysis, drivers access to workplace parking, daily mileage, charging needs, battery capacity needs, level 1 vs level 2.

## Develop Demonstration Program

- Program aimed at meeting charging needs of Hawaii
- Design flexibility within program to address individual site challenges
- Look at charging in a variety of locations, (i.e., workplace)
- Provides flexibility within an industry with fast moving technology



# 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

