Act 164: Hawaii Multi-Unit Dwelling EV Charging Working Group
October 28, 2015 Meeting Summary

Date: Wednesday, October 28, 2015
Time: 9:00 AM – 12:00 PM
Place: State Office Tower, Room 1401. 235 South Beretania St, Honolulu, HI 96813

Working Group members in attendance

- Mark Glick, Chair, (Representing the Director of Business, Economic Development, and Tourism), Hawaii State Energy Office;
- The Honorable Rosalyn H. Baker, Chair of the Senate Committee on Commerce and Consumer Protection and Health
- Matthew K. Yoshida (Representing The Honorable Angus L.K. McKelvey, Chair of the House Committee on Consumer Protection and Commerce)
- Catherine P. Awakuni Colón, Department of Commerce and Consumer Affairs
- Sherri Sakamoto, Division of Consumer Advocacy
- Phil Nerney, Community Associations Institute
- Shem Lawlor, Hawaii EV Partnership
- Todd Ritter, Hawaii EV Partnership
- McKibben Mist, Building Industry Association of Hawaii
- Michael Colon, Hawaiian Electric Company

Other attendees

- Gregg Kinkley, Deputy Attorney General
- Jo Ann Uchida, Department of Commerce and Consumer Affairs
- Benedyne Stone, Department of Commerce and Consumer Affairs
- Matt Prellberg, Legislative Reference Bureau
- Ted Baker, Legislative Reference Bureau
- Carlos Perez, Hawaiian Electric
- Jimmy Yao, Hawaiian Electric
- Mark Yamamoto, Hawaiian Electric
- Eric Shimono, Hawaiian Electric
- Dean Pang, City & County of Honolulu
- Chris Yunker, Hawaii State Energy Office
- Lynda Viray, Hawaii State Energy Office
- Margaret Larson, Hawaii State Energy Office
- Jon Chin, Hawaii State Energy Office
- Kate Aurilio, Hawaii Energy
- Jim Pastor, Hawaii Energy
- Anne Smart, Chargepoint
- Rodney Arakaki, Bennett Engineers ,
- Paul Glenny, NRG EVgo
- Kent Fukuhara, A-1 A-Lectrician, Inc.

Call to order. Welcome and Introduction
The second meeting of the Act 164 Working Group convened at 9am on October 28, 2015 in conference room 1403 of the State Office Tower. The meeting agenda, a list of Working Group members, a copy of the legislation were handed out and are attached to this document. The Working Group meeting was open to the public and several non-Working Group members attended. Mr. Mark Glick, Administrator of the Hawaii State Energy Office (HSEO) led the meeting per the October 1st meeting's delegation by Mr. Luis Salaveria, Director, DBEDT. Mark Glick, HSEO opened the meeting with a statement of Working Group goals, proposed timeline and strategy and general remarks on conduct of the meeting.

Working Group Member and Attendee Introductions.
Working Group members and non-Working Group members introduced themselves stating their name, tile and organization.

October 1 Meeting Summary and Highlights
Chris Yunker, Energy Systems and Planning Program Manager, HSEO summarized findings from the October 1st Meeting, posted to the HSEO website, http://energy.hawaii.gov/testbeds-initiatives/ev-ready-program/laws-incentives.

At the October 1st meeting, Working Group Members and Industry representatives pointed out there are significant challenges and costs to installing EV charging stations in existing MUDs such as: economic impacts & liabilities, installation costs, electrical capacity, electrical upgrades, parking availability, parking proximity to power, billing management, insurance, etc. Significant resources and effort is required to develop robust solutions and there is no "one size fits all" solution.

Public Charging Station Locations
At the October 1st meeting, Working Group Members requested a list of statewide charging station locations. Margaret Larson, Energy Analyst, HSEO gave a live demonstration of the HSEO mobile application, *EV Stations Hawaii*. The app is designed to help drivers locate publicly available EV charging stations statewide by providing information on: Charging stations locations, Driving directions, Charge level, and Charge fee (if applicable). http://energy.hawaii.gov/testbeds-initiatives/ev-ready-program/ev-stations-hawaii-mobile-app

Charging Station Installation at MUDs Cost Breakdown
At the October 1st meeting, Working Group members requested an example cost breakdown to install a EV charging station in a MUD. Margaret Larson, HSEO thanked Working Group member Hawaii EV Partnership, represented by EV Structure, and industry representatives, Boss Electric and A-1-Alectrican for providing and verifying cost estimates. Highlights from Margaret's October 28th meeting presentation include: 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. A MUD level 2 EV charging station installation could range from an estimated $4,000 to $25,000 all the way to $100,000; prices vary considerably. A relatively simple project could cost $6,000 to $8,000 per station. These figures do not include consultant and engineering fees which could be an additional $3,000 to $5,000. Level 2 charging equipment costs range from $499.00 to $7,000 +. Level 1 station installation are often less cost, sometimes as little as half the level 2 cost, however obsolete breaker, transformer capacity and charging station location/parking stall proximity (trenching needs) can

dwarf station installation costs. These figures are a rough estimate of Hawaii costs. There are a lot of complexities in providing costs as each charging station installation is essentially a case by case scenario.

Condominium Example: Level 2 EV Charging Station Decision/ Approval Flow Chart
The October 1st meeting focused on education and identifying the challenges of installing EV charging stations in MUDs. At the October 28th meeting the HSEO presented a flow chart from an EV driver's perspective which highlights the challenges and complexities that may arise when attempting to install an EV Charging Station at a condominium.

Sub metering
Sub metering was briefly discussed at the October 1st meeting as a potential solution to EV customer billing. At the October 28th meeting Chris Yunker, HSEO, noted a sub meter is a meter behind the main meter. The main meter is the meter at the interface between the customer and the grid. A building would have a main meter that measures the load the grid sees for the entire building. The sub meter records a subset of the main meters load which in this case is the EV charger. The sub-meter can then be used to calculate the cost associated with EV charging.

Hawaiian Electric – DC Fast Charger Deployment Update
At the October 28th meeting Hawaiian Electric provided an update regarding their DC Fast Chargers deployment program, a request made by Working Group meetings at the Oct 1st meeting. Hawaiian Electric has opened two DC Fast Charger locations- Dole Plantation in Wahiawa and Koolau Center in Kaneohe. They hope to complete and open two additional locations, (7-11 Hawaii Kai and Kapolei Commons), by end of 2015/early 2016. A DC Fast Charger is planned to be installed at the Hawaiian Electric's Ward Ave facility customer parking lot in 2016. Hawaiian Electric is also in discussions with other land owners for 2016 installations and planning to have three additional charging stations installed. Each DC Fast Charging Station can charge one car at a time. The first objective of DC Fast Charging program is to address range anxiety, and the second objective is to alleviate some charging demand at MUDs. DC Fast Charging installation costs are high and most business wouldn't be able to install DC Fast Charging, which is part of the reason Hawaiian Electric is taking that on.

Solution Avenues Discussion: Existing MUDs

Hawaiian Electric – Sub Metering
Hawaiian Electric provided a high level explanation of sub metering. Sub meters are deployed right now by third parties. Utility sub meter deployment is not something that the utility has done to date in Hawaii.

Summary of points discussed: Typically there are two types of metering for a MUD, a master meter and a direct meter. A master meter is usually subject to a bulk rate which is not itemized for the MUD customer and is portioned typically by a square footage or shares to MUD residents. A direct meter is not subject to bulk rate and allows customers to have control over their bill as their bill reflects the usage of their individual unit. This type of application applies to residential usage but could also be applicable for EVs, and EV charging. Direct metering is generally a higher installed cost relative to a master meter as it requires installing multiple meters and meter banks vs one master meter. Sub metering is effectively a way that usage can be backed out of a master meter for billing purposes. This can help reconcile the differences between the individual units usage and therefore creates greater visibility on the usage for individual customers. For an EV application, if an AOAO, for example, requires an EV to be metered, sub metering can help lower the cost of the infrastructure by bringing that meter connection closer to the

customer and further away from the master meter which can be beneficial for existing buildings. Sub metering could help solve a cost issue where existing building power infrastructure is close to the EV customer's proposed charging location. This assumes there is sufficient capacity available within the existing building infrastructure and thereby wouldn't necessarily trigger upgrades resulting in high costs. Sub metering wouldn't necessarily address the secondary issue of who pays for the cost of infrastructure to the point of the customer or EV, those costs would still remain. Hawaiian Electric is committed to exploring utility sub metering and sees it as a viable option.

Legislation pertaining to Sub metering
Senator Baker noted the current Hawaii law pertaining to sub meters allows AOAOs to provide sub metering or individual meters at the request of unit owners so that they can control their units electric bill. The law only applies to condominiums. There is a State measure to be considered during the 2016 session which proposes to extend this law to cooperatives and community associations.

Concerns regarding Sub metering & Standards
The Community Associations Institute noted a number of clients have reported difficulties with 3rd party billing relating to sub metering which have created significant irreconcilable billing problems. Mr. Nerney pointed out there is a need for a reliable mechanism for reading sub meters and an industry-wide utility based solution could be helpful.

Public Comment: Hawaii Energy noted standards currently exist for sub meters and in order to receive a Hawaii Energy rebate for sub meters the meters have to meet a revenue standard. Unfortunately there are some projects where the AOAO is not familiar with the technology, and install meters that do not meet such standards and this may be part of the issue.

Hawaii EV Partnership
Todd Ritter provided slides highlighting case studies from Hawaii, both existing and new MUD EV charging installations. Summary of talking points:

Case Study: Existing Buildings, Energy Efficiency retrofit for EV charging
Downtown MUD, mixed use building. Built in year 2000 with 500 parking stalls. EV Structure installed 2, Level 2 charging stations. The charging station installation project was originally constrained by transformer size and the MUD couldn't add any more than 6 charging stations. EV Structure performed a transformer load measurement, transformer/ electrical engineering report (ranges $1500.00) which showed how many EV charging stations the building could accommodate. EV Structure did a complete LED lighting retrofit that freed up two 40 amp breakers. They were able to accommodate two more level 2 charging stations by making these energy efficiency measures. PV was also recommended with standalone battery storage, and as a result freed up capacity for ten level 2 charging station and fifteen 110v outlets (level 1).The ROI in Hawaii, was about 12 months. Mr. Ritter claimed with Hawaii Energy rebates there were no costs to the upgrades.

Case Study: New Construction
Installing an EV charging Station in a new construction as opposed to retrofitting an existing building can make a tremendous difference. Slides were shown that highlight the $24,000 cost saving difference between specking out a charging station in a new building versus retrofitting an existing buildings. The case study showcased three level 2 charging stations.

Case Study: Technology Solutions
EV Structure stated Level 1 is a similar cost to install a level 2, therefore they generally recommend a Level 2 should be installed in order to get a faster charge. The hardware for a Level 1 charging is cheaper, yet the cost to run the electricity back to the master meter and panel room is generally the same cost as a Level 2 charging station. Capacity availability is also a consideration. EV Structure highlighted technology solutions to EV charging station installations at MUDs including, the EV Gauge, a monitoring and billing device which measures the amount of electricity used by an EV in real-time. The EV Gauge includes an internet based dashboard. EV Structure also noted Free Wire technology, on/off grid battery storage, solar carports, and LED light post with battery storage. FreeWire will be partnering with a variety of industries in Hawaii including MUDs, to demonstrate their mobile charging solution. FreeWire technology is a mobile Level 2 and 3 Fast Charger that mitigates the need for infrastructure and expensive trenching, allowing customers to quickly add EV charging capability.
http://energyexcelerator.com/portfolio/freewire-technologies-inc/

Priority Focus Discussion- Existing MUDs vs New Construction
Working Group members discussed the importance of focusing Working Group findings and recommendations primarily on existing MUDs rather than new, or soon to be constructed MUDs. Working Group members noted there is a larger inventory of existing MUDs and it's important to ensure the focus remains on what the legislation primarily asked for, to address existing buildings.

Solution Avenues Discussion: New MUDs
Howard Wiig, Energy Analyst, and HSEO's Building Codes expert presented a summary including the process and current timeline for adding new language into the Federal and State building code. Mr. Wiig noted often times when a building code passes (for example, an energy efficiency measure/code requirement) a market transformation generally follows, and suddenly there's a demand for that equipment, i.e. the cost of equipment may go down and existing buildings tend to adopt the new efficiency equipment. Mr. Wiig believes for this reason building codes can help to encourage the market transition to efficient buildings.

The Hawaii's Energy Building Code recently passed International Energy Conservation Code (IECC) 2015, the latest national building code which includes a tropical climate code. It is now going a public hearing process with the end result of it becoming law in the form of Hawaii Administrative Rules. Simultaneously, the four Hawaiian counties are going through their amendment, review, and ordinance process occurring over the next year. The 2015 code does not include EV charging station guidelines. The next time the national IECC code will be update will be in 2018. It is anticipated that EV requirements will be incorporated into the 2018 national building code. The HSEO would be willing to propose options for EV infrastructure inclusion into the national level code council.

Another approach aside from Building Codes is legislation. Mr. Wiig referenced the success of Hawaii's mandatory solar water heating law.

Open Discussion- Existing Buildings

Mark Glick facilitated an open discussion pertaining to existing MUDs, with a goal of the discussion to determine how far the Working Group wants to go in terms of exploring options, guidelines, incentives, etc.

Hawaii EV Partnership Proposal- Funding EV Charging Installations via State Fuel Tax

Hawaii EV Partnership's Shem Lawlor, proposed to add a two cents per gallon increase onto the State fuel tax and to allocate the revenue/ funding to support an EV charging station installation program. Mr. Lawlor noted gas prices have dropped $1.50 since mid-2014, however the State fuel tax is still seventeen cents a gallon. A two cents increase to the State fuel tax would generate over $10M a year in revenue. An average cost of $10,000 per charging station could add 1,000 charging stations per year with such a program, more than doubling what is installed today. Mr. Lawlor noted this increase would cost about $10.00 a driver per year in additional costs, and claimed if MUDs had a "carrot" where they could receive some funding that could solve some of the problems we're facing. Mr. Lawlor noted it would be difficult to impose a mandate or a program that includes strong requirements which may result in a heavy burden on some buildings.

Working Group members noted that Oahu costs for gasoline are much different that the neighbor islands, where they are much greater. Likewise neighbor islands, such as the Big Island, do not have a lot public transportation options like Oahu. Working Group members noted the State fuel tax is a sensitive piece of legislation and it's important to not make it harder and more costly for those who need to get to work via car.

Identifying Potential Funding Source

Building Industry Association suggested designing a program to leverage energy efficiency measures to assist with EV charging station installations, noting if buildings are more energy efficiency they have a cash stream they can use to put in an EV charging station and also get additional building capacity. Mr. Mist noted the importance of battery storage and TOU rates to help balance load on the grid. Mr. Mist and Hawaiian Electric suggested applying Public Benefit Fund /Hawaii Energy funding. Mark Glick noted the Public Benefit Fund has access of $30M annual funding for efficiency, and noted there is an existing RFP underway.

Enabling Legislation

Senator Baker noted unless it's already in the Public Benefit Fund RFI it may be faster to incorporate such language/ well formulated proposal via legislation allowing for a program to be designed to assist MUDs to install charging stations, battery storage, EV TOU rates, etc., DCCA noted they would review the process, and agreed to the concept of incorporating efficiency measures and EV charging stations to MUDs, pointing out that's where the nexus exists. DCCA noted it would be important to include a specific articulation/ language that states, EV charging stations installed in existing MUDs could specifically be funded using energy efficiency funding via the Public Benefit Fund. Creating greater

capacity in the MUDS or any other facility depends on the scope of how the Public Benefit Fund administrator could utilize the Public Benefit Fund. The notion of utilizing that additional building capacity from EE measures for EV charging probably would need to be specified by legislation, to avoid potential delay.

High Level Goal
Hawaiian Electric noted the importance of having a high level state policy to justify such EV programs, which highlights the nexus between efficiency and EV adoption. EV Partnership referred to Hawaii Act 28, 2015 "eventual elimination of fossil fuels from electricity and ground transportation"

Public Comment: Charge Point noted it would be helpful to have a State policy when creating a funding program. The policy would mention (in respect to EV's generating added load) policy to recognize it's a public benefit to increase alternative fuels, not inconsistent with energy efficiency.

Action Item
Mark Glick summarized, the Working Group finds there is an interest in creating a funding pool and an interest to look at an appropriate source of funding to incentivize EV charging station installations in MUDs, yet the scope could also be broader. Mr. Glick noted an action item moving forward could be to review language relative to the Public Benefit Fund.

Program to include "Make Ready" Language
Public Comment: Charge Point noted funding specifically focused to cover the costs to make existing buildings EV Ready, or "make ready" costs would be cost effective and help to enable EV charging. Charge Point noted, costs to prepare an existing building to be EV Ready is very significant, and can be more than half the cost of the EV charging station installation. Charge Point recommended such program would be company "vendor neutral" allowing the site host to determine EV charging company, or Level 1 vs Level 2.

Important Nexus: Workplace Charging and MUD charging
Working Group members noted it is important to design a broad enough program to include applications beyond MUDs, for example to workplace charging. Members recognized to solve the MUD issue, workplace charging may be needed, and pointing out the workplace is where EV drivers could charge when they can't charge at home/MUD.

Enabling legislation needs to be legally defensible
The Community Associations Institute clarified many condominium project documents include language that state, *an association shall not run a business for profit.* Mr. Nerney stressed the importance of legislation to contain clear language; 1) where a MUD board would need to be enabled, and immunized, 2) the language, if needed, could be litigated effectively, 3) the legislation would provide clarity as to what the policy is and so "it trumps everything", noting a simple example, "so that you're not going to an owners meeting and having someone say you're going to have to take out my bed of petunias, and therefore you can't do it, and I will sue you if you try."

Proposed program to adequately accommodate building shortcomings
The Community Associations Institute noted it is important to consider the high number of MUDs have old/inferior infrastructure, where incentives aren't going to help them. A funding source external to the home owners is appreciated, however it is essential for the proposed program to have flexibility, without mandates, with an objective means of determining when a building can't install an EV Charging Station. He suggested the program may need to establish an approach to making a determination for funding or safe harbor, perhaps determined by building capacity, project complexity.

Action Item
Mark Glick, summarized the Working Group's discussion noting the group has found 1) exploring a source of funding, and 2) has identified a specific source of funding to explore in a deeper fashion, 3) have possibly some language on how to utilize such funding. At the next meeting the action item will be to have the will of the group on certain action items and recommendations so that the draft report could be built around those recommendations, to ensure the draft is written with the will of the working group, rather than the interpretation.

Hawaiian Electric- Utility program to support EV charging infrastructure installations
Hawaiian Electric proposed a program which would enable the utility to cover some of the infrastructure work behind the meter. He noted this type of program is a trend occurring on the mainland. Utilities traditionally build infrastructure to meet load and demand. As an example, Mr. Colon proposed the utility could "take on" a point of interconnection from the master meter to the individual EV customer. The infrastructure could be put into distribution rate base and recovered through rates by the utility. He noted the benefit of getting buy in from other stakeholders, as a portion of the costs would be borne by the utility. A broad customer base could be leveraged as well as a greater ability to recoup cost over a long period of time. Mr. Colon noted the importance of having high level support/strong state policy on this subject as such a program could be construed to create a cost shift between customers.

Public Comment: Charge Point clarified expensive "Make Ready" costs could potentially be covered by the utility rather than the property owner thereby enabling the customers opportunity to have charging infrastructure, and allowing the site host to determine a charging station vendor. Because this proposed program would be rate based, the utility could be empowered to build in a quantifiable rate payer benefits, for example by requiring the site host to, participate in load management, TOU rates or demand response capable technology.

Sub metering
Working Group members highlighted the need for sub meters, identifying many MUDs on Oahu still have one single meter, where they don't share the cost, and they don't have any way for the individual owner pay for their electrical use.

Flexibility
Members noted a program "mandate with carrot" needs to be flexible enough to accommodate MUDs that can't install charging infrastructure until technology (for example, utility sub meters) can catch up, etc. Members noted the importance of using public funds as efficiently as possible, and recognized there will

be MUDs where it's harder than others to install EV charging infrastructure. Members noted a criteria may need to be developed to include benchmarks, accountability, and cap to avoid "sinking" the full fund. Hawaiian Electric stressed it is important to keep at the forefront that this is a unique opportunity to design a solution that would make the whole EV experience for the customer easier, for example it would help that when the customer wants to either purchase an EV or install a charger, via this program it becomes so much easier.

Action Items
Mark Glick clarified, the Working Group findings 1) have identified a need for source of funding, 2) have discussed the need for incentives and how they work, 3) identified that any potential language would require support from a requirement standpoint, 4) there is a need for further clarification on utility sub metering and utility sponsored program, for example what kind of guidelines could be worked out, and how some of these rate basing options could apply to the utility. Mr. Glick also suggested the report would benefit by including an initial section that puts context on broader and contributing EV adoption mechanisms such as; workplace charging, or/and MUDs, TOU rates. It would also be important for the report to highlight that MUDs are essentially a part of the EV network and other tools are needed as a means to promote and support the greater use of EVs as a replacement to fossil fuel based fuels and energy in transportation.

Review SB 1316
Senator Baker proposed the Working Group review any issues raised last session per SB 1316 (which resulted into a Working Group) in order to avoid potentially missing something that may still be relevant. Mark Glick noted this review would be included in the next meeting's agenda.

New MUD Construction/ New Buildings
Working Group members noted developers are receiving demand from EV drivers/ buyers to install EV charging stations, and therefore they don't believe there would be a need to recommend an incentive. Working Group members found the report should suggest, for example; as long as it makes sense for people to buy EVs (hence, the selling points of EVs), it is presumed that new developers will respond to market forces, and the Working Group encourages developers to consider EV infrastructure.

Extending Working Group
Working Group members discussed the consideration of extending the working group an additional year, understanding the legislators in the group would absence themselves during session. Members noted if there are topics that come up it may be useful to have a group for discussion purposes. This point will be added to the next agenda for further consideration.

Adjourn

Mark Glick, HSEO noted the next meeting will be November 16 9am-12pm, and the hope is that a vote will be made on how to move forward with a recommendation. Mr. Glick adjourned the meeting at 11:35 PM.