The Maui EVA Story

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It started with a vision

PARADISE ELECTRIFIED:

TOP 10 REASONS
WHY MAUI IS
THE PERFECT
SITE FOR
ELECTRIC
VEHICLES
Curtailed wind power could charge up to 40,000 electric vehicles per year
Solar carports could charge EVs in the daytime
Ecotourism for visitors
Residents benefit from second-hand EVs from turnover of rental fleets
Displaced gasoline usage & increased renewable energy to meet Hawaii Clean Energy Initiative
14 cost-share partners

Hawaiian Electric Vehicle Network

Grand Wailea Resort & Spa
Dept of Energy Clean Cities EV-Readiness Planning Grant

* UH Maui College
* DBEDT
* UCSD
* Honolulu Clean Cities
Clean Cities’ Community Readiness and Planning for Plug-in Electric Vehicles and Charging Infrastructure Selections
Electric vehicle readiness plan

- EV = PEV = PHEV highway-ready plug-in (hybrid or all) electric vehicle
- Focus on light-duty passenger vehicle and up, e.g. Chevy Volt, Nissan LEAF, Toyota Plug-in Prius, Mitsubishi iMiev
- Mass adoption
- EV infrastructure development: local ordinances, charging stations
“It's an interesting case that seems relatively ideal for EV adoption: a small region populated with EVs driven by tourists, who may be less worried about day-to-day range anxiety. The rental fleet also provides a nice sink of early adopters, who can bear the brunt of upfront costs, eventually allowing locals to take advantage of cheaper used EV prices and a more mature infrastructure.”

- Green Tech Media, Dec 2011
Visitors need EV charging at hotels and public places & EVs for rent
How to convince hotels to install charging stations?

* Compliance with Hawaii State EV law: Act 89 SB2747 SD1 HD2
* Interpretation of the law
* There’s no enforcement or penalty if you don’t
* $1.4 million ARRA funds to AVinc and Better Place to install charging stations in Hawaii
166 tourist destinations: hotels, parks, golf courses, etc.

<table>
<thead>
<tr>
<th>HOTELS to COMPLY</th>
<th>With condo-hotels</th>
<th>Without condo-hotels</th>
</tr>
</thead>
<tbody>
<tr>
<td>East</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Central</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>West</td>
<td>36</td>
<td>15</td>
</tr>
<tr>
<td>South</td>
<td>34</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>73</td>
<td>31</td>
</tr>
</tbody>
</table>

Note that law may not include condominiums. However, it is unclear if it encompasses “condo-hotels” so both scenarios have been taken into consideration. Some properties are mixed-use, if a property has condominium hotel as well as other uses (i.e. timeshare, hotel, condo) and over 50 units total, they were considered as the non-condo use would require them to install chargers.
* Tourism is the economic engine of Maui County
  * – accounting for 75-80% of our economy
  * – 40% of all jobs are directly related to the Visitor Industry
* Infrastructure should be in place for residents before we push visitors into renting EVs
* Let’s not test market EVs on tourism and risk negative visitor experiences
New EV owners actively joining Maui EVA
Two car rental companies with EVs for rent: as low as $39.99 per day kama’aina rates
9 hotels with level 2 charging stations (compared to 4 in 2012)
192 registered EVs in Maui County (compared to 110)
1 DC Fast Charger at County Building in Wailuku (Sept 2012)
4-port Hitachi DC Fast Chargers in 5 locations by June 2013
Hitachi DC Fast Chargers planned for 15 more locations
OpConnect to take over Better Place Network in Hawaii
Volta Industries to install Level 2 chargers – free for users
EV growth in Maui boosted by DC Fast Charger, EV dealerships

$4,500 state rebate ends

Source: State Energy Office / DBEDT Monthly Energy Data
Compare Registered EVs and publically available charging stations in Hawaii

<table>
<thead>
<tr>
<th></th>
<th>Electric Vehicles</th>
<th>Level 2 Charging Stations</th>
<th>Charging Ports</th>
<th>DC Fast Chargers</th>
</tr>
</thead>
<tbody>
<tr>
<td>O‘ahu</td>
<td>946</td>
<td>170</td>
<td>182</td>
<td>4</td>
</tr>
<tr>
<td>Maui</td>
<td>187</td>
<td>30</td>
<td>36</td>
<td>1</td>
</tr>
<tr>
<td>Big Island</td>
<td>88</td>
<td>23</td>
<td>37</td>
<td>0</td>
</tr>
<tr>
<td>Kaua‘i</td>
<td>36</td>
<td>19</td>
<td>22</td>
<td>1</td>
</tr>
<tr>
<td>State of Hawaii</td>
<td>1,257</td>
<td>242</td>
<td>277</td>
<td>6</td>
</tr>
</tbody>
</table>

Source: State Energy Office / DBEDT @ March 2013
Chicken or the egg?

**Rental car company:**
* There are not enough charging stations
* We don’t want to spend extensive time profiling the customer to make sure he/she won’t get stranded

**Property owner:** There are not enough EVs

**Autodealer:**
We’re not going to invest in getting our mechanics and salesmen trained and certified to sell EVs if the charging infrastructure is inadequate

**Resident, fleet owner, consumer:**
I’m not going to invest in EVs if there aren’t charging stations where I need to go.
Against buying an EV in Hawaii

- Existing EVs: too short (range), too long (to charge), too expensive
- High cost of electricity AND gasoline
- Not enough charging stations to be convenient & stress-free
- Limited models coming to Hawaii
  - No convertibles
  - No SUVs
  - No pick-up trucks
  - No buses
But people are still buying EVs

- Molokai: 1 iMiev, 1 VOLT, 3 LEAFS — no charging stations, highest electricity & gasoline prices
- Have PV, pay $18 per month for home & EV
- EV lease deals, now as low as $1,999 down and $250 per month for 2013 Nissan LEAFs
- Falling prices of Level 2 charging stations - order online for $700 or pick one up at Lowe’s
- EV as the second car
- Charge at home and/or at work
Level 1 Charging

- Any standard, normal 110-120V three-prong outlet will do
- Plug-in your EV when it’s parked
- Habit is no different from plugging in your iPhone, iPad, laptop, electric bicycle
- Access: charge adaptor length > distance between parking & outlet
- Right of access: asking for permission
- NEED greater awareness of this possibility
Level 2 Charging

- Requires 220-240V
- Falling prices
- No longer a mystique
- Still need licensed electrician to install
- Newer models available for self-install
- Partnerships between automakers & charging station installers / manufacturers etc.


DC Fast Chargers

* Requires 480 V, three-phase power
* High cost, low return on investment
* No lucrative business model yet (as most are subsidized)
* Standards issue: CHAdeMO vs. SAE Combo
* Demand charge (thus only makes sense for larger properties already paying a demand charge)
1. Identify initial cost-share partners to compete for the grant
2. Establish working groups to gather information and analyze community needs
3. Build community awareness and participation through public events

Stage 1: Oct – Dec 2011
Stage 2: Jan – June 2012
Stage 3: July 2012 - present
4. Recruit new stakeholders for post-award implementation
Japan-US Smart Grid Project

* $37 million funded by NEDO
* Hitachi – smart grid technologies & DC Fast Chargers
* 40 homes in 3-circuit area in Kihei volunteers
* 200 EV drivers needed (with CHAdeMO port) volunteers
* LEAF trial usage: promotion & research as catalyst
* Mizuho Bank: ecotourism

Synergy and overlap between
Maui EVA and the Japan US
Smart Grid Project
Outreach philosophy

AIDA: Awareness, Interest, Desire, Action

Big splash:
Kick-off at the Grand Wailea, continuous positive press mentions, 3rd most innovative EV project in the USA

Keep it alive:
monthly press releases, weekly meetings, activities

Engage the press:
include them in mailing list, invite them to cover our events, appear on radio, TV, online & offline newspapers, magazines

Multi-channels:
media, social media, website, mailing list, own productions & publications
Free parking is provided in State and County Government lots, facilities, and at parking meters (Act 168 of 2012, formerly Act 290 of 1997). This means up to one day (overnight) at state airports in Hawaii if your vehicle has an Electric Vehicle license plate.

Vehicles with Electric Vehicle license plates are allowed access to High Occupancy Vehicle lanes (Act 168 of 2012).

Parking lots with at least one hundred public parking spaces are required to have at least one parking space, equipped with an EV charging system, reserved exclusively for EVs (Act 089 of 2012, formerly Act 156 of 2009).

Multi-family residential dwellings or townhouses cannot prohibit owners from installing EV chargers in their assigned parking spaces (Act 186 of 2010).

Recovery Act funding provided electric vehicle grants and rebates (2009-2012).
Maui EVA Publications

UHMC: EVs in Paradise

DBEDT: driving EVs forward

HCC: Lessons learned
Maui Electric Vehicle Alliance

* Website: http://www.mauieva.org
* Facebook: http://www.facebook.com/mauieva
* Twitter: http://www.twitter.com/mauieva
* Linked In Group: Maui Electric Vehicle Alliance
* Youtube Channel: Maui EVA TV 12 episodes
* Maui Weekly newspaper column: EV in Paradise
* Monthly EV Newsletter: sign up!