Hawaii State Energy Office EV Ready Fact Sheet

Hawaii is the most oil-dependent state in the United States with more than 95% of its energy supplied by imported fossil fuels. Ground transportation accounts for 30% of liquid fuel use in Hawaii. High dependence on imported fuels makes Hawaii's economy highly vulnerable to fluctuations in the price of oil.

Hawaii is committed to reducing petroleum dependency through a comprehensive transportation strategy that includes the integration of electric vehicles (EV) and charging networks with renewable energy. Today, Hawaii is navigating a clean transportation future and taking great strides toward accelerating the deployment of EVs and related charging infrastructure.

EVs fit comfortably into Hawaii's energy-saving goals because they can use energy produced locally from the state's abundant wind energy, wave energy, geothermal energy, ocean-thermal energy, and bio-fuel energy. EVs will strengthen Hawaii's economy and increase energy security.

Abundant renewable resources; favorable climate and geography; and government, utility, and industry commitment to a clean energy future; combined with a collective can-do spirit, make Hawaii a leader in transportation transformation, and a leader in EV implementation. A world-class tourist destination and a central hub for international business travel; Hawaii is uniquely positioned to be an international showcase for EV technologies.

State of Hawaii Primed for EVs

The state of Hawaii has been working toward implementing EVs and charging stations for almost two decades. All that work means Hawaii is primed and ready for EV use to help meet the state's goal of reducing ground transportation fuel use 70% by 2030. Ways the state is meeting this goal include:

- The Hawaii Center for Advanced Transportation Technologies (HCATT) has focused on energizing the transportation technologies industry in Hawaii to support military and commercial applications that contribute to improving economic competitiveness and to decrease our nation's dependence on imported petroleum since 1993. Under U.S. Department of Defense and U.S. Department of Transportation programs, HCATT develops and demonstrates advanced energy storage systems; electric and hydrogen fuel cell vehicles; vehicle charging infrastructure; and advanced vehicle conversions and maintenance.

- The Hawaii Clean Energy Initiative (HCEI) is a public-private partnership between Hawaii, the U.S. Department of Energy (DOE), and many other government and private groups that provides a framework for reducing Hawaii's dependence on imported fossil fuels by at least 70% by 2030. Specifically 40% of Hawaii's electricity must be generated by renewable resources including solar, wind, geothermal, hydropower, and biofuels, and 30% of demand must be reduced through energy efficiency measures. HCEI has set a transportation goal of 70% petroleum reduction by 2030, or an

approximate 385 million gallons per year for ground transportation. The HCEI Transportation Working Group is dedicated to transforming Hawaii's ground transportation sector to be less dependent on petroleum while accelerating the adoption of alternative-fuel vehicles in Hawaii. Transportation strategies include: improving standard vehicle efficiency of the fleet, reducing vehicle miles traveled, incorporating renewable fuels into the transportation section, and accelerating the deployment of EV and supporting infrastructure.

- A 2008 energy agreement between the state of Hawaii and the Hawaiian Electric Company (HECO) to accelerate energy efficiency and renewable energy. The agreement calls for the deployment of EVs and for the state and HECO to create an environment that will enable broad adoption of EVs. In addition, HECO has joined with major mainland utilities to work to bring EVs to widespread use in our country.

Programs

Numerous programs help the state of Hawaii strive toward reducing petroleum use and increasing EV use and infrastructure, including:

- $4.5 million of DOE's State Energy Program American Recovery and Reinvestment Act stimulus funding allocated in 2009 to the Transportation Energy Diversification EV Ready Program (EV Ready) to accelerate EV adoption and charging equipment in Hawaii. EV Ready funding in the form of rebates and grants is available to Hawaii residents and businesses for the purchase of EVs and installation of charging equipment.

- HECO's EV Time of Use Pilot Rates, enacted by the Hawaii Public Utility Commission in October 2010 are open to 1,000 customers on Oahu, 300 in Maui County, and 300 in Hawaii County. Commercial and residential customers can participate in the pilot program, which incentivizes the charging of EVs during off-peak hours by charging less per kilowatt-hour during these times.
- Over $1.4 million in Recovery Act funding was set aside for the EV Ready Rebate program to accelerate the deployment of EVs and charging stations. Qualified residents, businesses, government agencies, and non-profits can receive rebates for the purchase of new electric vehicles (20% of the EV price with a maximum of $4,500), and for the purchase and rebates for the installation of electric vehicle chargers (30% of the charging system cost, up to $500). On January 30th The State of Hawaii announced it is re-energizing its successful EV Ready Rebate Program with an additional $150,000 and has extended the deadline for rebates on new electric or plug-in hybrid electric vehicles and chargers from January 31 to March 31, 2012. Funding is available on a first-come, first-served basis, and will run through the deadline or while funds are available, whichever comes first. From early January 2011 to February 2012, approximately 375 EV rebates and 245 chargers have been approved. These will be a mixture of both residential and publically available chargers. Rebate forms are available on the Department of Business, Economic Development and Tourism's (DBEDT) State Energy Office website at electricvehicle.hawaii.gov.
- $475,500 in EV Ready funding allocated to the state of Hawaii Department of Accounting and General Services Automotive Management Division to lead-by-example through the purchase of EVs for the state motor pool, and for the installation of charging stations at public lots and state motor pool. There are 5 charging stations at State-owned buildings downtown Honolulu including one public charger in the State Capitol basement and one public charger at the First Circuit Court building. There are also 8 EVs in the State motor pool.
- $2.6 million in Recovery Act-funded grants awarded to six organizations in 2011 to promote, install, and deploy charging stations and EVs across the state of Hawaii. Backed by matching funds, program grants ranged from $50,000 to $854,000 to attract first-market-release of EVs, build local

knowledge, and showcase Hawaii's opportunities for clean energy through the deployment of EVs.

EV Ready awardees include:

- Better Place. For installation of charging stations across the state and the introduction of EVs to a rental car fleet. *To sign up for the Better Place electric car charging network and map of Charge Spot locations check out betterplace.com/Hawaii*
- AeroVironment. For installation of charging stations across the state, conducting grid integration analysis, and accelerating EV introduction to dealerships and vehicle fleets. *For further information regarding AeroVironment and EV related information specific to Hawaii check out, alohaev.com*
- GreenCar Hawaii. To introduce EVs to car-sharing services within the hospitality industry. *For more information visit, greencarhawaii.com*
- County of Kauai. For installation of charging stations across Kauai and the purchase EVs for the County fleet.
- City & County of Honolulu. For installation of charging stations on Oahu, purchase of EVs for City and County fleet, and streamlining City and County of Honolulu's residential EV permitting process.
- Plug In America. To develop the Hawaii EV Ready Guidebook and conduct public education and outreach. *For more information including a EV and charging station database/ tracker visit, pluginamerica.org*

These six contracts developed under the EV Ready program will lead to approximately 120 charging stations, 250 ports at 100 locations. Additionally18 EVs (minimum) are to be introduced to several public and private fleets.

Partnerships

Numerous partnerships between local entities, the state, and the private sector are making EVs a success in Hawaii, including:

- The Hawaii Automotive Dealers' Association (HADA)'s committee "to guide in the deployment of the new automotive technologies that use renewable fuels, or conserve fossil fuels and use them more efficiently " As a direct result, HADA has worked with Hawaii EV dealers to implement EV readiness training and education, install charging infrastructure at EV dealerships across Hawaii, and featured EVs at the annual First Hawaiian International Auto Show. HADA continues to play an active role in HCEI and is currently coordinating the award of an EV to the winner of Hawaii's 2012 State Teacher of the Year.

- The state of Hawaii's Definitive Agreement with Nissan North America to promote the use of EVs and charging infrastructure in Hawaii. Nissan North America, Inc. announced Hawaii to be one of its initial launch markets for the all-electric Nissan LEAF in the United States beginning in early 2011. Nissan reports 1,400 Leaf "hand-raisers" and over 400 reservations.

- CT&T, a Korean-based EV manufacturer and the state of Hawaii's memorandum of understanding (MOU) to support CT&T's plan for Hawaiian EV regional assembly and sales facility.

- In December 2011, Mitsubishi Motors North America, Inc. made the first customer retail delivery of the electric-powered 2012 Mitsubishi I in Honolulu, Hawaii. Hawaii is the first state to receive the North American version of the company's EV, Mitsubishi i. In June 2011, Mitsubishi Motors North America, Inc., and the state of Hawaii entered into an MOU aimed to improve awareness and adoption of EVs in Hawaii and to assist in rapid deployment of EV charger infrastructure.

- Nearly $300,000 from DOE awarded to the University of Hawaii Maui College in partnership with the Hawaii State Energy Office within the Department of Business, Economic Development, and Tourism; Honolulu Clean Cities Coalition; and the University of California San Diego to accelerate the adoption of EVs. Grant partners will collectively develop a plan to implement an EV charging permitting process, incentives, policies, and a renewable energy grid system analysis for the deployment of EVs and charging infrastructure. The plan will help provide a model that can be adapted for broader application across the state.

Project Deployment

Thanks to the success of EV programs and partnerships, EV projects are being deployed around the state. Some project highlights include:

- The Hawaii Renewable Energy Development Venture's selection of Better Place to deploy 10 charge spots to support seven EVs throughout Oahu. The company, a project of the Hawaii-based non-profit Pacific International Center for High Technology Research, will use its network management software along with the charge spots to demonstrate the integration of EV charging infrastructure with the local utility grid, track driver behavior and vehicle performance, and show how to optimize EV network infrastructure. Project partners include Kyo-ya, owner of the Sheraton-branded properties in Hawaii, Hawaii Natural Energy Institute, and HECO. The cost of the pilot project is co-funded through DOE and the Hawaii Renewable Energy Development Venture.

- The City and County of Honolulu added an additional 20 new hybrid-electric buses destined for Honolulu roads to TheBus program, expanding the city's hybrid fleet to 80 buses.

- Governor Neil Abercrombie unveiled the first EV charger at the Hawaii State Capitol in July 2011, located in the building's underground parking garage.

- Chrysler Group, LLC announced collaboration with the Hawaii Natural Energy Institute to supply a test fleet of 14 plug-in hybrid electric pickup trucks (Dodge Ram 1500) with vehicle-to-grid capabilities for demonstration purposes.

- The Ford Motor Company selected Honolulu as one of 25 cities that are EV-ready and will have an increasing number of green-car sales.

- Under the EV Ready Grant program, the City and County of Honolulu streamlined the residential EV charger permitting processes, making permits available online for the installation of home charging stations.

- Enterprise Rent-A-Car became the first rental company in Hawaii to offer EVs and install charging stations. Enterprise Rent-A-Car selected Hawaii as one of only five states to introduce EVs for rental. Enterprise Rent-A-Car on Oahu currently has 30 EVs in their fleet. Charging stations are part of an EV network funded through the Hawaii EV Ready program.

- Maui was selected as the site for a smart grid renewable energy demonstration project, with an investment of approximately $37 million from the Japan-based New Energy and Industrial Technology Development Organization. The project will use renewable energy resources, such as solar and wind power, and prepare the island's power system for the widespread use of EVs and fast chargers. Installation of the smart-grid technology is expected to begin in late 2012, with the project becoming operational in 2013. The project is scheduled to run from 2013 to 2015.

- DOE's Advanced Vehicle Testing Activity program, under the direction of the Idaho National Laboratory, currently sponsors the Plug- in Hybrid EVs (PHEV) program in Hawaii, consisting of six PHEVs on the islands of Oahu and Maui. Participants testing the converted PHEVs include the University of Hawaii, Maui Electric Company, the County of Maui, HECO, and the U.S. Air Force.

- Wheeler Army Airfield began demonstrating the Army's first smart-charging microgrid, one step in a bid to make the installation energy independent. The prototype consists of 25 kilowatts of solar power array, 200 kilowatt-hours of battery storage, and four EVs and Level 2 EV chargers. The system has the ability to provide instant backup power to support three buildings for 72 hours, including the Garrison Headquarters. The microgrid system was developed by the Army Tank Automotive Research, Development, and Engineering Center along with private industry partners.

Policies

Various Acts have been enacted in Hawaii since the mid-90s to help with the deployment of EVs and EV infrastructure, including:

- Act 290, 1997. This bill instated EV license plates, permitting EVs to park for free at state and county facilities, including parking meters, and allows EVs access to Hawaii high-occupancy-vehicle lanes with a single occupant.

- Act 155, 2009. This bill amended Hawaii's renewable energy law to require Hawaii's electric utility companies to provide at least 25% renewable energy by 2020 and 40% renewable energy by 2030.

- Act 156, 2009. This law requires any parking lot with at least 100 or more parking stalls available to the public to set aside 1% of parking spaces for EVs by December 31, 2011. At least one parking spot designated for EVs is required to be equipped with an EV charging capability. This law also establishes the development of non-fossil fuel transportation as a state policy goal and requires state and county agencies to lead-by-example in purchasing EVs and other alternative-fuel vehicles.

- Act 186, 2010. This law prohibits covenants, deed restrictions, and similar agreements in multi-family or townhouse associations from barring the installation of EV charging stations. This law allows private entities to adopt rules reasonably restricting the placement and use of charging systems provided that those restrictions do not prohibit the placement or use of the charging systems altogether.

EVs incentives in Hawaii

- The State of Hawaii is current offering EV Ready Rebates for EVs and chargers: Up to 20% of the vehicle purchase price, up to a maximum of $4500 per vehicle and up to 30% of the charging system cost, including installation, up to a maximum of $500. For more information: visit, electricvehicle.hawaii.gov

- EVs with EV license plates are allowed access to drive in the HOV lane with a single occupant.

- EVs can park for free at government facilities, including City/County/State parking meters.

- HECO is currently offering Time Of Use rates for EV drivers, for more information visit goev.heco.com

- Parking lots with 100+ publicly available parking stalls are required to set aside 1% for EVs, with at least one requiring being equipped with an EV charger.

EVs in Hawaii

- As of February 2012, there were 704 registered taxable plug-in electric passenger vehicles and there were 11,081 registered passenger hybrid vehicles. There were 975,171 registered taxable gasoline passenger vehicles in the state. To see or download the data, monthly energy trend link visit, http://hawaii.gov/dbedt/info/economic/data_reports/info/economic/data_reports/energy-trends

- From early January 2011 to February 2012, approximately 375 rebates for EVs have been approved per the EV Ready Rebate program

EV Chargers in Hawaii

- By April 2012, approximately 120 charging stations, 250 ports at 100 locations charging stations will be installed across the state of Hawaii, as part of the EV Ready Grant program. Some chargers will have the capacity to charge more than one vehicle at time.

- From early January 2011 to February 2012, approximately 245 EV Ready charger rebates have been approved. These are a mixture of both residential and publically available chargers.

- Many public and private businesses are in the process of installing publically available EV chargers. Chargers are being installed at local auto dealers, rental car locations, and private businesses for fleet and corporate use. Some charge station owners have invited EV owners to charge if needed until more public chargers are available.

- For a complete and continuously updated list/map of EV chargers in Hawaii visit the Hawaii EV Charging Station Location Database at electricvehicle.hawaii.gov or a direct link at: http://energy.hawaii.gov/wp-content/uploads/2011/09/Hawaii-EV-Charging-Station-Database-FEB-2012_pdf.pdf

- The State Energy Office is working with the US. DOE to continuously update The Alternative Fuels and Advanced Vehicles Data Center's Alternative Fuels Station Locator. To use this map, select fuel choice (electric), zip code and mile radius. http://www.afdc.energy.gov/stations/

Hawaii Clean Energy Initiative Targets & Status

The Hawaii Clean Energy Initiative (HCEI) aims to provide 70% of Hawaii's energy needs through clean and renewable resources by 2030. In 2009, Hawaii's Renewable Portfolio Standard was established with a goal of 25% renewable energy by 2020, and 40% by 2030. Reducing petroleum use in transportation is critical to reach these aggressive goals.

The HCEI goal in transportation is to reduce petroleum consumption by 70% or displace 385 million gallons of petroleum by year 2030. To achieve this, Hawaii is committed to a comprehensive transportation strategy that includes the adoption and integration of EVs and charging networks.

HCEI transportation "targets" are goals toward meeting the HCEI 70% clean energy objective for transportation. These targets are very aggressive and reflect the transformational change needed to meet Hawaii's transportation clean energy goals. They are not market projections. Actual EV penetration levels will be a function of market forces such as, vehicle price and availability, fuel price, availability of government incentives, and consumer behavior and preferences.

By 2015 Hawaii drivers should be piloting 10,000 electric vehicles (with an extensive electric vehicle charging network deployed to support them).

HCEI EV Targets	Year				Total Fuel Reduction (2030)
	2015	2020	2025	2030	
Annual Sales	4,000	10,000	20,000	30,000	75 Million Gallons a Year by 2030 reduced via EV Adoption in Hawaii
Total Market Penetration	10,000	50,000	100,000	210,000	

For more information and to view the 2011 HCEI Roadmap visit,
http://www1.eere.energy.gov/deployment/pdfs/52611.pdf

How far can I drive per hour of charging?

- Estimates are based off of data provided by www.fueleconomy.gov

Leaf example:	Volt example:	Mitsubishi i example:
Level II charger 3.3 kW (on-board charger) x 1 hour ÷ 0.34 kWh / mile (EPA) = 9.7 miles *About 9 ¾ miles per hour of Level II charging*	Level II charger 3.3 kW (on-board charger) x 1 hour ÷ 0.36 kWh / mile (EPA) = 9.2 miles *About 9 ¼ miles per hour of Level II charging*	Level II charger 3.3 kW (on-board charger) x 1 hour ÷ 0.30 kWh / mile (EPA) = 11 miles *About 11 miles per hour of Level II charging*

How much does it cost to drive an EV in Hawaii?

- Estimates are based off of data provided by www.fueleconomy.gov

Leaf example	Volt example	Mitsubishi i example	Average Hawaii car (gasoline)	Nissan Versa (gasoline)
34 kWh/100 mile x $0.30 / kWh = 11 cents / mile	36 kWh/100 mile x $0.30 / kWh = 11 cents / mile	30 kWh/100 mile x $0.30 / kWh = 9 cents / mile	$4.00 / gal ÷ 20 miles / gal = 20 cents / mile	$4.00 / gal ÷ 27 miles / gal = 15 cents / mile

Helpful websites

Hawaii DBEDT Energy Office, electricvehicle.hawaii.gov
U.S. Department of Energy, National Renewable Energy Laboratory, www.nrel.gov/vehiclesandfuels
U.S. Department of Energy Clean Cities Program, www1.eere.energy.gov/cleancities
Official US Government source for fuel economy information, fueleconomy.gov
U.S. Department of Energy, Alternative Fuels and Advanced Vehicles Data Center, www.afdc.energy.gov/afdc

Contact

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