



**Transforming Inertia in Paradise: An Exploratory Example and Role for UH Maui and Other Colleges and Universities in Demonstrating Sustainable Energy Solutions**

# A UH Maui College Initiative in Sustainable Energy Education

1. Institutional Backdrop
2. Maui County and State Context
3. UHMC Initiative: Maui Electric Vehicle Alliance
4. Confronting and Transforming Inertia
5. Status



# Backdrop: An Evolving Island Energy Profile

- Isolated Island Microcosms of Maui, Molokai and Lanai, and other Counties in Hawai'i
- 143,000 Maui residents
- About 300 Megawatts annually consumed on Maui
- Primarily oil-based with about 17 % from Wind and PV
- Maui County Energy Alliance Report:

<http://www.co.maui.hi.us/documents/50/54/317/MCEA%20Expo%20Long%20Version%20Final%20Sep%2009.pdf>



# State Energy Policy



- Be more independent and less reliant on other economies
- Achieve greater security.
- Keep an estimated \$7 billion in state that would otherwise go toward foreign oil investments to stabilize economy.
- Establish a new, green economic sector to counter-balance reliance on tourism and the military.
- Position Hawai'i as a global leader in clean energy to attract more business and expertise to the region.

# Why it matters?

- Hawai'i is the nation's most dependent state on foreign oil
- Hawai'i spent \$7 billion importing oil –money lost to reinvesting in the local economy
- 60% of that is spent for transportation
- Problem that affects all of Hawai'i and other islands with similar cost of power challenges

# Sustaining and Strengthening Maui Nui's Economy, Workforce and Future through: the UHMC Response

## Adding Value

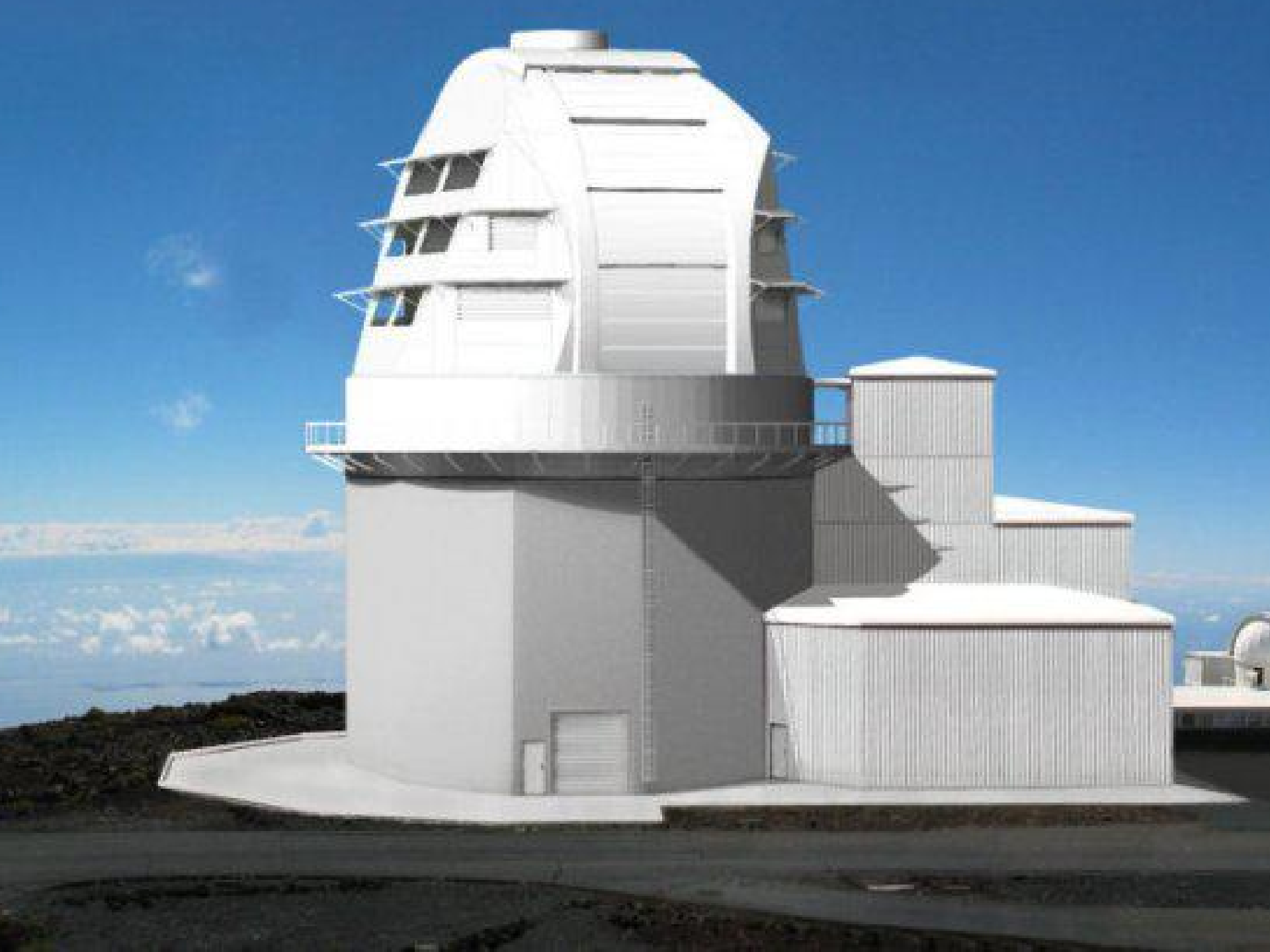
- Submit and compete for \$300,000 US Dept. of Energy grant for EV Policy and Planning
  - Secure Partners: County of Maui, Utility, Car Dealerships, Hotels, Shopping Centers, Restaurants, Golf Courses, Charging Stations, PV Installation Businesses, Rental Car Companies, Electricians Union, EV-related Research Entities, etc.
  - Create a campus example of an EV Solution supported by a PV Carport with Charging Stations
- Excel in Customer/Client service



# Focus on Student Needs and Opportunities through Recent Tech-Infused Educational Program Development

- Sustainable Business and Economic Development
  - CyberSecurity NSF Grant \$200,000
  - Agriculture and Natural Resources
- Netbook Project \$1.5m
- Advanced Technology Solar Telescope Project (\$300m) with UH Institute for Astronomy \$2m for 10 years if project clears environmental assessment









# UHMC Energy Response: Central Chiller Plant Upgrade – additional 350 tons



Serving, Ka Lama, Kupaa, Ka'a'ike, Laulima, Pilina, Pa'ina, Hookipa and 'Ike Le" a

# New Science Building – Spring 2013 completion



Observatory













# PARADISE ELECTRIFIED:

TOP 10 REASONS  
WHY MAUI IS  
THE PERFECT  
SITE FOR  
ELECTRIC  
VEHICLES



Maui is the perfect test site for making the switch quickly and leading the nation in EVs:



Here are the reasons why . . .

# Hawai'i Clean Energy Initiative

- 70 % Clean Energy by 2030
- (40% from Renewables and 30 % from Efficiencies)

# #10 Maui will benefit from early delivery of EVs

## Aloha! LEAF Electric Car to be Available Early in Hawaii

by Michael Graham Richard, Ottawa, Canada on 05.11.10

BUSINESS & POLITICS



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Photo: Flickr, CC & Seal of the state of Hawaii

# #9 Maui is geographically small (which helps with “range anxiety”)



↑  
26  
Miles  
across  
↓

← 48 miles wide →

#8 Maui hosts over 2 million visitors per year, (or, on average, over half of the people here are visitors) and . . .



85% of them choose rental cars  
for transportation.



#7 A majority of those visitors stay at hotels or condos clustered along the south and west coasts of the island





#6 New State Law - Parking facilities that are available for use by the general public and have at least 100 spaces are required to install an EV charger for every 100 spaces



#5 Which means that hotels, golf courses, restaurants, and major tourist destinations will need to install chargers



## #4 Large fleets of EV Rental cars will encourage local adoption

Available supply . . .  
Fleets generally  
replaced after two  
years

Available  
infrastructure  
Familiarity



# #3 EVs will assist Maui's isolated grid to integrate renewable energy:

- Wind and solar energy are readily available on Maui, but . . .



- Wind power gets dumped at night if not needed.
- Most EVs will charge at night, when loads on the utility are low



- During the daytime, EVs can draw on solar energy (and the technology is available)



- So EVs can become a potential source of storage - a critical component for an isolated grid





#2 Because of having an isolated grid, Maui has been selected as a test site for “Smart Grid” systems by several major companies, including MECO, GE, NEDO and Hitachi



- The NEDO (New Energy Development Organization – Gov. of Japan) consortium will spend \$40 million on Maui to create a smart grid demonstration site (research, testing, equipment, and training that supports the local MECO [Maui Electric Company] utility).

But EVs need to be a part of the system

And the #1 Reason EVs make sense  
for Maui?

Our gas prices are the highest in the nation!



Price shown from May 2011

# So what's the problem: Island Inertia

- Solutions recognized in principle:
  - But sluggish adoption
  - EV car numbers or Charging Stations . . . which comes first?
- Sunk costs into island Utility infrastructure:
  - Oil-based power plants
  - Aging workforce and leadership more familiar with oil-based technologies
- Federal accelerated depreciation expire in December 2012
- State tax credits for PV Installations and EV rebates threatened
- County expedited permitting and other assistance

## Challenges for EVs (cont.)

- Potential EV owners worry that the technology will become obsolete quickly
- Most EVs are sold in advance, so limited opportunities for test driving exist
- Dealerships have existing inventories
- They create an unknown impact on old utility grids

University of Hawaii Maui College  
in partnership with the  
Hawai'i State Energy Office



developed a plan for helping Maui become a national leader in the mass adoption of electric vehicles (EVs):

1. Secure national expertise: UC San Diego, National Research Energy Lab, Hawai'i Natural Energy Institute; NEDO, MECO
2. Bring together interested Maui parties to develop a collaborative EV support strategy
5. Focus planning on securing EVs and infrastructure
6. Include government, business, academic, and non-profit organizations.

# Project Partners

- Honolulu Clean Cities
- University of California – San Diego
- San Diego Regional Clean Fuels Coalition
- AeroVironment
- Better Place
- Castle and Cooke
- CATRALA (Car & Truck Rental Association)
- Chevron Energy Solutions
- County of Maui
- Destination Resorts Hawaii, Inc.
- EAN Holdings (Enterprise)
- GreenCar Hawaii
- Grand Wailea Resort Hotel & Spa
- Hawaii Automobile Dealers Association
- Hawaii Electric Company
- Hawaii Electric Vehicle Network Corporation
- Hawaii Electricians Training Fund
- Hawaii Renewable Energy Development Venture
- Hawaii Energy and Technology
- Hawaii Natural Energy Institute
- The Hertz Corporation
- Honua Kai Hotel
- HNU Energy
- HTDC - MEP
- Jim Falk Automotive Group
- Maui Economic Development Board
- Maui Electric Company
- Maui Hotel and Lodging Association
- NEDO
- Rising Sun Solar





# County of Maui



## Electric Vehicle Charging Station Program And Installation Guidelines

September 30, 2012



# Status

- 105 EVs, 40 More Leafs now available, Volts and Mitsubishi MIEVs on their way
- HEVN: [www.Hevn.net/](http://www.Hevn.net/)
- Maui EVA: funded at \$299,693; only College or University funded of the 16 project awards in the U.S.
- <http://twitter.com/#!/mauieva>
- [MauiEva.org](http://MauiEva.org)

# 611 kw Carport PV System – Construction I mminent



# JCI Energy Efficiency Project 90% Complete



# PIN-UHMC Partnerships

International Classrooms

Skype- and Video-Conference supported

Based on UHMC-Toyama University

Project

Institute for Hawaiian Music



# Mahalo!



# Maui College Targets and Enrollments

4,500





Fall 2011

Largest  
neighborhood



4,529 Students

UNIVERSITY of HAWAII®  
MAUI COLLEGE



## UH Center Maui Bachelor's and Graduate Degrees

14 Bachelor's Degrees (Business, Education, Health Care, Human Services, Public Administration, Social Sciences)

10 Certificate Programs (Accounting, Education, Travel Industry, Health Care, Disaster Preparation, Substance Abuse)

12 Master's Degrees (Business, Education, Human Resources, ICS, Nursing, Social Work)

UH Center Unduplicated Headcount Fall 2011 -- 296 total:

UH Hilo -- 13 bachelor's level

UH Manoa -- 160 total -- 85 bachelor's level, 75 graduate level

UH West Oahu -- 113 bachelor's level

