



HREDV

Hawaii Renewable Energy Development Venture: Update for HCEI Plenary

Hawaii Renewable Energy Development Venture
A Project of PICHTR
December 6, 2011

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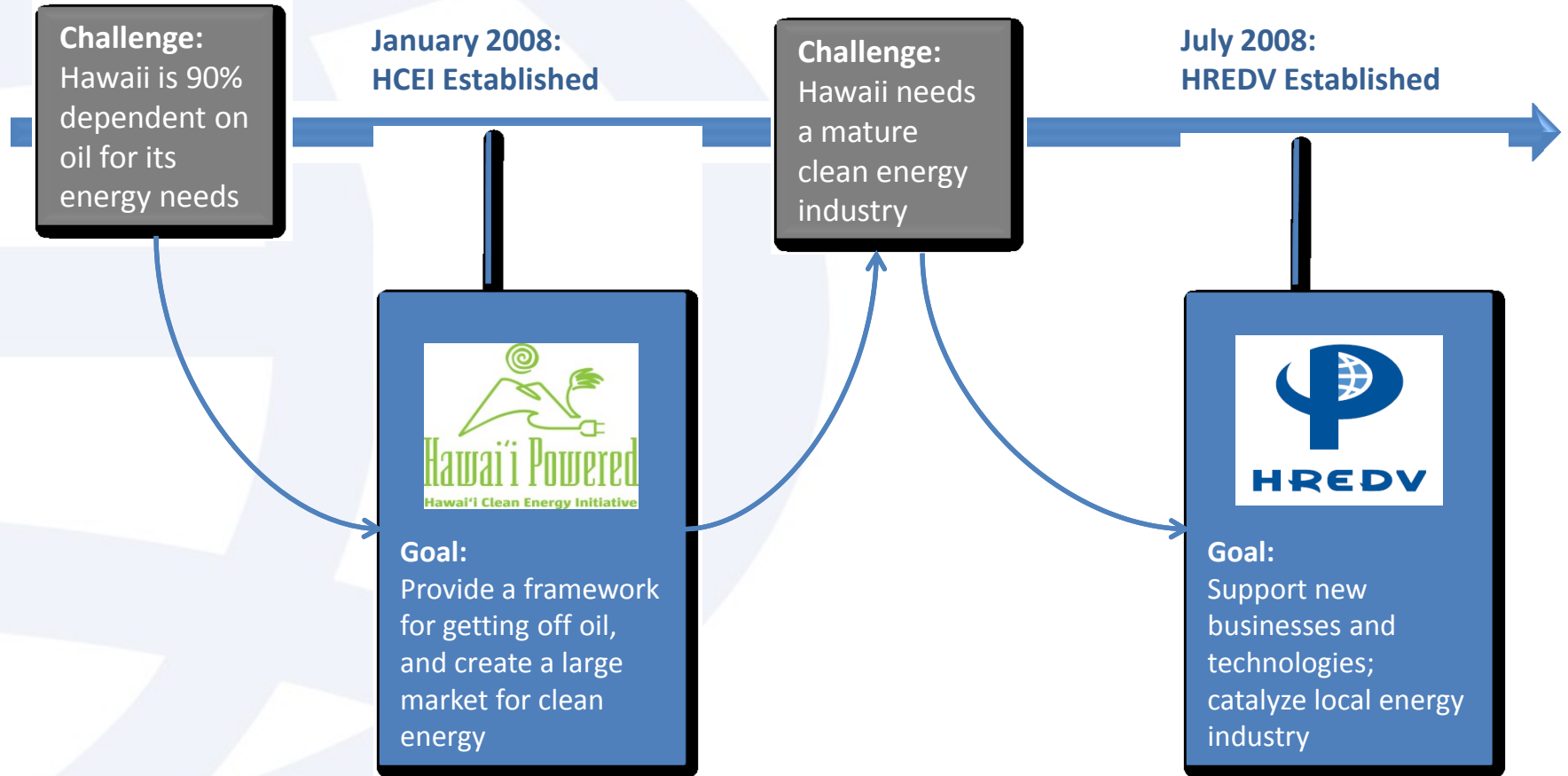
- ▶ **General update**
- ▶ **Funded projects**
- ▶ **Upcoming initiatives for HREDV**

HREDV is meeting project milestones on time and on budget



- ▶ **Ten projects underway** and meeting milestones
- ▶ **Total project portfolio under management is \$12.3 M**, including federal and private money
- ▶ **Expanded capacity** by hiring Project Engineer half time
- ▶ **Refreshed website** appearance to highlight projects, achievements
- ▶ **Outreach continues** to industry, investors, and stakeholders at the local, state, national, and international levels
- ▶ **Partnership development** activities continue by HREDV staff
- ▶ **Project management** is in compliance with DOE requirements

HREDV was created to support development of a clean energy industry in Hawaii



Community & utility needs drive HREDV funding priorities

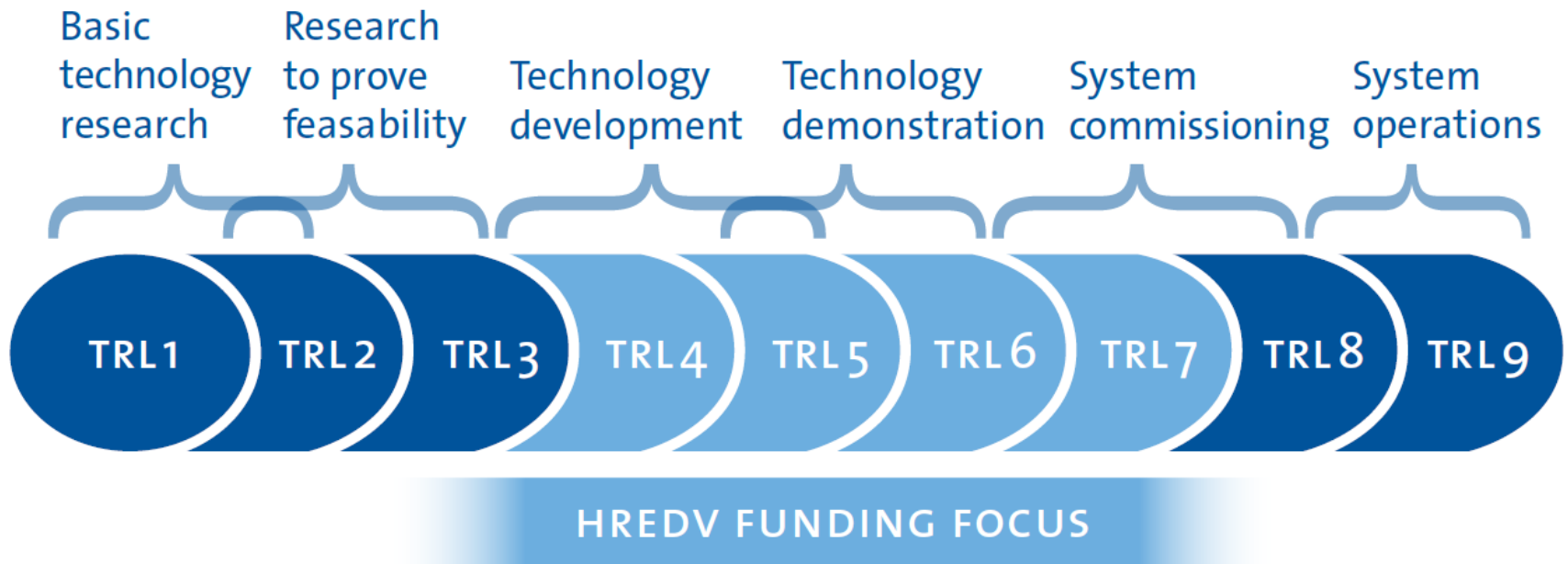


Challenge	HREDV Topic Area for 2010 funding
Wind intermittence	} Grid integration
Integrating PV	
Limited transportation options	} Transportation
Feedstock limitations	
Oil-based energy costs on farms	} Energy in Agriculture

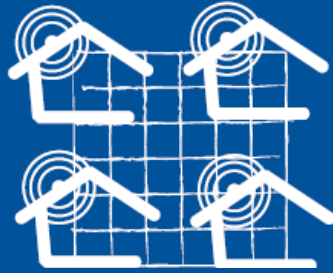
HREDV focuses on technologies that are nearly ready for the commercial marketplace



U.S. DOE Technology Readiness Levels (TRL)



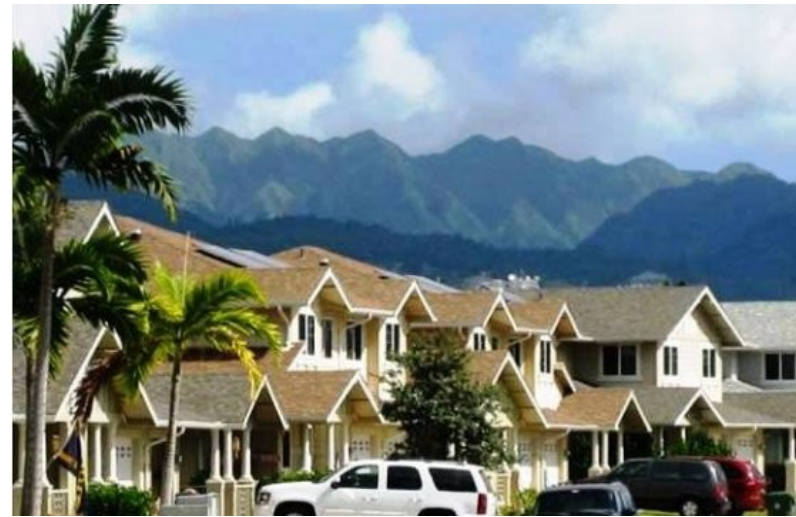
Concentris
systems



COST \$248,000

HREDV FUNDING 80%

PRIVATE 20%



PROBLEM

Energy use is highly variable in non-metered homes, and is not monitored or managed remotely.

PROJECT

MESHED INTELLIGENT SYSTEM FOR ENERGY-USE REDUCTION (MISER)

Concentris is demonstrating a smart metering technology in Oahu military housing which will enable residents and energy managers to save energy by monitoring and controlling appliances through the web and mobile devices.



SOPOGY™

COST \$535,033

HREDV FUNDING 50%

PRIVATE 50%

The graphic features the Sopogy logo on the left, a large image of a solar collector array on the right, and icons for recycling, snowflakes, and a star in the center. The text 'COST \$535,033' is positioned below the array. At the bottom, two boxes indicate 'HREDV FUNDING 50%' and 'PRIVATE 50%'.



PROBLEM

High electricity cost for air conditioning; photovoltaics are limited on many sunny circuits because of concerns about grid stability.

PROJECT

MICRO CONCENTRATED SOLAR POWER ABSORPTION AIR CONDITIONING

Sopogy is installing a rooftop array of micro concentrating solar collectors on the Maui Ocean Center; heat from the collectors will drive a double-effect absorption chiller to power the aquarium's air conditioning.

Satcon

Satcon SOLSTICE

COST \$890,864

HREDV FUNDING 66%

PRIVATE 34%



PV panels



Solstice Inverter



Electrical Vehicle



DC/DC converter



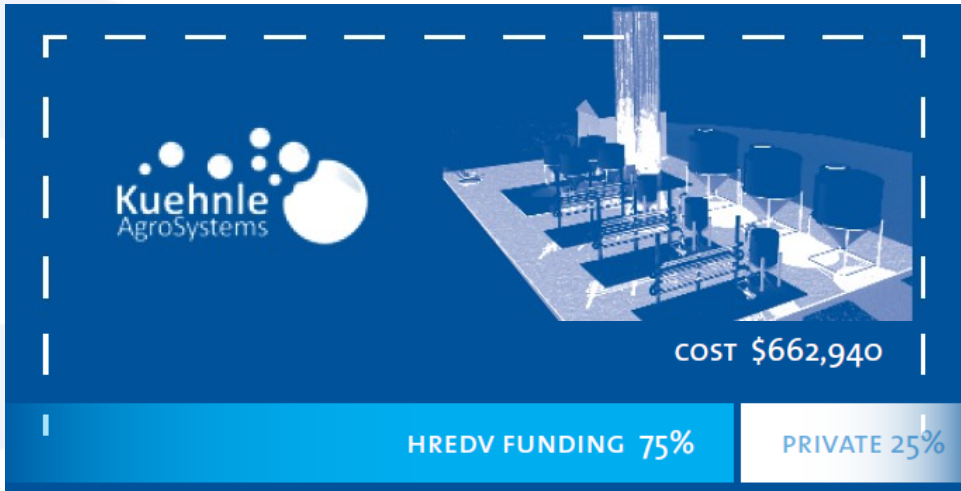
PROBLEM

Photovoltaics supply variable energy and electric vehicles add unpredictable load; both can impact grid stability.

PROJECT

GRID-INTERACTIVE DC-LINK PV CHARGING STATION

Satcon Technology Corporation is developing an inverter to efficiently charge vehicles using direct DC solar power as well as smooth solar power for a better interface with the electricity grid on Lanai.



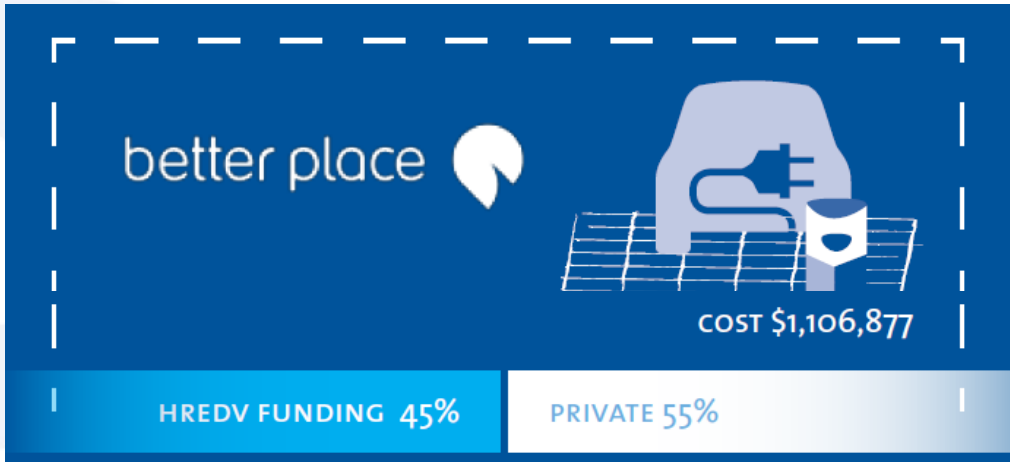
PROBLEM

Biofuels that are drop-in replacements for oil often need large tracts of agricultural land.

PROJECT

ALGAE BIOMASS FOR BIOFUEL PRODUCTION

Kuehnle AgroSystems is building a system to continuously produce algae for biofuels; the system will pipe CO₂ and wastewater from an industrial facility into the algae tanks to accelerate algae growth and demonstrate CO₂ emission reductions.



PROBLEM

Electric vehicles present a large new Load for the utility but also a potential energy management asset.

PROJECT

HAWAII ELECTRIC VEHICLE NETWORK INITIATIVE

Better Place is installing infrastructure for 9 electric vehicle charging stations and will use 7 electric vehicles to provide the first demonstration of integrated vehicle-to-grid technology on Oahu.



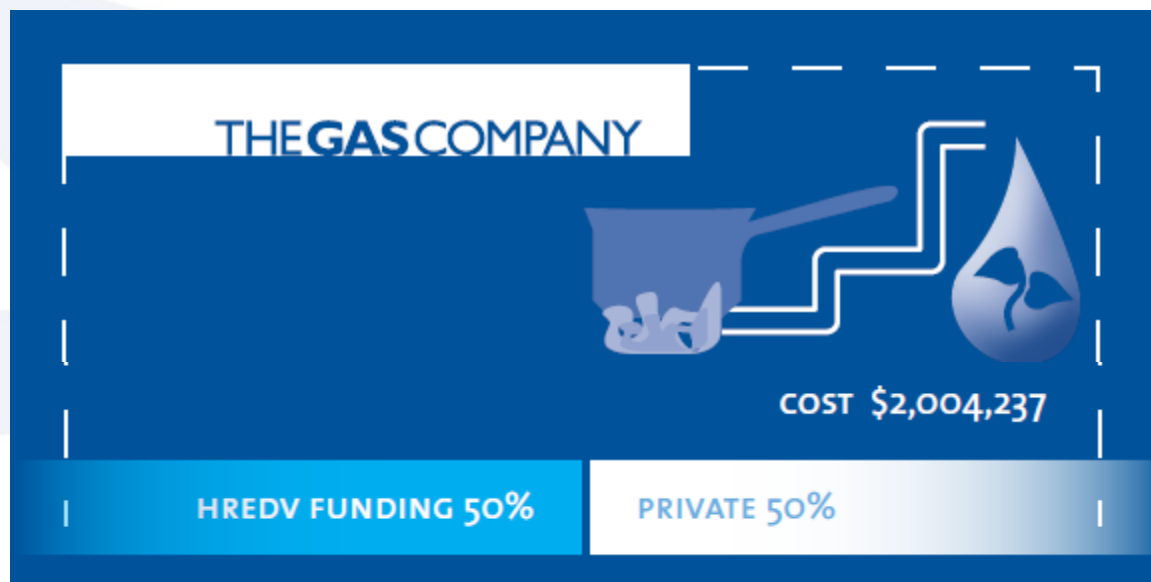
PROBLEM

The utility collects a mountain of data that is not immediately useful or accessible to operators.

PROJECT

GRID RENEWABLES INTEGRATION DECISION SUPPORT SYSTEMS (GRIDS2)

Referentia Systems, Inc. will develop a secure data system to enable electric utilities on Maui and Oahu to visualize what is happening on the grid in real time, and to help successfully integrate more solar, wind, smart grid technologies, and other clean energy assets.



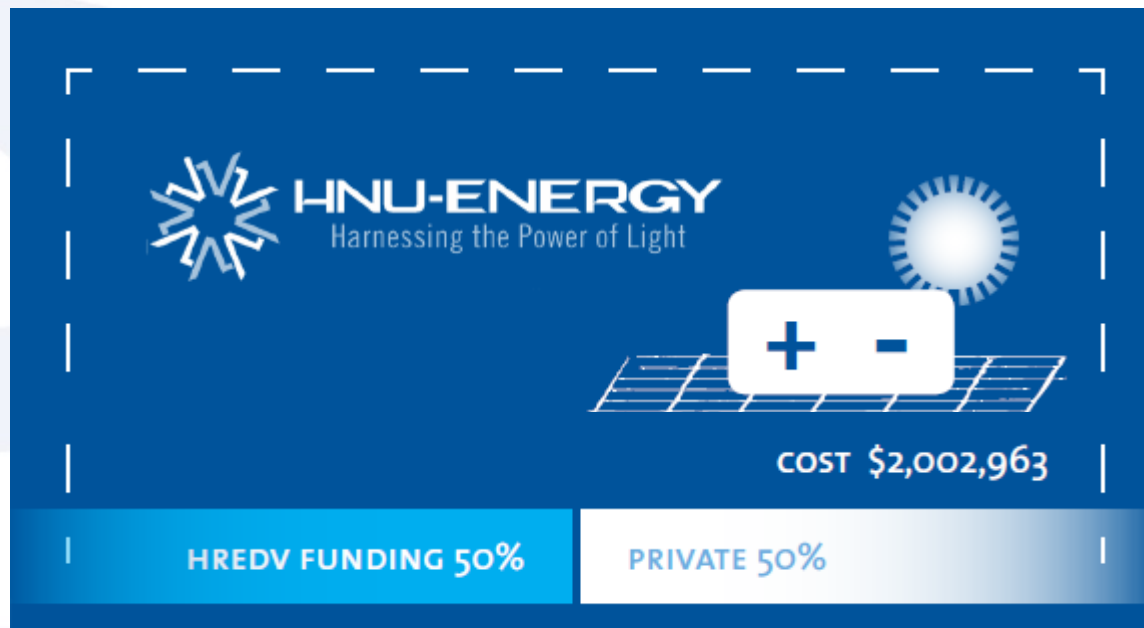
PROBLEM

Oahu does not currently have a refinery capable of processing bio-oils into gas and liquid products.

PROJECT

PROJECT BIO-OIL PYROLYSIS FOR GAS PIPELINE APPLICATION

The Gas Company will build a pilot plant to process 1 million gallons per year of oil from agricultural and algae feedstocks into products such as synthetic natural gas, gasoline, diesel, and hydrogen, helping the company meet its goal of a 50% renewable gas stream.



PROBLEM

As Hawaii adds more solar power, new turn-key technologies are needed to ensure grid reliability and efficiency.

PROJECT

MEGAWATT-CLASS STORAGE FOR RENEWABLE SOURCE GRID

INTEGRATION

HNU Energy will install a 1 mwh lithium-ion battery on Maui to smooth the short term variability of solar and to supply energy in the evening during peak demand, enabling more renewable energy to come online.



PROBLEM

Current biodiesel technology can use only limited feedstocks; new plant-based feedstocks are needed to produce fuel on a larger scale.

PROJECT

HIGH VACUUM BIODIESEL DISTILLATION UNIT Big Island Biodiesel, a subsidiary of Pacific Biodiesel, will build an hvd unit in a 5 million gallon per year facility that can process a wide range of agricultural feedstocks into high quality biodiesel.



PROBLEM

Farm irrigation and pumping systems in Hawaii run on fossil fuels with high and increasing costs.

PROJECT

OFF-GRID COMMERCIAL SCALE WIND STORAGE PLATFORM

Gen-X Energy Development will work with a Big Island agricultural operation to build an off-grid water pumping system powered by a 100 kW wind turbine with a battery, inverter, and controls that regulate pump speed to track renewable energy output.

HREDV Achievements

3
YEARS
of HREDV

4
HAWAIIAN
ISLANDS
included in geographic
spread of projects

5
NEW PRODUCTS
of first round companies
on the road to
commercialization

10
COMPANIES
bringing innovations to
the Hawaii clean tech sector

\$12.3
MILLION
in projects, nearly half of
which comes from private
funding sources

1337
TOTAL EMPLOYEES
at ten companies



Big Island Biodiesel

High Vacuum Biodiesel Distillation Unit

PROBLEM Current biodiesel technology can use only limited feedstocks; new plant-based feedstocks are needed to produce fuel on a larger scale.



HREDV PROJECT Big Island Biodiesel, a subsidiary of Pacific Biodiesel, will build an HVD unit in a 5 million gallon per year facility that can process a wide range of agricultural feedstocks into high quality biodiesel.

[Read more >>](#)



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Upcoming initiatives for HREDV

- ▶ **Video documentaries** highlighting HREDV accomplishments for investors, stakeholders, and potential funders
- ▶ **Identify potential funding opportunities** to continue HREDV mission
- ▶ **Continue to partner** with the university, utility, DOD, and other partners to expand our reach and impact
- ▶ **Track and market HREDV successes** with commercialization, follow-on funding, technical progress, and other metrics
- ▶ **Leverage international experience** to provide value to our Asia Pacific partners



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