

The Future is **Bright**

ARRA in Creating Hawaii's Clean
Energy Economy

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Hawaii State Energy Office



Overview

- **The State Energy Office**
- **Goals & Objectives**
- **ARRA Projects & Next Steps**

**The State Energy Office:
Helping to Deploy Hawaii's
Clean Energy Agenda**

Carrots & Sticks

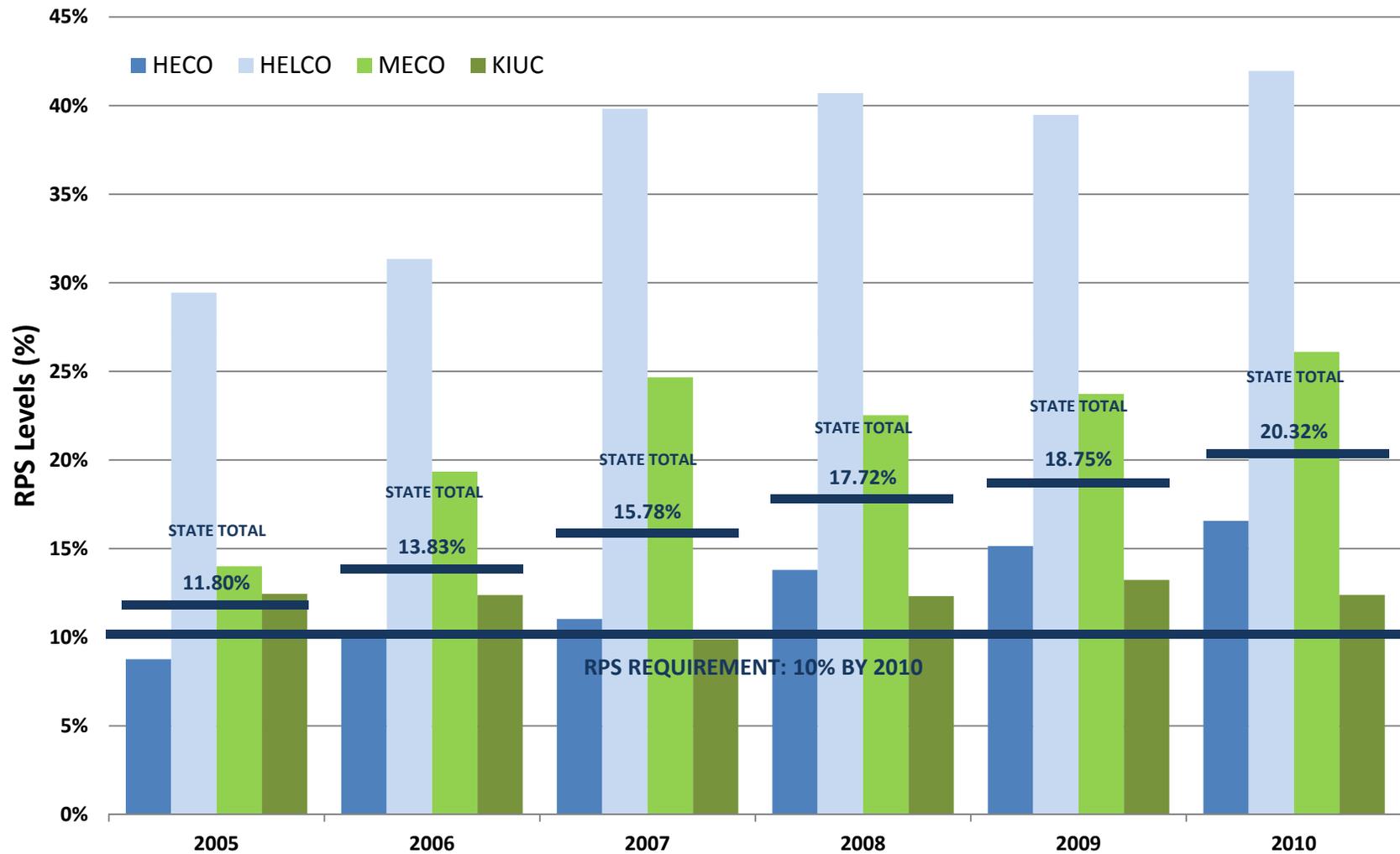
Laws & Regulations

- RPS & EEPS Goals codified as law
- Feed-in-tariff, Net Metering, Decoupling
- Reliability Standards Working Group

Incentives

- Tax Credits
- Public Benefits Fee Administrator
- US Dept. of Energy – formula grants, ARRA, technical assistance

Hawaii Renewable Portfolio Standard (RPS) Levels 2005-2010



Source: Renewable Portfolio Standards Status Reports, 2005-2010 (Hawaii Public Utilities Commission)

A Focused Strategic Plan

Mission:

Deploy clean energy infrastructure as a catalyst for economic growth, innovation sector development, and energy security advancement.

Strategies & Tactics: FOCUS

High-impact clean energy solutions that maximize economic development

- Concentrate on implementing high-impact clean energy solutions for near term and midterm.
- Improve core competencies in economic development, quantitative analysis, and communication.

Innovation in the Energy Sector

- Identify clean energy RD&D opportunities.
- Promote Hawaii as the test bed of the Asia-Pacific region for clean energy business development.

Strategies & Tactics: LEVERAGE

Resources through federal, county and private sector partnerships using HCEI as a key driver ...

- Serve as business systems integrator, resolve project implementation and permitting barriers.
- Advocate for programs, policies and incentives to make clean energy development cost-effective.
- Connect partnerships and resources to develop business opportunities, resolve policy barriers, and technical hurdles.
- Seek federal funding and private investment opportunities.

Strategies & Tactics: REACH

Objectives and maintain strong communication and outreach to key stakeholders and public ...

- Analyze data and results to identify best practices and ensure goals are met.
- Provide access to clean energy data, tools and information online.
- Communicate achievements and provide outreach through mass media, select events and public briefings.

Midterm Goals & Objectives (2015)

Implement HCEI 70% Clean Energy Benchmarks

- Meet 15% Renewable Portfolio Standard (RPS) target.
- Meet 2015 Energy Efficiency Portfolio Standard (EEPS) target.
- Displace 50 Million Gallons/Year of oil in the transportation sector.

Grow Hawaii's Clean Energy Innovation Sector

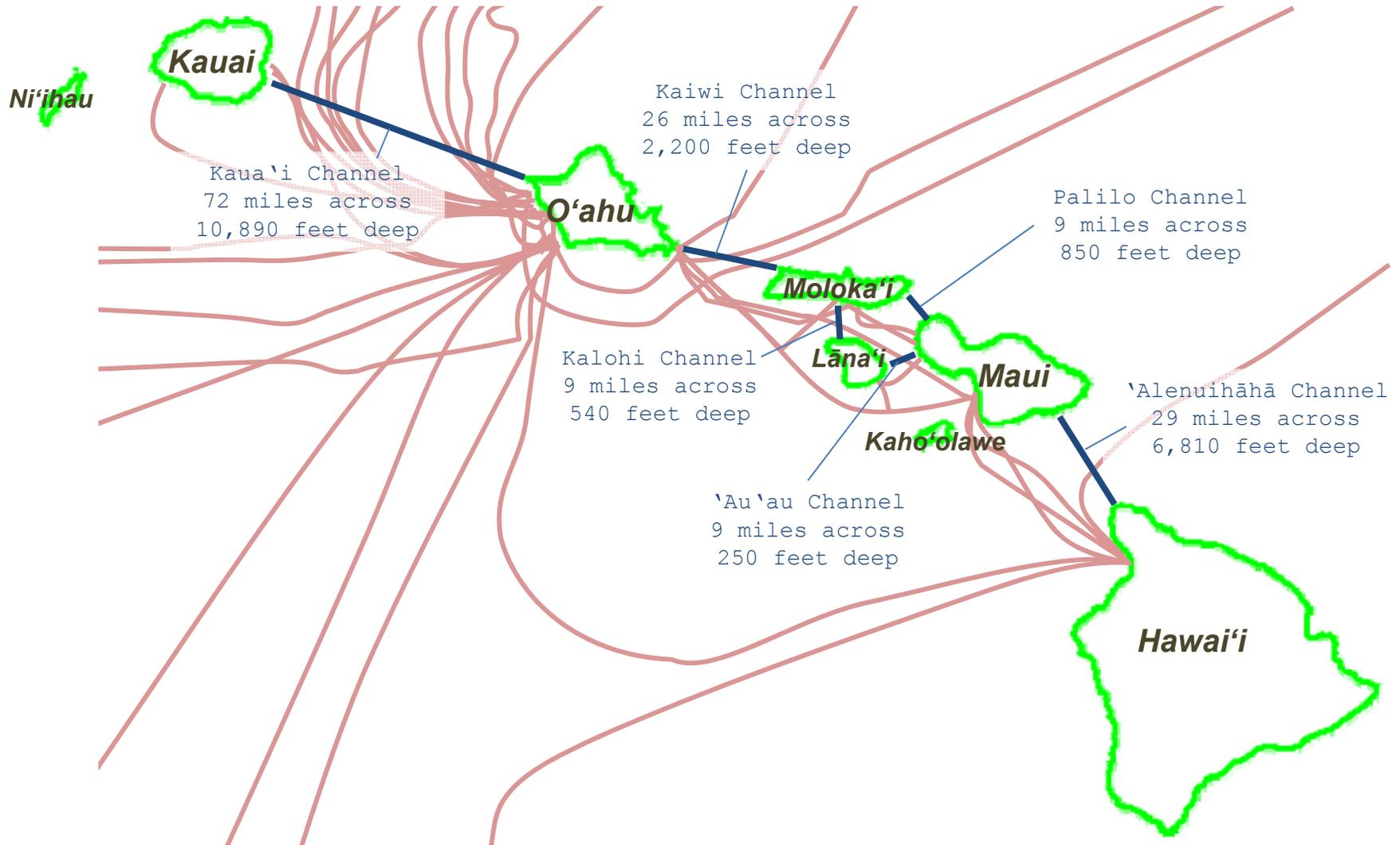
- Develop clean energy RD&D sector with annual revenues of \$100 M.
- Attract \$100 M in project financing for emerging technologies between 2011 and 2015.
- Add 400 clean energy RD&D jobs between 2011 and 2015.

Expand on Hawaii's Position as a National Clean Energy Leader

- Maintain top 5 national ranking in renewable energy penetration, performance contracting, and green job growth.
- Receive A rating for net metering and interconnection in national ranking.
- Complete interisland undersea cable programmatic EIS in preparation for permitting and construction.

Short Term Objectives (1 Year)

- Facilitate selection of cable developer.
- Contribute to comprehensive policy on net metering, interconnection and reliability standards.
- Increase federal funding opportunities.
- Serve as online clearinghouse for clean energy information and self-help permitting tools.
- Increase international clean energy trade, investment & RD&D possibilities.



Kauai

Niihau

Kaua'i Channel
72 miles across
10,890 feet deep

O'ahu

Kaiwi Channel
26 miles across
2,200 feet deep

Palilo Channel
9 miles across
850 feet deep

Moloka'i

Lana'i

Maui

Kalohi Channel
9 miles across
540 feet deep

Kaho'olawe

'Alenuihähä Channel
29 miles across
6,810 feet deep

'Au'au Channel
9 miles across
250 feet deep

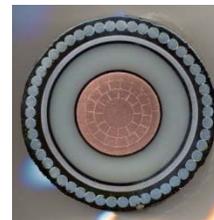
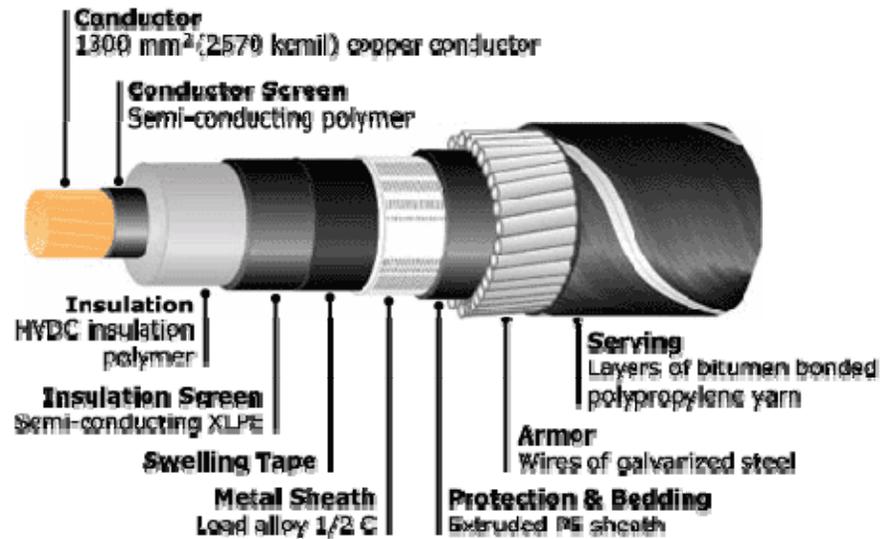
Hawai'i

Interconnection Strategy

- **True programmatic EIS**
 - US DOE to oversee the process with DBEDT as collaborating agency.
- **Private sector driven,** owned, operator interisland cable with affordable financing – sole purpose of the Cable bill.
- **Accepts all RE options,** ultimately leading to connection with geothermal on Hawaii
- **RFP** for RE production and cable must be simple, direct, & intended to connect to Maui in initial phase.

Undersea Power Cable

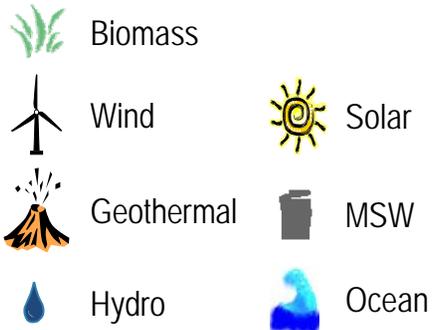
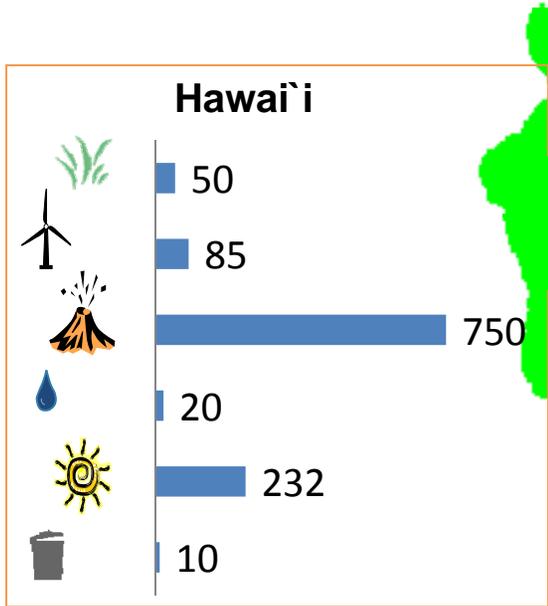
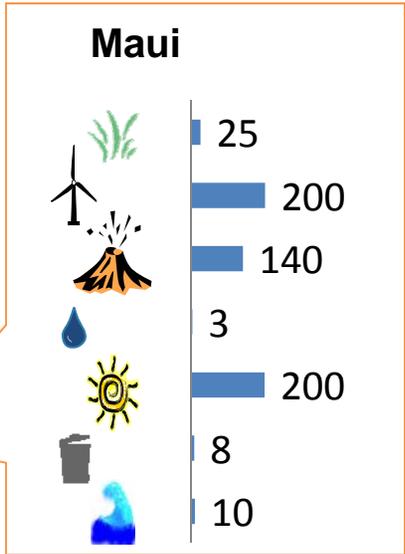
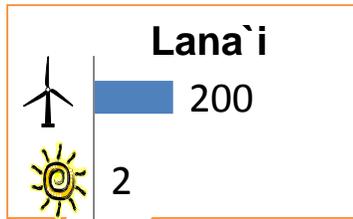
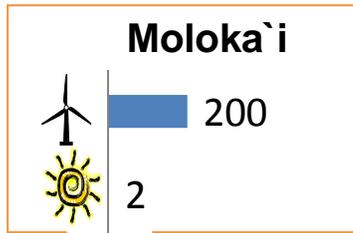
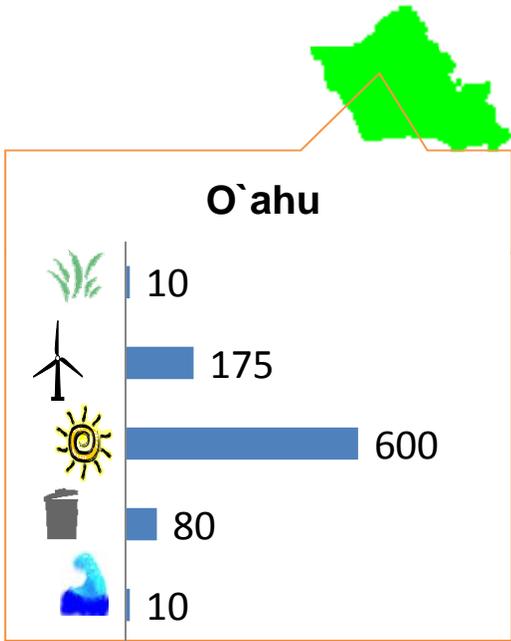
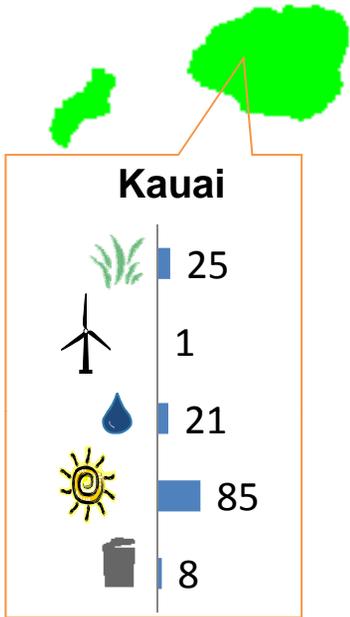
The cables are approximately 4 inches in diameter depending on carrying capacity; about the size of a can of tuna.



Renewable Resource Abundance by Island (GWh)

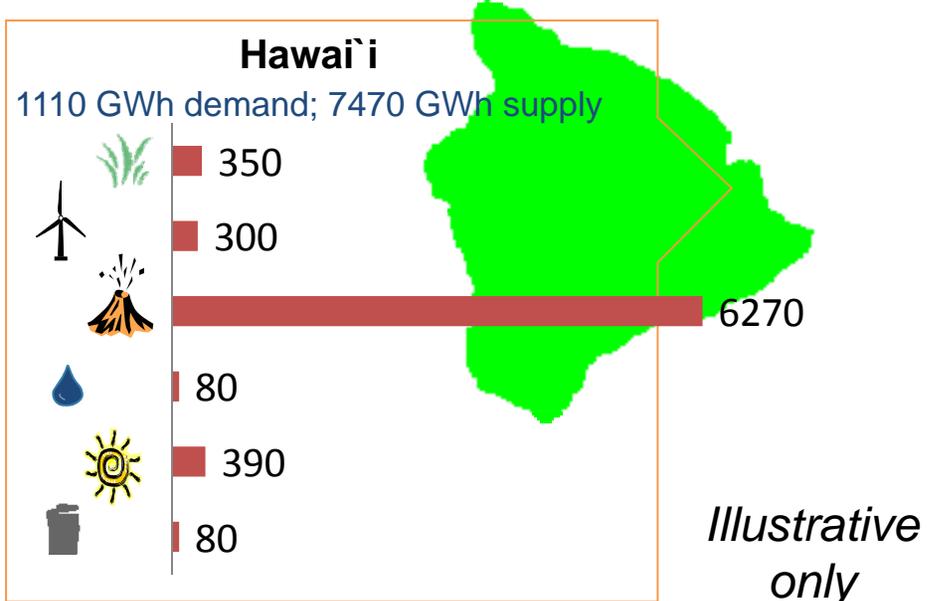
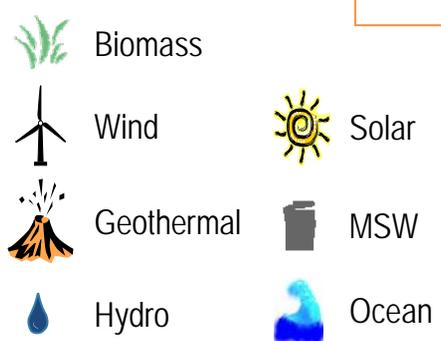
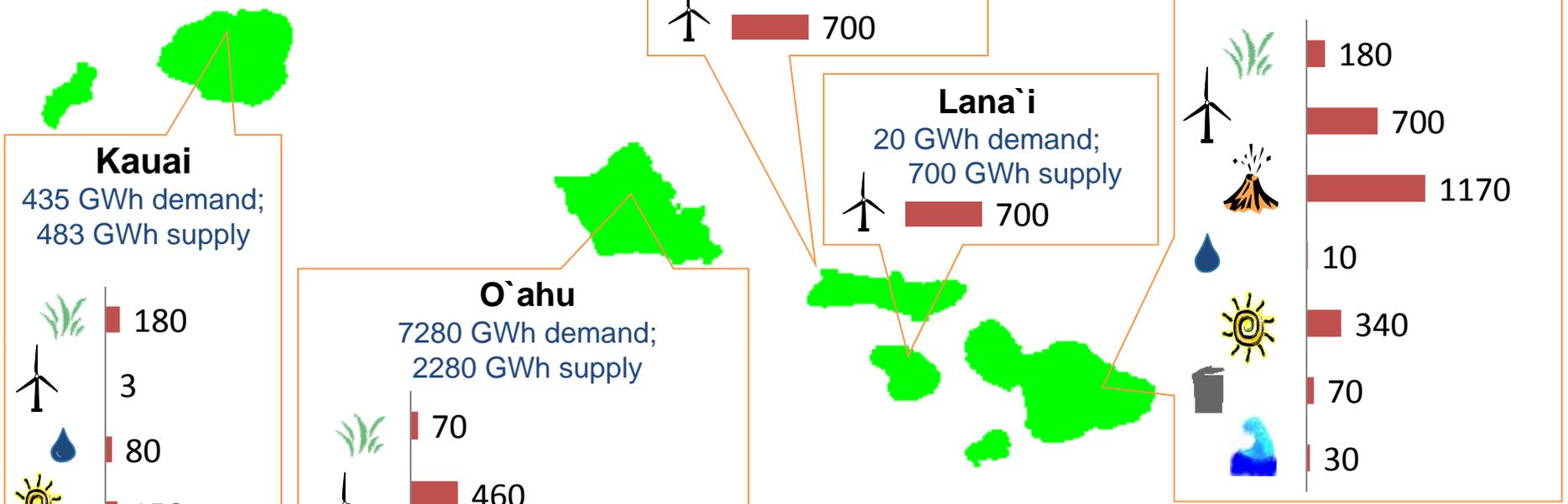
	Oahu	Kauai	Maui	Hawaii	Lanai	Molokai	State
Biomass	70	180	180	350	-	-	780
Wind	460	-	700	300	700	700	2,860
Geothermal	-	-	1,170	6,270	-	-	7,440
Hydro	-	80	10	80	-	-	170
Solar	1,050	150	340	390	4	4	1,938
MSW	670	70	70	80	-	-	890
Ocean	30	-	30	-	-	-	60
RENEWABLE POTENTIAL	2,280	480	2,500	7,470	704	704	14,138
DEMAND	7,280	430	1,140	1,110	20	30	10,010
%	<i>31%</i>	<i>109%</i>	<i>220%</i>	<i>673%</i>	<i>2822%</i>	<i>2240%</i>	<i>141%</i>

Potential Renewable Energy (Capacity, MW)



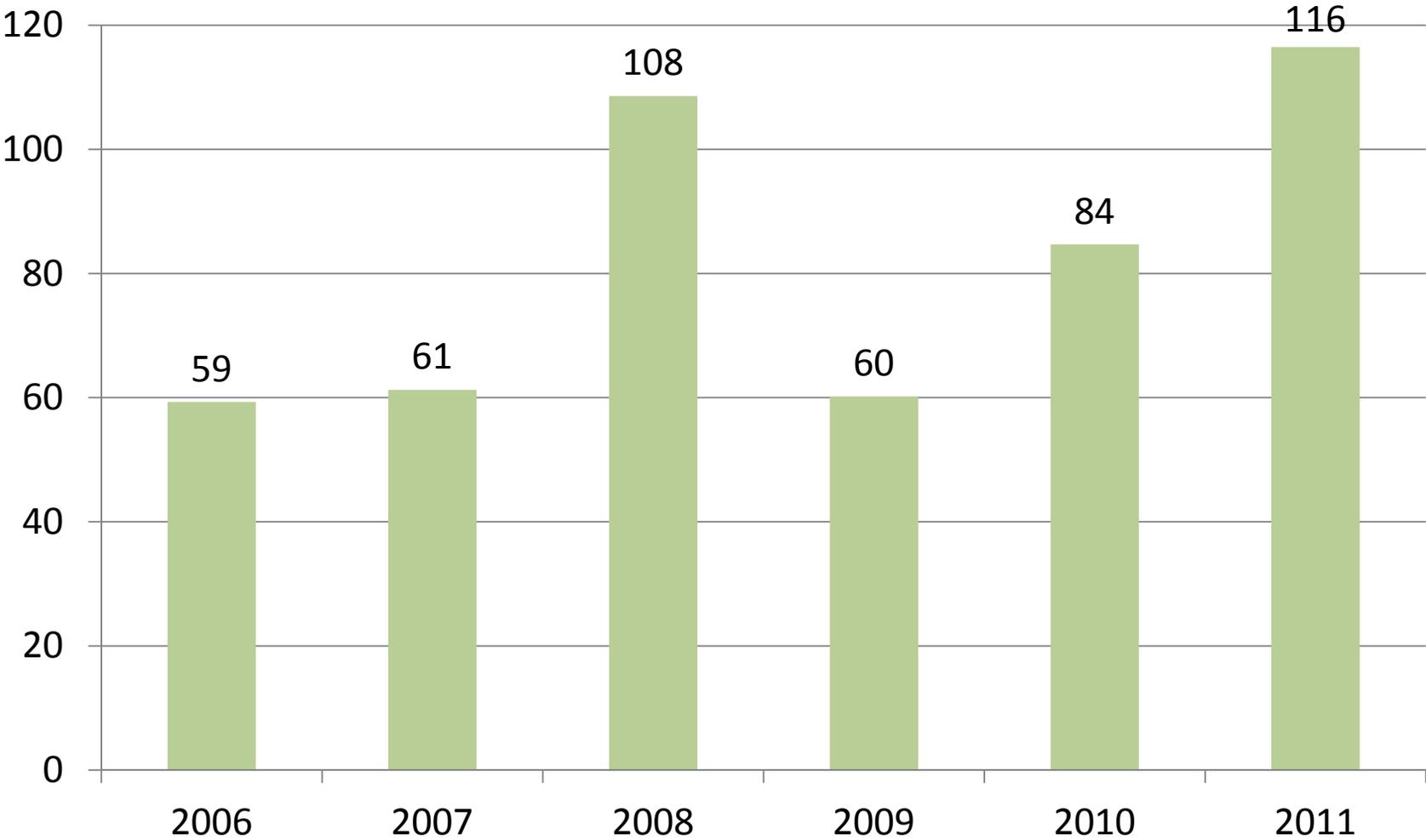
Illustrative only

Potential Renewable Energy (Production, GWh)



Illustrative only

Hawaii's Average Fuel Oil Costs (\$/Bbl)



State Energy Office ARRA SEP Projects

PROJECT STATUS

Market	Vendor / Subrecipient	Contract Amount	Estimated by 4/30/12:	
			Amount Unexpended	% Completed
Electric Power & Renewable Energy	Kobayashi, Sugita, Goda	200,000	26,879	87%
	AECOM	2,997,947	278,715	91%
	Hawaii Electric Light Co., Inc. (HELCO)	900,000	98,000	89%
	Maui Electric Company (MECO)	1,200,000	353,000	71%
Transportation	GreenCar Hawaii	200,000	4,589	98%
	County of Kauai	276,000	4,000	99%
	AeroVironment	820,000	145,000	82%
	Plug In America	50,000	5,000	90%
	Better Place	581,943	31,943	95%
	DAGS - MOA	475,500	17,456	96%
Buildings	GBS	300,000	35,000	88%
	Insynergy	367,000	51,380	86%
	University of Hawaii	200,000	26,000	87%
Total Contractual under Performance Modification		\$8,201,390	\$1,075,582	87%
Total Contractual under DE-EE-0000216		\$20,635,187	\$1,075,582	95%

ARRA SEP – WHAT’S LEFT

For the Eight Months Ending December 31, 2012									
CONTRACTORS *									
	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Totals
County of Kauai									
Kobayashi, Sugita, Goda	8,000	8,000	8,000	2,879					26,879
HELCO					98,000				98,000
MECO		322,000			26,765				348,765
GreenCar Hawaii	918	918	918	918	917				4,589
County of Kauai	1,000	1,000	1,000	1,000					4,000
AeroVironment	29,000	29,000	29,000	29,000	29,000				145,000
Plug In America	1,667			1,667	1,666				5,000
Better Place	6,389	6,389	6,389	6,389	6,387				31,943
DAGS-MOA		5,819	5,819	5,818					17,456
Green Building Services	5,000	5,000	5,000	5,000	5,000	5,000	2,500	2,500	35,000
Insynergy			25,000					26,380	51,380
University of Hawaii			15,000					11,000	26,000
DCCA	100,000	100,000	100,000	100,000	100,000				500,000
Hawaii Community Reinvestment Corporation		250,000							250,000
Totals	233,974	800,126	258,126	192,671	282,735	10,000	5,215	39,880	1,822,727

A PEEK AT TRANSPORTATION

Contractor:

AeroVironment

For the Period From May 1, 2012 to September 30, 2012

Milestones	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Totals
Data Analysis	29,000	29,000	29,000	29,000	29,000				145,000
Education & Outreach									0
Final Report									0
Totals	29,000	29,000	29,000	29,000	29,000	0	0	0	145,000

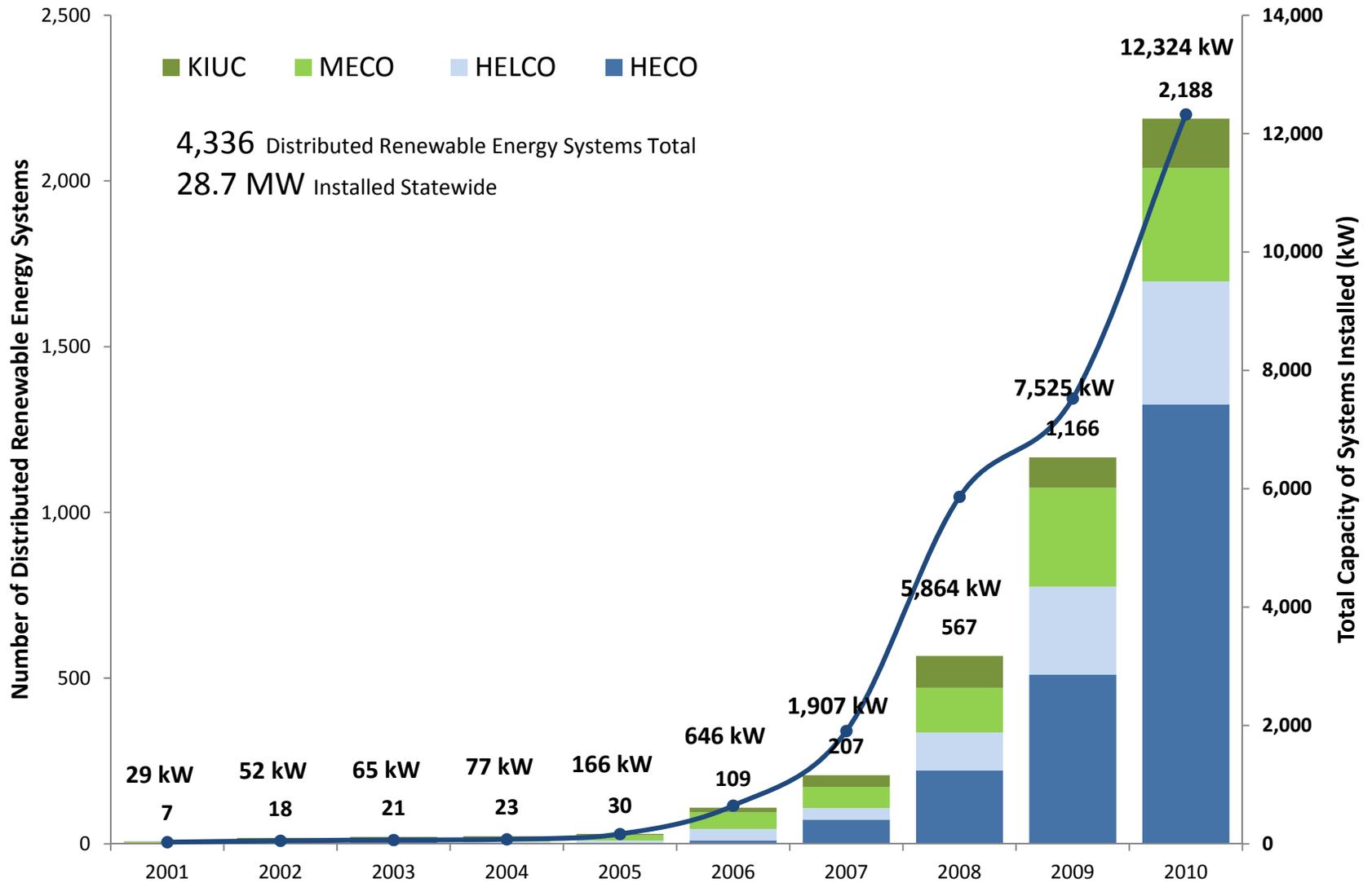
Better Place

For the Period From May 1, 2012 to September 30, 2012

Milestones	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Totals
Evaluation of Grid									0
Education & Outreach	6,389	6,389	6,389	6,389					25,556
Final report					6,387				6,387
Totals	6,389	6,389	6,389	6,389	6,387	0	0	0	31,943

Impact of the Hawaii Clean Energy Initiative – Including ARRA

New Distributed Renewable Energy Systems Installed in Hawaii Annually 2001-2010



Source: Net Energy Metering Status Reports, 2010 (Public Utilities Commission)

First in Nation Energy Savings Performance Contracting Per Capita

State	Dollars per Capita (\$)	Total Performance Contracting (\$)	Jobs Created (Job Year)
1. Hawaii	\$117.09	\$159,278,011	1,731
2. Kansas	\$90.81	\$259,094,503	2,816
3. Idaho	\$90.27	\$129,000,000	1,402
4. Massachusetts	\$71.53	\$457,696,106	4,975
5. Utah	\$66.89	\$165,195,000	1,796
National Average	\$31.46	\$130,846,670	1,379

Source: *Performance Contracting Impacts - State Comparison*, December 2011 (Energy Services Coalition)

Second in the Nation
Cumulative Installed Photovoltaic Capacity per Capita

State	Cumulative Through 2010 (W _{DC} /person)	2010 Installations (W _{DC} /person)
1. Nevada	38.8	25.3
2. Hawaii	32.9	13.6
3. New Jersey	29.6	15.1
4. California	27.4	6.8
5. Colorado	24.1	12.3
National Average	7.0	2.9

Source: 2010 U.S. Solar Market Trends, July 2011 (IREC)

Renewable Energy Investments in Hawaii

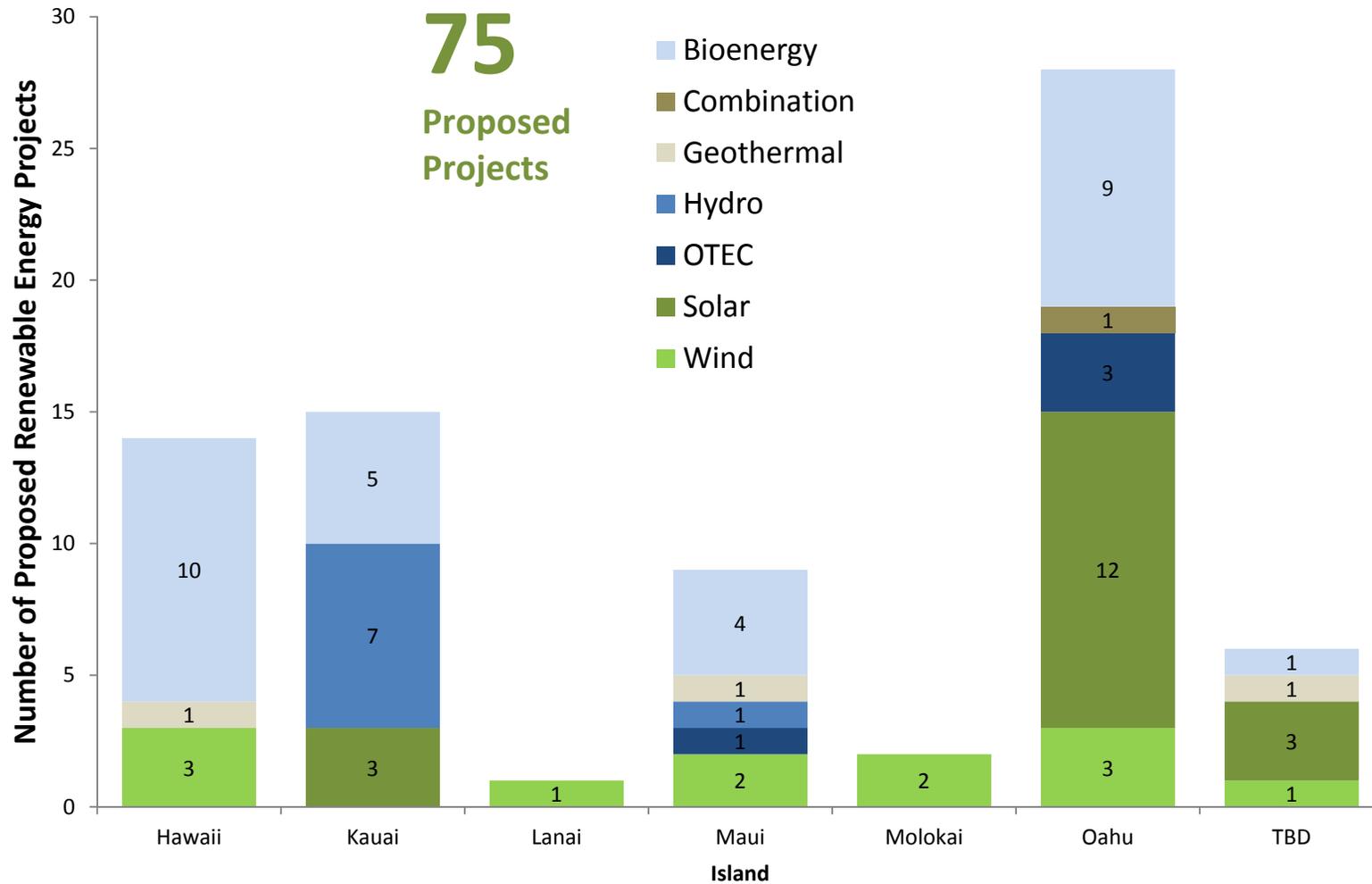
Entities	2009 Expenditures	2010 Expenditures	2011 Expenditures
Private Companies	\$ 188,961,485	\$ 441,503,536	\$ 598,790,774
Government Agencies	\$ 71,977,111	\$ 213,759,898	\$ 252,853,383
Others*	\$ 101,671,469	\$ 174,698,204	\$ 413,268,330
State total	\$ 362,610,064	\$ 829,961,638	\$ 1,264,912,487

*Includes investments in commercial and residential photovoltaic systems and solar water heaters

Source: State Energy Office

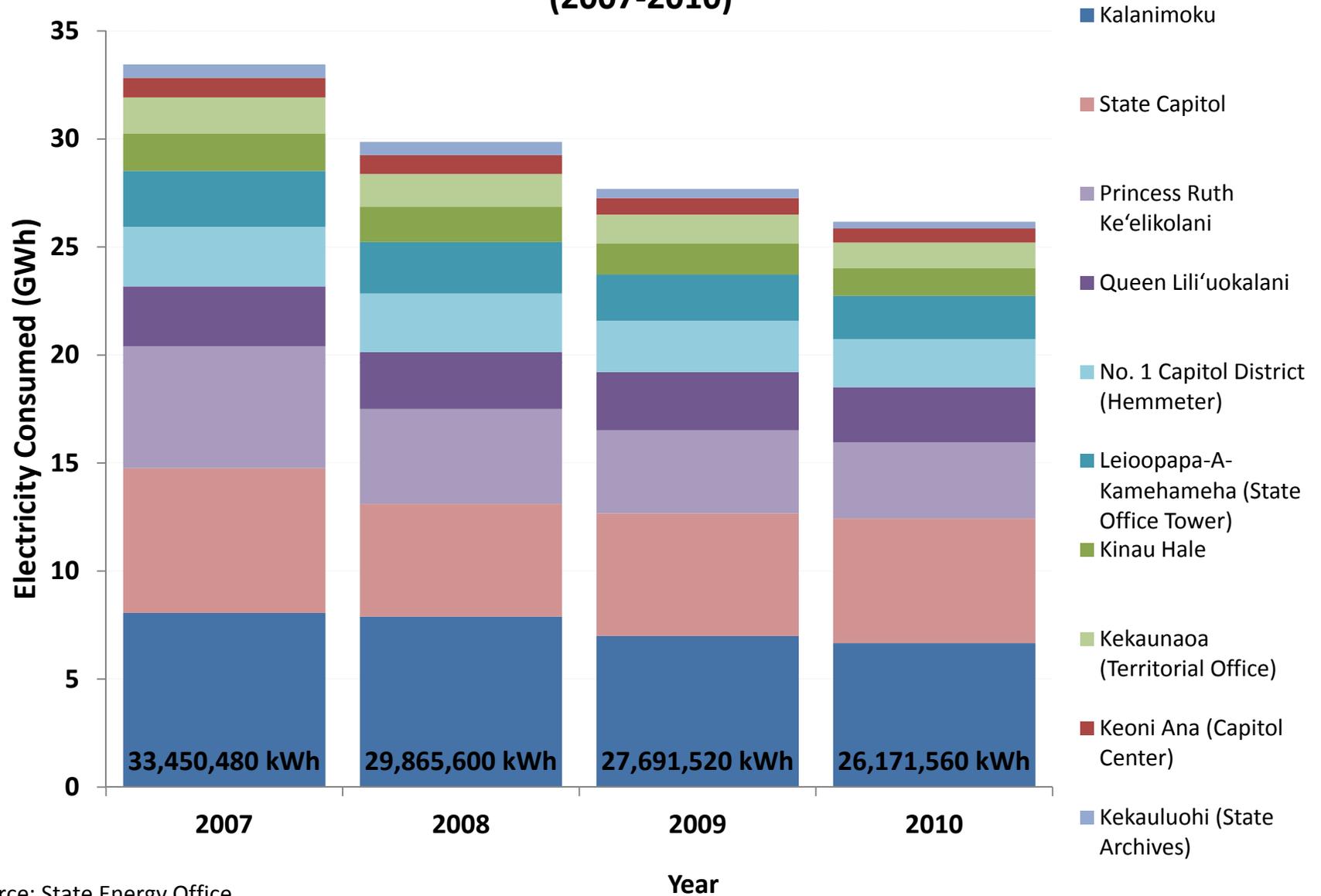
75 Projects under Development

Currently Proposed Renewable Energy Projects in Hawaii



Source: Department of Business, Economic Development and Tourism, December 2011

Decreased Electricity Consumption in Lead-By-Example State Buildings (2007-2010)



Source: State Energy Office

Power Purchase Agreements at Four Airports Decrease Electricity Costs Nearly 20%



National Leader

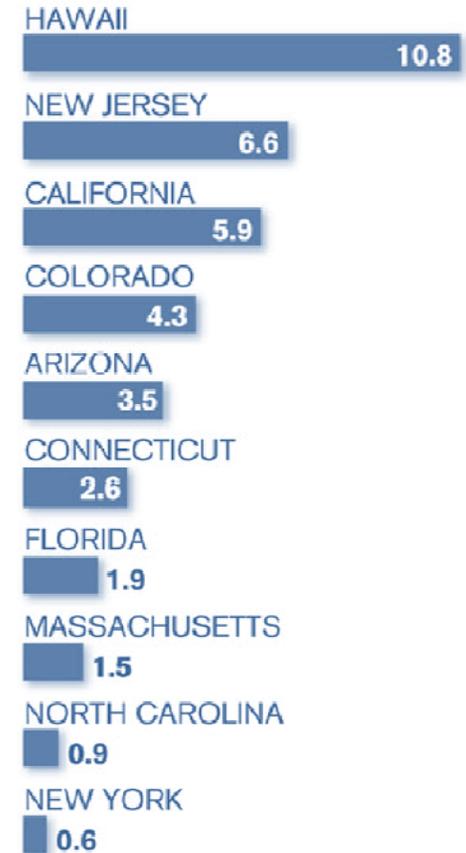
1st in solar water heaters per capita
2nd in power purchase agreements per capita



856 kW solar system at Oceanic Time Warner Cable's facility at the Mililani Tech Park, by Chevron Energy Solutions, includes rooftop panels & the largest solar parking canopy in Hawaii.

HAWAII TOPS IN SOLAR ENERGY

Grid-tied solar energy generation in the U.S. (watts per capita):



Source: Solar Energy Industry Association

STAR-ADVERTISER

Mahalo

Visit energy.hawaii.gov for a more comprehensive look at Hawaii's clean energy future.