Hawaii Clean Energy Initiative

The Association of Pacific Island Legislatures

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DBEDT
STATE OF HAWAII

“Clean Energy Market Transformation -It’s Happening Here”

Hawaii is one of the world’s leading clean energy test beds

"We Need to Act"

Cause for Action in an Island Economy

- Create green jobs & economic opportunities
  - Retain income in Hawaii
  - Create skilled job opportunities
  - Reduce the cost of energy
- Becoming more energy secure
  - Replace imports with indigenous clean energy

“We’re Building an International Model”

Strategy for Action

- Analyze energy sector - build knowledge base
- Set goals & develop scenarios to reach goals
- Codify goals into commitments via laws & regulations
- Inform, listen to, & engage the public and key stakeholders
- Leverage resources, align incentives, and remove barriers
- Deploy infrastructure to achieve goals

“Our Balanced, Portfolio Approach”

If a community doesn’t want it, neither do we.

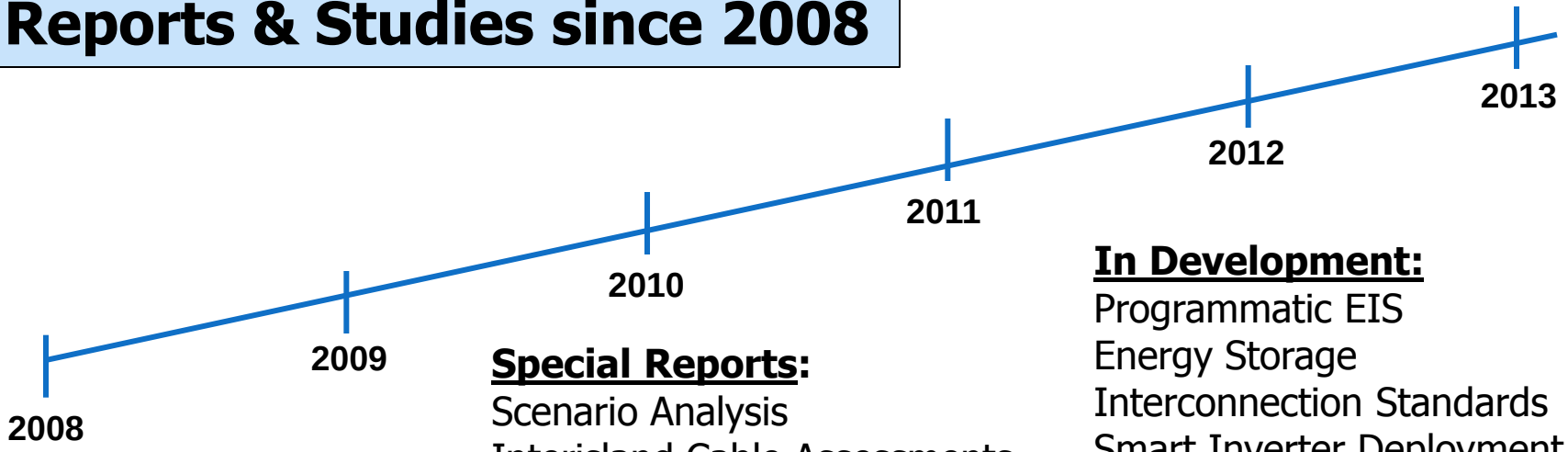
- Consistency with community values & plans
- Encourage local partnerships
- Transportation Goals

Hawaii has all of the clean energy options.

- High impact solutions to meet goals
- Distributed energy to empower ratepayers & energy users
- Use entire portfolio of clean energy options

“We’re Seeking Knowledge”

Reports & Studies since 2008



Annual Reports:
ERC Annual Report
Lead by Example
Hydrogen Fund
PUC Annual
Hawaii Energy

Special Reports:
Scenario Analysis
Interisland Cable Assessments
Solar Resource
Wind Integration
HCEI Permitting Guidebook
HCEI Roadmap
Net Zero Energy
Biofuels
Energy Assurance Plan
Geothermal Assessment

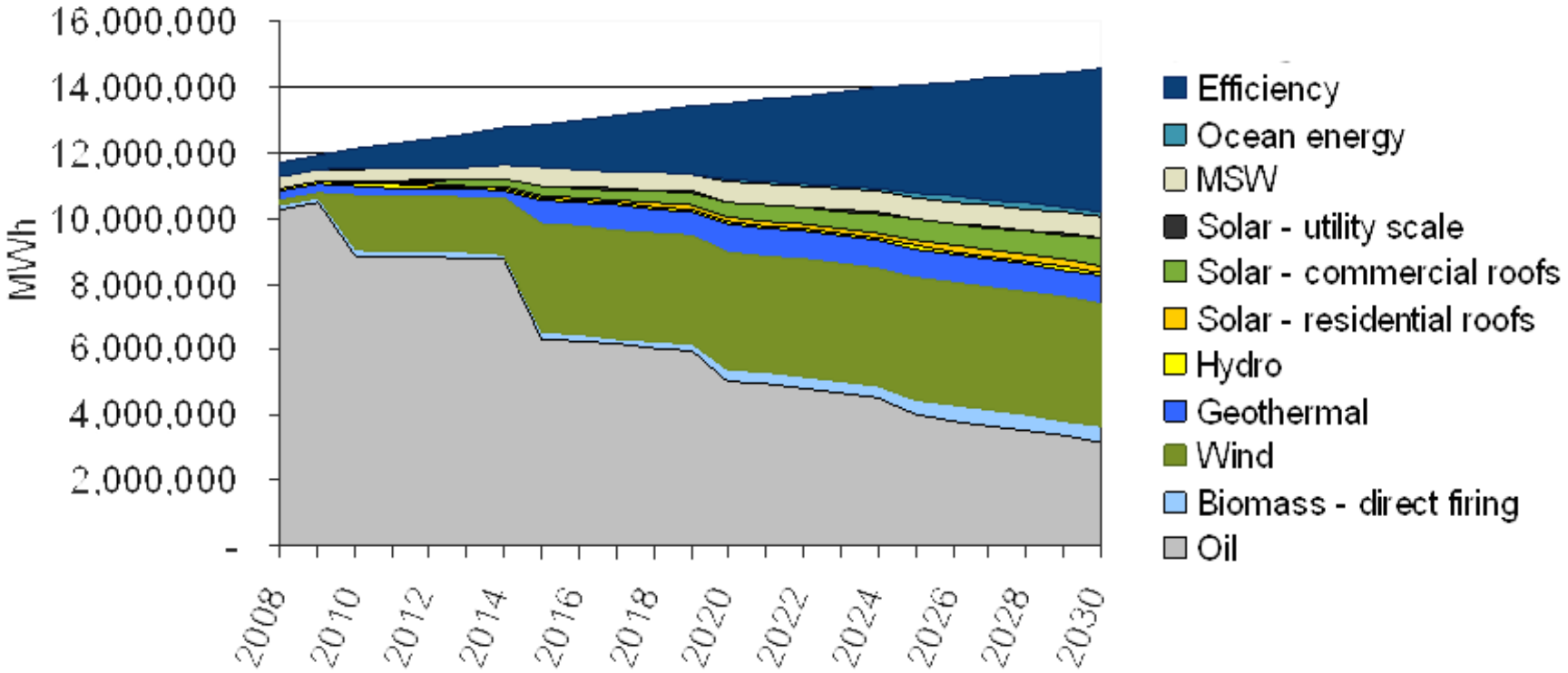
In Development:
Programmatic EIS
Energy Storage
Interconnection Standards
Smart Inverter Deployment,
Hydrogen for Grid Management
Updated Scenario Analysis

"Home-grown Energy Diversity"

Results of the Hawaii Clean Energy Scenario Analysis

Our 70% clean energy goal for the electricity sector is achievable

-requires deployment of commercially available renewable resources and an interisland transmission via submarine cable



"We Can Afford It"

Scenario Installation & Capital Requirements

Assumes $16 billion of NPV for capital investment and a "break-even" value of this investment when the long-term average cost of oil is $65 to $85 per barrel (bbl).

Renewable Energy Sources ($ / kWh)	Scenario 8	Capital Cost Range
Solid Biomass	83 MW	$2,000 - $6,000
Wind	1,060 MW	$2,400 - $2,800
Geothermal	102 MW	$3,000 - $5,000
Small Hydro	24 MW	$2,500 - $4,000
Solar - Residential Roofs	179 MW	$8,125 - $9,375
Solar PV (large roof/utility scale)	651 MW	$6,500 - $7,500
MSW/Landfill Gas	77 MW	$2,100 - $3,500
Ocean Energy (wave)	53 MW	$2,000 - $7,600
Energy Efficiency	495 MW	$70 - $100

"Let's Motivate"
Carrots & Sticks

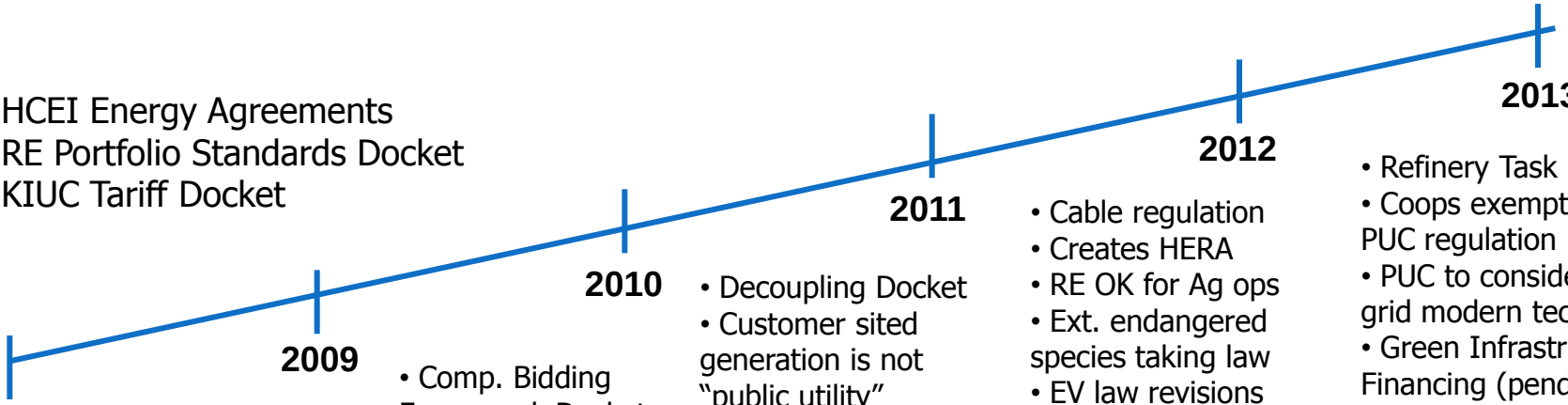
Laws & Regulations

- RPS & EEPS Goals codified as law
- FIT, Net Metering, Decoupling, RSWG
- Transportation Goals

Incentives & Technical Assistance

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

"Hawaii's Legislative & Regulatory Success"



2008

- RE Infrastructure Program Docket
- Maui County PV/Wind Permit Guidance, DSA 18.0
- New home solar hot water heating mandate (196-6.5)
- RPS revised to 25% by 2020, 30% by 2030; created EEPS (4300 GWh reduction by 2030); allowed EPC contracting
- Renewable Energy Facility Siting Process (201N)
- Subdiv. exemption for RE

2009

- HCEI Energy Agreements
- RE Portfolio Standards Docket
- KIUC Tariff Docket

2010

- Comp. Bidding Framework Docket
- Created $1.05 "Barrel Tax" for food & energy security
- HAWAII GAS to submit RPS reports
- FIT Tiers 1 and 2 approved

2011

- Decoupling Docket
- Customer sited generation is not "public utility"
- RE includes customer site generation
- Modifies REFSP for biofuel (100Kgal/yr)
- Extends subdiv. exemption
- Allows solar on better Ag lands w/ limitation
- FIT Tier 3 approved

2012

- Cable regulation
- Creates HERA
- RE OK for Ag ops
- Ext. endangered species taking law
- EV law revisions
- PUC to consider diverse fossil fuels
- Removes geothermal subzones
- C&CH Solar Permit ruling: 2012/INT-1
- Hawaii County Ord. for RE permitting

2013

- Refinery Task Force
- Coops exempt from PUC regulation
- PUC to consider adv. grid modern tech.
- Green Infrastructure Financing (pending)
- Wind farm decom. (pending)
- Energy Info. Reporting (pending)
- PUC/PBF reporting (pending)
- Landlords not a public utility (pending)

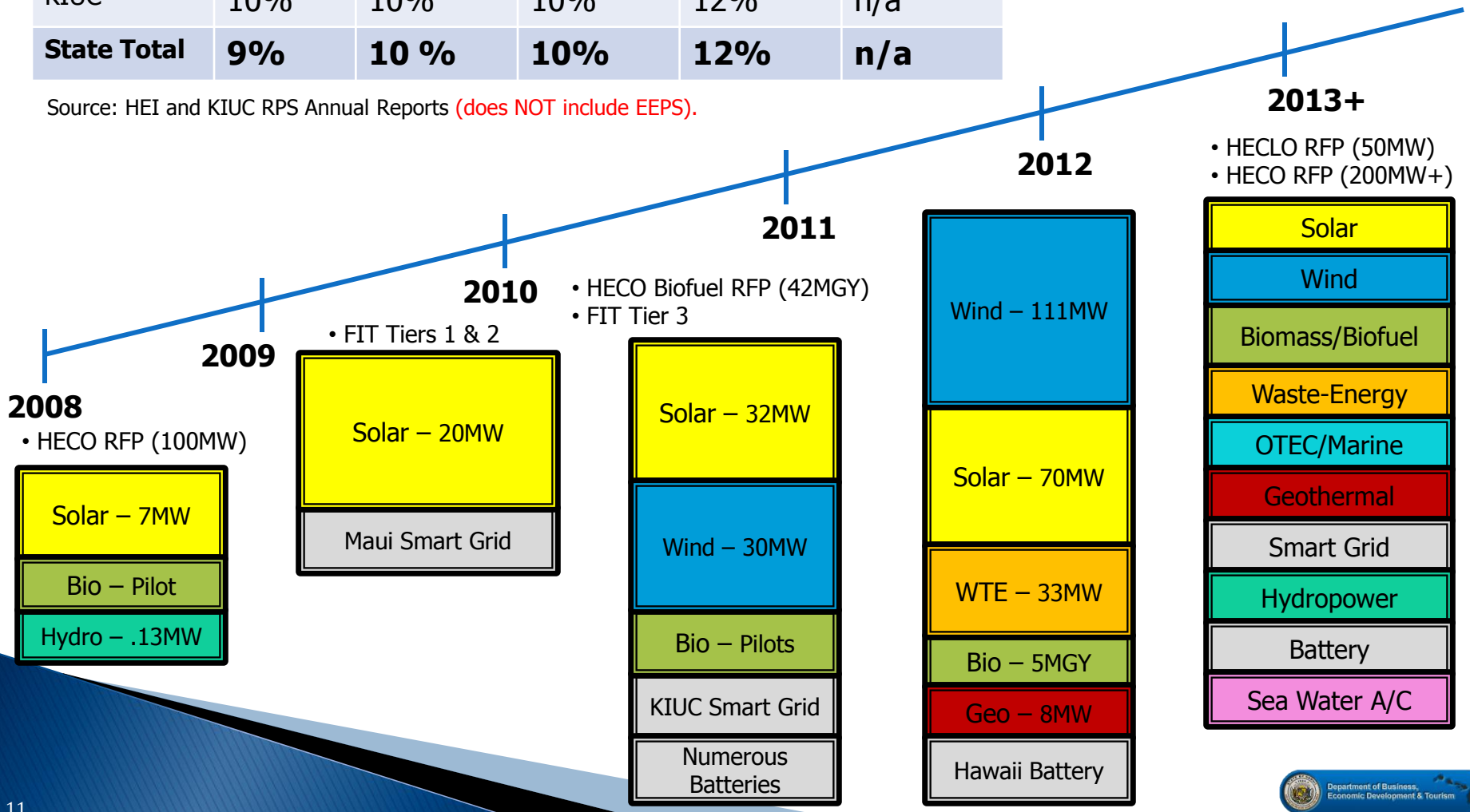
Major Open Dockets:

- Intragovernmental Wheeling (opened in 2007)
- HECO Feed-in Tariff (opened in 2008)
- HECO Rule 14H (opened in 2010)
- Implementation of Reliability Standards (opened in 2011)
- Integrated Resource Planning (opened in 2012)

"Our RE Deployments"

	2008	2009	2010	2011	2012
HEI Companies	9%	10%	10%	12%	14%
KIUC	10%	10%	10%	12%	n/a
State Total	**9%**	**10 %**	**10%**	**12%**	**n/a**

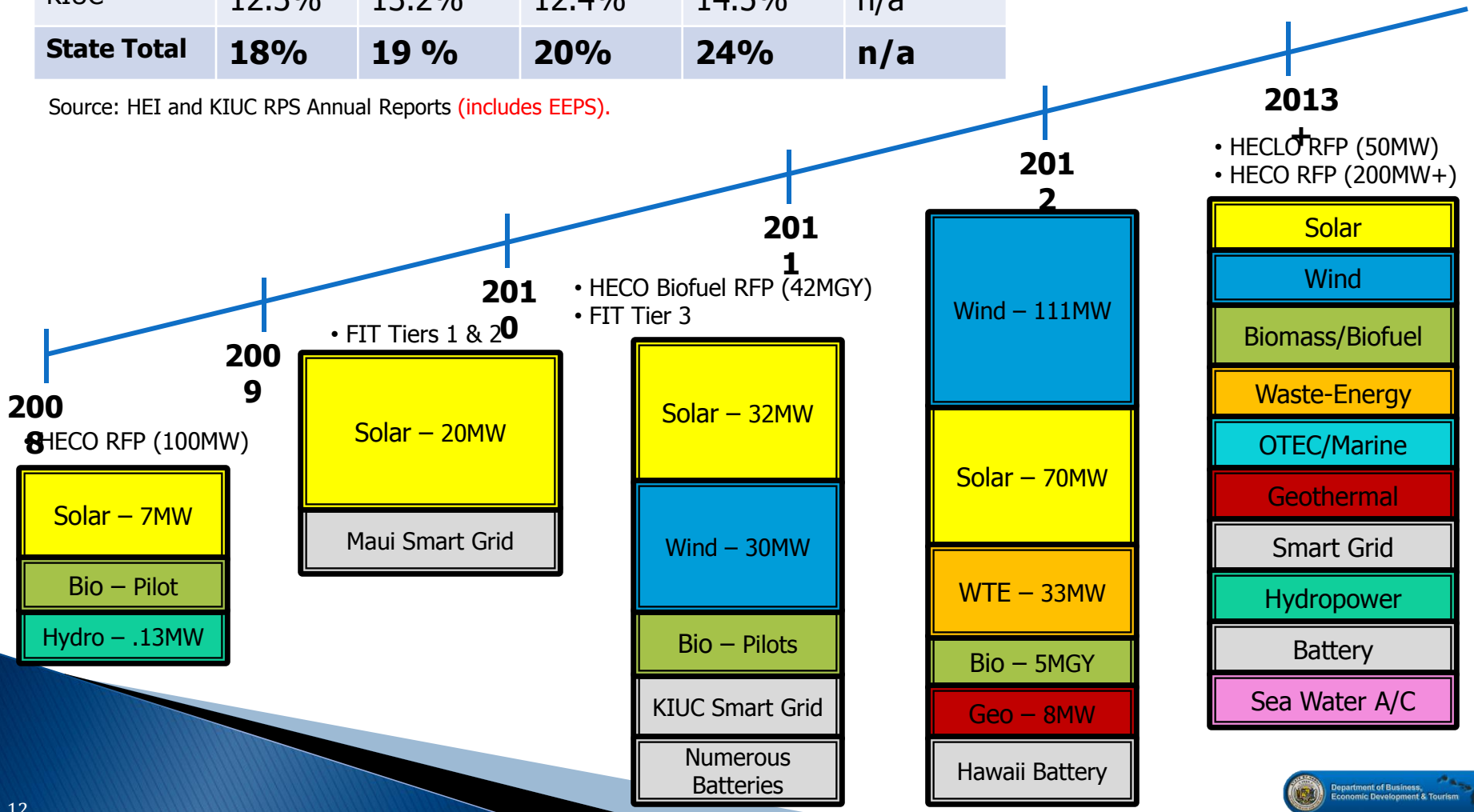
Source: HEI and KIUC RPS Annual Reports (does NOT include EEPS).



"Our Clean Energy Deployments"

	2008	2009	2010	2011	2012
HEI Companies	18%	19%	20.7%	24.5%	28.7%
KIUC	12.3%	13.2%	12.4%	14.5%	n/a
State Total	**18%**	**19 %**	**20%**	**24%**	**n/a**

Source: HEI and KIUC RPS Annual Reports (includes EEPS).



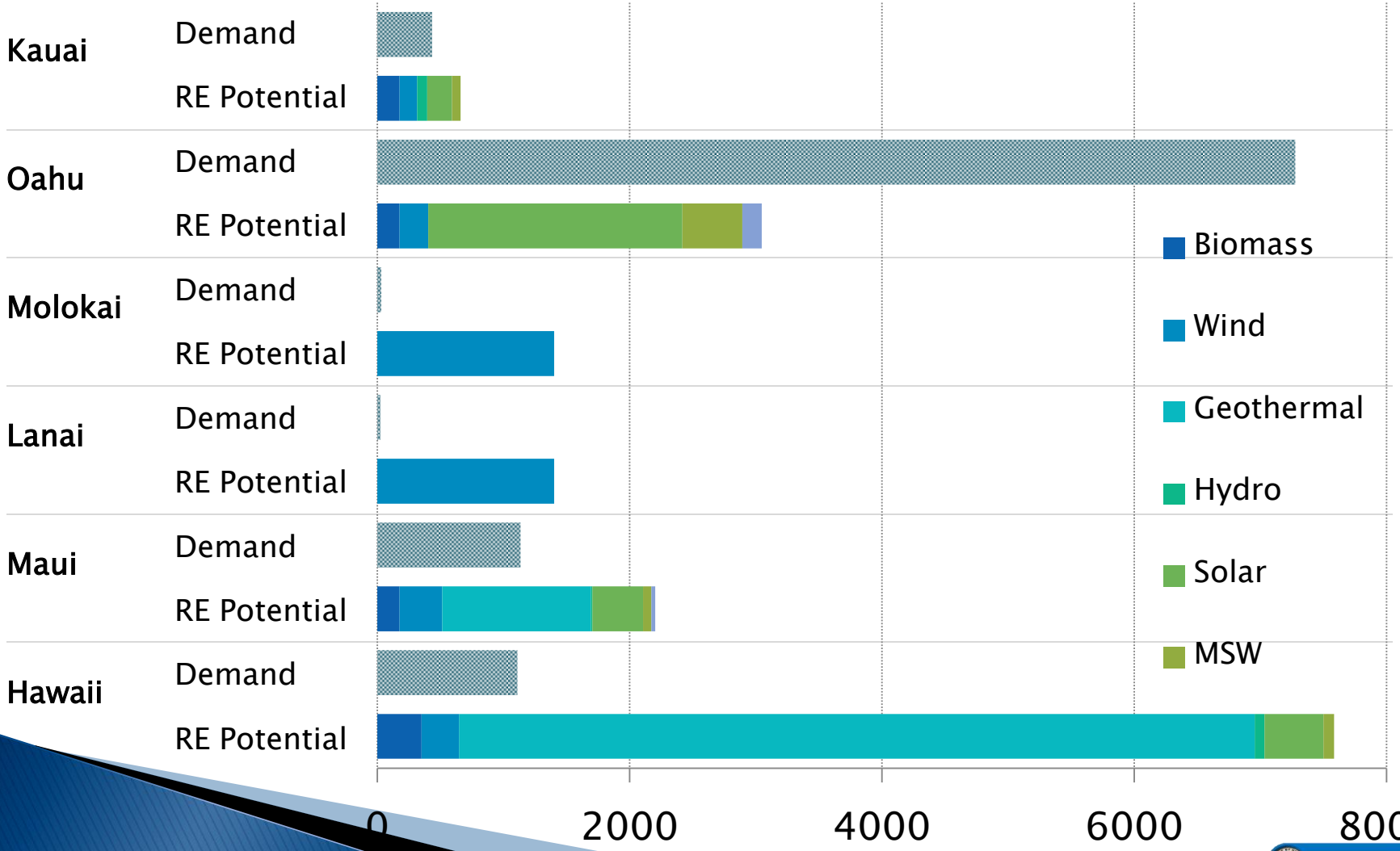
"Assistance is on the Way"

- State Energy Office Online Permitting Wizard
  - Permit Guide and Packets
- DOH ePermitting Portal
- Renewable EnerGIS Mapping Tool
- State Energy Office Developer & Investor Center
- Technical Assistance & Priority Processing
  - County, State, Federal Agencies
- DPP Online Building/Electrical Permits

“We Have the Resources”

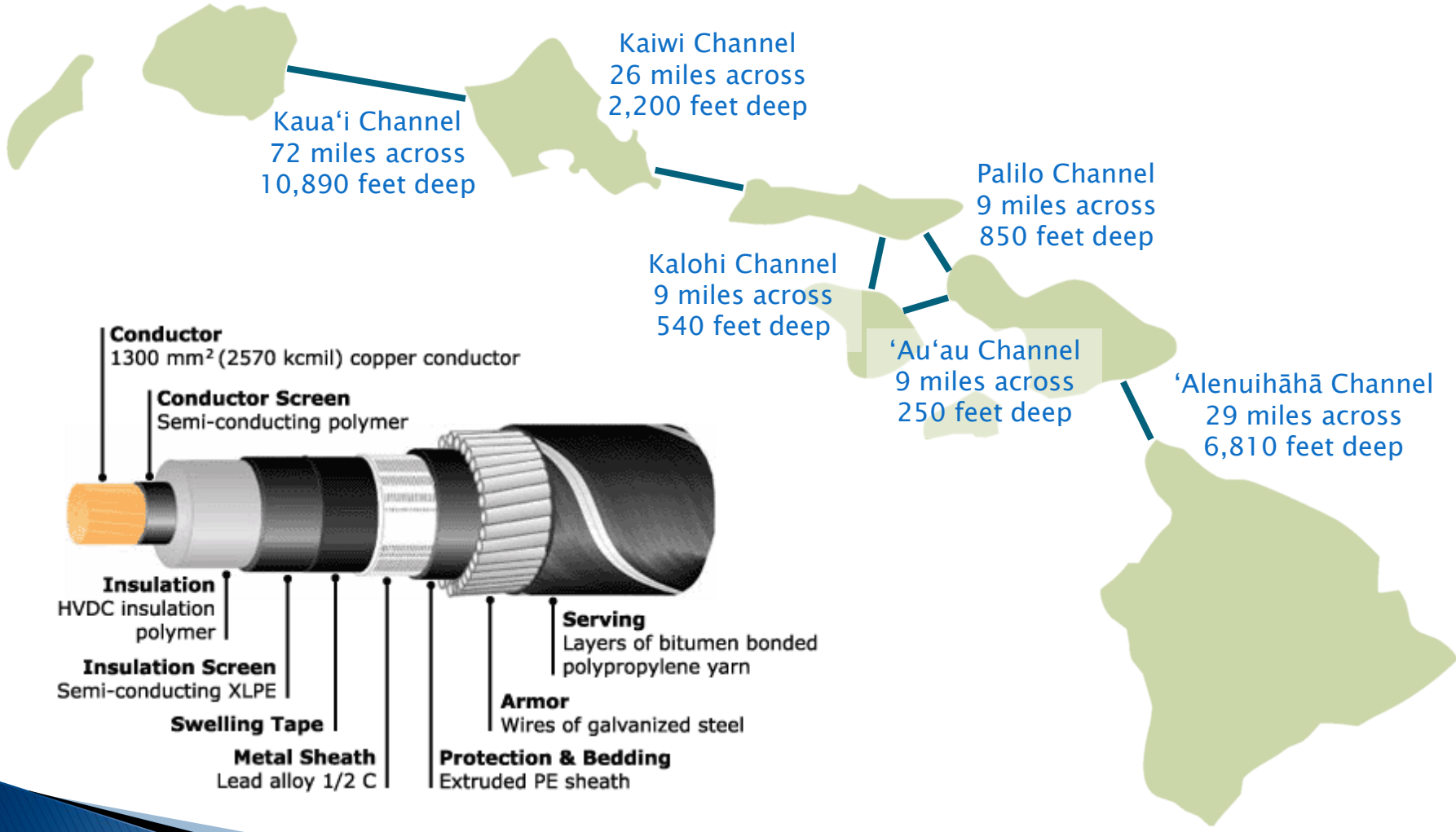
Hawaii Renewable Energy (RE) Potential (GWh)

Oahu has the most energy demand, but most renewable energy sources are on the neighbor islands



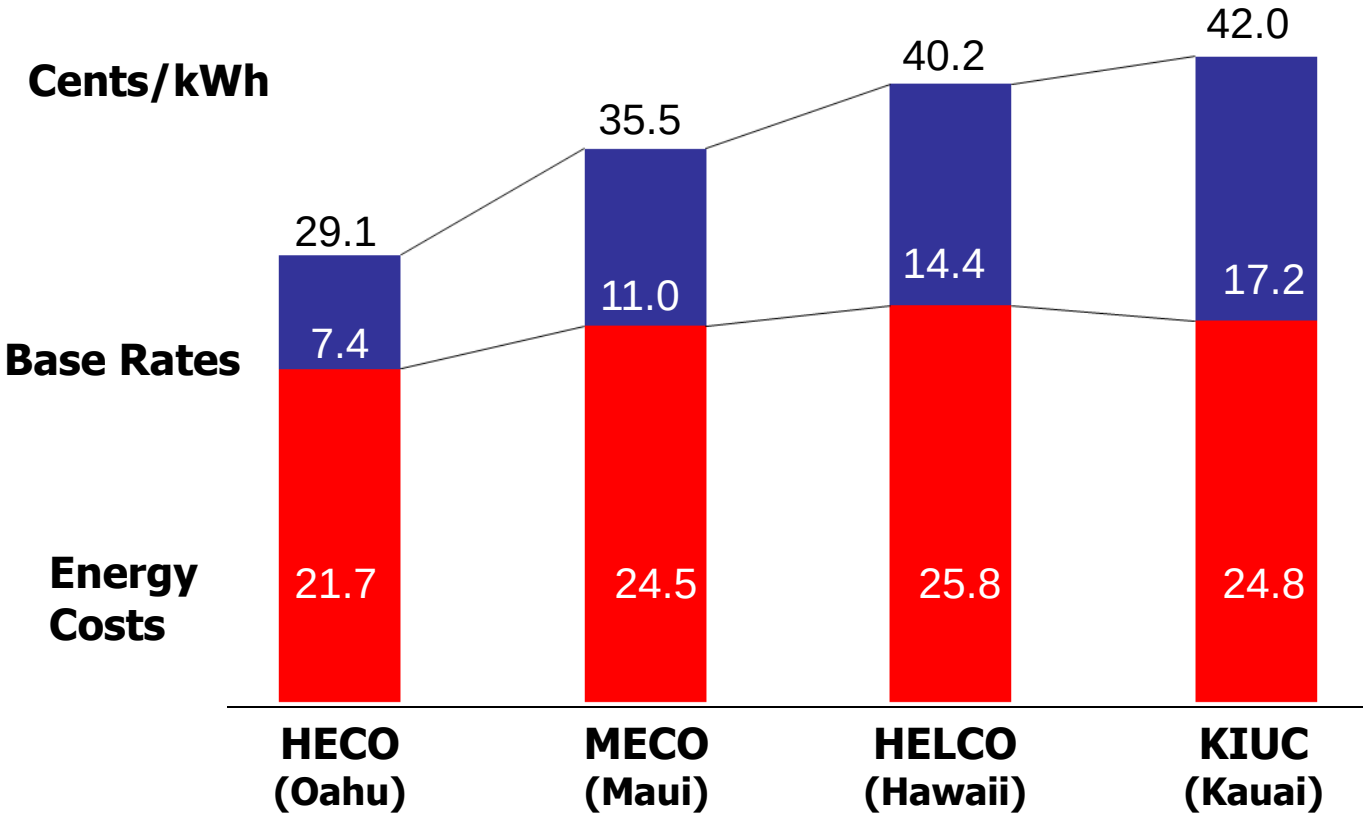
“Let’s Connect: Grid Ties”

Connecting Oahu, Maui and Hawaii grids makes sense for Hawaii’s clean energy future



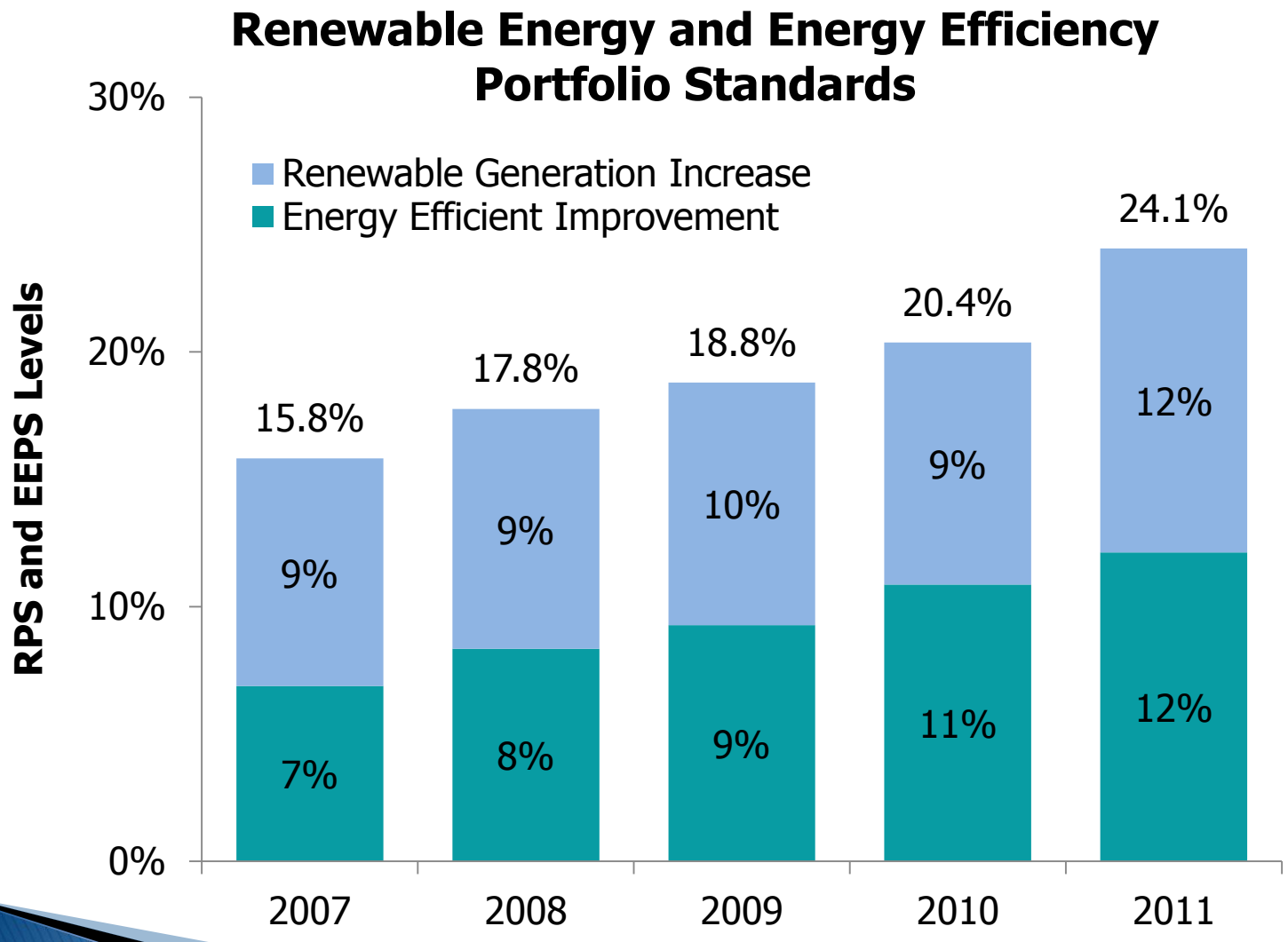
“Equalize Rates?”

Average Electric Rate Level by County: 2011

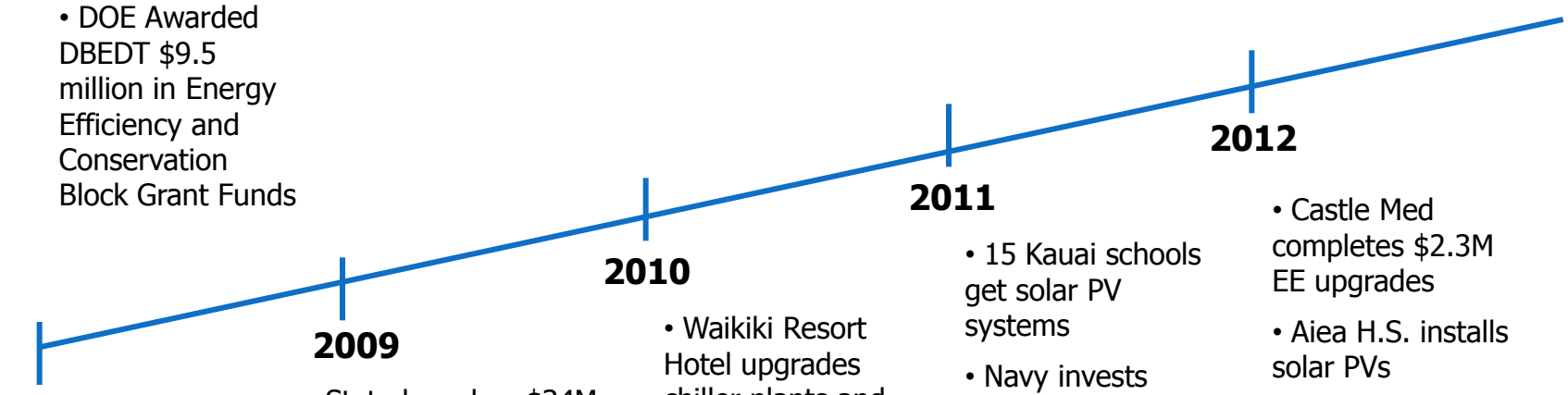


Customers	297,000	68,000	81,000	36,000
Sales (GWh)	7,242	1,181	1,104	435
Capacity (MW)	1,786	290	287	122
Avg Use/Customer (kWh)	23,564	17,369	13,771	11,995
Distribution Lines (Miles)	2,294	1,500	3,212	781

“We’re Making Progress”



“Efficiency Accomplishments”



2008

- DOE Awarded DBEDT $9.5 million in Energy Efficiency and Conservation Block Grant Funds

2009

- State launches $34M Capital District project
- PUC awards $38M contract to SAIC for Utility EE programs
- DOT signs PPAs for 7 PV systems

2010

- Waikiki Resort Hotel upgrades chiller plants and cooling towers
- Honolulu Academy of Arts begins EE project
- Honblue retrofits cut usage by 20 percent

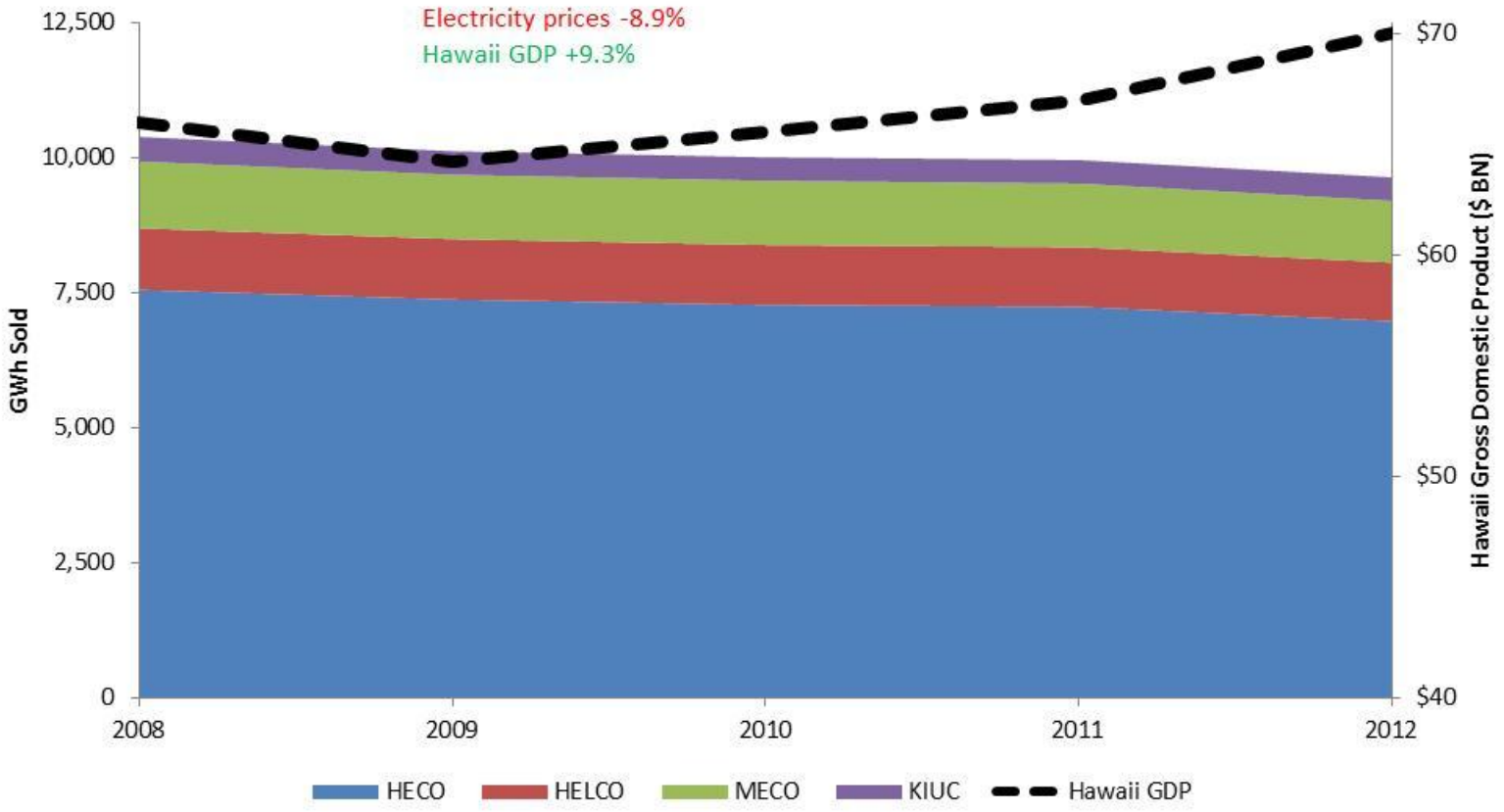
2011

- 15 Kauai schools get solar PV systems
- Navy invests $2.2M solar thermal at Pearl Harbor, Hickam
- State DPS invests $25.5 million in retrofits
- UH Community College system plans $32.8 million EE investment

2012

- Castle Med completes $2.3M EE upgrades
- Aiea H.S. installs solar PVs
- Honolulu Museum of Art $1.5M EE
- Hawaii Energy, Forest City launch Energy Smart Initiative

"Electricity Sales, 2008-2012
We're Getting Results"



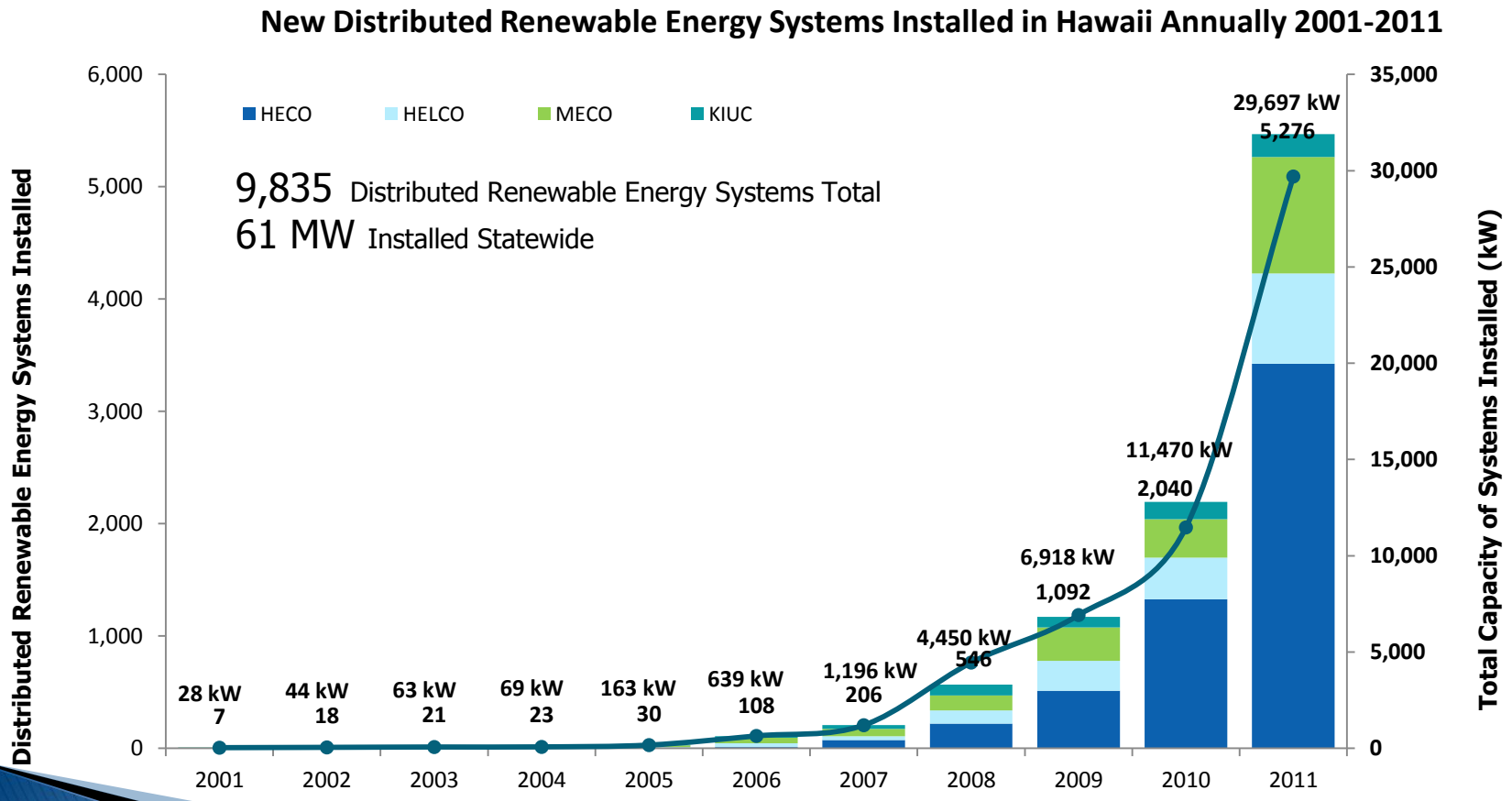
Sources: DBEDT, Monthly Energy Trends, March 2013; Sources: Renewable Portfolio Standards Status Reports , HECO (2008-2011), 2011 Renewable Portfolio Standards Status Report, KIUC (Includes past data. Retrieved from the Hawaii Public Utilities Commission: http://dms.puc.hawaii.gov).

"The Private Sector is Responding"

Distributed Renewable Energy Systems

Solar-related construction expenditures reached nearly 26% in 2012

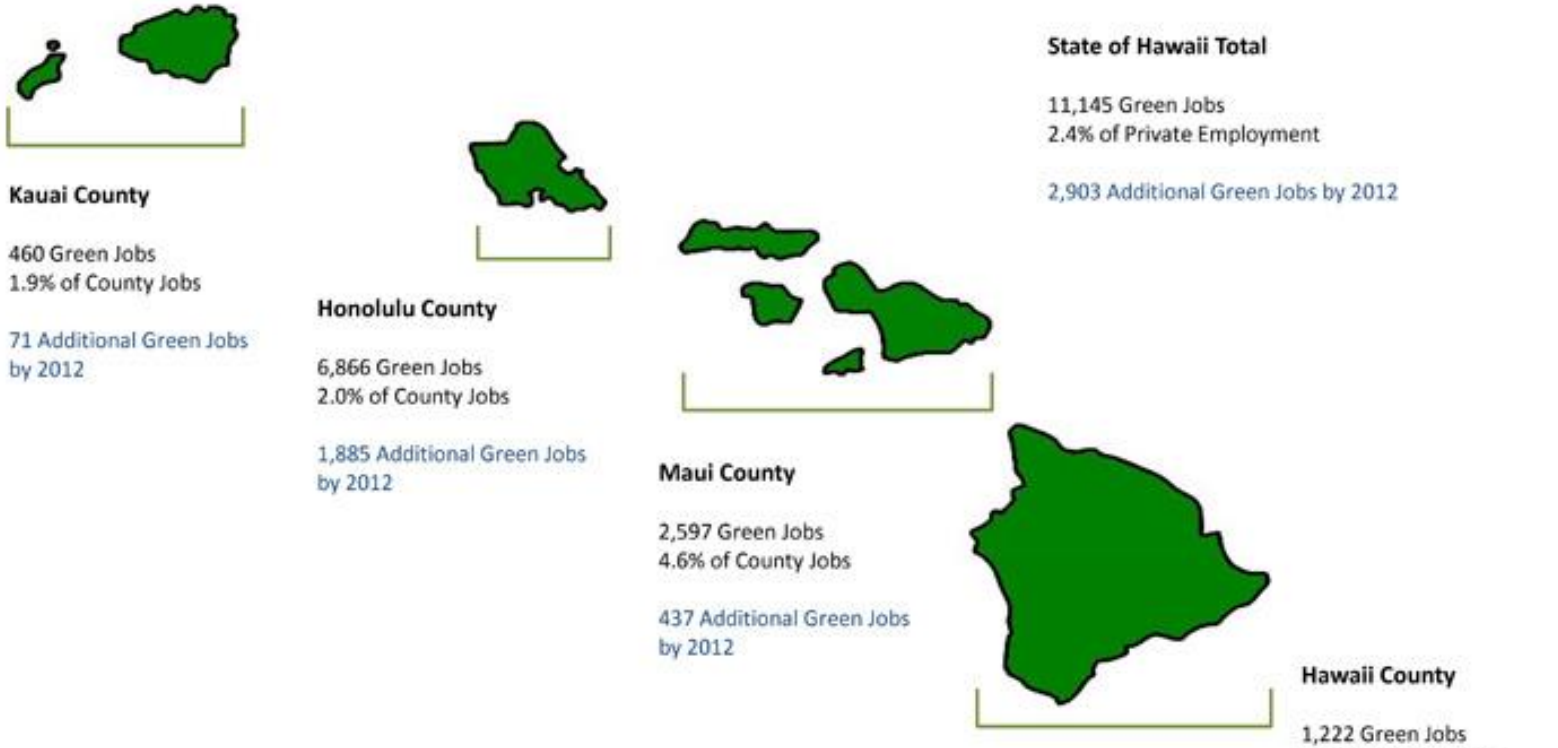
As of 2011, over 9,000 distributed renewable energy systems have been installed statewide, totaling over 58 MW in capacity.



Source: *Net Energy Metering Status Reports*, 2011 (Public Utilities Commission)

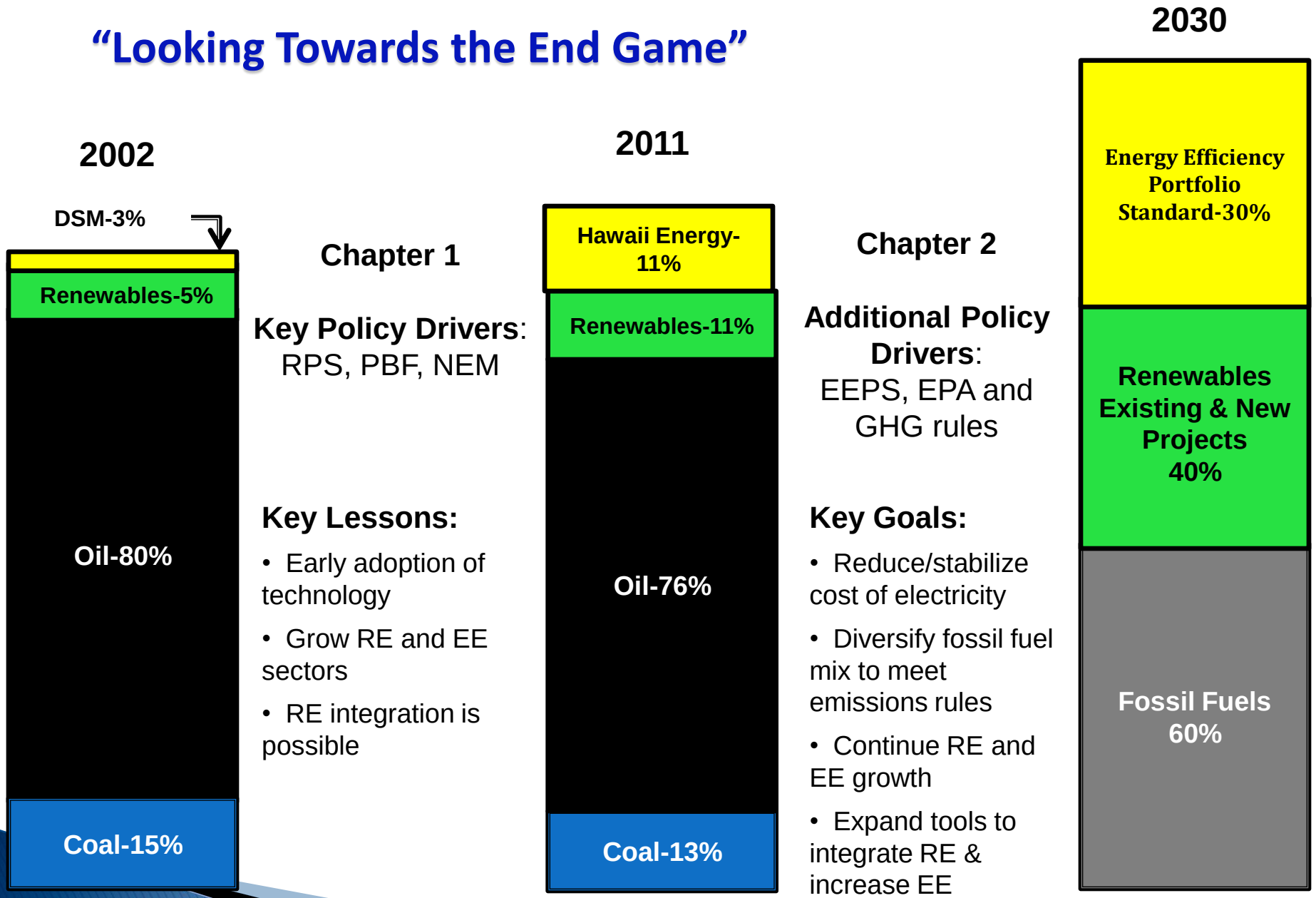
“We’re Seeing Economic Benefits”

Hawaii created over 14,000 green jobs in 2012.



Source: *Hawaii’s Green Workforce: A Baseline Assessment*, December 2010 (Department of Labor and Industrial Relations)

"Looking Towards the End Game"



Chapter 1

Key Policy Drivers:
RPS, PBF, NEM

Key Lessons:

- Early adoption of technology
- Grow RE and EE sectors
- RE integration is possible

Chapter 2

Additional Policy Drivers:
EEPS, EPA and GHG rules

Key Goals:

- Reduce/stabilize cost of electricity
- Diversify fossil fuel mix to meet emissions rules
- Continue RE and EE growth
- Expand tools to integrate RE & increase EE

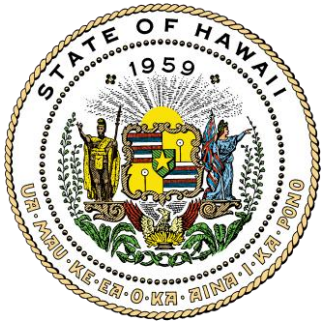
"*Next Steps for the Test Bed - Innovation and Proof of Concept Centers*"

- **PICHTR has established Hawaii's first clean energy accelerator program.**
- **DBEDT is establishing the Hawaii Growth Venture - with an energy focus.**
- **A next step are proof of concept centers for rapid development of clean technology innovations.**

“Clean Energy Can Transform Hawaii’s Economy”

- Together we can position Hawaii as the world’s leading test bed for clean energy innovation and deployment.

“Let’s Work Together”



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