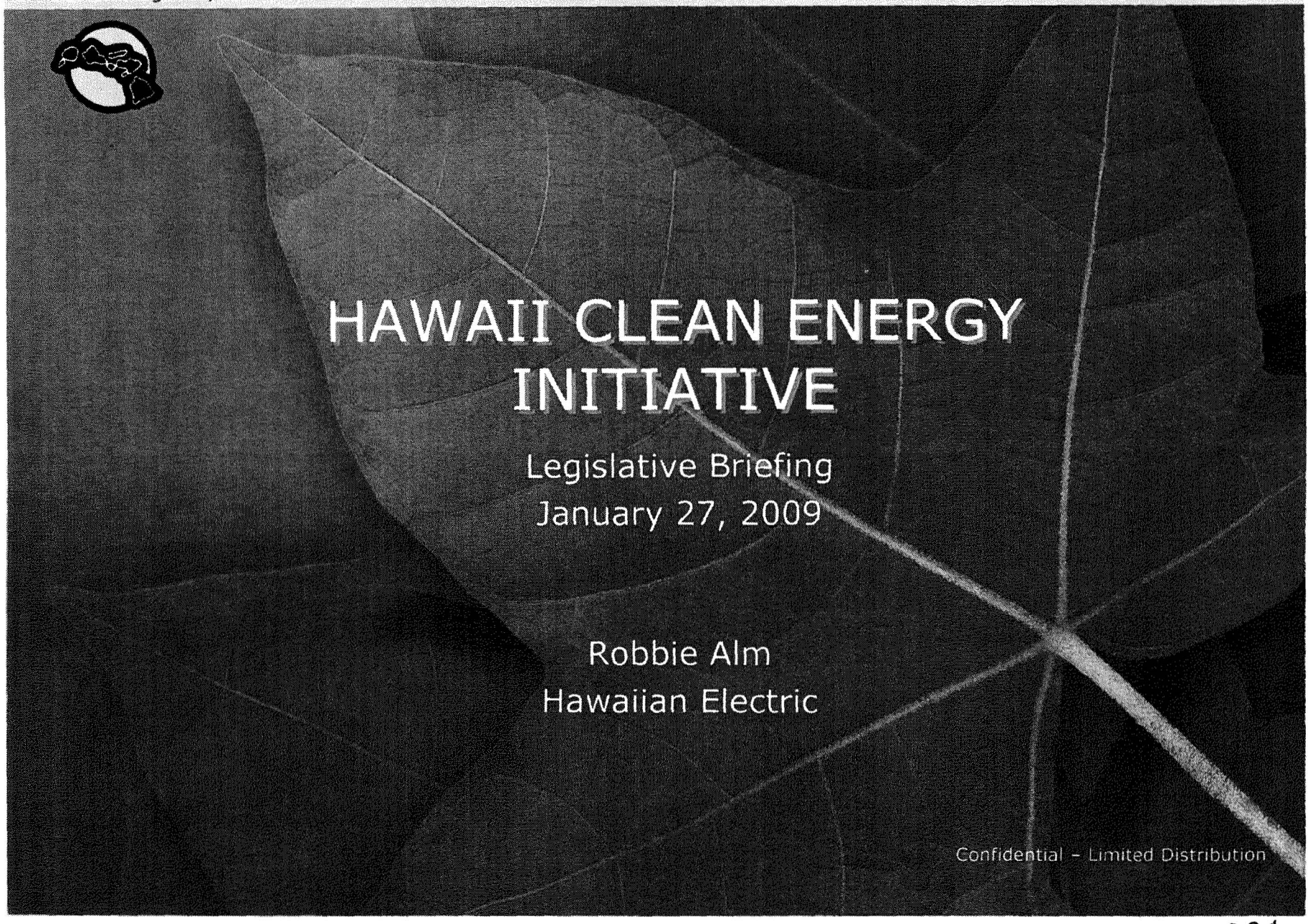
Hawaiian Electric Company, Inc.
Maui Electric Company, Ltd.
Hawaii Electric Light Co., Inc.



HAWAII CLEAN ENERGY INITIATIVE

Legislative Briefing
January 27, 2009

Robbie Alm
Hawaiian Electric

The October 20th Agreement

- Covers those items that can be resolved in the regulatory context
- In two areas, legislative action is recommended:
  1. Renewable Portfolio Standards
  2. Energy Efficiency Portfolio Standards
- The hope was that an advanced "settlement agreement" between the Department of Business Economic Development and Tourism, the Consumer Advocate and Hawaiian Electric could accelerate Hawaii's move to renewable energy in the regulatory context.
- There remain substantial areas that only the legislature can work on, where the regulatory system cannot act or is not empowered to act.

Key Areas of the Agreement Renewable Generation

- Big Wind and the Implementation Studies
- Pending Renewable Projects
- Solar energy
- Biofuels
- No new fossil fuel plants/retirements
- Feed-in tariffs
- Net energy metering
- Utility firming responsibility

Key Areas of the Agreement Customers and the New Electrical System

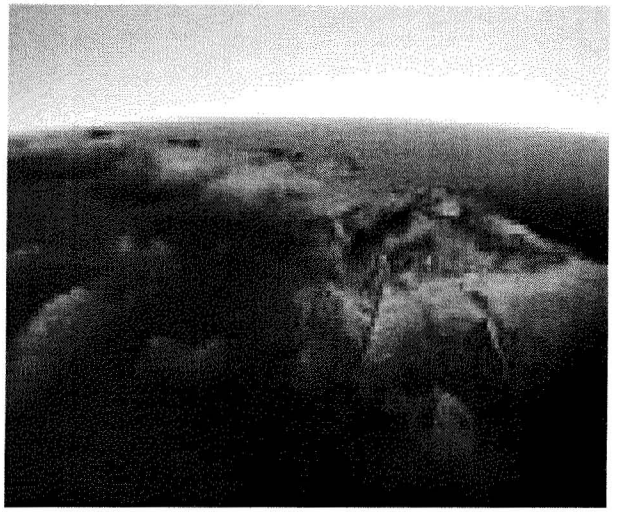
- AMI and Pricing Programs
- The Smart Grid
- Public Benefit Fund for energy efficiency programs
- Support for the basic infrastructure
- Expanded load management programs
- Clean Energy Scenario Planning
- Lifeline Rates
- Pay-As-You-Save type programs

Key Areas of the Agreement Changing the Utility Financial Model

- Decoupling revenues from sales
- The Clean Energy Infrastructure program
- The Cost Adjustment Clause
- Imputed debt resolution
- Feed-in tariff contracts

THE HAWAIIAN ELECTRIC COMPANIES

The Hawaiian Electric Companies understand that our mission is to deliver reliable power to our customers, clean and sourced to greatest extent possible in Hawaii, with a mandate to lower the cost burdens on our customers.



Hawaii Clean Energy Initiative

Context and Background

Bill Parks, DOE

January 27, 2009

HCEI and the Federal Energy Perspective on Hawaii

US Dept of Energy

- 30,000 employees
- 100,000's of contractors
- $24 billion annual budget
- 17 national laboratories

- Mission: **The Department of Energy's** overarching mission is to advance the national, economic, and energy security of the United States; to promote scientific and technological innovation in support of that mission; and to ensure the environmental cleanup of the national nuclear weapons complex.

- Number of employees in Hawaii:1 (temporary duty)

The Obama-Biden comprehensive New Energy for America plan will:

- Help create five million new jobs by strategically investing $150 billion over the next ten years to catalyze private efforts to build a clean energy future.
- Within 10 years save more oil than we currently import from the Middle East and Venezuela combined.
- Put 1 million Plug-In Hybrid cars -- cars that can get up to 150 miles per gallon -- on the road by 2015, cars that we will work to make sure are built here in America.
- Ensure 10 percent of our electricity comes from renewable sources by 2012, and 25 percent by 2025.
- Implement an economy-wide cap-and-trade program to reduce greenhouse gas emissions 80 percent by 2050.

William Parks-Background

- Graduate school on an Energy fellowship
- 11 years in industry, 3 in a new technology business venture
- 19 years DOE, budget authority for over $3 billion in energy investments
- Worked in renewable energy, EE, electricity, bioenergy, hydrogen technology development and policy
- Started programs in electricity, hydrogen, distributed generation, transmission, CHP, bioenergy
- DOE principal representative to EU, states, regions, industry
- 2006-2008 Hawaii Liaison

My colleagues

- Mary Werner – National Renewable Energy Laboratory
  - Energy Efficiency
  - Systems Integration

- Ralph Braccio – Booz Allen Hamilton
  - Financial Analyst
  - Strategic Planner

DOE Activities in Hawaii

- 1970-90's early demonstrations in ocean thermal energy conversion (OTEC), biogasifer, wind, solar systems with marginal impacts
- Annual State energy project grants to DBEDT
- 2004 Gateway Center
  - Energy summit at NELHA
  - HNEI projects including HELCO grid modeling and hydrogen
- **2006 legislation foundation for change and enabled my assignment to Hawaii**

Why is HCEI needed?

1. Oil provides ~85% of the state's energy, leaving Hawaii vulnerable to supply disruptions and in need of diversification to **enhance its energy security**

   - Alaska North Slope oil, the basis for the design of our refineries, is no longer available; more than 96% of petroleum in Hawaii comes from **foreign sources**

2. Hawaii pays the **highest electricity costs** in the nation and among the highest transportation fuel costs—shipping billions of dollars out of the state each year

3. **Climate change mitigation** and environmental protection

Dependence on foreign oil = dependence on foreign political instability

- October 16, 2007 -- **$87.61/barrel**
  - **"Weak dollar** and **international tensions** (anxieties over northern Iraq, where there is potential for a Turkish strike on Kurdish separatists)"
  - **"Crude options expire tomorrow** and the market was thought to be heading toward $90/bbl."
  - "The market, said OPEC, is **'very well supplied.'"**
- January 2, 2008 -- **$100/barrel**
  - "...a **weakening dollar**, the flow of money into commodities from faltering stocks and bonds, and **Nigerian and Kenyan political unrest**...and oncoming Winter storm, apprehension over tomorrow's DOE report"
- July 11, 2008 -- **$147.27/barrel**
  - "...market watchers pointed to concerns in regards to Nigerian production, the ongoing **tensions with Iran** and an **impending strike of Petrobras workers**. In addition, dollar weakness and an early exodus from equities into oil were also considered factors today."

What's the price of doing nothing?

- $3-5 Billion annually, $65-100 Billion by 2030, sent out of Hawaii for oil for electricity and ground transportation
- Increased vulnerability to disruption, in Hawaii and internationally
- High energy prices
- Volatility of prices, uncertainty for businesses on energy costs
- Dependence on others for solutions, products
- Leaving problems for the keiki

Hawaii Clean Energy Initiative is born – January 2008

- Signing of the HCEI Memorandum of Understanding between Governor Lingle and Asst. Secretary Karsner on behalf of the State and the DOE
- The goals are:
  - *Achieve a **70% clean energy economy** for Hawaii within a generation*
  - *Increase Hawaii's **security***
  - *Capture **economic benefits** of clean energy for all levels of society*
  - *Foster and demonstrate **innovation***
  - *Build the **workforce** of the future*
  - *Serve as a **model** for the US and the world*

HCEI Costs and Benefits

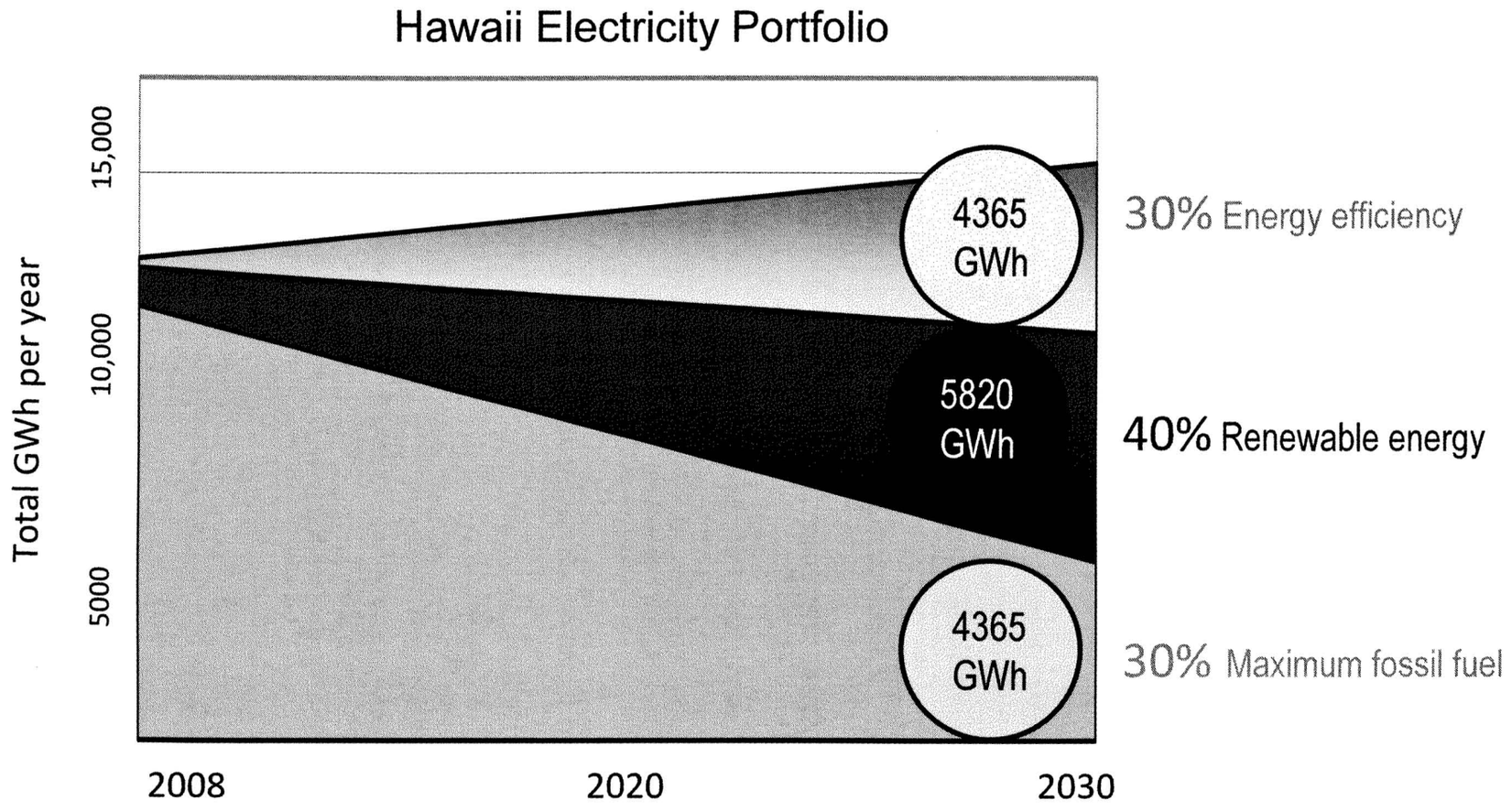
- COSTS
  - Initial estimates, around $16 billion by 2030
  - Change of behavior and personal decision making
  - Disruption of business as usual
  - Initially higher costs for longer term savings
- BENEFITS
  - Self reliance
  - Creating a healthier business and living environment
  - Reducing energy price volatility, disruption
  - Increased customer choice and conscious decision-making
  - More jobs and more money stays in Hawaii

HCEI - Major Thrusts

- Efficiency
- Electricity Generation
- Electricity Transmission and Distribution
- Transportation

- *Plus the integration of all of these into an interactive energy system*

We now know what it will take to reach 70% clean energy in 2030



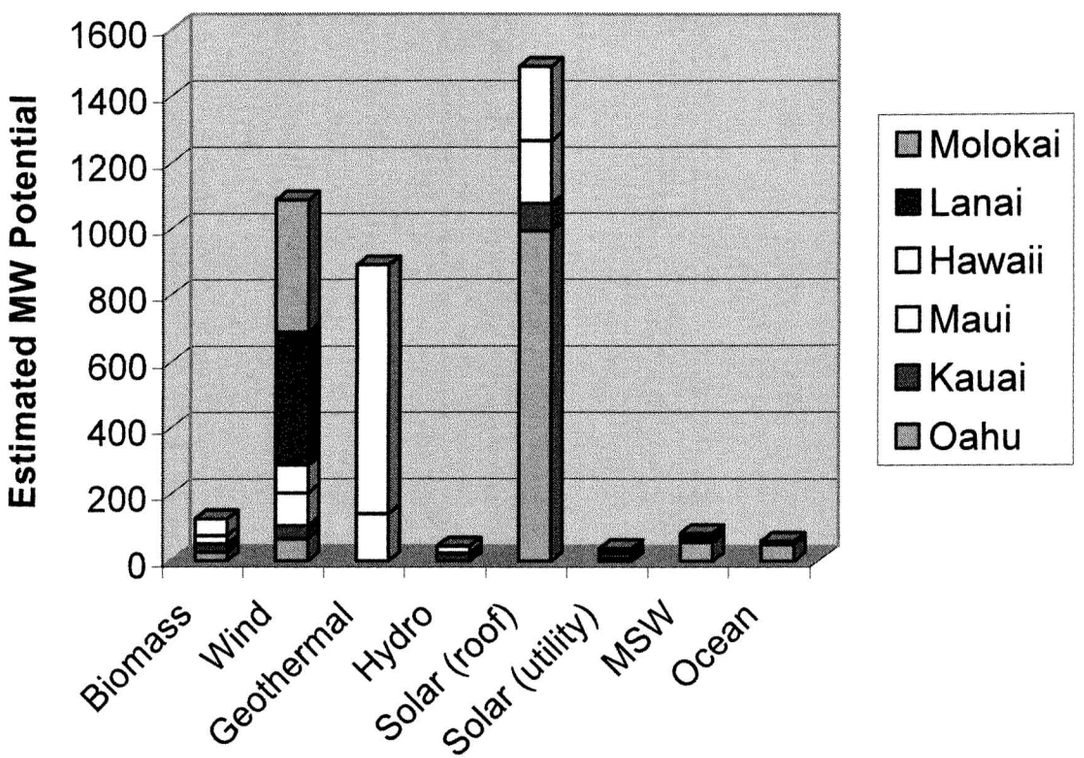
Note: This just reflects 2030 electricity targets; still need interim targets and transportation targets

Why Efficiency First?

- Lower cost than electric supply
  - Includes renewable substitution such as solar water heating, sea water air conditioning
- Lower total energy use means less need for generation and grid infrastructure—both renewable and fossil
- Demand response can improve the responsiveness of the system

Electricity Generation

- Hawaii has a wealth of renewable resources
- Technically feasible for 100% renewable potential across all the state
- Assumes access to land and resources as well as cultural acceptability
- Initial capital costs high, no fuel costs (except bioenergy)



http://hawaii.gov/dbedt/info/energy/

Electricity Generation: Market readiness of renewable technologies

- Wind, solar hot water, geothermal, biomass combustion - *commercially available*
- Solar photovoltaics (PV) - *commercially available* but expensive on a kWh basis; distributed PV with efficiency can be cost effective
- Wave, ocean thermal (OTEC), new storage and control devices, electric vehicles, microgrids - *initial demos*
- Bioenergy and biorefineries (best use of energy, water, land, food)
- PLUS smart grid and demand response technologies to integrate renewables effectively

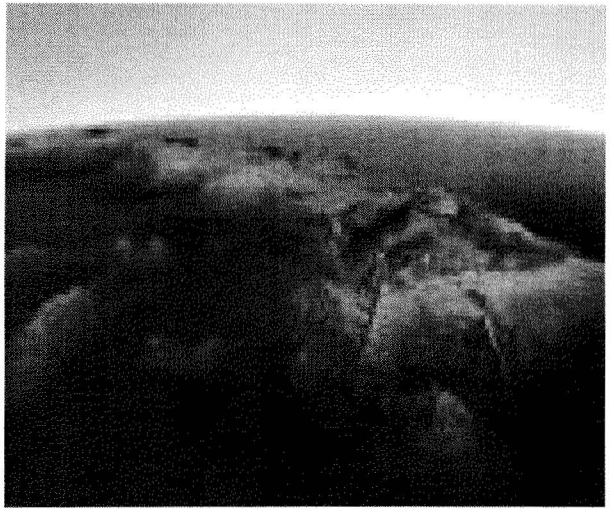
Transmission and Distribution

- Backbone to create a resilient, reliable grid
- Grid modeling of all the islands for maximizing reliability and performance
- Smart grid – a self-aware, responsive, interconnected system
  - Smart Meters + Time of Use rates
  - Electric Vehicle compatibility
- Demand response and distributed storage
- Inter-island cable
  - Load in Oahu + resources in outer islands
  - Basis for electric vehicles
  - Strengthen all interconnected grids

Transportation

- Biofuels
  - Bioenergy master plan
  - Integrated land, water, energy, food, consumer and cultural issues

- Electric vehicles
  - Create a market friendly to initial fleet penetration
  - Create incentives for early adopters



Hawaii Clean Energy Initiative

Analysis to Assist Working Groups & Policymakers

Ralph Braccio, Booz Allen Hamilton

January 27, 2009

An introduction to Booz Allen and the project team leader

Booz | Allen | Hamilton

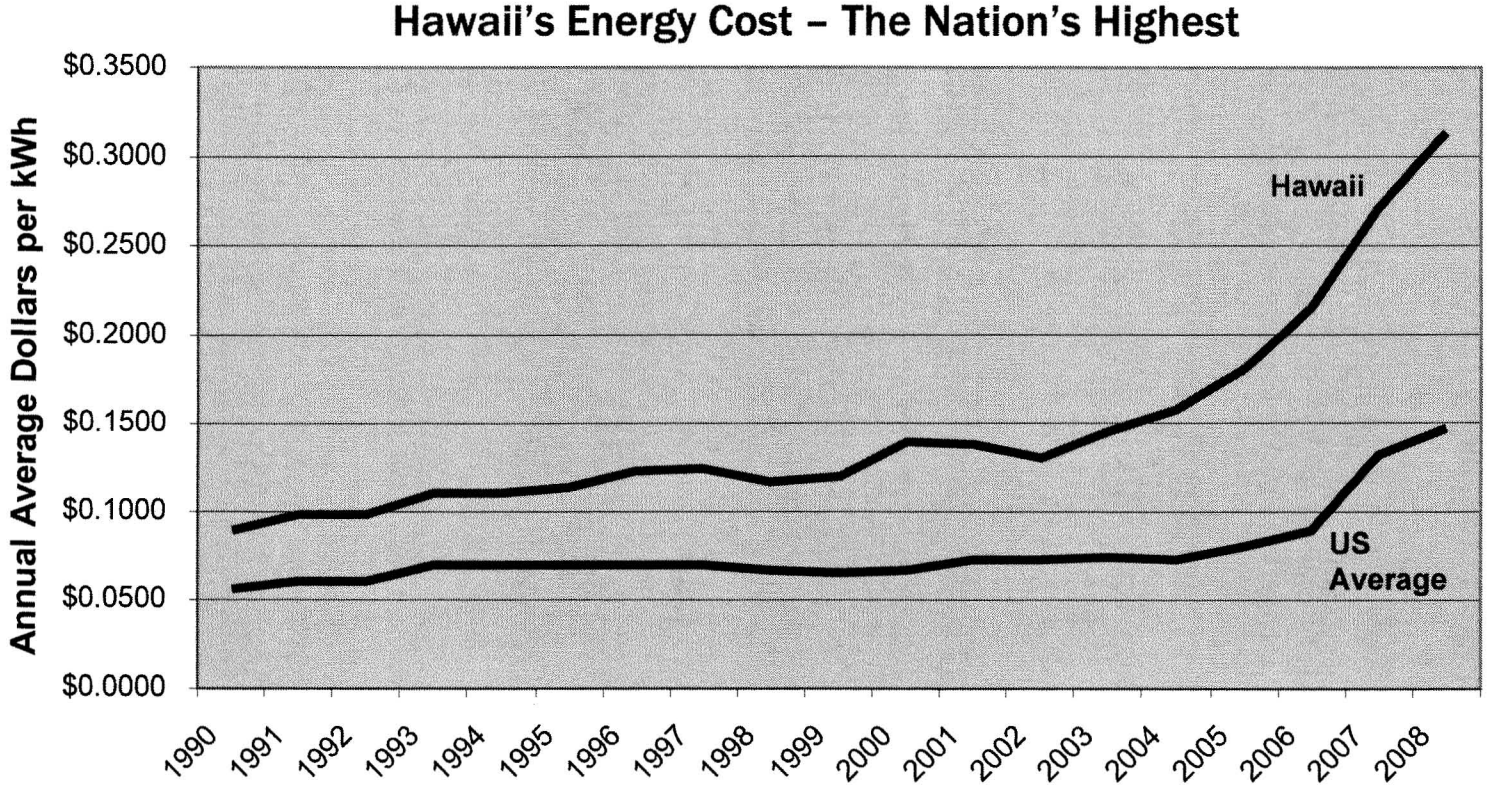
- Booz Allen Hamilton has been at the forefront of strategy and technology consulting for 95 years. Providing a broad range of services in strategy, operations, organization and change, information technology, systems engineering, and program management, Booz Allen is committed to delivering results that endure
- Headquartered in McLean, Virginia, with offices in Hawaii, Booz Allen has 20,000 employees and generates annual revenue of over $4 billion

RALPH BRACCIO

- Over 20 years experience in energy & environmental consulting with a focus on technology commercialization and project financial feasibility
- Has led projects involved in State and regional energy planning internationally as well as in the U.S.
- Clients include U.S. Federal government and private sector firms
- Education: Chemical Engineering and Public Policy Analysis, at MIT

Contents

Over 90% of Hawaii's energy comes from oil, and this dependence results in electricity rates higher than the national average for the past 18 years



Hawaii residents pay roughly twice the national average for electricity

Sources: State of Hawaii - DBEDT, 2006 - 2008; USEIA 2006 - 2008

A better measure of cost is to examine the impact on residents of Hawaii

FACTS:

- In 2008, an estimated 41 million barrels of oil were imported into the State *(lower than prior years)*
- The global average price of oil in 2008 was $100 per barrel *(higher than prior years)*
- Approximately 2/3 of every barrel of oil imported into Hawaii goes to the generation of electricity and for ground transportation (e.g., gasoline)
- The 1.3 million residents of Hawaii shoulder this cost of energy

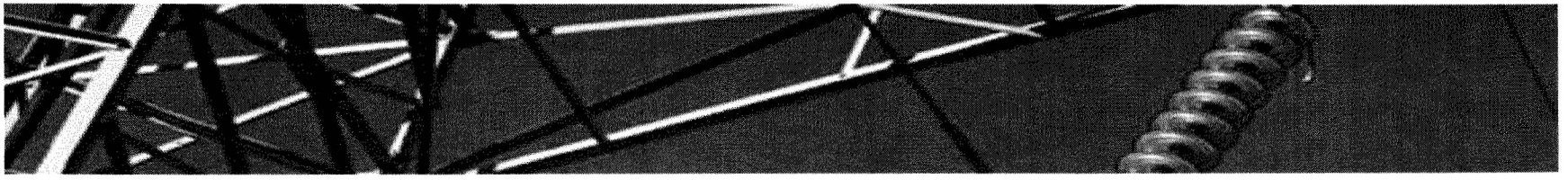
THUS, IN 2008, IN HAWAII, EVERY MAN, WOMAN, AND CHILD "EXPORTED" $2,100 FOR ENERGY (EXCLUDING AVIATION FUEL)

What will the cost/export be in 2009? 2010? 2030?

Sources: State of Hawaii - DBEDT, 2008

This historical oil dependence has affected the mix of assets, the business models of energy supply companies, and energy security

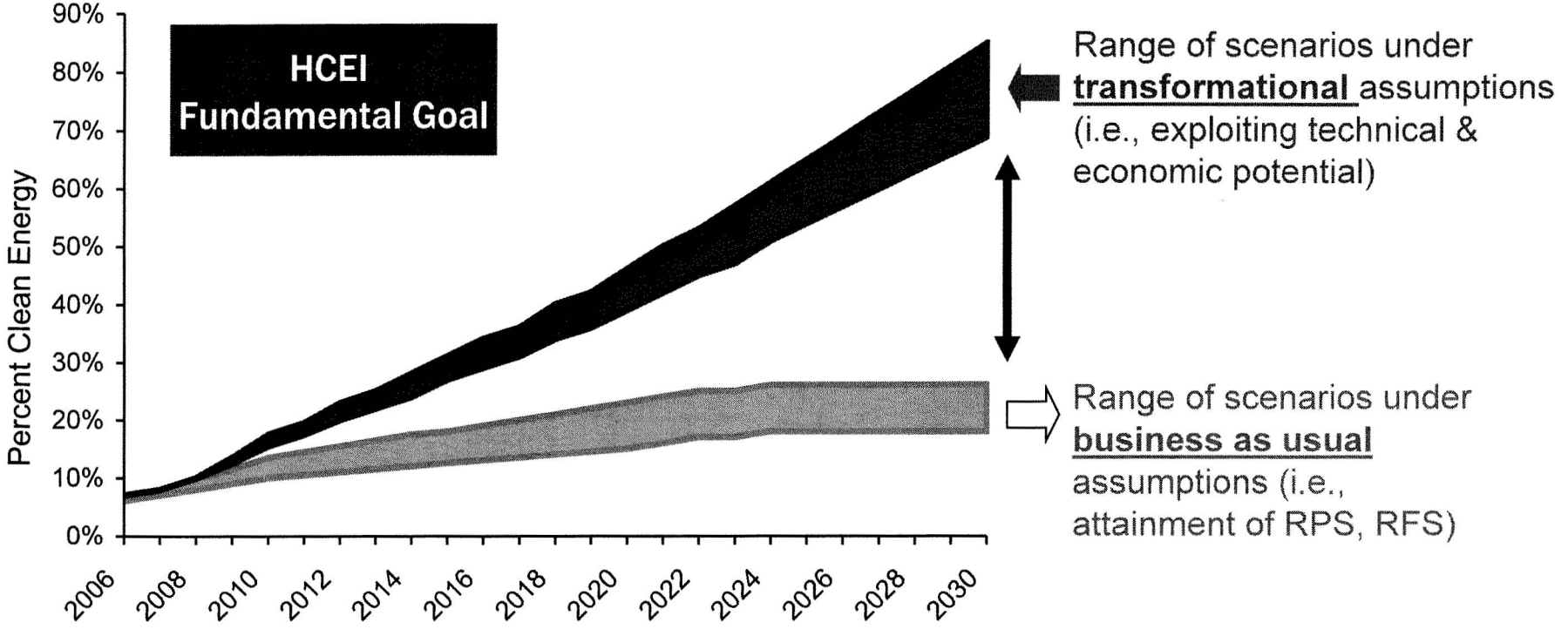
- Today's asset base was created on the assumption of cheap oil and secure oil supply
- In 1992, about 55% of Hawaii's oil was non-US imports, in 2006, it was 99%
- Grid transmission & distribution was fitted to serve generation assets/technology
- Utilities have limited incentives to buy renewable energy from independent power producers (IPPs), and IPPs are paid based largely on avoided cost; therefore the price of renewables is linked to oil
- Fuel costs are passed on to consumers/ratepayers—utilities have no incentive to diversify their generation portfolio
- Hawaii's grid was built on the assumption of consistent, non-variable generation sources, with power plant capacity that could be actively adjusted to meet load needs
- The islands are independent micro grids, ranging from 75 to 1,800 MW of capacity



In that context, HCEI represents a leap forward from current RPS standards

- The goal of HCEI is to engage all stakeholders in Hawaii in creating a path to a sustainable, flexible, and vibrant State economy that by 2030 is based on clean energy resources for *70% or more of its energy needs,*
- And to serve as an integrated clean energy model for the United States and communities globally

Where we are today: Hawaii needs to transition from an economy powered by oil to one based on clean energy…

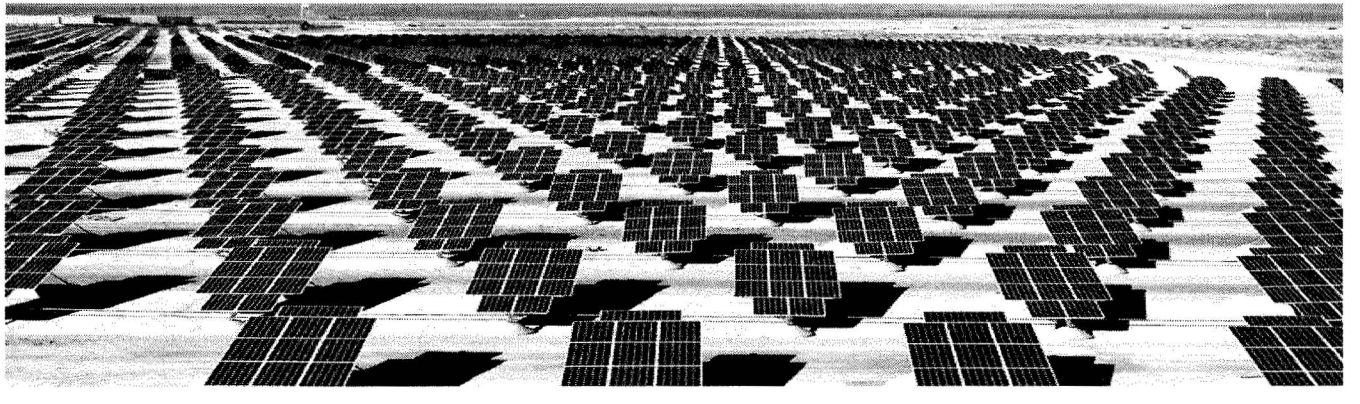


…doing so will require a substantive transformation of regulatory, financial, and institutional systems

Contents

Booz Allen was asked to assess what technical components would be important in reaching 70% clean energy in Hawaii

- Given the resource potential, what is achievable and what would be a stretch?
- Can we reach the goal with one type of technology? Will we need a suite of actions?
- PURPOSE: Understanding the need for future technology deployment will help determine what regulatory and financial rules should be changed to create incentives for investment



The analytic process balanced potential supply and future use of clean energy

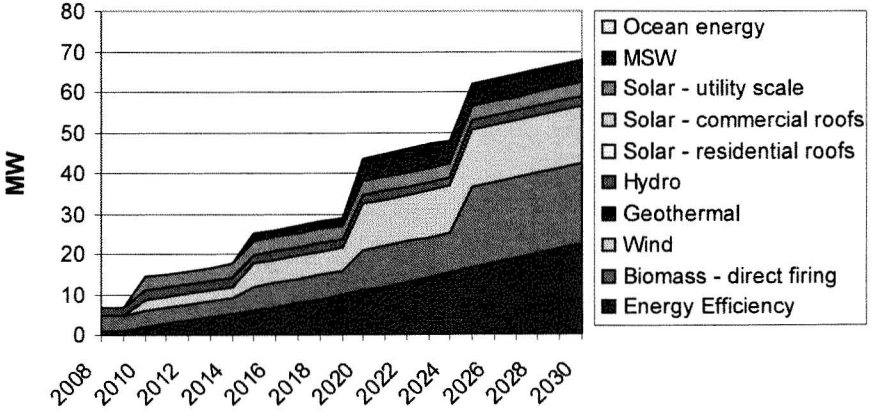
- **Analysis Step 1 – Evaluate the resource potential for each island based on studies by Hawaii institutions**
- **Analysis Step 2 – Design a model to explore the inter-dependence of energy efficiency, electric generation, energy delivery, and transportation**
  - Not to focus solely on supply, but to look at energy efficiency to reduce demand and to move from using liquid fuels to using electricity for transportation, for example
  - This level of modeling is to inform policymakers; it doesn't incorporate integrated resource modeling or grid modeling (being done elsewhere) at a more detailed level

The analytic process (continued)

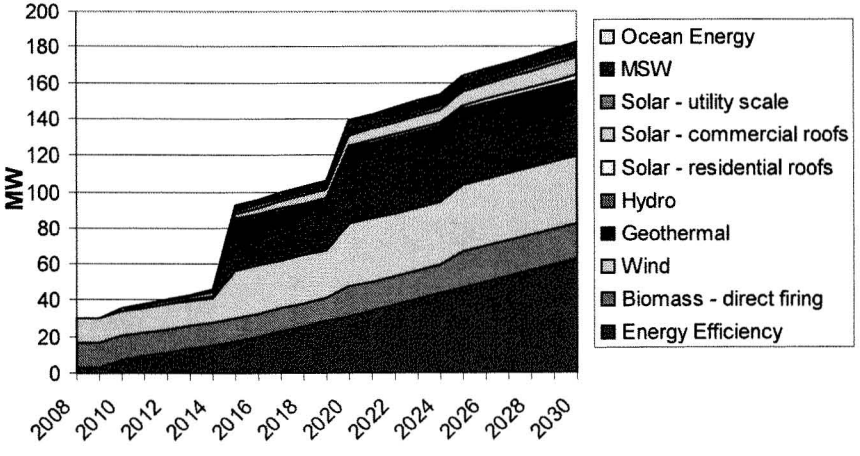
- **Analysis Step 3 – Distinguish the impacts among available policy levers**
  - Look at multiple scenarios based on potential policy choices—e.g., high penetration of electric vehicles, inter-island cable
  - We did not base this on advanced technologies but on technologies deployable today or in the near future; also our focus was on indigenous resources
- ***Again, the purpose of the analysis is not to create a prediction but to understand, in broad terms, the technical components and policy decisions***

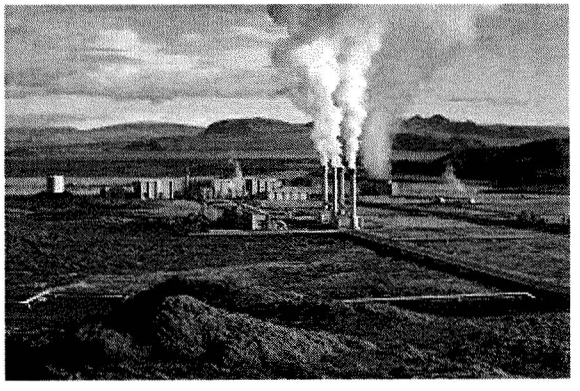
Analysis Step 4 – Identify potential deployment of economically viable renewable energy on each island

Kauai



Maui





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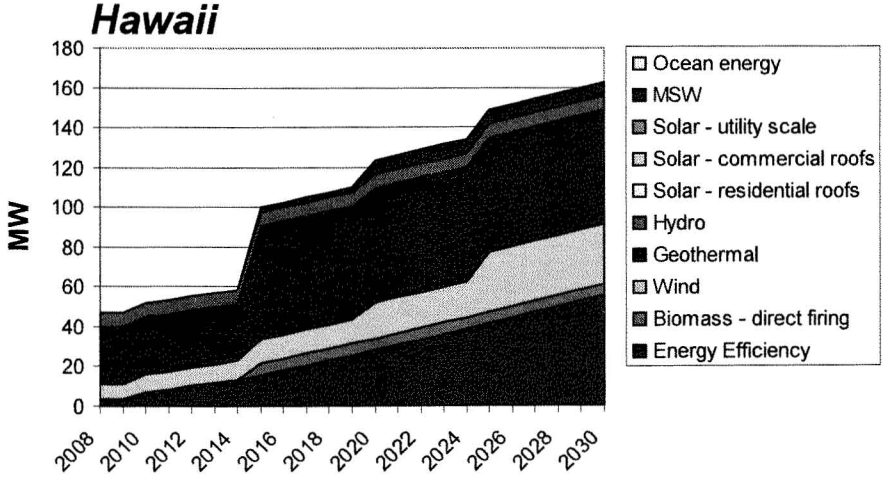
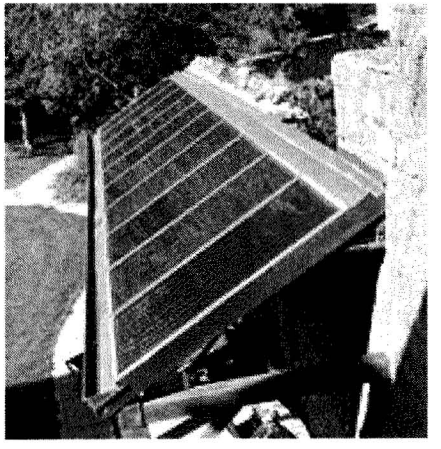
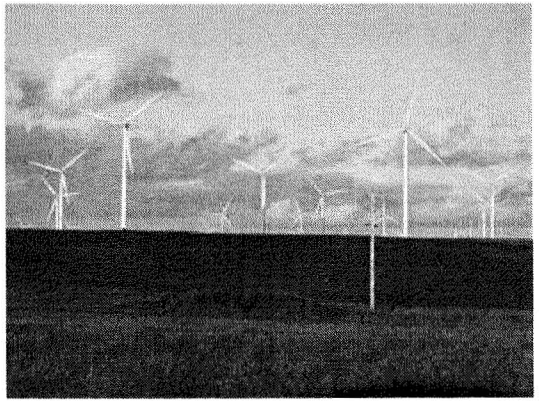
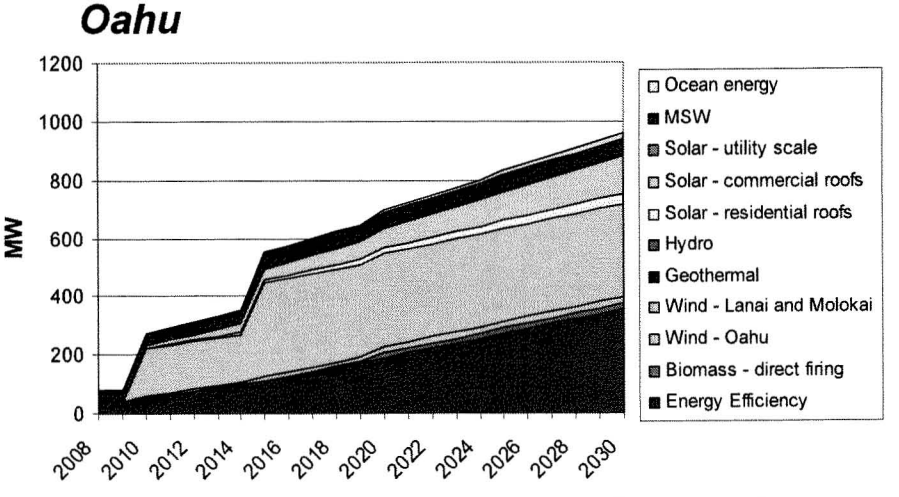
Analysis Step 4 – Identify potential deployment of economically viable renewable energy on each island (continued)

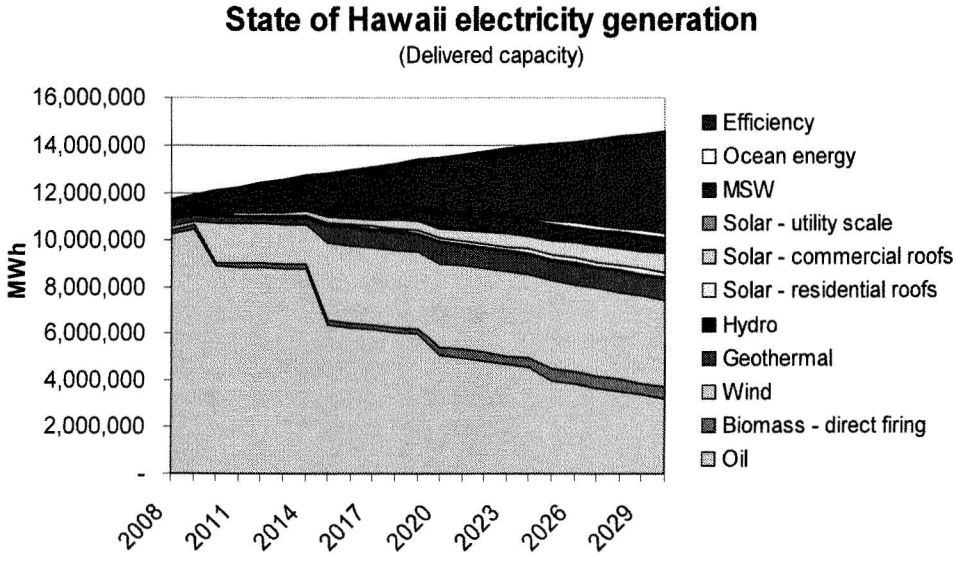


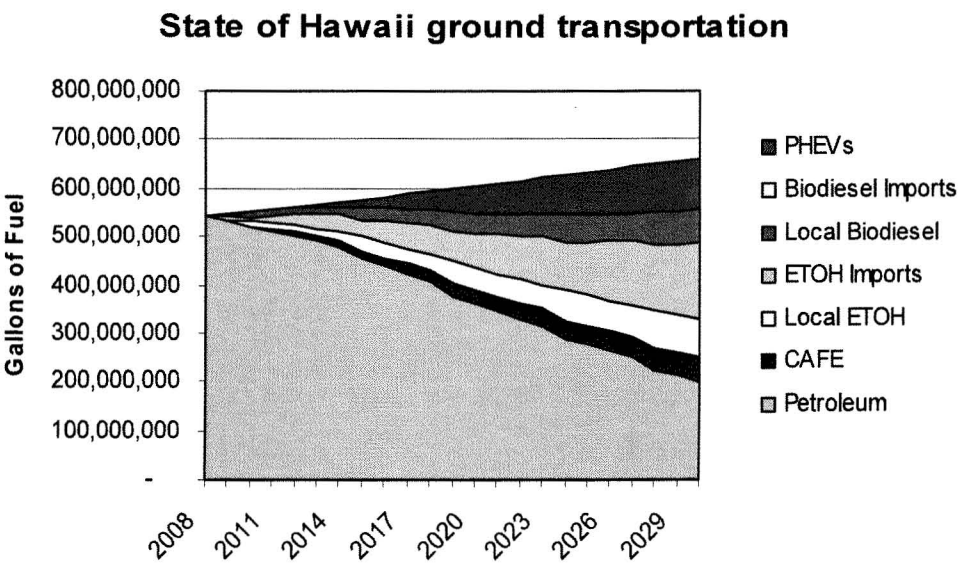






Analysis Step 5 – Roll up information to the state level to inform Hawaii working groups and leaders on policies and tradeoffs



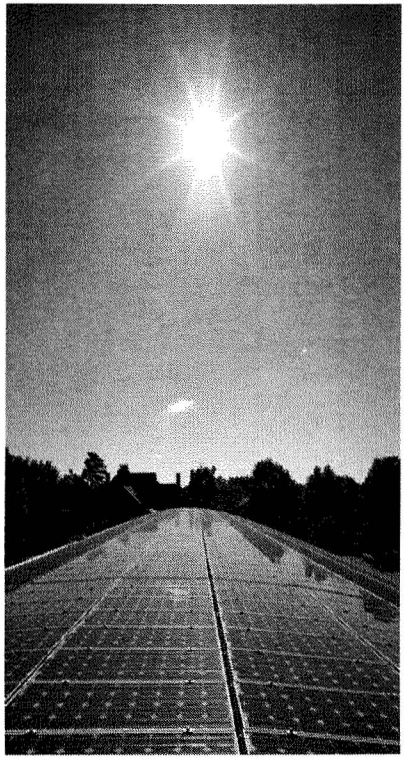


Summary of 2030 Electricity Results	
Clean energy achieved	*70%*
Oil reduction (million bbl/yr)	*17.3*
CO2 avoided (million ton/yr)	*8.8*

Summary of 2030 Transportation Results	
Clean energy achieved w/o imports	*45%*
Oil reduction (million bbl/yr)	*7.9*
CO2 avoided (million ton/yr)	*2.7*

Results – Achieving 70% clean energy in Hawaii is possible, but will require aggressive action in a number of areas

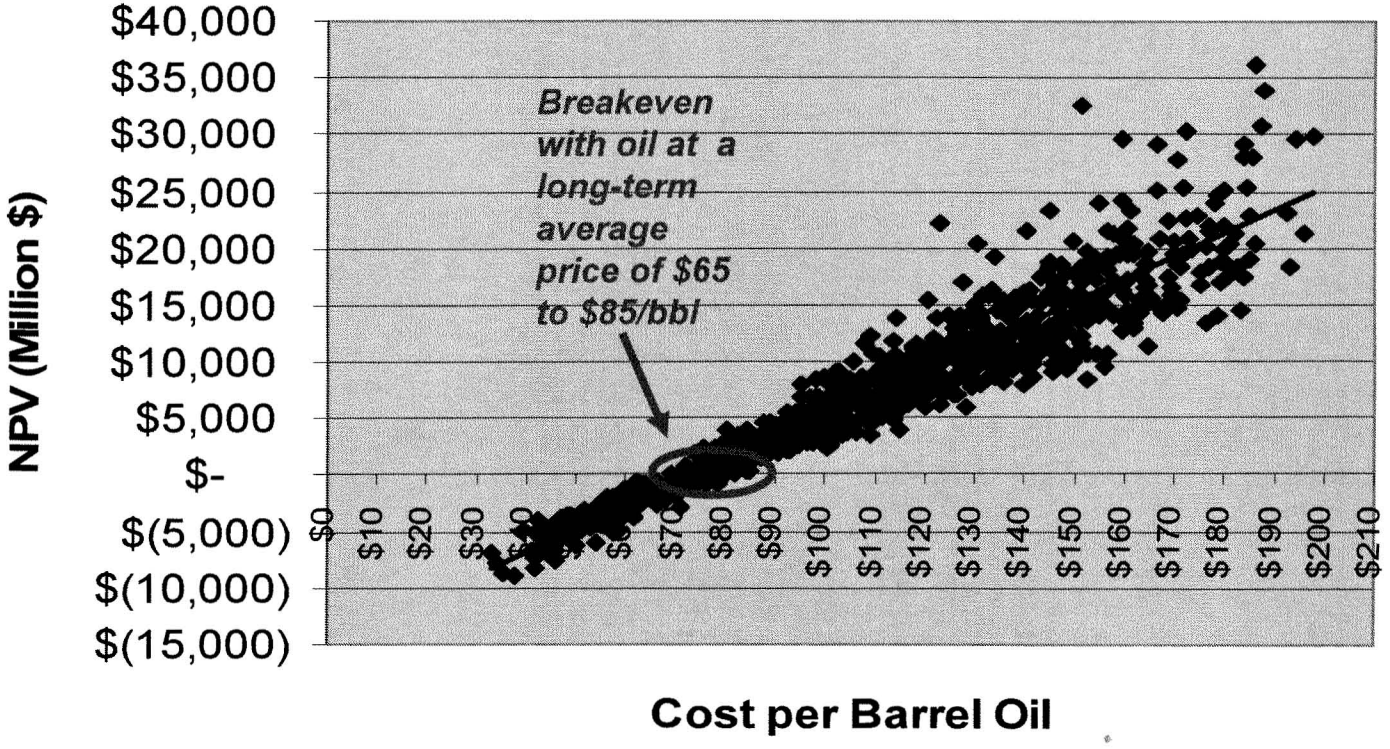
- **Renewable resources**: All types of electricity generating technologies need to be deployed to reach 70% (geothermal, hydropower, biomass, wind, solar, etc.)
- **Efficiency**: Aggressive energy efficiency measures are critical to achieving the 70% clean energy goal
- **Inter-island cable**: The state cannot reach 70% clean energy for electricity and maintain high levels of clean energy for transportation unless there is a cable to Oahu from the outer islands; the cable explored in this analysis is a shallow cable to Oahu from Lanai and Molokai
- **Electric vehicles**: High levels of electric vehicles are needed if the transportation sector is to reach high clean energy goals



Contents

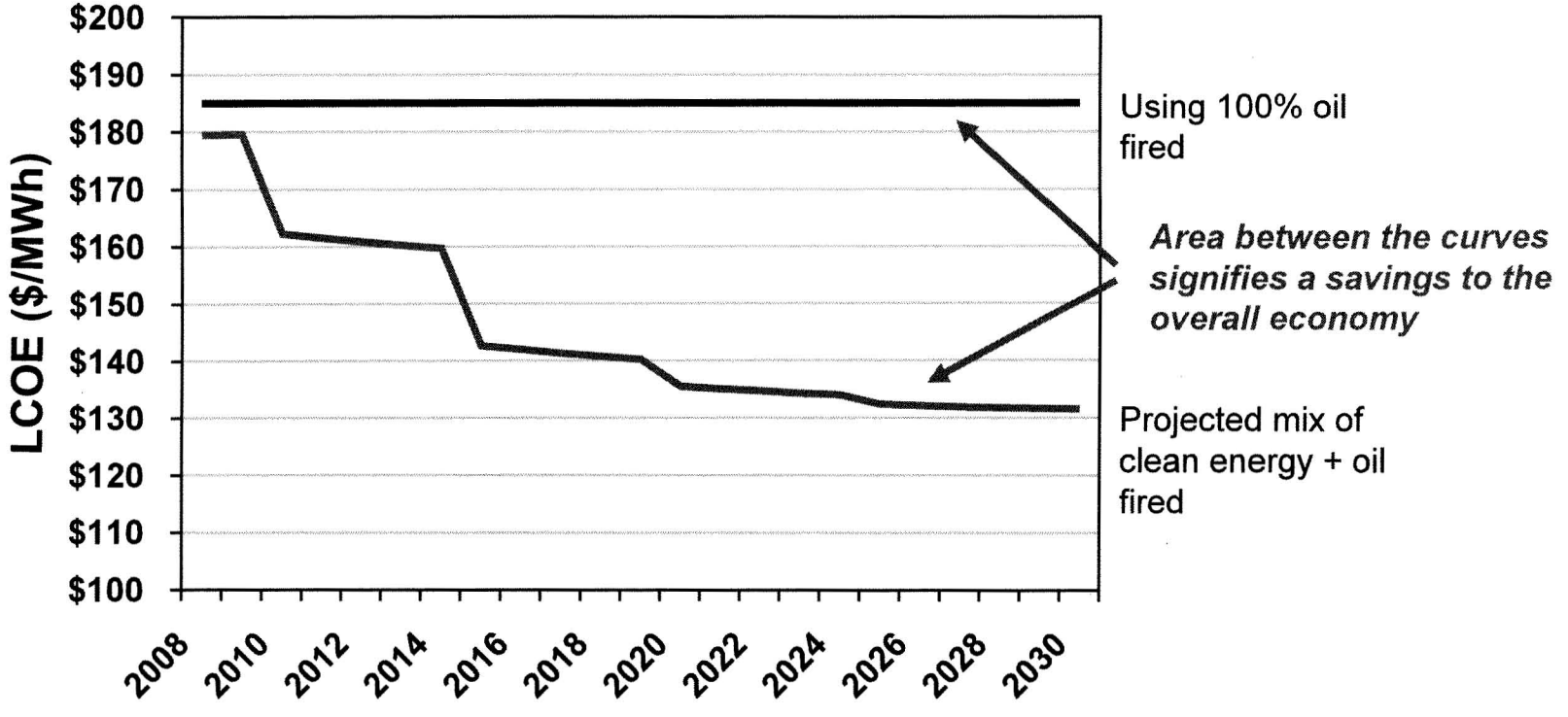
- Current Energy Situation in Hawaii
- Booz Allen's Analysis of Clean Energy Scenarios
- **Investment Costs, Benefits & Conclusions**

Long-term total investments are likely to approach $16 billion—But investment in clean energy will to lead to significant savings from oil avoided over time



For context, note that in 2008 Hawaii "exported" over $4 billion for crude oil

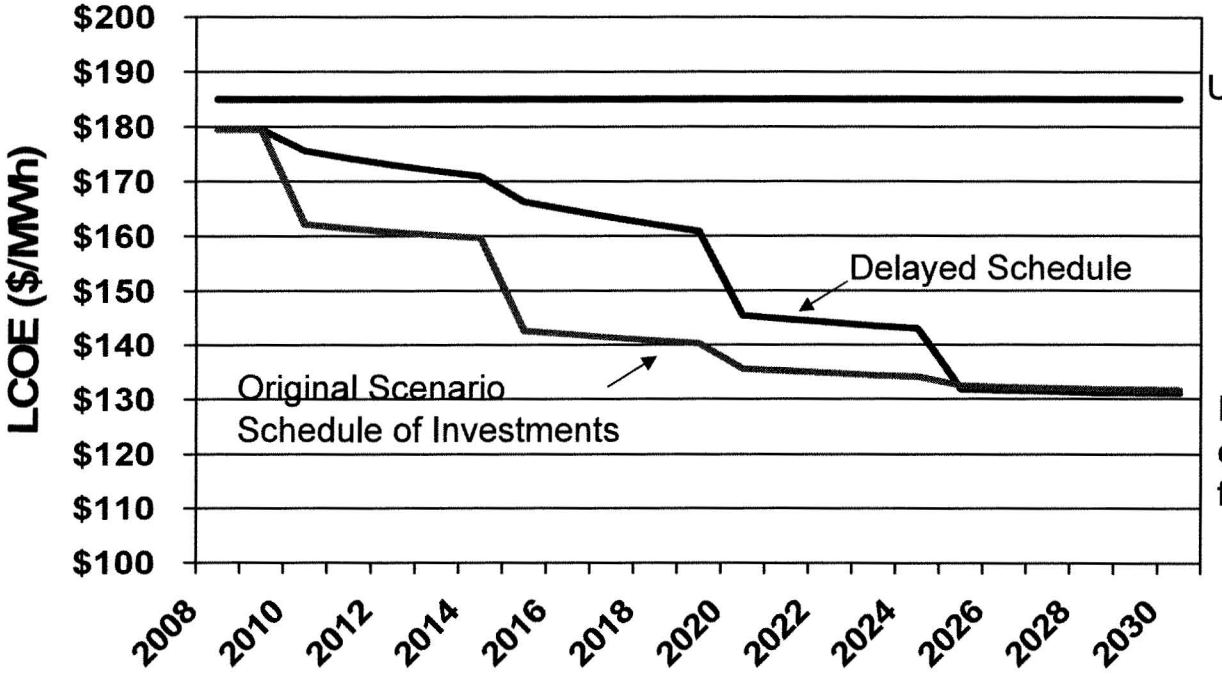
Example: Savings in the Levelized Cost of Electricity (LCOE) over time based on a long-term average price of oil of $100/barrel and one of the scenarios in the analysis



IMPORTANT: Retail electricity rates include other factors beyond LCOE

Figures in 2008 dollars
PV figures based on discount rate of 7%

Example: Early action is crucial—a ten year delay in the deployment of major clean energy systems impacts the savings to the overall economy



Note the area between the top two curves, the savings, is greatly reduced

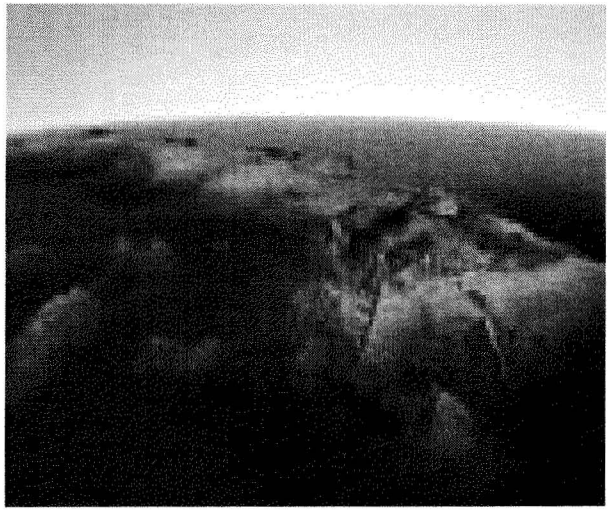
IMPORTANT: Retail electricity rates include other factors beyond LCOE

Figures in 2008 dollars
Crude oil assumed as $100/bbl long-term average
PV figures based on discount rate of 7%

Booz | Allen | Hamilton

More importantly, a clean energy future as envisioned by HCEI will create a ***broad suite of benefits*** for Hawaii

	Current oil-based situation	Future HCEI Clean Energy Scenario	Description/Comment
▸ Price Volatility "Index"	92%	37%	▸ Percent of generation tied to oil prices in the long term, including petroleum products, ethanol and biodiesel
▸ Percentage of Clean Energy consumed in State	7%	70%	▸ The current situation is 7% renewables, and the current RPS calls for 20%
▸ Trend in CO_2 emissions Statewide	▸ Flat with steady, high emissions	▸ Emissions decreasing rapidly over time	▸ With over 90% of energy based on fossil fuels, CO_2 reductions will be quite limited. Clean energy sources will dramatically reduce CO_2 emissions
▸ Potential for Energy Sector investment	▸ Low	▸ High	▸ Large investments will be needed for grid upgrades, energy efficiency, renewable energy supply, biofuel production, etc.
▸ Potential for new Job Creation	▸ None	▸ High	▸ While the number of new jobs may not be extraordinarily high, the quality of the jobs will be high



Hawaii Clean Energy Initiative

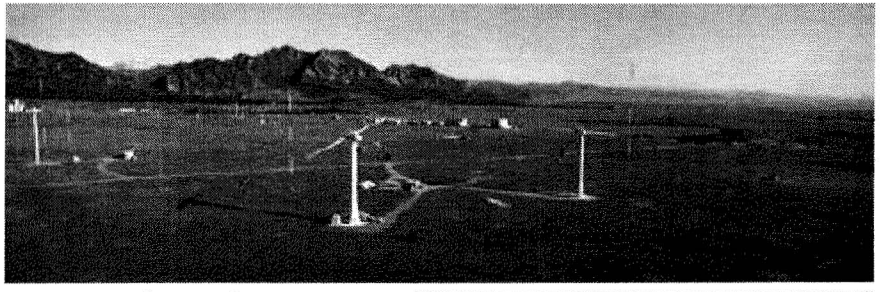
Mary Werner

January 27, 2009

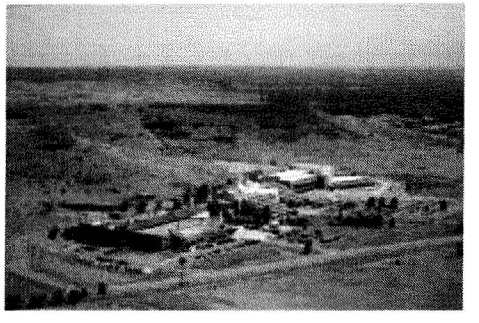
NREL at a Glance

Mission: ***Develop renewable energy and energy efficiency technologies and practices, advance related science and engineering, and transfer knowledge and innovations to address the nation's energy and environmental goals***

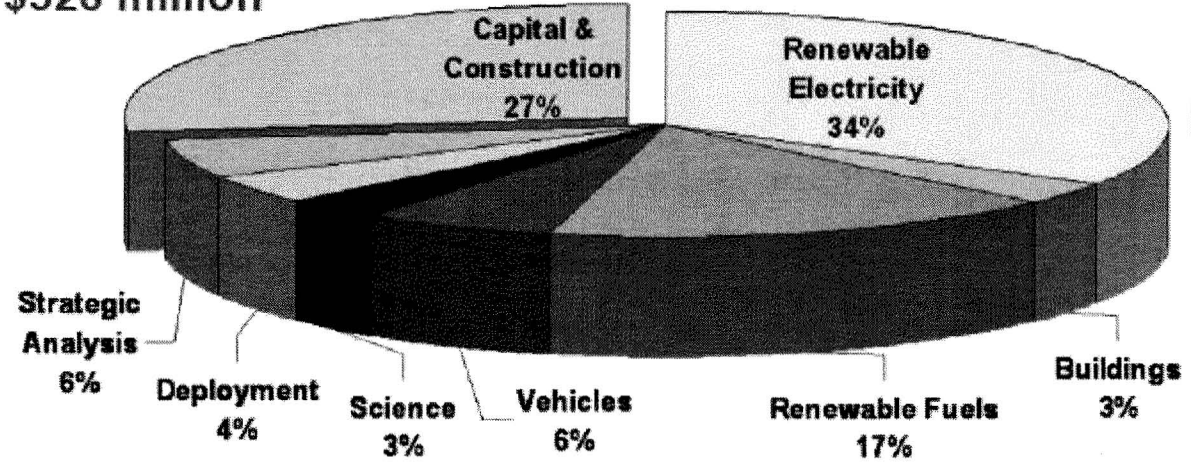
- Government Owned: DOE Office of Energy Efficiency and Renewable Energy
- M&O Contractor: Alliance for Sustainable Energy, LLC (Battelle & Midwest Research Institute)
- Two Primary Sites in Colorado
- ~1200 staff
- ~$328 million



National Wind Technology Center



South Table Mountain Campus



Mary Werner

- Bachelor of Science in Mechanical Engineering with a concentration in Solar Engineering
- MBA with emphasis in Executive Leadership
- 16 years experience in energy efficiency and renewable energy research, development, and deployment including project development and financing
- Worked for the Sacramento Municipal Utility District in advanced efficiency and renewable technologies
  - Led projects on stationary fuel cells, PV on homes, Geothermal Heat Pumps, and Electric Lawn Mower rebate program
- 14 years of experience working at the National Renewable Energy Laboratory:
  - Engineer and Project Facilitator for Federal EERE projects
  - Led development of innovative financing contracts and financing programs
  - Team Leader for Utility Program
  - Group Manager and Program Manager for the Federal Energy Management Program
  - Program Manager for the Buildings Technologies Program
  - Executive Manager for Integrated Deployment
- Established the Integrated Deployment corporate function at NREL to support projects focusing on a comprehensive and integrated deployment of EE and RE technologies

Integrated Deployment Projects

Rebuilding New Orleans

Rebuilding Greensburg, Kansas

DOE / DOD Initiative

National Science Foundation Polar Programs

Hawaii Clean Energy Initiative

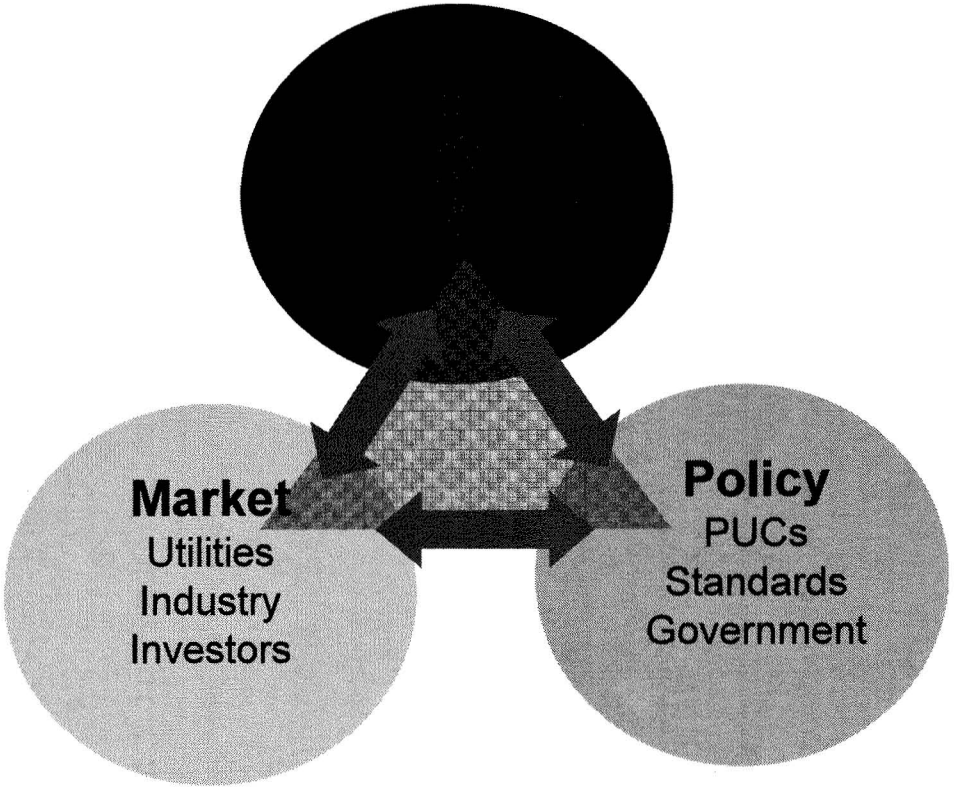
State of Alaska

Energy Development in Island Nations

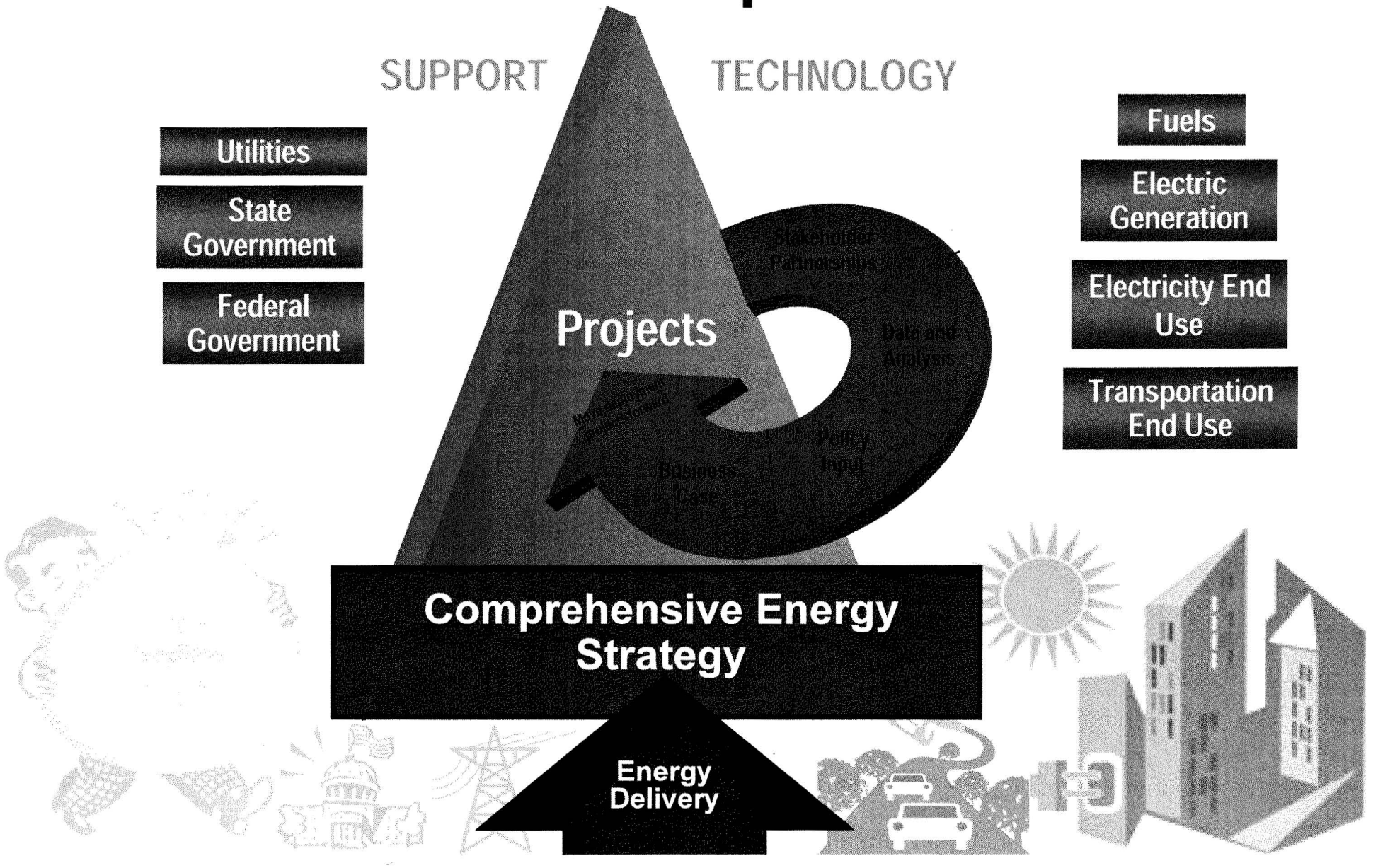

In addition to technology solutions, it takes many other pieces to achieve a comprehensive energy strategy:
Leadership
Drivers
Analysis
Policy Changes
Regulatory Changes
Examples
Tools
Financing
Partners
Commitment
A Vision
A Plan
Goals
National Renewable Energy Laboratory
Innovation for Our Energy Future

Integrated Deployment Implementation

What will it take to achieve success?



HCEI Success is Complex



Federal Role in HCEI

Provide Technical Support to:

- Address issues
- Reduce Barriers
- Identify solutions
- Analyze options
- Assess opportunities
- Build EERE market
- Increase technology adoption rate
- Improve efficiency
- Educate stakeholders

Federal commitment to HCEI is strong; but only as strong as the State commitment

The Federal Government cannot achieve the HCEI goals. DOE is not the decision maker, the policy maker, the financier, the business partner, or the utility.

DOE FY09 Critical Path Deliverables for HCEI

1. Analysis and Education to Promote Adoption of Aggressive Policy Package
2. Inter-island cable study
3. Risk assessment and analysis on Better Place proposal
4. Establish the business case for Hawaii Utilities
5. Develop an aggressive energy efficiency plan including financing and partners
6. Techno-economic analysis of grid integration on key islands
7. Develop Policy recommendations for fuels and vehicles
8. Establish a Multi-Year Implementation Plan with the State of Hawaii
9. HCEI Outreach Plan developed jointly with State
10. Establish a presence in Hawaii with a team of staff providing expertise and support.

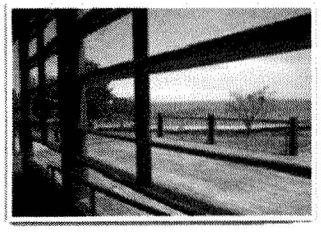
DOE HCEI Plan for FY09

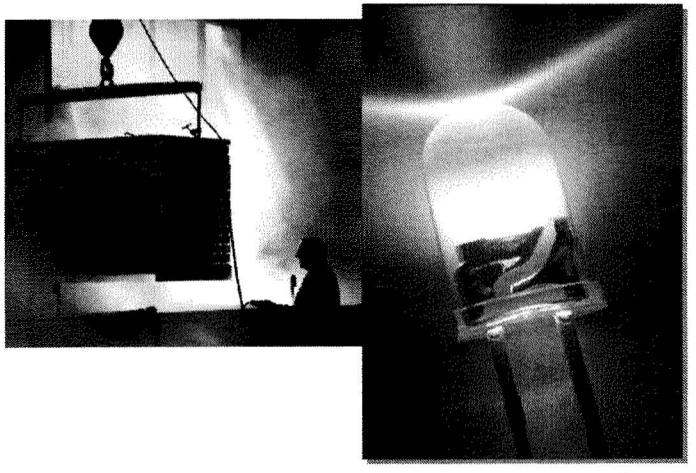
- **Foundation Work**
  - Stakeholder Partnership Development & Knowledge Transfer
  - Analysis and Policy Development
  - Project Finance & Business Viability
  - Resource Assessment & Technology Optimization

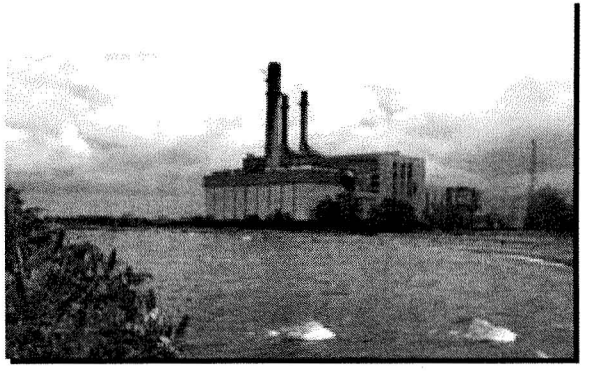
- **Continuation Work**
  - Inter-island Cable Study
  - Lanai Grid & PV Project
  - Military Grid and EERE Support
  - KIUC Support
  - Bioenergy Master Plan Development

- **New Work Efforts**
  - Oahu Grid Integration Support
  - Grid Integration Technical Review Committee
  - Utility / EV Joint Integration Plan
  - Transportation Analysis
  - Community Scale Net Zero Energy Projects
  - Large-scale Aggregation Projects

Efficiency – Low Hanging Fruit





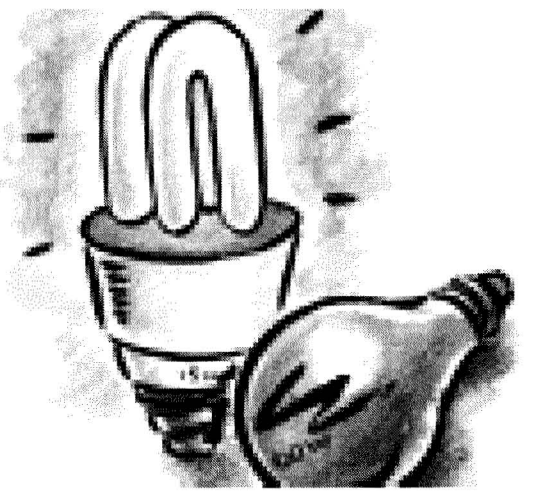


- Energy Efficiency is cheaper than generation
- Has a faster payback than other options
- Has a huge potential impact

Efficiency is the cheapest option and most immediate, but hardest to implement effectively

Complexity of Efficiency

- Millions of decisions by thousands of decision makers
- Thousands of transactions; each at a low $ value
- Hundreds of products and manufacturers
- Numerous retailers
- Enablers and education are critical for voluntary efforts
- Mandates and standards will get to a large compliance rate
- It's a multi-year process to achieve a significant result

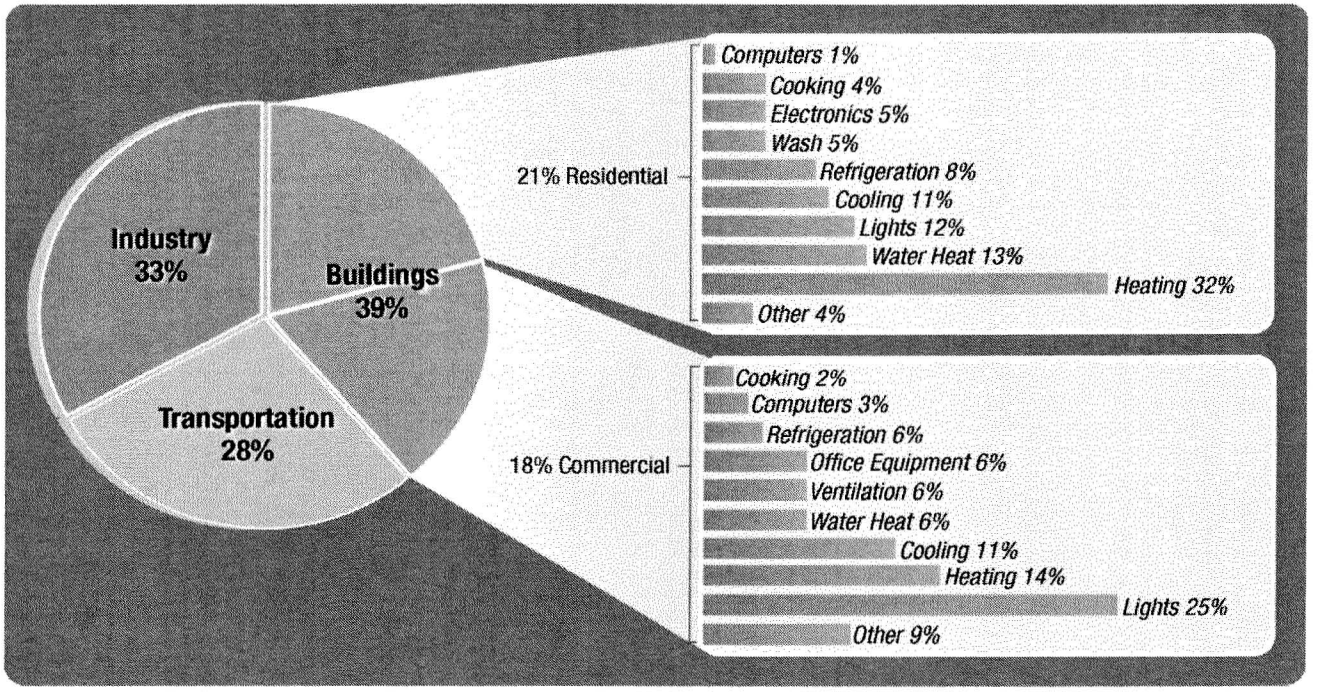


Efficiency Opportunity

Buildings = ENORMOUS Energy-Saving Opportunity

Buildings consume 39% of total U.S. energy

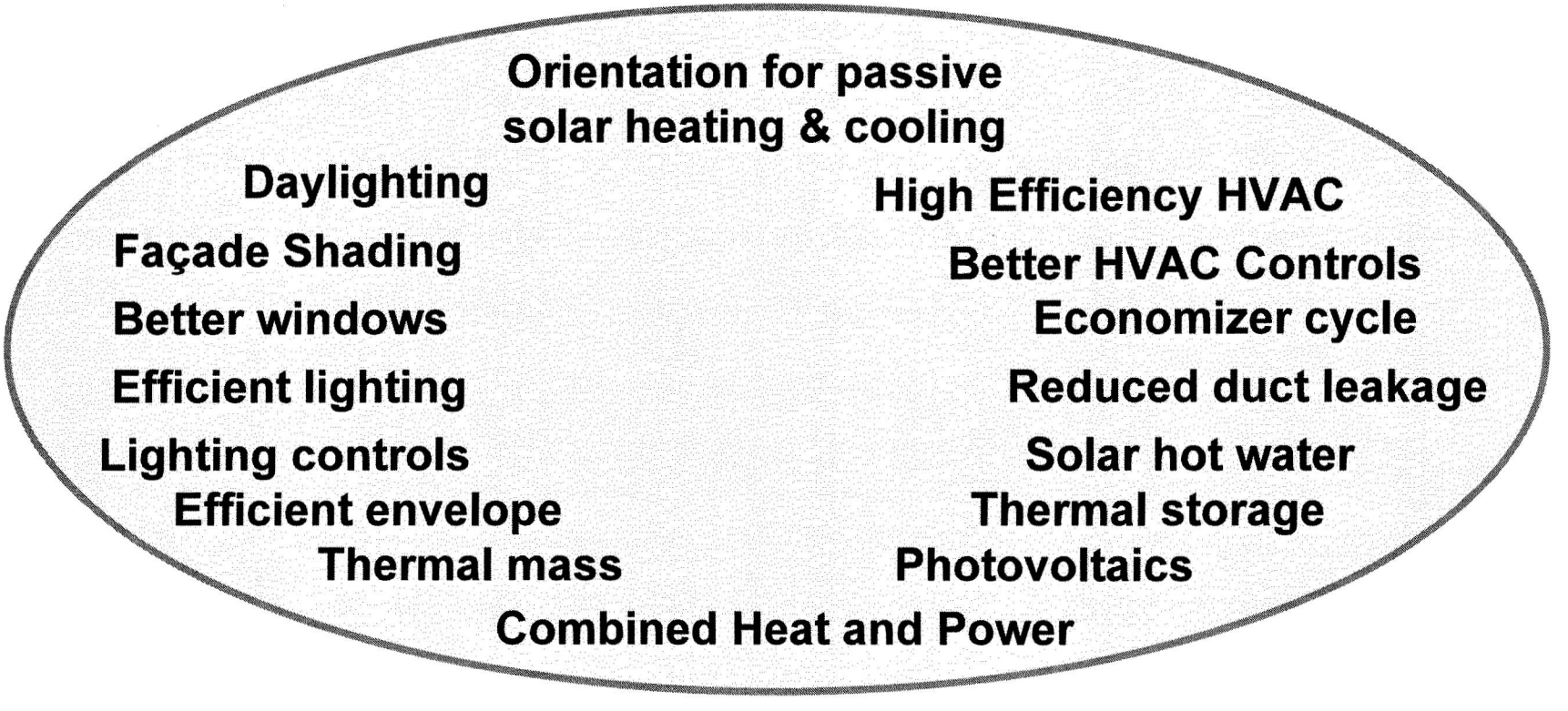
- 71% of electricity
- 53% of natural gas (primary consumption)



Source: 2005 Building Energy Databook with remainder equal to SEDS adjustment.

New Construction: Whole Buildings Focus

Evaluate a wide range of energy-efficient strategies, *working together*



Net Zero Energy Buildings

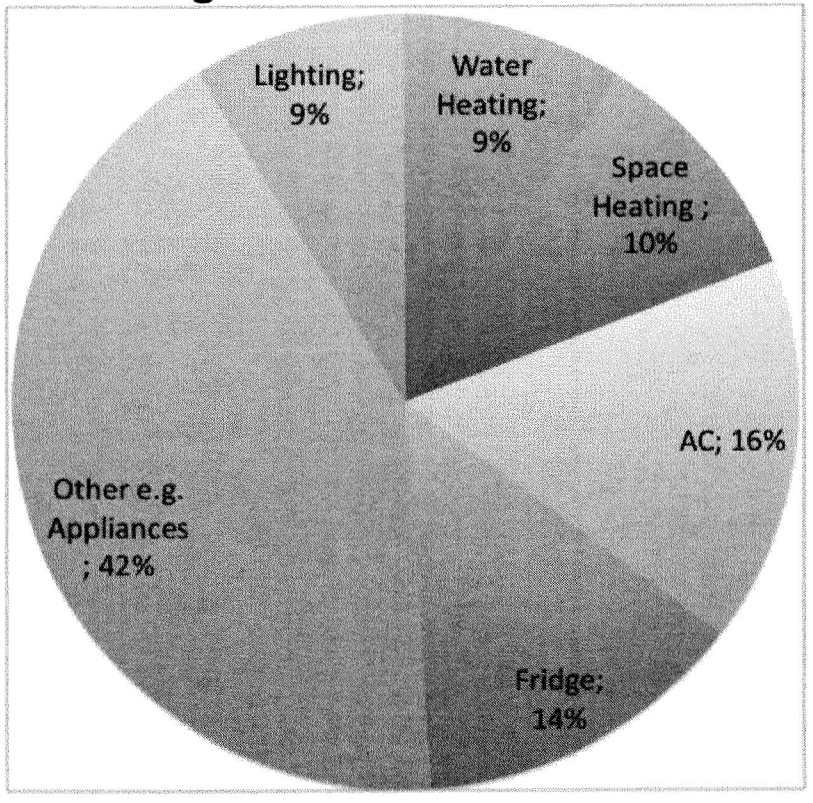
A building that generates as much energy as it consumes

- DOE Buildings Program Goals
  - Cost-Neutral Net Zero Energy Homes by 2020
  - Cost-Neutral Net Zero Energy Commercial Buildings by 2025

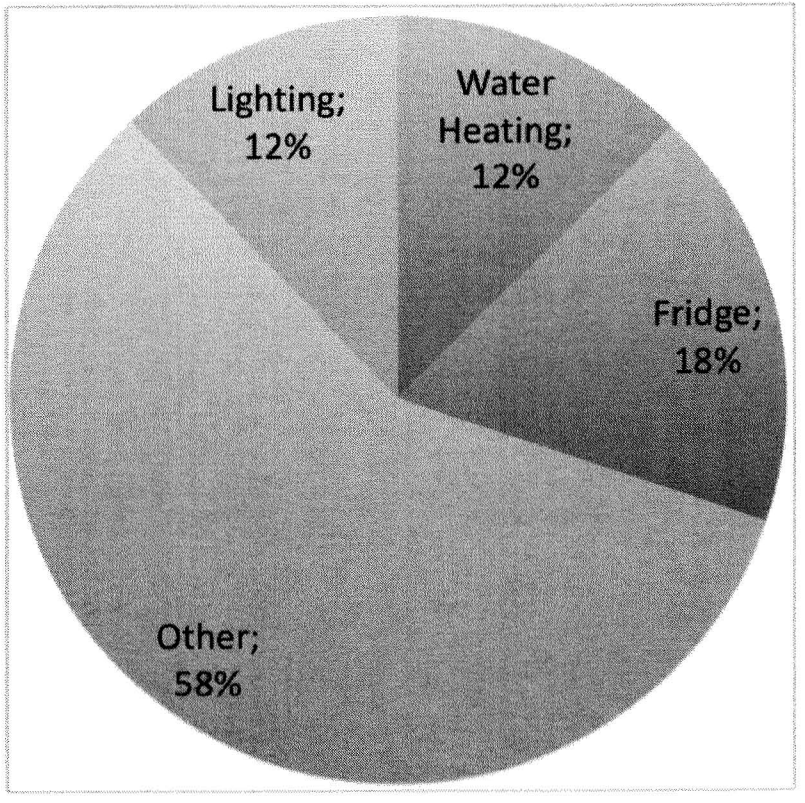
- Net Zero Energy Buildings exist today
  - Technology exists today
  - Price point is the limiting factor

Hawaii Specific Challenge: Load differences

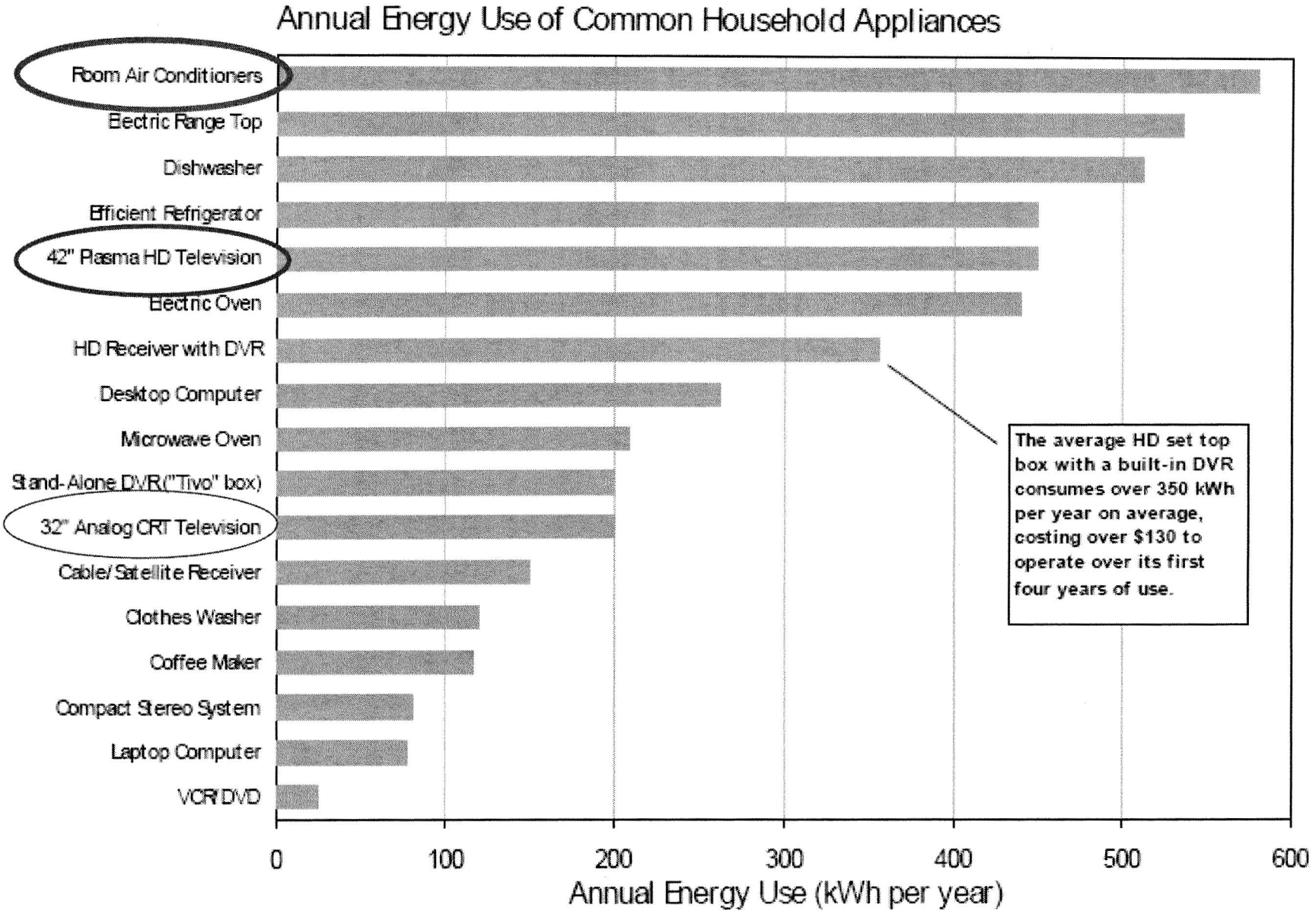
- US Average 2001



- No AC Loads 2001:

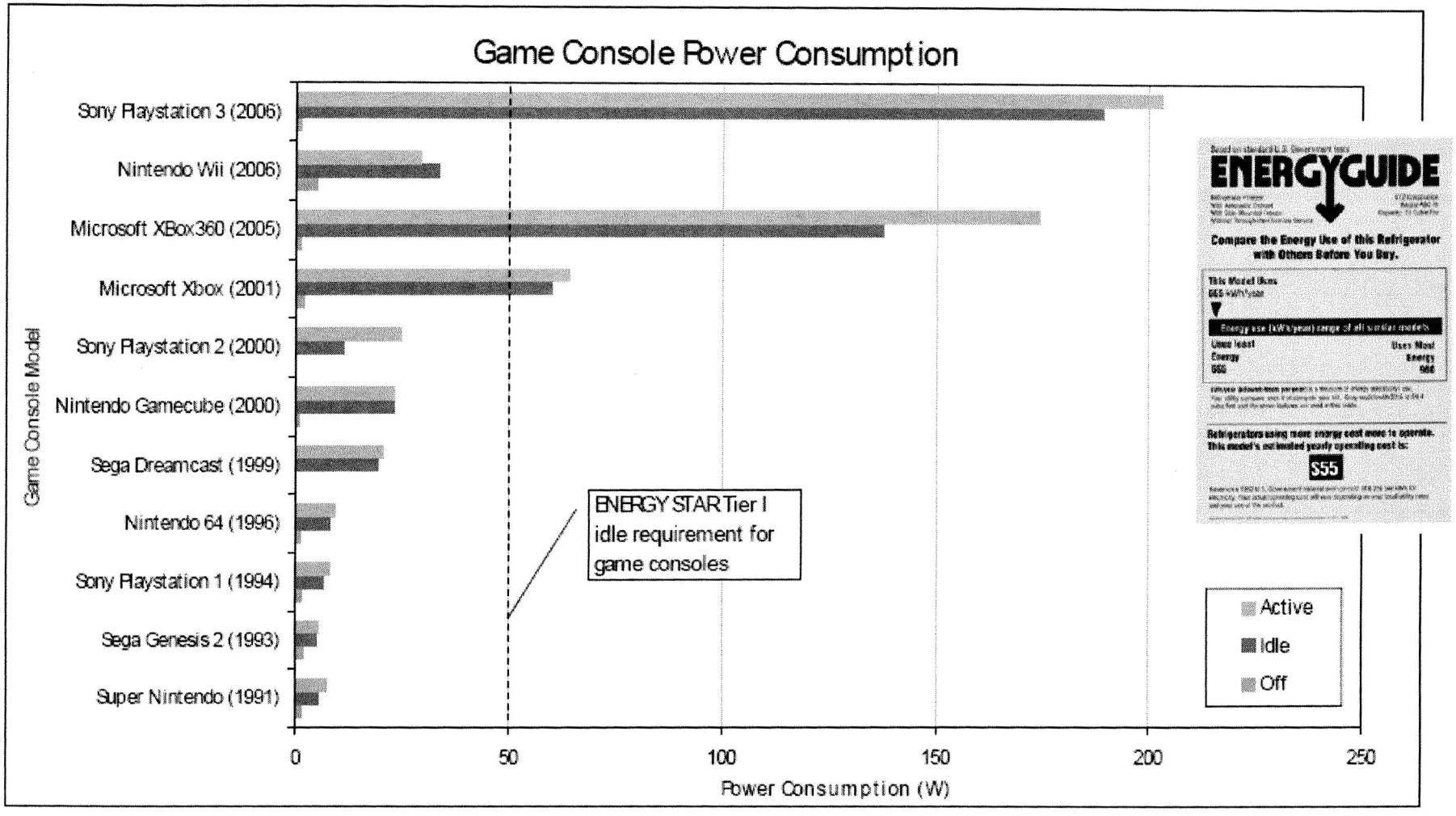


Source: EIA RECS 2001



NRDC Study, May 22, 2007

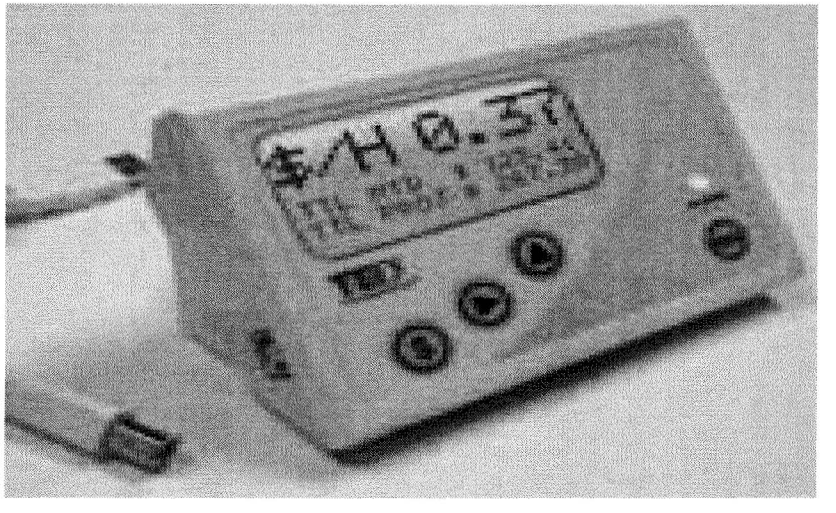
http://www.energystar.gov/ia/partners/prod_development/revisions/downloads/settop_boxes/NRDC_SetTopBox_Data_IEA.pdf



- Measured and/or researched "active" (i.e. playing games), "idle" (i.e. no active gameplay, menu screen, etc.) and "off" modes for a variety of past and present game consoles. Measurements made on current consoles (Playstation 3, Wii, XBox360) and obtained through internet research for older vintage consoles
- Next generation game consoles are trending toward greater power consumption (e.g. compare the various generations of Playstations shown above)
- Although older game consoles consume less power, analysis shows that these consoles may still have a large installed base, meaning that aggregate power consumption is relatively significant even though individual devices power use is relatively small. (For example, see "Game Console Power Consumption" and "Video Game Console World Sales" for Playstation 2)
- "Off" power modes in game consoles do consume significantly less power than "idle" or "active" modes, unlike cable/satellite boxes

Electricity Feedback

- Provides consumers instant electricity feedback
- 5-15% reduction with feedback alone
- Approx $100 in bulk
- Provide monitors (and 10 minute training) as feedback mechanism to consumer



Does Policy Play a Role?

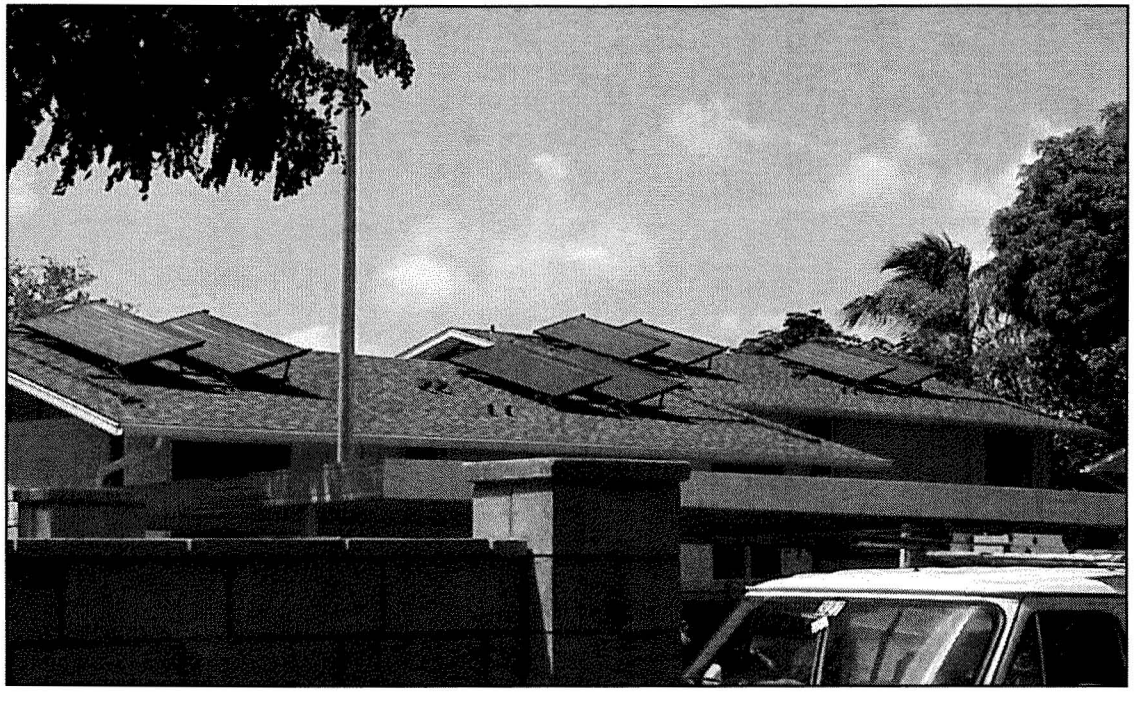
- You Bet! Without it, we cannot achieve the 30% energy reduction goal
- Voluntary programs:
  - Reach anywhere from less than 1% up to 20% of the people, depending on ease of use, outreach level, and amount of incentive or rebate.
  - Instant rebates achieve higher penetration levels than tax credits or mail-in rebates
  - Rebates & Incentives cost money
  - Administration is expensive – lots of transactions, oversight, administration
- Codes and Standards:
  - Reach all the people
  - Do not cost the State money to implement
  - Generally do not require additional administration/enforcement

Energy Efficiency Policy Options

	Mandates / Codes & Standards	Rebates & Incentives	Price Point Incentives	Financing / Funds Options
Number of Customers Benefiting	All	Few	All	All
Administrator	State	State or Utility or Third Party Admin.	State or Utility or 3rd Party Admin.	
Ease of Implementation	Business as usual	High transaction cost	High	High
State Costs	Low	High	None	Med-High
Education Requirement	Low	High	Medium	High

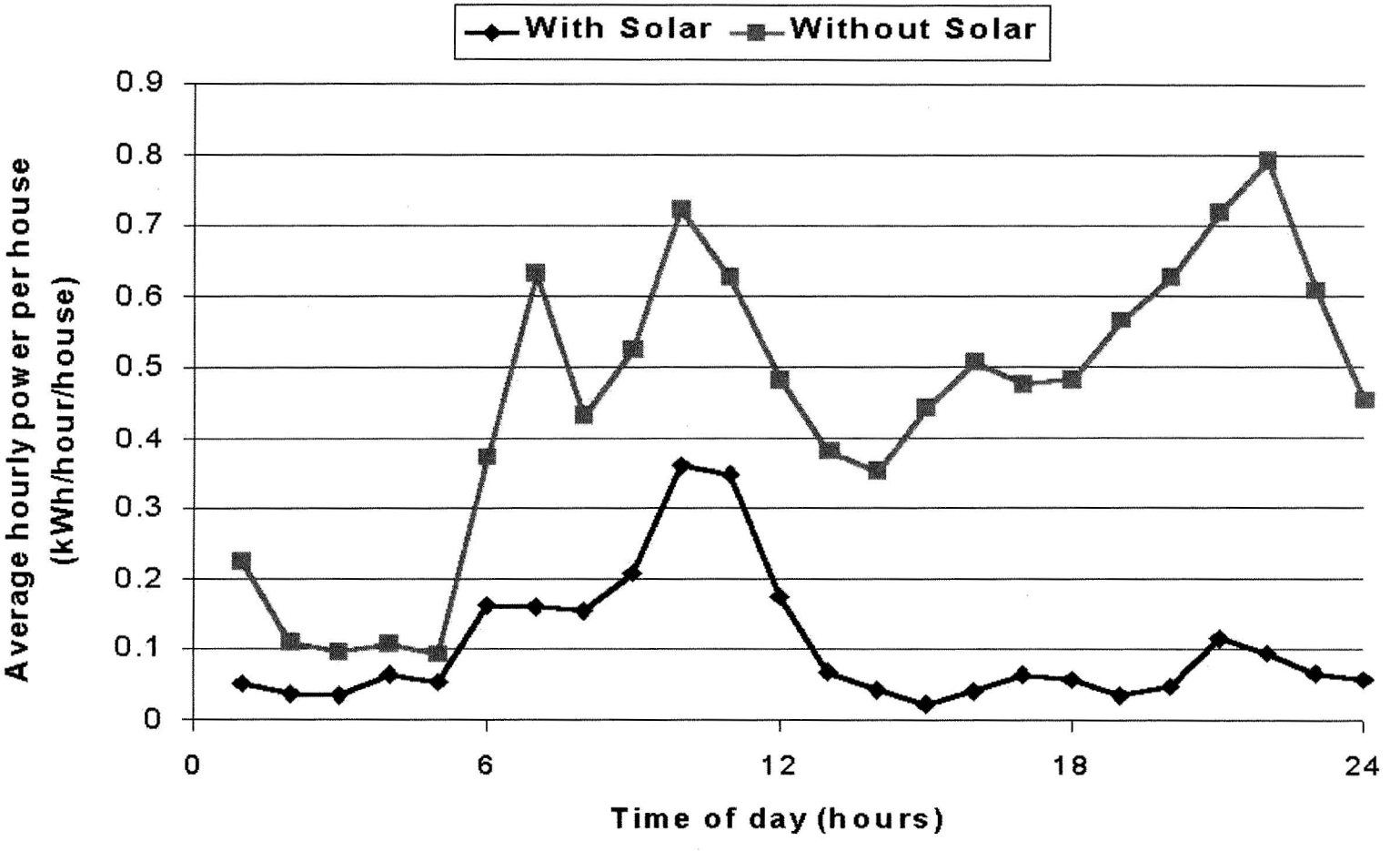
Establish Policy Based on Smart Energy Decisions

Case Study: USCG Housing, Honolulu HI



- 62 units installed 1998
- 80 sf per system
- Cost $4,000 per system
- $800 per system HECO rebate
- Savings of 9,700 kWh/year and $822/year per system
- Simple Payback 4 years (with rebate)

Case Study: USCG Solar Water Heater Performance



Energy Efficiency Portfolio Standards

- Establish an efficiency requirement to be obtained
- Require an entity to be accountable
- Needs the success ingredients (education, motivators, access to funding) to work

Home Performance with Energy Star (HPwES)

- HPwES is a voluntary, systems-based approach to residential energy efficiency improvements through audits, prepared financing packages, and improvements.

- Benefits:
  - Lower bills (10-50%)
  - Appropriate technologies applied
  - Homegrown contractor energy efficiency industry

- Modifications:
  - Energy Monitor for Marketing and Impact
  - Based on Hawaii Market and Hawaii experience

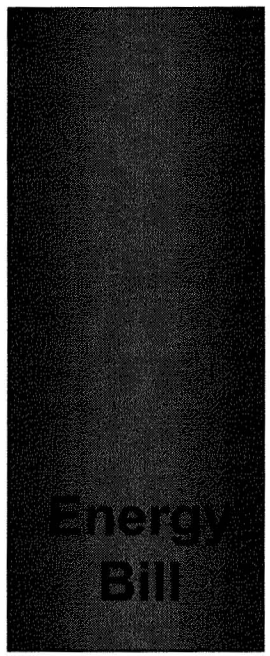
State can Lead By Example

- Public Buildings can be 30% more efficient than standard code
- Retrofits can yield 20-30% more efficient buildings

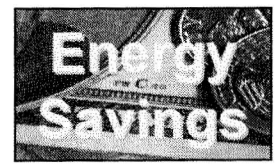
Does it really cost more?

- Efficiency is an investment that pays for itself over time
- Difference between first cost and life cycle cost

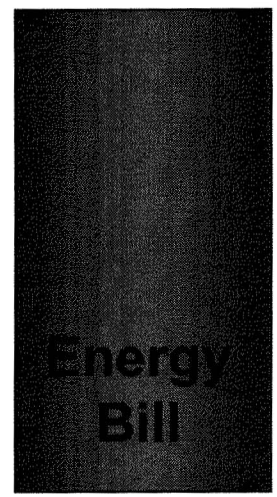
Financing Energy Efficiency



Before Efficiency

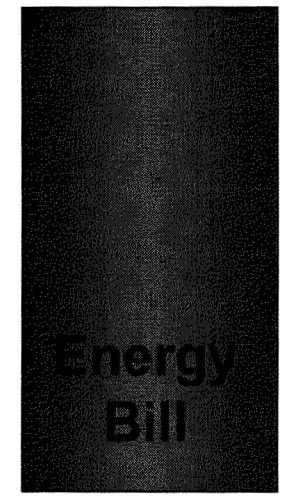


Payback for Project



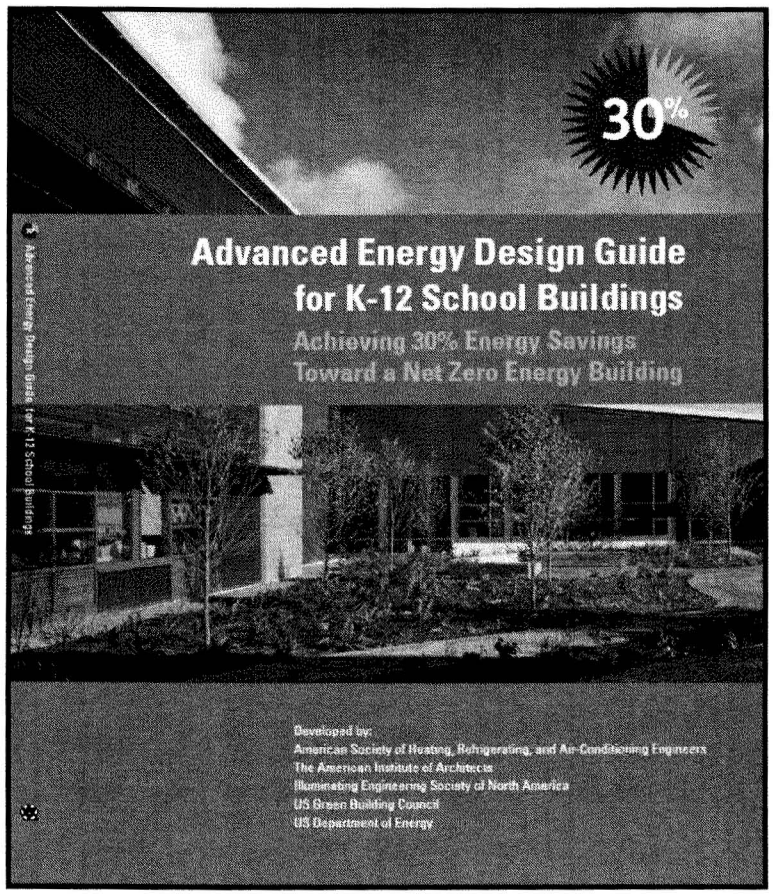
Finance Cost of EE Project

Retained by Consumer



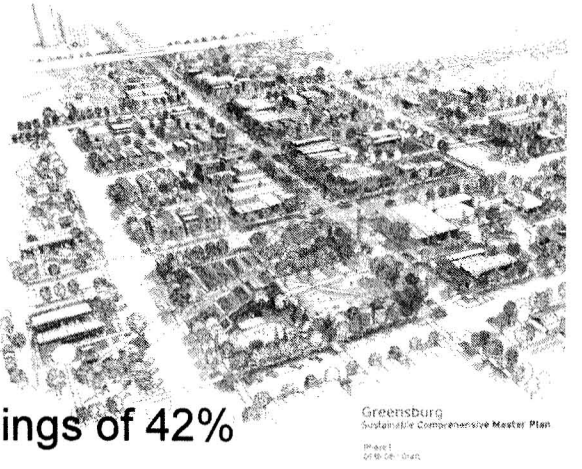
Project Paid Off

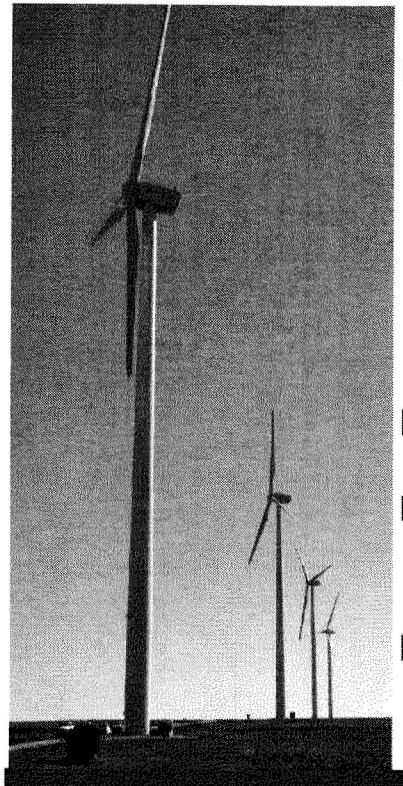
New Orleans Schools – Raising the Bar on Efficiency



New Orleans Recovery School District established a requirement for all new schools to be built to 30% better than most recent code

Greensburg: National Leader in Energy Policy





- LEED Platinum City Ordinance
  - All city buildings over 4000 ft^2
  - Achieve highest possible LEED Energy savings of 42%
  - Only city in US
- School – 50% more energy efficient than Standard
- Over 30 Commercial and Public building projects reaching for at least LEED Certified or 30% energy savings
- Highest density of LEED Platinum projects in the US

City Adopts Goal of 100% Renewable, 100% of the Time

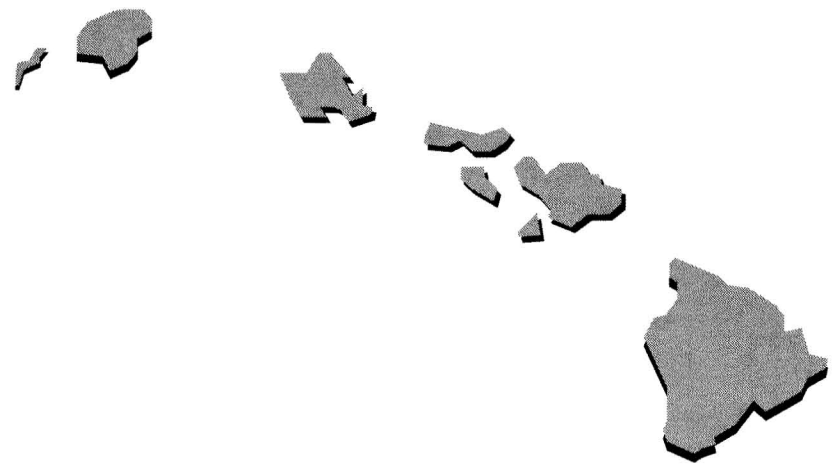
- Wind project will deliver and sell energy and RECs to wholesale provider
- Wholesale provider will warrant that all energy delivered to Greensburg will be from renewable energy, including allocations from Western Area Power Administration
- City retains the right to ultimately own the wind project

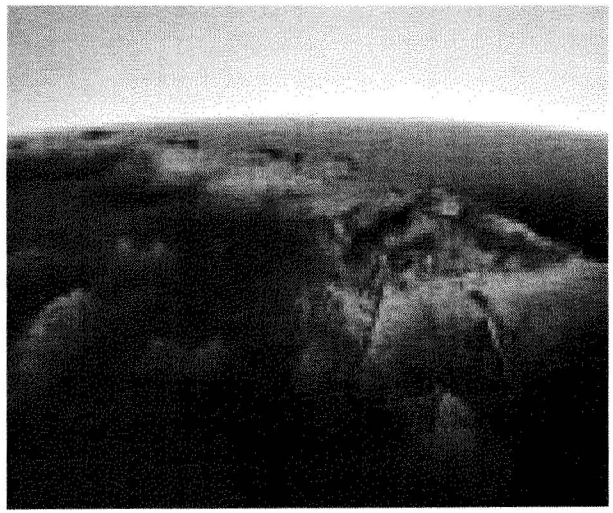
Necessary Ingredients to a Successful Voluntary Energy Efficiency Program

- Education and Outreach
  - People need to know what can be done
  - People need to know how to get it done
- Money - a source of funds to cover the up front cost to the consumer
  - Public Benefit Fund
  - Utility on-bill financing
  - Home equity loan programs backed by loan guarantees
  - Weatherization grants
  - Energy Efficient Mortgages where utility savings is calculated into loan qualification
  - Revolving Fund
- Time and Will
  - Motivation
  - Simplicity

Litmus Tests for a Good Program

- Does the consumer have to pay for it out of pocket?
- Can the incentive $ be used to qualify for credit?
- Are there minimal decision points?
- ***Would you do it?***





Hawaii Clean Energy Initiative

Bill Parks, DOE

January 27, 2009

Year 1 Accomplishments: Regulatory

- Regulatory
  - PUC training on best practices, options to allow renewable energy and energy efficiency thrusts
  - Public training and discussion on the same subjects

- Voluntary agreement between HECO, Consumer Advocate, and Governor Lingle
  - Support regulatory action for new utility business model
  - 40% RPS
  - Plans for over 1000 MW of renewables
  - Plans for efficiency, demand response, distributed generation

Year 1 Accomplishments: Policy Progress

- HCEI recommendations
  - Energy efficiency standard of 30%
    - *** Aggressive building codes
  - Renewable portfolio standard of 40%
  - Incentives and mandates
    - *** Transportation

Year 1 Accomplishments: Other

- Electric Vehicles
  - Better Place
  - Phoenix Motorcars
  - Plug-in Electric Hybrid Testing
- Hawaii Marine Energy Center
  - One of two National Centers established Fall 2008
  - Concentrate on wave energy and OTEC
  - Awarded to University of Hawaii Team
- Energy Development in Island Nations (EDIN)
  - Requests for information, status
- HCEI Replication
  - Virgin Islands
  - Alaska (300 million in energy efficiency programs leverage)

Year 1 Accomplishments: HCEI analysis & projects

- 70% Clean Energy scenario analysis (Booz Allen Hamilton)
- Hawaii greenhouse gas carbon tax/abatement analysis (McKinsey & Company)
- Economic modeling of energy system
- Inter-island cable: feasibility and cost/benefit studies
- Technical and economic assessment of plug-in hybrid and electric vehicles
- 100% Renewable Lanai
- Forest City Highly Efficient Communities
- Marine Energy Center
- Modeling electricity grids on all islands
- Maui grid integration
- Bioenergy Master Plan
- Wind resource and storage testing
- Regulatory framework development

World class studies and expertise leading to projects with a broad base of partners

Moving forward into 2009: Working group priorities on HCEI's first birthday

- Willingness to increase commitment to HCEI and tackle tough issues
- Desire to be have recommendations heard and acted upon for the good of Hawaii

- Engage stakeholders and the public—this emerged as a top priority
- Facilitate communication and coordination among and within working groups
- Track DOE and other solicitations to make the most of federal opportunities and the stimulus package

Federal budget - annual process

- FY 2009 current budget year under a continuing resolution
- FY 2010 starting preparation

- Both suggest large increases to RE, EE and smart grid programs and investments
- Ultimately will be matched to annual milestones, performance

Federal budget - stimulus package and beyond

- Billions under consideration
- Rules of engagement and proof of potential outcomes will be important
- Expected DOE solicitations in 2009
  - Bioenergy
  - Smart grids
  - Solar America

As of January 21, the U.S. economic stimulus package includes significant clean energy investments

Examples:

- **Reliable, Efficient Electricity Grid:** $11 billion
- **Renewable Energy Loan Guarantees:** $8 billion
- **Local Govt Energy Efficiency Block Grants:** $6.9 billion
- **Energy Efficiency Housing Retrofits:** $2.5 billion
- **Smart Appliances:** $300 million
- **Department of Defense Efficiency:** $1.8 billion
- **Energy Efficiency and Renewable Energy Research:** $2 billion
- **Alternative Buses and Trucks:** $400 million
- **Electric Transportation:** $200 million

Source: House Appropriations Committee: http://appropriations.house.gov/

Hawaii: Critical Issues for Success

- Formulate winning policies and regulation
- Open the market for renewable and efficiency technologies
- Implement non-partisan clean energy legislation
- Private leadership
- Community involvement
- Partnership approaches
- Adequate state funding

Coordination/Cost Sharing

- Congressional Delegation
- US Department of Energy
- DOD, USDA, Other Federal Agencies
- DBEDT/State
  - Hydrogen Fund
- Private Sector
- Hawaii Legislature

Long term Federal investment is contingent on

- State as a fully engaged partner
  - Executive, legislative, counties, business community
- State leverage of funds, state cost share
- Annual proof of progress
- Continued evidence of leading the pack

HCEI sets you apart temporarily…

- **If** the legislature takes definitive action in this session to enable change and maximize access to federal cost share
- And **if** the PUC sets favorable regulatory structure
- And **if** the private sector brings the finance in
- And **if** the Hawaii citizenry supports HCEI and clean energy projects

...Protect your lead

- Pass the majority of the HCEI recommendations for Year 1
- Fund or remove funding barriers to allow fully functional PUC, Consumer Advocate, and State Energy Office
- Create an annual funding source to incentivize clean energy
- Send a signal to the business community that clean energy business models will be rewarded – create certainty, predictability, speed for regulation, permitting, infrastructure, to facilitate investment
- Prove to the Federal Govt that Hawaii wants to be a leader in this transformation

In conclusion

- HCEI has helped position Hawaii for a clean energy future
- Hawaii must step up in order to…
  - Reach energy independence
  - Take advantage of Federal leadership and resources to help this transition
- The legislature needs to provide leadership and prove commitment by passing legislation on efficiency, transportation and electric generation this year