



February 3, 2009

Representative Hermina Morita, Chair
 Committee on Energy and Environmental Protection
 Conference Room 325
 State Capitol
 415 South Beretania Street

Representative Morita:

Subject: **House Bills No. HB 429, HB 430, HB 432, HB 433 and HB 436
 Relating to Energy Efficiency**

My name is Dean Uchida, Vice President of the Hawaii Developers' Council (HDC). We represent over 200 members and associates in development-related industries. The mission of Hawaii Developers' Council (HDC) is to educate developers and the public regarding land, construction and development issues through public forums, seminars and publications.

It is also the goal of HDC to promote high ethics and community responsibility in real estate development and related trades and professions.

The HDC is concerned on the approach proposed in each of the bills to that are intended to make the State of Hawaii more energy efficient.

The following is a list that attempts to summarize what is being proposed in each of the five (5) bills being heard.

Energy Efficiency Bills	HB 429	HB 430	HB 432	HB 433	HB 436
Proposal:	Directs the public utilities commission to establish energy efficiency portfolio standards.	Public benefits fee administrator conduct an energy efficiency assessment of energy use patterns in the State	Expands the pay as you save pilot program to include photovoltaic energy systems and refrigerator exchanges	Directs the public benefits fee administrator to develop and implement a program to encourage residential retail electricity customers to replace inefficient household appliances with ENERGY STAR appliances	Directs the public utilities commission to establish a consumer information program on energy efficient properties
Statutes:	Amend Chapter		Amends Act 240,	Amend Chapter	Amend Chapter 196

	269 HRS		SLH 2006	269 HRS	HRS
Intent:	PUC establish energy efficiency portfolio standards		Adds photovoltaic energy systems to the Pay as you save program	The public benefits fee administrator shall establish a program goal of replacing 50% of qualifying household appliances in the State within five years of the implementation of the program	Provide for the reporting of energy efficiency information on a subject property to consumers, lenders and realtors. Also, allow for information to be stored in a data base for internet access
Mandates or Incentives	Establishes incentives and penalties based on performance		Each electric utility shall implement by tariff a pay as you save model system program for consumers	The public benefits fee administrator develop and implement a cash financial incentive program for the replacement of other qualifying household appliances	
Funding Source:		\$500,000 from the PUC special fund to conduct an energy efficiency assessment	Tariff imposed on future electric bills	The public benefits fee administrator may expend moneys collected through the public benefits fee	

As in most public policy issues, the process toward energy efficiency has many “unintended consequences.” For example, last session the Legislature approved SB No. 644 which “mandated” the installation of a solar water heater in all new single family residences. The bill effectively:

1. Required all new single family residences constructed after January 1, 2010 to include a solar water heater system;
2. Eliminated the Solar thermal energy systems tax credits on all single-family residential properties after 1/1/2010; and
3. Prohibited a single family residential developer from claiming any renewable energy technologies tax credits for systems installed between now and 2010.

Government “Mandates” that attempts to direct the free market system generally result in penalizing one section of the market. For example, in this case, while the arguments that a \$7,000 thermal solar water heating system can easily be incorporated into the mortgage of the average priced home in Hawaii resulting in the homeowner realizing a net savings as energy cost rise over time, the mandate does not recognize or provide a mechanism to assist buyers seeking units priced for residents making less than 80% and less than 120% of the Housing and Urban Development (HUD) median income levels in Hawaii. For Honolulu, the HUD median income for a family of four is \$77,300. Irrespective of costs, developers are required to provide generally 20% of their total units for families making 120% or less of the HUD median income and 10% of their total units for families making 80% or less of the HUD median income.

Adding the cost of a thermal solar water heating unit to these houses effectively means the buyer gets \$7,000 “less” house.

If the goal was really to significantly reduce our 90% dependency on imported oil, wouldn't it have made more of an impact on our energy dependency to require all existing housing units (approximately 491,000 as of July 2005) to convert to solar water heaters as opposed to requiring only new units to have solar (approximately 5,700 units in 2006). Why do you think the focus was on new units as opposed to existing?

No one disagrees with the intended goal of moving the state toward becoming more energy self sufficient. The concern is in the manner our elected leaders are choosing to accomplish this goal.

As was the case last session, none of the energy efficiency bills clearly identifies the specific problem or problems that need to be addressed through the proposed legislation. If the underlying intent is to encourage more energy efficient perhaps the proposed legislation should be expanded to include an assessment and analysis of the various proposed legislation with clearly articulated criteria for outcomes that unintended consequences of the proposed legislation.

In other Cities or municipalities, government has led by example by "Mandating" that all government projects achieve a certain green or sustainable design standard. In so doing, the design professionals and contractors in these Cities were educated and developed the necessary hands on experience to build a green or sustainable project. AFTER the design professionals and contractors gained this experience, there were incentives created based on their hands on experience, to encourage the private projects to incorporate green or sustainable design. People were able to see that costs and benefits of changing behavior and moving toward more energy efficiency.

There also does not appear to be a comprehensive approach or "game plan" for how we should approach our dependency on imported oil. A comprehensive approach would require research and analysis of the programs and desired outcomes along with the economic analysis of all the costs associated with achieving these outcomes.

We strongly recommend that the Legislature develop a full understanding of the economic impacts created by this type of legislation. Perhaps the Legislature should conduct its own analysis or comparison to determine, at a minimum, the following:

1. What specific outcome or range of outcomes would each of the bills achieve;
2. Discuss the public benefits among the different outcomes and assess whether or not government involvement is necessary;
3. If government involvement is desired, assess the pros and cons of providing incentives or mandating compliance to achieve the desired outcomes.

While we see interest in the market moving toward more energy efficiency and sustainable designs, we believe there is much more that needs to be done before public policy makers "Mandate" any more "green or sustainable" legislation.

Thank you for the opportunity to share our views with you.

February 3, 2009

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Committee on Energy and Environmental Protection
Conference Room 325
State Capitol
415 South Beretania Street

Representative Morita:

Subject: **House Bills No. HB 429, HB 430, HB 432, HB 433 and HB 436
Relating to Energy Efficiency**

My name is Jim Tollefson, President of the Chamber of Commerce of Hawaii. The Chamber of Commerce of Hawaii works on behalf of its members and the entire business community to:

- Improve the state's economic climate
- Help businesses thrive

The Chamber of Commerce of Hawaii is concerned on the approach proposed in each of the bills to that are intended to make the State of Hawaii more energy efficient.

The following is a list that attempts to summarize what is being proposed in each of the five (5) bills being heard.

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Statutes:	Amend Chapter 269 HRS		Amends Act 240, SLH 2006	Amend Chapter 269 HRS	Amend Chapter 196 HRS
Intent:	PUC establish energy efficiency portfolio standards		Adds photovoltaic energy systems to the Pay as you save program	The public benefits fee administrator shall establish a program goal of replacing 50% of qualifying household	Provide for the reporting of energy efficiency information on a subject property to consumers, lenders and realtors. Also,

				appliances in the State within five years of the implementation of the program	allow for information to be stored in a data base for internet access
Mandates or Incentives	Establishes incentives and penalties based on performance		Each electric utility shall implement by tariff a pay as you save model system program for consumers	The public benefits fee administrator develop and implement a cash financial incentive program for the replacement of other qualifying household appliances	
Funding Source:		\$500,000 from the PUC special fund to conduct an energy efficiency assessment	Tariff imposed on future electric bills	The public benefits fee administrator may expend moneys collected through the public benefits fee	

As in most public policy issues, the process toward energy efficiency has many “unintended consequences.” For example, last session the Legislature approved SB No. 644 which “mandated” the installation of a solar water heater in all new single family residences. The bill effectively:

1. Required all new single family residences constructed after January 1, 2010 to include a solar water heater system;
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Government “Mandates” that attempts to direct the free market system generally result in penalizing one section of the market. For example, in this case, while the arguments that a \$7,000 thermal solar water heating system can easily be incorporated into the mortgage of the average priced home in Hawaii resulting in the homeowner realizing an net savings as energy cost rise over time, the mandate does not recognize or provide a mechanism to assist buyers seeking units priced for residents making less than 80% and less than 120% of the Housing and Urban Development (HUD) median income levels in Hawaii. For Honolulu, the HUD median income for a family of four is \$77,300. Irrespective of costs, developers are required to provide generally 20% of their total units for families making 120% or less of the HUD median income and 10% of their total units for families making 80% or less of the HUD median income.

Adding the cost of a thermal solar water heating unit to these houses effectively means the buyer gets \$7,000 “less” house.

If the goal was really to significantly reduce our 90% dependency on imported oil, wouldn't it have made more of an impact on our energy dependency to require all existing housing units (approximately 491,000 as of July 2005) to covert to solar water heaters as opposed to requiring only new units to have solar (approximately 5,700 units in 2006). Why do you think the focus was on new units as opposed to existing?

No one disagrees with the intended goal of moving the state toward becoming more energy self sufficient. The concern is in the manner our elected leaders are choosing to accomplish this goal.

As was the case last session, none of the energy efficiency bills clearly identifies the specific problem or problems that need to be addressed through the proposed legislation. If the underlying intent is to encourage more energy efficient perhaps the proposed legislation should be expanded to include an assessment and analysis of the various proposed legislation with clearly articulated criteria for outcomes that unintended consequences of the proposed legislation.

In other Cities or municipalities, government has led by example by “Mandating” that all government projects achieve a certain green or sustainable design standard. In so doing, the design professionals and contractors in these Cities were educated and developed the necessary hands on experience to build a green or sustainable project. AFTER the design professionals and contractors gained this experience, there were incentives created based on their hands on experience, to encourage the private projects to incorporate green or sustainable design. People were able to see that costs and benefits of changing behavior and moving toward more energy efficiency.

There also does not appear to be a comprehensive approach or “game plan” for how we should approach our dependency on imported oil. A comprehensive approach would require research and analysis of the programs and desired outcomes along with the economic analysis of all the costs associated with achieving these outcomes.

We strongly recommend that the Legislature develop a full understanding of the economic impacts created by this type of legislation. Perhaps the Legislature should conduct its own analysis or comparison to determine, at a minimum, the following:

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BIA-HAWAII

BUILDING INDUSTRY ASSOCIATION

February 3, 2009

Representative Hermina Morita, Chair
Committee on Energy and Environmental Protection
Conference Room 325
State Capitol
415 South Beretania Street

Representative Morita:

Subject: **House Bills No. HB 429, HB 430, HB 432, HB 433 and HB 436
Relating to Energy Efficiency**

I am Karen Nakamura, Chief Executive Officer of the Building Industry Association of Hawaii (BIA-Hawaii). Chartered in 1955, the Building Industry Association of Hawaii is a professional trade organization affiliated with the National Association of Home Builders, representing the building industry and its associates. BIA-Hawaii takes a leadership role in unifying and promoting the interests of the industry to enhance the quality of life for the people of Hawaii.

BIA-HAWAII is concerned on the approach proposed in each of the bills to that are intended to make the State of Hawaii more energy efficient.

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Executive Vice President & Chief Executive Officer

**DEPARTMENT OF BUSINESS,
ECONOMIC DEVELOPMENT & TOURISM**

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Statement of
THEODORE E. LIU
Director

Department of Business, Economic Development, and Tourism
before the

COMMITTEE ON ENERGY & ENVIRONMENTAL PROTECTION

Tuesday, February 3, 2009
9:00am

State Capitol, Conference Room 325

in consideration of
HB429
RELATING TO ENERGY EFFICIENCY

Chair Morita, Vice Chair Coffman, and Members of the Committee.

The Department of Business, Economic Development, and Tourism (DBEDT) supports the intent of HB429, which directs the Public Utilities Commission to set an energy efficiency portfolio standard (EEPS) that will offset the forecasted electrical load growth statewide by 4,300 gigawatt hours between the years 2009 and 2030. We prefer the version of HB429 which is embodied in HB1053, which is a comprehensive bill introduced under the Hawaii Clean Energy Initiative (HCEI), a partnership of the state and the U.S. Department of Energy.

Both HB429 and HB1053 set a statewide target for electricity savings and propose that the Public Utilities Commission identify parties and stakeholders responsible for EEPS, monitor progress toward achieving EEPS, and establish incentives and penalties based on performance. Both bills extend the energy efficiency program across all end use sectors and count renewable substitution, including solar water heating and sea water air conditioning, toward achieving the

standard. Both bills also require that the Public Utilities Commission monitor and evaluate progress and provide annual progress reports.

EEPS sets a goal for energy savings and requires that utilities meet this goal, treating energy efficiency as an invisible power plant. The proposed Hawaii EEPS will provide plans, programs, and strategies to support and expedite cost-effective energy efficiency in Hawaii. An EEPS is important to increase market penetration for energy efficiency measures resulting in new jobs and increased economic development.

California, Colorado, Connecticut, Illinois, Maryland, Minnesota, Nevada, New Mexico, New York, North Carolina, Ohio, Pennsylvania, Texas, Washington, Vermont, and Virginia currently have Energy Efficiency Portfolio Standards. We understand that other states are also moving toward this model. We will review other programs and consult other states as we proceed.

There is no doubt that expanded energy efficiency programs stimulated by the EEPS will play an integral role in meeting the targets of HCEI.

Thank you for the opportunity to offer these comments.

**Testimony Before the House Committee
On
Energy & Environmental Protection**

February 3, 2009 (9:00 AM)

H.B. 429 RELATING TO ENERGY EFFICIENCY

**By: Alan Hee
Energy Services Department
Hawaiian Electric Company, Inc.**

Chair Morita, Vice Chair Coffman and Members of the Committee:

My name is Alan Hee, and I represent Hawaiian Electric Company (HECO) and its subsidiary utilities, Hawaii Electric Light Company (HELCO) and Maui Electric Company (MECO). I appreciate the opportunity to present testimony on H.B. 429.

HECO supports the development of an energy efficiency portfolio standard. It reflects the commitment of the state to energy efficiency and creates a yardstick against which we can measure our progress as a community towards energy independence.

HECO also supports giving the PUC the authority to establish the energy efficiency portfolio standard. It is the right agency to administer this standard because it has been involved in the utilities' integrated resource planning and demand-side management programs for over 13 years. The PUC is also familiar with how the design and implementation of energy efficiency programs must integrate with projections of electricity demand and the energy efficiency potential for Hawaii to set a reasonable level for the energy efficiency portfolio standard.

We therefore request an amendment to the bill. Rather than quantifying the energy efficiency portfolio standard by legislation, HECO suggests that the level of the standard be set by the PUC after it has had an opportunity to review recommendations from the public benefits fund administrator, who will be administering the energy efficiency programs later this year. Other industry participants, including the electric utilities, should also be asked to provide input to quantifying this standard.

For example, the bill requires a reduction of 4,300 GW. We believe this was meant to be 4,300 GWH. Still, it is not clear whether the 4,300 GWH is cumulative or incremental. If incremental, a report presented by HECO and discussed by HECO's Integrated Resource Planning Advisory Group in early 2008, found that the absolute maximum energy efficiency potential on Oahu was substantially less than half of the 4,300 GWH goal in this bill. Thus, HECO questions the basis and the methodology used to determine the 4,300 GWH figure.

In summary, HECO supports the development of an energy efficiency portfolio standard, but recommends that the level of the standard be set by the PUC rather than by legislation.

Thank you for this opportunity to testify on this measure.

HAWAII RENEWABLE ENERGY ALLIANCE

46-040 Konane Place #3816, Kaneohe, HI 96744 – Telephone/FAX: 247-7753 – Email: wsb@lava.net

Officers

President
Warren S. Bollmeier II

Vice-President
John Crouch

Directors

Warren S. Bollmeier II
WSB-Hawaii

Cully Judd
Inter Island Solar Supply

John Crouch
Sunpower

Herbert M. (Monty) Richards
Kahua Ranch Ltd.

TESTIMONY OF WARREN BOLLMEIER ON BEHALF OF THE HAWAII
RENEWABLE ENERGY ALLIANCE BEFORE THE HOUSE COMMITTEE ON
ENERGY AND ENVIRONMENTAL PROTECTION

HB 429, RELATING TO ENERGY EFFICIENCY

February 3, 2009

Chair Morita, Vice-Chair Kaufmann and members of the Committee I am Warren Bollmeier, testifying on behalf of the Hawaii Renewable Energy Alliance (HREA). HREA is a nonprofit corporation in Hawaii, established in 1995 by a group of individuals and organizations concerned about the energy future of Hawaii. HREA's mission is to support, through education and advocacy, the use of renewables for a sustainable, energy-efficient, environmentally-friendly, economically-sound future for Hawaii. One of HREA's goals is to support appropriate policy changes in state and local government, the Public Utilities Commission and the electric utilities to encourage increased use of renewables in Hawaii.

The purpose of HB 429 is to direct the public utilities commission to establish energy efficiency portfolio standards ("EEPS"). HREA supports the intent of this bill, but **opposes** the bill as written for the following reasons:

1. Reason for a EEPS? HREA agrees there is a need for a portfolio standard (separate from RPS, and a companion to RPS) that includes energy efficiency technologies and measures. However, we believe the implied definition in this bill that energy efficiency includes renewable substitution (or "off-set") technologies is wrong and therefore not appropriate;
2. Better Yet a DPS. HREA suggests a demand-side portfolio standard ("DPS") is a more appropriate companion to RPS. DPS would include those measures a customer could employ to "off-set a portion up to all" of his electrical load. These include the following technologies and measures:
 - a. traditional energy efficiency,
 - b. off-set renewables, and
 - c. net metered renewables; and
3. How to Implement the DPS. HREA recommends, as is stated in the bill, that the DPS be the responsibility of the Public Benefits Fund Administrator as directed by the public utilities commission.

That said, HREA opposes the bill in its current form, but can support the bill as modified in the attachment to establish a DPS law. We do recognize:

1. there will also need to be amendments to our RPS law, and
2. the proposed title change of the bill is probably not possible at this time.

However, we believe the proposed revisions are:

1. a clarion call to facilitate the attainment of the Hawaii Clean Energy Initiative goals, and
2. concurrently, in the best interests of the consumer.

Thank you for this opportunity to testify.

Report Title:

Demand-side Portfolio

Deleted: Energy Efficiency

Description:

Directs the public utilities commission to establish demand-side portfolio standards.

Deleted: energy efficiency

HOUSE OF REPRESENTATIVES
TWENTY-FIFTH LEGISLATURE, 2009
STATE OF HAWAII

H.B. NO. 429

A BILL FOR AN ACT

RELATING TO DEMAND-SIDE PORTFOLIO STANDARDS.

Deleted: ENERGY EFFICIENCY

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF HAWAII:

SECTION 1. Chapter 269, Hawaii Revised Statutes, is amended by adding a new section to be appropriately designated and to read as follows:

"§269- Demand-Side portfolio standards. (a) The public utilities commission shall establish demand-side portfolio standards that will mandate utility customer energy savings between the years 2009 and 2030.

Deleted: Energy efficiency

Deleted: energy efficiency

Deleted:

Deleted: offset the forecasted electrical load growth statewide

Deleted: energy efficiency

(b) The demand-side portfolio standards, which are to be a companion to the Renewable Portfolio Standards (HRS 269, Part V) shall be designed to achieve 30% of the statewide electricity requirements in 2030 including electricity savings by 2030.;

Deleted: four thousand three hundred gigawatts of electricity savings statewide by 2030

provided that the public utilities commission shall establish interim goals for energy use reductions.

(c) The public utilities commission shall:

(1) Identify parties and stakeholders who are responsible for each element of the demand-side portfolio standards;

Deleted: energy efficiency

(2) Monitor progress towards achieving the demand-side portfolio standards; and

Deleted: energy efficiency

(3) Establish incentives and penalties based on performance.

Deleted: energy efficiency

(d) In establishing the demand-side portfolio standards, the public utilities commission shall consider the impact of;

Deleted:

(i) energy efficiency measures, (ii) renewable energy substitutions (or off-sets), including solar water heating, solar air conditioning and seawater air-conditioning, and (iii) net metered systems on meeting the demand-side portfolio standards.

Deleted: energy efficiency

(e) The public utilities commission shall direct the public benefits fee administrator to develop demand-side programs designed to facilitate the achievement of demand-side portfolio standards. Beginning March 1, 2010, the public benefits fee administrator shall submit annual progress reports to the public utilities commission on the energy savings achieved during the previous year."

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SECTION 2. New statutory material is underscored.

SECTION 3. This Act shall take effect upon its approval.



HOUSE COMMITTEE ON ENERGY & ENVIRONMENTAL PROTECTION

February 3rd, 2008, 9:00 A.M.

Room 325

(Testimony is 2 pages long)

TESTIMONY IN SUPPORT OF HB 429; SUGGESTED AMENDMENTS

Chair Morita and members of the committee:

The Blue Planet Foundation supports the intent of House Bill 429, directing the public utilities commission (PUC) to establish energy efficiency portfolio standards. Energy efficiency, unfortunately, is the “dark horse” of clean energy resources. Energy efficiency—efficient lights, appliances, electronics, behavior changes, and the like—is the largest, cheapest, safest, and fastest energy option that Hawai‘i can implement. Consider:

- Energy efficiency is the fastest-growing U.S. “energy source” (growth of ~2.5 to 3.5% annually)
- National energy efficiency programs save energy at an average cost of about 3 cents/kWh -- *about 1/10 the average electricity cost in Hawaii*
- Leading states are saving over 1% additional of total electricity sales annually
- Energy efficiency provides major local economic benefits: energy efficiency is 100% obtained from investment in local homes and businesses
- Also the least visible, least understood, and most neglected

Directing the PUC to establish an energy efficiency portfolio standard would help Hawaii take advantage of this critical energy resource. While Blue Planet supports HB 429, we would prefer that the measure go further to create the framework for dramatic increases in energy efficiency in Hawai‘i. We offer the following suggested amendments:

1. Hawai‘i law should declare that energy efficiency shall be the first priority resource for new electric system resources in Hawai‘i. This could be done by adding to HRS the following: ***“Given that energy efficiency is the most cost effective electricity resource, it is the policy of the state of Hawai‘i to implement energy efficiency measures before other electricity supply resources.”***

Alternatively, the policy could read: ***“It is the policy of the state of Hawaii to implement commercially available and cost effective energy efficiency measures to the maximum extent feasible.”***

Jeff Mikulina, executive director • jeff@blueplanetfoundation.org

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2. While we appreciate the clear direction to the PUC to achieve a certain amount of savings¹ by a certain year, annual percentages may make more sense and be easier to measure and keep on track. For example, the “energy efficiency resource standard” could require annual energy efficiency program electricity savings equivalent to 3% of 2008 retail sales by the end of 2011; 10% by the end of 2015; and an additional 2% per year each year thereafter.
3. To increase compliance with the energy efficiency portfolio standard, a system of incentives and penalties to the third party administrator and the utility for achievement should be established in addition to the standards.

Finally, an energy efficiency portfolio standard should complement a true renewable portfolio standard, should one be established through other measures currently pending before this committee. We hope that the legislature forwards this proposal, IN CONJUNCTION with measures to establish a true renewable portfolio standard that would:

- Require renewable portfolio standard (RPS) targets be achieved only by electricity produced from renewable energy resources, and repeal the definition of energy efficiency gains as renewable resources for the purpose of the RPS.
- Eliminate “off-ramps” for failure to meet the standards.
- Establish penalties for utilities' non-attainment of RPS target.
- Increase the amount of renewable energy generated by Hawaii's utilities to achieve levels of 20% of net electricity sales by 2015, 30% by 2020, 40% by 2025, and 50% by 2030.

Setting an aggressive, clear energy efficiency standard and high renewable portfolio standard will mobilize the whole state to move towards our preferred energy future.

Thank you for the opportunity to testify.

¹ On page 1, lines 9-10 of the bill, the “four thousand three hundred gigwatts of electricity savings statewide by 2030” should read “four thousand three hundred gigwatt-hours of electricity savings statewide by 2030.”



LIFE OF THE LAND

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COMMITTEE ON ENERGY & ENVIRONMENTAL PROTECTION

Rep. Hermina M. Morita, Chair

Rep. Denny Coffman, Vice Chair

DATE: Tuesday, February 03, 2009

TIME: 9:00 a.m.

PLACE: Conference Room 325

HB 429 PUC to establish energy efficiency portfolio standards. **SUPPORT**

Aloha Chair Morita, Vice Chair Coffman and Members of the Committee

My name is Henry Curtis and I am the Executive Director of Life of the Land, Hawai'i's own energy, environmental and community action group advocating for the people and `aina for almost four decades. Our mission is to preserve and protect the life of the land through sound energy and land use policies and to promote open government through research, education, advocacy and, when necessary, litigation.

A couple of years ago I was introduced to a concept that took some time to comprehend, and shook up the way I viewed energy efficiency. At its core, this energy efficiency paradox is an economic issue, the type of issue which I studied as an undergrad and graduate student of economic theory.

At the microeconomic level, energy efficiency makes sense, we can do everything we currently do with less energy and at a lower cost.

At the macroeconomic level there are three feedbacks which vary in importance over time but which are often ignored by those who advocate energy efficiency.

These feedbacks are known as the "rebound effects" and they stem from producing the same good with less energy:

(1) Energy efficiency means we can produce the same good for a lower cost, and thus the price of the finished good or service drops and demand for it rises

(2) When the costs of inputs change relative to one another, there is a tendency to shift from higher cost inputs to lower cost inputs, thus if costs associated with energy inputs drops relative to other inputs, then there will be a tendency to substitute energy inputs for existing labor, capital, and land inputs

(3) When we produce the same goods by using less energy, we can drive down the demand for total energy and then the cost of energy falls, making it more appealing to use

Some researchers have pointed out that large increases in efficiency are associated with spurts in economic growth and in the expansion in the total demand for energy.

This phenomena was first pointed out by the English economist and philosopher William Stanley Jevons in "The Coal Question" (1865). Jevons was one of the main contributors to the development of neoclassical economics which is based on empirical methods, the use of statistics and econometrics, and marginal analysis.

Jevons analyzed the impact of James Watt's introduction of a more efficient coal steam engine. This efficiency innovation had the effect of making coal a more cost effective power source. Its impact to the economy was two-fold: (1) There was a decrease in the units of coal needed per unit output (microeconomic efficiency) but (2) There was a sharp rise in the total amount of coal consumed (macroeconomic national impacts).

These Rebound Effect are also known as the Jevons Paradox, the Jevons Effect, and the Khazzoom-Brookes Postulate. This paradox suggests that increasing energy efficiency is great as an economic tool to promote economic growth, but its adoption will not lead to a decrease, but rather an increase, in total energy consumption.

The only way of achieving economic security associated with decreased reliance on imported fuels is by converting the economy from relying on imported fossil fuels and imported vegetable oils to the use of local renewable energy: solar, wind, biomass, ocean wave, and ocean thermal resources.

Henry Curtis
Executive Director