

State of Hawaii Energy Resources Coordinator

Annual Report 2005



**State of Hawaii
Department of Business, Economic Development & Tourism**

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Economic Health Depends on Energy

Energy—its supply and use—is the foundation of Hawaii’s economy. How much fuel is imported and how efficiently it is used impacts each resident’s personal life and business activities. A stable energy supply is essential to continued prosperity.

Every barrel of oil saved translates to more dollars available to the local economy, in addition to the many environmental benefits.

The Energy Resources Coordinator, whose staff works to enhance energy security, improve the state’s economy, and reduce dependence on imports, faces many challenges, including:

- ✓ Hawaii, the most oil-dependent of the 50 states, relies on im-

ported petroleum for about 89% of its primary energy. Most of this oil is from foreign nations.

- ✓ The islands’ electricity grids are not interconnected.

- ✓ Hawaii residents pay among the nation’s highest costs for electricity and gasoline.

In 1974, the Legislature created the position of Energy Resources Coordinator to address economic, environmental and energy security issues. It is held by the Director of the Department of Business, Economic Development, and Tourism (DBEDT).

By law, the State’s energy program considers these objectives:

- ◇ dependable, efficient, and economical statewide energy sys-

tems capable of meeting the needs of the people;

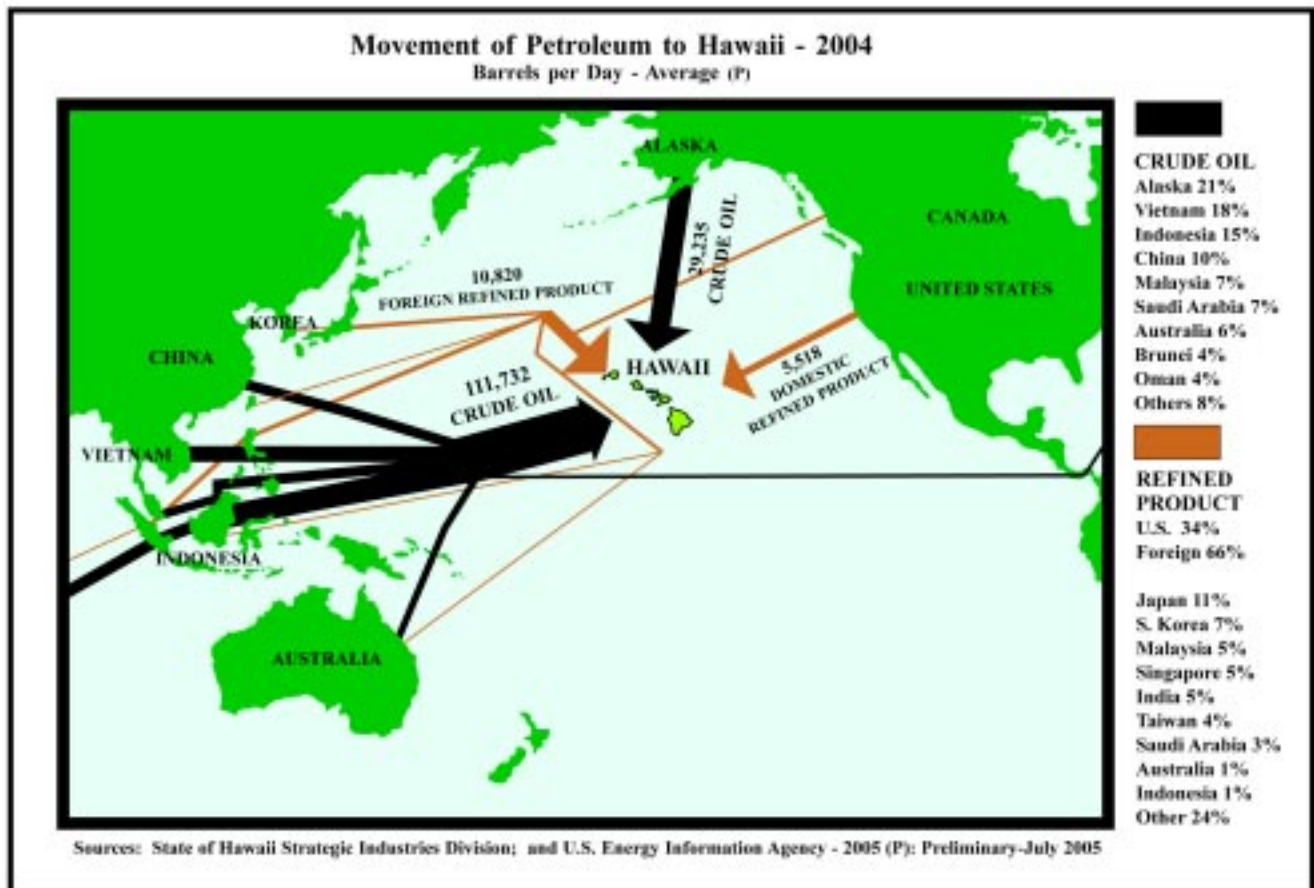
- ◇ increased energy self-sufficiency;

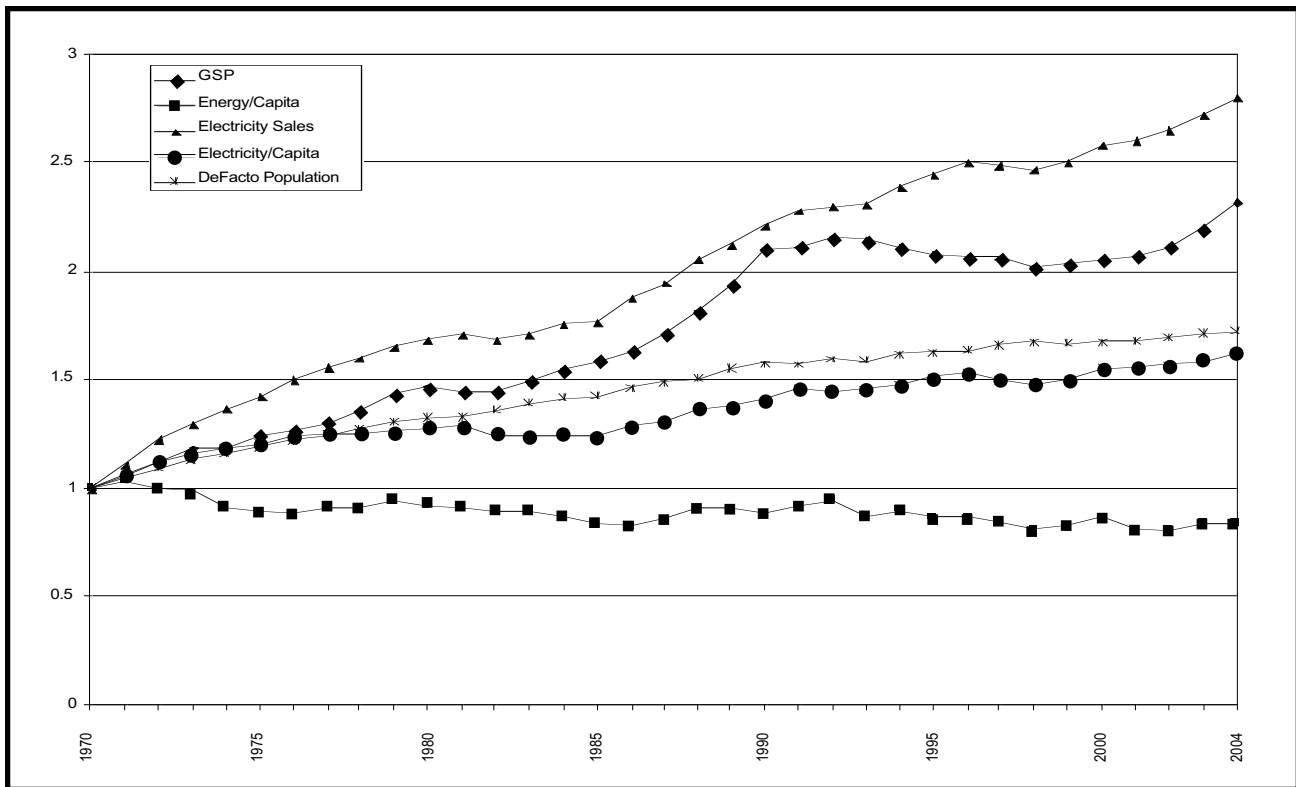
- ◇ greater energy security; and

- ◇ reduction, avoidance, or sequestration of greenhouse gas emissions.

The State’s energy policy also requires that the total costs and benefits of all energy resource options—including efficiency—be compared. Alternative transportation fuels and efficient transportation must also be promoted.

The Strategic Industries Division (SID) implements programs to meet these goals. Achievements for 2005 are detailed in the following pages.





Key Energy and Economic Indicators in Hawaii, 1970-2004

Hawaii Consumers Using More Energy: Consumption of Oil, Coal, Renewables and Electricity Rises Slightly

Hawaii's primary energy consumption last year was 324 trillion Btu, up 1.14% over 2003.

Petroleum use increased slightly, rising 1.17% from 2003 to 2004. Petroleum consumption totalled 287.8 trillion Btu in 2004; it was somewhat more than 284 trillion Btu in 2003.

Coal consumption in short tons increased 2% from 2003, continuing a trend begun in 1985.

Together, the imported fossil fuels—coal and oil—represent almost 94% of Hawaii's energy consumption.

Renewable energy production

increased by 4.03% during 2004. Much of this was due to increased output from Puna Geothermal Venture's power plant.

Energy consumers spent \$4.35 billion for energy in 2004, or 18% more than in 2003, principally due to high oil prices. This was about 8.7% of Hawaii's \$50.13 billion Gross State Product (GSP).

Despite the increases in 2004 energy use, Hawaii's economy is significantly more energy efficient than it was in 1970. Hawaii residents use 17% less energy per capita (based on de facto population) than 35 years ago, although

overall energy used per capita did increase by 0.29% in 2004 compared to the previous year.

Consumers' increasing use of electrotechnologies has resulted in electricity sales continuing to rise faster than the de facto population and GSP.

In 2004, electricity sales per capita were 162% more than 1970, while de facto population grew 72% and real GSP increased 131%.

2004 electricity sales increased 2.96% over 2003. This resulted in a modest 2.09% increase in electricity sales per capita.

Energy Programs Supported by \$1.25 Million in State and Federal Funds

Nearly \$1.25 million in Federal and State funds were dedicated to a wide variety of energy initiatives in 2005.

Of this, \$1.1 million was from Federal sources, nearly \$8 for every \$1 of State funds budgeted.

Federal funds included a significant figure obtained through competitive nationwide solicitations offered by the U.S. Department of Energy (USDOE). SID's track record of securing and successfully completing Federal contracts remains stellar.

The State's energy program is extended by a network of partners at the County, State and Federal government level as well as in the private sector. Many of SID's projects involve matching funds and in-kind services from other partners, meaning that the level of commitment within the State and the economic impact of these programs is far beyond what can be characterized by SID's budget alone.

The Utilities program remained the largest component of SID's efforts in 2005. Over half of the Federal funds and nearly all of the State funds dedicated to energy programs were used in this sector.

Utility projects supported by Federal contracts, totalling \$577,356, included energy emergency pre-

paredness planning and hazard mitigation, State energy policy planning, study of distributed energy resources, and activities promoting renewables such as biomass, wind and nonelectric geothermal energy.

State general funds totalling \$129,000 were used to support the Homeland Security Summit, renewable hydrogen projects, and other activities undertaken by the Energy Resources Coordinator and a liaison in Washington, D.C.

The second largest component was the Buildings sector, which encompasses building guidelines, the Model Energy Code, the Rebuild Hawaii consortium, the national Rebuild America program, Energy Star products promotion and other State Energy Program initiatives. A total of \$464,585 was budgeted from Federal sources.

Activities in resource efficiency were supported by \$10,000 in Federal funds under the Industrial sector component.

Alternative fuels in the Transportation sector received \$50,000 in Federal support.

Science education, including support for the Science Bowl and State Science and Engineering Fair, totalled \$7,950 in Federal grants.

Description	State Funds	Federal Grants	Total
Education	\$ 10,000	\$ 7,950	\$ 17,950
Transportation	0	50,000	50,000
Buildings	0	464,585	464,585
Industrial	0	10,000	10,000
Utilities	129,000	577,365	706,356
Totals	\$ 139,000	\$1,109,891	\$1,248,891

SID Energy Program Budget for the Fiscal Year Ended 6/30/05

Monitoring of “Gas Cap” Initiated

The nation’s only state law to cap gasoline prices took effect in Hawaii on September 1, 2005. It was passed by the 2004 Hawaii State Legislature and became law as HRS Chapter 486H without the Governor’s signature.

The Energy Resources Coordinator and his staff worked closely with the Governor, her senior staff and advisors, the Public Utilities Commission (PUC), the Department of Commerce and Consumer Affairs, the Attorney General, and numerous other government agencies, as well as

the petroleum industry, to develop monitoring methods for the new law.

Staff also designed contingency plans to respond to potential major adverse effects of the law on the State’s economy and public welfare.

As part of the gas cap implementation, gasoline wholesalers and jobbers are required to report petroleum market data and other information to the PUC.

SID supported the PUC by identifying requisite data and information, and developing data

collection methods. Nearly 300 gasoline retailers have reported data essential to the price caps monitoring effort.

Weekly charts of petroleum prices collected from reporting services have been placed on the internet at www.hawaii.gov/dbedt/ert.

SID established procedures for reporting issues and problems encountered by gasoline dealers. SID helped to coordinate responses to complaints from consumers, wholesalers, and service stations.

Hawaii’s Expertise in Emergency Planning Aids Gulf Coast States, Pacific Region

Interagency coordination of emergency responses has long been a strength of Hawaii’s energy emergency preparedness program, which trains cooperating agencies for disasters—ranging from hurricanes to terrorist events—that can disrupt the islands’ energy infrastructure.

In 2005, SID staff conducted both exercises and “real world” hurricane preparation, coordinating with State Civil Defense, Federal Emergency Management Agency, U.S. Army Corps of Engineers, and members of the Hawaii State Energy Council (EC).

When Hurricane Katrina hit the Gulf Coast, SID staff provided technical and advisory support to the affected states through the

National Association of State Energy Officials. SID also shared pertinent fuel shortage management plans.

SID staff developed ways that EC members can plan training exercises for disaster resource assistance. A flowchart of the processes to request and coordinate Federal resources will be developed.

To facilitate management of local emergencies, SID staff worked with the U.S. Army Corps of Engineers to transfer Geographic Information System (GIS) data on emergency generators to a State-accessible database. These data will help emergency response staff identify generator locations throughout Hawaii.

Expanding the GIS dataset to include all critical infrastructure facilities has been proposed.

To share Hawaii’s expertise in emergency planning, SID participated in an East West Center seminar on disaster risk mitigation in April, presenting Hawaii’s “best practices” to Asia-Pacific counterparts.

Also, as part of the 2005 Asia-Pacific Homeland Security Summit and Exposition, SID representatives spoke on a panel covering regional security concerns. A special concurrent meeting of the EC offered briefings on the Hawaii Gas Cap law, lessons learned from Hurricane Katrina, and other issues pertinent to energy planners.

Efficiency Opportunities Identified

Energy Use by State Facilities Pinpointed

Eleven energy conservation measures (ECMs) in State buildings could save up to 14.2% of those facilities' annual energy use. The measures would save \$10.7 million; estimated construction costs would be \$78.3 million.

These are among the conclusions of a recently-published energy benchmarking study of State facilities on Oahu. The study evaluates electricity consumption and characterizes the distribution of electrical energy usage by agency, building occupancy type, and end use.

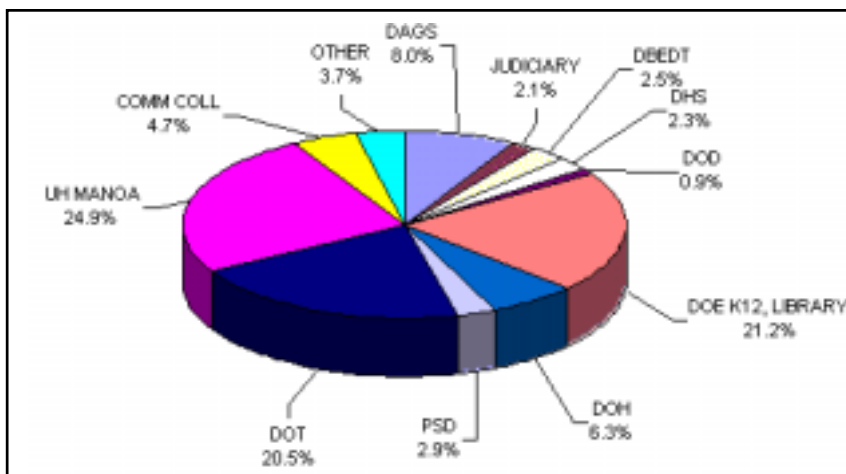
Due to constraints on resources and time, the study relied on existing data. Oak Ridge National Laboratory provided a technical review of the study.

Approximately 80% of the 2,625 buildings owned and operated by the State are on Oahu. In 2004, State facilities on Oahu used some 556 million kilowatt-hours, costing over \$71 million.

Air conditioners consume most of the electricity—44%—followed by lighting at 30%.

The recommended ECMs, which would produce energy savings with paybacks of less than 15 years, include lighting retrofits, reflective solar window tinting, high efficiency motor replacement, and roof insulation. Installing facility management systems had the fastest payback—less than two years—followed by waste heat recovery systems.

While assessing the implemen-



State of Hawaii Facilities on Oahu: Electricity Consumption by State Agency

tation of these recommendations, the State is proceeding with other efficiency improvements. The \$1.4 million performance contract to improve lighting in the Judiciary was completed for five buildings on Oahu and Maui. The retrofits are saving the Judiciary over 3 million kilowatt-hours annually, reducing demand by 600 kilowatts and slicing approximately \$342,000 off utility bills.

Savings continue at the State's first performance contract, at the University of Hawaii at Hilo. Since the start of the contract in 1996, the U.H.H. has saved nearly \$4.3 million; the cost of the contract was \$2.9 million.

Hawaii High Performance School Guidelines were developed in partnership with the State Dept. of Education (DOE) and the Dept. of Accounting and General Services. These guidelines will assist DOE design facilities that are energy efficient, comfortable, and durable.

A passive cooling project for portable public classrooms is providing solar fans and high-reflectance roofs. Students in science classes are documenting the cooling effects of these measures. Architects have also developed designs for new portables that include solar chimneys, which facilitate natural ventilation, daylighting, and flexible interior space.

At the U.H.-Manoa campus, a project cosponsored by USDOE is featuring Energy Star products in the Wainani Hale student apartments.

The Counties are also targeting energy efficiency. Hawaii County, in the third year after retrofitting the Hilo Public Safety Building and Kona Police Station, has saved \$177,584 in energy costs, more than the savings guaranteed by the performance contract.

Hawaii County has also begun to implement energy efficiency measures at the Department of Water Supply.

State Garners Additional Federal Energy Grant Awards

The State's energy program has been awarded \$100,000 to continue the Rebuild America Program, \$149,986 for the development of a tropical energy code, and \$10,000 to promote the purchase of efficient Energy Star products. All grants were achieved during highly competitive national solicitations by the U.S. Department of Energy.

The Rebuild America grant will provide for technical advice which will promote high performance buildings and encourage state agencies to pursue energy efficiency. This is the seventh Rebuild America grant received by Hawaii, an indication of the state's leadership and achievements in this national program.

For the Codes and Standards grant, Hawaii will serve in an international leadership role by working with Pacific and Caribbean entities to write a Model Tropical Code tailored to the needs of the participating entities: Puerto Rico, the U.S. Virgin Islands, and the Commonwealth of the Northern Mariana Islands. The model code will also be promulgated to design professionals and decision makers.

Items bearing the Energy Star label meet energy efficiency standards. The new grant will promote the purchase of Energy Star products by public agencies. A case study will analyze the use of Energy Star products in low-income multifamily housing, comparing the savings with conventional housing. In addition to Energy Star appliances and lighting products, roofing materials and electronics may also be considered in the study.

Maui Adopts Energy Building Code

Maui County, joining the other three counties, adopted energy efficiency measures in its Building Code during 2005.

The energy code increases heating, ventilating, and air conditioning efficiencies in commercial buildings by about 17%. It also sets lighting power limits for building interiors, as well as for outdoor lighting sources such as service stations.

For residential dwellings, the energy efficiency code provides a range of design options for roofs to keep the interior of the home cooler and more comfortable. These options will help deter the installation of costly air conditioning systems.

The Code improvements were implemented with the support and advice of SID staff, who also traveled to Maui to explain the standards to design professionals and outline compliance issues for Maui's permitting staff.

Environmentally Preferable Purchasing Conserves Resources

Public agencies received assistance procuring recycled and otherwise environmentally preferable materials in 2005 from several new publications.

With support from the U.S. Environmental Protection Agency, a Management Action Plan was developed to provide guidance and recommendations.

A Guide on Environmentally Preferable Products, outlining where and why to purchase these

items, was also circulated.

A survey of the purchasing habits of State agencies offered an opportunity to advise buyers which recycled products should be purchased, and why. SID provided technical assistance for the survey to the State Department of Health and the State of Hawaii Procurement Office.

According to the survey, Hawaii's state agencies are definitely using their purchasing

power to protect our environment. Last year, 112 survey respondents showed that state agencies spent approximately \$750,000 on recycled products. The survey also found that 90% of office paper contained recycled content.

In addition, agencies received fact sheets explaining federal executive orders and State of Hawaii statutes relating to the procurement of environmentally preferable products.

E-10 Unleaded Fuel to be Available in Hawaii

Beginning on April 2, 2006, at least 85 percent of Hawaii's gasoline must be "E-10 Unleaded" – gasoline containing 10% ethanol. Ethanol, a renewable fuel, is a normal component of today's gasoline.

All gasoline-powered vehicles sold in the U.S. are designed to use E-10 Unleaded. Gasoline containing up to 10% ethanol has been in increasing use in the U.S. since the late 1970s. In 2005, about 46% of the gasoline in the U.S. contained ethanol.

In some states and large metropolitan areas, all of the gasoline contains ethanol and has for several years; it has been available in over 41 states for more than 10 years and in over 21 states for more than two decades.

To prepare for the mandate, numerous meetings have been held and publications have been sent to fuel distributors, fuel in-

dustry service providers, gasoline retailers, regulators, automotive technicians, and fleet managers, as well as the general public.

Refiners and distributors are working to construct needed storage and blending facilities.

Exemptions will only be allowed if competitively priced ethanol is not available, or in the case of undue hardship for the fuel distributor.

Ethanol can be made from a variety of materials. Worldwide ethanol fuel demand and production have been expanding. Several studies have indicated that Hawaii can cost-effectively compete in producing ethanol fuel to meet Hawaii's needs, as well as for export.

Five ethanol plants are currently planned for construction in the islands: two each on Maui and Kauai, and one on Oahu. All expect to make use of molasses or

bagasse, by-products of the sugar industry. The first facilities are expected to begin production in late 2006.

Other technologies under development could use "cellulosic" waste materials such as yard waste or wood waste.

Tax incentives to assist developers, fuel distributors, and retailers include a facility incentive equal to 30 cents per gallon of capacity, a Federal tax credit for blenders, and an excise tax exemption. Additional incentives are contained in the 2005 Federal energy bill.

The production of E-10 Unleaded in Hawaii will require more than 40 million gallons of ethanol per year.

Answers to commonly-asked questions are posted at <http://new-fuel.com>. This website is designed as a "one stop shop" for information on E-10 Unleaded.

Net Metering Law Strengthened

Senate Bill 1003, CD1, was signed into law by Governor Linda Lingle as Act 104 on June 6, 2005. It strengthens Hawaii's net metering statute by allowing excess credits to be carried forward from month to month, for up to a year.

It also allows the PUC to increase the current 50-kilowatt size limit for individual systems and to amend the rate structure, standard contract, or tariff for net metered systems.

A related measure, Act 69, addressed regulatory controls for renewable systems over 10 kilowatts. The law directs the PUC to determine safety, performance, and reliability standards for these systems.

Maui Student Scientists Win Again

Maui High School, which has won more top awards in the Hawaii Science Bowl than any other school, took first place again in 2005, earning the right to compete nationally in Washington, D.C.

Iolani High School, the second place winner, toured science facilities on the Big Island.

SID also supported the annual Science and Engineering Fair, providing judges and making nine awards in three categories.

Biomass Projects Span the State

A versatile renewable resource, biomass can provide solid, liquid or gaseous fuels for power generation and transportation.

In 2005, SID was awarded \$75,328 from the USDOE to continue education and technical support projects under its Pacific Regional Biomass Energy Partnership.

On Kauai, samples of gas from the Kekaha landfill were analyzed to determine gas quality and to identify any potentially detrimental components. Tests revealed that methane concentrations ranged between 55% and 65%.

The analysis concluded that the gas does have potential to generate electricity through internal combustion engines, Stirling engines or microturbines.

Funding has been provided to design a gas distribution and collection system in cooperation with

the Pacific Missile Range Facility, located adjacent to the landfill and a potential user of the fuel.

On Oahu, landfill gas had provided 3 MW annually from 1989 to 2002, until turbine problems shut down the operation at Kapaa landfill. The City and County of Honolulu has updated gas analyses and production models, and expects to seek proposals to resume power generation.

In 2005, one of Hawaii's most innovative renewable energy companies, Pacific Biodiesel, was honored by the U.S. Small Business Administration as the Small Business Person of the Year for Maui County. Pacific Biodiesel, which initiated a pilot project to convert cooking grease to fuel on Maui in 1996, also has operations in Japan and several locations in the U.S.

The County of Hawaii is moving toward the production of

biodiesel, having surveyed food establishments producing waste cooking oil.

Analyses of other biomass resources, including cane trash and wood waste, were completed by the U.H. Hawaii Natural Energy Institute. One of the studies examined gasification of mixed eucalyptus fuels.

The U.H. has also completed a statewide biomass map, based on a 2002 inventory focusing on currently available feedstocks.

Hawaii was selected as one of twelve states to participate in a U.S. Department of Agriculture-funded study to determine biomass incentives needed to promote developing markets for near-term biofuels and other bio-products. Local response to the study, conducted by the North Carolina Solar Center, was coordinated by SID.

"Green" Buildings Reap Environmental Benefits, Savings

The 2004 Hawaii Green Business Awards ceremony, held in the Governor's Office during January 2005, honored resort industry leaders for their energy and re-

source efficiency programs.

The 2004 award recipients were:

- ❖ Grand Wailea Resort Hotel and Spa
- ❖ Hale Koa Hotel

- ❖ Sheraton Hotels in Waikiki
- ❖ Hyatt Regency Kauai Resort and Spa
- ❖ Chamber of Commerce of Hawaii



Governor Linda Lingle and other notables celebrate the 2004 Hawaii Green Business Awards

New, Upgraded Wind and Hydro Projects

Residents on two islands can look forward to more wind power as planning and construction move ahead.

On the Big Island, Hawi Renewable Energy Development has broken ground for its new 10.56 MW wind farm in N. Kohala. It will consist of 16 Vestas turbines on 200 acres at Upolu Point.

On the south end of the Big Island, Apollo Energy plans to upgrade the Kamaoa Wind Farm, increasing capacity from 7 MW to 20.5 MW. PUC approval has been obtained.

In October, ground was broken for the Kaheawa Wind Power project in West Maui. Twenty turbines are expected to provide up to 30 MW, or about 9% of Maui Electric Company's power, when it is operational in early 2006.

Hawaiian Electric Company tested the wind resource on the ridge above Kahe Point for a year, and proposed installing up to 26 300-foot turbines to generate as much as 39 MW. However, the company has decided not to pursue the project.

One of the oldest renewable energy power plants in the state—HELCO's Puueo hydro facility—was upgraded and is back in operation. The Puueo plant was originally built in 1910. The larger of its two turbines, damaged in 2001, was replaced with a new impulse turbine, bringing the total capacity up to 2.5 MW.

Both Electric and Nonelectric Uses of Geothermal Energy Advance

An updated geothermal resource assessment was completed for SID in September 2005. The report estimates Hawaii's geothermal reserves, based on available exploration and well testing data, at about 1,535 MW, although the energy may not be commercially recoverable.

The report also analyzes drilling and operations costs to estimate the capital cost and the cost of operations and maintenance for geothermal development in the Kilauea East Rift Zone.

Meanwhile, Puna Geothermal Venture (PGV), operators of the state's only geothermal power plant, completed redrilling an existing production well, increasing the net capacity of the power plant by approximately 4 MW to a total of approximately 29 MW.

A new production well, KS6, and a new injection well, KS13, were also completed.

The drilling is part of a \$15 million enhancement program, expected to bring the plant to its 30 MW capacity by the end of 2005. Currently, electricity is sold to the Hawaii Electric Light Company (HELCO), primarily during peak hours.

In addition to electricity production, geothermal fluids can provide heat for a variety of enterprises, ranging from ice making to fruit dehydration and spas.

With support from USDOE, the State and County of Hawaii are investigating these nonelectric "direct uses" of geothermal. An



Margarita Hopkins, the County of Hawaii's agricultural specialist, examines an unutilized shallow, warm well at the Malama Ki agricultural experiment station in Puna.

advisory Working Group has been established to consider projects beneficial to the community.

Several meetings were held in the community, for agriculture and business groups, and for the County Council to explore issues, concerns and potential for direct use enterprises.

Potentially, heat could be transferred from PGV's waste fluids before they are injected, and hot water transported to nearby businesses. Another option for direct use development is extracting warm water from shallow wells tapping the top of the aquifer; the water is salty but does not contain the same chemicals or gases as deep, hot, pressurized fluids.

Renewable Energy Research, Demonstration & Commercialization Contribute to Goals

Hawaii's Renewable Portfolio Standard sets a target of 20% renewables by 2020. Continued progress in renewable energy research, development, demonstration and commercialization are moving the state toward this goal.

The future got brighter for solar power in Hawaii during 2005. The U.S. Army announced plans to install solar water heaters and an array of energy-efficiency measures in all of approximately 7,500 new and renovated homes which will serve military families. Also, nearly 3,000 of the new homes will receive photovoltaic systems.

In October, a 309-kilowatt photovoltaic installation was dedicated on the rooftop of Building 54, an historic aircraft hangar on Ford Island, Pearl Harbor. The system, the largest federal solar

electric facility in Hawaii, will save \$40,000 per year.

Wave power research and development took another step forward this year with the upgrading and redeployment of the PowerBuoy in Kaneohe Bay, under the aegis of the U.S. Navy. The PowerBuoy, which is expected to produce about 20 kilowatts, began at-sea tests in 2004 but was removed for maintenance and reworking.

A second, improved PowerBuoy intended for Kaneohe Bay is being tested off the New Jersey coast.

Assessments of the wave power potential in Hawaiian waters have encouraged several other wave power manufacturers to consider deployment in Hawaii.

The state's High Technology Development Corp., through its

Hawaii Center for Advanced Transportation Technologies (HCATT), continues its partnership with the U.S. Air Force, supporting the National Demonstration Center for Alternative Fuel Vehicles at Hickam Air Force Base. Current focus is on hydrogen fuel cell powered vehicles and the supporting infrastructure.

This year, HCATT developed a fuel cell powered step van, adding to the fuel cell bus delivered last year. Additionally, HCATT developed a modular, deployable hydrogen fueling station which will serve as a model for use at bases throughout the Air Force.

Future projects include increasing the fuel cell vehicle and ground support equipment fleet and introducing lithium battery powered vehicles.



This Ford Island installation is Hawaii's largest federal solar electric system. Photo courtesy of PowerLight Corp.

Workshops, Events Provide Training and Educational Opportunities

As part of SID's efforts to inform design professionals and administrators about the value of increased building design efficiency, staff spoke at the Cool Roofs Seminar and contributed to discussions of the benefits of garden roofs at events sponsored by the Hawaii Roofing Contractor's Association.

Energy Star presentations this year included sessions for: Roofing Contractors Association of Hawaii; National Association of County Officials Conference and Exposition in Honolulu; and a presentation on the Hawaii Green Business Program at the National Environmental Performance Summit in Chicago.

The "Costs and Benefits of Green Buildings" were explained to public and private sector professionals in a workshop. The presenter met separately with members of DBEDT's State Facilities Energy Efficiency Discussion Group, the BuiltGreen Steering Committee, and the American Institute of Architects.

This subject was also offered during the plenary session of the 2005 Pacific Coast Electrical Association (PCEA) Conference and Expo. The PCEA agenda included a variety of other sessions on energy efficient technologies.

Charrettes—cooperative design exercises—stimulated the inclusion of energy and resource efficiency for the Kanuikapono

Learning Center at Anahola, Kauai, the Hilo Redemption Center, the Academy of the Pacific, the Building Industries Association (BIA) new Training Center, and a Maui County facility.

SID also cosponsored the BIA's Home Building and Remodeling Show in February, conducting a seminar on how to save money at home with energy efficient appliances and features.

Another BIA series, "Remodel it Right!" received SID support. Seminars were held at four community venues.

SID staff also participated in the BIA's "Parade of Homes," discussing building practices with builder representatives and reviewing the energy efficiency features of the homes.

Workshops on Greening Affordable Housing were cosponsored with federal and nonprofit housing agencies.

A series of eight sustainable design tools workshops were offered by HECO, DBEDT, Rebuild Hawaii, the U.H. School of Architecture, USDOE, and Rebuild America. Topics included commissioning, advanced building design, daylighting, photovoltaics in buildings, energy management systems, building energy simulation and indoor air quality. Nearly 300 individuals participated.

A technical review workshop for commercial interiors achieving Leadership in Energy and En-

vironmental Design criteria was held at the Punahou School Science Center, reaching 25 people.

Three seminars on "Saving Energy in your Home" were conducted at the 28th Annual Pacific Home and Garden Show, promoting solar water heating, insulation, ceiling fans, Energy Star appliances and other energy savers.

Six presentations on home efficiency measures were provided for 150 Molokai residents.

Energy Awareness Month, which is October, was celebrated with an informative exhibition at Ala Moana Center. Five thousand people attended.

To help meet the information needs of government energy managers, a seminar was offered on Measurement and Verification of Energy Savings.

A workshop on residential air conditioning emphasizing the importance of correct sizing attracted 80 professionals.

Hawaii Green Hotel forums were cosponsored at four resorts statewide, featuring energy and resource efficiency, renewable energy and green purchasing.

The envelope section of Hawaii's energy code was discussed with the National Fenestration Council's Technical Review Committee, which reviewed the best options for upgrading fenestration requirements for Hawaii.