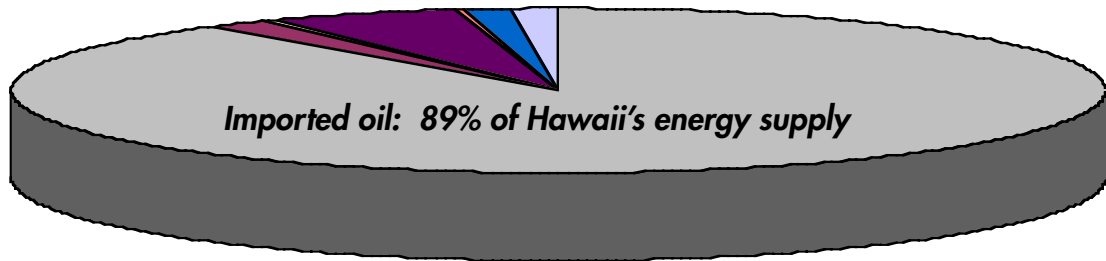


# State of Hawaii Energy Resources Coordinator



## Annual Report 2003



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Cover illustration: Sources of Hawaii's primary energy in 2002. Oil—89.12%; coal—5.60%; biomass—1.82%; municipal solid waste—1.52%; solar water heating—1.31%; hydroelectricity—0.34%; geothermal—0.25%.

This report is also available at: <http://www.hawaii.gov/dbedt/ert/erc/erc03.html>

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# Energy Affects Economic Health and Security

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.

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

Hawaii, the most oil-dependent of the 50 states, relies on imported petroleum for over 89% of its primary energy. Most of this oil is from foreign nations.

Aircraft consume an unusually large percentage of our energy.

The islands’ electricity grids are not interconnected.

Hawaii residents pay among the

nation’s highest costs for electricity and gasoline.

These are among the challenges facing the Energy Resources Coordinator, whose staff works to enhance energy security, improve the state’s economy, and reduce dependence on imports.

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 systems

capable of meeting the needs of the people;

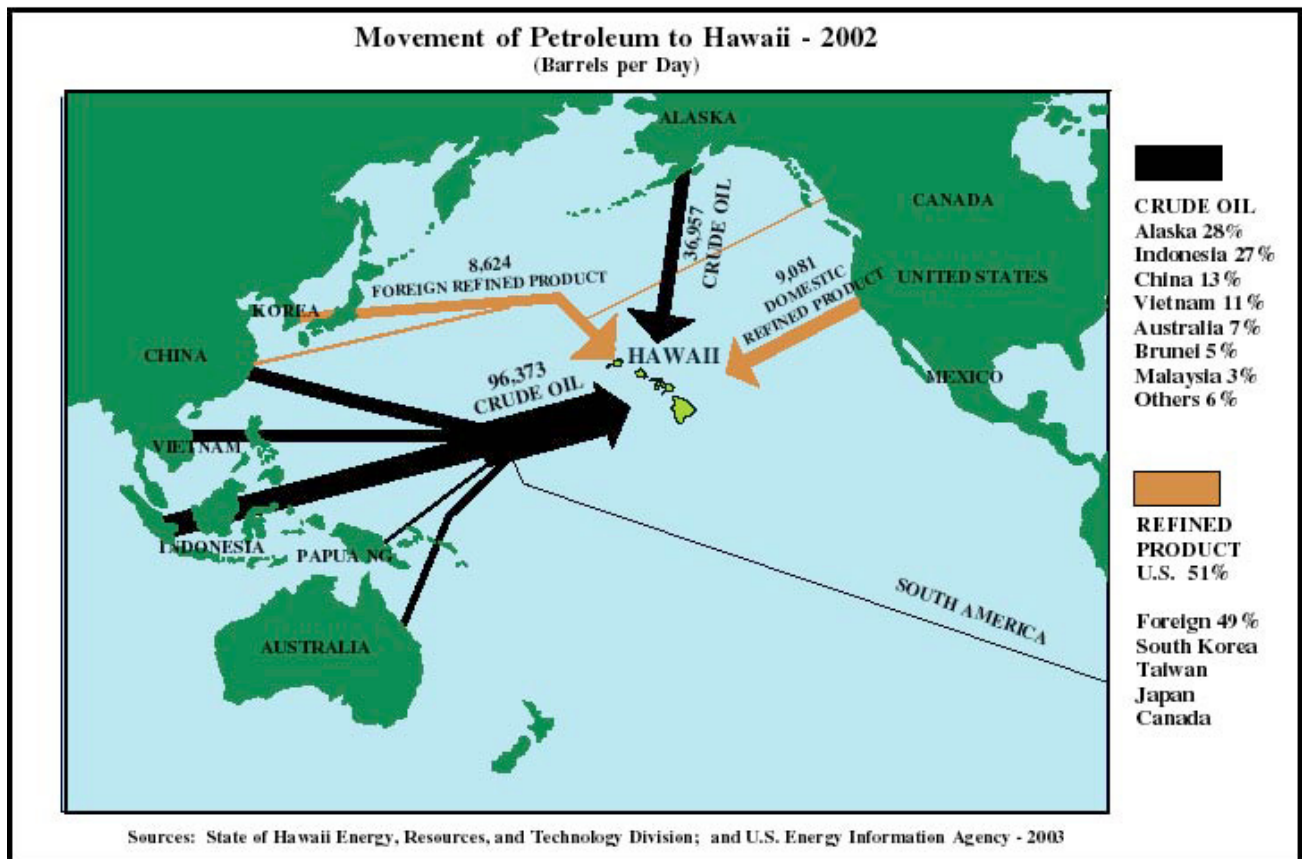
- ◇ increased energy self-sufficiency;

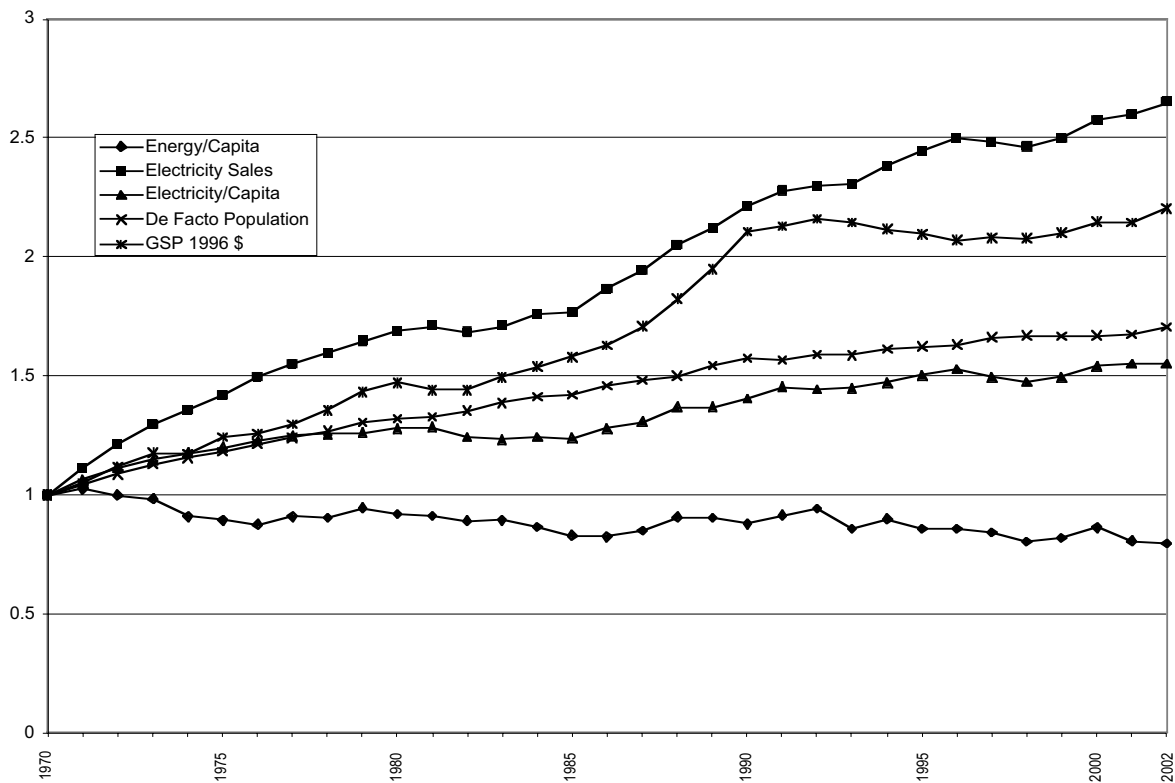
- ◇ greater energy security; and

- ◇ 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 2003 are detailed in the following pages.





*Key Energy and Economic Indicators in Hawaii, 1970-2002*

## Continued Drop in Oil, Per Capita Energy Use

Energy continues to be a key factor shaping Hawaii's economy, environment, and standard of living.

A stable energy supply is essential to continued prosperity. Energy efficiency and the use of indigenous energy resources also ensure that fewer dollars leave the state for fuel purchases.

In addition, reduced expenditures for energy release consumer dollars for other purchases in the State's economy.

An estimated 306 trillion Btu of primary energy was consumed in Hawaii last year.

In 2002, isle residents and businesses spent \$3.08 billion on energy, or about seven percent of Hawaii's \$45.7 billion GSP (in

2002 dollars.)

This is an increase of one percentage point over the percentage of GSP spent on energy in 2001.

Petroleum use declined during 2002, in part due to reduced activity in the visitor industry resulting from the SARS epidemic in Asia and the build up for the Iraq war. Petroleum consumption totalled 47.5 million barrels. This is a decrease of 94 trillion Btu and 600,000 barrels from 2001.

Energy efficiency is another factor contributing to reduced petroleum use. Hawaii's economy is significantly more energy efficient than it was in 1970. Hawaii residents use 20% less energy per capita than they did 30 years ago.

In 2002, overall energy use per

capita (based on de facto population) decreased 1.42% from the previous year.

In contrast, electricity sales continue to rise faster than the de facto population and GSP, reflecting increased use of electrotechnologies. Electricity revenues totaled \$1.34 billion, or 2.93% of 2002 GSP.

Between 1970 and 2002, electricity sales increased 265% while defacto population grew 171% and GSP (in 1996 dollars) increased 220%.

During 2002, electricity sales increased 1.86% from 2001. This also resulted in a modest 0.07% increase in electricity sales per capita, but a decline of 0.84% per dollar of real GSP.

# DBEDT Attracts \$2.5 Million in Federal Funds to Support Diverse Energy Program

Nearly \$3 million in Federal and State funds were dedicated to a wide variety of energy initiatives in 2003.

Of this, \$2,582,315 was from Federal sources, nearly \$8 for every \$1 of State funds budgeted.

Federal funds included a significant amount 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 was the largest component of SID's efforts in 2003. Over half of the Federal funds and all of the State funds dedicated to energy programs were used in this sector.

Utility projects supported by Federal contracts, totalling \$1.3 million, included administrative

rulemaking, energy emergency preparedness, an initiative for international technology exports, State energy policy planning, research into renewable energy resources, energy storage, distributed energy resources, and a hydrogen power park.

State general funds totalling \$319,000 were used for a gasoline price cap study, petroleum data, renewable hydrogen, and energy planning and policy development.

The second largest component was the Buildings sector, which encompasses building guidelines, the Model Energy Code, the Rebuild Hawaii consortium, technical assistance to State and County agencies, and innovative energy systems. A total of \$834,844 was budgeted from Federal sources.

The Industrial sector, funded by \$218,863 in Federal grants, includes projects in resource efficiency, technology innovation, and the Hawaii Environmentally Preferable Purchasing Program.

Alternative fuels in the Transportation sector received \$145,305 in Federal support.

Science education, including support for the Science Bowl and State Science and Engineering Fair, totalled \$28,386 in Federal grants.

<b>Description</b>	<b>State Funds</b>	<b>Federal Grants</b>	<b>Total</b>
<b>Education</b>	<b>\$0</b>	<b>\$28,386</b>	<b>\$28,386</b>
<b>Transportation</b>	<b>\$0</b>	<b>\$145,305</b>	<b>\$145,305</b>
<b>Buildings</b>	<b>\$0</b>	<b>\$834,844</b>	<b>\$834,844</b>
<b>Industrial</b>	<b>\$0</b>	<b>\$218,863</b>	<b>\$218,863</b>
<b>Utilities</b>	<b>\$319,000</b>	<b>\$1,354,917</b>	<b>\$1,673,917</b>
<b>Totals</b>	<b>\$319,000</b>	<b>\$2,582,315</b>	<b>\$2,901,315</b>

*SID Energy Program Budget for the Fiscal Year Ending 6/30/03*

# State Facility Efficiency Targets Identified

A law passed in 2002, Act 77, directs the State administration to achieve specific reductions in electricity use and greenhouse gas emissions in State facilities, while increasing the utilization of renewable energy resources.

Among the goals delineated are a 20% reduction in energy use by non-laboratory State facilities as of January 1, 2007. The reduction must reach 30% by January 1, 2012.

## Analysis Completed

The completion of a key study, *State Facility Energy Upgrade Analysis and Performance Contracting Potential, Phase I*, provides essential information on current energy consumption. Phase II of the study will estimate the potential for savings in State buildings which is necessary to meet these goals.

The study found that the total electrical consumption for all State of Hawaii facilities is more than 688 million kilowatt-hours per year, at an annual cost of \$83.6 million. Not surprisingly, nearly 80% of the total state energy consumption is on Oahu.

## Education Uses Most

The largest consumers of electricity are educational facilities, which use nearly 46% of the state-wide total. Department of Education buildings, including the public school system, use approximately 19%; the University of

Hawaii campuses use 22%. An additional 5% is consumed by the community college system.

The analysis also examined energy conservation measures which have already been implemented, highlighting the effectiveness of current efficiency incentives. Twenty-two of the facilities studied have achieved energy savings between 10 and 25% through demand-side management programs sponsored by Hawaiian Electric Co., Maui Electric Co., and the Hawaii Electric Light Co.

## Target: Large Facilities

Phase II of the analysis includes audits on State buildings most likely to benefit from efficiency retrofits. There are 86 large facilities—those using over one million kilowatt-hours annually—which have not yet achieved at least a 10% reduction using available utility demand-side management measures.

Additional information will be gathered on a sample of these buildings to determine if they are State-owned or leased, their size, types of occupancy, operating hours, and future plans. This information will be used to prioritize the implementation of energy performance contracts.

## New U.H. Standards

To take the next steps at the U.H.-Manoa campus, the Rebuild Hawaii consortium was awarded

\$95,346 to establish new high-performance building standards to guide architects and engineers who bid on new U.H. projects.

The standards will significantly reduce energy demand, operating costs, greenhouse gas emissions and the State's dependency on imported oil. Indoor air quality will also be improved.

Currently, the U.H. main campus spends \$13.3 million per year on electricity. By 2005, this project expects to retrofit 200,000 square feet of University buildings, produce \$500,000 in energy savings annually, and generate \$2.5 million in private investment.

## Classroom Efficiency

A \$10,000 grant from the US-DOE will underwrite technical support for the High Performance Schools Project. The goal of this project is to make new and renovated schools energy efficient, environmentally healthy, and conducive to productivity.

In a related effort, the U.H. School of Architecture has finished gathering data on temperatures in eight portable classrooms in order to develop recommendations for keeping cool without air conditioning.

Data loggers recorded temperatures over 95°F during school hours at Waianae High School, the hottest campus in the study. Ventilation can help keep temperatures down, but roof insulation may be even more effective.

# State Agencies Receive Energy Training

Recognizing the aggressive goals set by Act 77, SID cosponsored or assisted with a myriad training and networking opportunities for state agency personnel during 2003. These training sessions enable agency staff to apply state-of-the-art information appropriate for their individual facilities.

- ✓ Life Cycle Costing Workshops, Feb. 4 & 5, and 6 & 7.
- ✓ Performance Contracting Workshop, Feb. 26.
- ✓ Kauai Lagoons Pumping Workshop, Mar. 6.
- ✓ Informational Briefing on Building America Program and Zero Energy Homes, Mar. 19.
- ✓ Innovative Energy Systems Workshop, Mar. 19-20.
- ✓ Installing and Inspecting PV Systems workshop, Apr. 8.
- ✓ Efficient Purchasing/Energy Star Seminar, Apr. 21.
- ✓ Build and Buy Green Conference and Expo, Apr. 22.
- ✓ Green Building on Brownfields, Apr. 23 & May 30.
- ✓ Lighting for Aging Eyes seminar, Apr. 23.
- ✓ Creating High Performance Green Buildings: Training on Leadership in Energy and Environmental Design (LEED) Applications for Hawaii, May 16.
- ✓ Lighting for LEED, May 22.
- ✓ Energy Efficiency in Government Facilities and Energy Auditing workshop, June 17 & 19.
- ✓ Environmentally Preferable Purchasing for Government Agencies workshop, June 18 & 27.
- ✓ Pumping System Assess-



*Working closely with private partners such as the Building Industry Association, SID sponsored many energy efficiency workshops and conferences.*

ment: Certification Training, June 19 & 20, and 24 & 25.

- ✓ Innovative Energy Systems for Hawaii: Hydrogen & Fuel Cells, Aug. 21.
- ✓ Energy Star Purchasing for Government Agencies, Aug. 29.
- ✓ Pacific Coast Electrical Association Hawaii Conference and Exposition, Sept. 25-27.
- ✓ Energy Star online training, Oct. 9 and Oct. 16.
- ✓ Outdoor lighting design and Dark Skies web seminar, Nov. 5.
- ✓ American Institute of Architects & Construction Specifications Institute conference, Nov. 19.
- ✓ Landfill Methane Gas Workshop, Dec. 1.
- ✓ Hawaii Energy Policy Forum Summit, Dec. 2-3.

In addition to formal workshops and conferences, SID staff provided targeted technical support for State agencies with specific needs. This included:

- ◆ Assistance with schools constructed from high-insulation, low sound resonance materials.
- ◆ Meetings between Housing and Community Development Corporation of Hawaii

(HCDCH) engineers and vendors of high-efficiency outdoor lamps.

- ◆ Providing quotes from solar companies regarding multifamily installations to HCDCH engineers.
- ◆ Meetings with representatives of the Dept. of Accounting and General Services and the Dept. of Education regarding the requirement for R-19 insulation in school roofs.
- ◆ Meetings with the UH Institute for Astronomy on “dark skies” legislation.
- ◆ Analysis of statewide energy performance contracts for the Judiciary and the Hawaii Army National Guard.

SID also participated in workshops and special events which provided energy information to the general public and professional groups.

Topics included energy-efficient residences, solar energy investments, sustainable commercial building design for builders and design professionals, code-compliant photovoltaic installations, implementing energy efficiency projects, and efficiency for the hospitality industry.

# Study Recommends Against Gas Price Caps

Act 77 became law in 2002. Among other mandates, Act 77 calls for price caps on wholesale and retail gasoline. These caps are scheduled for implementation on July 1, 2004.

In accordance with the new law, SID subcontracted with a nationally recognized consulting firm with expertise in the petroleum industry, Stillwater Associates, to study the impacts of price caps and make recommendations on implementation. The Federal Trade Commission and the National Conference of State Legislatures also contributed to the analysis. The full report is available at <http://www.hawaii.gov/dbedt/ert/act77>.

The study concluded that Hawaii's gasoline market would be adversely affected and consumers would not benefit by the structure of gasoline price controls described in Act 77. Alternatives such as increased oversight and monitoring of the industry were recommended instead.

Hawaii is currently the only state with price caps. Previous caps elsewhere in the U.S. posed problems when implemented during the oil crisis of the 1970s.

Hawaii's caps are to be benchmarked to West Coast prices.

The analysis demonstrates that price caps are likely to raise, not lower, the price of gas in Hawaii, and would result in wide swings in prices, like those in California. Other impacts include the closure of some gasoline service stations,

and gas shortages.

The report reveals a complex gasoline market that, while not as competitive as many other markets, still responds to global trends.

There is a limited amount of transparency in the area of fuel pricing in Hawaii, analysts found. Increasing transparency could aid in determining additional market-based options to help the neighbor island markets, in particular, become as competitive as possible. Gathering hard data on the petroleum industry would contribute to this goal.

Other jurisdictions, such as Australia, have implemented both price caps and "watchdog" price monitoring and reporting. Mar-

ket monitoring and oversight was found to be more effective at preventing excess profit taking than gasoline price controls.

In addition, consumer protection oversight actions avoid the negative impacts of price caps like gasoline shortages, lines at the pump, or using the cap price as a target to earn windfall profits.

For instance, a campaign to educate consumers against buying a grade of gasoline higher than that specified by the car's manufacturer could help save Hawaii motorists \$7 million per year.

The study found that a disproportionate percentage of Hawaii motorists—35% as compared to 20% on the mainland—buy unnecessarily high octane gasoline.

## Alternative Fuel Use Expands

The use of biodiesel, manufactured on Oahu and Maui, increased significantly in 2003 when 800 City and County of Honolulu fleet vehicles made the switch to B20, a blend containing 20% biodiesel. The alternative fuel is produced from waste restaurant oils; the current production is 160,000 gallons per year, and the manufacturer, Pacific Biodiesel, can produce as much as 400,000 gallons using existing resources.

City and County vehicles ranging from refuse trucks to the Honolulu Zoo train are using biodiesel, which has also proven popular in ecotourism and park applications. There are even VW "biobeetle" rental vehicles on at

least two islands.

Ethanol, another alternative fuel, continues to excite interest. Two separate studies, completed in 2003, indicated that ethanol could be produced economically in Hawaii, though there was disagreement on whether the fuel should be used locally or shipped to the Mainland.

The reports are available at <http://www.state.hi.us/dbedt/ert/ethanol.html>.

Two-year tests of Hyundai electric SUVs were successful enough to warrant a two-year extension. There are 15 EV SUVs being tested by HECO, the U.S. Air Force, and the Hawaii Electric Vehicle Demonstration Program.



# Homeland Security is Focus of State's Emergency Preparedness Efforts

Hawaii's long-standing Energy Emergency Preparedness program, which has been exercised in preparation for hurricanes and other natural disasters, refocused on national security.

SID chairs the Energy Council, whose other participants include State Civil Defense, military forces, energy industries and local government.

During the war with Iraq, the Energy Council issued reports concerning the world petroleum market, Hawaii's energy situation, and response actions taken and planned. Emergency crude oil and refined petroleum product

supplies were assessed weekly.

The Council coordinated a transition of the Hawaii Homeland Security Advisory System with Hawaii's energy industry, and updated the Hawaii Infrastructure Security Guidelines to align with the federal color-coded system. It also conducted discussions by government agencies regarding their security initiatives.

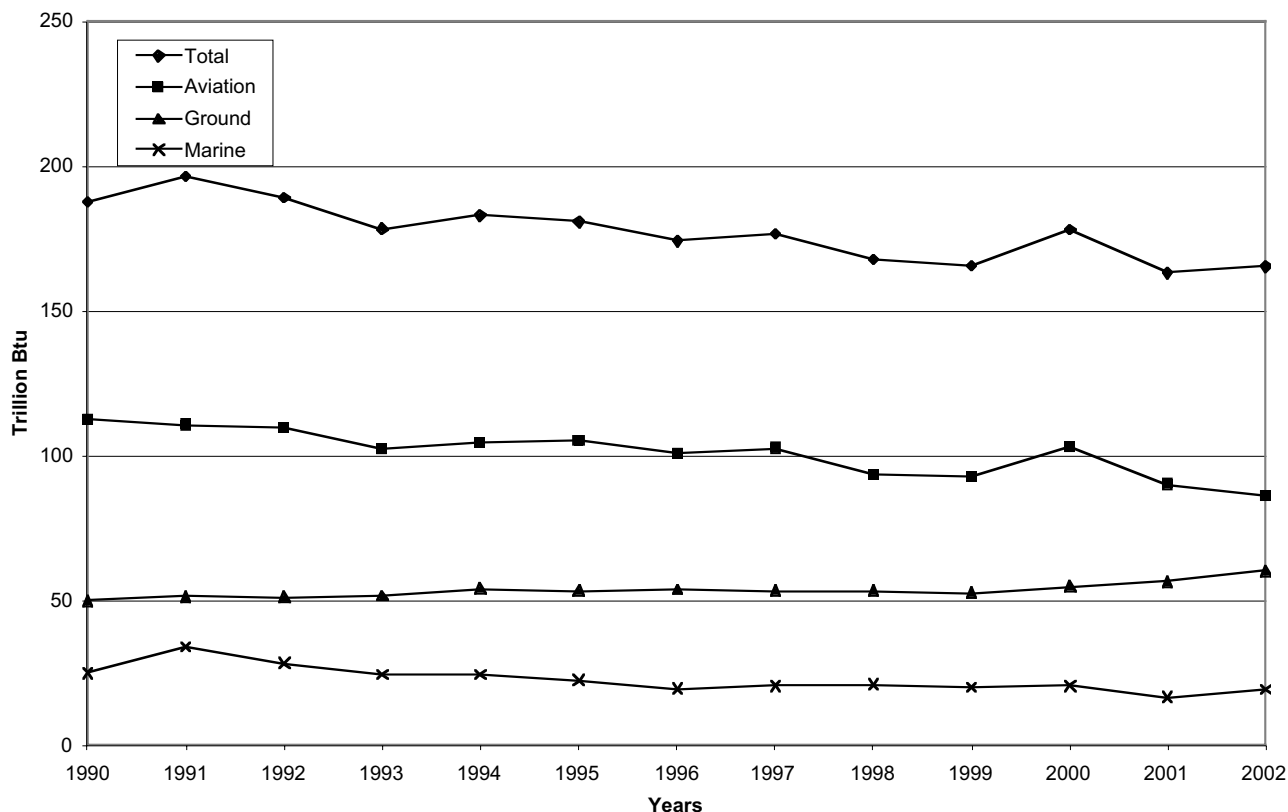
The mock drawdown of the national strategic petroleum reserve was a major exercise during 2003.

Other events included the annual Makani Pahili hurricane preparedness exercise, operational

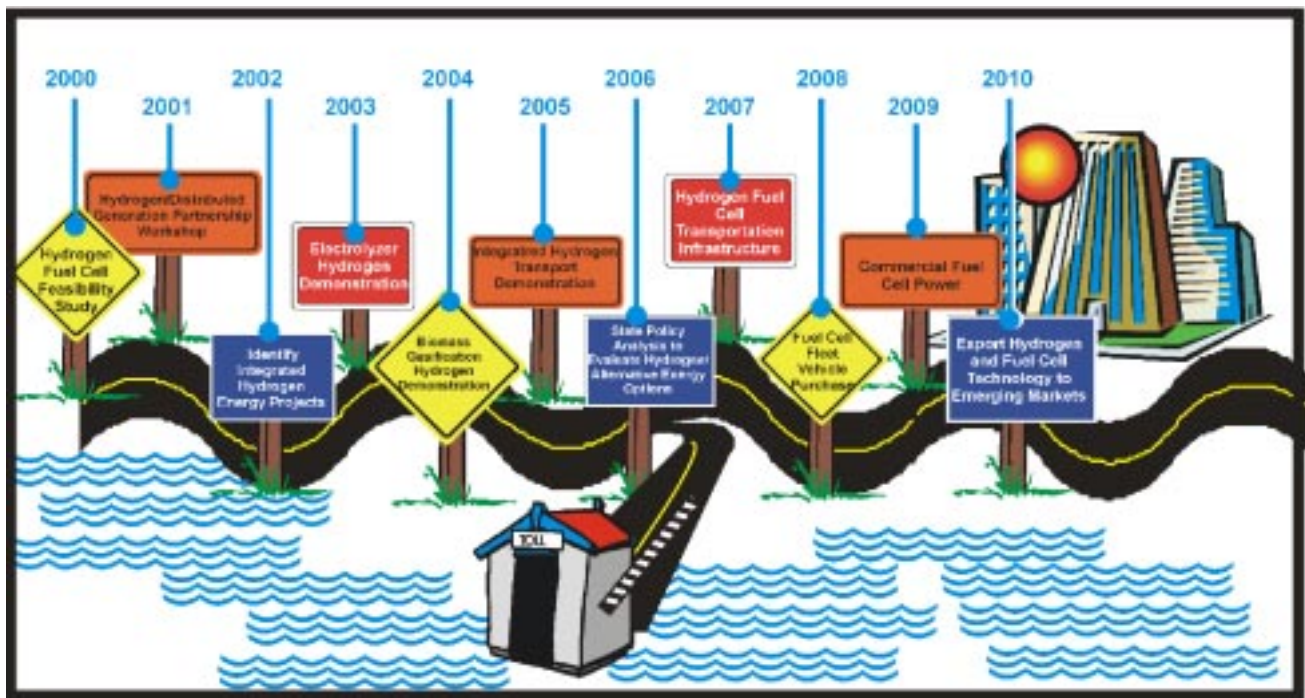
tests of emergency communications equipment, and participation in a May Disaster Response Planning Workshop.

Hawaii's homeland security practices were showcased during the inaugural Asia-Pacific Homeland Security Summit and Exposition, held in November. Over 600 regional government and business leaders attended.

The Energy Council cosponsored the Summit, which provided insight into shared security challenges. Hawaii's experience translating threat assessments into strategies was presented as a case study of this dynamic process.



*Annual transportation fuel use in Hawaii, 1990-2002*



*Hawaii's Roadmap to a Hydrogen Future*

## Hawaii: Ideal Hydrogen Laboratory

Many of the challenges facing Hawaii's energy system—no interconnection between islands, high utility rates and gasoline prices, overdependence on imported, nonrenewable fossil fuels—make our islands an ideal site for deploying hydrogen technologies.

Major investments have been made in hydrogen research locally, including the Hawaii Fuel Cell Test Facility in Honolulu, the Hydrogen Power Park, and the Gateway Distributed Energy Resources Center planned for the Natural Energy Laboratory of Hawaii Authority in Kona.

The Fuel Cell Test Facility opened for business in April 2003. Up to 20 scientists, coordinated by the UH Hawaii Natural Energy Institute, are studying ways to make fuel cell technology more practical and economic. The Of-

fice of Naval Research has supplied funding, and HECO is providing the facility plus the electricity needed to run experiments.

The facility currently houses three test stands, and could hold up to eight. Each stand allows researchers to compare the efficiency, power output and other

factors of various fuel cells.

The first phase of a demonstration project, the Hawaii Hydrogen Power Park, received an additional \$300,000 in federal funding during 2003. A site for the park, which will demonstrate hydrogen and fuel cell system integration and operation, is being selected.

## Competitions Energize Students

Maui High School's Science Bowl team reigned supreme for the second year in a row, winning another opportunity to compete at the National Science Bowl in Washington, D.C. SID provided staff support and funding for the Science Bowl, and also for the State Science and Engineering Fair, where a dozen energy awards were presented.

During the Electron Marathon in March, Sacred Hearts Academy placed first out of 28 high school teams. The third-place winner, Waialua High, traveled to Portland for the America Cup 2003 Electrathon event—and placed first. The only Hawaii school to compete nationally, Waialua's team consisted of industrial arts and special education students.

# Renewables Offer Energy Security, Stability

Becoming more energy self-reliant through the use of renewable, indigenous energy resources is a cornerstone of State energy policy for many reasons:

- ✓ reducing the use of imported oil helps our trade balance and protects against international market disruptions;
- ✓ diversity in electricity generating sources contributes to a robust and reliable utility system;
- ✓ renewable energy resources have many local and global environmental benefits; and
- ✓ renewable energy and efficiency technologies generally increase local employment.

## Geothermal

In 2003, DBEDT joined the USDOE's Geo-Powering the West initiative and received a \$10,000 grant to provide an update to legislators and agency personnel regarding Hawaii's geothermal status and potential.

An additional \$42,753 was awarded by USDOE to conduct a statewide geothermal resource assessment. The work, to begin in 2004, will update previous analyses and include potential for power generation, direct use, and applications of innovative energy technologies.

In January 2003, Puna Geothermal Venture, the state's only commercial geothermal power plant, commenced operation of a new production well, KS-5. With the subsequent conversion of former production well KS-11 to an injection well, production is being

incrementally increased to full capacity of 30 megawatts.

## Ocean Energy

In March, a workshop in Innovative Energy Systems outlined potential applications of seawater air conditioning, thermal energy storage, waste heat recovery, and the Kalina Cycle. An analysis of a hybrid district cooling system utilizing cold seawater and thermal storage showed that such an endeavor is both technically and economically viable for downtown Honolulu. Energy savings in excess of 80% are achievable.

The workshop proceedings are posted at <http://www.state.hi.us/dbedt/ert/iesw2003/iesw2003.html>.

In another application of ocean energy, the Navy will be demonstrating Wave Energy Conversion buoys in Kaneohe Bay. Up to six submerged buoys may be anchored in about 100 feet of water, providing power to the Marine Corps Base Hawaii. An anchor and cable to service the first buoy were deployed in September 2003. The buoy is expected to generate between 20 and 50 kW.

The State's premier ocean energy laboratory is the Natural Energy Laboratory of Hawaii Authority (NELHA) at Keahole Point, Kona. In 2003, the American Society of Civil Engineers selected NELHA's HOST Park Seawater Supply Pipeline as one of only six merit finalists in the 2003 Outstanding Civil Engineering Achievement competition.

The pipeline provides nutrient-rich seawater to various aquaculture business and research facilities. Some 7,000 feet long, it descends to 3,000 feet and is the largest and deepest seawater intake pipeline in the Pacific.

## Biomass

The Pacific Regional Biomass Energy Program continues to provide technical support for bioenergy projects with a \$68,861 grant received in 2003. Among the cosponsored events was a Landfill Methane workshop, held Dec. 1.

In 2003, biomass assessment reports were posted online at <http://www.hawaii.gov/dbedt/ert/biomass-assessment.html>.

The first report, "Biomass and Bioenergy Resource Assessment," provides comprehensive information on potential bioenergy resources including animal wastes, forestry operations, agricultural residues and urban waste.

The second report, "Analysis of Hawaii Biomass Energy Resources for Distributed Energy Applications," documents laboratory analyses of selected resources outlined in the first assessment.

One form of biomass, municipal waste, is a major source of energy on Oahu. The HPOWER plant, which has operated for 12 years, processed its 8 millionth ton of trash in 2003. HPOWER generates 7% of the power consumed on Oahu, reduces the amount of trash going to the landfill by 90%, and employs 150 people.

# Distributed Energy Promises Many Benefits

Distributed energy resources (DER) offer opportunities for energy savings, increased reliability, economic benefits, and environmental protection. DER can include renewable energy as well as other technologies which are not sited in a central power plant.

In 2003, *Creating Distributed Energy Opportunities for Hawaii*, a project funded by the USDOE, was completed. The report identifies the benefits of DER in Hawaii and estimates the technical potential, as well as identifying barriers and recommending actions to overcome them.

Energy storage can be an important component of a reliable energy system. SID obtained a USDOE competitive grant to help HELCO evaluate battery storage and grid management options which would allow increased penetration of DER and intermittent renewables. Project completion is expected in early 2004.

## Combined Heat, Power

Combined heat and power (CHP), or cogeneration, facilities greatly improve efficiency by recovering waste heat from on-site electrical generation to produce hot water, process heat, or absorption cooling. Over a dozen CHP systems are in operation in Hawaii; installations during 2003 included systems at Honolulu Hale, a resort on Maui, an Oahu retirement facility, and hospitals on both Kauai and the Big Island.

A CHP plant fueled by landfill gas is envisioned for the Pacific

Missile Range Facility at Barking Sands. A preliminary screening conducted by Oak Ridge National Laboratory indicates potential.

This project is funded by a \$75,000 technical assistance contract with the USDOE.

## Solar Energy

The extension of the renewable energy tax credits represented a major milestone in 2003. The income tax credits, now in place until Jan. 1, 2008, encourage Hawaii taxpayers to invest in solar thermal, photovoltaic (PV), and wind equipment.

Analyses have shown that every dollar spent by the state for the residential renewable tax credit generated \$1.82 in tax revenues. The total tax revenue effect for installations between 1996 to 2001—primarily solar water heaters—is nearly \$37 million.

There are now more than 85,000 solar water heaters statewide, the highest number per capita in the U.S. These systems have saved Hawaii consumers \$240 million, reduced oil consumption by more than 4 million barrels, and provided 1,800 jobs for Hawaii residents.

Solar installations are expected to increase on Oahu as the result of a new low-interest loan program implemented by the City and County. Loans with 0% or 2% interest rates will be available to low and moderate income households, respectively.

Solar electricity is also expand-

ing. The utility-sponsored Sun Power for Schools program provided area lighting for Iao Intermediate and a 1-kW grid-connected system for Kalaniana'ole Elementary in 2003, bringing the total number of Sun Power for Schools installations to 19.

Kauai County is analyzing the feasibility of installing PV on its renovated Civic Center.

Also, photovoltaic lights are increasing parking lot security at a transitional shelter in Kawaihae on the Big Island.

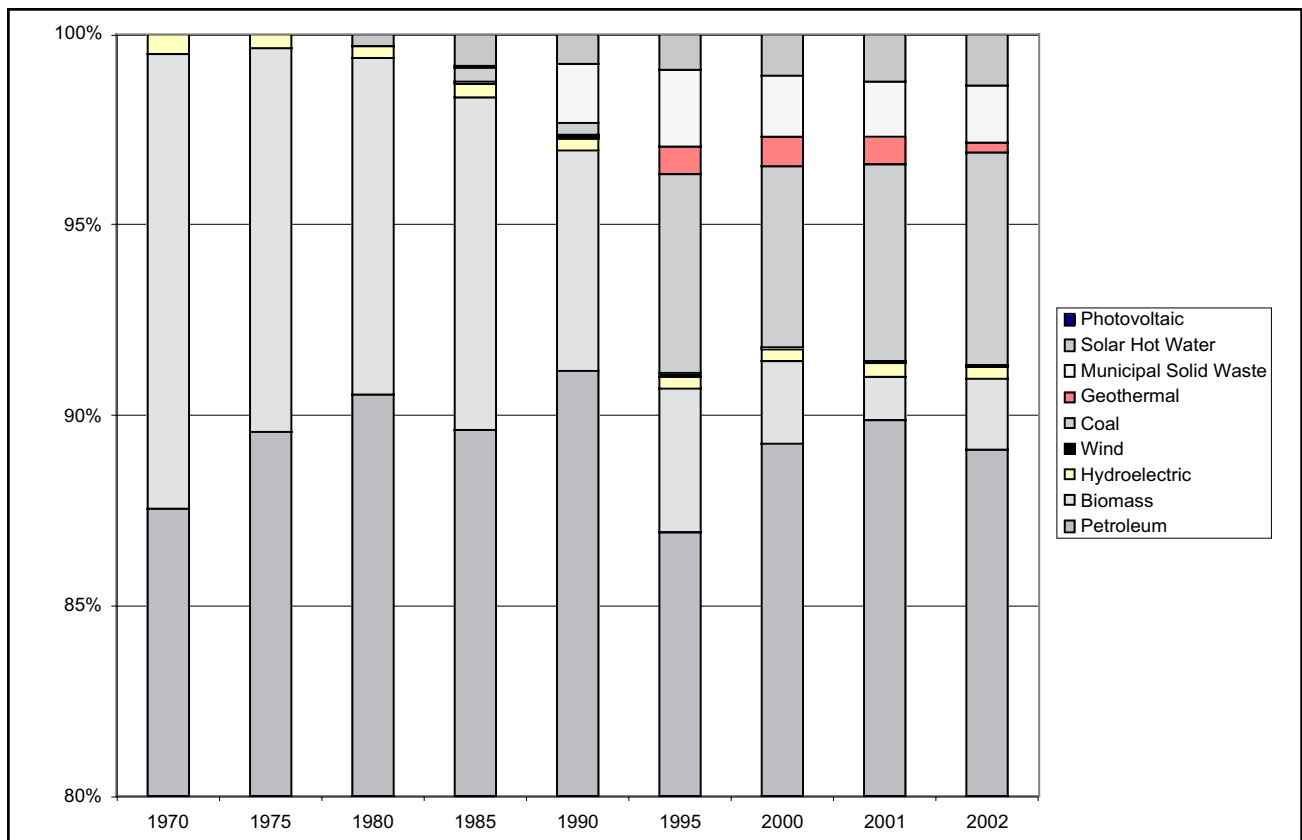
## Wind Power

High resolution wind resource maps of six major islands produced in 2003 will help potential wind developers assess the opportunities for wind energy in Hawaii. Verification is expected to be complete by mid-2004.

Available on the internet at <http://www.state.hi.us/dbedt/ert/wwg/windy.html>, the maps provide wind speeds and power densities at various heights.

A proposed Big Island wind farm moved closer to reality in 2003 when the Public Utilities Commission approved a power purchase agreement between HELCO and the developer of the planned 3 MW Upolu Point wind farm.

On Maui, GE Wind Energy and Hawi Renewable Development, Inc., received approval from the State Board of Land and Natural Resources to build a 20-MW project on conservation land along Ukumehame Ridge.



*Hawaii's Primary Energy Sources*

## Ongoing Projects Conserve Energy Through Performance Contracts

A number of projects are already reducing energy consumption in government facilities.

The Judiciary is implementing an \$1.8 million, 10-year energy performance contract focusing on lighting upgrades.

Maui Community College conducted a feasibility study on chiller consolidation and chilled water storage, analyzing five options.

The Army National Guard is implementing a \$6.5 million, 15-year performance contract encompassing improvements to lighting, maintenance and heating, ventilation, and air conditioning systems.

The University of Hawaii at Hilo is in the sixth year of its ten-year performance contract. As of June 30, 2002, the total savings due to reduced energy consumption was \$3.5 million, comparing favorably to the total investment of \$2.9 million.

Two energy performance contracts are underway at the City and County of Honolulu, one at Honolulu Hale and the other retrofitting red and green traffic lights throughout the city with LED lamps. Savings from these two projects totals \$432,000 annually; the total investment was \$4.8 million.

## Hawaii Companies Get Boost in China

Hawaii-based businesses can take advantage of a Platinum Key Service agreement between DBEDT and the U.S. Commercial Service-Beijing that supports environmental exports to China.

The agreement provides information and business development assistance to Hawaii firms related to the 2008 Beijing Olympics and beyond.

Services include market information and logistical support for conferences. An April videoconference gave more than 140 participants an opportunity to learn firsthand of export opportunities. A December trade mission offered support activities tailored exclusively for Hawaii companies.

## Efficiency Partnerships Prove Effective

Now in its sixth year, the Rebuild Hawaii program has established a network of government agencies, community, political and business leaders, private industry, nongovernmental organizations, and energy service companies.

There are 16 Rebuild America partnerships in Hawaii; Rebuild Hawaii, in which DBEDT is a major partner, is one. The program has been supported by six competitive grant awards totalling \$694,590, as well as State Energy Program funds.

The program builds public-private partnerships that will make energy efficient improvements to reduce energy costs, with savings used to modernize buildings and revitalize communities. The overall impact of the program includes:

- \$59.6 million investment in energy efficiency projects;
- \$9.7 million annual energy savings to statewide facilities;
- 824 jobs created;
- \$31 million in estimated income to the economy; and
- 54,000 tons reduction in annual CO<sub>2</sub> emissions.

Among the efforts in 2003 is an initiative by the County of Hawaii Department of Water Supply to reduce their nearly \$9 million annual electricity bill by \$2.5 million a year.

The Department has implemented part of the plan, including operating the most efficient pumps available, reducing leaks, and using off-peak power. This effort is expected to generate



\$225,000 in annual savings. A total of \$2 million has been set aside for additional improvements through fiscal year 2004-2005.

A Rebuild Hawaii analysis of the Kauai Lagoons golf course irrigation system developed strong justification for an energy efficiency retrofit with a 2.2-year pay-back. The property's new owners have been advised of this opportunity.

Using lessons learned at the Lagoon, a Pump and Motor Efficiency Workshop was offered on Kauai in March, attracting 27 public and private sector attendees.

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## Publication Wins National Recognition

"Hawaii Homeowner's Guide to Energy, Comfort and Value," a 2003 brochure published by DBEDT, was acknowledged as

## Huge Savings Projected from Model Energy Code

DBEDT, teaming up with County and private partners, has developed a Model Energy Code for residential and commercial buildings which has been partially implemented in three Counties.

The SID estimates that between 1995, when the Code was first adopted in some jurisdictions, and 2014, the Codes will:

- ◆ reduce energy costs by \$336 million;
- ◆ reduce oil imports by 5 million barrels; and
- ◆ generate \$97 million worth of investments in energy efficiency.

In 2003, the City and County of Honolulu removed a residential zoning restriction on efficient air conditioners. Kauai adopted a Code based on Honolulu's.

Best of Show during the USDOE's National Workshop on State Building Energy Codes.

The brochure provides helpful hints for residents, following the techniques developed by the Hawaii Built-Green program.

Previous publications were intended for design professionals.



# Green Businesses Conserve Both Resources and Money

The Green Business Program has brought together DBEDT, the Chamber of Commerce of Hawaii, and the Department of Health. These partners assist and recognize businesses which operate in an environmentally responsible way.

A new webpage provides program details and updates: <http://www.state.hi.us/dbedt/ert/greenbusiness/index.html>.

Due to the potential for significant resource reduction at hotels, the Green Business program has initially focused on the visitor industry.

In 2003, energy and water conservation were promoted.

The partnership has developed water conservation cards which can be placed in guest rooms, advising visitors that they may

choose to not have linens changed daily. The cards premiered during October, Energy Awareness Month.

Participation among hotels is at about 15% statewide, with new inquiries received daily. At current participation levels, an estimated 25 to 35 million gallons of water can be saved annually.

At one participating hotel, the Hilton Hawaiian Village Beach Resort & Spa, participation by guests is running around 50%.

SID is also continuing its partnership in the Hawaii BuiltGreen Alliance, which targets residences as well as commercial buildings. Architects, designers and building professionals were assisted at an October forum with information on daylighting, high efficiency lighting and other topics.

## Jobs Through Recycling Ends With Success

The Jobs Through Recycling Grant, which ended in 2003, diverted the following materials from landfills:

- ✓ 1,866 tons of furniture, equipment, and construction and demolition wastes;
- ✓ 2,700 gallons of paint;
- ✓ 8,000 tires; and
- ✓ 36,500 pallets.

The project also created six full time jobs and five spin-off jobs.

Jobs Through Recycling received \$236,000 from the U.S. Environmental Protection Agency. Other achievements included workshops on reuse and waste minimization, the establishment of materials exchange programs in several counties, and various publications.

A related affirmative procurement project helped the State increase initiatives to buy recycled products.

## Recovered Driftnets Save Wildlife, Generate Electricity

Driftnets recovered from the Northwestern Hawaiian Islands, a federal wildlife refuge, are generating electricity on Oahu.

Nets are cut loose from reefs, where they endanger marine wildlife, hauled into Kewalo Basin, sliced up by Hawaii Metal Recycling, and then burned at HPOWER. This produces enough electricity for about 40 homes for a year.

During 2003, about 130 tons of net were collected, a significant increase over previous years. Many public and private agencies are involved in this effort.



*NOAA Photo by Ray Boland*