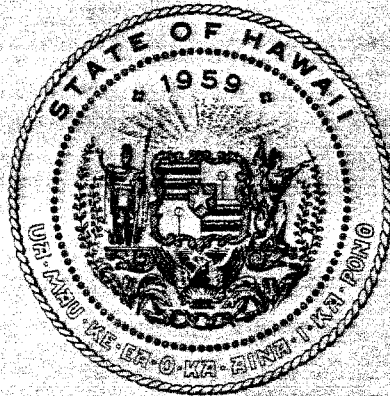


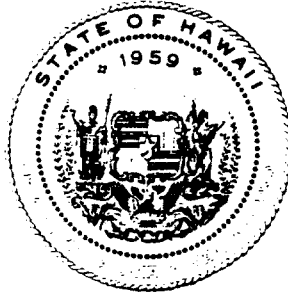
The Hawaii State Plan



ENERGY

***STATE FUNCTIONAL PLAN
1991***

The Hawaii State Plan



ENERGY

Preparation of this Functional Plan was coordinated by the
**DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT
AND TOURISM**
in accordance with Chapter 226, Hawaii Revised Statutes.

Submitted By *Murray E. Towili* Date *3/20/91*
Murray E. Towili, Director

Approved by *John Waihee* Date *May 22, 1991*
John Waihee, Governor, State of Hawaii



EXECUTIVE CHAMBERS
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JOHN WAIHEE
GOVERNOR

FOREWORD

The recent conflict in the Persian Gulf has reminded us of Hawaii's energy dependence. Ninety percent of our total energy needs are met through imported oil, making our State extremely vulnerable to changes in the world petroleum market.

We must focus our efforts on lessening our reliance on petroleum and other fossil fuels. In Hawaii, we are fortunate to have an abundance of alternative sources of energy to draw upon; and we will continue to press toward the commercial application of these indigenous, renewable energy resources. I welcome the emerging role of energy conservation as a vital and valuable energy resource in offsetting the need for increasing power supply.

One of my Administration's energy priorities is the establishment of an energy management framework: one in which public and private energy agencies and other organizations work together to ensure that our communities' energy supplies are reliable, economical, and environmentally sound. Collectively, the program initiatives in this Plan will wean us from our petroleum dependence and lead to a more secure and sustainable energy future for Hawaii.

A handwritten signature in black ink, appearing to read "John Waihee", with a long horizontal stroke extending to the left.

JOHN WAIHEE



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PREFACE

The Department of Business, Economic Development & Tourism (DBED), is charged with the responsibility of preparing the Energy Functional Plan. We have set forth in this Plan a balanced, integrated strategy designed to meet Hawaii's future energy needs through the most efficient use of all available energy resources. The Energy Plan fulfills the energy objectives in the Hawaii State Plan, Chapter 226, Hawaii Revised Statutes. It also follows the areas of concern addressed in Chapter 196, Hawaii Revised Statutes, which assigns energy responsibilities to the Director of DBED, who serves as the State Energy Resources Coordinator. These responsibilities include formulating comprehensive plans and specific proposals for the optimal development of Hawaii's alternate energy resources; the conservation and efficient use of energy; the allocation and distribution of fuels; and the coordination of government and private efforts in energy activities. Contingency planning for energy emergencies, as specified in Act 238, Session Laws of Hawaii 1984 and earlier legislation, is also addressed.

The State Energy Functional Plan has been prepared in concert with other State and County agencies and energy-oriented private groups and individuals. The Plan has been presented to the public on a Statewide basis to inform interested persons and organizations of the contents of the Plan and to receive comments and recommendations.

We are most appreciative of all the invaluable contributions of members of the State Plan Policy Council, the State Energy Functional Plan Advisory Committee, and members of the public and the staff of DBED, whose joint efforts have made this Plan possible.

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The State Department of Business, Economic Development and Tourism (DBED) appreciates the cooperation of interested citizens, private organizations, the visitor industry and agencies throughout the State and County governments in the development of the State Energy Functional Plan.

The Department expresses its appreciation to the Energy Functional Plan Advisory Committee for its guidance and help.

Finally, the Department acknowledges with gratitude the tireless efforts of numerous staff members throughout the Department of Business, Economic Development & Tourism.

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CHAPTER I

INTRODUCTION

The Hawaii State Plan, Chapter 226, Hawaii Revised Statutes, provides a long-range guide for Hawaii's future. It establishes State goals, objectives and policies and a Statewide Planning System to carry them out. This system requires the development of State Functional Plans (SFP) which are approved by the Governor. The Functional Plans guide implementation of State and County actions in the following areas: agriculture, conservation lands, education, employment, energy, health, higher education, historic preservation, housing, human services, recreation, tourism, transportation and water resources development.

In 1984-85, the Legislature adopted the first 12 Functional Plans. Revisions to five SFPs related to human needs (education, employment, health, housing and human services) occurred in 1987-88. The Governor approved the plans in 1989 in accordance with amendments to Chapter 226, HRS, which changed approval responsibility to the Governor. In 1989-90, the SFP revision process has focused primarily on the preparation of seven SFPs relating to physical resource needs and development:

<u>Area</u>	<u>Coordinating Agency</u>
Agriculture	Department of Agriculture
Conservation Lands	Department of Land and Natural Resources
Energy	Department of Business, Economic Development and Tourism
Historic Preservation	Department of Land and Natural Resources
Recreation	Department of Land and Natural Resources
Tourism	Department of Business, Economic Development and Tourism
Transportation	Department of Transportation

PURPOSE OF THE STATE FUNCTIONAL PLANS

In conjunction with County General Plans, State Functional Plans are the primary guideposts for implementing the Hawaii State Plan. While the Hawaii State Plan establishes long-term objectives for Hawaii, the State Functional Plans delineate specific strategies of policies and priority actions that need to be addressed in the short-term.

In addition, there is an increased emphasis on the implementation of programs and actions. Therefore, Functional Plans contain specific, implementable actions that can be directly related to budget items.

The purposes of the State Functional Plans with respect to Chapter 226, Hawaii Revised Statutes, are to:

- ° Identify major statewide priority concerns;
- ° Define current strategies for the functional area;
- ° Identify major relationships among functional areas;
- ° Provide the direction and strategies for departmental policies, programs and priorities;
- ° Provide a guide for the allocation of resources to carry out various State activities in coordination with County activities; and
- ° Assist in reconciling and coordinating State and County roles and responsibilities in the implementation of the Hawaii State Plan.

ROLE OF THE STATE FUNCTIONAL PLANS

Functional Plans primarily address priority actions that should be taken within a two- to six-year period. This time frame coincides with the Biennial Budget and Capital Improvement Program budgetary cycles. The plans primarily affect State operations; however, recommendations for coordinated actions at the Federal, County and private sector levels are also included.

State Functional Plans are intended to act in a coordinated fashion with County General Plans and Development Plans. Chapter 226, Hawaii Revised Statutes, states that County General Plans and Development Plans shall be used as a basis in the formulation of State Functional Plans. Conversely, the law also states that the Counties shall use approved State Functional Plans as guidelines in formulating, amending and implementing the County General Plans and Development Plans. Thus, State Functional Plans and the County General Plans and Development Plans each draw from the knowledge embodied in the other, and all are essential to implement the Hawaii State Plan. However, State Functional Plans are still not to be interpreted as law or statutory mandates, nor do they mandate County or private sector actions. The Functional Plans assure that problems and issues of statewide importance are addressed, while the County General and Development Plans indicate desired population and physical development patterns for each County, and assure that the unique problems and needs for each County are addressed.

THEME: BALANCED GROWTH

The major theme for these physical Functional Plans focusses on the promotion of a balanced growth approach in the use of our limited resources. This recognizes the need for economic development while preserving our fragile environment and multi-cultural lifestyles throughout our island State. The strategies for each SFP are aimed at initiating desired development, while at

the same time limiting or discouraging development which would impact negatively on our resource base. It also means enhancing our natural environment and cultural resources through actions aimed at protecting, preserving and promoting their significance. In order to achieve balanced growth, the Functional Plans address issues through the following interrelated elements: Resource Management which ensures the preservation and conservation of fragile, unique ecosystems and other natural physical and historical/cultural resources from loss or degradation; Resource Development which ensures the compatibility of development activities with surrounding communities and infrastructure, and ensures the diversification of economic activities to increase the viability and stability of our economic, environmental and social base; and Infrastructure and Service Supports that promote public and private partnerships for effective management and the timely provision of services and physical infrastructure.

STATE FUNCTIONAL PLAN ADVISORY COMMITTEE

Each Functional Plan has an Advisory Committee composed of State officials, County officials, members of the public from each County and experts in the particular functional area. Members are appointed by the Governor in accordance with provisions of the Hawaii State Plan, Section 226-57, Hawaii Revised Statutes.

The State Functional Plan Advisory Committee plays a major role in advising State Functional Plan agencies in the revision and implementation of the SFPs. The Committee provides an opportunity for other governmental agencies, the private sector and the public to participate in the revision process. Representation of County officials on each of the State Functional Plan Advisory Committee ensures that the SFPs take into account major concerns in each County. Once the plan has been approved, the Committee meets on a periodic basis to monitor implementation of the Functional Plan.

REVIEW AND REVISION

In order to be responsive to constantly changing needs and conditions, Functional Plans are subject to review and revision at least every two years; the timing of which is linked to the review process of the Hawaii State Plan.

In undertaking these reviews, some of the State Functional Plan agencies have developed Technical Reference Documents and/or other technical studies and resource materials which provide background information and supporting rationale for policies and actions contained in the Functional Plan.

COORDINATION

This Functional Plan document has been produced by the Department of Business and Economic Development through consultations with the State Energy Functional Plan Advisory Committee, the Office of State Planning, other affected State and County agencies, the private sector, and the general public.

The Functional Plan agencies initiate interagency coordination by identifying areas with complementary and competing interests. The review and monitoring activities conducted by their Advisory Committees provide assurance

that areas of complementary and competing relationships continue to be addressed in the implementation process.

While each Functional Plan agency develops a process for public and agency input, overall responsibility for assuring coordination among Functional Plans on a continuing basis rests with the Office of State Planning.

Each of the major participants in the SFP revision process with their corresponding functions are identified in Chart 1.

CHART 1

KEY PARTICIPANTS IN THE STATE FUNCTIONAL PLAN REVISION PROCESS ¹

PARTICIPANT	FUNCTION / ROLE	MANDATE
Governor	• Establishes Advisory Committees.	§226-55
	• Designates Functional Plan Agencies.	
	• Approves State Functional Plans (SFPs).	§226-55
	• Transmits Functional Plans to Legislature, Mayors, County Councils for information and use.	§226-56
Legislature	• Reviews approved Functional Plans to be used as guidelines for resource allocation in implementing State policies.	§226-57
Department of Budget and Finance	• Prepares guidelines for the preparation and revision of SFPs.	§226-56
	• Assures that the approved SFPs are used as guidelines in the budgetary review and allocation process.	§226-52
State Functional Plan Agency	• Responsible for preparing and updating SFP.	§226-52
	• Works with the SFP Advisory Committee, State and County agencies.	§226-55
	• Solicits public views and comments on the SFP.	§226-55
Functional Plan Advisory Committee	• Advises SFP agencies in preparing, implementing, monitoring, and updating SFPs.	§226-55
Office of State Planning	• Provides recommendations to the Governor, State and County agencies.	§226-53
	• Prepares reports and special studies for the Governor.	§226-53
	• Reports on emerging issues for use in the updating of SFPs.	§226-53
General Public	• Serves on SFP Advisory Committees.	§226-55
	• Provides comments, concerns, and input on Functional Plans to SFP agencies through public informational meetings, surveys or other agency contacts.	§226-55

¹ Based on the passage of Act 76, Session Laws of Hawaii 1991, enacted on April 30, 1991, which amended provisions of Part II of the Hawaii State Plan, Chapter 226, H.R.S.

CHAPTER II

Mission Statement

Hawaii's energy problems are both long-term and short-term. Their solutions, therefore, require both comprehensive long-term and specific short-term planning. This is especially true under today's condition of seemingly adequate oil supplies and moderate prices.

The objectives of the Hawaii State Plan in energy and energy-related areas are to achieve dependable, efficient and economical statewide energy systems capable of supporting the needs of the people, and increased energy self-sufficiency.

The commercialization of Hawaii's abundant alternative energy resources, the implementation of a wide range of energy conservation and efficiency technologies and the preparation of plans and actions to be implemented in case of an interruption of energy supplies have been the primary objectives of the State's energy programs during this Administration. However, the State also must go further to reduce our dependence upon imported fossil fuels such as oil and our vulnerability to supply disruptions. An integrated approach - one which combines and coordinates the efforts of Hawaii's public and private efforts in energy related activities - is essential to our achievement of the State's major energy objectives.

ISSUES ADDRESSED IN THE ENERGY FUNCTIONAL PLAN

The Energy Situation

Currently, there appears to be a national and local perception that petroleum is no longer in short supply, and that it will be available at reasonable cost indefinitely, and that the energy crisis of the 1970s will not recur. Such perceptions, partly brought about by moderate oil prices and abundant supply, have been followed by significant cuts in federal energy programs.

However, the fundamental facts of world and domestic petroleum supplies have not changed:

- * About 66 percent of world crude oil reserves are in the Middle East, virtually all in countries surrounding the Persian Gulf.
- * The 13 OPEC countries control over 76 percent of the world's crude oil.
- * The United States controls less than three percent of the world's crude oil.

- * Western Europe has two percent of the world's crude.
- * The U.S.S.R., Eastern Europe, China and other centrally planned economies control under 9 percent of the world's crude oil.

Oil continues to be the single most important energy source in the United States and worldwide, supplying about 39 percent of the world's energy with coal second supplying about 28 percent. The Energy Information Administration has projected oil to decline in importance to supply about 32 percent of the world's energy by 2010 as other energy sources, mainly coal and natural gas, increase in relative importance due to the increasing world demand for electricity.

United States production of crude oil peaked in 1970 and has steadily declined mainly because of low world oil prices. These low prices have discouraged domestic production and exploration and have even lead to the closure of uneconomic oil wells. In addition, as a result of these relatively low prices international oil demand has increased especially in the less developed countries.

In 1989, total U.S. imports of petroleum increased by 6.8 percent, an amount equal to 41 percent of the U.S oil demand. By the first half of 1990, oil imports into the U.S. surpassed 45% of demand. This foreign dependence is at its highest level since 1979. This trend toward greater dependence on foreign oil is expected to continue.

In Hawaii, percapita petroleum consumption has remained relatively constant at about 37 barrels per person since the mid 1980s and in fact has been lower than levels experienced during the 1970s when the state was experiencing peak consumption of over 43 barrels of oil per person. However, in 1988 this figure jumped to about 41 barrels per person a level not seen since the late 1970s and early 1980s. At this time, 1989 figures have not been finalized but preliminary results show values in the range of about 40 barrels per person. These increases may have been due mainly to the State's robust economy led by the visitor industry and healthy construction activity.

The transportation sector in Hawaii is the single largest consumer of energy and specifically of petroleum fuels, accounting for about 60 percent of total oil consumption. Airlines serving Hawaii's large visitor industry, account for the largest share (42 percent) of transportation fuel followed by ground transportation use at over 18 percent. In contrast, transportation in the U.S. as a whole accounts for only 27 percent of energy consumption. Hawaii is also unique in that air transportation is the primary transportation user of oil while in the U.S. ground transportation, particularly automobiles, is the largest user. Again, this emphasizes the State's high dependence upon oil to meet its energy needs and to support its largest industry, tourism.

The second largest users of petroleum are the electric utilities using about 13 million barrels of fuel oil and diesel annually to generate electricity. This accounts for about 26 percent of total oil consumption in the state. In the electricity sector, technologies both on the supply and demand/consumption sides are more mature and can be implemented within a shorter time frame than can those in the transportation sector. Examples of the technologies and programs in place or soon to be in place include:

demand-side management programs/technologies for energy conservation and increased energy efficiency; the implementation of a process to require energy utilities to do integrated resource planning (IRP) including demand-side management (DSM) programs; and continued research and development of alternate and renewable energy technologies such as geothermal, wind, photovoltaics, biomass, hydro and others for electricity production.

In recent years, foreign crude oil has supplied about 50 percent of demand with the remainder coming from the Alaska North Slope oil fields. Production from Alaska's North Slope oil fields are projected by the Federal Government to decline by 50% by the year 2000. Because oil supplies 90 percent of Hawaii's energy needs as opposed to 42 percent in the U.S. as a whole, the state's relative dependence on foreign oil for its energy is over twice the national average. This high dependence on oil and especially foreign oil makes Hawaii extremely vulnerable to any world disruption in oil supplies.

Since the major oil price shocks in the mid and late 1970s, the energy field as a functional area has grown in complexity. Energy issues are now, more than ever, technologically and economically integrated (or linked) with events and issues in other areas, such as the visitor industry, transportation, the environment, and the development of Hawaii's natural resources among others. Because of this there is need to develop a framework for an approach to energy development and management under which the activities of Hawaii's "energy community" would be integrated and coordinated.

These major concerns -- Over dependence upon oil and other fossil fuels; need for an integrated approach to energy development and management; energy emergency preparedness -- must be addressed. The following section summarizes problems and opportunities faced in each area.

ISSUE ASSESSMENT

One of Hawaii's major concerns, economically, environmentally and socially, is our State's dependence on fossil fuels such as oil for about 90 percent of our total energy needs. This energy provides the power that sustains our economy. Faced with an increase in oil prices over the long-term, an ever increasing dependence on foreign oil, the contribution of greenhouse gases from fossil fuel combustion and the ever-present possibility of a disruption in oil supplies, Hawaii has no other choice but to reduce its dependence on these fossil fuels.

In 1988, about \$1.6 billion was spent for energy in Hawaii and a large portion of that amount left the state to pay for imported crude and refined product. Policies which encourage energy conservation and efficiency and local production of energy can contribute directly to the economic growth and development of the State while at the same time lessen the dependence on oil. Dollars spent to purchase locally produced energy supplies circulate within the local economy. Savings through conservation and efficiency lowers expenses and become available for saving or the purchase of other goods and services. Such actions lead to the creation of expanded job opportunities, the stimulation of local industries and the expansion of the tax base to provide increased services to the residents of the State.

Because of its near total dependence upon oil to meet its energy needs, Hawaii continues to be highly vulnerable to future world, domestic and other oil supply interruptions and escalating costs. Hawaii's dependence on petroleum is about twice the national average and its consumers face energy costs which are among the highest in the country.

A reduction of our dependence on oil and fossil fuels can be achieved by a balanced combination of demand reduction through the development of conservation and energy efficiency resources and the displacement of fossil fuels with new energy sources through alternate and renewable energy resource development.

Energy Conservation and Efficiency

Energy conservation and efficiency are among the most effective means of reducing Hawaii's dependence on imported fossil fuels and overall energy demand, while lowering the operating costs of public and private facilities and transportation systems.

The development of a process by which to implement Integrated Resource Planning (IRP) has been mandated under a docket opened by the Public Utilities Commission (PUC) in January 1990. Integrated Resource Planning (IRP) is the continuing process of developing, implementing, monitoring, and evaluating a utility resource plan that identifies an optimum mix of energy resources for meeting forecasted levels of consumer energy needs, after consideration of all reasonable supply- and demand-side resources in concert with resource planning objectives.

Although the development of an IRP process may take time, implementation of demand-side management (DSM) programs by electric and gas utilities may be put in place in a relatively short period of time. Utility DSM programs can be integrated into the IRP process as these develop. Any delay to plan and implement DSM programs now could result in near-term and long-term "lost opportunities" for increased energy savings and lowered aggregate energy demand in the State. In addition, experience, information and data gained with DSM programs will make IRP that much more effective upon its implementation.

Electric and gas utility DSM programs are designed to influence customer consumption of electricity or gas in ways that will produce desired changes in the utility's load shape. These DSM programs encompass the entire range of management functions associated with directing demand-side activities, including program planning, implementation, monitoring and evaluation. Programs include conservation, energy efficiency, load management fuel substitution among others. Opportunities for DSM can be found in all customer classes including residential, commercial and industrial sectors. These conservation and efficiency programs and efforts will push forward the time when new energy supplies will be necessary because of real growth in the state's economy.

Alternate and Renewable Energy

Development of alternative and renewable energy sources is essential for the displacement of oil and other fossil fuels as Hawaii's primary energy

source. Utilization of the state's abundant resources of indigenous, non-fossil energy -- geothermal, ocean thermal (OTEC), solar thermal, photovoltaic, biomass, wind, hydropower and others -- must also be developed to provide Hawaii with a reliable, economic and secure energy supply. Assessments of environmental and social costs must be made before large scale developments take place.

Since the energy crisis in the mid-1970s, Hawaii has made progress in many alternative energy technologies. Hawaii is the site of the world's largest wind turbine. A utility-scale photovoltaic plant has been installed to investigate and demonstrate the use of PV systems in a utility setting. Our state has the highest percapita use of solar water heaters and heat pumps in the nation. Experimental plantings of many varieties of trees and other crops continue to identify the lands and species most suitable for biomass energy. Research into ocean thermal energy conversion technologies continue in Kona, at the world's premier OTEC laboratory.

However, of all the renewable energy technologies for electricity generation, only geothermal is ready, today, to provide firm, reliable electricity. It is a technology which has a proven track record throughout the world. Geothermal is the only indigenous resource, available in large quantities, which can be converted to baseload (24 hours per day) electricity and is commercially mature. It is the means by which Hawaii can best reduce its dependence on imported oil and other fossil fuels for supplying its electricity. The other alternate energy resources such as solar and wind technologies cannot yet provide firm, baseload power in sufficient quantities. Biomass, mainly from sugar plantations is the second largest source of fuel for baseload electricity production. In 1988, biomass accounted for over 35 percent of Kauai's electricity. Maui and Oahu followed with about 20 and 8 percent respectively. Because the great proportion of biomass energy in Hawaii is now tied to the sugar industry, its supply depends on continuation of the industry.

Although the transportation sector is the largest consumer of petroleum in Hawaii, the limited ability at this time to substitute other fuels for oil on a large scale forces alternate energy programs in this sector into a mid- to long-range time frame and makes federal involvement a high priority. Liquid transportation fuels, such as ethanol and methanol, derived from biomass are a potential replacement for petroleum transportation fuels. Local efforts in alternative fuels have been to support demonstration projects and initiatives in biomass-to-fuel technologies as well as small pilot demonstration programs.

Integrated Approach to Energy Development and Management

Since the mid 1970s, the energy field as a functional area has grown exponentially. In Hawaii, a host of private and public agencies and organizations has emerged whose activities involve the various aspects of exploration, research, distribution, conservation and the production of all forms of energy resources. There are also those groups concerned with the protection of the environment from negative side effects which result from the development and production of energy. Energy technologies have advanced in sophistication and new technologies have proliferated. Accordingly, there exists a clear need to initiate a program to plan for and manage this

exceedingly complex energy functional area. A comprehensive, integrated energy program must be developed to provide a framework within which Hawaii's energy objectives can be accomplished through participation of both public and private sector.

The Hawaii Integrated Energy Policy Development (HEP) Program is being designed to fulfill the above purpose. The objectives of this program are to formulate a management framework which: (a) maximizes the integration of energy related activities of major public and private energy agencies and organizations in Hawaii; and (b) enhances the State's capabilities to achieve the energy objectives in The Hawaii State Plan.

To achieve the objectives above, the HEP Program is organized into working groups with representation from both formal agencies/organizations and public groups/private citizens. The functions of the working groups are to: (a) identify issues affecting the task area; (b) clarify the issues and roles of agencies in the affected issue area; (c) determine areas of inefficiency or redundancy; and (d) develop near-, mid- and long-term policy recommendations on actions required to resolve issues, identify lead and supporting agencies responsible to implement recommended actions, estimate resources needed, and recommend projected deadlines for resolving the issues raised. A consultant has been selected to provide professional and technical services in support of implementation of the Hawaii Integrated Energy Policy Development (HEP) Program.

In this integrated approach to energy management and policy development, a process will be adopted to "level the economic playing field" to allow alternate and renewable energy resources and conservation and efficiency technologies to compete effectively against fossil fuels. Support will be given to a systematic and comprehensive determination of all costs involved in energy development for all energy technologies. These costs, normally not considered in conventional energy financing or in current resource planning processes, include environmental, health, research and development, security considerations, government subsidies and tax credits and so forth. These costs must be quantified, monetized and passed on to the consumer.

Only by considering total costs can environmental degradation, health concerns, security considerations and other external costs be factored into decisions on energy development and management in the electricity field, transportation and conservation and energy efficiency sectors and technologies.

On environmental concerns, Dr. Robert L. San Martin, Deputy Assistant Secretary for Renewable Energy, U.S. Department of Energy has suggested that "to accurately quantify and compare environmental emissions from energy technologies, each phase of the fuel cycle, including resource extraction, facility construction and facility operation must be evaluated." This "total" environmental emissions analysis methodology considers emissions on a universal basis and not only at the geographical area of the energy generating or use site.

Dr. San Martin cautions that these emissions profiles are not the only component that must be considered in any energy technology development. Information on costs, energy demand, applicability of a technology to a specific area and other environmental impacts associated with the project are

other important components which must be considered in the decision process. A policy recommendation will be made in the HEP program concerning these and other environmental impacts resulting from the development of energy technologies.

Energy Emergency Preparedness Planning

Because of Hawaii's over dependence on petroleum for 90 percent of its energy needs, plans need to be in place to ensure the maintenance of essential public services and alleviation of economic and personal hardships in the event of an emergency disruption of petroleum supplies to the islands. Existing plans and procedures must be maintained, reviewed and updated and recommendations for changes made where appropriate.

In 1988/1989, DBED embarked on an initiative to revitalize the State Energy Emergency Preparedness (EEP) Program. This revitalization project includes a complete review and update of the State EEP Plan by identifying current EEP issues and providing for their resolution as part of our review and update process. Also, as a part of our EEP Program, the State, led by the Governor and our Congressional Delegation, has stepped up its efforts to persuade the U.S. Department of Energy (DOE) to establish a 10 million barrel (90 day supply) Regional Petroleum Reserve (RPR) in Hawaii. Other options are being developed to ensure Hawaii's energy security is maintained and the effects of any petroleum supply disruption are minimized.

FUNCTIONAL PLAN STRATEGIES

The State Energy Functional Plan has three major strategies to achieve the objectives, policies and priority guidelines of the Hawaii State Plan.

1. Reduce the state's dependency on petroleum and other fossil fuels by actively demonstrating, developing and coordinating alternate and renewable energy resources and energy conservation and efficiency resources.
2. Development of an integrated approach for more effective energy development and management.
3. Initiate and carry out actions to ensure an adequate and timely supply of the national Strategic Petroleum Reserve is available to Hawaii in event of disruption in petroleum supplies. Develop and maintain emergency preparedness plans to protect public health and welfare in case of petroleum shortages.

CHAPTER III

OBJECTIVES, POLICIES AND ACTIONS

(May 1990)

The objectives, policies and actions below are considered to be of high priority in that they implement State Plan policy and priority guidelines and administrative initiatives.

ISSUE AREA: OVERDEPENDENCE UPON OIL AND OTHER FOSSIL FUELS FOR ENERGY NEEDS.

OBJECTIVE A: Moderate the Growth in Energy Demand through Conservation and Energy Efficiency.

POLICY A(1): Promote & Stimulate Greater Energy Efficiency and Conservation in Non-transportation Sectors.

ACTION A(1)(a): Provide Technical Support & Assistance to the State Government, County Governments, The PUC, and The Energy Utilities in Developing the Integrated Resource Planning (IRP) Process and Carrying Out Demand-Side Management (DSM) Assessments.

Lead Organization(s): DBED

Assisting Organization(s): DCCA, Energy utilities, parties to the IRP docket, PUC

Start Dates: Ongoing

Target Locations: Statewide

Total Budget: \$300,000 (Federal)

Comment: The particulars of this assistance will be developed as part of a collaborative effort involving the parties in the generic docket which was opened in January 1990 to investigate and implement IRP.

ACTION A(1)(b): Advance the use of Demand-Side Management (DSM) by creating pilot programs and promoting education of local energy producers and users.

Lead Organization(s): DBED

Assisting Organization(s): County governments, Electric and Gas Utilities

Start Dates: FY 1991

Target Locations: Kauai, Oahu, Maui, Molokai, Lanai, Hawaii

Total Budget: \$400,000 (Federal)

Comment: DSM is a major and critical component of the Integrated Resource planning process.

ACTION A(1)(c): Support Feasibility Analyses and Design Retrofits for Public and Private Development

Lead Organization(s): DBED
Assisting Organization(s): State and County Agencies
Start Dates: Ongoing
Target Locations: Statewide
Total Budget: \$1 million (Federal)

Comment: This program is designed to provide engineering reviews, and assessments/recommendations as well as energy saving retrofits in public and private developments using a combination of Federal, State and private funding.

Under this general program, a new project has been initiated, Dollars From Sense, which provides technical assistance and 50 percent matching funds for energy conserving retrofits for private non-profit organizations.

The retrofit funding is provided through a loan subsidy or a rebate. Dollars From Sense began with a pilot program targeting shelters for the homeless, abused women and children, and other groups requiring emergency or temporary shelter.

Upon completion of this Pilot Program during FY'91, the Dollars From Sense program will be open to approximately 900 private, non-profit agencies to assist with energy conservation technical assistance and retrofits. At that time, individual or family shelters, rehabilitation centers and shelters, community health centers, and education facilities will be given priority over other types of non-profit agencies.

ACTION A(1)(d): Provide Technical Assistance for Energy Conservation/Efficiency Projects for Residential and Commercial Projects

Lead Organization(s): DBED
Assisting Organization(s): County, State Agencies, Private Non-profit Organizations
Start Dates: Ongoing
Target Locations: Statewide
Total Budget: \$100,000 (Federal)

Comment: This program was originally created to provide technical assistance to the Housing Finance and Development Corporation (HFDC) to insure that energy efficiency is considered throughout the design and construction of the 4,000-unit, 850 acre Kapolei Village and other HFDC housing projects.

During 1989/1990, DBED contracted with a consultant team to provide energy technical assistance to HFDC and other public and private developers in the areas of plan density, transportation and utility infrastructure plans, building design, location and orientation, and landscaping, as they might affect the potential energy use within their projects. The consultant team produced "energy efficiency guidelines" that were incorporated into HFDC's request for proposals for new residential subdivisions at Kapolei.

This program will continue to provide technical assistance to public and private sector developers. This program involves working with both public and private sectors in broad-based community projects and more narrowly focused energy efficiency projects.

ACTION A(1)(e): Provide Support for Electricity Audits and Technical Analyses of County Facilities

Lead Organization(s): DBED
Assisting Organization(s): County Governments
Start Dates: Ongoing
Target Locations: Counties
Total Budget: \$200,000 (Federal)

Comment: This project consists of audits and technical analyses of county police, fire, and public works departments' water heating systems; wastewater treatment and water pumping facilities.

ACTION A(1)(f): Complete Performance Contracting Demonstration in Hawaii Housing Authority Project

Lead Organization(s): DBED
Assisting Organization(s): HHA
Start Dates: FY 1991
Target Locations: Oahu
Total Budget: \$50,000 (Federal)

Comment: Performance contracting is an agreement between the customer and contractor in which savings resulting from the installation of energy saving equipment is used to pay for the cost of the equipment. Phase I of this project, completed in 1987/1988, explored the feasibility of using performance contracting to effect energy efficient retrofits in public housing projects. Phase II is to provide technical assistance to the Hawaii Housing Authority (HHA) to develop a demonstration energy conservation project in one of their low-income housing facilities, using a performance contracting arrangement. In

1989, HHA decided to proceed with the project. DBED's consultant has finalized a request for proposals that could result in an executed performance contract in 1990. During 1990/1991 DBED will continue working with HHA, the U.S. Department of Housing and Urban Development, and our consultant.

ACTION A(1)(g): Support the Continued Implementation of the Institutional Conservation Program

Lead Organization(s): DBED
Assisting Organization(s): State and County Government, Public Care Institutions, Private Non-Profit Schools
Start Dates: FY 91, FY 92 or when funding is available
Target Locations: Statewide
Total Budget: \$60,000 (Gen Fund); \$500,000 (CIP); one million dollars (Federal)

Comment: This program implements conservation activities such as retrofitting schools, hospitals and public care institutions to reduce energy demand. The U.S. Department of Energy provides funding on a matching basis.

ACTION A(1)(h): Energy Efficiency Standards - Strengthen the government procurement practices monitoring system to ensure that individual agencies purchase energy efficient equipment.

Lead Organization(s): DAGS
Assisting Organization(s): DBED, other State agencies
Start Dates: FY 91, FY 92
Target Locations: Statewide
Total Budget: \$70,000 (Federal)

Comment: Phase I of the public school re-lamping and re-ballasting project was completed during last program year, resulting in the installation of 210,000 new lamps and 105,000 new ballasts. FY 1990 will see the purchase and installation of approximately 190,000 new lamps and 95,000 new ballasts, possibly via third party financing. In addition, the Energy Division will work closely with the other State agencies to stimulate the purchase of compact fluorescent lamps and other energy-saving lighting products.

ACTION A(1)(i): Support the Used Oil Recycling Program

Lead Organization(s): DBED
Assisting Organization(s): DOH
Start Dates: Ongoing
Target Locations: Statewide
Total Budget: \$100,000 (Federal)

Comment: During 1989/90, DBED continued its contract with the Hawaii Automotive Retail Gasoline Dealers (HARGD) in order to: 1) maintain a system of used oil collection sites and the Used Oil Hotline on Oahu; 2) provide administrative support to the State Used Oil Advisory Committee; and 3) involve the counties more extensively in establishing used oil recycling policies and practices.

In 1990/91, DBED will continue to contract with HARGD to maintain the role it has played in recycling used oil. In the absence of a State government program, and as county-run programs become operational, DBED's contract with HARGD will provide for continuity in the used oil recycling effort.

POLICY A(2): Stimulate and promote Greater Energy Efficiency and Conservation in the Transportation Sector.

ACTION A(2)(a): Provide Assistance to Counties, Regional Transportation Management Associations and Major Employers in the development of ridesharing programs.

Lead Organization(s): DBED, DOT

Assisting Organization(s): County Governments, Major employers, transportation management associations

Start Dates: Ongoing

Target Locations: Counties

Total Budget: \$50,000 (Federal)

Comment: All of the counties are in touch with the State Department of Transportation (DOT) ridesharing program and can benefit from the work done by DOT in the development of computer ridesharing software and promotional materials for the Oahu commuter market.

ACTION A(2)(b): Assist the Department of Transportation in Implementing a Rideshare Program by assisting suburban communities and the University of Hawaii in expanding their computer data bases, developing promotional materials for ridesharing on Oahu, and making preparations for a full-time, State-funded rideshare unit within DOT.

Lead Organization(s): DOT

Assisting Organization(s): DBED

Start Dates: Ongoing

Target Locations: Statewide

Total Budget: \$25,000 (Federal)

Comment: The purpose of this program is to assist the State Department of Transportation (DOT) in implementing a ridesharing program.

ACTION A(2)(c): Support the Fleet Energy Management Program designed to track operational costs and energy use by vehicle in order to make fleet operations more efficient.

Lead Organization(s): DBED
Assisting Organization(s): Fleet operators
Start Dates: Ongoing
Target Locations: Statewide
Total Budget: \$25,000 (Federal)

Comment: Program implementation is divided into three phases. Phase I was completed during FY 1987. A survey of the meetings with fleet operators culminated with an industry workshop. A reference booklet with practical ideas was provided to all participants.

Five transportation fleets are participating in Phase II of this program. During the 1988 and 1989 grant years, the fleets received technical assistance in setting up computerized energy management data collection systems and in training drivers in energy efficient driving techniques.

The implementation of Phase III will consist of the dissemination to other fleet operators of energy management information derived from the experience of the five fleets.

OBJECTIVE B: DISPLACE OIL AND FOSSIL FUELS THROUGH ALTERNATE AND RENEWABLE ENERGY RESOURCES

POLICY B(1): Displace Oil and Fossil Fuels Consumption through the Application of Appropriate Alternate and Renewable Energy Resources and Technologies.

ACTION B(1)(a): Complete a Master Development Plan and Environmental Impact Statement (EIS) to Guide Geothermal Development

Lead Organization(s): DBED
Assisting Organization(s): DLNR, DOH
Start Dates: Ongoing
Target Locations: Hawaii
Total Budget: \$1.2 million

Comment: The Master Development Plan will guide the development of the most promising geothermal resource on the Big Island. This plan will cover all aspects of the development and its effects on the community, the environment, the economy, and will be based upon public involvement. A draft conceptual Master Plan has been completed. A

programmatic EIS will be initiated in 1991 to assess the environmental impacts of the plan. Specific environmental studies are to be conducted for each phase as the project develops.

ACTION B(1)(b): Continue Geothermal Resource Verification and Characterization Program to better assess the size, nature and viability of the geothermal resource.

Lead Organization(s): DBED

Assisting Organization(s): DLNR, HNEI, HECO, Geothermal Developers, U.S. DOE, USGS

Start Dates: Ongoing

Target Locations: Hawaii

Total Budget: \$28.7 million

Comment: The State Legislature appropriated \$3 million in FY1988-89, \$2.6 million in FY 1989-90 and \$3.0 million in FY 1990-91. Developers have indicated \$4.0 million in-kind, HECO \$100,000 and EPRI \$1.0 million. In addition, \$15 million over a 3-year period is being requested of the U.S. DOE.

DBED has contracted with HNEI to drill up to 6 Scientific Observation Holes, the first of which was completed in May 1990.

ACTION B(1)(c): Assist with the Development of Geothermal First to Serve the Island of Hawaii, and then for Export if Economically, Environmentally and Socially Acceptable and Feasible.

Lead Organization(s): DBED

Assisting Organization(s): DLNR, DOH, HECO, Hawaii County, Private Sector

Start Dates: Ongoing

Target Locations: Hawaii

Total Budget: To be determined

Comment: The State is committed to support geothermal development first to serve the electricity needs of the County of Hawaii. The extent of State support for large scale geothermal development and the export of power to Maui and Oahu will be dependent on the assessment of the size, nature and availability of the resource; its impact on the environment; social acceptability; and economic feasibility. The State, in cooperation with county governments and the private sector, is addressing these concerns through the Master Development Plan and EIS Action and the Geothermal Resource Verification Program Action.

ACTION B(1)(d): Support of Governor's Advisory Board for the Geothermal/Cable Project

Lead Organization(s): DBED
Assisting Organization(s): DLNR
Start Dates: Ongoing
Target Locations: Statewide
Total Budget: \$200,000 per year

Comment: The Board was appointed by Governor Jonn Waihee in August 1987 to oversee the planning of the combined Geothermal/Cable Project, and to determine the feasibility of the project and the role the State government should play in the project. Members include top-level government, business and labor officials. The chairman is former Governor William F. Quinn.

ACTION B(1)(e): Administer the Community Assistance Fund to Assist in Mitigation of Proven Harmful Effects Resulting from Geothermal Development Activities.

Lead Organization(s): County of Hawaii, DLNR
Assisting Organization(s):
Start Dates: FY 91
Target Locations: Hawaii
Total Budget: \$250,000

Comment: The County of Hawaii will administer the community assistance fund. Revenues from the sale of steam from the HGP-A will be used to reimburse the DLNR for the \$250,000.

ACTION B(1)(f): Continue Support of Ocean Thermal Energy Conversion (OTEC) Technology

Lead Organization(s): DBED
Assisting Organization(s): U.S. DOE, Hawaii Natural Energy Institute (HNEI), Pacific International Center of High Technology Research (PICHTR)
Start Dates: Ongoing
Target Locations: Statewide
Total Budget: To be determined

Comment: Research, demonstration and commercial OTEC and OTEC-related projects are being conducted through funding from U.S. Department of Energy, State and private sources. Alcan International and the State have initiated plans to implement a 180 kW closed-cycle OTEC project. The system features a major breakthrough in OTEC heat exchanger design and construction. Additional support will be

necessary to take advantage of previous experience in this field. Larger closed-cycle OTEC systems have also been proposed.

ACTION B(1)(g): Support Solar Thermal Electricity Generation Demonstration Project

Lead Organization(s): DBED, Luz Engineering Corp.

Assisting Organization(s):

Start Dates: FY 91

Target Locations: Statewide

Total Budget: \$100,000 (Federal)

Comment: In FY 1990/91, an economic and technical location specific feasibility analysis will be funded. If indications are good, a demonstration project would be built during FY 1991/92. More than 200 MW of Solar Generating Systems (SEGS) designed and built by the Luz Engineering Corp. are operating in California and Luz has proved this technology. SEGS modules are in the 30 to 80 MW range and may be combined for larger generating capacities.

ACTION B(1)(h): Support Gasifier Project to Convert Biomass to Methanol and other products

Lead Organization(s): PICHTR

Assisting Organization(s): DBED, HNEI

Start Dates: FY 91

Target Locations: Maui

Total Budget: \$5 million (State/private); \$5 million (Federal)

Comment: A total of \$4 million has been appropriated by the 1988 and 1990 Legislature. Additional private funding is being sought to match \$5 million in Federal funding for this project. Gas can be used for electric utility fuel, sugar plantation boilers and transportation fuels.

ACTION B(1)(i): Support Demonstration Project in Selected Government and Private Business motor vehicle fleets in use of Oxygenated (Alcohol) Fuels.

Lead Organization(s): DOT, DBED

Assisting Organization(s): Federal Government, County Government, Private Business

Start Dates: FY 91

Target Locations: Oahu

Total Budget: \$10,000

Comment: Provide demonstration of the use of an environmentally benign fuel produced from an indigenous biomass renewable energy source as a replacement to imported petroleum and providing economic benefits to the State.

The project will support the State energy objectives of reducing dependence on imported petroleum, thereby improving the State's balance of trade and will serve to maintain a more healthful environment. The demonstration will establish the feasibility of converting vehicles to a renewable locally produced fuel.

ACTION B(1)(j): Support Biomass Production for Conversion to Fuels for Electrical Generation and Transportation Systems and for the Development of High Value Products.

Lead Organization(s): DBED

Assisting Organization(s): DLNR, UH-HNEI and College of Agriculture, Hawaiian Sugar Planters' Association

Start Dates: FY 91, FY 92

Target Locations: Statewide

Total Budget: \$70,000

Comment: The State of Hawaii possesses adequate land area for tree and grass production that could be converted to fuel to supply all of Hawaii's ground transportation requirements and for much of the State's electrical generation. Research, development and demonstration of various biomass species is needed to identify those most suited and productive for various locations throughout the State.

ACTION B(1)(k): Support Biomass and Biowaste Conversion Technologies.

Lead Organization(s): DBED, Hawaii Natural Energy Institute (HNEI)

Assisting Organization(s):

Start Dates: FY 91 or when funding is available

Target Locations: Oahu

Total Budget: \$75,000 CIP

Comment: With the rapid filling of the state's landfills with municipal waste, including tree and grass trimmings and waste from livestock feedlots, alternative means of disposal are necessary. These programs will support research & development of technologies so that wastes can be recycled and converted to electricity, fuels and other valuable products.

ACTION B(1)(1): Expand Upon the Existing 20 kW Photovoltaic Utility-Scale Application (PVUSA)

Lead Organization(s): DBED
Assisting Organization(s): MECO, U.S. DOE
Start Dates: FY 91, FY 92
Target Locations: To be determined
Total Budget: To be determined

Comment: The 20 kW PVUSA system operating on Maui is principally sponsored by DBED, Maui Electric Company, Energy Conversion Devices, Maui Economic Development Board, and the U.S. DOE. The California Energy Commission, Electric Power Research Institute and the Pacific Gas and Electric Company are providing additional support. The PVUSA program is designed to demonstrate photovoltaics in a utility setting.

ACTION B(1)(m): Continue to Support the Operation of Energy Research Facilities such as the Hawaii Natural Energy Laboratory of Hawaii.

Lead Organization(s): DBED
Assisting Organization(s): U.S. DOE, PICHTR
Start Dates: Ongoing
Target Locations: Big Island
Total Budget: \$2.2 million

Comment: The Hawaii Natural Energy Laboratory (NELH) at Keahole, Hawaii, is the site of the world's foremost testing facility for Ocean Thermal Energy Conversion (OTEC) projects and OTEC-related activities. OTEC-related activities include use of pure, cold, nutrient-rich seawater for commercial aquaculture production. Support of such energy research centers is vital to keep Hawaii in the forefront of alternate and renewable energy development.

ACTION B(1)(n): Support Projects for the Generation of Energy from Farm-generated Wastes and Municipal Wastewater.

Lead Organization(s): DBED, Counties
Assisting Organization(s):
Start Dates: FY 92, FY 93 or when funding is available
Target Locations: Statewide
Total Budget: To be determined

Comment: In addition to being economically attractive and currently technologically feasible, increased energy self-sufficiency of waste treatment operations will reduce Hawaii's dependence on

imported petroleum as well as the potential impact of petroleum supply disruption or shortage.

Wastewater treatment and the sanitary disposal of other types of waste are essential for the maintenance of public health and welfare. According to Hawaii's Fuel Requirements for Essential Services, the sanitation sector, including sewers and refuse collection/disposal, are a Priority 1 in the case of an energy emergency.

Several ongoing and planned projects, funded by oil-overcharge and State funds, will provide a basis for further development of this plentiful resource on all islands.

Wastewater treatment alone consumes approximately 35 million kilowatt hours of electricity each year. Energy from digester gas can typically supply 25 to 50 percent of the electrical needs of secondary treatment.

ACTION B(1)(o): Support and Demonstrate Hybrid Energy Systems for Firm Power Generation.

Lead Organization(s): DBED
Assisting Organization(s): UH-HNEI, PICHTR
Start Dates: FY 91, FY 92
Target Locations: Statewide
Total Budget: To be determined

Comment: Produce firm power through a combination of non-baseload energy technologies such as wind/pumped hydro energy storage, wind/diesel, fuel cells and other renewable energy options.

ACTION B(1)(p): Support Hydrogen Production from Renewable Energy Sources.

Lead Organization(s): DBED
Assisting Organization(s): UH-HNEI, PICHTR
Start Dates: FY 92, FY 93
Target Locations: Statewide
Total Budget: To be determined

Comment: Although hydrogen is not viewed as a near-term commercial fuel due to its explosive nature and high cost, it is considered an environmentally benign fuel which warrants further research development and demonstration. It may become economical when produced from low cost sources of renewable energy.

ACTION B(1)(q): Support Expanded Commercialization of Photovoltaics and Other Solar Technologies for Electricity, Transportation, Air Conditioning, Refrigeration, Desalination, Dehumidification and Cogeneration.

Lead Organization(s): DBED
Assisting Organization(s): UH-HNEI, PICHTR
Start Dates: FY 92, FY 93
Target Locations: Statewide
Total Budget: To be determined

Comment: The abundance of solar radiation in Hawaii makes the full development of this energy resource of prime importance toward attaining greater energy independence for the state. Increased research development and demonstration should be focused on commercial applications of solar energy.

OBJECTIVE C: PROMOTE ENERGY EDUCATION AND LEGISLATION

POLICY C(1): Support Energy-related Educational Programs and Activities which Focus upon Professionals in the Energy Field, Schools and General Public.

ACTION C(1)(a): Support Promotion and Public Education of Integrated Resource Planning (IRP)

Lead Organization(s): PUC
Assisting Organization(s): DBED, Electric and Gas Utilities
Start Dates: Ongoing
Target Locations: Statewide
Total Budget: \$150,000 (Federal)

Comment: The Public Utility Commission will use funds to educate participants in the potential use of IRP in Hawaii.

ACTION C(1)(b): Support Geothermal, Other Alternate and Renewable Energy Resources and Energy Conservation and Efficiency Education and Public Information and Outreach Programs

Lead Organization(s): DBED
Assisting Organization(s):
Start Dates: Ongoing
Target Locations: Statewide
Total Budget: \$75,000 (Federal)

Comment: Service to be provided entails a proactive public information program to present factual information to the public on the State's efforts to develop geothermal energy in an efficient and environmentally acceptable manner. Included will be an emphasis on the State's support of and progress in the development of other renewable energy

technologies along with conservation programs including demand-side management and integrated resource planning.

ACTION C(1)(c): Assist in the Development of Energy-Related Educational Programs.

Lead Organization(s): Department of Education
Assisting Organization(s): DBED
Start Dates: Ongoing
Target Locations: Statewide
Total Budget: \$140,000 (Federal)

Comment: Energy-related educational programs will be developed that complement the existing goals and objectives of the State Department of Education's approved instructional materials. Books, supplemental materials and activities will be produced to ensure that alternate energy, energy conservation/efficiency, and energy policy planning developments are incorporated into existing school curriculum.

Examples of projects that support these objectives are: teacher training workshops; lesson plans and energy-related activities for grades K-12; poster and essay contests; and videotape programs.

ACTION C(1)(d): Support the University of Hawaii's Curriculum Research Development Group in development of energy-related materials for secondary schools under the Developmental Approaches for Science and Health (DASH) Program.

Lead Organization(s): UH Curriculum Research Development Group, Department of Education
Assisting Organization(s): DBED
Start Dates: Ongoing
Target Locations: Statewide
Total Budget: \$165,000 (Federal)

Comment: The DASH project is producing a seven-year sequence of educational materials for kindergarten through grade 6. A major energy component is included in its studies of the biological, earth, and physical sciences and the health, agricultural, manufacturing, transportation, communication, and other technologies. DBED funding has supported writing of the energy materials in Phase I--writing and support for the purchase of materials in Phase II.

Funding of Phase III of the Developmental Approaches to Science and Health (DASH) project will involve providing classroom sets of the DASH project materials and teacher training workshops to teachers statewide.

ACTION C(1)(e): AIA Energy Education Program. Develop and Implement an Education Program among Design Professionals to Teach and Promote Energy Efficient Design.

Lead Organization(s): DBED, AIA
Assisting Organization(s): Engineering and development firms
Start Dates: Ongoing
Target Locations: Statewide
Total Budget: \$250,000 (Federal)

Comment: The American Institute of Architects, Hawaii Chapter (AIA/HC) project is developing and implementing an educational effort among architects, design professionals and other interested parties from the building industry in the State to teach and promote energy efficient design in new and renovated buildings. A design guidebook has been completed, and slide show seminars are being conducted.

In the new grant year, the AIA will develop a computerized design tool that will help architects, engineers and developers to comply with any new County building codes.

POLICY C(2): Promote Legislation and Other Measures to Encourage, Support and Provide Incentives for Energy Conservation and Efficiency and Alternate and Renewable Energy Resources.

ACTION C(2)(a): Develop Building Efficiency Standards in Building Codes and State Appliance Standards to Achieve Greater Energy Efficiency in buildings and facilities.

Lead Organization(s): DBED, DAGS
Assisting Organization(s): State and County Governments
Start Dates: FY 91
Target Locations: Statewide
Total Budget: \$60,000 (Federal)

Comment: The purpose of the Building Energy Efficiency Standards (BEES) project is to improve energy efficiency in new and renovated buildings. At the present time, Hawaii statutes require Counties to follow Article 8 of the Uniform Building Code as amended, and to consider new codes as they may be promulgated. A new energy code for Hawaii is being developed based on ASHRAE 90.1P and the California Energy Code. The proposed code has been reviewed and will be revised under a new contract to reflect the latest changes per ASHRAE and the California Energy Code. The proposed code will be tested for Hawaii conditions. Feedback will be solicited from the general public, building industry design professionals and government agencies. The scope

of the new contract also includes an assessment of the potential gross effect the proposed code would have on future energy consumption. An assessment and life cycle cost analysis will also be completed for the different sectors as well as for specific buildings.

ISSUE AREA: NEED FOR AN INTEGRATED ENERGY MANAGEMENT AND DEVELOPMENT PROGRAM.

OBJECTIVE D: Support and Develop an Integrated Approach to Energy Development and Management.

POLICY D(1): Develop an Integrated Energy Management Development Program by which Hawaii's Energy Objectives can be Facilitated.

ACTION D(1)(a): Implement the Hawaii Integrated Energy Policy Management Development (HIEP) Program.

Lead Organization(s): DBED

Assisting Organization(s): PUC, Oil Companies, State Agencies,
Environmental Groups, Other
Private Sector

Start Dates: Ongoing (Review/update every 2 years)

Target Locations: Statewide

Total Budget: \$150,000

Comment: The objectives of this program are to formulate a State energy policy which: (a) maximizes the integration of energy related activities of major public and private energy agencies and organizations in Hawaii; and (b) enhances the State's capabilities to achieve the energy objectives of The Hawaii State Plan. These objectives are:

- o Increased energy self-sufficiency; and
- o Dependable, efficient and economical energy systems capable of supporting Hawaii's needs.

To achieve the objectives above, the HEP Program is organized into working groups with representation from both formal agencies/organizations and public groups/private citizens. The functions of the working groups are to: (a) identify issues affecting the task area including economic, social and environmental costs; (b) clarify the issues and roles of agencies in the affected issue area; (c) determine areas of inefficiency or redundancy; and (d) develop near-, mid-, and long-term policy recommendations on actions required to resolve issues, identify lead and supporting agencies responsible to implement

recommended actions, estimate resources needed and recommend projected deadlines in resolving the issues raised.

ACTION D(1)(b): Assist in the development of mechanisms -- through Integrated Resource Planning (IRP), the Hawaii Integrated Energy Policy Development Program (HEP) or other interagency efforts -- to assess and mitigate potential impacts of energy exploration, production or development.

Lead Organization(s) DBED

Assisting Organization(s): DLNR, DOH, Counties

Start Dates: FY 92

Target Locations: Statewide

Total Budget: Operating funds

Comments: Assessment of potential environmental impacts and development of mitigating actions are essential early in the energy planning process. For example, exploration for geothermal energy may involve temporary environmental impacts that can be mitigated. Once activities are underway, monitoring and enforcement should be in place to assure compliance with mitigation plans.

ISSUE AREA: ENERGY EMERGENCY PREPAREDNESS.

OBJECTIVE E: Ensure State's Abilities to Implement Energy Emergency Actions Immediately In Event of Fuel Supply Disruptions. Ensure Essential Public Services are Maintained and Provisions are made to Alleviate Economic and Personal Hardships which May Arise.

POLICY E(1): Maintain, review and manage the State Energy Emergency Preparedness (EEP) Plan.

ACTION E(1)(a): Provide for Energy Emergency Planning and Management Consultant Services for emergency planning; issue identification and resolution; development of economic impact models to forecast and determine economic impact of oil supply disruptions.

Lead Organization(s): DBED

Assisting Organization(s): State & County Agencies & petroleum industry

Start Dates: Ongoing (Review/update every 2 years)

Target Locations: Statewide

Total Budget: \$85,000

POLICY E(2): Ensure that Hawaii Receives an Adequate and Timely Supply of Oil from the National Strategic Petroleum Reserve in Event of Oil Supply Disruption.

ACTION E(2)(a): Continue to Pursue the establishment of a Hawaii Regional Petroleum Reserve and Options Which Would Insure Hawaii Receives Oil from the SPR in Event of Supply Disruption.

Lead Organization(s): DBED

Assisting Organization(s): Hawaii's Congressional Delegation,
Oil Industry, Hawaii State
Department of Defense

Start Dates: FY 91 or when funding is available

Target Locations: Oahu

Total Budget: \$150,000 (State and Federal)
\$652,000 (CIP)

Comment: The purpose is to pursue the establishment of a Hawaii RPR with appropriate Congressional and Federal officials and to obtain the support and federal funds for the RPR. This follow up will include, but not be limited to, contracting for legal services to draft RPR legislation at both State and Federal levels, and contracting an assessment of Hawaii's fossil fuel supply sources futures to enable the State to further justify the RPR and make other energy security plans as appropriate. Also, preliminary environmental review, site selection, planning and design work on a Hawaii RPR will be conducted in support of the development of a proposal for Hawaii to be the site of a U.S. DOE 3-year pilot project.

This project is implementing a strategy to negotiate with the U.S. DOE for the establishment of the RPR, while working with Hawaii's Congressional Delegation to coordinate the State's legislative and administrative actions being taken to establish the RPR project.

LIST OF ACRONYMS

The following is a list of acronyms of various organizations and agencies referred to in this plan.

AIA	American Institute of Architects
BLNR	State Board of Land and Natural Resources
DBED	State Department of Business, Economic Development & Tourism
DCCA	State Department of Commerce and Consumer Affairs
DLNR	State Department of Land and Natural Resources
DOH	State Department of Health
DOT	State Department of Transportation
ERC	Energy Resources Coordinator
EES	Energy Extension Service
HECO	Hawaiian Electric Company
HEI	Hawaiian Electric Industries
HELCO	Hawaiian Electric Light Company
HERS	Hawaiian Electric Renewable Systems
HNEI	Hawaii Natural Energy Institute
HSPA	Hawaiian Sugar Planters' Association
MECO	Maui Electric Company
NELH	Natural Energy Laboratory of Hawaii
PICHTR	Pacific International Center for High Technology
PUC	Public Utilities Commission
UH	University of Hawaii
U.S. DOE	United States Department of Energy
USGS	United States Geological Survey